

Cal. DH33

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You are now the proud owner of a SEIKO Diving Computer Cal. DH33. For best results, please read the instructions in this booklet carefully before using your SEIKO Diving Computer. Please keep this manual handy for ready reference.

Sie sind jetzt stolzer Besitzer eines SEIKO Tauchcomputers Kal. DH33. Lesen Sie diese Bedienungsanleitung vor der Verwendung Ihres SEIKO Tauchcomputers aufmerksam durch, um seine optimale Nutzung zu gewährleisten. Heben Sie diese Bedienungsanleitung gut auf, um jederzeit wieder nachlesen zu können.

Vous voici l'heureux propriétaire d'un Ordinateur de Plongée SEIKO Cal. DH33. Pour en obtenir d'excellentes performances, veuillez lire attentivement les explications de ce livret avant d'utiliser cet appareil SEIKO. Conservez cette brochure de manière à pouvoir la consulter au besoin.

Grazie per aver acquistato questo orologio computer per immersioni, SEIKO Cal. DH33. Per ottenere i migliori risultati leggere attentamente le istruzioni di questo libretto prima di passare all'uso del computer stesso. Tenere poi il manuale a portata di mano, per ogni eventuale futura, ulteriore consultazione.

Usted es ahora un orgulloso propietario de un Ordenador de Buceo Cal. DH33 SEIKO. Para los mejores resultados, por favor, lea cuidadosamente las instrucciones de este librito antes de utilizar su Ordenador de Buceo Cal. DH33 SEIKO. Le rogamos que guarde este conveniente manual para pronta referencia.

Você pode sentir-se orgulhoso de ter adquirido um SEIKO Computador de Mergulho Cal. DH33. Para obter os resultados máximos, solicitamos-lhe que, antes de usar o seu SEIKO Computador de Mergulho, leia atentamente as instruções contidas neste opúsculo. E guarde este manual para referências futuras.

歡迎購買精工 DH33 機型潛水電腦錶。為達到良好使用效果，在使用您的潛水電腦錶之前，請詳細閱讀本使用手冊的用法說明，並妥善保管以便隨時參閱。

 **WARNING**

The SEIKO Diving Computer Cal. DH33 is intended for use in an inherently hazardous form of recreation. Therefore, it is absolutely essential that you strictly observe all instructions for the use and maintenance of the watch set forth in this manual.

First of all, this watch is for use in recreational (no-decompression) diving in water having a temperature range -5°C to $+40^{\circ}\text{C}$ ($+23^{\circ}\text{F}$ to $+104^{\circ}\text{F}$) only by adults in good health and having average physical strength. It is not suitable for use in saturation diving using helium gas.

The watch uses an algorithm developed by Mr. Randy Bohrer, one of the most distinguished scientists in this field, which expands upon the theories of the so-called Swiss model. Unless you have undergone scuba training with a qualified instructor, you can neither fully appreciate the concept of those theories and the nature of hazards you may face while diving, nor properly understand the meanings of indications and warnings the watch provides.

The watch also provides data for Nitrox diving. Do not use the watch for Nitrox

diving unless you are specially qualified to dive with Nitrox, having full knowledge of the potential hazards of Nitrox diving. It is extremely hazardous to dive using the watch if it is set for the wrong percentage of oxygen (FO_2). You should check before every dive if the FO_2 value set for the watch corresponds exactly to the actual percentage of oxygen in your scuba tank.

Anticipating emergencies, the watch provides information for decompression diving. Decompression diving can be quite hazardous, however, and you should not make decompression dives.

Do not attempt to dive using the watch unless you have been properly trained in scuba diving, possess the requisite experience and skill to dive safely, have thoroughly familiarized yourself with the operation and maintenance of the watch, and have tested all watch functions prior to each dive.

In addition, sharp fluctuations in atmospheric pressure and aquatic environments may affect the performance of the watch. The indications and warnings it provides serve only as general guidelines to minimize the possibility of


decompression sickness and other hazards, and are not intended to guarantee the safety of the diver. It is necessary to use other diving equipment together with the watch for safety's sake.

Also note that the possibility of decompression sickness and other hazards may increase depending on such factors as the individual diver's physiological characteristics, environmental conditions and the extent of the diver's fatigue.

Finally, the watch is intended for use by a single user. Do not share it with other divers. If any one other than the owner of the watch uses it, make sure that the watch is reset to the initial settings with the measurements stored in it being all erased.

 **WARNING**

WARNING notes indicate any condition or practice which, if not strictly observed, could result in severe personal injury or possible death.

 **CAUTION**

CAUTION notes indicate any condition or practice which, if not strictly observed, could result in personal injury or property damage.

PRECAUTIONS FOR DIVING

- Strictly observe the precautions below to enjoy safe diving with the SEIKO Diving Computer Cal. DH33.

IN GENERAL

- Do not stay underwater beyond the no-decompression limits.
- When you have descended below 15 m (50ft), be sure to make a safety stop in ascent at 3 to 6 m (10 to 20 ft). If the watch gives a decompression warning, it is recommended that you stay at the decompression stop depth longer than the stop time that the watch indicates.
 - * *While making a decompression stop, be sure to check the amount of air remaining in your tank.*
- The watch does not indicate the amount of air in your tank. Use a submersible pressure gauge to check it.
- For safety's sake, use other diving equipment such as dive computer, depth gauge and another diver's watch together with the watch.
- The watch cannot serve as your "buddy". Abide by the rules of scuba diving, and never dive alone even if you have the watch on your wrist.
- Abrupt change of altitude after diving is extremely hazardous to your health. Do not move across the altitude ranks that the watch indicates.

