



InBody

USER'S MANUAL

InBody520 USER'S MANUAL

Thank you for purchasing the InBody520.

Please read this manual carefully and operate with care.

Make sure to keep this manual for future reference.

BIOSPACE

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Introducing the InBody520

Body Composition consists of 4 major components: Water, Protein, Minerals and Fat. These four elements are the fundamental ingredients the body is comprised of, and it is important for them to be balanced. Body composition analysis is expected to quantify and measure these components.

In the past, diagnosing obesity was focused on how we looked on the outside, without considering the balance of body water, protein, body fat and minerals. From the health point of view, body composition analysis that takes into account the balance between body water, protein, body fat and mineral makes more sense than diagnosing obesity based on how we look. In addition, this is where the body composition analyzer with high precision comes in.

Since 1996, Biospace has developed its resources and technology and has been recognized worldwide for its efforts. Biospace has upgraded its InBody system and has developed the InBody520.

With direct segmental measurement, the InBody520 guarantees high accuracy and reproducibility. The InBody520 yields accurate results unique to the individual, regardless of empirical estimations and reliably evaluates the effectiveness of nutrition control and exercise prescription. In addition, sophisticated design and measurement instructions with advanced display allows for convenient use.

Biospace is committed to creating advanced equipment to promote good health and a long life.

Kichul Cha, CEO



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How to use this manual

This user's manual explains the functions of the InBody520.

Follow the instructions below for effective use.

1. Please read this manual thoroughly before you use the InBody520 and use it with proper operation.
2. Take a few moments to look at the pictures to understand the configuration of this product.
3. If you have clinical issues while using the InBody520, please contact us using the e-mail address as shown below.

E-mail :USA@biospaceamerica.com

4. Read warning symbols, precautions and note carefully. The followings are the visual representations of these symbols.



WARNING

Important information to warn you of situations which may cause major injury and/or damage to property if instructions are not carefully followed.



CAUTION

Important information to warn you of situations which may cause minor injury and/or damage to property if instructions are not carefully followed.



NOTE

Important and helpful information for operation.

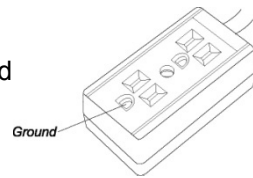
Safety Information



1. Do not use this equipment in combination with the following electronic medical devices.

- Medical devices, such as a pacemaker
- Electronic life support systems, such as an artificial heart/lung
- Portable electronic medical devices, such as an electrocardiograph.

2. This product should always be placed on the ground and plugged into a secure electrical outlet.



3. Physically disabled persons or children should not attempt to take measurements alone, but instead should get help by having a guardian hold them from the side or the back not to slip in case of improper measurement.

4. Do not insert and remove the power cord with wet hands.

5. Do not jump or give physical shock on the foot plate, this may cause an incorrect measurement or malfunction.

6. To prevent fire or breakdown, please use a socket connected to appropriate power supply (100-240VAC). If the socket has several terminals, a socket or extension cable with enough electric capacity should be used.

7. To avoid electric shock, be sure to avoid contact between this product and other devices.

8. Use caution when raising or folding the stand portion of the equipment to avoid injury. When the stand portion is raised, do not touch the joint part by hand or with any other part of the body. There is a danger of hands or other parts of the body getting jammed in between the joints.

9. Do not dismantle the equipment or open the back cover. Internal parts are not for customer use. If the equipment is dismantled, the warranty is void, and service costs will be charged. If service is required, contact Biospace or the supplying agency.

10. Follow local government ordinances and recycling plans regarding the disposal or recycling of device components.

11. This device should not be used on pregnant women. Besides providing readings that may be inaccurate, the effect on the fetus is unknown.



1. Cross Contamination

Individuals with any kind of contagious disease or infection must not use or come in contact with the foot plate or this product. Please be sure to clean the foot plate with appropriate disinfectant after each use. Never pour any liquid directly on the foot plate, as it may leak and cause internal damage. Use a soft cloth and appropriate ethyl alcohol to wipe off the foot plate. Do not wipe the foot plate with strong chemicals.

2. Test result's interpretation and prescription

Do not start weight control or exercise therapy without physician's prescription or expert's advice. Misguided self-diagnosis may harm your health. If you are pregnant, please consult with your physician or an expert before use.

3. Other equipments

Please block electromagnetic interferences from other equipment. It may lead to inaccurate test results or error.

-
4. This product must be installed on a flat and non-vibrating floor. If the floor is not even, it will affect a risk of faltering when making measurements and cause incorrect measurement.
 5. Make sure you use the AC adaptor provided by Biospace. Using of other AC adaptor may cause the malfunction or breakdown of the product.
 6. Be careful not to spill or drop any residues of food or beverages on this product. It may cause serious damage to the electronic components.
 7. Do not move your body during measurement for accurate test results.
 8. The arm consists of a hand electrode. Do not force the arm in the wrong direction. The resulting damage may affect the functioning of the internal cable and circuit board.
 9. Be careful not to hurt your fingers on the edge of the Foot Plate when handling the leveling screws.



NOTE

1. Wrong installation contrary to this manual's guidelines can cause error or inaccurate test results. Also other equipment interference can also be a cause. To solve the interference problem, you should
 - Separate power supply from other equipment that may cause interference.
 - Space out the equipment in the room.
 - Use power supply different from the one for the equipment.
 - Please contact Biospace if the problem continues.

2. Excessively high or low temperatures, humidity and pressure may have some effect on the equipment's operation and cause error. Please use the equipment within the suggested specification range for equipment use.

3. While moving, installing, or using this product, be sure to protect it against any physical shock or damage. Always use the packing material and the original box when moving or transporting this product.

4. Use this equipment only for the purpose of body composition analysis.




5. Repair and examination should be conducted only by Biospace's professional A/S staff. Please contact Biospace if needed.

6. The InBody520 fulfills the Standards of IEC60601-1(EN60601-1), Safety of Electric Medical Equipment. In addition, the InBody520 complies not only with Level A for Noise Immunity, but also with Level A for Noise Emission by the Standard IEC60601-1-2(EN60601-1-2), Electromagnetic Compatibility Requirements.








7. The InBody520 has been designed, manufactured, and inspected under the full quality assurance system of Biospace. Biospace fulfills the international standardization system, ISO 90001 and ISO 13485.


Indicators & Safety Symbols

A. Indicators

	9pin Serial port, Female (RS-232C)
	Ethernet port (10T Base)
	USB port

B. Safety Symbols

	Warning / Caution / Note
	BF Type Equipment
 12V $\overline{\text{=}}$, 3.5A	Adapter
	Power On
	Power Off
	Direct current
	Date of manufacture

 Use the adapter provided/recommended by Biospace. (Adapter; JEC Korea Corp., MW160)
For 120V input power, use only UL Listed detachable power cord with NEMA configuration 5-15P type, hospital grade plug(parallel blades).
For 240V input power, use only UL Listed detachable power cord with NEMA configuration 6-15P type hospital grade plug(Tandem blades).

C. Care Marks on the Box



Move the equipment parallel to the ground



CE mark



This way up



Stack up to 4 boxes



Keep dry



Fragile-handle with care



No Hooks

D. Others



Disposal of old Electrical/Electronic Equipment

(Application in the European Union and other European countries with separate collection system)



This symbol indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment. For more detailed information about recycling this product, please refer to local government ordinances and recycling plans.



NOTE

Follow local government ordinances and recycling instructions regarding disposal or recycling of device components, including batteries.

Workplace Requirements

□ Operation Environment

Temperature range	10 ~ 40 °C (50°F ~ 104°F)
Relative humidity	30 ~ 75 %
Atmospheric pressure range	70 ~ 106 kPa

□ Transport and Storage Environment

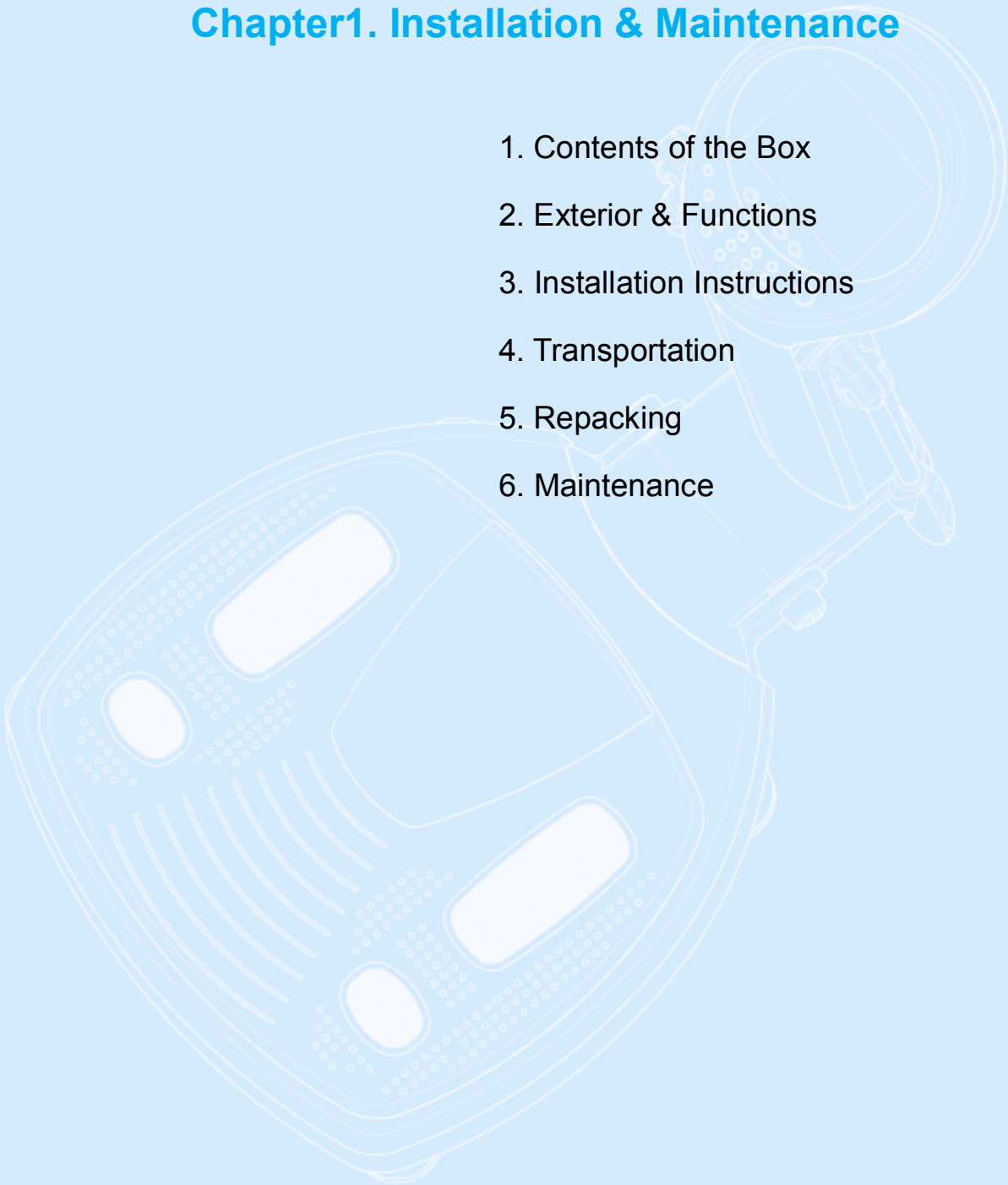
Temperature range	-20 ~ 70 °C (-4°F ~ 158°F)
Relative humidity	10 ~ 95 % (No condensation)
Atmospheric pressure range	50 ~ 106 kPa

□ Adapter

Power Input	AC 100 - 240V, 50/60Hz, 1.2A
Power Output	DC 12V, 3.5A

Chapter1. Installation & Maintenance

1. Contents of the Box
2. Exterior & Functions
3. Installation Instructions
4. Transportation
5. Repacking
6. Maintenance



1. Contents of the Box

When opening the box, make sure all of the following items are inside.

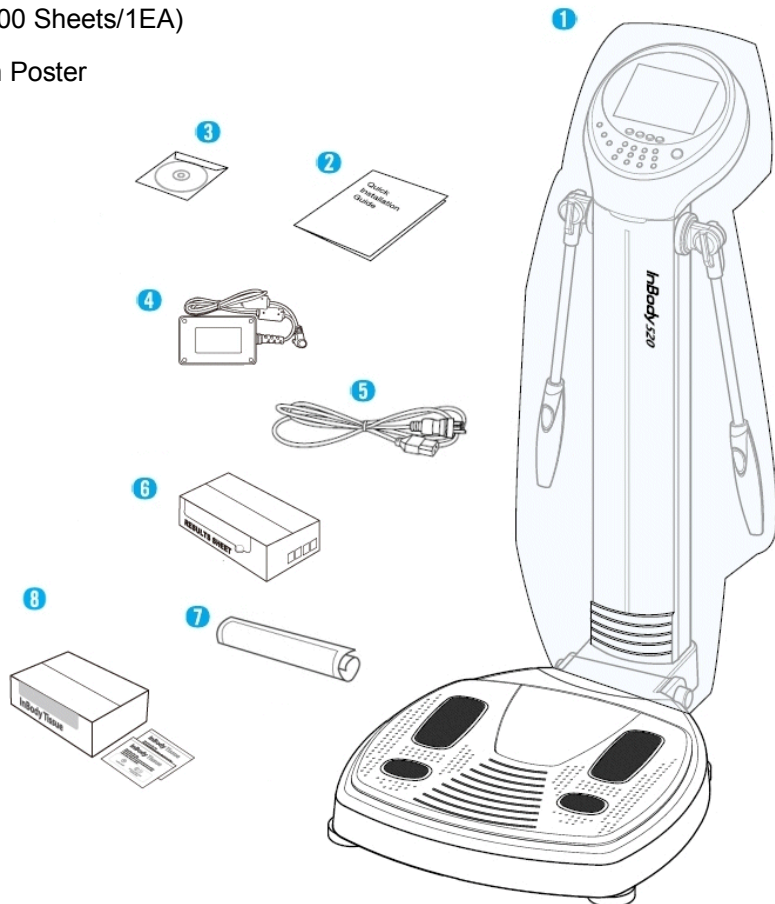
A. Included Items

Basic

- ① InBody520
- ② InBody520 Quick Reference □ 1EA
- ③ User's Manual CD
- ④ Adapter (12V, 3.5A) 1EA
- ⑤ Power cable 1EA

Optional

- ⑥ Result sheet 1Box (300 Sheets/1EA)
- ⑦ Results Interpretation Poster
- ⑧ InBody Tissue



B. Package

(1) Package Box

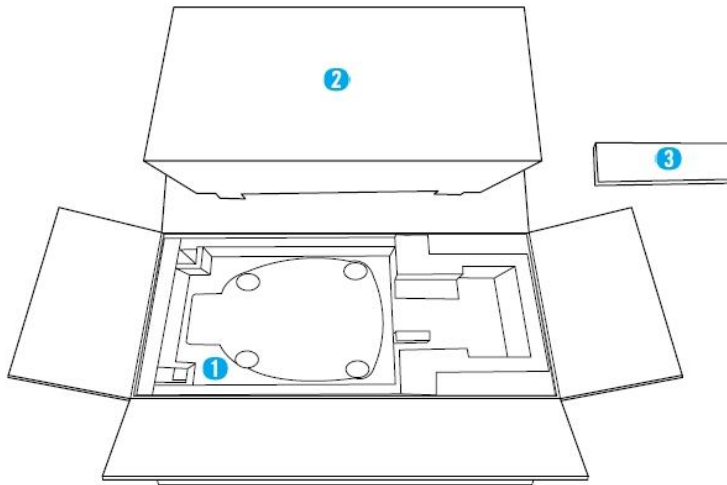
① Box size: 24.4(W) × 44.1(L) × 17.3(H) unit: in.

(2) Packing Pad

① Bottom Pad 1EA

② Top Pad 1EA

③ Rectangular Pad (1EA)



To prevent physical shock, use Biospace's packing material when shipping or transporting the equipment. Refer to Chapter 1, Section 4: "Transportation."

