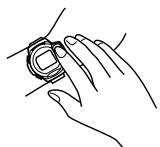


GETTING ACQUAINTED

Congratulations upon your selection of this CASIO Blood Pressure Monitor Watch (BP-1B, Module No. 2196). To get the most out of your purchase, be sure to carefully read this manual and keep it on hand for later reference when necessary.

Introduction



Simply place your finger on the Watch's sensor for instant blood pressure readings while on the go. Data can be stored in memory, and you can set an alarm to remind you to take a reading at a particular time.

- For best results, read the section of this manual titled "HOW THE WATCH MEASURES BLOOD PRESSURE" before actually trying to perform measurements.

Read This Important Information!

This Watch measures blood pressure using a fingertip pulse wave detection system. This means that the data produced by this Watch is not actually a measurement of your blood pressure. Instead it represents a value calculated using a blood pressure measurement taken using the CASIO Digital Blood Pressure Monitor Base Unit (BP-1M), and data measured by the Watch.

- All mentions of "the Watch" in this manual refer to the Blood Pressure Monitor Watch (BP-1B, Module 2196). All mentions of "the Base Unit" in this manual refer to the CASIO Cuff Type Digital Blood Pressure Monitor (BP-1M).

Warning!

- Be sure to input your basic data before using this Watch for blood pressure measurements. Also, you should update your basic data periodically (about once a month). If another person uses this Watch, basic data for that person must be input before measuring blood pressure.
- Blood pressure constantly fluctuates. Any diagnosis based on changes in blood pressure should be performed by qualified physicians only.
- Individuals under treatment for heart ailments, on dialysis, on blood pressure reduction medication, etc., and individuals wearing a pacemaker should always make medical decisions under the advice of his or her main physicians.
- In very rare cases, individuals with poor circulation or who possess other physical characteristics may experience problems with achieving proper readings with the Watch. Measurement may be impossible or large measurement error may be caused if you are unable to hold your finger steady on the Watch during measurement.
- Do not use a mobile phone or other device that emits radio waves in the vicinity of this Watch while taking blood pressure readings. Do not take blood pressure readings in the vicinity of a TV, microwave oven, etc. Electrostatic noise can also make it impossible to achieve correct blood pressure readings with this Watch.
- Do not take blood pressure readings with this Watch while riding in a train, automobile, or other vehicle. Vibration and noise can make it impossible to achieve correct blood pressure readings with this Watch.
- Never try to take this Watch apart or try to perform self-repair. Doing so can lead to malfunction of the Watch and other serious problems.
- When the battery needs replacement, be sure to take the Watch to the Store/Dealer where purchased.

CASIO ASSUMES NO LIABILITY OR RESPONSIBILITY WHATSOEVER FOR ANY DAMAGES, INCLUDING BUT WITHOUT LIMITATION TO DAMAGES OR INJURIES RESULTING FROM MATHEMATICAL OR BLOOD PRESSURE MEASUREMENT INACCURACY OF THE WATCH OR THE LOSS OF STORED DATA.

About This Manual

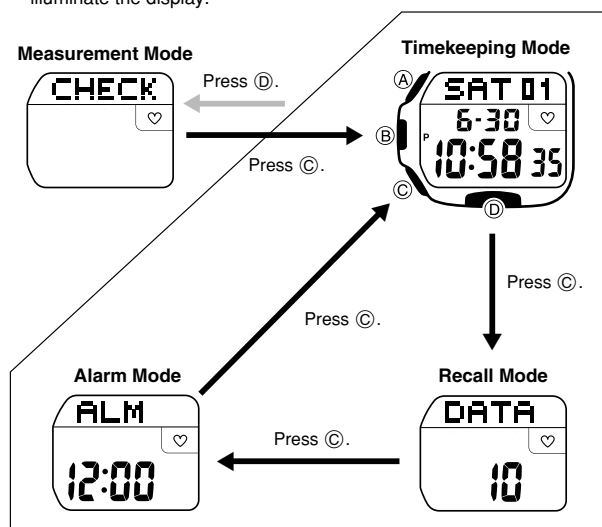


- Button operations are indicated using the letters shown in the illustration.
- Each section of this manual provides you with the information you need to perform operations in each mode. Further details and technical information can be found in the "REFERENCE" section.