BEFORE DIVING

- Check that:
 - the watch is operating normally.
 - there are no visible scratches or cracks in the band and crystal.
 - the band is securely fastened to the watch case.
 - the battery life indicator (battery mark) is not shown on the display.
 - all segments of the display are not flashing.
 - the altitude rank mark is not flashing.
 - not all nine residual nitrogen indicator bars are lit up.

- * *If you find any malfunction, do not use the watch for diving.*

- If the temperature of the watch is much higher than that of the water, for example, after having been left under direct sunlight before being put in water, the watch may not measure the depth of water accurately. Soak it in water for approximately 5 minutes before using it for diving.
- Be sure to check that the actual percentage of oxygen in your tank (FO₂) is properly set for the watch. FO₂ cannot be readjusted while you are underwater.
- Check that the measurement units of depth and temperature are set according to your requirement. They can be selected from "meters (m) and centigrade (° C)" and "feet (ft) and Fahrenheit (° F)".

WHILE DIVING

- Take care not to hit the watch against hard objects such as rocks.
- Check that the watch indicates the current depth properly. If "---" or "Err" is shown when the current depth is less than 100 m (329 ft), stop using the watch immediately, and use other diving equipment such as diving computer, depth gauge and another diver's watch you have with you.
- While in the dive mode, the display cannot be changed over to modes other than time/calendar by pressing button "C".
- Depending on the aquatic environment where the watch is used, the beeping sound of the regular alarm and warnings may or may not reach your ears.
- The watch measures the depth of water on the basis of seawater having a specific gravity of 1.03. When it is used in fresh water such as lakes, therefore, the displayed depth should be corrected by multiplying it by 1.03. No-decompression limits, however, will be calculated and displayed normally without any adjustment.

Ex.) If the displayed depth of the water is 19.4 m (64 ft) in fresh water (specific gravity 1.00), the actual depth is:

$$19.4 \text{ m} \times 1.03/1.00 \approx 20.0 \text{ m (66 ft)}$$

AFTER DIVING

- Be sure to rinse the watch in fresh water, and wash out all seawater, soil, sand, etc.
- After cleaning the watch in fresh water, be sure to wipe it thoroughly dry.
- If the watch is left soaked in water for a long time for removing salt or other purposes, the auto sensor function is activated and consumes battery energy.
- If a grain of sand or the like gets in the pressure sensor, rinse the watch in fresh water to wash it out. Do not use anything with a pointed tip to pick it out or an air blast to blow it out. If it sticks in the pressure sensor and cannot be washed out, consult the retailer from whom it was purchased.
- Be careful not to expose the pressure sensor to solvents such as alcohol and gasoline, as this will cause malfunctions.
- When the surface interval time is less than 10 minutes, time/calendar setting, FO₂ setting and hour correction cannot be made.
- If the measurement exceeds the measurable range of the watch, all the segments of the display flash. In that case, the watch cannot be used for diving for 48 hours after the dive is over.

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FEATURES

The SEIKO Diving Computer Cal. DH33 is a digital diver's watch featuring dive computer functions. An algorithm is programmed into it to calculate multilevel diving.

DIVE COMPUTER FUNCTIONS

Algorithm

- The watch has an algorithm that calculates multilevel diving.
- The watch uses an algorithm developed by Mr. Randy Bohrer, one of the most distinguished scientist in this field, which expands upon the theories of the so-called Swiss model.

Dive function

- The watch is equipped with an auto switch that senses water and activates the dive function.
- The diving data is measured automatically while diving between 1.5 m (5 ft) and 99.9 m (328 ft), eliminating the need for any button operation.
- The residual nitrogen and residual oxygen are indicated graphically for a quick grasp of the current safety situation.

Altitude compensation

- The watch measures the current altitude automatically, calculating the residual nitrogen and other data for the next dive taking into account the altitude change following an air flight or move to high ground.

Nitrox diving function

- The watch can provide data for nitrox diving.
- The percentage of oxygen (FO₂) in the gas mixture of your scuba tank can be set for the watch from 22% to 50%.

Dive plan function

- No-decompression limits are calculated, automatically taking into consideration the current residual nitrogen and altitude.
- This mode is convenient for planning the next dive.

Dive log function

- Details of up to 30 dives are recorded automatically.

- The log data includes date of dive, entry/exit time, dive time, maximum depth, FO₂ setting (percentage of oxygen in gas mixture), and residual nitrogen/oxygen at the end of dive.
- The measurement units of depth and temperature can be selected from "meters (m) and centigrade (°C)", and "feet (ft) and Fahrenheit (°F)".

TIME FUNCTIONS

Time/calendar function

- Hour, minutes, seconds, month, date and day are displayed.

Fully automatic calendar

- The calendar adjusts automatically for odd and even months including February of leap years up to 2050.

Regular alarm function

- The alarm can be set to ring once a day at a designated time. Hourly time signal and alarm test functions are also provided.

