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Name and function of parts
The names and functions of parts in ANSWatch wrist monitor are shown in Fig 2:
(1) Device main body
(2) Wearing cuff
(3) Power On-Off
(4) Start (for standard BP+HRV test)
(5) Light indicator for charging
(6)&(7)&(8)&(9) Screen-defined soft keys
   (orange, green, yellow, and blue)
(10) LCD display
(11) Mini-USB port
(12) Battery cover

Precaution before use
- ANSWatch battery must be charged before use (reffering to "Battery charging and replacement" section). Date and time must be confirmed or re-set for accuracy before use (reffering to "Setting date and time" section).
- Do not substitute professional instructions with self-interpretation. Test results of blood pressures, heart rate variability (autonomic nervous system functions), and irregular heartbeats should be analyzed by physicians or health professionals who understand your health condition.
- If you are currently taking medicine, consult with your doctor to determine the best times for conducting blood pressure and heart rate variability tests. *Do not stop taking or switch medicine without your doctor's permission.
- ANSWatch is designed for use by adults. Tests for children must be conducted under a health professional's supervision. *ANSWatch should never be used on babies.
- To improve data consistency, efforts should be made to conduct tests under similar conditions at same time zones of the day. Avoid time periods of before meal, after meal, or after heavy exercise. Suggested time periods for testing are: 9 ~ 11:30 AM, 2 ~ 6 PM, and 8 ~ 10 PM. Rest for at least 15 minutes between two consecutive tests.
- To prepare for a test, remove any wearing (watch, jewelry, etc.) on the left wrist. Lie down or sit comfortably for 10 minutes. When ready, wear ANSWatch on your left wrist according to instructions in this User’s manual.
- During the test, keep quiet and maintain stable. *No talking or body movement is allowed. Close your eyes for better results. It has been noted that blood pressures could be affected by muscle tightness or
environmental, physical, or mental disturbances.
- Keep the product and package in its "original" condition in case of product return, replacement, or repair.

**Warning (READ CAREFULLY BEFORE USE)**
- ANSWatch should not be used on patients with severe cardiovascular diseases, poor blood circulation, or late-stage cancers. Always consult with your physician first.
- Press "Power" key to stop if the patient feels discomfort for any reason during a test.
- If an "error" message (accompanied by sounds) appears on the LCD screen during a test, follow the instructions on the screen. If conducting a second test is needed, wait for 10-15 minutes. If error messages keep appearing, notify your sales representative immediately. Consultation with your physician is also recommended. *It is noted that patients with weak pulses or very large wrists (although few) may not be suitable for ANSWatch tests.*
- During or after a test, if severe skin color change is observed, stop the test. *Do not use the device again. Notify your sales representative immediately. Consultation with your physician is also recommended.*

**Wearing procedure (You must follow this instruction, or the test will fail)**
- Referring to Fig 3-1 and Fig 3-3, wear ANSWatch on your left wrist (warning: tests will fail if worn on the right wrist, due to bio-sensor locations embedded in the cuff). Follow these key points when wearing: (i) Both the palm and the device should face up-straight (ii) The centerlines of the palm and the device body should be aligned (iii) The front edge of the wearing cuff should be at the dividing line between wrist and palm (slightly coverage of the palm by the cuff is most ideal) (iv) Pull and close the cuff tightly when the conditions of (i) through (iii) are met (do not leave a space between the wrist and the cuff), and (v) Move and rotate the wrist around and confirm that ANSWatch is securely fastened on the wrist (if ANSWatch is judged too loose, open the cuff and repeat the above procedures). Common wearing mistakes to avoid are shown in Fig 3-2 and Fig 3-4.
- Sitting or lying positions are suitable. In either posture, ensure that the left wrist is at the similar height as the heart. Once selecting a posture, stick to it for subsequent tests.
- It is a good practice to place a soft pillow under the wrist (not the palm) to add comfort and maintain stability. In such a position, the palm is raised in air and bent naturally downward for strong pulse signals. Fingers can extend loosely or make a soft grasp.
- During test, keep the shoulder and arm relaxed. Do not talk or move.