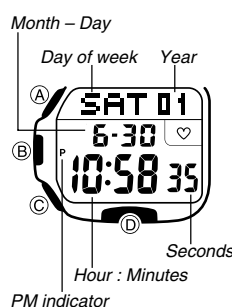
GENERAL GUIDE



- The illustration below shows which buttons you need to press to navigate between modes.
- In any mode (except for the Measurement Mode), press (B) to illuminate the display.



TIMEKEEPING

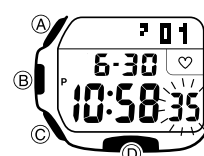


Use the Timekeeping Mode to set and view the current time and date.

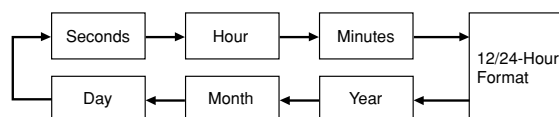
To reset the seconds count to zero

- In the Timekeeping Mode, hold down (A) until the second digits start to flash, which indicates the setting screen.
- Press (B) to reset the seconds count to 00.
 - Pressing (B) while the seconds count is in the range of 30 to 59 resets the seconds to 00 and adds 1 to the minutes. In the range of 00 to 29, the minutes count is unchanged.
- Press (A) to exit the setting screen.

To set the time and date



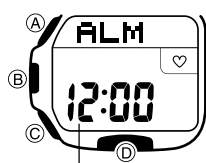
- In the Timekeeping Mode, hold down (A) until the second digits start to flash, which indicates the setting screen.
- Press (C) to move the flashing in the sequence shown below to select other settings.





- While a setting is flashing, press (B) to increase it.
 - When the 12/24-hour setting is selected, press (B) to toggle between 12-hour (12H) and 24-hour (24H) timekeeping.
- Press (A) to exit the setting screen.
 - The day of the week is automatically displayed in accordance with the date (year, month, and day) settings.

ALARM



Alarm time (Hour : Minutes)

To set the alarm time



Alarm on indicator

- In the Alarm Mode, hold down (A) until the hour digits of the alarm time start to flash, which indicates the setting screen.
 - This automatically turns on the alarm.
- Press (C) to move the flashing between the hour and minutes.
- While a setting is flashing, press (B) to increase it.
 - When setting the alarm time using the 12-hour format, take care to set the time correctly as a.m. (no indicator) or p.m. (P indicator).
- Press (A) to exit the setting screen.

Daily Alarm Operation

The alarm sounds at the preset time each day for about 20 seconds, or until you stop it by pressing any button.

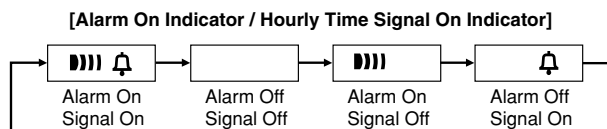
- Note that the alarm and Hourly Time Signal do not sound while the Watch is in the Measurement Mode.

To test the alarm

- In the Alarm Mode, hold down (A) until the hour digits of the alarm time start to flash, which indicates the setting screen.
- Hold down (C) to sound the alarm.
- Press (A) to exit the setting screen.

To turn the Daily Alarm and Hourly Time Signal on and off

In the Alarm Mode, press (A) to cycle through the on and off settings as shown below.



BASIC DATA

The Watch cannot calculate a blood pressure value until the person using it first inputs some basic data.

