

Max Pulse

User Manual



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GENERAL

Thank you for using the Max Pulse. Please read this User's Manual carefully before operating this equipment for proper handling and maintenance, and get familiar with all the functions and features of this equipment for safe handling and reliable performance.

Medicore Co., Ltd. only provides reliable products to our customers.

This operational instruction and the product are protected by Copyright Act.

No part of this instruction and the product may be copied, reproduced, transmitted, or translated in any form that could be read by electronics or machines without a written permission from Medicore Co., Ltd. This operations instruction and the product may contain printing or technical errors, and are subject to change without notice. Do not alter or remodel this device. Do not use this product other than for general purpose.

Requesting Service

- All assembling, extending, adjusting or repairing of this equipment shall be carried out only by the service personnel authorized by our Company or Medicore Co., Ltd.
 - Electrical connection or installation location has to comply with relevant regulations.

If repairing was done or tried by unauthorized service personnel, anytime within the warranty period, even within the warranty period Medicore Co., Ltd will not be responsible for any free service.

When there is a problem with this device, please do the following.

- Immediately contact Medicore Co., Ltd. Or authorized agency/franchise.
- Prepare model name, production number and inquiries in advance then contact Medicore Co., Ltd. Or authorized agency/franchise.

How to Contact

TEL	Seoul Office: 82-2-2056-2650 Factory: 82-31-726-1172
Request of Purchase or Technical Support	Overseas : 82-2-2056-2650
Website	http://www.medi-core.com

1 About User Manual



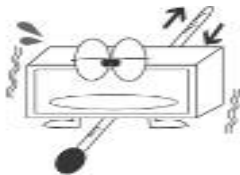
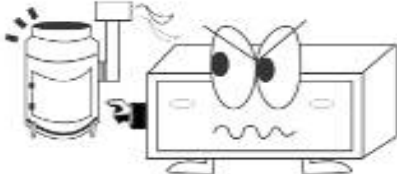

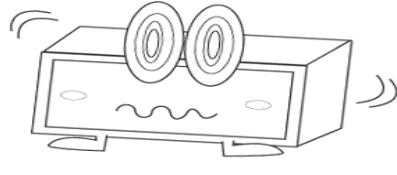
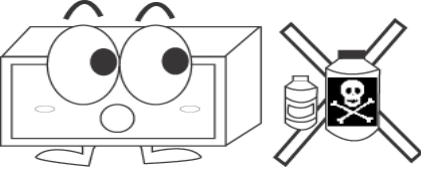
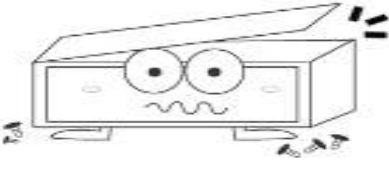
This manual contains all the information needed to operate our Max Pulse and it further provides exact information on the conditions of the patients including the measured parameter analysis.

Because the chapters in the manual are constructed so that each chapter can be used independently, some contents may appear in more than one chapter.

2. Notices and Precautions

2.1 Notice and Precautions for the Use

Do not use or keep Max Pulse under circumstances described below

 <p>Humid place (do not touch the power plug or equipment with wet hands)</p>	 <p>Do not expose Max Pulse directly to the sun.</p>
 <p>Do not place Max Pulse in an extremely hot or cold room.</p>	 <p>Do not place Max Pulse close to electric heaters.</p>
 <p>Do not place Max Pulse in an extremely wet place</p>	 <p>Avoid shocks and vibrations.</p>
 <p>Do not place Max Pulse close to chemical substances and explosive gas.</p>	 <p>Do not disassemble Max Pulse. In this case, the product warranty may not be guaranteed.</p>

Operation Environment

- Temperature : 10°C ~ 40°C (50°F ~ 104°F)
- Humidity : 80% RH max @40°C (104°F)

2.2. Electrical Safety and Precautions

Check on the following before using the Max Pulse.

- Please make sure the power voltage (100 – 240V AC) before using the Max Pulse.
- Please make sure the power cord and accessories are properly connected before turning on the power.

Classifications

Safety classification for electric shock	Class II
Protection degree of electric shock	Type BF

Warning

- Do not interlock Max Pulse to other medical instruments when in use.
- Interlocked using may cause a leakage current.