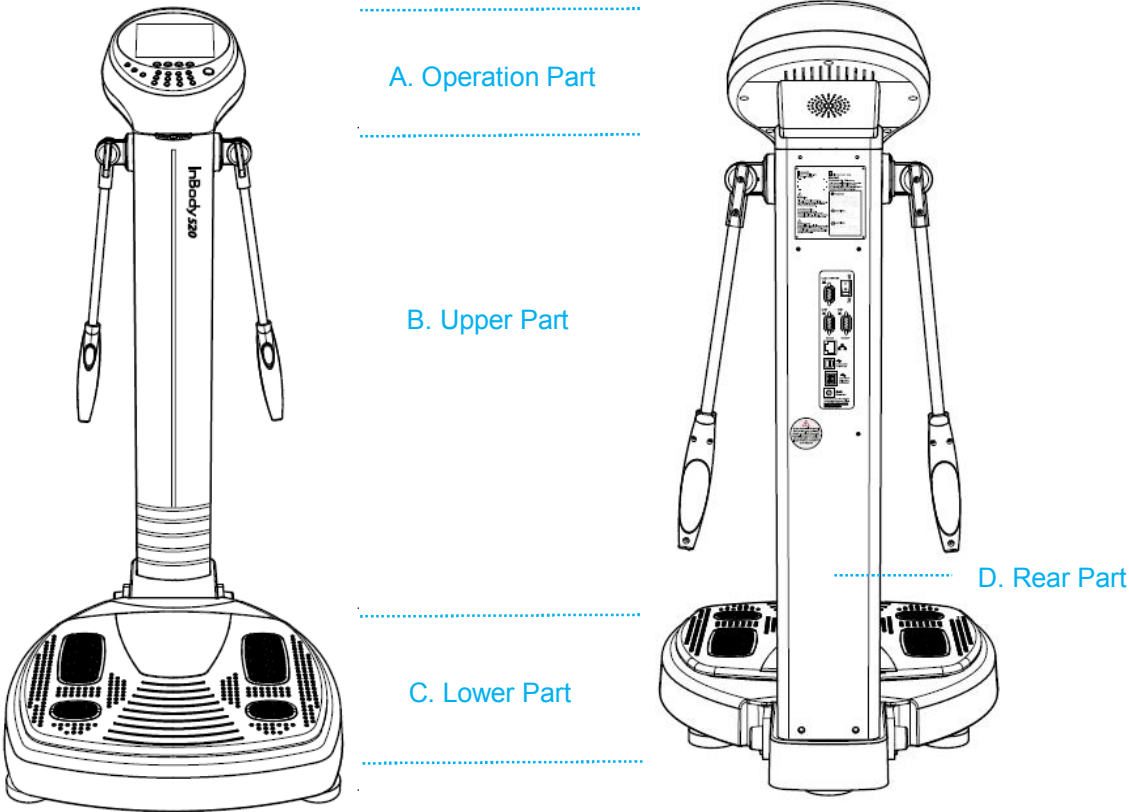


Save the wrapping material after unpacking for the event of relocation.

2. Exterior & Functions

Individual part identification and functions with schematic sketches are provided below. Please inspect each component of the InBody520 before installation to ensure there are no scratches or damage.

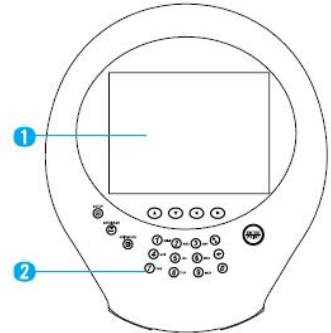
- A. Operation Part
- B. Upper Part
- C. Lower Part
- D. Rear Part



A. Operation Part

① LCD Monitor (640×480 TFT Color LCD)

This displays the analysis procedure, messages, and results.



② Key Pad (20 buttons)

The keypad is divisible into input buttons and function buttons. These are used to input the data required for body composition analysis, to set up the operating environment, and to print out test results.

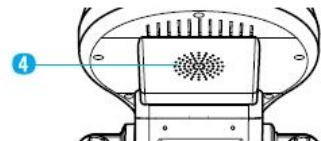
③ LED

The LED indicates the current status of the equipment. It is on during measurement or at the home screen.



④ Speaker

A signal sound informs users of the status, for the process or completion of measurement.



B. Upper Part

① Thumb Electrode

Activated by placing the thumb on the thumb electrode, allowing current to flow through the body during measurement.

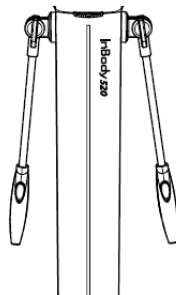
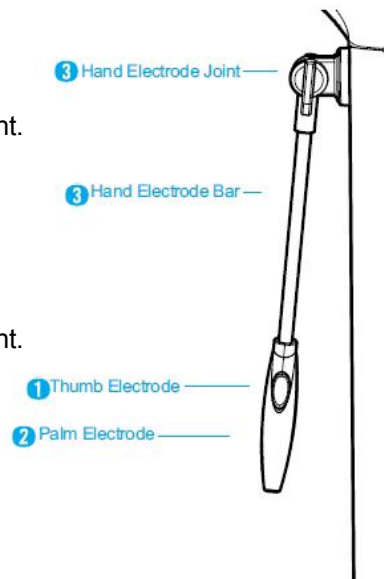
② Palm Electrode

Activated by wrapping the palm around the electrode, allowing current to flow through the body during measurement.

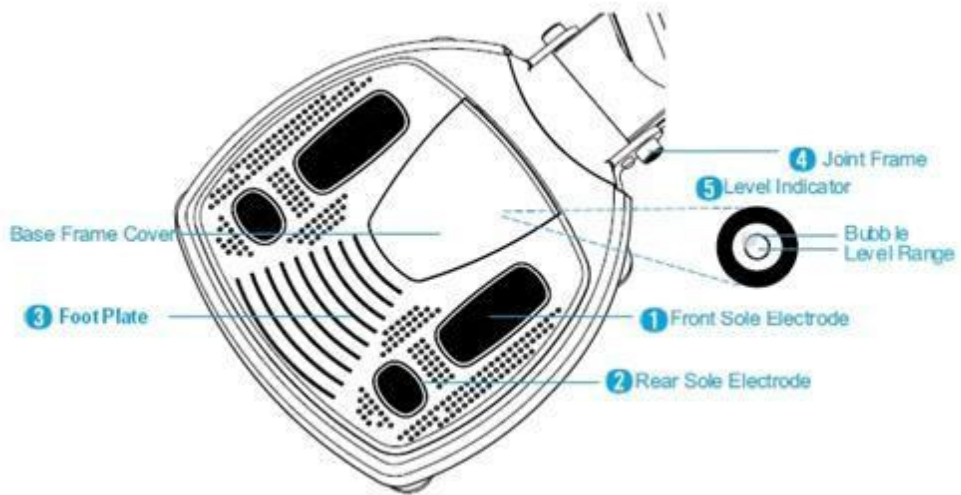
③ Hand Electrode Joint and Hand Electrode Bar

Supports hand select rode and contains electrical wires.

④ Body Stand



C. Lower Part



① Front Sole Electrode

Activated by placing the forefoot directly on the front sole electrode.

② Rear Sole Electrode

Activated by placing the heel of the foot directly on the rear sole electrode.

③ Foot Plate

The load cell, which measures body weight, is underneath the foot plate.

④ Joint Frame

Connects the upper part and the lower part.

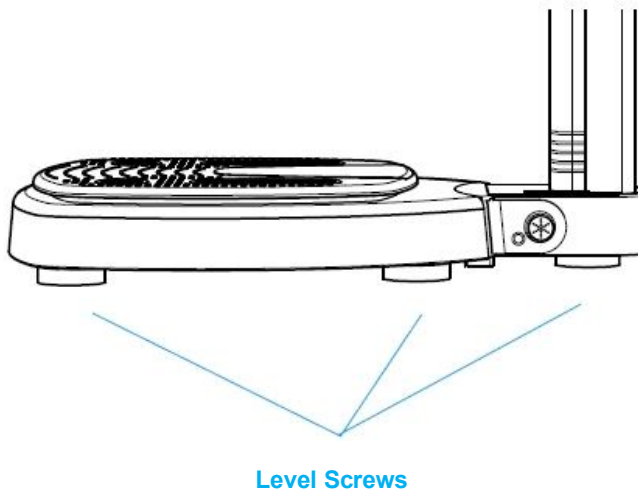
⑤ Level Indicator

Used to level the InBody520 by means of a bubble alignment.



⑥ Level Screws

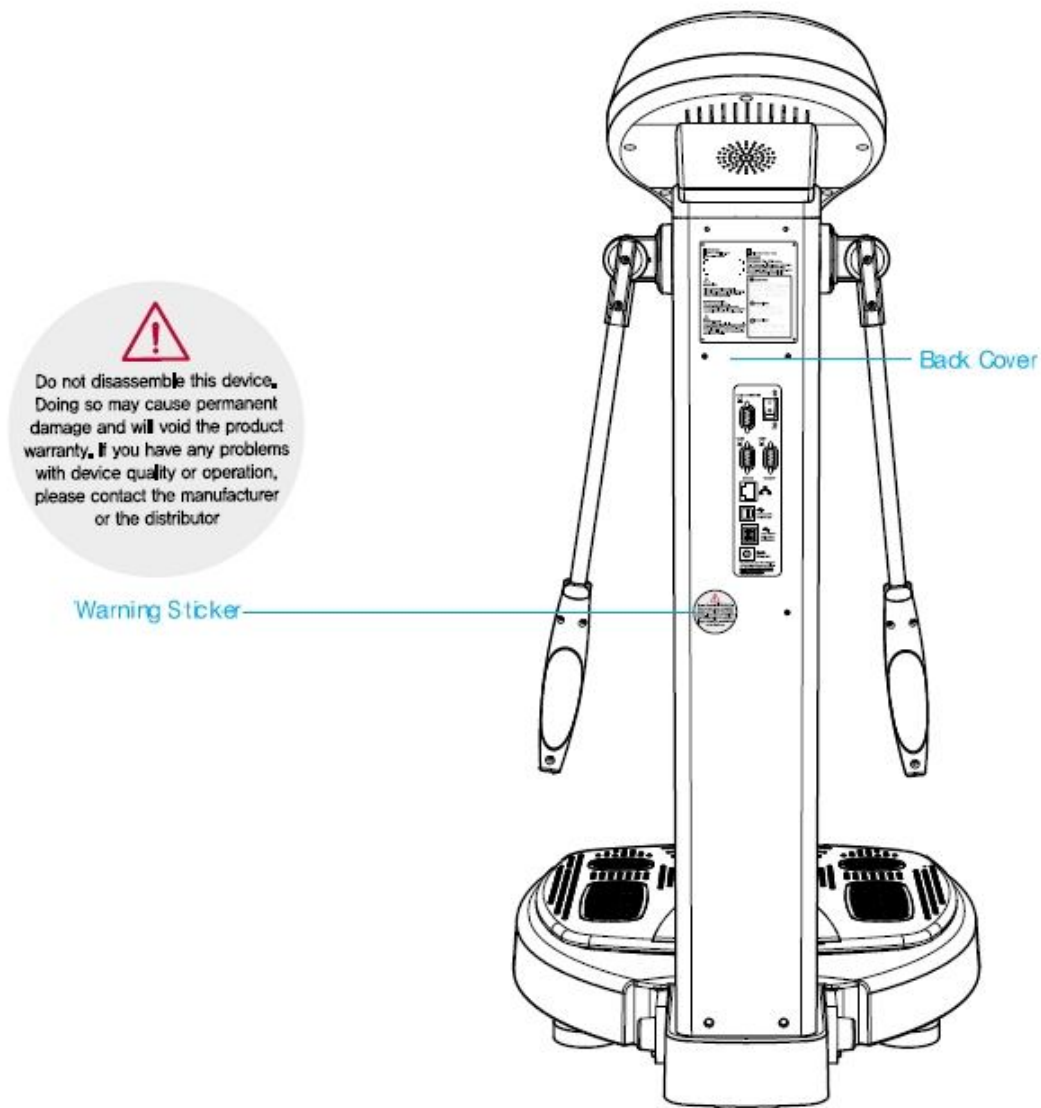
There are 5 leveling screws that support the InBody520. Leveling screws are designed to be turned by hand to easily adjust the balance of the equipment.



D. Rear Part

(1) Back Cover

Only qualified personnel are allowed to remove the back cover.



Do not dismantle the equipment or open the back cover. Internal parts are not for customer use and may cause electric shock. If the equipment is dismantled, the warranty is void, and service costs will be charged.

(2) Control & Connection Unit

Connects to peripherals such as a PC or a printer for data transmission.

① 9pin Serial Port, Female (RS-232C)

Used to connect optional devices i.e. Lookin'Body (data management system) or blood pressure monitor provided by Biospace.

② LAN Port (10T Base)

Through a LAN cable, the equipment can communicate with external systems including computers. The LAN interface supports 10Mbps.

③ USB Slave Port

Use to connect with a PC.

④ USB Host Port

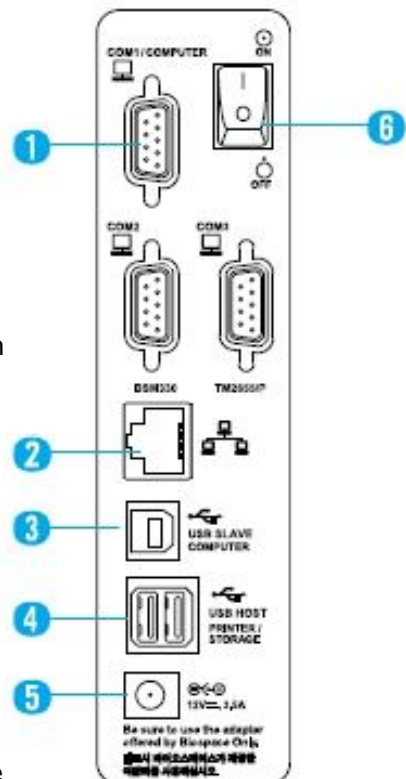
Use to interface with a USB printer or a USB storage device.

⑤ Power Input Port

Use to connect the power adapter.

⑥ Power Switch

Power the InBody520 on/off.





Since the control and connection part is located below the rear part of the equipment, liquid or foreign matter may flow into the equipment. The liquid or foreign matter which may flow into it could cause critical damage to any electronic parts.



Do not touch signal input, signal output or other connectors, and the patient simultaneously.



External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC Standard(e.g., IEC60950 for IT equipment and IEC60601-1 series for medical electrical equipment). In addition, all such combination-system-shall comply with the standard IEC60601-1 and/or IEC60601-1-1 harmonized national standard or the combination. If, in doubt, contact qualified technician or your local representative.



Use the adapter provided by Biospace only.



When you use the adapter cable, insert the adapter cable tightly into the InBody520.



Only the peripherals provided by Biospace can be connected to the InBody520, including the optional equipment. For any inquiry about peripherals, contact Biospace.

3. Installation Instructions

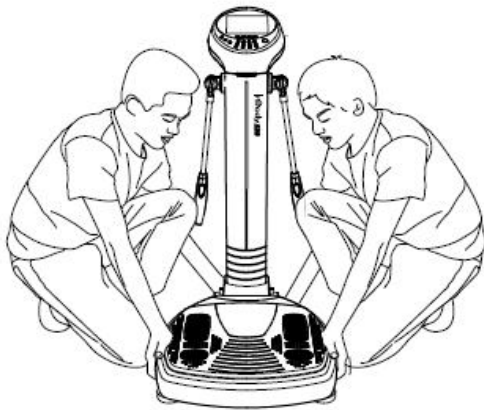
A. Workplace requirements

- (1) Location: Indoor only. Any outdoor area where the equipment is to be located should meet all the conditions below.
- (2) Operation environment: 50 ~ 104 °F (10 ~ 40 °C), 30 ~ 75%RH, 70 ~ 106kPa
- (3) Adapter: Power Input 100-240V, 50-60Hz, 1.2A Power Output DC 12V, 3.5A

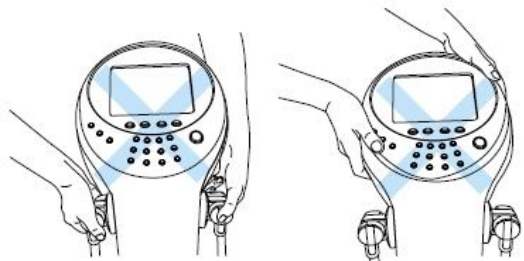
B. Note on Unpacking & Assembling

Be sure to read these instructions carefully before assembling.

- (1) Place the equipment on level ground.
- (2) Do not move by holding the hand electrode joints or control parts with LCD.
- (3) Move the equipment referring to the following picture.