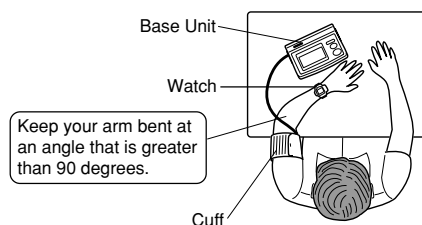
Inputting Basic Data

Basic data is set using both the Watch and the Base Unit in combination. Basic data is set by taking simultaneous pulse and blood pressure readings with the Base Unit, and pulse wave and electric potential readings with the Watch. Readings taken with the Base Unit are sent to the Watch using infrared data communication. This means you should have both the Watch and Base Unit on hand before starting the basic data setting procedure.

- See the "BP-1M User's Guide" for full details about using the Base Unit.

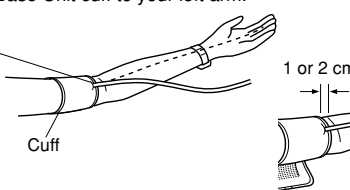
To input basic data

- With your arm resting on a table or desk, attach the cuff of the Base Unit to your arm and buckle the Watch to your wrist as shown below.
 - The Watch should be on the outside of the left wrist.

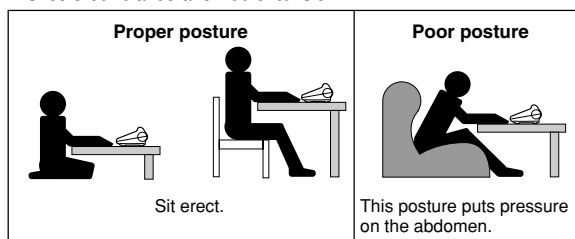


- Be sure to attach the Base Unit cuff to your left arm.

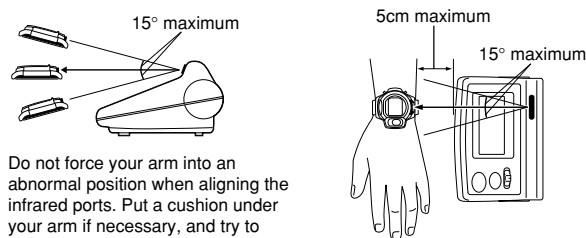
Position the cuff so the air tube is located at the top of your biceps.
 • The tube should align approximately with your middle finger.



- Your left arm (which is wearing the Watch) should be resting on the same table or desktop as the Base Unit. Your arm and shoulders should be relaxed and free of tension.



- Position the infrared ports of the Base Unit and the Watch as shown in the illustration below.

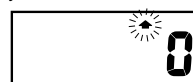


Do not force your arm into an abnormal position when aligning the infrared ports. Put a cushion under your arm if necessary, and try to achieve a path between the ports that is as straight and level as possible.

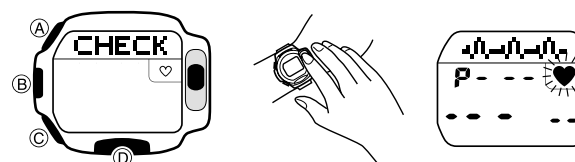
Important!

It takes a few moments after your blood pressure appears on the display of the Base Unit before it is sent to the Watch. Be sure you keep your finger on the Watch's sensor and keep the infrared ports pointed each other until the Watch beeps in step 5.

- Turn on the Base Unit by pressing its ON/OFF button.
 - The indicator should flash on the Base Unit display to indicate that it is standing by for measurement.

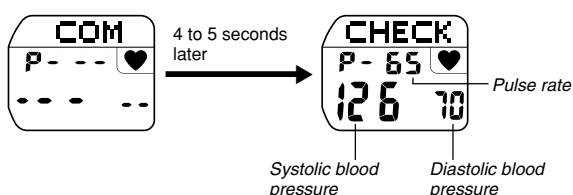


- On the Watch, press the (D) button and then immediately place your right index finger on the Watch's sensor.



Keep your finger on the Watch's sensor and keep the infrared ports aligned until the Watch beeps in step 5.