Note

- Do not install Max Pulse close to electric generator, x-ray device, broadcast device, and electric shifting cable to avoid electrical noise; such electrical devices may lead to invalid results.
- Keep out of the reach of children and pets to prevent them from electric shocks.

2.3 Cleaning and Maintenance.

It is recommended that the body of Max Pulse and accessories should always be maintained in a clean condition..

The free repair service does not cover any damage caused by using any substances that may lead to product damages

Use warm water or alcohol on a soft cloth to clean and remove dust. Never use thinner, ethylene or oxidized substances, which may cause product damage. Cables and accessories should be kept free of dust or dirt and wipe down them with an warm water (40°C/104°F) soaked cloth. Never soak accessories in any liquids or detergents. Any liquids must not be inserted to the equipment and accessories.

2.4 Precaution

2.4.1 Prior to Measurement

Prior to the measurement, do not do anything that may cause sudden heart rate changes. Exercise, smoking, and certain medication may result in invalid measurement reports.

2.4.2 Preparation before Measurement

Patients should be in a relaxed state during the measurement.

2.4.3 Preparation on Measurement Day.

Do not smoke, drink or have drugs that irritate the autonomic nervous system.

Remove nail varnish on left finger nail before measurement.

Relax for 15~20 minutes before measurement.

2.4.4 During the Measurement

Patients should not move or speak during the measurement, and breathe normally

2.4.5 Why to get different result when testing multiple times

In general, a healthy person has a large change in heart rate, and conversely, a person with a disease (diabetes, myocardial infarction, arteriosclerosis, obesity, etc.) or older people has less change in heart rate.

In other words, a large change in heart rate means that the autonomic nervous system functions and the resistant to stress are good, thus lowering the incidence risk of stress-related diseases.

The cycle of heartbeat changes by affecting the autonomic nervous system (Sinus Arterial Node).

In other words, repeatedly testing effected of internal and external environmental factors (mental stress, emotional changes, breathing, blood pressure, body temperature or hormone, etc.) make a change of result value.

People with diseases or older people are not able to respond immediately to changes in internal and external environments. Therefore, the difference of the result value is small in the continuous measurement, but the difference in the result value for the health person is large because of quick response to the changes of internal and external environment.

In addition, since vital signs are very sensitive, the following points should be carefully taken for the measurement.

If there is a lot of change, it is recommended to read the average after 2 to 3 measurements.

- 1) After exercise, you should measure after 10 minutes stabilization.
- 2) Do not move or talk during testing.
- 3) Maintain most comfortable and normal breathing. (Coughing, sneezing, sighing, yawning and abdominal breathing are not allowed during the measurement)
- 4) Avoid 8 hours before drinking and at least 2 hours before smoking or coffee.
- 5) When measuring, do not apply pressure with sensor finger.
- 6) The proper temperature should be maintained. (Room temperature 22 to 25 ° C)
Higher room temperature causes expansion of the peripheral blood vessels, resulting in higher wave height. Lower temperature causes contraction of blood vessel, resulting lower wave height.
In particular, measurement with cold finger may be fail.
- 7) Measure with the left index finger (measurement standard).
- 8) Nail polish must be removed for the measurement (a cause of measurement error)
- 9) There is a difference between the results in the morning and afternoon, but the measurement in the morning is recommended for periodic test.
- 10) In case of hypertension, high fever or tachycardia, the result value tend to get better because of rapid blood flow in artery.
Even after drinking, the result value tend to get better due to increased blood flow.
- 11) In the case of arrhythmia, heart disease or asthma, the result value is unreliable.

3. Overview

3.1 Purpose of Using Max Pulse

Max Pulse measures heart rate variability in a given time period and analyzes the variability to determine one's overall health status and autonomic nerves system activity.

Throughout the measurement, the levels of physical/mental stress, autonomic nerves balance and vascular aging are evaluated.

