B.C.A. for experts that analyzes human body through a single scan

X-SCANPLUS 950

Our company uses additional information such as body weight, height, age and gender based on directly measured impedance. Or the device can only use weight and height.
Body composition cannot be measured without using necessary factors. B.C.A. becomes smarter by using more factors such as age and gender in addition to body weight and height.

Correctly understanding B.C.A.

The technology of measuring Body Composition is based on directly measured impedance and shows the result from the calculation with additional information such as weight, height, age and gender. We have kept claiming this fact since the establishment and recently FDA presented the same contents as the definition of BCA. Do not be misled by deceptive advertising such as 'direct measurement' and etc.

Experience the **world first 'B.M.S.' technology** with B.C.A. of Jawon Medical.

FDA defines BCA is the device that calculates and estimates body composition parameters by using measured weight and impedance in a specified age range.

Choice of many medical doctors around the world!

1. Association between Genetic Polymorphism of Peroxisome Proliferator-Act ivated Receptor Alpha Leu 162 Val and Metabolic Syndrome in Korean. S. C. Shin et al. Kosin University and Dong-A Univ ersity
2. Lifestyle behaviors associated with metabolic syndrome in medical chec k-up examinee. C. H.Kim et al. Kosin University
3. The Comparison of Middle Age Women's Metabolic Syndrome by GNB3 Gene Polymorphism. H. S. Kang et al. Sungkyunkwan University

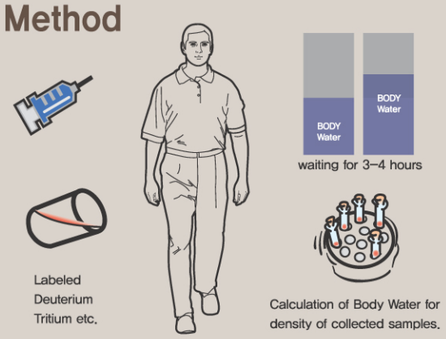
We have dozens of papers so if you need to see more, please visit our web site or contact us.

Bluetooth communication with Mobile devices (Option)
Bluetooth function is embedded in the device so the measured data can be transmitted by mobile devices. As soon as measurement is finished, the measured data will be transmitted without scanning QR code or printing out result sheet for saving and managing the data.

Technology of Jawon Medical

Jawon Medical has constantly been using tetra-polar electrode method using 8 touch electrodes ever since its foundation in **1993**. Instead of switching between bi-polar electrode and tetra-polar electrode methods, we have consistently used tetra-polar electrode method. Technology of our company is based on isotope dilution method, the golden method for measuring body water. **Empirically estimated values** refer to ceaseless modification on the formula based on comparison of DEXA, CT or user measurement data without basic clinical data.
Jawon used a formula to body water through official clinical means with isotope dilution method.

01. Jawon's Clinical study based on Isotope Dilution Method



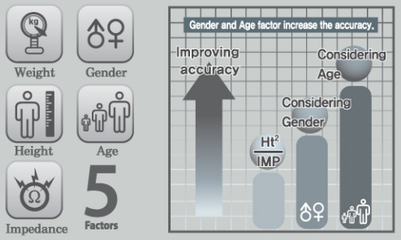
02. 5 factors

What's Bioelectrical Impedance Analysis? (BIA)

In BIA, the difference in electrical conductivity according to biological characteristics of the tissue has some limitation as followings.

The limitations of BIA:

The human body is represented as a simple cylindrical shape determined by height and weight. It assumes that body composition is homogenous and evenly distributed. It does not consider individual differences and variation of Body Composition. It ignores any changes in the environment (temperature), body heat, and stress. However, in reality, the human body is different with the assumptions mentioned above. In order to use BIA to analyze the "actual" human body accurately, 5 factors must be considered in the calculation.