- When you press **D**, the message **CHECK** appears on the display of the Watch, indicating the Measurement Mode. The **CHECK** message starts to flash after about six or seven seconds. Make sure you place your finger onto the sensor before the flashing starts.
 - A few seconds after you place your finger onto the sensor, the Base Unit starts to inflate the cuff, so you should feel it tighten on your arm. This means that blood pressure measurement has started. At the same time, the display of the Watch shows a flashing **♥** indicator and a scrolling waveform as pulse wave and electric potential detection starts.
5. After the readings on the Base Unit and Watch are complete, the Base Unit sends blood pressure data to the Watch. The basic data setting procedure is complete when the Watch beeps and displays blood pressure values.



Note

- It takes about four or five seconds for the Base Unit to send the data to the Watch after Base Unit and Watch readings are complete. Do not move your arm until the Watch beeps and displays the blood pressure values, which indicates that the data send operation is complete. Make sure you keep the infrared ports of the Base Unit and the Watch pointed at each other until the data send operation is complete.
- The **COM** message on the display of the Watch indicates that measurement by the watch is complete, and the Watch is standing by for data to be sent from the Base Unit. A data communication error occurs (indicated by the message **XCOM** on the Watch display) if the Watch does not receive any data within about 90 seconds after **COM** appears.
- Remember that your physical condition is constantly changing. Because of this, you should update your basic data periodically (about once a month). Also, the basic data must be changed whenever a different person uses the Watch.
- Inputting basic data replaces any existing basic data currently in Watch memory. Note that the pulse rate, and systolic and diastolic blood pressure values that make up the basic data is stored in Watch memory, just as readings taken with the Watch are.
- To return to the Timekeeping Mode, press **C**.

Error Messages When Setting Basic Data



The error messages listed below can appear in the upper display area of the Watch during the basic data setting procedure. If a message appears, determine the cause and take the necessary action to correct the problem.

- Be sure to take breaks between basic data setting sessions. Pressure from the Base Unit cuff can cut off circulation in your arm and cause incorrect readings. If you need to restart a basic data setting procedure for some reason, be sure to remove the cuff and allow some time to pass before restarting.

Message	Cause	Action
XCOLD	A pulse wave cannot be detected because you are pressing down on the sensor too hard, your fingertip is cold, etc.	Apply less pressure with your finger. If your fingertip is cold, warm it up.
XDRY	Electric potential cannot be detected because your fingertip is too dry.	Moisten your fingertip slightly. Make sure you do not make your fingertip too wet.
XMOVE	A reading is impossible because you are moving your fingertip or there is too much light.	Do not move your finger while a reading is in progress. Avoid taking readings in area exposed to direct sunlight. XMOVE may also appear if your fingertip is cold or dry. See the explanations for XCOLD and XDRY for information about what you should do.
XSET	The Base Unit cannot be found.	Make sure the infrared ports of the Base Unit and the Watch are oriented correctly.
XCOM	The Watch and Base Unit may be too far apart or an error may have occurred on the Base Unit.	Do not move the Watch while Basic Data setting is in progress. See the Base Unit's manual for information about what to do in case of Base Unit error.
	When the XCOM message appears on the Watch, keep the infrared ports of the Watch and Base Unit facing each other. Press the Watch's D button, place your finger on the sensor, and try taking a reading again. After measurements are complete, the Base Unit sends data to the Watch, and the basic data setting procedure is complete. Note that when the XCOM message appears, the cuff of the Base Unit does not inflate (does not tighten on your arm) when you press the D button.	
XBAT	Watch battery power is low.	Have the battery replaced as soon as possible. Contact the Store/Dealer where purchased about battery replacement.

- See "Tips on Placing Your Finger on the Sensor" for information about how to position your finger.

BLOOD PRESSURE MEASUREMENTS

In order to get a reasonably accurate idea of changes in your blood pressure from day to day, we recommend that you take measurements under the same conditions (same time, same environment, etc.) each day.