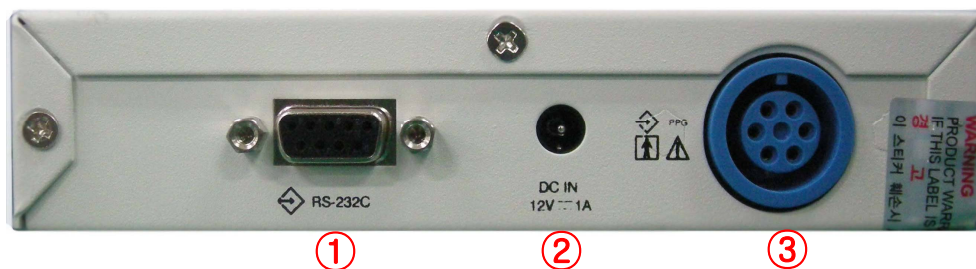
3.2 Product Contents

Parts and items are provided as follows :.

- | | |
|-----------------------|--------|
| ① Main body | : 1 pc |
| ② Operation Manual | : 1 ea |
| ③ Power Adapter | : 1 ea |
| ④ Power Cable | : 1 ea |
| ⑤ PPG PROBE | : 1 ea |
| ⑥ USB to RS-232 Cable | : 1 ea |

3.3 The name of Each part

● Back



- ① RS-232 Serial Port
- ② Adapter Inlet
- ③ PPG Probe Port

● Right Side



- ④ Power S/W

4. Program Installation

4.1 Software Installation

4.1.1 Max Pulse Program Installation

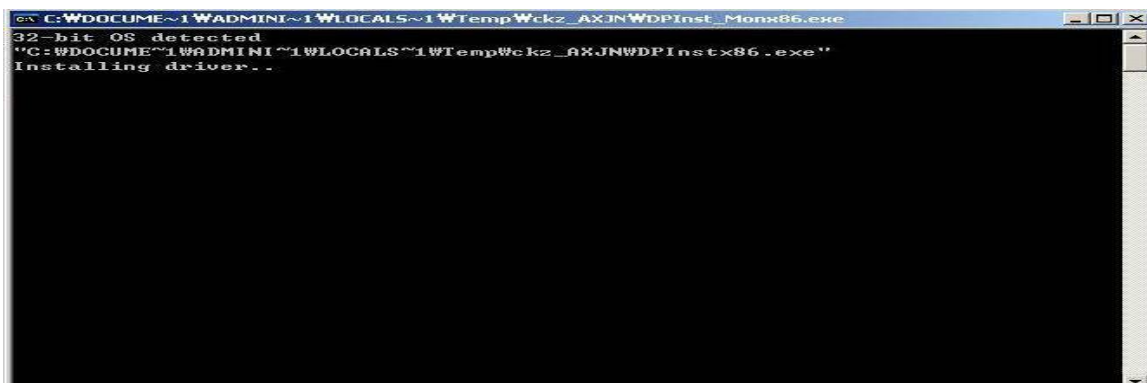
- Insert the Installation CD into PC CD-ROM.
- Click **Max Pulse _General_V.x.x_Install.exe** inside Max Pulse Program folder.
- Max Pulse installation screen will be shown as below.
(The name and version no. of .exe file can be different according to upgraded version)
- Click "Install" from the window below.



- When installation is finished, the screen below will be shown. Click the finish button.



- When you click "Finish" button, the driver will be automatically installed as below.



- When the driver is completed, this screen will be automatically disappeared.

NOTE) For the customer who uses Windows Vista or Windows 7, if the user account control is set up, the Wizard may appear. Then, click “Yes” and continues.

4.1.2 Probe Connection to the Max Pulse

- Connect probe to the connection ports of the equipment.

4.1.3 Power Cable Connection to the Max Pulse

- Insert one side of power code into the power terminal of Max Pulse.
- Check if power lamp light is on.

※ Run the program of Max Pulse installed on the computer and then check if the program is running properly.

Note) Connect “USB TO RS232 CABLE” to the device and PC before installation of the Max Pulse program. Otherwise the program may not run properly.
If Max Pulse program does not run properly, turn it off and turn on again after connection of “USB TO RS232 CABLE”.

4.2 Caution When Installing the Program

NOTE

- Take care to handle PPG probe and its cable otherwise the sensitive PPG probe may have a trouble. Avoid the probe touching into sharp things.