Hour correction function

- When you are traveling around different time zones, the time and calendar of the place you visit can be shown easily with only the press of a button. The time can be adjusted in 30 minute increments, making it available for those areas having a time difference in 30 minute increments from GMT.

OTHER FUNCTION

Illuminating light (Electroluminescent panel)

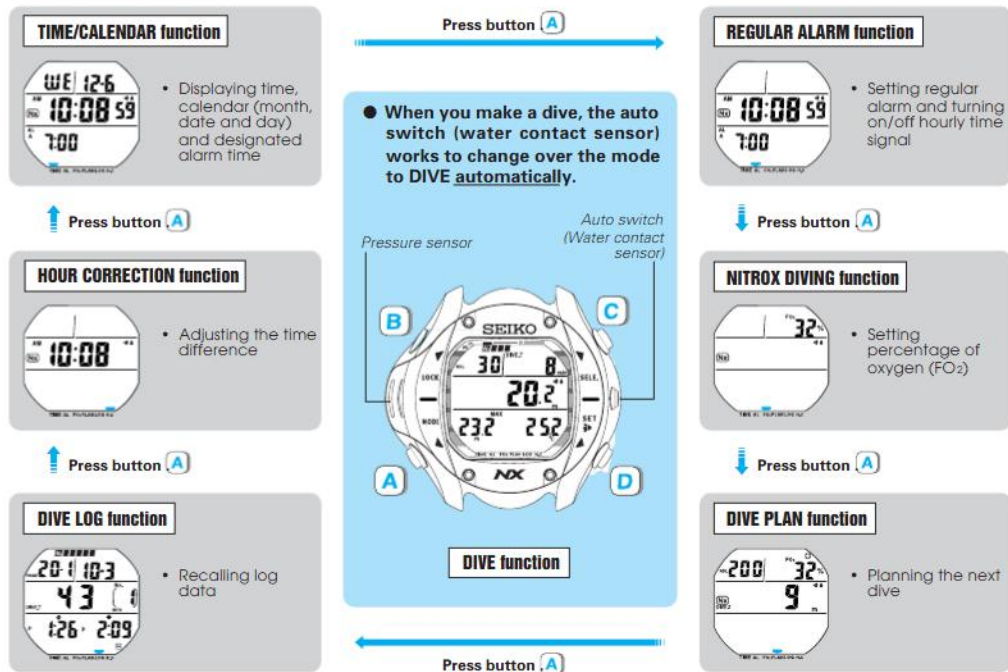
- Certain materials emit light when voltage passes through them. This phenomenon, known as "electroluminescence", is used to illuminate the display.
- With the press of a button, the light illuminates the display for 2 to 3 seconds for easy viewing in the dark.

BUTTONS AND DISPLAY CHANGE

- Other than in the DIVE mode, the display changes in the following order by pressing button **A**.

* The display indicator  shows to which display the watch is set.

* If the watch is left untouched in any of the displays other than TIME/CALENDAR and DIVE, the display will automatically return to the TIME/CALENDAR in 5 to 6 minutes.



HOW TO USE TIME FUNCTIONS

TIME/CALENDAR FUNCTION

TIME/CALENDAR SETTING

- The time/calendar setting cannot be made for 10 minutes after a dive.

A Press to show TIME/CALENDAR display.



B Press to show TIME/CALENDAR SETTING display.



* If the watch is left untouched in the TIME/CALENDAR SETTING display, the display will automatically return to the TIME/CALENDAR in 1 to 2 minutes.

C Press to select the digits to be adjusted (flashing).

* With each press, the digits flash in the following order:

Seconds → Minutes → Hour → Year
 ↑ ↓
 12-/24-hour indication ← Date ← Month



D Press to set the flashing digits.

* The digits move quickly by keeping the button pressed.

* When both the hour and minute digits are flashing, changeover between 12- and 24-hour indications can be made.

* For the 12-hour indication, "AM" or "PM" is shown. There is no mark for the 24-hour indication.

< Seconds setting >

When the seconds digits are flashing, press button D in accordance with a time signal. The digits are reset to "00" and start immediately.

* When the digits count any number from 30 to 59, one minute is added and the seconds start immediately.

B Press to return to TIME/CALENDAR display.

When all the segments of the display light up:

- If buttons C and D are pressed at the same time in the TIME/CALENDAR SETTING display, all the segments of the display will light up. This is not a malfunction. Press button A, B, C or D to return to the TIME/CALENDAR display, and set the time/calendar again.



HOW TO USE TIME FUNCTIONS

REGULAR ALARM FUNCTION

- The alarm can be set to ring once a day at a designated time.
- Once the alarm is set, the set time is shown in the TIME/CALENDAR display.
- Alarm can be tested.
- Hourly time signal is provided.

REGULAR ALARM SETTING

A Press to show REGULAR ALARM display.

B Press to show REGULAR ALARM SETTING display.



C With each press, flashing digits change in the following order:

Hour → Minutes

D Press to set the flashing digits.

* The digits move quickly by keeping the button pressed.

B Press to return to REGULAR ALARM display.

Notes:

- If the watch is left untouched in the REGULAR ALARM SETTING display, the display will automatically return to the TIME/CALENDAR in 1 to 2 minutes.