Jawon Medical uses 5 Factors correctly to analyze the whole body and abdominal fat. Using 5 factors, the accuracy of final analysis is greatly improved

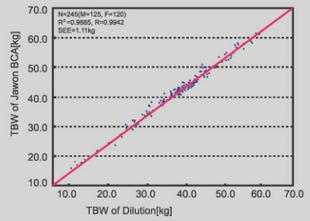
03. Tetra polar electrode method using 8 touch electrodes

We, Jawon Medical Co.,Ltd. use the Tetra Polar Method to achieve the greatest accuracy in analyzing body composition.
Tetra Polar Method uses separate electrode:
Current Electrode which sends out an electric current to the human body and voltage electrode which detects impedance. It minimizes the contact resistance and increases the accuracy. In addition, it takes a measurement at the fixed location of foot electrode (ankle electrode) and hand so that it reduces measurement errors and increases reproducibility of results.

04. Accuracy

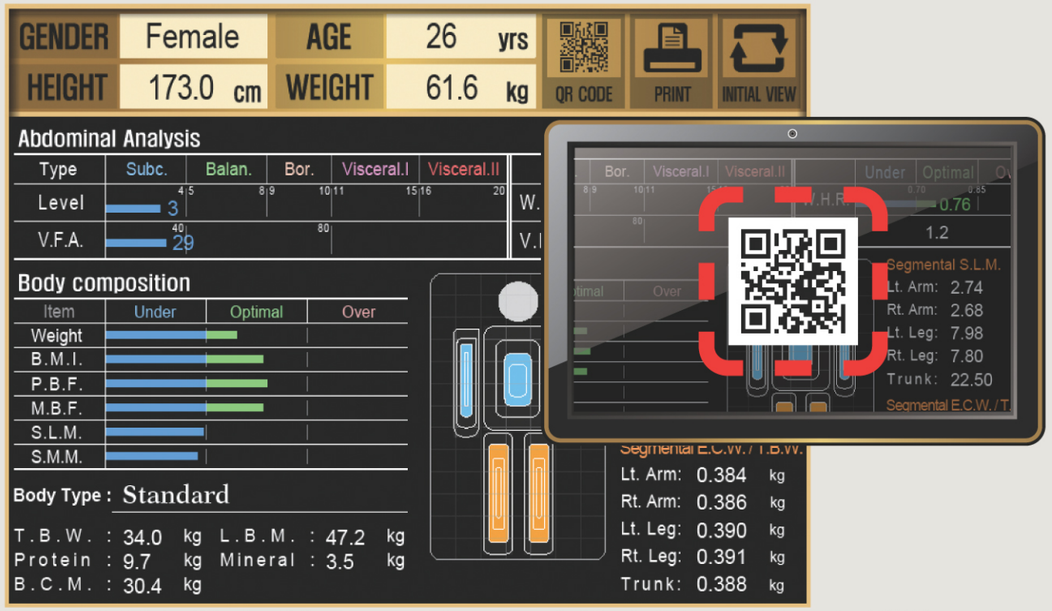
Standard deviation with isotope dilution method, is the golden method for measuring body water.

The measured values of body water with BIA and isotope dilution method were compared to evaluate correlation. It appeared high correlation between the two values with R^2 value of 0.9885.



05. Multi frequency

Many body composition analyzer companies approach consumers by presenting themselves as to offer accurate measurement data using terms like "no. 1 in the world" or "best in the world". Such words are simply used for promotion, and the most accurate way to determine accuracy of a device is for the user to directly measure Jawon's device in comparison with other companies' devices setting the standard with DEXA results, which is a clinical method of measuring body fat. The device that has the least margin of error in measured percent of body fat comparing with DEXA results is the most accurate. **We think it would be reasonable to put the responsibility for the test cost on the company that shows lower accuracy comparing with DEXA result.**



The equipment will display a QR code on LCD result screen so that users can scan the QR code with their mobile devices such as tablet PC and smart phone. After the mobile devices scan the QR code, the measured data are transmitted and saved in the server and users can check the data. User can review and manage the saved data in the dedicated homepage 'http://m.jawon.com' whenever they want.
(There could be a limit for use in accordance with performance of mobile devices.)

Comparison data between BCA and DEXA

New BCA of Jawon Medical, X-SCAN PLUS 950!

The new model has been prepared with an upgraded program. The upgraded program allows the analysis in specific body types like a Body Builder as well as Standard, Thin and Obese body types.