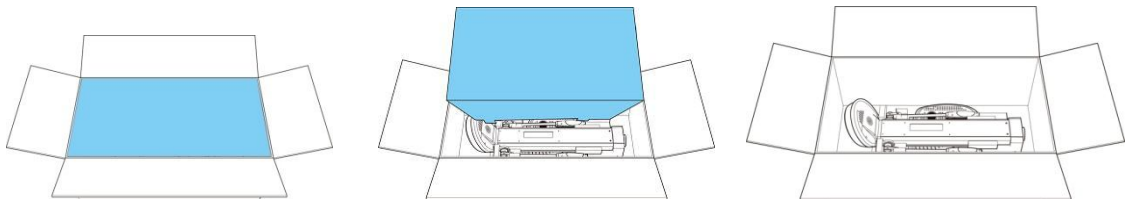
< Correct >



< Incorrect >

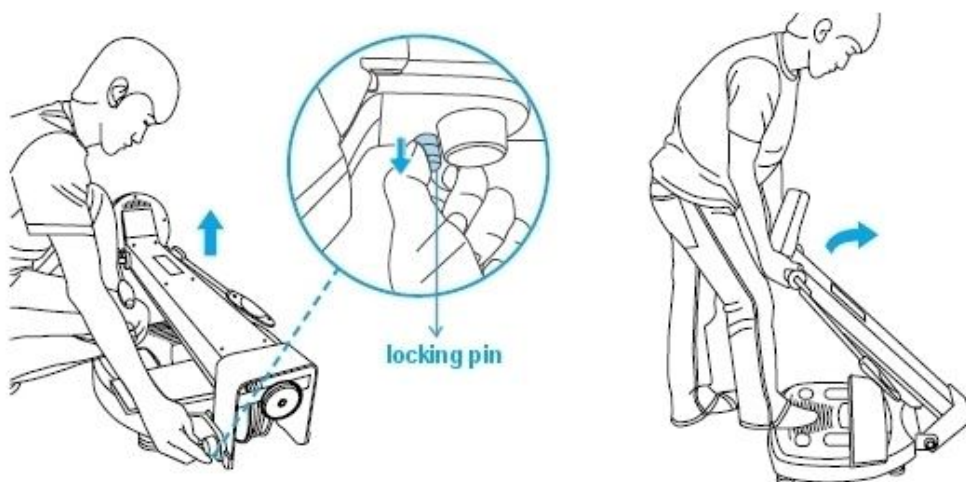
C. Unpacking & Assembling

(1) Unpack the box and remove the top pad.



(2) Take out the InBody520 from the box.

(3) Draw 'locking pin' located on the right bottom. The back part of the stand will raise up when pressure is applied.



WARNING

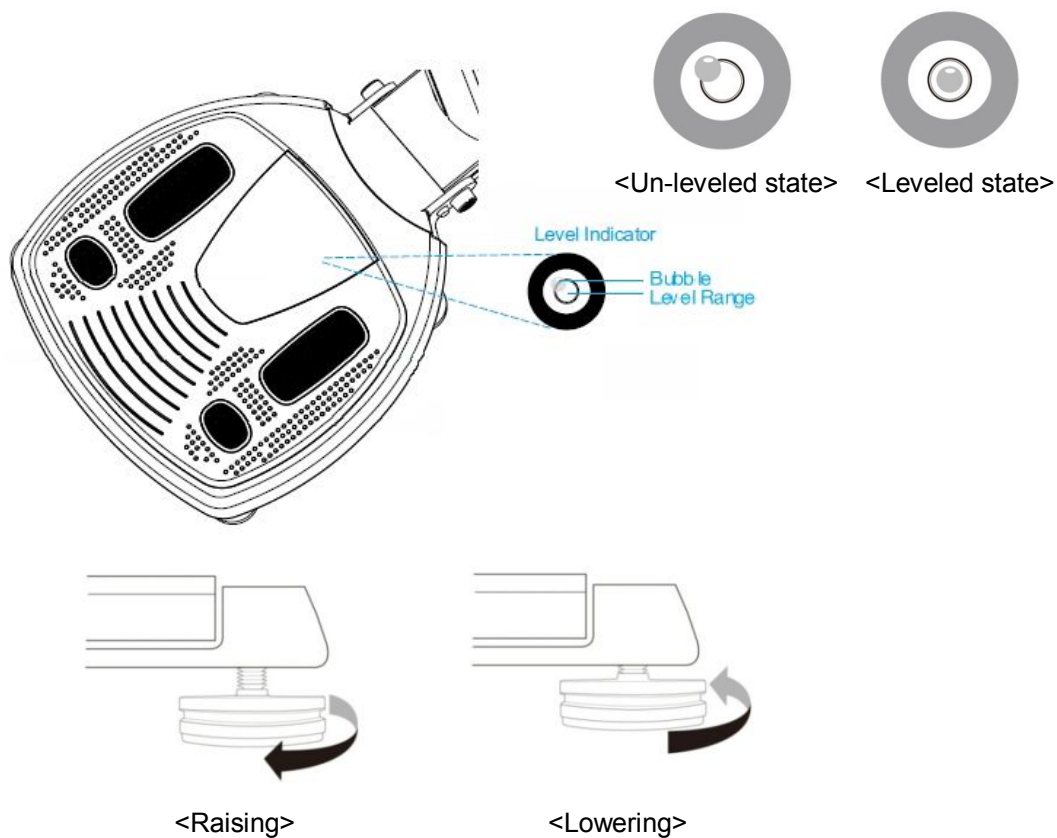
Use caution when raising the stand body of the equipment to avoid injury. When the body stand is raised, do not touch the joint part by hand or with any other part of the body. There is a danger of your hands or other parts of the body getting jammed in between the joints.



CAUTION

In case of a loose conjunction between the stand body and the foot plate, measurement process cannot be performed properly. Fix the stand straight-up on the foot plate.

(4) Level the InBody520 using the leveling screws and bubble level indicator. Leveling screws are located under the foot plate. The bubble level indicator is located under the base frame.



If the equipment is not horizontally leveled, adjust the leveling screw on the opposite side of the bubble to place it at the center of the level indicator.



Use caution when handling the leveling screws to avoid injury.

4. Transportation

If it must be transported, be extra careful to ensure safe handling. The following are some tips for safely transporting the InBody520:

- (1) Before transporting the InBody520, turn off the power switch and unplug the adapter.
- (2) Be careful not to damage the hand module.
- (3) After moving the InBody520, ensure that it is placed horizontal to the ground.

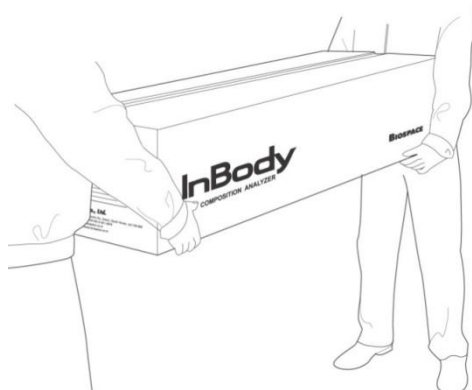
A. Environmental Requirements

Transport and Storage Environment: 4°F ~ 158°F (-20 ~ 70°C), 10 ~ 95%RH
50 ~ 106kPa (No condensation)

B. Transporting Before Installation

Before installation, the InBody520 is shipped in the box designed by Biospace.

For safety, have two people move it by holding both sides or use handling equipment such as a cart or dolly.



Be careful with fragile freight. The package has fragile operation parts including LCD, which is notated on the box.

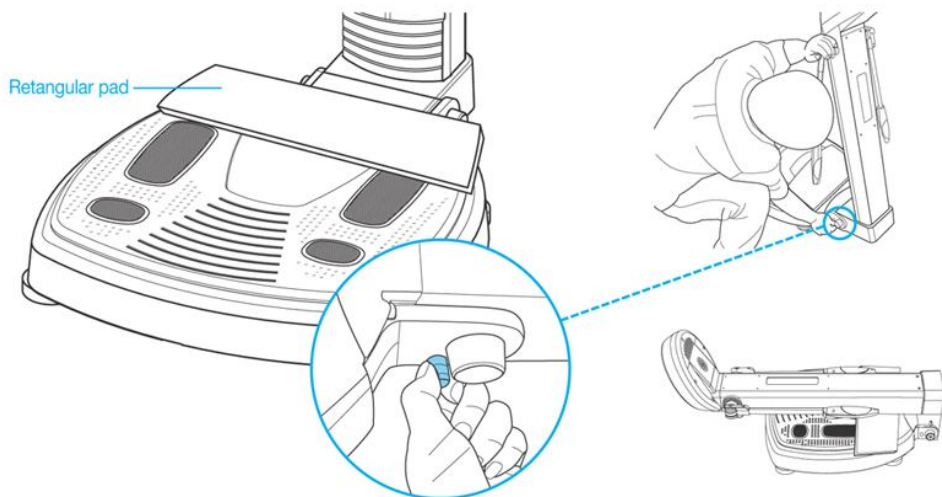


After relocating the InBody520, make sure it is level again. Inaccurate leveling will affect accuracy of individual weight measurements.

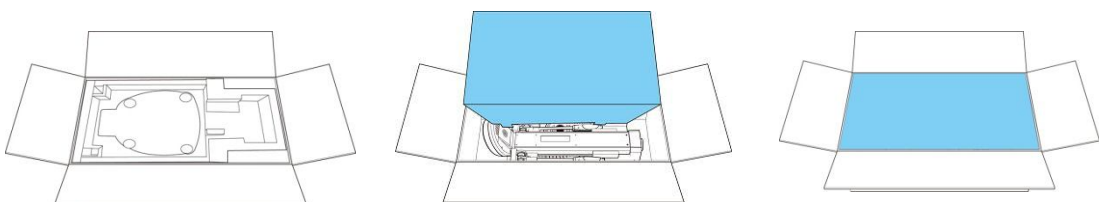
5. Repacking

Be sure to turn off the power switch and unplug the power cable before repacking. Be careful to avoid severe physical shock, jarring or other damage while repacking, especially with regard to the arm and foot electrodes.

- (1) Turn off the power switch.
- (2) Remove all cables connected to the InBody520.
- (3) Unplug the cables from the power outlet.
- (4) Place the rectangular pad on the foot plate.
- (5) Fold the upper part of the body, pull the locking pin located at the bottom right of the base of the unit.



- (6) Put the equipment in the box and place the pads in position as illustrated below.
- (7) Seal the box with tape.



6. Maintenance

(1) For each user, wipe hands and feet with InBody Tissue to ensure quality measurements. InBody Tissue is sold separately. Contact Biospace for ordering details.

(2) After using the machine, wipe electrodes with a wet tissue(also known as wet naps, surface wipes, anti-bacterial tissues, etc.). Wet tissues can be purchased at any local store.

(3) Handle the arms with care. Never apply excessive force near the hand electrode joint. The damage caused by misuse may affect the function of the internal cable and electric board.

(4) Do not place anything on the foot plate or apply any pressure onto it when the InBody520 is not in use.

(5) If the InBody520 is idle for more than a day, unplug the adapter.

(6) Do not move or relocate the InBody520 while the power is on.

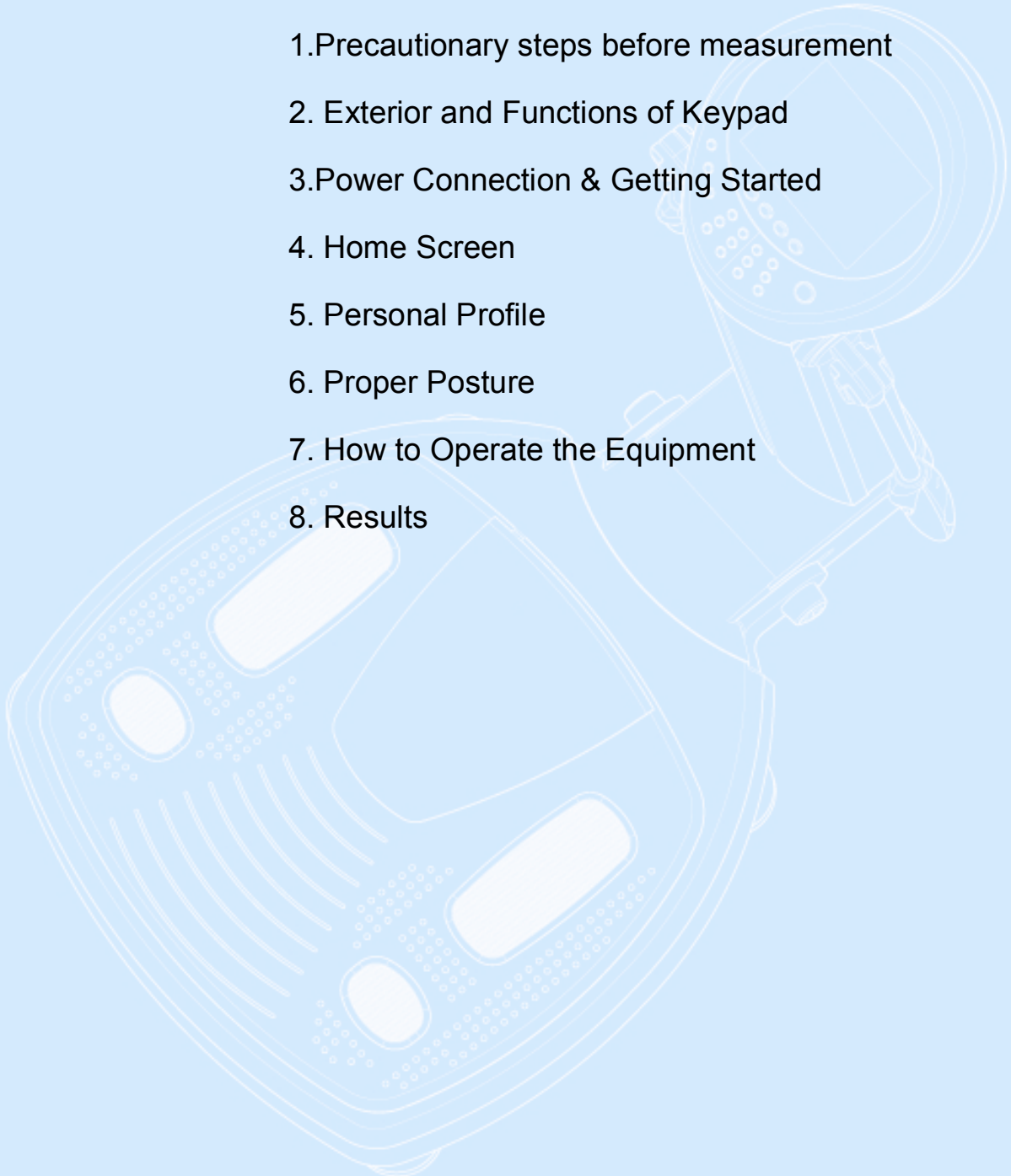
(7) Do not drop any food or liquid on the equipment. It may affect the electrical parts in the equipment or cause damage.

(8) Once a week, wipe the exterior sides of the InBody520 with a dry towel. In particular, clean the LCD monitor, using gentle care not to scratch the surface.

(9) Follow local government ordinances and recycling plans regarding the disposal or recycling of device components.

Chapter 2. Management & Results Description

1. Precautionary steps before measurement
2. Exterior and Functions of Keypad
3. Power Connection & Getting Started
4. Home Screen
5. Personal Profile
6. Proper Posture
7. How to Operate the Equipment
8. Results



1. Precautionary steps before measurement

To observe changes in the human body through body composition analysis, it is crucial to perform the analysis each time under the same conditions, temperature, posture, etc. Bear in mind, the following factors affect the results of body composition analysis, and as a result, affect the reproducibility of analysis.

(1) Make sure not to use this equipment with those that have medical electronic devices, such as a pacemaker.

(2) Do not eat before measurement.

(3) Do not exercise or perform any physical activities before testing. If an examinee has already been physically active, a temporary change in body composition will result.

(4) Do not take a bath or shower prior to measurement .Perspiration can result in a temporary change in body composition.

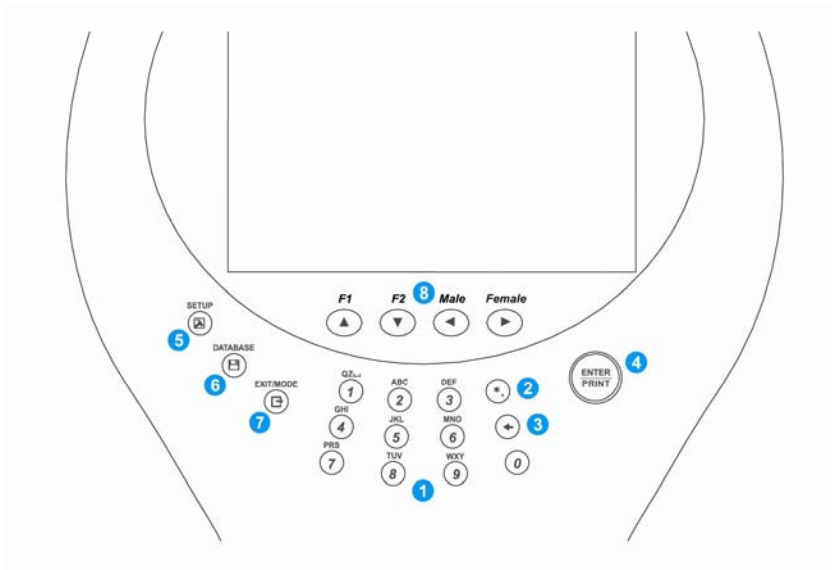
(5) Perform the measurement after urination or excretion, if possible. Residues in the human body are interpreted as fat mass. If there is waste in the body, the analysis may be less accurate.