2. When the digits are adjusted in the REGULAR ALARM SETTING display, the alarm is engaged automatically, and the regular alarm mark is shown on the display.

3. When setting the hour digits in the 12-hour indication, check that AM/PM is correctly set. "A" or "P" is shown for the AM or PM setting, respectively.

ENGAGEMENT/DISENGAGEMENT OF REGULAR ALARM AND HOURLY TIME SIGNAL

C With each press in the REGULAR ALARM display, the regular alarm and hourly time signal are engaged and disengaged in the following order:



How to stop the regular alarm

The regular alarm rings at the designated time for 20 seconds and stops. While the alarm is ringing, the regular alarm mark flashes. To stop them manually, press button **A** **B**

C or in any **D** display.

Alarm test

Press and hold buttons **C** and **D** at the same time in the REGULAR ALARM or TIME/CALENDAR display.

Notes:

1. While you are underwater, the regular alarm rings for 3 seconds and stops, but the regular alarm mark flashes for up to 20 seconds.
2. In testing the alarm, if button C is pressed just before pressing button D, the engagement/disengagement of the regular alarm and hourly time signal will be made. Show the REGULAR ALARM display to engage or disengage them as required, following the procedure above.



ILLUMINATING LIGHT

- D** Press in the displays other than DIVE PLAN and DIVE LOG to turn on the illuminating light.



- The display panel is evenly illuminated for 2 to 3 seconds.

Notes:

1. While the illuminating light is used, the watch may make a very small noise. However, this is not a malfunction.
2. The electroluminescent panel loses its luminance as the battery voltage becomes lower. Also, its luminance level decreases gradually with use.
3. When the illuminating light becomes dim, replace the battery with a new one. If the light remains dim after the battery is replaced, have the electroluminescent panel replaced with a new one by the retailer from whom the watch was purchased. It will be replaced at cost.

HOOR CORRECTION FUNCTION

- When you travel around different time zones, the time/calendar of the place you visit can be set easily.
- The time difference can be adjusted in 30 minute increments up to 24 hours. The calendar is also adjusted accordingly.
- When you dive in a different time zone, it is recommended that you use this function to set the time/calendar of the diving site before diving.

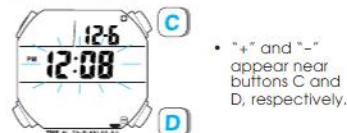
HOW TO USE THE HOUR CORRECTION FUNCTION

- A** Press to show HOUR CORRECTION display.

- B** Press to show TIME DIFFERENCE SETTING display.



- C** or **D** Press to set the time/calendar of the place you visit.



- "+" and "-" appear near buttons C and D, respectively.

* With each press of buttons C or D, 30 minutes are increased or decreased, respectively. The digits move quickly by keeping the respective buttons pressed.

- B** Press to return to HOUR CORRECTION display.

Notes:

1. For 10 minutes after a dive, the hour correction cannot be made.
2. If the watch is left untouched in the TIME DIFFERENCE SETTING display, the display will automatically return to the TIME/CALENDAR in 1 to 2 minutes.
3. Check that AM/PM and calendar are correctly set.



HOW TO USE DIVE COMPUTER FUNCTIONS

NITROX DIVING FUNCTION

- The percentage of oxygen in the air used for ordinary diving is 21%. The higher percentage of oxygen in the gas mixture means a lower percentage of nitrogen than ordinary air, reducing the risk of decompression sickness.



WARNING

- This function should be used only when you dive with a gas mixture of oxygen and nitrogen other than ordinary air. When diving with air, be sure to set the percentage of oxygen (FO₂) to "Air".
- Never use the watch for diving with any value other than the actual percentage of oxygen in your tank set for FO₂.
- If you have set FO₂ for nitrox diving, be sure to re-check the FO₂ setting before a dive. On the day following the day you made a nitrox dive, "--" is displayed in place of the FO₂ setting, "Nx" flashes, and the watch cannot be used for diving. In that case, set FO₂ again.

- By setting "Air" for FO₂, the percentage of oxygen is set to 21% as in the ordinary air. FO₂ can be set from 22% to 50% according to the gas mixture of your scuba tank.
- When a value between 22 and 50 is set for FO₂, the nitrox mark "Nx" appears on the display, and the watch is shifted for nitrox diving.
- The watch calculates the no-decompression limit, residual nitrogen and other data according to the FO₂ you have set.

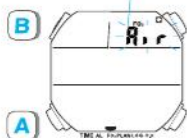
HOW TO SET FO₂

A Press to show FO₂ display.

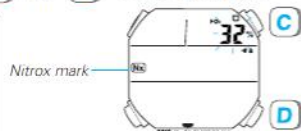
B Press to show FO₂ SETTING display.

* For diving with ordinary air, set "Air" for FO₂.

Percentage of oxygen
"Air": 21% for diving with ordinary air



C or **D** Press to set FO₂.



* "+" and "-" appear near buttons C and D, respectively.

* With each press of buttons C and D, the percentage is increased and decreased in increments of 1%, respectively. The digits move quickly by keeping the respective buttons pressed.

* If a value between 22% and 50% is set for FO₂, the nitrox mark "Nx" appears on the display.

B Press to return to FO₂ display.