Fig 3:
(1) Correct wearing (device centered)
(2) Incorrect wearing (device leaned to left)
(3) Correct wearing (cuff at palm edge)
(4) Incorrect wearing (cuff away from palm)

**Operating procedure - BP and HRV test (standard)**
- Wear ANSWatch on the left wrist (see "Wearing procedure" section)
- Open the LCD cover with the right hand (Fig 4-1)
- Press **Power** key to turn on the device (Fig 4-1)
- Press **Start** key to start the standard test (test time about 7 minutes; blood pressures and pulse wave analysis two minutes, HRV 5 minutes)
- Pay attention to the quality of pulse waves shown on LCD. If pulse waves are weak and accompanied by irregular noises, press **Power** key to stop the test. Take ANSWatch off the wrist, wait for 10-15 minutes, re-wear, and re-test.
- During test, do not talk. Any body movement (head, hands, legs) is prohibited.
- When the test is done, a finishing sound Mi-Mi-Miiii is issued. If you hear a Din-Din-Din-Din sound and see a warning or error message on LCD, the test is failed. (Referring to "If a test fails" section for detailed instructions).
- After a successful test, LCD monitor will show the test data in three pages (Figs 4-2 through Fig 4-4), where SYS stands for systolic pressure (mmHg), DIA for diastolic pressure (mmHg), HR for heart rate (1/min), HRV for heart rate variability (ms; autonomic nervous system total activity index; same as SDNN in ECG devices), LF for high frequency (sympathetic nerve activity index, %), HF for high frequency (para-sympathetic nerve activity index, %), LF/HF for low frequency/high frequency ratio (sympathetic-parasympathetic balance index); **Irregular** for number of irregular heartbeats (could be due to cardiac arrhythmias, cough, or body movement; please refer to "Do I have cardiac arrhythmias?" section)

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3

4
LCD test data pages can be switched using screen-defined keys. Press the ORANGE key (LEFT) for the next page, GREEN key (RIGHT) for the previous page, and BLUE key (EXIT) for exit of test data pages.

If irregular heartbeats are detected, press the YELLOW key (IrHB) to examine pulse waves of irregular heartbeats (also referring to "Do I have cardiac arrhythmias?" section)

The top line of test data pages shows the date and time of the test and a 5-digit test ID assigned for each test (#00000, #00001, and up) (Fig 4-2, 4-3, and 4-4)

Press POWER key to turn the device off

Fig 4:
(1) Press POWER key to turn on and press START key to start the standard test
(2) Test data of blood pressures and heart rate
(3) Test data of autonomic nervous system
(4) Test data of number of irregular heartbeats

Operating procedure - Real-time test (user defined test)

Wearing procedures same as described in "Operating procedure - BP and HRV test (standard)" section

Press POWER key to turn on the device

Press BLUE key (UTIL) to enter the utility page (Fig 5).

Press YELLOW key (RT TEST) to enter Real-time test (Fig 6-1). Message on LCD indicates that the total test time limit is 20 minutes (Fig 6-2)

Press BLUE key (START) to start the test (Fig 6-2)

During test, LCD shows the current HR (heart rate, 1/min) and HRV (ms; autonomic nervous system total activity index, same as SDNN in ECG devices) and refresh every 10 seconds. The top-right corner also shows the test time remaining (Fig 6-3)

Press BLUE key (STOP) to stop the test at any time (Fig 6-3). The test will automatically stop at 20-minute.

After test, LCD will show the test summary of HR and HRV (MIN for minimum, MAX for maximum, and AVG for average). The test date and time is also shown on the page (Fig 6-4).

To review previous Real-time test data, press GREEN key (LEFT)

Press POWER key to turn the device off

Fig 5: Opening page after power-on

Operating procedure - BP test (skip HRV test)

Wearing procedures same as described in "Operating procedure - BP and HRV test (standard)" section

Press POWER key to turn on the device

Press ORANGE (BP) to start the blood pressure test (skip HRV test) (Fig 5). The test lasts for about 30 seconds

When the test is done, a finishing sound Mi-Mi-Mi is issued. If you hear a Din-Din-Din-Din sound and see a warning or error message on LCD, the test is failed (Referring to "If a test fails" section for detailed instructions).

After a successful test, LCD monitor will show the test data in a single page (see Fig 4-2), where SYS stands for systolic pressure (mmHg), DIA for diastolic pressure (mmHg), and HR for heart rate (1/min)

The top line of test data pages shows the date and time of the test and a 5-digit test ID assigned for each test (#00000, #00001, and up) (Fig 4-2)

Press POWER key to turn the device off

Fig 6:
(1) Utility page
(2) Message page (total time limit 20 minutes)
(3) Real-time display of test data (HR and HRV) and time remaining
(4) Real-time test data page
If a test fails