(6) Measurement should ideally be done before mid-day.

(7) Perform the measurement under normal temperature conditions 68~77 °F(20~25°C). If the ambient temperature is too high or too low, the human body responds, resulting in temporary changes in body composition.

2. Exterior and Functions of Keypad

Keypad is located below the display screen. It can be divided into two categories by their functions.



A. Input Button

① Numerical Buttons (0~9) / Alphabet Buttons (A~Z)

The input buttons are used to enter alpha-numeric data such as the patient's age, height and ID with each button, the alpha numeric are displayed in the sequence shown on the keypad. For instance, when you press the button 2, you will see a set of alpha-numeric representations assigned to the button showing up in the pre-determined order of 2, A, B and C.

② Point / Star Button

The "point" button is used to enter a decimal point for height, age, ID, and weight. Star (*) is used to search ID's, in the DATABASE menu.

③ Backspace Button

Used to delete entered data.

④ ENTER / PRINT Button

This button is used when data input is finished, to move on to the next item, or to store modified values in the Setup menu. Also, you can print out an extra result sheet of the last examinee tested when you press the PRINT button on the home screen. Unless another examinee steps onto the foot plate and completes a measurement, the previous examinee's data will not be deleted, and you can keep printing it.

B. Function Button

⑤ SETUP Button

Used to update or modify the user environment.

⑥ DATABASE Button

Used to search stored results.

⑦ EXIT / MODE Button

EXIT / MODE button is used for quick setup on the home screen. Also, this button is used to stop the process in progress or to go back to the previous process.

⑧ Direction / Gender Selection Button

The directional buttons consist of up, down, left and right.

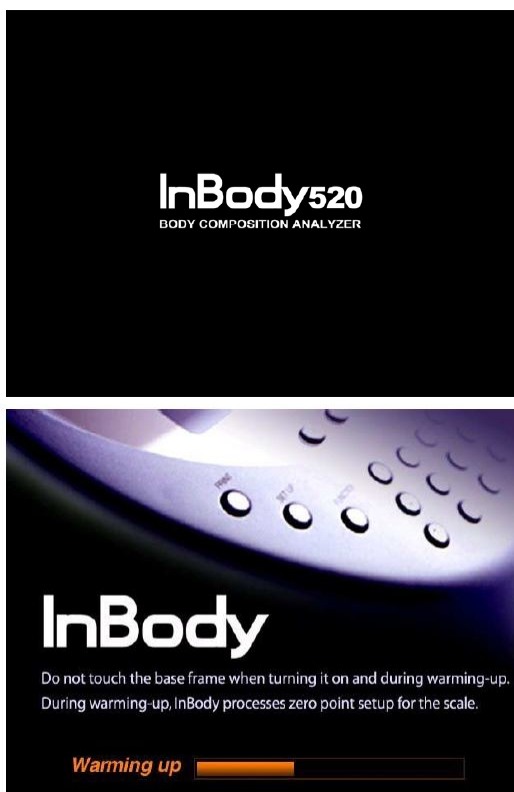
They are used as gender input buttons when entering the personal profile.(Male, Female)

3. Power Connection & Getting Started

(1) Connect the adapter cable to the power input port.

(2) When the system switch is turned on, the screen is displayed as illustrated below and the InBody520 starts warming up by itself. The warm up lasts for about 1 minute.

During the warm up, the InBody520 processes the self-testing, zero-point calibration for the scale, and the adjustment of the internal circuit. Also, it checks the usage status of the peripherals registered in the Setup menu and displays them on the screen window.



When connecting peripherals (printers and other optional devices) to the InBody520, turn on the power of peripherals before turning on the InBody520. When turning the power off, turn off the InBody520 first before turning off the peripherals. This process will minimize harm to the equipment caused by electric shock.



Do not touch the foot plate when turning on and during warm up. Applying pressure or weight to the foot plate during warm up can result in an inaccurate calibration, which may cause the measurements to be inaccurate.

4. Home Screen

The home screen of the InBody520 consists of various items for both examinee and user convenience. It can be distinguished into 4 categories as shown below.



A. Personal Information Window

This is for ID, age, height, gender and weight.

B. Information Window

This area will display the process and completion of the measurement, providing helpful and specific information for the examinees and the users.

C. Analysis Results Window

Before printing out the results, you can check the key figures in the window. All figures shown in the window will be printed on the result sheet.

D. Lower Menu Bar

The lower menu bar shows setting options registered in the InBody520 such as the Units, Printing number of result sheet, Volume, Date / Time setup icon.



Please do not poke the screen with sharp objects. This could cause damage to the screen.

5. Personal Profile

Age, height, gender and weight are essential information for body composition analysis. The InBody520 analyzes the measurement results based on the input data. To reduce errors and acquire more reliable results, input examinee's data.



(1) ID (permitted range: 20 Characters)

Use number buttons to enter ID. With each press of a button, numbers or letters are displayed in the sequence shown on the keypad.

(2) Age (Recommended input range: 3 ~ 99 years)

Use the number buttons to enter age.

(3) Height (Recommended input range: 3ft. 1.4in. ~ 7ft. 2.6in. , 95cm ~ 220cm)

Press the EXIT/MODE button first to select the unit you want to use, and enter height using the number buttons. If the chosen unit is cm, it is possible to input to one decimal place. If the chosen unit is in., it is possible to input one digit of a fixed number for ft., and down to one decimal place for in.

(4) Gender

You can select the gender by using the Male or Female button.

(5) Weight (permitted range: 10kg ~ 250kg / 22 lb. ~ 551 lb.)

The measured weight is automatically added to the weight column. Press the EXIT/MODE button to select the unit you want to use. When the unit is changed, the weight will change automatically.

If the weight measurement mode is registered as 'Disable' in Setup, press the EXIT/MODE button first to select the unit you want to use, and enter the weight.



NOTE

You cannot change personal information during measurement. Step down from the InBody520, and start again from the weight measurement screen.

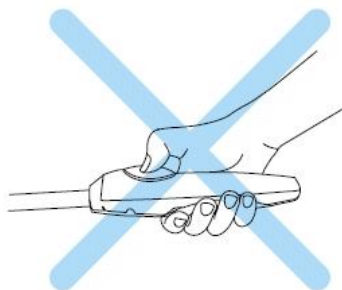
6. Proper Posture

Proper posture is essential to achieve reliable results and high reproducibility.

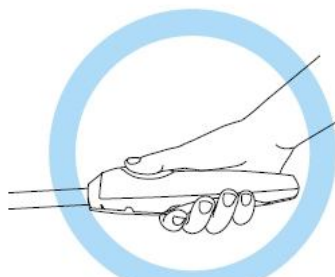
To minimize errors and improve reliability, keep the following in mind:

A. How to hold the hand electrodes

- (1) Make parallel, flat contact with four fingers on the surface of the electrode.
- (2) Place thumb on the electrode pad on the top surface of the handle. Touch lightly, do not press with nails, and do not press down too hard.
- (3) When holding the hand electrodes, make sure your thumbs are covering the thumb electrodes and hold the palm electrodes with the rest of your hands.



<Wrong posture>



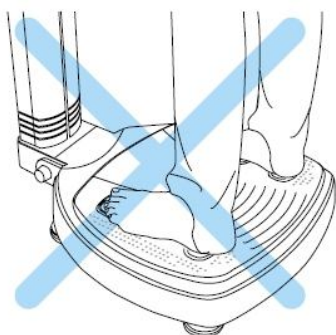
<Right posture>



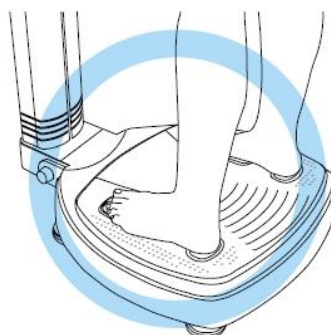
Do not press the electrodes with the fingernails; fingernails may damage the electrodes and cause inaccurate results.

B. How to stand on the foot electrodes

- (1) Bare feet must be in contact with the electrodes.
- (2) Make sure to place the heel on the circular (rear sole) electrode.
- (3) Then place the sole on the elliptical (front sole) electrode surface.



<Wrong posture>



<Right posture>



Be careful not to spill water on the electrodes. Excessive water may cause corrosion or other issues.



Do not allow your pants to prevent contact between the heels and the electrodes.



If the foot is exceptionally small, place it between the electrodes, ensuring that it makes contact with both sets of electrodes.



Measurements may not be possible due to hardened skin on the palm or sole. In this case, wipe the palm and sole with a wet tissue before measuring.

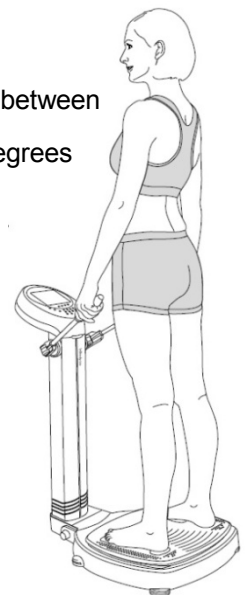
C. Body Posture

The proper body posture is a normal standing position with the arms and legs extended.

For accurate results, please take off heavy clothing and accessories.

(1) Avoid direct contact between the arms and the body at the armpit and between the legs at the crotch. It is recommended to stretch your arms about 15 degrees away from the body during the analysis.

(2) The examinee should remain relaxed and avoid straining or moving during the analysis.



When the examinee cannot maintain proper posture during the analysis, an assistant may be required to ensure proper posture. The assistant or technician must take care not to inadvertently make skin contact with the examinee. The InBody520 cannot be performed if an examinee is missing a hand, a thumb or a foot.

7. How to Operate the Equipment

The following procedure is based on the initial setting of the InBody520. If an examinee steps down from the InBody520 during measurement, the procedure will automatically be cancelled.

(1) Confirm the InBody520 is ready for measurement. If it is ready, the following screen is displayed. Remove heavy clothing and accessories before stepping on the InBody520.



(2) Stand on the foot plate of the InBody520. Be sure to match the examinee's heels with the rear sole electrodes and examinee's soles with the fore-foot electrodes. Bare feet must be in contact with the electrodes. When an examinee steps onto the InBody520, individual's weight is displayed on the information screen. While the device is measuring weight, stand up straight and do not move until the measured value on the screen settles at the examinee's weight.

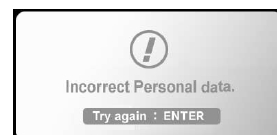


(3) The examinee's data screen will be displayed. Input ID, age, height, gender using the buttons on the keypad and press the ENTER button. Then entered values will be added into the personal information window.

I.D.	AGE	HEIGHT	GENDER	WEIGHT
ABC	30.0	5ft. 06.1in.	F	156.7 lb.



If you enter the information that is out of the range, the above error will appear on the screen. Please reenter the personal information.



(4) As indicated in the screen, the examinee must assume the proper posture. The InBody520 checks the posture continuously. Once measurement has started, the examinee should maintain the posture until the test has completed.



Measurement may not be possible if the palms or soles are too dry or have hardened skin on them. In this case wipe palms and soles with a wet tissue before measuring.

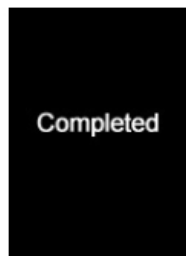


If the posture is not correct during measurement, error messages will be displayed.

(5) During measurement, the InBody520 displays the results of the examinee's body composition analysis.



(6) When the measurement is finished, the completion message appears on the information screen.



(7) Return each hand electrode back to its original position, and step down from the base frame.



Do not turn the hand electrode bar by force. If the bar is turned the InBody520 may malfunction, because important cables are located inside of the hand electrode bars.

(8) When a printer is connected, it automatically prints the result sheet.

8. Results

A. Result Screen

During measurement, the InBody520 displays information about the examinee's body composition on the LCD. The results show on the LCD while an examinee is standing on the machine. As soon as the examinee steps down, it goes back to the home screen, and the InBody520 is ready for measurement again.

Looking at the display of the results, you can check the main items that will appear on the result sheet that the InBody520 prints out.



- (1) Body Composition
- (2) Segmental Lean Analysis
- (3) Obesity Analysis
- (4) Body Water Balance
- (5) Body Fat & Lean Body Mass

B. Result sheet

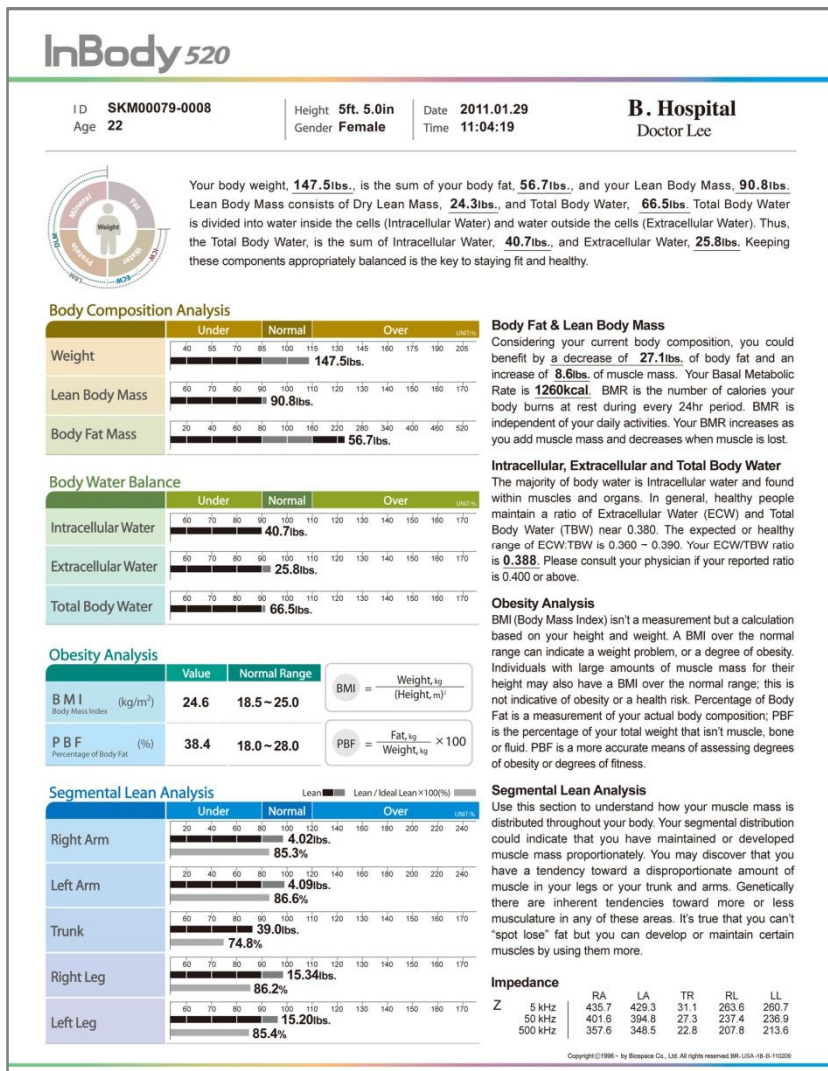
If the printer is connected, you can print the result sheets.

(1) Printer

Use the printers recommended by Biospace.

(2) Result sheet Form

The result sheet is consumable. Use the printed result sheet provided by Biospace. Please contact Biospace or an authorized distributor to place a purchase order.



C. Output Items

The following are the definitions and explanation for each item analyzed on the result sheet.



The normal range on the result sheet is the standard provided by Biospace based on past reference data.



Basically, the result sheet shows measured values for each test item. Regarding the ideal as 100%, it shows the ratio of measured values to standard values with the bar graph lengths. The normal range will be set according to the standard value to enhance examinee's easy understanding of result sheet.