HOW TO USE DIVE COMPUTER FUNCTIONS

Notes:

- For 10 minutes after a dive, FO₂ setting cannot be made.
- If the watch is left untouched in the FO₂ SETTING display, the display will automatically return to the FO₂ in 1 to 2 minutes.

When the nitrox mark "Nx" is flashing:



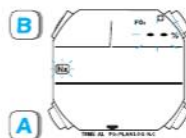
Nitrox mark

- If FO₂ was set for nitrox diving the previous day and the date has changed to the next, a flashing "Nx" is shown on the display. In that case, be sure to set FO₂ newly before the next dive according to the gas mixture of your scuba tanks.

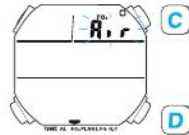
How to re-set FO₂

A Press to show FO₂ display.

B Press to show FO₂ SETTING display.



C Press once to show "Air" for diving with ordinary air.



* "Nx" disappears.

C or **D** Press to set FO₂ if you wish to dive with nitrox.

B Press to return to FO₂ display.

■ ALTITUDE COMPENSATION

- This watch has a built-in pressure sensor to measure the altitude (above sea level) and indicates the altitude rank graphically in four levels.
- Residual nitrogen, no-decompression limits for the next dive and other data are calculated taking into account the current altitude.
- As you move across altitude ranks, the watch re-calculates residual nitrogen on the spot.



Altitude rank indicator

Altitude rank	0	1	2	3	Measurement error
Indicator	Nil	▲	▲▲	▲▲▲	▲▲▲▲ (Flashing)
Altitude above sea level	0 ~ 900 m	600 ~ 1700 m	1300 ~ 2500 m	2200 ~ 6000 m	6001 m and higher
	0 ~ 3000 ft	2000 ~ 5500 ft	4300 ~ 8200 ft	7200 ~ 19700 ft	19700 ft and higher

Notes:

1. The altitude range in the above table provides general guideline of altitude only, and the altitude rank indication does not indicate a specific altitude.
2. If the watch senses an altitude change across altitude ranks, the residual nitrogen indicator may appear even while you are on the surface. This is not a malfunction.

■ SELECTION OF MEASUREMENT UNITS

- The measurement units of depth and temperature can be selected from "meters (m) and centigrade (° C)" and "feet (ft) and Fahrenheit (° F)".

HOW TO SET THE DEPTH & TEMPERATURE UNITS

A Press to show DIVE PLAN display.



B Press for 4 to 5 seconds to change over the depth and temperature units.

* With each press of the button, the units of depth and temperature change over alternately between "meters and centigrade" and "feet and Fahrenheit".

Note:

Once the units of depth and temperature are set in the DIVE PLAN display, those in the DIVE LOG display and the DIVE mode will also be set accordingly.

■ DIVE PLAN FUNCTION



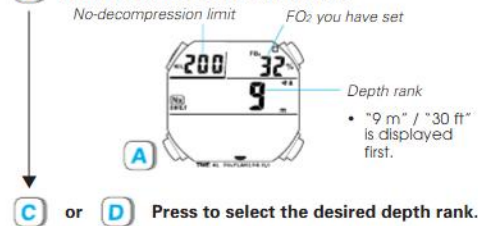
WARNING

- Before using the dive plan function, be sure to check the gas mixture of your scuba tank, set FO₂ accordingly and set the unit of depth as required.

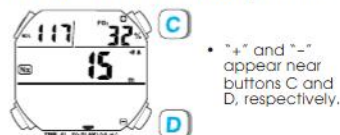
- Use this function for planning a dive before diving.
- No-decompression limits corresponding to each of the 14 ranks of depth of water are displayed.
 - Depth rank : ● In meters : 9 m, 12 m, 15 m, 18 m, 21 m, 24 m, 27 m, 30 m, 33 m, 36 m, 39 m, 42 m, 45 m and 48 m.
 - In feet : 30 ft, 40 ft, 50 ft, 60 ft, 70 ft, 80 ft, 90 ft, 100 ft, 110 ft, 120 ft, 130 ft, 140 ft, 150 ft and 160 ft.
- No-decompression limits are calculated according to FO₂ you have set, current altitude rank and residual nitrogen during surface interval.

HOW TO USE THE DIVE PLAN FUNCTION

A Press to show DIVE PLAN display.



C or **D** Press to select the desired depth rank.



• "+-" and "--" appear near buttons C and D, respectively.

* With each press of buttons C and D, the depth rank advances and moves back by one rank, respectively. It changes quickly by keeping the respective buttons pressed.

* As you select a depth rank, the watch calculates and displays a corresponding no-decompression limit.

Notes:

1. The display cannot be changed over to the DIVE PLAN for 10 minutes after a dive.
2. Please note that it may take some time to calculate no-decompression limits.
3. **During surface interval:** While the watch counts down the desaturation time during surface interval, surface time and desaturation time are also shown in the DIVE PLAN display.

4. When planning a dive with nitrox:

Depending on the FO₂ setting, "--" appears in place of no-decompression limit for a depth rank. It indicates that the selected depth rank exceeds the maximum depth to which you can descend with the gas mixture you have set.