Name	Age	Weight	Height	DEXA	JAWON	Competitor	Body Type
Matt	29yrs	71.4kg	169.0cm	13.7%	13.9%	14.0%	Standard
Paul	28yrs	82.4kg	179.0cm	14.1%	14.1%	10.6%	Standard
Ed	42yrs	90.2kg	176.0cm	19.9%	20.0%	20.3%	Obese
George	50yrs	94.8kg	169.0cm	26.0%	26.6%	32.4%	Obese
Aric	35yrs	98.5kg	178.5cm	15.9%	17.4%	17.3%	Tall muscular
Kelly	34yrs	94.5kg	188.5cm	9.8%	8.5%	6.8%	Tall muscular
Liz	28yrs	72.4kg	178.0cm	23.6%	23.5%	22.5%	Standard
Kelly	26yrs	74.5kg	170.0cm	27.5%	26.2%	27.8%	Standard

The data above compares the results of measurement on body fat percentage of a body builder and the standard type using the body composition analyzers of Jawon Medical and a competitor (2014) with the DEXA equipment of company H.
There could be some differences comparing with the real measured data.

ID: JAWON MED 0002345265 Name: Diane
Date: 2014-04-20 16:25 Height: 173.0 cm Weight: 61.6 kg Age: 26 yrs Gender: Female

X-SCAN PLUS 950

JAWON MEDICAL www.jawon.com

1 Body Composition

[kg]

Weight/Optimal 61.6(59.2~72.3)	Std.wt. 65.8	
L.B.M./Optimal 47.2(46.1~52.6)		M.B.F./Optimal 14.4(13.2~19.7)
S.L.M./Under 43.7(45.5~54.9)	S.M.M./Under 26.2(27.3~32.9)	Mineral/Under 3.5(3.6~3.9)
T.B.W./Optimal 34.0(33.1~37.8)	Protein/Optimal 9.7(9.2~10.5)	
I.C.W./Balan. 20.7(20.4~22.3)	E.C.W./Balan. 13.3(11.7~13.6)	

2 Body Status

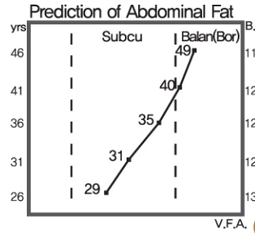
	Under	Optimal	Over	
Weight kg	70 80 90 100 110 120 130 140 150	61.6		[%]
B.M.I. kg/m²	14.5 16.5 18.5 21.75 25 27.5 30 32.5 35	20.6		[kg/m²]
P.B.F. %	10 15 20 25 30 35 40 45 50	23.4		[%]
S.L.M. kg	70 80 90 100 110 120 130 140 150	43.7(66%)		[%]
S.M.M. kg	70 80 90 100 110 120 130 140 150	26.2		[%]

3 Abdominal Analysis

	Subcut-aneous	Balanced	Border-line	Visceral I	Visceral II
V.F.L.	1 5	9	11	16	
	3				
V.F.A.	40	80			
	29				

Under	Optimal	Over
W.H.R. 0.70 0.85	0.76	
V.F.M. 1.2 kg	S.F.M. 13.2 kg	

Prediction of Abdominal Fat



4 Segmental S.L.M.

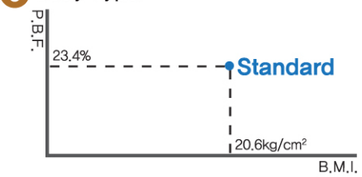
■ S.L.M. ■ S.L.M./I.S.L.M.×100%

	Under	Optimal	Well	E.C.F./T.B.F.	E.C.W./T.B.W.
Lt.Arm kg	70 80 90 100 110 120 130 [%] 2.74 94%			0.336	0.384
Rt.Arm kg	2.68 92%			0.338	0.386
Lt.Leg kg	7.98 101%			0.342	0.390
Rt.Leg kg	7.80 96%			0.343	0.391
Trunk kg	22.50 105%			0.340	0.388