(1) Personal Information

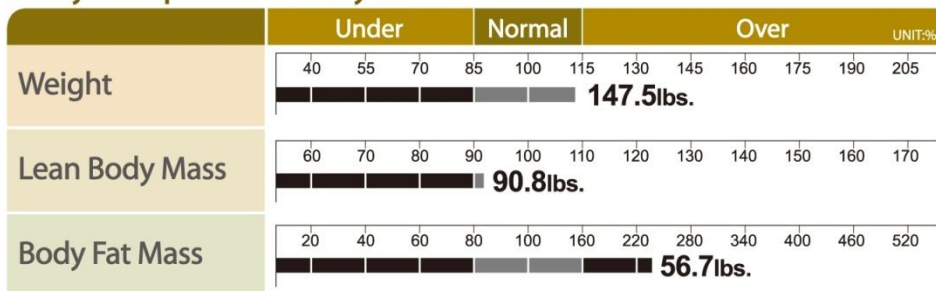
The examinee's ID, age, height, gender, exam date and time are displayed here.

ID	SKM00079-0008	Height	5ft. 5.0in	Date	2011.01.29	B. Hospital Doctor Cha
Age	22	Gender	Female	Time	11:04:19	

(2) Body Composition Analysis

The horizontal bar graphs help you understand your body composition compared to standard values. The numbers next to the bar graphs indicate the numerical values for the specific field. The length of the bar graph indicates where the examinee falls in relationship to the standard range. The overall summary of the body composition can be found at the top of the result sheet.

Body Composition Analysis



① Weight (lbs.)

Standard weight indicates the ideal value in accordance with the examinee's height. The InBody520 provides the standard weight, based on the BMI (Body Mass Index) Standard Weight Index.

***BMI method**

$$\text{Standard Weight(kg)} = \text{ideal BMI} * \text{Height}^2 (m^2)$$

The Obesity Index indicates the level of obesity. Generally, a BMI of 18.5 – 25.0 is used to determine the normal weight range. With the InBody520, the normal weight range is $\pm 15\%$ of standard value, very similar to one based on BMI (18.5 – 25). Standard weight is determined according to a BMI of 22 for males, a BMI of 21.5 for females.

② Lean Body Mass (lbs.)

100% Lean Body Mass indicates that the examinee being measured has reached his/her standard weight and standard Lean Body Mass. The standard proportion of LBM is 85% of the standard weight for males, and 77% of the standard weight for females. The normal range of LBM is 90-110% of the standard LBM. Change in muscle is the most effective indicator of health improvements as a result of exercise. The **UCLA definition** of obesity is based on the level of muscle development. This definition is based on a proactive approach to obesity, one in which obesity is regarded as a problem involving the proportion of Lean Body Mass to Body Fat Mass.

Lean Body Mass refers to the entire body weight with the exception of Body Fat Mass. Athletes have a higher proportion of Lean Body Mass than regular people. As such, it is important for athletes to measure their Lean Body Mass. InBody520 provides comprehensive data which can be used to evaluate the health of an examinee.

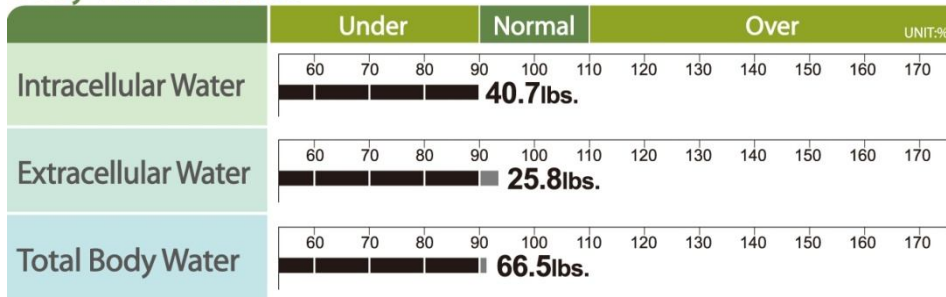
③ Body Fat Mass (lbs.)

The normal range of Body Fat Mass is ascertained by calculating an examinee's body fat mass as compared to the standard weight and standard Body Fat Mass. The InBody520 displays the percentage of the standard value of Body Fat Mass in a bar graph.

(3) Body Water Balance

The body is composed of approximately 70% water and it is important to maintain this level and a proper balance of intra and extracellular water. A healthy person has 3:2 ratio of intracellular to extracellular water. Those that have more lean body mass tend to retain more intracellular water in relationship to extracellular water.

Body Water Balance



① Intracellular Water and Extracellular Water (lbs.)

A healthy person's weight has a consistent proportion of Total Body Water. If this proportion of Intracellular and Extracellular Water becomes unbalanced a person may be diagnosed with edema. Edema refers to a state in which the interstitial fluid found in the extracellular water has abnormally increased. When edema is discovered only in a certain part of the body, this is known as localized edema. However, when edema is discovered throughout the body, this is known as generalized edema. Total Body Water is consistently distributed in a healthy body. Therefore, if an imbalance in Total Body Water is discovered, a comprehensive health examination should be carried out.

② Total Body Water(lbs.)

TBW means the total water in our body, which amounts around 50%~70% of the weight. TBW is the most essential component in our bodily fluid. Balanced TBW is a basic requirement for a healthy life. Mostly TBW is in cells of muscle mass. While a healthy person’s muscle is over 70% of water, dry lean mass or body fat has very little water. As most of the TBW is in the lean body mass, the difference of people’s TBW is significant. People with high body fat have TBW of about 50% of their weight, but athletes with developed muscle mass have TBW of up to 70% of their weight.

(4) Obesity Analysis

By analyzing the examinee’s weight using BMI and Percentage of Body Fat, the InBody520 Analyzer makes it possible to screen for sarcopenic obesity. People included in this sarcopenic obesity type fall within the normal range when it comes to BMI and weight, but are regarded as obese when their percentage of body fat is calculated. This is mainly due to low muscle content compared to body fat mass.

Obesity Analysis

	Value	Normal Range	
BMI Body Mass Index (kg/m ²)	24.6	18.5 ~ 25.0	$BMI = \frac{\text{Weight, kg}}{(\text{Height, m})^2}$
PBF Percentage of Body Fat (%)	38.4	18.0 ~ 28.0	$PBF = \frac{\text{Fat, kg}}{\text{Weight, kg}} \times 100$

*** The normal range of BMI & PBF**

Normal range	Males	Females
BMI	18.5~25.0(Standard value: 22)	18.5~25.0 (Standard value: 21.5)
PBF	10% ~ 20%	18% ~ 28%

BMI(Body Mass Index, kg/m²)

As we can see from the formula, $BMI = \text{weight (kg)} \div \text{height}^2 \text{ (m}^2\text{)}$, BMI is used to approximate obesity levels. The BMI method has been widely applied in general medicine, dietary, and sports medicine fields as the main means of diagnosing obesity. However, this method is flawed in that it cannot be applied to adults with high levels of LBM, children, those over the age of 65, or pregnant females. Nevertheless, as the BMI has been the most commonly used index, much research on using the BMI method to prevent adult diseases has been conducted. This is why the InBody520 also includes BMI based information. Differences have emerged among researchers as to which standards should be used to determine the BMI of examinees of different age and gender. The InBody520 uses the World Health Organization (WHO) standards as the normal ranges for BMI (1998). The InBody520 identifies the standard BMI as 22 for males, 21.5 for females and the normal ranges as 18.5 ~25.0 for both males and females.

Determination 1) WHO Standard

BMI(kg/m ²)	Classification		Diagnosis
<18.5	Underweight	Under	Infectious disease, malnutrition related disease
18.5~24.9	Normal	Standard	Least risk at most disease
25.0~29.9	Overweight	Over	May cause health problem
30.0~34.9	Obese1		Increase of the risk of cardiac disease, high blood pressure, diabetes, etc
35.0~39.9	Obese2		
≥40	Severely Obese		

Ref. WHO and the National Heart, Lung, and Blood Institute: clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults, the evidence report. June 1998, xiv

② Percentage of Body Fat (%)

Percentage of Body Fat indicates the percentage of body fat to body weight.

$$\text{Percentage of Body Fat(\%)} = \text{Body Fat Mass} / \text{Body Weight} \times 100$$

The standard Percentage of Body Fat is 15% for males and 23% for females. When a person's Percentage of Body Fat is calculated as being beyond the normal range, he/she is regarded as being overweight/obese. When a person's Percentage of Body Fat falls below the normal range, he/she is regarded as having a low level of body fat. This low level of body fat can be separated into two types: The first is a person whose muscle type is deemed to account for a desirable proportion of the body composition. Such people's weight is regarded as being within the normal range or falling within the overweight range. The second type, the poor nutrition type, is one in which a person's body is deemed to be in an unhealthy state because of a lack of Body Fat Mass and LBM. This type has a higher possibility of contracting clinical diseases.

Ref. Lee RD, Nieman DC, Nutritional Assessment, 2nd edition, pp.264

Ref. Bray GA, Contemporary Diagnosis and Management of Obesity, pp.13, 1998

cf. In case of children less than 18 years old, different standards are applied as it is necessary to consider the difference in physical characteristics from adults.

Ref. Samuel J. Fomon, M.D., et al. Body Composition of reference children from birth to age 10 years. The American Journal of Clinical Nutrition, 35, 1169-1175, 1982.

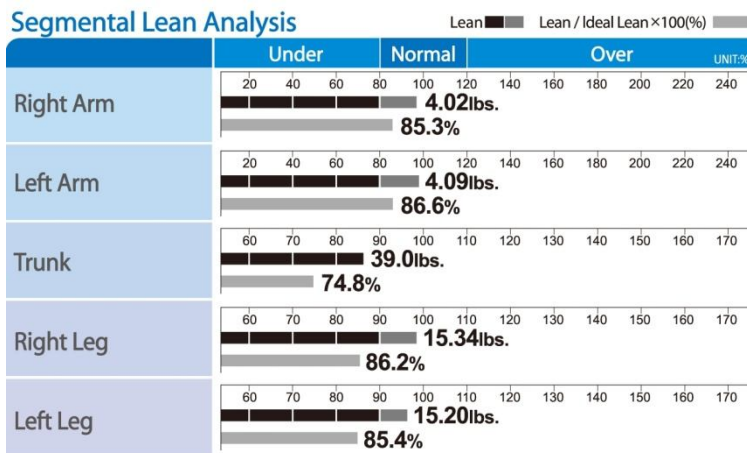
(5) Segmental Lean Analysis

With the InBody520, you can measure the lean mass of your body parts. It is achieved through the use of one of the InBody520's measuring principles, bioelectrical impedance measurements of body parts. The measurement of soft lean mass for body parts is based on the following theory.

$$\text{Segmental Soft Lean Mass} \propto (\text{Height}) / (\text{Segmental Resistance})$$

Ref. Samuel J. Fomon, M.D., et al. *Body composition of reference children from birth to age 10 years. The American journal of Clinical Nutrition*, 35, 1169~1175, 1982.

Re5f. Henry C. Lukaski, Phyllis E. Johnson, William W. Bolonchuk and Glenn I. Lykken, *Assessment of fat – free mass using bioelectrical impedance measurements of the human body, The American J. of Clinical Nutrition*, Vol.41, pp810-817, 1985



There are two bar graphs for each body part in the Segmental Lean Analysis graph. The two graphs have different meanings, respectively. The numbers beside the upper bar graph indicates the actual soft lean mass of an examinee. If the upper bar graph reaches 100%, it means that the examinee has ideal lean mass for his or her ideal weight, which is derived from the examinee's height. Therefore, the length of the upper bar graph shows the relative ratio of the ideal lean mass for his or her ideal weight. If the lower bar graph reaches 100%, it denotes the ideal lean mass for the examinee in relation to his or her actual weight. Therefore, the length of the lower bar graph indicates the relative ratio of the ideal lean mass for the actual weight, while the number beside the lower bar graph shows that ratio.

By displaying these two bar graphs, it makes it more effective to diagnose the actual lean mass of the examinee. The upper bar graph is based on the soft lean mass of the examinee's ideal weight, so that the 100% value will not vary unless there is a change in his or her height. Thus, it is easier to see the increase or decrease of the lean mass while providing an enduring goal. Since the lower bar graph is only based on the lean mass of the actual weight, the 100% value will alter in accordance with the weight change.

Hence, though it is not possible to check the increase or decrease of the lean mass as with the upper graph, it will directly reflect changes in the examinee's weight, thereby allowing you to determine whether or not there is actual lean mass appropriate to his or her weight. Throughout the lean balance muscle graph for body parts, you can see if upper • lower • left • right muscle developments are balanced and if body parts' lean mass is appropriate (muscle strength).

*** The normal range of the graph**

	Males	Females
Arm	85~115%	80~120%
Trunk, Leg	90~110%	90~110%

(6) Impedance

The InBody520 uses 3 frequencies (5, 50, 500 kHz) to gather Impedance values. For further research purposes, from the left to the right, it shows the values for the right arm, left arm, trunk, right leg and left leg. This data indicates if the measurement was successful or not.

Impedance		RA	LA	TR	RL	LL
Z	5 kHz	435.7	429.3	31.1	263.6	260.7
	50 kHz	401.6	394.8	27.3	237.4	236.9
	500 kHz	357.6	348.5	22.8	207.8	213.6

9. Facts for Normal Range

The InBody provides an analysis value for each test item. In addition, it gives guidelines for each test item's normal range to evaluate the current status of the body composition ratio. The examinee's body composition analysis value is at the end of the graph and the graph's length is a relative % of the standard result. The standard results and normal ranges are determined in related studies and research.

When references for normal ranges of a certain test item could not be found, the InBody uses exclusive Biospace normal ranges that are based upon internally collected data and other accepted standards.

1. TBW (Total Body Water)

The normal range of TBW is 90%~110% of standard TBW. Standard TBW is around 73% of standard lean body mass of a body with adequate weight for the examinee's height. For children under the age of 18 years old, standard TBW is 73~77% of standard lean body mass.

■ Used Reference

1. Heyward VH and Stolarczyk LM. *Applied Body Composition Assessment. Human Kinetics* pp 44, 1996
2. Fomon SJ, Haschke F, Ziegler EE. *Body composition of reference children from birth to age 10 years. Am J Clin Nutr* 35:1169-1175, 1982

2. ICW (Intracellular Water) & ECW(Extracellular Water)

Normal ranges of ICW and ECW are calculated by converting the normal range of TBW into ICW and ECW based on normal ECW/TBW. Normal ranges of ICW and ECW are 90%~110% of the standard value of each one. Standard values of ICW and ECW are calculated by dividing TBW into ICW and ECW based on normal ECW/TBW.

■ Used Reference

1. Harvey AM, Johns RJ, McKusick VA, Owens AH, and Ross RS. *The principle and practice of medicine 22nd edition* pp 686
2. Ganong WF. *Review of medical physiology 11th edition. pp14. Lange medical publications*

3. Weight

For adults over the age of 18, normal weight range is about 85%~115% of standard weight according to the BMI standard. Standard weight is calculated by multiplying the square of height by standard BMI. Standard BMI is 22 for males and 21.5 for females. 85%~115% is the range corresponding to 18.5~25 which is the normal BMI range specified by the WHO.

Cf. For children under the age of 18, 85~115% of standard weight is the normal range. Children's standard weight in the result sheet refers to Biospace's own BMI data. Since children have various development levels and body shapes because they keep growing, it is recommended to use standard BMI per height.

■ **Used Reference**

1. *Characteristics of obesity : An overview. Ann NY Acad Sci. 499:4-13, 1987*
2. *WHO and the National Heart, Lung, and Blood Institute : Clinical guideline on the Identification, Evaluation, and treatment of overweight and obesity in adults, the evidence report. 1998 (Obes Res 6(suppl 2):51S, 1998)*

*** The following is a summary of technical key points explained in the above reference.**

1) Characteristics of obesity: An overview. Ann NY Acad Sci. 499:4-13, 1987

As can be seen in these tables, the mean desirable BMI is 22.0 for men and 21.5 for women, and the range is 20-25 for men and 19-26 for women.

2) WHO and the National Heart, Lung, and Blood Institute: Clinical guideline on the Identification, Evaluation, and treatment of overweight and obesity in adults, the evidence report. 1998

	Obesity Class	BMI(kg/m ²)
Underweight		under 18.5
Normal		18.5~24.9
Overweight		25~29.9
Obesity	I	30~34.9
	II	35~39.9
Extreme obesity	III	over 40

4. Lean Body Mass

Normal range of LBM is 90%~110% of standard Lean Body Mass. Standard LBM is 85% of standard weight for males, and 77% for females. (Standard value of LBM, the value that deducts body fat from body weight is directly related to the standard value of body fat. So research papers about LBM refer to papers related to Section 5. Body Fat)

5. Body Fat

Normal range of body fat is 80~160% of standard body fat. Standard body fat mass is 15% of standard weight for males and 23% for females. As compared with other body compositions, body fat differs for each person even at normal weight. When body fat increases, its normal range is wider than others because it increases with a higher rate than muscle.