DIVE FUNCTION

- The auto switch (water contact sensor) senses water and automatically activates the DIVE FUNCTION, showing the DIVE display. There is no need to change the displays manually.
- As you descend to 1.5 m (5 ft) underwater, the watch starts showing the current depth and measuring the diving time.
- During a dive, the watch automatically measures depth, water temperature and dive time, and provides the information necessary for diving including warnings on hazards.

WARNING

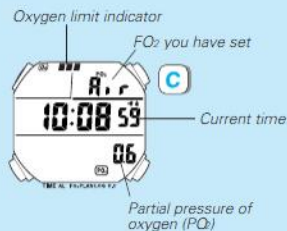
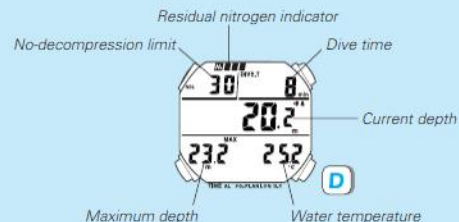
- Before making a dive, be sure to check the function of your watch, following the instructions set forth in "BEFORE DIVING" in "PRECAUTIONS FOR DIVING" on page 4.
- Also, be sure to set FO₂ according to the gas mixture of

your scuba tank. FO₂ cannot be re-adjusted while you are underwater.

- Select the measurement units of depth and temperature as you require. They cannot be selected while you are underwater.

DISPLAY WHILE DIVING

During no-decompression diving



D Press to illuminate the display for 2 to 3 seconds.

* The illuminating light will not stay lit if the button is kept pressed.

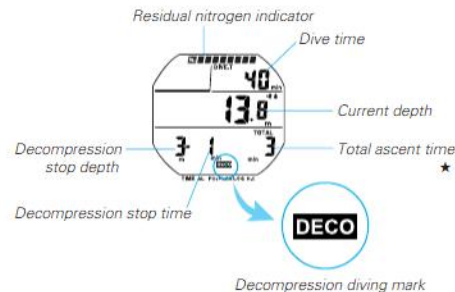
C Press and hold to display current time, partial pressure of oxygen (PO₂) and data.

* The display is illuminated for 2 to 3 seconds.

After no-decompression limit reaches "0" (during decompression diving):



- Never dive beyond the no-decompression limit.



- When the no-decompression limit reaches "0" while diving, all the residual nitrogen indicators are displayed to indicate that the watch has shifted to decompression diving mode.
- After you make decompression stops as indicated by the watch, it will resume calculation of no-decompression diving.

★ **Total ascent time** refers to the minimum time required to stay underwater before surfacing, including the decompression stop time at the indicated decompression stop depths.








WARNING

- Do not make a decompression stop at a depth shallower than the decompression stop depth the watch indicates. It is in violation of the decompression stop warning, and the watch will not count down the decompression stop time and total ascent time even if you make a stop during ascent.
- Even after the watch has given a decompression stop violation warning, it will resume calculation of no-decompression diving if you return to the indicated decompression stop depth and make a decompression stop as indicated by the watch. **If you continue ascending and surface, defying the warning, the watch cannot be used for diving for 48 hours.** During that time period, the watch is not set to calculate decompression diving, and only the surface interval and dive log displays are shown. If the aquatic environment permits, **it is recommended that you make a decompression stop at a depth 1 to 2 m (3 to 7 ft) deeper than the indicated decompression stop depth.** In that case, take care that you should stay at the depth for a longer time period than the decompression stop time that the watch indicates.

WARNINGS DURING A DIVE



Indication	Warning	Description
 (flashing)	Ascent rate warning	<p>If you ascend in water at a rate greater than the specified one, flashing "SLOW" appears for 5 seconds and the warning sound beeps for 3 seconds.</p> <p>Three rates are specified depending on the depth level.</p> <p>0.0 ~ 5.9 m (0 ~ 19 ft) : 8 m (26 ft)/min 6.0 ~ 17.9 m (20 ~ 59 ft) : 12 m (39 ft)/min 18.0 m (60 ft) and deeper : 16 m (52 ft)/min</p> <p>* The watch calculates the ascent rate by measuring the current depth every 6 seconds.</p>
 (flashing)	Decompression warning Decompression stop violation warning	<p>If you accidentally exceed the no-decompression limit, the watch is shifted to the decompression mode, flashing "DECO" is shown, and the warning sound beeps for 3 seconds.</p> <p>If you ascend to a depth shallower than the decompression stop depth that the watch indicates, it gives a decompression stop violation warning. The current depth, decompression stop depth, decompression stop time and "DECO" all flash, and the warning sound beeps for 3 seconds.</p> <p>When you return to a depth deeper than the decompression stop depth, the watch starts counting down the decompression stop time.</p>
 (flashing)	PO₂ limit warning (Warning on partial pressure of oxygen)	<p>If the partial pressure of oxygen (PO₂) reaches 1.5, the warning sound beeps for 3 seconds. By pressing and holding button C to show PO₂, you can see some of the oxygen limit indicators flashing.</p> <p>If PO₂ exceeds 1.6, the "O₂" mark starts flashing, and the warning sound beeps for 3 seconds. By pressing and holding button C to show PO₂, you can see all the oxygen limit indicators flashing.</p>
 (flashing)	OLI warning (Warning on oxygen limit)	It appears when all the oxygen limit indicators are flashing.
 (flashing)	Out of range warning	<p>It appears when the measurement exceeds the specified value as follows:</p> <ul style="list-style-type: none"> Maximum depth exceeds 99.9 m (328 ft). Dive time exceeds 599 minutes. Decompression stop depth exceeds 15 m (50 ft). Decompression stop time exceeds 99 minutes.