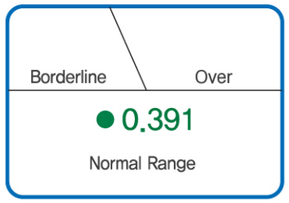
5 Body Composition Change

	2014.4.20 09:30	2014.4.13 11:30	2014.4.06 10:45	2014.3.30 13:30	2014.3.23 12:30	2014.3.16 10:30	2014.3.09 11:30	2014.3.02 15:15
E.C.W./T.B.W.	0.391	0.389	0.388	0.388	0.387	0.392	0.395	0.394
P.B.F. %	23.4	23.2	23.3	23.3	23.2	23.5	23.9	23.9
S.L.M. kg	43.7	43.9	43.9	43.8	43.5	44.1	43.3	44.4
Weight kg	61.6	61.5	61.3	61.6	61.8	62.2	62.3	62.3

6 Body Type



7 E.C.W./T.B.W.



8

T.B.W.: 34.0 kg (33.1~37.8)
L.B.M.: 47.2 kg (46.1~52.6)
M.B.F.: 14.4 kg (13.2~19.7)
S.L.M.: 43.7 kg (45.5~54.9)
S.M.M.: 26.2 kg (27.3~32.9)
Protein : 9.7 kg (9.2 ~10.5)
Mineral : 3.5 kg (3.6 ~ 3.9)
B.C.M.: 30.4 kg (29.2~31.0)
B.M.R.: 1306 kcal
T.E.E.: 2011 kcal
A.M.B.: 26 yrs

Total score 80/100

9 Study

Impedance (320Ω)

Freq	1K	5K	50K	250K	550K	1M
RA,Imp.	336	336	314	262	260	188
LA,Imp.	332	323	308	263	243	184
Trunk	22	67	42	67	72	44
RL,Imp.	252	243	229	183	164	104
LL,Imp.	256	256	235	182	181	108

10

Systolic Lt 125 mmHg / Rt 111 mmHg
Diastolic Lt 65 mmHg / Rt 69 mmHg
Pulse 76 bpm
The difference of your inter-arm pressure is
Systolic 14mmHg, Diastolic 04mmHg

11

Scan the left QR code with a smart phone to see the result on the website.

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Segmental Result (Option)

ID: JAWON MED 0002345265 Name: Diane
Date: 2014-04-20 16:25 Height: 173.0 cm Weight: 61.6 kg Age: 26 yrs Gender: Female

X-SCAN PLUS 950

JAWON MEDICAL www.jawon.com

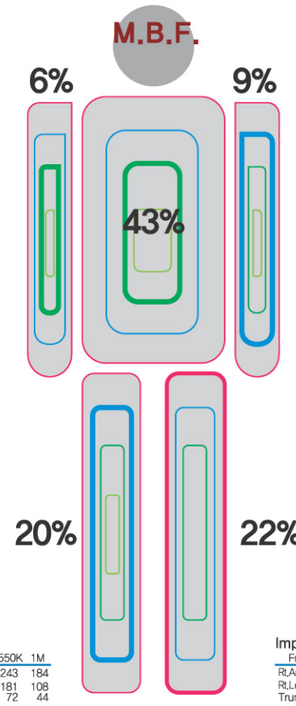
Segmental T.B.W.
Lt. Arm: 3.86 kg [3.79~3.90]
Rt. Arm: 3.85 kg [3.79~3.90]
Lt. Leg: 6.13 kg [6.10~6.17]
Rt. Leg: 6.10 kg [6.10~6.17]
Trunk: 15.6 kg [15.5~16.3]

Segmental I.C.W.
Lt. Arm: 1.67 kg [1.65~1.70]
Rt. Arm: 1.69 kg [1.65~1.70]
Lt. Leg: 4.09 kg [3.99~4.10]
Rt. Leg: 4.10 kg [3.99~4.10]
Trunk: 9.15 kg [9.12~9.17]

Segmental E.C.W.
Lt. Arm: 1.27 kg [1.23~1.28]
Rt. Arm: 1.28 kg [1.23~1.28]
Lt. Leg: 3.03 kg [3.01~3.07]
Rt. Leg: 3.05 kg [3.01~3.07]
Trunk: 4.67 kg [4.64~4.69]