■ *Used reference*

1. Lohman TG. *Advanced in body composition assessment - Current issues in exercise science series. Champaign-IL: Human Kinetics. pp 80. 1992*

**For children under the age of 18, standard % body fat differs by age and height because height keeps changing with growth. In this age group, standard body fat is 15~17% of standard weight for males, and 16~23% for females.*

■ *Used reference*

1. Fomon SJ, Haschke F, Ziegler EE. *Body composition of reference children from birth to age 10 years. Am J Clin Nutr 35:1169-1175, 1982*

6. BMI

For adults, the normal range of BMI is 18.5~25 specified by the WHO standard. The standard result is 22 for males, and 21.5 for females.

■ *Used Reference*

1. Simopoulos AP. *Characteristics of obesity : An overview. Ann NY Acad Sci. 499:4-13, 1987*

**For children under the age of 18, the normal range of BMI is ± 3 of the standard BMI per height.*

7. Percentage of Body Fat

The normal range of % body fat is 10~20% for males, and 18~28% for females. The standard result is 15% for males, and 23% for females.

■ Used Reference

There are various opinions on the normal range according to different references and scholars. We chose the following data for references.

1. Heyward VH and Stolarczyk LM. *Applied body composition assessment. Human Kinetics. pp.8*
2. Lohman TG. *Advanced in body composition assessment - Current issues in exercise science series. Champaign-IL: Human Kinetics. pp 80. 1992*
3. Lee RD and Nieman DC. *Nutritional Assessment(second edition), pp.264*
4. Bray GA. *Contemporary Diagnosis and Management of Obesity. pp.13, 1998*
5. Mahan LK and Escott-stump S. *Krause's Food, nutrition & diet therapy 9th edition. WB Saunders Co. pp 455*
6. Brown JE. *Nutrition Now 2nd edition. Wadsworth Publishing Company. pp 9-3. 1999*
7. Tahara Y, Moji K, Aoyagi K, Tsunawake N, Muraki S, Mascie-Taylor CG. *Age-related pattern of body density and body composition of Japanese men and women 18-59 years of age. Am J Hum Biol. 14(6):743-52, 2002*
8. *Advanced fitness assessment and exercise prescription. Heyward VH. Human Kinetics. pp. 162*

Detailed contents are here referred from the original documents.

1) Heyward VH and Stolarczyk LM. *Applied body composition assessment. Human Kinetics. pp.8*

Table 1.4 Assumed Values for fat and fat-free body(FFB) Components

Component	Density(g/cc)	Proportion(%)
Fat	0.9007	15.3
FFB	1.1000	84.7
Water	0.9937	73.8
Protein	1.34	19.4
Mineral	3.038	6.8

2) Lohman TG. Advanced in body composition assessment - Current issues in exercise science series. Champaign-IL: Human Kinetics. pp 80. 1992

Figure 7.1 Percent body fat standards for men and women in relation to health

<u>Men</u>	5%	15%	20%
Minimal weight	Below average	Above average	At risk

<u>Women</u>	8%	14%	23%	32%
Minimal weight	Below average	Above average	At risk	

3) Lee RD, Nieman DC. Nutritional Assessment(second edition), pp.264

Table 6-13 Suggested percent body fat standard for adults

Classification	Males	Female
Lean	<8%	<13%
Optimal	8-15%	13-23%
Slightly over fat	16-20%	24-27%
Fat	21-24%	28-33%
Obese	≥25%	≥33%

4) Bray GA. Contemporary Diagnosis and Management of Obesity. Handbooks in Health Care Publisher. pp.13, 1998

Table 1. Criteria for Obesity in Males and Females

Category	Body Fat	
	Males	Females
Normal	12%-20%	20%-30%
Borderline	21%-25%	31%-33%
Obesity	>25%	>33%

5) Mahan LK and Escott-stump S. Krause's Food, nutrition & diet therapy 9th edition. WB Saunders Co. pp 455

Appropriate body fatness for an adult women ranges from 20% to 25% of body weight with about 12% as essential fat. In men, appropriate body fatness is 12% to 15% of body weight, and approximately 3% is essential fat.

6) Brown JE. Nutrition Now 2nd edition. Wadsworth Publishing Company. pp 9-3. 1999

Obesity is defined by science as excess of body fat. An "excess" is an amount that interferes with health. For women, having more than 28% of body weight as fat is considered excessive. For men, the figure is 20%.

Also defined as a BMI of 30 or higher, or a weight-for-height over 120% of standard.

7) Tahara Y, Moji K, Aoyagi K, Tsunawake N, Muraki S, Mascie-Taylor CG. Age-related pattern of body density and body composition of Japanese men and women 18-59 years of age. Am J Hum Biol. 14(6):743-52, 2002

Mean %Fat of young adult males 18-29 years in the present study was 14.4%, and similar to the value of 14.7% for Japanese men in their 20s. The mean %Fat of females <30 years of age in the present study was 23.3% and was similar to values reported in the past three decades. Mean %Fat of females of >30 years of age in the present study was 26.7%, which was slightly greater than the value of 26.0% reported by Kitagawa et al.

8) Advanced fitness assessment and exercise prescription. Heyward VH. Human Kinetics. pp. 162

Table 8.1 Percent body fat standards for adults, Children, and Physically Active adults

Recommended %BF levels for adults and children					
	NR	Low	Mid	Upper	Obesity
Males					
18-34years	<8	8	13	22	>22
33-55years	<10	10	18	25	>25
55+years	<10	10	16	23	>23
6-17years	<5	5-10	11-25	26-31	>31
Females					
18-34years	<20	20	28	35	>35
33-55years	<25	25	32	38	>38
55+years	<25	25	30	35	>35
6-17years	<12	12-15	16-30	31-36	>36
Recommended %BF levels for physically active adults					
	Low	Mid	Upper		
Males					
18-34years	5	10	15		
33-55years	7	11	18		
55+years	9	12	18		
Females					
18-34years	16	23	28		
33-55years	20	27	33		
55+years	20	27	33		

* For children under the age of 18, the normal range of % body fat is $\pm 5\%$ of standard % body fat. In this age group, standard % body fat is 15~17% for males, and 16~23% for females.

■ Used Reference

1. Fomon SJ, Haschke F, Ziegler EE. Body composition of reference children from birth to age 10 years. *Am J Clin Nutr* 35:1169-1175, 1982
2. Mahan LK and Escott-stump S. Krause's Food, nutrition & diet therapy 9th edition. WB Saunders Co. pp 276
3. Roche A, Heymsfield SB and Lohman TG. Human body composition. *Human kinetics*. pp.207
4. Heymsfield SB, Lohman TG, Wang Z and Going SB. Human body composition. pp271-284
5. Malina Rm, Bouchard C and Beunen G. Human growth: Selected aspects of current research on well nourished children. *Ann. Rev. Anthropol.* 17:187-219, 1988
6. Tahara Y, Moji K, Aoyagi K, Tsunawake N, Muraki S, Mascie-Taylor CG. Age-related pattern of body density and body composition in Japanese males and females, 11 and 18 years of age. *Am J Hum Biol.* 14(3):327-337, 2002

8. Segmental Lean Analysis

Segmental Lean Analysis follows below the normal range

	Males	Females
Arm	85~115%	80~120%
Trunk, Leg	90~110%	90~110%

Each body part's standard lean mass means the lean mass that is supposed to be in each body part at the standard weight.

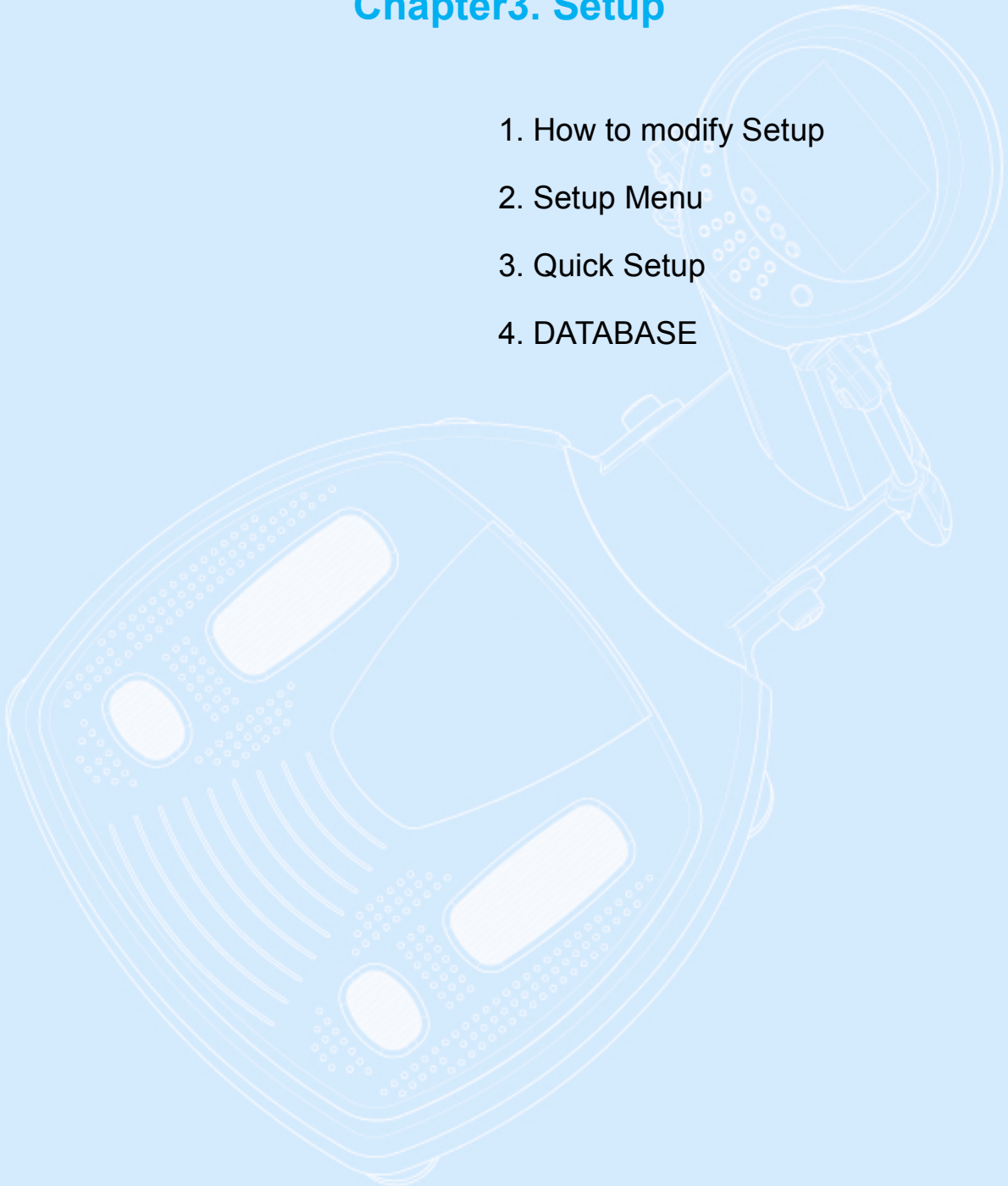
Since there is no released reference on segmental lean mass, we provided its normal range and standard value based on our clinical data research. Normal range is 85% confidence level. As distribution of arm's lean mass is larger than leg's lean mass, the normal range of arm's lean mass is wider than leg's lean mass.

9. ECW/TBW

The normal range of ECW/TBW is higher than 0.36 and less than 0.39. When it is higher than 0.39 and less than 0.40, it is likely to cause mild edema. When it is higher than 0.40, it is highly possible to cause edema.

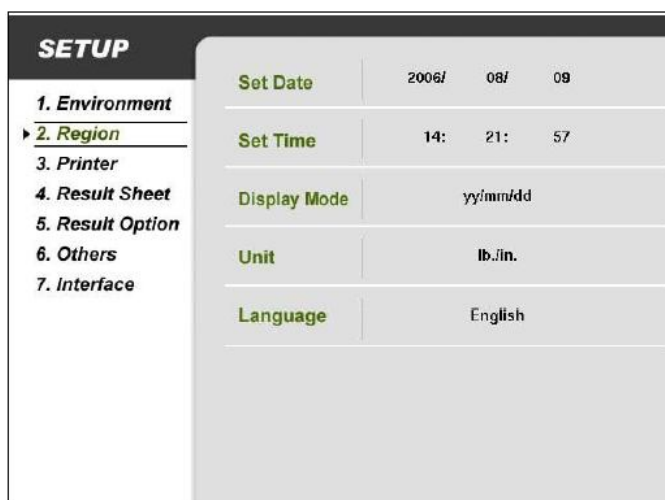
Chapter3. Setup

1. How to modify Setup
2. Setup Menu
3. Quick Setup
4. DATABASE



1. How to modify Setup

When pressing the SETUP button, the following screen is displayed.



(1) Use the direction button (▲▼) to select an item among Environment, Region, Printer, Result Sheet, Result Option, Others and Interface. The selected item's subcategories are then displayed on the screen.

(2) Use the ENTER button or the direction button (▶) to move to the subcategories.

Then, use the direction button (▲▼) to move to the subcategory you want and then press the ENTER button.

(3) The subcategories are subdivided into several setup items. Already selected items are checked (V). Use the direction button (▲▼) to move to an item you want to modify and press the ENTER button. Then the item will be selected and checked (V).

(4) If you want to modify more items, press the EXIT/MODE button and use the direction button (▲▼◀▶) to move and select the item you wish to modify. When you have no more to modify, press the EXIT/MODE button to move to another category: Environment, Region, Printer, Result Sheet, Result Option, Others and Interface. And then press the EXIT/MODE button.

(5) When the screen asks whether or not you want to save the modified contents, press the ENTER or EXIT/MODE button to quit the Setup menu.

2. SETUP Menu

A. Environment

It shows the environmental status of the InBody520. No items can be changed by users.

(1) Environment Summary

- ① Language : displays the current language.
- ② Result Sheet : This section pertains to the number of sheets that will be printed (0-2).
- ③ BMI Basis : displays a selected standard range of BMI.
- ④ Measure Weight : displays the current selection of weight measurement.

(2) Memory Status

- ① Total: Total capacity in use
- ② Program: Capacity in use for program
- ③ Data: Capacity in use for results storage

(3) Version Information : Shows the current version of the InBody520.

B. Region

Set the Date, Time, Display Mode, Unit and Language.

- (1) Set Date : Set the current date.
- (2) Set Time : Set the current time in the order of OO(hour)/OO(min)/OO(sec)
- (3) Display Mode : Select the date display mode.

‘yy’ is for year, ‘mm’ is for month and ‘dd’ is for date.

- (4) Unit : Select units to be used. (kg /cm, kg/in., lb./cm, lb./in.)
- (5) Language : Language is English only.

C. Printer

Set the type of printer, adjust the printing alignment of result sheet and test print.

(1) Printer

Select the type of printer. Printers that support PCL3 above or higher are compatible with the InBody520.

[Samsung PCL Printer, SPL Compatible Printer, HP PCL Printer, SPL 2009 Printer, SPL2011 Printer]

(2) Alignment

It is possible to adjust the coordinates on the result sheet. After adjustment, you can check whether the alignment was done properly with a “test print”.

The adjustment range: X (horizontal), Y (vertical) (+50 ~ -50)

(3) Test Print

You can check the printing coordinates by printing out a sample.

D. Result Sheet

This section pertains to the number of sheets to be printed and the mode of the result.

(1) Mode

Select the type of result sheet. This is fixed to ‘Printed’ only.

(2) Printed : to use printed result sheet provided by Biospace.

(3) Number of Result Sheet to be printed

You can decide the numbers of result sheet automatically printed after measurement.

(0~2 sheets)



If it is set up as ‘None’, it will not print result sheet.

(3) Logo Type

You may choose between two formats, Text and BMP Logo. The Text logo allows you to manually input your business information using keypad of InBody520. The information can consist of 3 lines. Please contact Biospace for BMP logo instructions.

E. Result Option

(1) BMI Basis: Select the normal range for BMI.

- ① WHO(World Health Organization) : The normal range is 18.5~25.0kg/m².
- ② Asian : The normal range is 18.5~23kg/m², but you can't use this basis.
- ③ User: The normal range is 18.5~27 kg/m².

(2) Weight Control

This is an option of 'Body Fat & Lean Body Mass' provision on the result sheet.

- ① Enable: Printout provision for 'Body Fat & Lean Body Mass'.
- ② Disable : No printout of provision for 'Body Fat & Lean Body Mass'.