Important!

- Remember that you have to input basic data before you can use the Watch for blood pressure measurements. Once you set your basic data, you can take blood pressure measurements using the procedures described below.
- You should use the same finger for blood pressure and pulse measurements that you used when setting your basic data. Otherwise, measured data may be wrong.
- This Watch automatically stores measured values, along with the current time and date in memory. Be sure to set the time and date before taking measurements.
- When using the Watch to take a blood pressure reading, turn off the Base Unit and keep it away from the Watch.

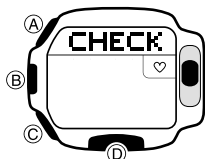


Rest your arm on a table and do not move it. Keep your arm and shoulders relaxed and tension free.

Extend your finger slightly and keep it relaxed.

To measure blood pressure and pulse

1. Strap the Watch onto your left wrist.



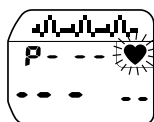
2. Press (D) to enter the Measurement Mode.



3. As shown in the illustration, lightly place a finger of your right hand onto the sensor.

- The **CHECK** message starts to flash after about six or seven seconds. Make sure you place your finger onto the sensor before the flashing starts.
- After a few moments, the display should change to show a ♥ indicator flashing and a waveform scrolling across the upper part of the display. This indicates that your pulse and blood pressure are being measured.

After placing your finger on the sensor, do not move it until measurement is complete.



4. When the measurement is complete, the Watch beeps, and then shows your pulse, systolic blood pressure, and diastolic blood pressure on the display.

- If you want to take another measurement, press (D) and continue from step 3, above.
- When a reading is successful, the data is stored in memory.
- To return to the Timekeeping Mode, press (C).

Blood Pressure Reading Error Messages

The messages below appear in the upper part of the Watch display when a problem occurs during the blood pressure reading procedure. When this happens, determine the cause of the problem and take the necessary action to correct it.

Message	Cause	Action
XCOLD	A pulse wave cannot be detected because you are pressing down on the sensor too hard, your finger tip is cold, etc.	Apply less pressure with your finger. If your finger tip is cold, warm it up.
XDRIY	Electric potential cannot be detected because your finger tip is too dry.	Moisten your fingertip slightly. Make sure you do not make your fingertip too wet.
XMOVE	A reading is impossible because you are moving your fingertip or there is too much light.	Do not move your finger while a reading is in progress. Avoid taking readings in area exposed to direct sunlight. XMOVE may also appear if your fingertip is cold or dry. See the explanations for XCOLD and XDRIY for information about what you should do.
XSET	There is no basic data set on the Watch.	Use the procedure under "Inputting Basic Data" to input the required basic data.
XBAT	Watch battery power is low.	Have the battery replaced as soon as possible. Contact the Store/Dealer where purchased about battery replacement.

- See "Tips on Placing Your Finger on the Sensor" for information about how to position your finger.

BLOOD PRESSURE MEASUREMENT DATA MEMORY

You can store up to 30 measurement data records in memory. Each record includes the pulse rate, systolic blood pressure and diastolic blood pressure, and the month, day, day of the week, and the time that the measurement was taken. If memory is already full when you perform the measurement procedure, the oldest record is deleted to make room for the new data. You can also recall and manually delete all records using the procedures described below.

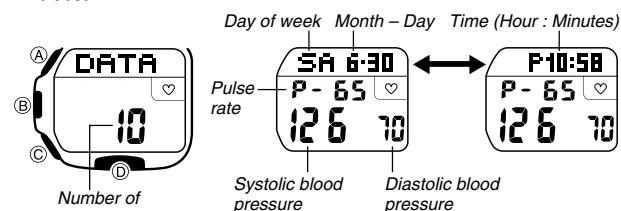
- You can use copies of the "BLOOD PRESSURE RECORD" at the back of this manual to keep track of changes in your blood pressure and pulse measurements.