Segmental E.C.W./T.B.W.
Lt. Arm: 0.384
Rt. Arm: 0.386
Lt. Leg: 0.390
Rt. Leg: 0.391
Trunk: 0.388

Segmental E.C.F./T.B.F.
Lt. Arm: 0.336
Rt. Arm: 0.338
Lt. Leg: 0.342
Rt. Leg: 0.343
Trunk: 0.340



Segmental S.L.M.
Lt. Arm: 2.74 kg [2.71~2.76]
Rt. Arm: 2.68 kg [2.71~2.76]
Lt. Leg: 7.98 kg [7.93~7.98]
Rt. Leg: 7.80 kg [7.93~7.98]
Trunk: 22.50 kg [22.48~22.53]

Segmental M.B.F.
Lt. Arm: 0.87 kg [1.65~1.70]
Rt. Arm: 1.29 kg [1.65~1.70]
Lt. Leg: 2.88 kg [2.01~2.07]
Rt. Leg: 3.17 kg [2.01~2.07]
Trunk: 6.19 kg [6.73~6.80]

Study

Impedance

Freq	1K	5K	50K	250K	550K	1M
Lt.Arm Imp.	332	323	308	263	243	184
Lt.Leg Imp.	256	256	235	182	181	108
Trunk	22	67	42	67	72	44

Impedance

Freq	1K	5K	50K	250K	550K	1M
Rt.Arm Imp.	336	336	314	262	260	188
Rt.Leg Imp.	252	243	229	183	164	104
Trunk	22	67	42	67	72	44

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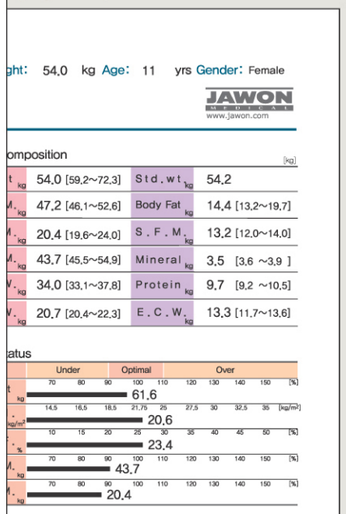
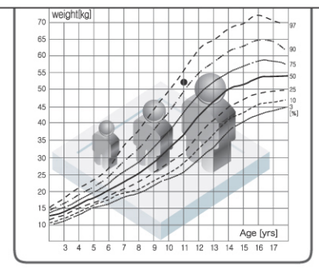
Result sheet for children (Option)





Body Type: Standard

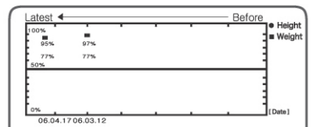
B.M.R.: 1306 kcal B.C.M.: 34.0 kg Fatness: -6.38%
T.E.E.: 2011 kcal A.M.B.: 26 yrs W.H.R.: 0.73

Nutritional Assessment

	Under	Optimal	Well		Under	Optimal	Well
Mineral		✓		B.C.M.		✓	
Protein		✓					

Body Composition Change

	Date	Weight	P.B.F.	S.L.M.
Previous	2013.4.14	61.8 kg	23.6 %	43.5 kg
Present	2013.4.26	61.6 kg	23.4 %	43.7 kg



Height is the seventy seventh from the smallest among 100 children of the same age.
Weight is the ninety fifth from the lightest among 100 children of the same age.

Segmental S.L.M.
Lt. Arm: 2.74 kg [Optimal]
Rt. Arm: 2.68 kg [Optimal]
Lt. Leg: 7.98 kg [Optimal]
Rt. Leg: 7.80 kg [Optimal]
Trunk: 22.50 kg [Well]

Segmental M.B.F.
Lt. Arm: 1.68 kg [Optimal]
Rt. Arm: 1.66 kg [Optimal]
Lt. Leg: 2.02 kg [Optimal]
Rt. Leg: 2.05 kg [Optimal]
Trunk: 6.79 kg [Optimal]

Impedance (310Ω)

Freq	1K	5K	50K	250K	550K	1M
RA,Imp.	336	336	314	262	260	188
LA,Imp.	332	323	308	263	243	184
Trunk	22	67	42	67	72	44
RL,Imp.	252	243	229	183	164	104
LL,Imp.	256	256	235	182	181	108

Scan the left QR code with a smart phone to see the result on the website.