* The watch will not measure the current depth while the warning sound is beeping.

DISPLAY AFTER A DIVE

When you are less than 1.5 m (5 ft) underwater and the auto switch senses water:



- The watch shows the dive display with the current depth being "0.0 m (0 ft)".
- If the watch shows the dive display after you surface, check that water does not remain on the auto switch.
- If the watch measures the current depth of greater than 1.5 m (5 ft) within 10 minutes after this display is shown, the previous and the new dives are considered inseparable, and the dive times of both dives and the surface interval time are added together.



When you are less than 1.5m underwater or on the surface and the auto switch does not sense water:



- TIME/CALENDAR display

C Press and hold to show the surface interval time and desaturation time.

DIVE LOG FUNCTION

- The log data recorded automatically while diving can be recalled.
- The stored data includes almost all the data necessary for keeping in log books.
- Log No., date of dive, entry time, exit time, dive time, dive No. on that day, percentage of oxygen, average depth, maximum depth and water temperature at maximum depth are displayed in the two separate dive log displays.
- Details of up to 30 dives can be stored in memory. If more than 30 dives are made, the oldest data will be erased from memory.

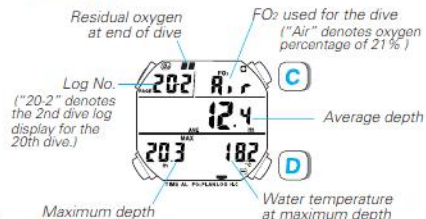
HOW TO RECALL LOG DATA

A Press to show DIVE LOG display.

* 1st dive log display for the newest dive will appear.



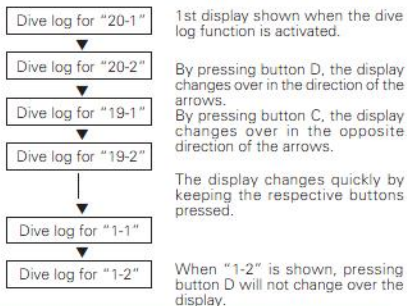
D Press to show the 2nd dive log display for the newest dive.



C or D Press to show the dive log for other dives.

* The display changes in the following order by pressing button C or D:

Ex.) When details of 20 dives have been recorded:









Notes:

- Nitrox mark appears when a value between 22% and 50% is set for FO₂.
- The entire log data of a dive is divided and shown in two separate displays. Check the log No. to show the data as required.

WARNINGS SHOWN IN DIVE LOG DISPLAY



Indication	Warning	Description
 (flashing)	Ascent rate warning	It appears if the rate of ascent has exceeded the specified value two times in a row.
 (flashing)	Decompression warning	It appears if you have exceeded no-decompression limit and have made a decompression stop.
 (flashing)	Decompression stop violation warning	It appears if you have exceeded no-decompression limit but have not made a decompression stop as indicated by the watch.
 (flashing)	PO ₂ limit warning (Warning on partial pressure of oxygen)	It appears if the partial pressure of oxygen (PO ₂) has exceeded 1.5.
 (flashing)	OLI warning (Warning on oxygen limit)	It appears when all the oxygen limit indicators have lit up.
 (flashing)	Out of range warning	It appears when the measurement has exceeded the specified value. Ex.) Maximum depth exceeded 99.9 m (328 ft).

HOW TO USE DIVE COMPUTER FUNCTIONS

When more than 30 dives are made:

- If a new dive is made when log data of 30 dives are stored in memory, the log data for the oldest dive is erased from memory and the data for the new one is recorded in memory.
- In that case, log No. for the existing data will be reduced by one.

Dive that is not recorded in the dive log function

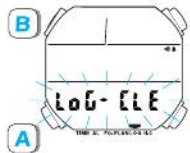
Even if the dive function is started by measuring a depth greater than 1.5 m (5 ft), a dive that lasts less than 3 minutes will not be recorded.

How to erase the log data in memory

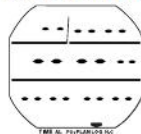
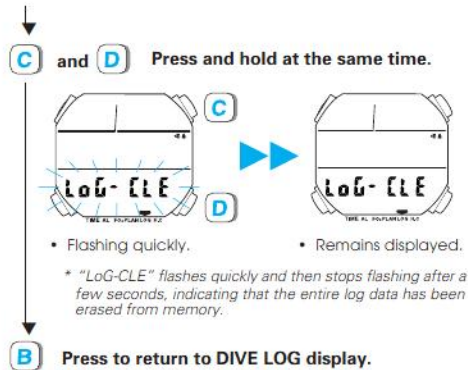
The entire log data stored in memory can be erased as required.

A Press to show DIVE LOG display.

B Press to show LOG DATA ERASURE display.



- Flashing "LoG-CLE" appears.



- No log data is stored in memory.