F. Others

(1) Measure Weight

- ① AUTO: When stepping on the foot plate, weight is automatically measured and added to the personal information window.
- ② MANUAL: An examinee directly enters his/her weight.

(2) Adjust Weight

It is possible to adjust weight offset value. If weight adjustment is needed due to clothes or accessories, use the upper and lower buttons (▲, ▼) to select the desire offset value.

(Calibration Range: +10.0lb. ~ -10.0lb., step : 0.1lb. or +5.0kg ~ -5.0kg, step: 0.1kg)

(3) Adjust Volume

Used to control sound volume (0~100%).

(4) Sound Type

Select the sound type to be used. (Type1, Type2, Type3)

(5) Initialize History

Used to erase the entire data history. InBody520 will be erased by pressing 'ENTER' button. Make note, after deletion, data history is not retrievable.

(6) Gender Default

Select the gender automatically added to the information window.

(Female, Male, Last Gender)

(7) ID Input

① Input: Manual ID input.

② Disable : No ID needed. Make note, without ID input, data will not be saved in the database.

G. Interface

Setup the exterior device to connect to the InBody520 through a network.

(1) Manual

DNS, Netmask, Gateway, IP, Host IP : Connect in the same way as connect general PC to the network.

(2) Lookin'Body(PC)

- ① Ethernet: to connect the InBody520 and PC by LAN cable.
- ② USB : to connect the InBody520 and PC by USB cable.
- ③ Serial: to connect the InBody520 and PC by Serial cable.
- ④ Disable : Not use Lookin'Body.

H. Example for Environmental Setup

* In the case of measuring weight automatically.

- ① Press the SETUP button.
- ② Using the direction button (▲,▼), select the 'Others' menu.
- ③ Use the ENTER or direction button (▶) to move to 'Measure Weight', and press the direction button (▶). Using the direction button (▲,▼), select AUTO and press the ENTER button.
- ④ Using the EXIT/MODE button, move to 'Measure Weight' and press the EXIT/MODE button twice and then press ENTER. Then the modified setup will be stored.

3. Quick setup

Users can easily modify frequently changed functions in the home screen.

A. How to modify Quick Setup

(1) Press the EXIT/MODE button on the home screen. You can see below screen.



(2) Choose an item you want to modify.

-Use the right and left direction button (◀ ▶) to move between items.

-Use the up and down direction button (▲ ▼) to modify setup values.

(3) Modified setup values are automatically stored. After finishing modification, press EXIT/MODE or the ENTER button to exit the Quick Setup.

B. Quick Setup Menu

(1) Unit

Refers to the unit used in measurement.

(2) Printing number of result sheet.

Decide on the number of result sheet that will be printed (0-2).

(3) Volume

Used to control the sound volume.

(4) Date / Time

Used to set up the current date and time.

4. DATABASE

When pressing the DATABASE button, the following screen will be displayed. It shows results from analysis stored in the InBody520.

DATABASE					
I.D. Search		Date Search		From	2006 07 01
<input type="text"/>				To	2006 08 09
No	ID	Date	Time	Height	Weight
1	895	2006/07/28	09:13	5ft. 3.0in.	147.5 lb.
2	5	2006/07/27	09:53	5ft. 4.0in.	149.2 lb.
3	26	2006/07/27	09:50	5ft. 2.5in.	145.0 lb.
4	635	2006/07/26	14:29	5ft. 0.5in.	140.0 lb.
5	624	2006/07/26	14:25	5ft. 3.5in.	147.5 lb.
6	33333	2006/07/26	10:21	5ft. 2.0in.	139.5 lb.
7	340	2006/07/26	09:43	5ft. 5.0in.	140.0 lb.
8	2006	2006/07/25	13:11	5ft. 1.0in.	143.0 lb.
9	444	2006/07/24	17:47	5ft. 8.0in.	135.2 lb.
10	505	2006/07/24	17:42	5ft. 1.0in.	145.2 lb.

Search Menu Exit
ENTER SETUP EXIT

You can search the results by ID and date. The followings are details to search.

A. ID Search

- (1) 12 + * : to find all ID's with 12 in the first 2 digits.
- (2) DA + * : to find all ID's with DA in the first 2 digits.
- (3) 12 + * + 34 : to find all ID's with '12' in the first 2 digits and 34 in the last 2 digits.
- (4) * + 12 + * : to find all ID's including 12 not in the first and last digits.
- (5) * : to list all stored data.

B. Date Search

- (1) Specific period
 - ① Enter the first day of the period you want to search (From).
 - ② Enter the last day of the period you want to search (To).
 - ③ Press ENTER button.

- (2) Specific day

Enter the same date in the both the From and To column.

C. Result Management

You can print, delete and copy the results searched by ID or date.

(1) Reprint

Locate the selection box, which indicates a selected result. When you have selected the one you want to print, press ENTER. When you press button 1, the result sheet will be printed.

(2) Copy

Locate the selection box of the result you want to copy and press ENTER. When you press button 2, the result will be copied into a USB storage device. You can select several results, or you can print out all the results at once.



NOTE

Contact Biospace or an authorized distributor for information about USB storage devices compatible with the InBody520.

(3) Delete

Locate the selection box of the result you want to delete and press ENTER. When you press button 3, the result will be deleted.



CAUTION

Once it has been deleted, the data cannot be restored.

(4) Backup

You can easily back up all data stored in the InBody520 into a USB storage device. When pressing the SETUP button on the database screen and then pressing button 1, it automatically starts a backup. Users cannot use the backup files. It is only used for result restoration when necessary.



CAUTION

Periodically backup the results in case of user misuse or disruption of the equipment.

(5) Restore

Connect the USB storage device to the USB host port. When pressing the SETUP button and on the database screen and then pressing button 2, data in the USB storage will be restored to the InBody520.



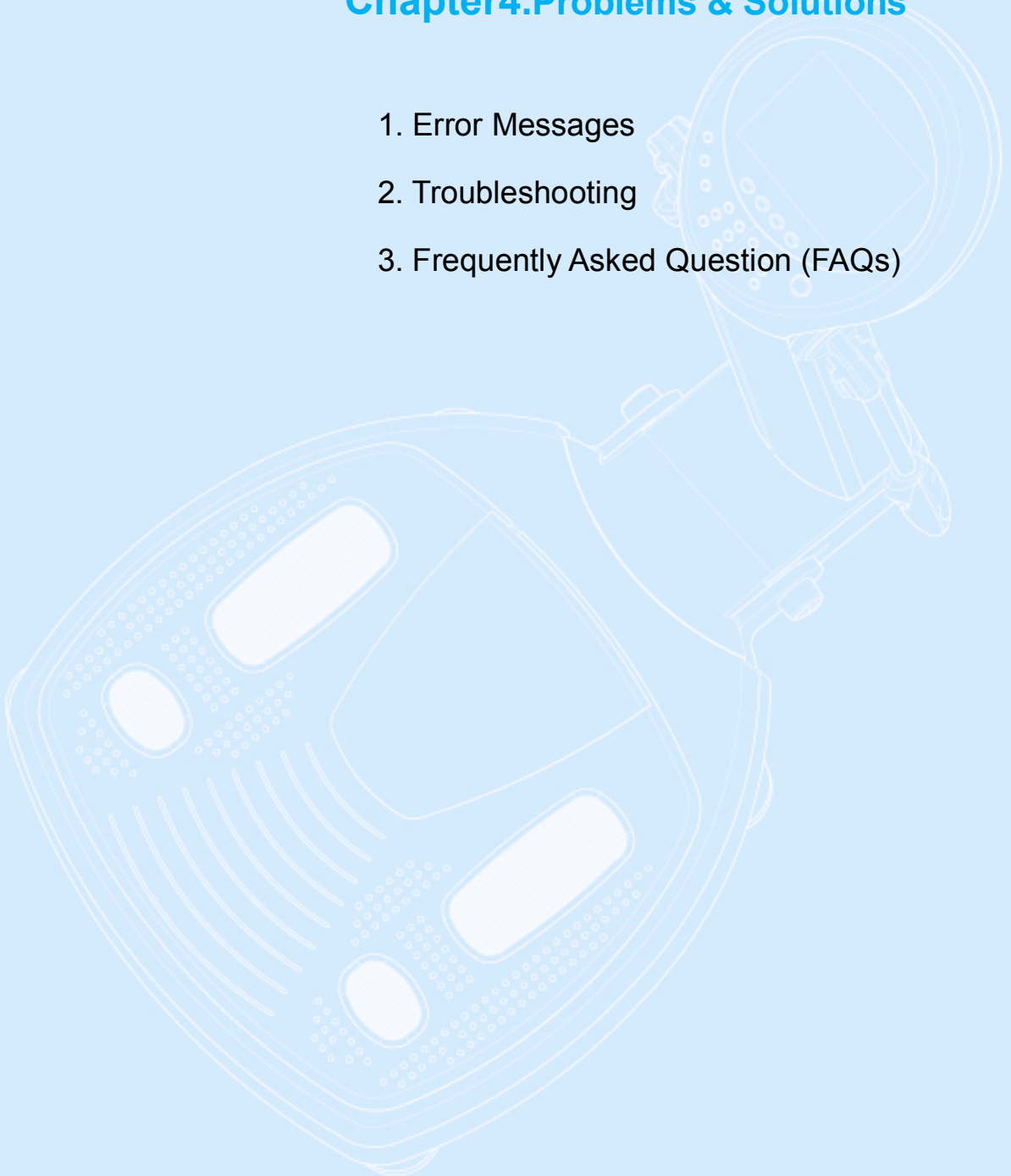
Note that stored data in the InBody520 is automatically deleted when restoring new data from the USB.



There is no limit to individual data storage. It is possible to store approximately 100,000 results in total.

Chapter 4. Problems & Solutions

1. Error Messages
2. Troubleshooting
3. Frequently Asked Question (FAQs)

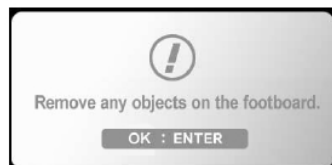


1. Error Messages

The InBody520 may display the following error messages to alert the operator of problems and to recommend the correct actions.

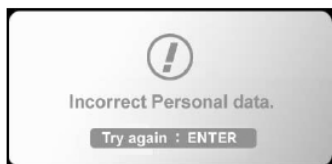
A. “Remove any objects on the footboard.”

When pressure or weight is applied to the foot plate during warm up, this message appears. Turn the InBody520 off and on again after removing the material on the foot plate. Please do not apply pressure or weight to the foot plate during the warm up.



B. “Incorrect Personal data.”

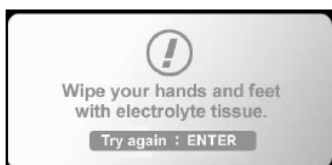
If inputted examinee data is beyond acceptable ranges, this error message appears. When inputting examinee data, do not exceed the acceptable ranges for Age and Height (Age: 1~99 years, Height: 1ft. 7.7in.~9ft. 10.1in.).



C. “Wipe your hands and feet with InBody tissue.”

If this message still displays on the LCD after checking the examinee’s posture, this examinee’s soles and palms may be too dry to be measured precisely.

In this case, a examinee should wipe his/her hands and feet with a wet tissue and try again.



2. Troubleshooting

This section lists the order of steps you should take in case of malfunction, with the assumption that you have some basic knowledge about how to operate the equipment. If you still have the problem after taking the following steps, contact Biospace.

A. The equipment won't turn on, even though the power switch is on

(In a normal situation, a signal sounds and the LCD is turned on.)

Cause 1 The plug is not pushed all the way into the electrical outlet.

Action 1 Push the plug all the way into the electrical outlet.

Cause 2 Extension is not turned on (when using a surge protector) or the power does not flow into extension.

Action 2 Check if the power flows into the extension and the electrical outlet where the extension is connected.

Cause 3 When an adapter not provided by Biospace is used.

Action 3 Use the adapter provided by Biospace only.

Cause 4 Adapter is not tightly inserted into the InBody 520.

Action 4 Insert the adapter into the power input port tightly.

B. The measured weight value seems very low or shows a negative value.

(Normally the measured weight should not be different from what the examinee believes his or her actual weight to be.)

Cause 1 The weight sensor (load cell) calibration was performed wrong during the self-calibration.

Action 1 Turn off the power of the InBody520, then turn it on again. Allow the unit to perform the self-calibration process again with no weight on the foot plate. The load cell will be set to 0 kg during self-calibration. Keep in mind, even a small amount of weight affects the calibration.

C. The analysis results are unexpected or unusual.

(It is not common to observe unexpected values. All analyzed values should not be outside of pre-determined ranges.)

Cause 1 An examinee failed to maintain proper posture. He/She removed fingers or the sole of the foot from the tactile points of the electrodes.

Action 1 He/She must maintain proper posture until the analysis is complete. Refer to Chapter 2, Section 6: "Proper Posture," (page 24) for more information. If the repeated analysis results are the same, contact Biospace.

D. The result sheet is not printing from the printer.

(In a normal situation, the result sheet automatically prints out after the measurement.)

Cause 1 Occurs when the paper tray is empty.

Action 1 Check if there is an indicator light or message on the printer. If the tray is empty then refill it with result paper. Be sure to place the paper properly in the tray (proper direction and surface orientation).

Cause 2 Occurs when the printer cable is unplugged.

Action 2 Ensure the cable is connected tightly to the InBody520 . Occasionally this may be a result of a bad cable. In this case, you must replace the cable.

Cause 3 Occurs when the paper is jammed inside the printer.

Action 3 Check if the paper is jammed inside. Normally, you will be alerted by the indicator light or message. Remove the paper jam and try again. Refer to the manual provided by the printer manufacturer.

Cause 4 Occurs when the printer or the InBody520 setup is incorrect.

Action 4 Check if the current printer setup is done properly, or if the printer is compatible with the InBody520 . Please also check if the number of result sheet is set as “0”.

E. Printing alignment needs to be adjusted.

(Normally, printing alignment correlates with each result item shown on the result sheet.)

Cause 1 Occurs when printing location has not been set normally.

Action 1 Refer to Chapter 3, Section 2: “Setup Menu” (page48) for the printing alignment.



CAUTION

When connecting a printer to the InBody520, turn on the power of the printer before turning on the InBody520. When turning the power off, turn off the InBody520 before turning off the printer. This process will minimize the harm to the equipment caused by electric shock.



NOTE

Occasionally the printing direction can be problematic. Refer to the printer manual provided by the manufacturer.



NOTE

Error messages and misprints are things that technical service representatives can examine in the process of troubleshooting, keep them in a safe spot or keep record of them.

3. Frequently Asked Question (FAQs)

Even if no problems arise from the equipment, users may still have many questions, especially regarding clinical procedures. A few more of the common questions and answers are listed below. If additional questions or more clarification is desired, please contact us by e-mail. The e-mail address for clinical questions is as follows:

E-mail: usa@biospaceamerica.com

A. Must socks or stockings be removed from the feet for analysis?

Bare skin contact is essential in the analysis using the BIA method. Socks or stockings may cause a varying degree of distortion in the results. Socks and stocking must be removed to obtain accurate data.

B. What are the circumstances where an analysis cannot be performed?

Examinees who have a pacemaker or other internal electronic medical devices should never use the InBody520 .

C. Is the electrical current applied to a human body through electrodes safe?

Yes. The BIA method uses an electrical current, but is practically harmless. The InBody520 has acquired the CE and other certifications that assure safety of the medical equipment.

D. Do accessories (jewelry, watches, rings, etc.) or any other metal objects worn by an examinee affect the analysis?

The ideal condition for the analysis is simply standing with no clothes (naked) and wearing no accessories. However, this may not always be possible. Therefore, we recommend that the subject remove as many clothing items and accessories that may affect the weight as possible.

E. How often does the examinee perform the analysis?

The body composition changes by inches but continuously according to steady diet, work out, or medical treatment, etc. We recommend you to measure the InBody520 once every two to four weeks to reliably see the changes.

F. Do I have to use electrolyte tissue? Can I just use wet cloth?

The electrolyte tissue that comes with the InBody520 is specially designed for optimal testing, as opposed to other wet cloth. Always use the electrolyte tissue for accurate testing.