Rev. 14,09,12 A.0

❶ Body Composition Analysis

It shows measurement results and optimal ranges of Body Water, Protein and Mineral that consist of Human Body. We have been recognized in the fact that there is 99% correlation through the clinical test comparing with Isotope Dilution Method called Golden Method in Body Water Measurement.

❷ The measurement result of Body Composition

It shows graphs to make people see their body conditions at a glance. It will guide them to decreasing body fat or increasing muscle.

❸ Abdominal analysis

Body Fat consists of subcutaneous fat and visceral fat.
It analyzes various items about visceral fat that closely related with lifestyle diseases.

Visceral fat Level

Visceral fat can be easily melted in blood in contrast to subcutaneous fat so it is closely related with lifestyle diseases.
The ideal ratio between subcutaneous fat and visceral fat is 6:4 and when it is balanced with the ratio, it is included in the 8th level. The higher ratio of visceral fat is, the higher level is. And in the case, it would be in the visceral obesity type.

Visceral Fat Area

The normal range of Visceral Fat Area for male is 50~100 cm^2 and female is 40~80 cm^2 . If the values are beyond the bounds, the risk of visceral fat gets high.

Waist to Hip Ratio

It is the index that indicates the ratio of Hip circumference and Waist circumference and assesses the body type.
In accordance with body fat distribution, it is distinguished into upper body obesity, lower body obesity or balanced and if Waist to Hip Ratio is in the Over range, it means upper body obesity.

Prediction of Abdominal Fat

It shows Prediction of Visceral Fat Area per every 5 years reflecting aging as well as just Visceral Fat Area. This induces people's interests in Visceral Fat Area motivation for health care.

❹ Segmental assessment

Soft lean mass and edema index of five body parts (left and right arms, left and right legs, and trunk) are analyzed.

❺ Accumulated data

It shows changes of body fat mass, muscle mass, Weight and ECW/TBW at a glance. Constant health care is important most of all rather than short term care.

❻ Body type

Based on the result of B.M.I. and the P.B.F., it assesses the overall body type of the measurer.

❼ The ratio of E.C.W. / T.B.W.

Extra Cellular Water/Body Water is the index evaluating the water balance as the ratio of Extra Cellular Water to the whole Body Water. In case that the value is on the border line or over the standard, it means unbalance of Intra Cellular Water and Extra Cellular Water and the cause could be salty food, undernourishment, problems in organ, childbirth, immoderate exercise and temporary fatigue, etc.

❽ Energy expenditure

It is the summary of overall metabolism analysis such as Body Cell Mass, Basal Metabolic Rate and Total Energy Expenditure. BMR is generally calculated with weight, height, age factors and etc using Harris-Benedict method. However, BMR is the item calculating expended energy amount therefore it would be more accurate when calculated with Lean Body Mass except Body Fat that does not expend energy from weigh. By using only Lean Body Mass that actually expends energy, it helps people to get more accurate BMR and do scientific diet.

❾ Study

It indicates Impedance in accordance with the frequency and segment. Impedance is Resistance Value that appears in human bodies when flowing fine electric current to human bodies and people differently have their own values.

❿ Blood pressure

In case of connecting Jawon Medical' s Blood Pressure Monitor to BCA product, BP data can be measured and indicated in result sheet.
It is useful to check obesity and blood pressure at once. If Double Arm blood pressure monitor produced by Jawon Medical is connected, blood pressure data of both arms and the difference of the BP values of both arms can be checked together so medical examination and treatment effects in wide ranges can be expected.

⓫ QR code

Once scanning QR code with your smart phone, all results will be transmitted to the smart phone. You can see the result whenever you want.

Data demonstrating that all companies are using additional information in measuring body composition

There is no such thing as empirically estimated values in body composition measurement.

Age and gender are factors that increase accuracy of measurement, and they belong to additional information like body weight and height. Additional information is essential for body composition measurement. The following data demonstrates this fact.