- During test, if you hear a Din-Din-Din-Din sound and see a warning or error message on LCD, the test is failed. The test is stopped with the LCD showing warning or error message (referring to "Error and warning message" section for detailed instructions). The most likely causes of failure and the suggested actions are:
  - Insufficient battery power; Charge the battery (see "Battery charging and replacement" section) and re-test
  - Incorrect wearing position causing weak pulse signals; Re-wear (see "Wearing procedure" and re-test
  - Weak pulses or rapid heartbeats (re-wearing still failed); Allow the body to recover and re-test
  - Blood pressures too high (>180 mmHg) or too low (<50 mmHg); Contact your doctor

- If you follow the above actions and the problem still persists, contact your sales representative or technical support (also referring to "Error and warning message"

Recalling test data

- ANSwatch can store 30 sets of test data (most recent). Follow the procedures below to review stored data.
- After the device is turned on (Fig 5), press YELLOW key (DATA) to enter data pages
- LCD shows the latest test data. Test date, time, and ID are shown on the top, patient parameters in the middle, while action keys (LEFT, RIGHT, EXIT) at the bottom (Fig 4-2,4-3,4-4)
- Press ORANGE key (LEFT) to go to the next page. Press GREEN key (RIGHT) to go to the previous page. Press YELLOW key (IRHB) to view irregular heartbeats (if detected). Press BLUE key (EXIT) to return to the main starting page
- Press POWER to turn off the device

Setting date and time

- Default date and time should have been set according to the user's time zone before shipping (adjustment for daylight saving may be needed).
- The setting is lost when the battery runs out of power (test data still stored safely). The device may jump to the re-setting page automatically if loss of setting is detected. On the first use, after battery charging, or whenever re-setting is needed, follow these procedures to re-set date
- and time.
- After the device is turned on, press BLUE key (UTI) to enter utility areas (Fig 5)
- Press ORANGE key (SET) to enter date and time setting (Fig 7)
- The arrow pointing to the first digit of year will blink. Press ORANGE key (+) to increase or GREEN key (-) to decrease the number; When done, press YELLOW key (RIGHT) to move to the next digit
- The second digit of year is now blinking. Adjust the number using the above procedures. When done, press YELLOW key (RIGHT) to move to the first digit for date.
- Repeat the above procedures until all date and time digits are set.
- Press BLUE key (SAVE) (at any time) to exit setting. If the device goes back to a previous digit by itself, that means the new setting is in error and not accepted (such as 13 for month). You should re-set for a correct number.
- Press POWER to turn off the device

Fig 7: Date and time setting page

Battery charging and replacement

- ANSwatch employs an environmentally-friendly rechargeable lithium battery. Each charge can provide power for 10 to 15 tests.
- On the opening page (Fig 5), the battery status indicator is shown on the top-right corner. A three-bar status indicated full power. Recharging is needed when the status falls to one-bar.
- To charge, insert the mini-USB connector of the charge/PC connection cable into the mini-USB port on the right side of ANSwatch (Fig 8-1). Insert the USB connector of the same cable into the USB port of the charging adaptor (Fig 8-1). Plug the charging adaptor into a wall power socket (100-240 VAC). The charge light indicator on ANSwatch is in red color during charging (Fig 2-5) and turns green when done. Always check date and time after charging (referring to "Setting date and time")
To charge with a PC, insert the mini-USB connector of the charge/PC connection cable into the mini-USB port on the right side of ANSWatch (Fig 8-1) and insert the USB connector of the charge/PC connection cable into the USB port of a PC (Fig 9).

Lithium battery will lose charging capacity gradually. When the full charge is no longer obtained or each charge is unable to provide 3 tests or more, it is time to replace the battery. An extra battery is included in the product package (Fig 1)

To change the battery, press and push the battery cover downward at the same time to open (Fig 8-3). Take out the old battery and insert the new one in (positive sign on right and negative sign on left). Place the cover back. (Warning: during battery change, the USB cable must be disconnected from the charging adapter or PC!)

If you need to purchase the lithium battery, contact your sales representative.

Fig 8:
(1) Charging cable and adaptor connection
(2) ANSWatch in charging
(3) Removing battery cover
(4) Inserting new battery
(Positive on right; Negative on left)

Fig 9:
Battery charging using PC's USB port

Auto power-off
To save power, LCD monitor turns off the backlighting after a few minutes of inaction
ANSWatch completely turns off after 3 minutes of inaction