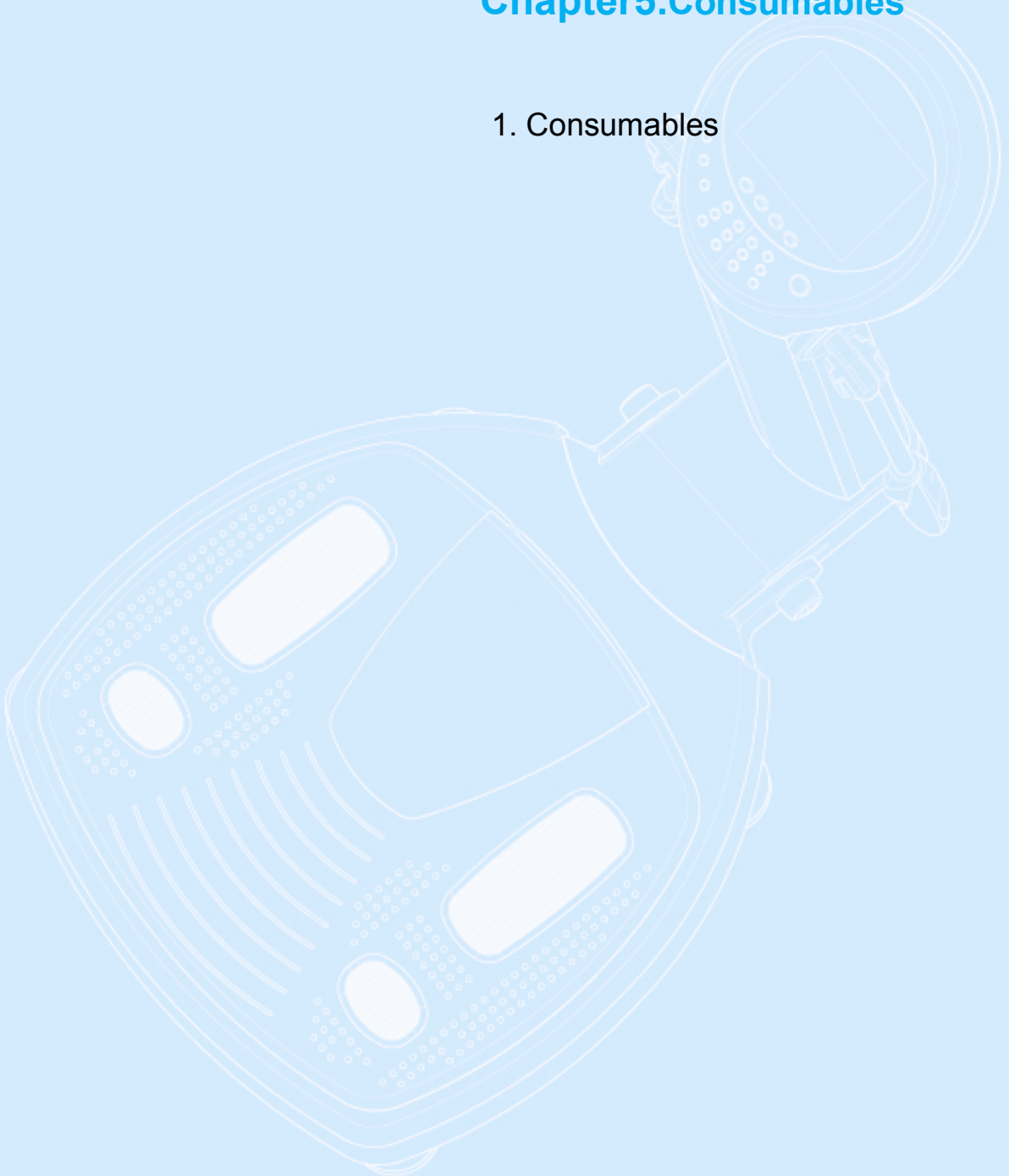
G. How does the examinee follow for accurate analysis?

For accurate analysis, Biospace recommends the following:

- Measure with an empty stomach.
- Measure 2 hours after a meal or on an empty stomach.
- Measure after using the restroom.
- Remove heavy clothes or accessories.
- Do not exercise or take a shower before measurement.
- Measure after standing for at least 5 minutes.
- Do not measure after abruptly standing up.
- Do not measure while taking a diuretic.
- For females, avoid having measurement during menstrual period as total body water will be higher than normal.
- Input accurate height.
- Keep room temperature at 68 ~ 77°F (20 ~ 25°C).
- Warm up yourself for 20 minutes before a test performed in winter.

Chapter 5. Consumables

1. Consumables



1. Consumables

A. Result sheet

When using the InBody520 with a printer, it is strongly recommended to use the result sheets supplied by Biospace. If more result sheets are needed, please contact Biospace.

Result sheet size	8.5 * 11 " (Letter type)
Number of sheets	500 / 1box
Printed condition	4 colors
Manufacturer	Biospace Co., Ltd

InBody 520

ID
Age

Height
Gender

Date
Time

Body Composition Analysis

	Under	Normal	Over	unit/s
Weight				
Lean Body Mass				
Body Fat Mass				

Body Water Balance

	Under	Normal	Over	unit/s
Intracellular Water				
Extracellular Water				
Total Body Water				

Obesity Analysis

	Value	Normal Range	
BMI <small>Body Mass Index</small> (kg/m ²)			$BMI = \frac{\text{Weight, kg}}{(\text{Height, m})^2}$
PBF <small>Percentage of Body Fat</small> (%)			$PBF = \frac{\text{Fat, kg}}{\text{Weight, kg}} \times 100$

Segmental Lean Analysis

	Under	Normal	Over	unit/s
Right Arm				
Left Arm				
Trunk				
Right Leg				
Left Leg				

Lean ■■■ Lean / Ideal Lean × 100(%) ■■■

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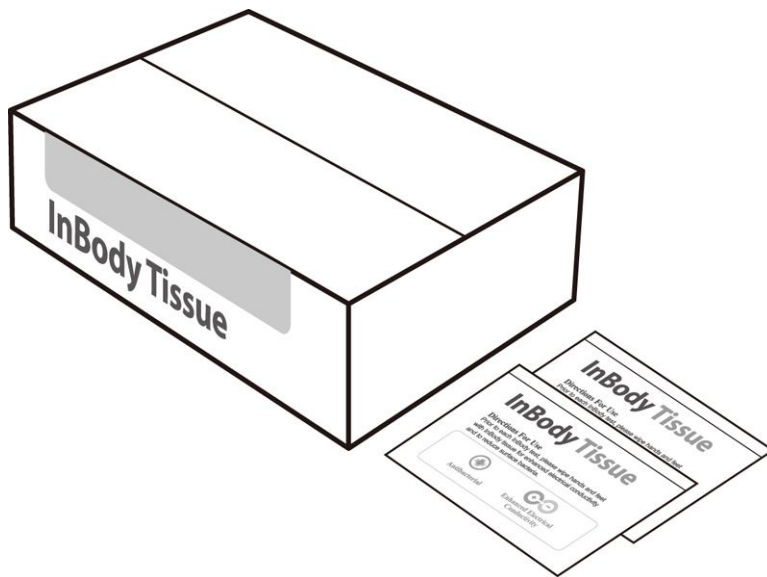
B. InBody Tissue

InBody Tissue is specially designed for optimal testing, as opposed to other wet cloth.

For each user, wipe hands and feet with InBody Tissue to ensure quality measurements.

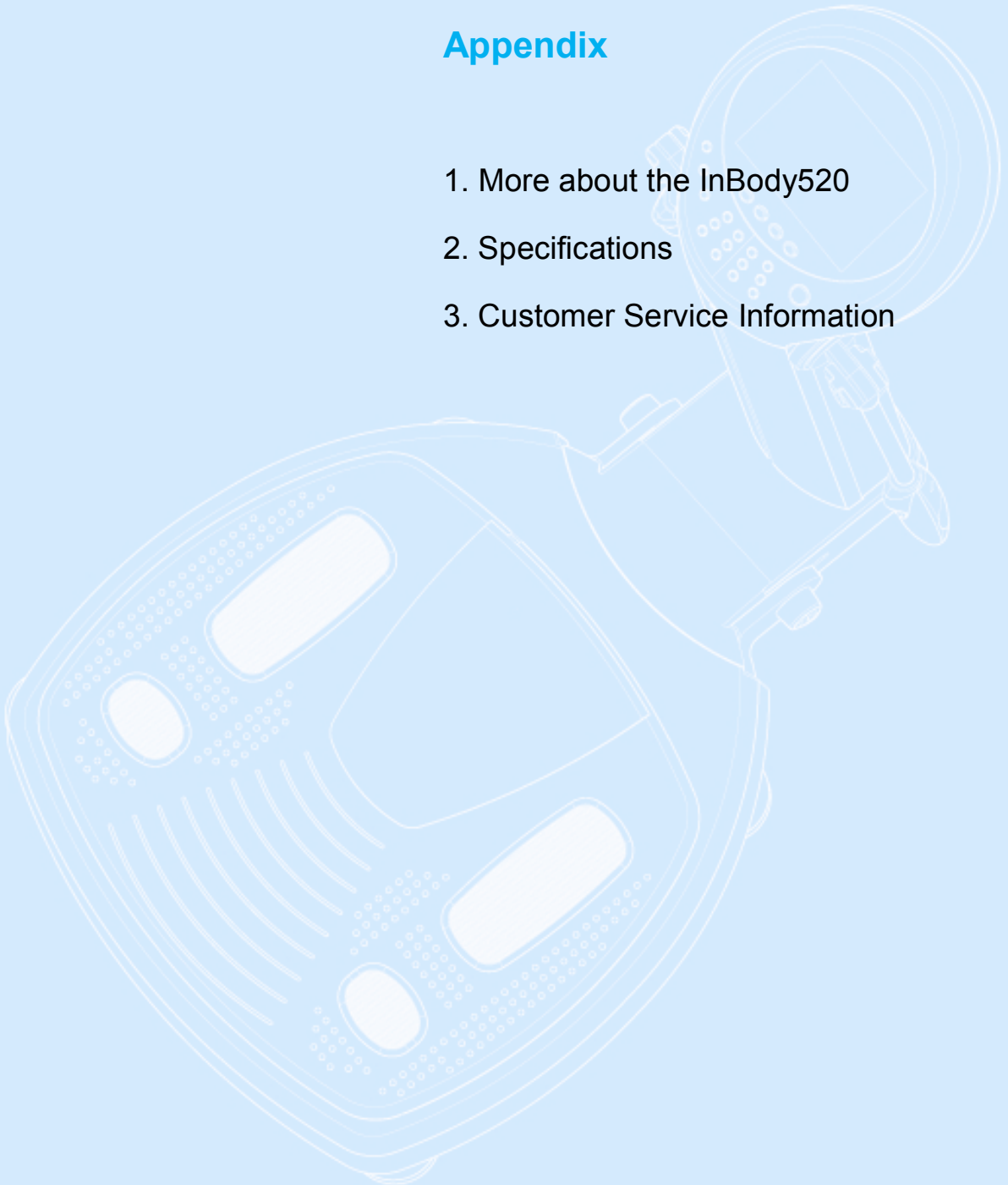
InBody Tissue is sold separately. Contact Biospace for ordering details.

Number of tissues	300 / 1box
Manufacturer	Biospace Co., Ltd



Appendix

1. More about the InBody520
2. Specifications
3. Customer Service Information



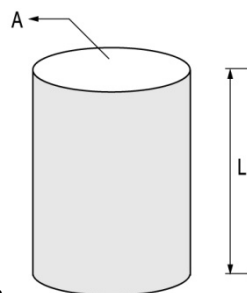
1. More about the InBody520

A. How does BIA work?

The Bioelectrical Impedance Analysis (BIA) method is based on the fact that the human body consists of conductors and non-conductors. Generally, 50~70% of the human body consists of water which functions as a conductor, whereas body fat functions as a non-conductor.

The classic BIA method measures the impedance of the whole body on the assumption that the human body can be considered a cylinder for the application of this model. If A is the cross sectional area, and L is the length, the impedance of the cylinder can be expressed as follows.

$$Z = \rho \frac{L}{A} (\rho = \text{resistivity})$$



If both sides are multiplied by L, We get the new expression as follows.

$$V = \rho \frac{L^2}{Z} (V(\text{Volume}) = A(\text{Area}) \times L (\text{Length}))$$

According to this expression, if we know the L and the impedance value, we get the volume. That is to say, if we know the height of the human body (acting as a conductor), and know the impedance value, we can get the volume of body water. Here, the volume represents examinee' height. Therefore, the two directly used variables in body composition analysis are impedance and height.

The principle of the InBody520 's body composition analysis is explained by the following; the volume of body water, an electrolyte, is calculated first with a measured impedance value. Then, we can get the value of fat free mass using the volume of body water. Body fat mass is determined by deducting the lean body mass from the measured weight.

Height should be entered by the user. Weight can be directly measured on the InBody520 .

B. Core Technology

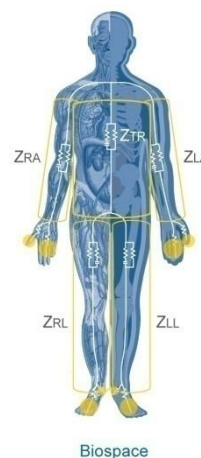
The following are key features that make the InBody520 extremely convenient, timely, and accurate.

(1) Tetra polar 8-Point Tactile Electrode

It was a complex and inconvenient procedure to attach and detach the electrodes to a specific spot every time. Trained technicians were needed for each measurement. The InBody520 uses tactile electrodes to avoid the possibility of errors and inaccuracies. The 8-point Tactile Electrode method enables the InBody520 to efficiently produce accurate data every time.

(2) Segmental Analysis

There are some claims to be able to estimate the body composition separately; there is no technology which can really measure it separately other than Biospace. Segmental measurement is the technology that assumes the body as five cylinders of four limbs and trunk and measures the impedance of these parts separately. Segmental body composition analysis provides segmental measurement of body water, muscle mass, and fat free mass. Furthermore, the analysis is highly accurate because the measured value of a certain part does not affect the measurements of other segments. It is because body composition analyzers lack accuracy in measuring body fat and cannot figure out the examinee's exact shape that they must rely on empirical references to correct inaccurate measured values. But, the InBody with the technology of segmental analysis can exactly figure out difference by gender, aging, disease and ethnic without any empirical estimation. Based on the fact that fat free mass (FFM) consists of about 73.3% of body fluid, it can be concluded that the distribution of body fluid reflects the distribution of FFM. The InBody can analyze the segmental lean development of each limb by treating them as individual cylinders.



C. Classifications

The product received classifications in the following:

Type of protection against electric shock : Class I

Type of the applied parts : BF Type

Degree of protection against water infiltration : IPX0

EMC Immunity : Level A EMC Emission : Level A

Equipment is not suitable for use in the presence of flammable mixture.



Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2. Specifications

Bioelectrical Impedance(BIA) Measurement Items	Bioelectrical Impedance(Z)	15 Impedance Measurements by Using 3 Different Frequencies (5kHz,50kHz,500kHz) at Each of 5 Segments (Right Arm, Left Arm, Trunk, Right Leg and Left Leg)
Electrode Method	Tetra polar 8-Point Tactile Electrodes	
Measurement Method	Direct Segmental Measurement Bioelectrical Impedance Analysis Method, DSM-BIA	
Body Composition Calculation Method	No use of Empirical Estimation.	
Outputs	Weight, Lean Body Mass, Body Fat Mass Intracellular Water, Extracellular Water, Total Body Water Dry Lean Mass Body Mass Index (BMI), Percentage of Body Fat (PBF) Segmental Lean Mass (Right Arm, Left Arm, Trunk, Right Leg, Left Leg) Body Fat & Lean Body Mass, Basal Metabolic Rate, ECW/TBW Impedance of Each Segments & Frequencies	
Applied Rating Current	400 μ A	
Adapter	Power Input	AC100-240V, 50/60Hz, 1.2A
	Power Output	DC 12V, 3.5A
Display Type	640 X 480 Color LCD	
External Interface	RS-232C 3EA, USB Slave 1EA, USB Host 2EA, Ethernet (10T) 1EA	
Compatible Printer	Laser/inkjet PCL 3 or above and SPL(Printer recommended by BIOSPACE)	
Dimensions	20.6(W)X33.2(L)X41.4(H): inch 522(W)X843(L)X1015(H): mm	
Weight	57.3lbs.(26kg)	
Operation Environment	50 ~ 104°F(10 ~ 40°C), 30 ~ 75%RH, 70 ~ 106kPa	
Transport and Storage Environment	-4 ~ 158°F(-20~ 70°C), 30 ~ 95%RH, 50 ~ 106kPa	
Weight Range	10 ~ 250kg (22 ~ 551lb.)	
Age Range	3 ~ 99years	
Height Range	3ft. 1.4in. ~ 7ft. 2.6in. (95cm ~ 220cm)	

* Specifications may change without prior notice.

3. Customer Service Information

Corporate agents of the InBody520 and addresses are listed below. Contact us for assistance or more information about the InBody520.

Biospace, Inc.

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518-10 Dogok 2- dong, Gangnam-gu, Seoul 135-854 KOREA

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