Jawon

Height : 174 cm	Weight : 78.5 kg		Age : 42yrs		Gender : Male
Factor	T.B.W.	S.L.M.	M.B.F.	P.B.F.	Visceral fat
None	44.8kg	57.6kg	16.4kg	20.9%	12
Change gender	42.6kg	54.6kg	19.4kg	24.7%	4
Change age (+20yrs)	44.2kg	56.9kg	17.1kg	21.8%	15
Added weight (+5kg)	46.1kg	59.2kg	19.5kg	23.3%	12

M1

Height : 174 cm	Weight : 78.6 kg		Age : 42yrs		Gender : Male
Factor	T.B.W.	S.L.M.	M.B.F.	P.B.F.	Visceral fat
None	46.6kg	61.5kg	13.9kg	17.6%	8
Change gender	43.8kg	58.3kg	17.2kg	21.9%	4
Change age (+20yrs)	45.4kg	61.4kg	14.0kg	17.8%	11
Added weight (+5kg)	47.0kg	62.1kg	15.7kg	19.3%	9

M2

Height : 174 cm	Weight : 78.1 kg		Age : 42yrs		Gender : Male
Factor	T.B.W.	S.L.M.	M.B.F.	P.B.F.	Visceral fat
None	45.3kg	34.8kg	16.5kg	21.2%	73.8
Change gender	45.7kg	35.1kg	16.0kg	20.5%	71.5
Change age (+20yrs)	45.9kg	35.3kg	15.6kg	20.0%	69.7
Added weight (+5kg)	46.2kg	35.5kg	19.7kg	23.8%	87.9

There could be some differences comparing with the real measured data.

M1 and Jawon Medical mentioned that factors of gender and age are taken into account during body composition analysis. The above measurement result shows change in the measurement values such as fat and muscle mass according to change in gender and age, proving that such mention is true. M2 stated that measurement is not affected by gender and age factors and measurement values only changed with extremely small deviations when age and gender were changed. When body weight factor was changed, M1 and Jawon Medical showed even distribution of additional mass of 5kg to body water, muscle mass and body fat. On the contrary, M2 only showed increase in body fat, especially affecting visceral fat. These results suggest that M2 relies on experientially obtained values.

Functional specification

Setup	Contents
Printing Logo	Printing logo or the name of hospital, address, contact information on the pre-printed result sheet.
Touch screen	Sensor of touch screen
Data storage	Data storage maximum 100,000
Measurement mode	Scale mode / Body composition mode
Various result sheets	Body composition result sheet, Segmental assessment result sheet (Option), Result sheet for children (Option)
Check the Measurement result	LCD, Web, Data management program, Consulting program (Option)
USB Storage	Data storage and backup
QR code	Scan the QR code on LCD & result sheet with your smart phone, all results transmitted to the web site. You can see the result whenever you want.