- Use Max Pulse in inner temperature of 10℃~ 40℃ and humidity of 80%.
- Check the power cable connection before its use.
- Do not insert more than one power code in an electric connector
- Do not use the connector making electric noise.
- Be cautious of shocks.
- Be cautious of dust and flammable substances.

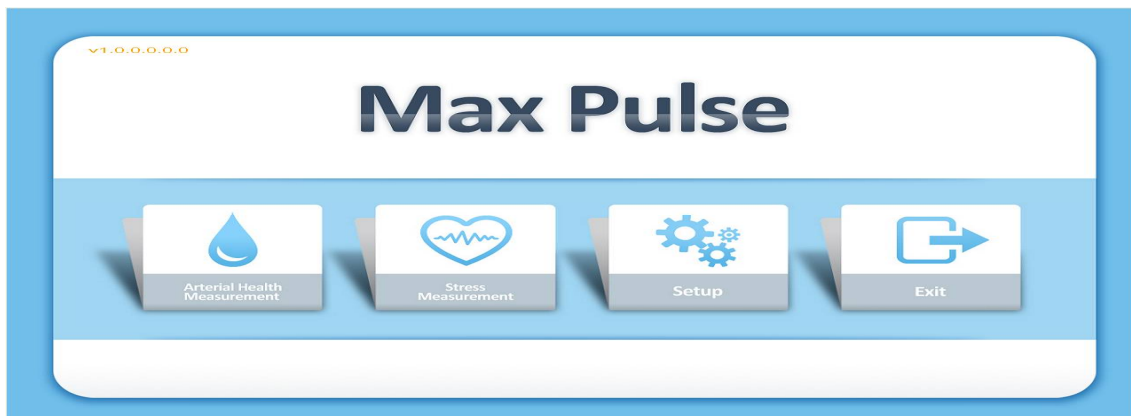
5 Method of Measurement

5.1 Advice for Users Who Using Max Pulse

- Do not move or talk during the measurement.
- Do not exercise, and relax about 10 minutes in measuring room before taking measurement.
- Do not strain and then take regular breath. Refrain from slowly breathing during the measurement.
- Keep the height of the probe level with the heart.
- The measurement should be taken with eyes open.
- Consult with a doctor in case of arrhythmia or cardiac disease.
- Measuring in the morning is recommended
- Refrain from smoking, taking drug or coffee 3 hours prior to the measurement.
- Refrain from drinking alcohol the day before taking measurement.
- Refrain from wearing accessories (ring, watch, nail varnish) that may interfere with accurate measurement.
- Avoid measurement after a meal.
- Measurement should be taken in a quiet, comfortable room (room temp.22℃~26℃)

5.2 Direction for Use

5.2.1 Main screen



- ① Press Setup () button to see setup screen.

- ② You can set or change language, test time, reference type, user name and phone number.



- ③ Press Exit () button to stop the program.



- ④ Press Arterial Health Measurement () button or Stress Measurement ()

button to see User information screen and take measurement.

5.2.2 SETUP Screen

The screenshot shows the 'Setup' screen of the 'Max Pulse' application. The interface is blue-themed. On the left, there is a large gear icon. On the right, there is a white box containing several configuration fields: 'Language' set to 'ENGLISH', 'Test Time' set to '3min', 'Reference Type' set to 'WEST', 'User Name' set to 'Medicare', and 'Telephone' set to '123-4567'. At the bottom right of the screen, there are two buttons: 'Cancel' and 'Save'.

① SAVE and CANCEL button



- Press button to save input information, and it move to main screen.



- Press button to go back to main screen without saving the input information.

② Language

- Select language in the combo box.

- If you changed language, press SAVE button and then restart the Max Pulse program.

③ Measurement time

- Select 45 sec, 3 min or 5 min in the combo box.

- In 3 min and 5 min, the software can measure Stress (HRV) and arterial health (APG) together.

- In 45sec, the software can measure arterial health only.

④ Reference Type

- Select ASIA for oriental people (Korean, Japanese or Chinese) or WEST for western people (USA, EU, Middle East etc)

⑤ Facility name and Phone number

- In order to print a facility name and telephone number, input the name of facility and telephone number. It needs to inform customers a facility name and telephone number

⑥ COM Port Set-up

COM Port can be set up as below.