Recalling Measurement Data

Use the Recall Mode to recall measurement data.

To recall measurement data

1. In the Timekeeping Mode, press (C) to enter the Recall Mode.
2. Each press of (A) scrolls through records, from the newest to the oldest.



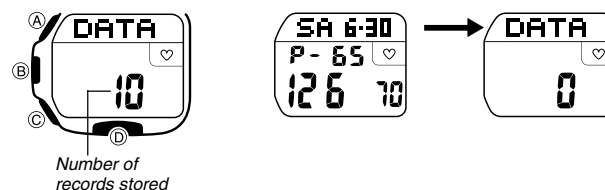
- To return to the Timekeeping Mode, press (C) twice.

Clearing Watch Memory Data

Use the Recall Mode to clear Watch memory data. Note that the procedure below clears all data stored in Watch memory, including measurement records and basic data. This means you will have to re-input basic data before performing another blood pressure operation.

To clear Watch memory data

1. In the Timekeeping Mode, press (C) to enter the Recall Mode.
2. Hold down (A) for about five or six seconds until the number of records value on the display reaches zero.



- The message **CLEAR** appears on the display after you hold down (A) for about two or three seconds. Keep (A) depressed at this time. If you don't, all of the records in memory will not be cleared.
- To return to the Timekeeping Mode, press (C) twice.

HOW THE WATCH MEASURES BLOOD PRESSURE

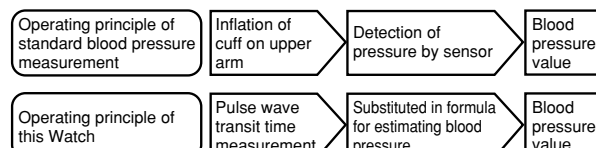
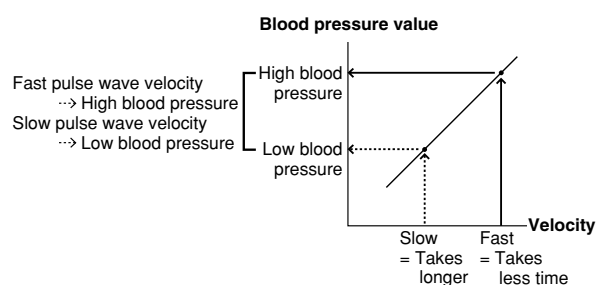
This part of the manual describes the internal workings of the Watch in detail. It also contains information you might find helpful in taking measurements correctly.

Blood Pressure Readings without Applying Pressure

Basic Operating Principles

It is a known fact that a strong correlation exists between pulse wave velocity and changes in blood pressure at the upper arm. This Watch uses this fact to estimate blood pressure based on pulse wave transit time.

This means that unlike the Base Unit or other upper arm type blood pressure monitors, this Watch does not require that pressure be applied each time reading is taken.



Pulse Wave Velocity

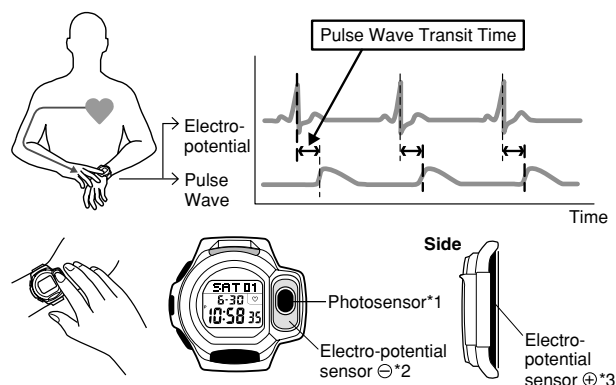
The change in blood vessel volume over time caused when the heart contracts is called a "pulse wave" (or "volume wave"). The time it takes for the pulse wave to reach a particular part of the body is the "pulse wave transit time (PWTT)," and the speed that the pulse travels is called the "pulse wave velocity."