Specification

Model	X-SCAN PLUS 950
Measuring method	Tetra-polar electrode method using 8 touch electrodes
Frequency range	1, 5, 50, 250, 550, 1000kHz
Measuring site	Whole body and segmental measurement (arms, legs and trunk)
Result item	**Body Composition Result** Weight, Standard weight, Lean body mass, Mass of body fat, Subcutaneous fat mass, Skeletal muscle mass, Soft lean mass, Protein mass, Mineral mass, Total body water, Intra cellular water, Extra cellular water, Body mass index, Percent of body fat, Ratio of E.C.W./T.B.W., Waist to hip ratio, Visceral fat level, Visceral fat mass, Visceral fat area, Prediction of abdominal fat, Target to Control(Control of Body fat, Control of Soft lean mass, Control of Weight), Body composition change (8times accumulated graph for Ratio of E.C.W./T.B.W., Percent of body fat, Soft lean mass, Weight), Segmental dual graph of soft lean mass, Body type, Body cell mass, Basal metabolic rate, Total energy expenditure, Age matched of body, Total score, Study item (Segmental impedance classified by frequency), Blood pressure (In case of being connected with blood pressure monitor), QR code **Segmental Result (Option)** Segmental total body water, Segmental intra cellular water, Segmental extra cellular water, Segmental ratio of E.C.W./T.B.W., Segmental E.C.F./T.B.F., Segmental soft lean mass, Segmental mass of body fat and percent, Study item (Segmental impedance classified by frequency) **Result sheet for children (Option)** Weight, Standard weight, Lean body mass, Mass of body fat, Subcutaneous fat mass, Skeletal muscle mass, Soft lean mass, Protein mass, Mineral mass, Total body water, Intra cellular water, Extra cellular water, Body mass index, Percent of body fat, Waist to hip ratio, Body type, Fatness, Child growth curve (height, weight), Body cell mass, Basal metabolic rate, Total energy expenditure, Age matched of body, Nutritional assessment, Body composition change, Segmental soft lean mass, Segmental mass of body fat, Study item (Segmental impedance classified by frequency), QR code
Power consumption	60VA
Power supply	Input (AC 100 ~ 240V, 50 / 60Hz), Output (DC 12V, 5A adapter)
Display	8.4inch wide color LCD
Input device	Touch screen, Key pad, PC remote control
Transmission device	USB port, RS-232C, Bluetooth, Wi-Fi (Option), Available of external port extension (Option)
Printing device	A4Printer
Dimension	main unit : 496×820×1150mm (W×D×H ±10mm) main unit+ Height Meter : 496×926×2260mm (W×D×H ±10mm)
Weight	About 42kg (main unit)
Measuring range	100~950Ω
Measuring time	Totally within 1minute
Applicable height	50~220cm
Measuring weight	10~270kg
Applicable age	1 ~ 99 years old
Operation ambient	Ambient temperature range +5 to +40°C, Relative humidity range 15 to 93 % (non condensing)
Storage ambient	Ambient temperature range -25 to +70°C, Relative humidity range lower than 93% RH

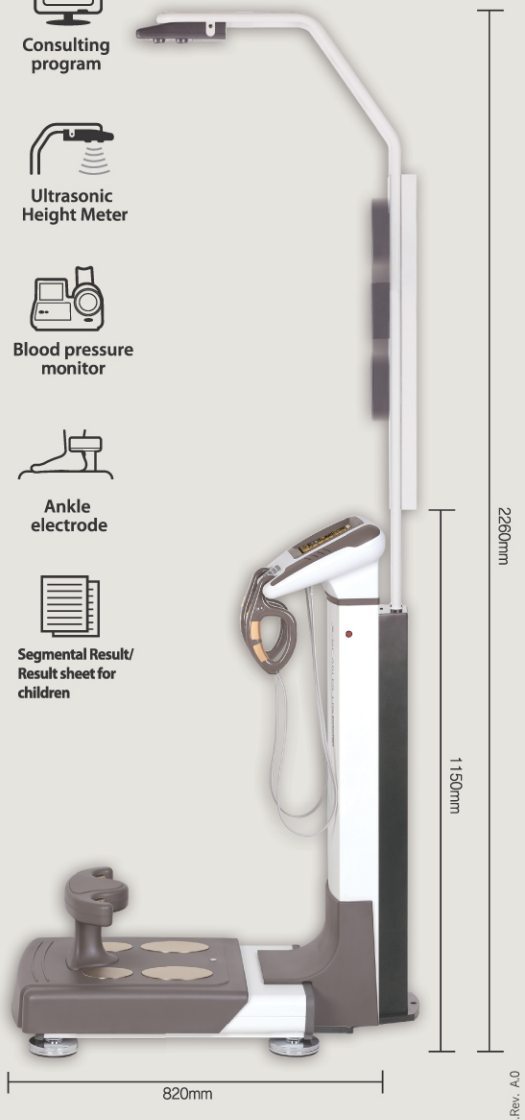
※For purpose of improvement, specifications and design are subject to change without notice.
This is a Medical device. Read precaution and operation method before use.

Accessory

- Touch screen
- A4 result sheet
- Voice message
- Printer
- Management program
- Bluetooth

Option

- Consulting program
- Ultrasonic Height Meter
- Blood pressure monitor
- Ankle electrode
- Segmental Result/ Result sheet for children



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the Bronze Tower Order of Industrial Service Merit

President's award

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