- CTRL + F1 :Manual Set-up for COM1
- CTRL + F2 : Manual Set-up for COM2
- CTRL + F3 : Manual Set-up for COM3
- CTRL + F4 : Manual Set-up for COM4
- CTRL + F5 : Automatic Set-up for COM Port

⑦ Comment Inserting

- F8 : The user can write the comment on the result


F9 : Automatically comments on the result

5.2.3 User Registration / Edit




① BUTTON




- When you press “NEXT” button () after inserting all personal information (Gender, Name, Date of Birth, ID), the personal information will be automatically registered and move to the measurement screen. You need to insert all of gender, name, date of birth and ID at this time. It means “Next” button has also “Registration” function by itself.



- If the selected patient already has the measuring data, RESULT button () will activate. Press result button to see the results on the screen.




- If you press DELETE () button after selecting user information from the list, all the information will be deleted. Pay special attention for the DELETE button.



- If you press BACK () button, it moves to main screen.



- If you press NEXT () button after selecting User information, it moves to measurement screen.

② Newly inputting patient's information

- Insert all of Gender / Name / Date of Birth / ID.
- Insert 4 digit numbers on the Date of Birth, and select the Day and Month from the combo box by clicking the day and month from the list.
- For the gender, you can select four categories as below.

1) The user's initial screen is a condition that does not select any gender. This status is in condition of clearing all users' information. If the user inserts the information and later click on the white area of this box, all information will be deleted.

2) To register the user's name, select the "Male" or "Female". If you would see all of male and female without registration, you can select the white blank or "ALL".

③ **Recalling a previous user information**

- Input gender.
- Input name.
- A patient's information will appear on the list, which is identical to the information that has been inputted.
- Select desired information from the list. (although if all a patient's information has not been inputted, select one in case of a corresponding patient's information from the list)
- Press the NEXT button to see the measuring screen.
- If the selected patient already has the measuring data, press the result button to the results on the screen.

④ **Deleting a previous user information**

- Select gender and input the name.
- The patient's information will appear from the list, which is identical to the information that has been input.
- Select desired user from the list.
- Press DELETE button.
- If "Do you want to delete the selected information?" is shown, press 'Yes' button.

⑤ **Editing the user information which is already registered**

- Select the user name on the user's list at the right side to edit it.
- Edit the user information on the left.
- Click 'Edit' button.
- If the message 'Do you want to edit the user data?', click "Yes".

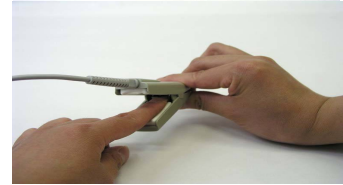
5.2.4 Measurement

- ① Place PPG probe before press NEXT button after inputting or selecting User.
- ② Wearing method of PPG probe.

Press on the tongs of probe by right hand.
(The sensor wire should be placed upper side)




Insert left index finger deeply into the PPG probe.



Release the tongs of probe.



- ③ Put hands on the table comfortably and relax and then press NEXT button.

- ④ On the measurement screen, press START button (), and it begin measurement with voice comment and appearing of waveform on the screen.



(45 sec Measurement Screen)



(3 min / 5 min Measurement Screen)

- ⑤ Do not move or speak while measuring.
- ⑥ Press STOP button or remove PPG probe from your index finger if you want to stop measurement. It automatically moves to previous screen seconds later after removal of PPG probe.
- ⑦ The report screen will be shown after the measurement is finished.

5.2.5 Report Screen

5.2.5.1 Measurement Time and Report

- The report screen will be shown after the measurement is finished.
- In the 45 sec. measurement mode, only APG (Arterial Health Test Report) report will be shown.