This watch measures the pulse wave transit time at the tip of a finger placed on a sensor, and uses this information to estimate blood pressure.

Pulse Wave Transit Time (PWTT) measurement

Though the procedures in this manual refer to a single sensor on the front of the Watch, there are actually three sensors that provide the data required to calculate blood pressure as described below.

The Watch's electro-potential sensor (the Watch's sensor where you place your finger is the negative terminal while the back of the watch in contact with your wrist is the positive terminal) detects the electrical signals generated right about the time the heart contracts. This electrical signal is the starting point of the pulse wave transit time. The Watch calculates the time between the electrical signal generated by the heartbeat and detection of the pulse wave at the fingertip placed on the Watch's sensor to determine the pulse wave transit time.



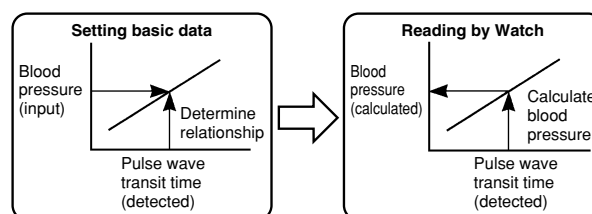
*1 This sensor detects when a pulse wave reaches your fingertip.

*2 This sensor is the negative ($\ominus$) electrode used for detecting differences in the body's electro-potential.

*3 The entire back of the Watch acts as a positive ($\oplus$) electrode, which is used for detecting differences in the body's electro-potential.

Why is basic data necessary?

Though pulse wave velocity and blood pressure are roughly proportional, there tend to be slight differences from person to person. Because of this, the relationship between the measured blood pressure value and the pulse wave velocity of the particular individual for whom blood pressure readings are to be taken must be measured (using the Base Unit) and sent to the Watch so it knows what allowances need to be made for that individual. This relationship, which is different for each person, is called "basic data." The Watch must have correct basic data (measured pulse wave velocity data) in order to calculate proportional blood pressure values.



Note

- It is important to remember that correct blood pressure measurements are impossible unless you correctly set your basic data.
- The message **XSET** on the display of the Watch indicates that there is no basic data in the Watch's memory. You cannot use the Watch to take blood pressure readings while this message is on the display.
- The Base Unit is required in order to set basic data.

When to use the Watch

This Watch calculates blood pressure values based on pulse wave transit time, so there is no need to apply pressure to the upper arm. This means that blood pressure readings can be taken quickly and easily, without the need for complex equipment or procedures. The compact watch-type configuration means you can take it along just about anywhere.

It should be noted that the Watch does not actually measure blood pressure, but rather it calculates an estimated blood pressure value. Because of this, there is some element of error in the readings produced by the Watch. The chance of error is increased by your personal physical properties and by the environment where you are taking a reading.

Be sure to use the Base Unit whenever you need accurate measurement of your blood pressure. Use the Watch when you are out and need to have a general idea of your current blood pressure.

When is the best time to set basic data?



Set basic data in a quiet place, while you are physically and emotionally relaxed. Example: Before breakfast, after rising

Important!

Individuals on blood pressure reduction medication may experience large errors in blood pressure readings. Consult your physician if you have any doubts about the readings produced by this Watch.

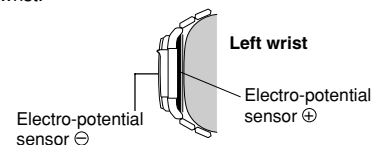
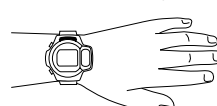
Tips on Placing Your Finger on the Sensor

The Watch uses the data detected through its sensors to calculate blood pressure. If it cannot pick up data through the sensors, an error message appears on the display. Note the following points if you experience problems with measurements.