Downloading test data to PC
The Standard model of ANSWatch works within itself for simplicity. It can not connect to a PC for data download.
An installation CD for ANSWatch Manager (the analytical tool for ANSWatch test data) is included in the product package for Deluxe and Pro models (Fig 1). Follow the on-screen instructions to install. The software is compatible with Windows XP, Vista, and 7.
For Deluxe model, conduct a test first, then download test data to a PC using the charging/PC connection cable (Fig 9) and ANSWatch Manager. Once in PC, test data can be further analyzed, plotted, and printed.
For Pro model, ANSWatch tests can be conducted while connected to a PC using test buttons on ANSWatch Manager. Pulse wave signals are displayed on the PC's monitor on real-time basis. After test, test data can be downloaded, analyzed, plotted, and printed using ANSWatch Manager.
For both Deluxe and Pro models, go to TOOLS> HELP on ANSWatch Manager. Under HELP, there are detailed instructions on operational procedures, and definitions/normal values/ranking of ANSWatch acquired parameters.
You must install at least one printer on PC to use the test report preview function on ANSWatch Manager.
You can select Language (English, Traditional Chinese, or Simplified Chinese) using TOOLS> CONFIGURATION>DISPLAY LANGUAGE on ANSWatch Manager.

Are my BP and HRV parameters normal?
Patient parameters, such as blood pressures, heart rate variability (HRV), and functions of autonomic nervous system (ANS), are often influenced by age, sex, season, region of living, medication, and other body conditions. Whether these values are normal (or healthy) require professional diagnosis based upon several related tests. It is strongly suggested that you show your test results to your physician for data interpretation. Based upon published literature (World Health Organization, European Society of Cardiology, North American Society of Pacing and Electrophysiology, and other related journal articles) and our own research, the tables below offer users a first-hand reference on normal and warning ranges of the eight patient parameters measured by ANSWatch. Do not use these tables for diagnosis of any disease without consultation with your doctors.
Table 1: Definition and normal value for ANSWatch measured patient parameters

<table>
<thead>
<tr>
<th>Patient Parameter</th>
<th>Physiological Meaning</th>
<th>Normal Range</th>
<th>Warning Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR (1/min)</td>
<td>Heartbeat per min</td>
<td>60 -100 (ave. 72)</td>
<td>Below 60 or above 100</td>
</tr>
<tr>
<td>SYS (mmHg)</td>
<td>Systolic Pressure</td>
<td>90 -140 (ave. 110)</td>
<td>Below 70 or above 140</td>
</tr>
<tr>
<td>DIA (mmHg)</td>
<td>Diastolic Pressure</td>
<td>60 - 90 (ave. 70)</td>
<td>Below 60 or above 90</td>
</tr>
<tr>
<td>HRV (ms)</td>
<td>Heart rate variability; ANS activity index</td>
<td>25 - 100 (ave. 60)</td>
<td>Below 15</td>
</tr>
<tr>
<td>HF (%)</td>
<td>High frequency %; parasympathetic activity index</td>
<td>30 - 55 (ave. 40)</td>
<td>Below 30% or above 70%</td>
</tr>
<tr>
<td>LF (%)</td>
<td>Low frequency %; sympathetic activity index</td>
<td>40 - 70 (ave. 60)</td>
<td>Below 30% or above 70%</td>
</tr>
<tr>
<td>LF/HF</td>
<td>Low frequency/High frequency; sympathetic-parasympathetic balance index</td>
<td>0.5 - 2.5 (ave. 1.5)</td>
<td>Below 0.4 or above 3</td>
</tr>
</tbody>
</table>

**Note:**
Large scale human clinical trials are being conducted by the world medical community to generate consensus on normal ranges of HRV indexes. The above table is for your initial reference only.

Table 2: ANS total activity index HRV normal values in relation to age and sex

<table>
<thead>
<tr>
<th>Age</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male HRV</td>
<td>60</td>
<td>56</td>
<td>46</td>
<td>41</td>
<td>36</td>
<td>31</td>
<td>29</td>
<td>27</td>
<td>26</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Female HRV</td>
<td>65</td>
<td>60</td>
<td>50</td>
<td>44</td>
<td>39</td>
<td>34</td>
<td>31</td>
<td>28</td>
<td>26</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 3: Sympathetic- parasympathetic balance index ranking

<table>
<thead>
<tr>
<th>LF/HF</th>
<th>Above 3.0</th>
<th>1.5-3.0</th>
<th>0.8-1.5</th>
<th>0.3-0.8</th>
<th>Below 0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>Sympathetic over-dominance</td>
<td>Sympathetic dominance</td>
<td>Normal</td>
<td>Parasympathetic dominance</td>
<td>Parasympathetic over-dominance</td>
</tr>
</tbody>
</table>

---

**Do I have cardiac arrhythmias?**

- If irregular heartbeats are detected by ANSWatch, the test data pages will show IrHB key (Fig 10). Number of irregular heartbeats during the 5-min monitoring period is also shown (Fig 10). Press YELLOW key (IrHB) to view irregular pulse waves (Fig 11). Press ORANGE or GREEN keys to switch between pages.
- Whether or not irregular heartbeats are caused by cardiac arrhythmias require professional judgment. Please consult with your physicians.
- Pulse waves of common cardiac arrhythmias are shown in Fig 12.