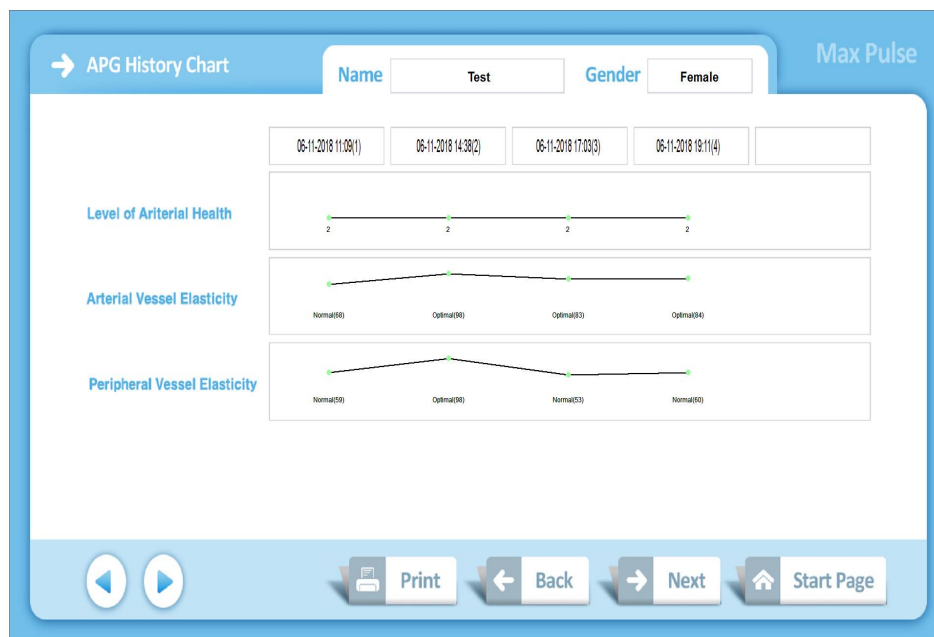


<<Arterial Health Test Report>>

- In the 3 min./5 min measurement mode, HRV (Stress Test Report) report will be shown.



- You can print HRV Report, APG Report and/or History Chart by pressing PRINT button on the screen.



<<APG History>>



<<HRV History>>


- When you select the manual mode for the comment, you can insert the comment on the APG Report and click “NEXT” or “BACK” button. Then, there will be a message box to save the comment or not. When you click “YES”, the comments will be saved with the report.
- When you select the automatic mode for the comment, the comments will be displayed automatically based on the result.

- After completing the measurement, the result will be saved at the route as C:\MEDICORE\MaxPulse_General\Share\ by EXCEL format. The file format is ID_Name_Date_HRV.xls/ID_Name_Date_APG.xls.

6 Max Pulse Troubleshooting

- 1) The wave does not show at the preview.
→ Check the connection between the probe and main body.
Check the test time on the environment setup window.
- 2) Do not measure while operating the printer: As our equipment collects the data at real time, if you use the printer at the same time, it could cause the trouble in the system.
- 3) Do not operate other equipment while you are using Max Pulse.: It may not collect the data at the real time.
- 4) For the measurement, when the below window is appeared on the screen after clicking "START".
-> Check if the power is turned on normally.
-> Check the connection between the computer and USB 2.0 TO RS232 Cable.
-> Check the setting of USB 2.0 TO RS232 Cable Driver & COM PORT.
- 5) Troubleshooting
 - ➔ Read the directions below when the equipment is improperly operating:
 - ➔ In case of not being able to turn on the power: Check whether AC is properly connected.
Check connecting switch conditions.
 - ➔ Retry to connect the probe to a finger if waveforms are too small to see on the screen.
Waveforms may not be presented or be too small on the screen in case of a finger not properly connecting to the optical probe.

PRODUCT WARRANTY

- ☞ This product has passed strict inspection and testing.
- ☞ Medcore Co.,Ltd. warrants that operational defects or product defects will be repaired free of charge for a period of 1 year from the date of purchase. During a period of 1 year from the date of purchase, reasonable repair fees may be charged if the repair requires extra costs.
- ☞ This warranty must be represented to the authorized agency when repair is required.
- ☞ As previously stated, this warranty shall only apply to operational defects or product defects under the proper using circumstances. Warnings and precautions stated in this manual must be observed.
- ☞ The repair service does not cover any surface damages or defects, which does not affect proper operation.
- ☞ The warranty shall not be applied to defects resulting from damaged or torn out the WARNING sticker () from main set.
- ☞ Medcore Co., Ltd. shall not be liable for direct, indirect, or incidental or consequential related to the use of the equipment.