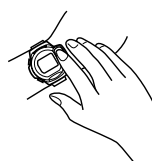
- For details about error messages, see "Error Messages When Setting Basic Data", and "Blood Pressure Reading Error Messages".

Be sure to wear the Watch on your left wrist.

The back of the Watch is designed to act as a sensor, and it must be in close contact with your left wrist.



Finger Placement



Place your finger on the sensors (photo sensor and electro-potential sensor) as shown in the illustration.

No matter how you place your finger on the sensors, you should use the same finger for blood pressure and pulse measurements that you used when setting your basic data. Otherwise, measured data may be wrong.

Correct

Place your finger on the sensor so that the pad of the finger (not the fingertip) is covering the photosensor. If your fingernail turns white, it means you are pressing too hard. Your fingertip should be resting lightly on the sensor so it is just brushing against the photosensor lens.

Incorrect

Finger too upright.



Finger too far back on the photosensor.



Finger too far forward on the photosensor.

Tips on Taking Measurements

Use the following techniques to ensure correct blood pressure measurements every time.

- When you are out of breath, your finger may move and cause problems with taking measurements. Wait for about five minutes before taking measurements.
- Once you start the measurement procedure, place your finger on the sensors as soon as possible.
- During measurements, keep still and do not talk.
- You should not be wearing a ring or any other object that restricts normal blood flow on the finger you place on the sensor.
- Avoid bright light when taking measurements.
- Do not take measurements near a TV or motor.

Important!

The following factors may make it difficult or even impossible to achieve good blood pressure readings with the Watch.

- Severe arrhythmia
Pulse waves are unstable, so they cannot be detected properly by the photosensor.
- Arteriosclerosis or other circulatory problems
Circulation at the fingertips is bad, so the photosensor cannot detect pulse waves.
- Thick fingertip skin
Thick skin impedes the passage of light through the fingertip. This makes it hard for the photosensor to take readings.
- Hairy arms
Electrical potential cannot be accurately measured unless the back cover's electro-potential sensor (Ⓢ) is in close contact with the skin. Try taking the measurement in a place where close skin contact can be maintained.
You can also try moving the Watch so it is on the inside of your left wrist.

REFERENCE

This section contains more detailed and technical information about Watch operation. It also contains important precautions and notes about the various features and functions of this Watch.

Auto Return Features

- If you leave the Watch in the Measurement Mode and Recall Mode for five to six minutes without performing any operation, the Watch automatically returns to the Timekeeping Mode.
- If you leave a screen with flashing digits on the display for two or three minutes without performing any operation, the Watch automatically saves anything you have input up to that point and exits the setting screen.

Data and Setting Scrolling

The Ⓢ button is used to scroll through setting screen data on the display. In most cases, holding down this button during a scroll operation scrolls through the data at high speed.

Timekeeping

- The year can be set in the range of 2000 to 2039.
- The Watch's built-in full automatic calendar automatically makes allowances for different month lengths and leap years. Once you set the date, there should be no reason to change it except after you have the Watch's battery replaced.

12-hour/24-hour Timekeeping Formats

The 12-hour/24-hour timekeeping format you select in the Timekeeping Mode is also applied in all modes.

- With the 12-hour format, the **P** (PM) indicator appears to the left of the hour digits for times in the range of noon to 11:59 p.m. and no indicator appears to the left of the hour digits for times in the range of midnight to 11:59 a.m.
- With the 24-hour format, times are displayed in the range of 0:00 to 23:59, with **24** indicator.

Backlight Precautions

In any mode (except for the Measurement Mode), press Ⓢ to illuminate the display for about one second.

- The electro-luminescent panel that provides illumination loses power after very long use.
- The illumination provided by the backlight may be hard to see when viewed under direct sunlight.
- The Watch may emit an audible sound whenever the display is illuminated. This is due to vibration of the EL panel used for illumination, and does not indicate malfunction.
- The backlight automatically turns off whenever an alarm sounds.
- Frequent use of the backlight shortens the battery life.

[illegible]