**Fig 10:**
Test data page showing IrHB key

**Fig 11:**
Press IrHB key to view each irregular heartbeats

**Fig 12:**
(1) Normal pulse waves
(2) Delayed heartbeat
(3) Skipped heartbeat
(4) Early heartbeat followed by delayed heartbeat
(5) Constant cardiac arrhythmias
(6) Random cardiac arrhythmias
How to utilize a Real-time test
- Deep breath (Qi practice): Inhale and exhale slowly and deeply (sitting or lying down position; using the time clock on LCD to monitor). During practice, the whole body is relaxed, real-time heart rate HR will go down and ANS activity index HRV will rise gradually.
- Music therapy (sitting or lying down): Let go any thought in mind, concentrate on listening to music; same effect on HR and HRV as above.
- Stand-up test: testing for 5 min using sitting position followed by standing up for 5 min. Note the difference of HR and HRV between two positions on LCD. Standing should have a higher HR and lower HRV than sitting, indicating healthy ANS adjustment.
- Recovery rate after exercise: After heavy exercise, wear ANSWatch and start Real-time test; As the body recovers, HR goes down while HRV goes up. A fast HR recovery indicates healthy ANS, heart, and circulation.

Self-monitoring
- Establish first the baselines of body parameters by consecutive tests at the same time zone (morning, afternoon, or evening) for several days.
- Continue to monitor. Ignore the occasional outliers (caused by cold, flu, or bad sleep, etc.).
- Pay attention to any trendy change or deviation from the baseline. If the new trend is in the direction of improvement, that means any action taken recently is working; Conversely, if the change is towards worsening, consult with your physicians.

Error and warning message
Error and warning messages on ANSWatch's LCD are listed in Table 4.

| Table 4: Error and Warning messages |
| Message | Indication | Action |
| E01: SENSOR NOT CALIBRATED! | Air pressure sensor not calibrated | Send device back for repair |
| E02: DATA FLASH WRITE FAILURE! | Unable to save data in memory | Send device back for repair |
| E03: AIR RELEASE VALVE FAILURE! | Failure to release air | Send device back for repair |

Product specification
Physical dimension: Length 10 cm x width 7 cm x thickness 10 cm
Weight: 215 g
Power: rechargeable lithium battery
Charge time: 4 hours
Battery capacity: 700 mAh (more than 10 tests per full charge)
Display: LCD (4 cm x 7 cm)
Data I/O port: Mini-USB (Virtual COM Port & USB)
Blood pressure range and accuracy: 50-180 mmHg (+ 8 mmHg)
Heart rate range and accuracy: 40-250 beat/min (+ 1 beat/min)
HRV range and accuracy: 0-999 ms (+ 5%)
HF% range and accuracy: 0-100% (+ 5%)
LF% range and accuracy: 0-100% (+ 5%)
LF/HF range and accuracy: 0-999 (+ 5%)
Number of irregular heartbeats: 0-999
Data analyzer: ANSWatch Manager (Window based)
Patient parameters measured:
Systolic Pressure, Diastolic Pressure, Heart Rate, Heart Rate Variability (HRV), High Frequency Component (HF), Low Frequency Component (LF), LF/HF, Number of Irregular Heartbeats.
Operating environment:
temperature (15 C to 40 C); humidity (20% to 99%); indoor use
Warranty
ANSWatch products are sold with a two-year (24-month) limited warranty (except for the bio-sensor module and the lithium battery, both carrying one-year (12-month) warranty). Within the warranty period, if your product does not work properly because of a defect in materials or workmanship, we will repair your product with new or refurbished parts or replace it with a new or a refurbished product. Customers should contact their sales representative first to arrange for carry-in or mail-in service. There will be no charge for labor or parts. The limited warranty does not cover normal wear, mechanical damage, or water damage. Warranty is invalidated if the product cover fixed by screws has been opened. Product repair with a charge is available for work not covered in the warranty. Contact your sales representative for details.

Product Warranty
(1) This product carries two-year limited warranty (parts and labor)
(2) Water, fire, and mechanical damages are excluded from coverage. Repairs with a charge are available
(3) Contact your sales representative for carry-in or mail-in instructions

Product model: ____________________________
Device ID: ________________________________
Sales representative: ________________________
Date of purchase: __________________________
Distributor: ________________________________

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