USE OF TERMS IN THIS MANUAL

DEFINITION OF THE TERMS AND BASIC DESIGN OF THE WATCH

Terms	Definition and basic design of the watch
Depth	<p>The watch measures the depth of water from 1.5 m (5 ft) up to 99.9 m (328 ft) in 0.1 m (1 ft) increments. The measurement is made on the basis of seawater having a specific gravity of 1.03.</p> <p>Ex.) If the displayed depth of the water is 19.4 m (64 ft) in fresh water (specific gravity 1.00), the actual depth is: $19.4 \text{ m (64 ft)} \times 1.03/1.00 = 20.0 \text{ m (66 ft)}$</p> <p>No-decompression limits and residual nitrogen the watch provides are calculated on the basis of water pressure only, and can be used while diving in fresh water without any conversion.</p>
Dive time (DIVE. T)	<p>The watch measures and indicates dive time in one minute increments up to 599 minutes. It starts measuring the time when the diver descends more than 1.5 m (5 ft), and stops when the diver ascends to a depth of less than 1.5 m (5 ft).</p>
Water temperature	<p>The watch measures the water temperature in 0.1° C (1° F) increments from -5.0° C up to +40.0° C (23° F up to 104° F). The water temperature recorded in the dive log function is a measurement taken at the maximum depth.</p>

Terms	Definition and basic design of the watch
Surface interval time (SURF. T)	<p>The watch measures the time spent on the surface in one minute increments up to 48 hours, starting from the time when the diver ascends to a depth of less than 1.5 m (5 ft).</p> <p>If the diver descends to a depth of greater than 1.5 m (5 ft) when the surface interval time is less than 10 minutes, the previous and the new dives are considered inseparable, and the dive times of both dives and the surface interval time are added together.</p>
Algorithm	<p>The watch uses an algorithm developed by Mr. Randy Bohrer, one of the most distinguished scientists in this field, which expands upon the theories of the so-called Swiss model.</p>
De-compression diving	<p>The watch is intended for use in no-decompression diving (diving which allows you to make a direct, continuous ascent to the surface). Anticipating emergencies, it provides information for decompression diving.</p> <p>* Decompression diving refers to diving which requires stops at specified depths during ascent, due to an impermissible amount of nitrogen having accumulated in the diver's body.</p>

EXPLANATION OF THE TERMS

Terms	Explanation
Altitude rank	The pressure sensor measures the atmospheric pressure at regular intervals, and the watch indicates the altitude rank in four levels from 0 to 3. The measurable range of altitude is 0 ~ 6,000 m (19,700 ft). If the measurement is outside this range, the altitude rank indicator flashes.
Residual nitrogen indicator	The amount of nitrogen absorbed by the diver's body is indicated graphically in 10 levels from 0 to 9 by the number of bars shown on the display. When all 9 indicator bars light up, the watch calculates decompression diving.
Desaturation time	The time required for the excess amount of nitrogen accumulated in the diver's body during a dive to be eliminated completely. It is indicated in hours and minutes, and the watch counts it down. Desaturation is considered to be completed when the countdown is over.
FO₂ (Percentage of Oxygen)	The percentage of oxygen in the gas mixture of the scuba tank, which the diver needs to set for the watch before diving. For diving with air, "Air" (21%) should be set. FO ₂ can be set from 22% to 50%, and if a value within this range is set, the watch calculates nitrox diving, and the nitrox mark "Nx" is shown on the display. The set FO ₂ is recorded in the dive log function.
Nitrox mark	If the watch is left untouched with "Nx" shown on the display after a dive, it starts flashing on the next day to indicate that FO ₂ should be re-set. Otherwise, "--" is shown in place of the previous FO ₂ setting, and the watch cannot be used for diving.
Depth rank	For planning a dive, the depths from 9 m to 48 m (30 ft to 160 ft) are divided into 14 ranks in 3 m (10 ft) increments.

Terms	Explanation
No-de-compression limit (NDL)	The maximum time during which the diver can stay at the current depth or in the selected depth rank without decompression procedure. The watch indicates NDL up to 200 minutes. In the DIVE PLAN display, if you choose a depth rank where the partial pressure of oxygen exceeds 1.6, "--" is displayed in place of NDL.
Log No.	The order of diving data stored in memory. Details of up to 30 dives can be recorded. The log data of a dive is shown in two separate displays. They have different log Nos. such as "30-1" and "30-2".
Number of dives on that day	The number of dives made on the same day. It is recorded in the dive log function.
Entry time	The time when the dive is started. The watch records the time when the diver descends to a depth of more than 1.5 m (5 ft).
Exit time	The time when the dive is finished. It corresponds to the hour and minute when the diver ascends to less than 1.5 m (5 ft) underwater.
Average depth	The average depth is calculated from the depth data measured during a dive. It can be checked in the dive log function.
Maximum depth	The greatest measurement of depth during a dive.

EXPLANATION OF THE TERMS

Terms	Explanation
Current water temperature	The watch measures the water temperature every minute in 0.1° C (1° F) increments from -5.0° C up to +40.0° C (23° F up to 104° F). If the measurement is outside the range, "Lo" or "Hi" is displayed.
Water temperature at maximum depth	The water temperature at the maximum depth is recorded in the dive log function.
Residual nitrogen at end of dive	Residual nitrogen at the end of a dive is recorded in the dive function and indicated graphically by the number of bars.
Residual oxygen at end of dive	Residual oxygen at the end of a dive is recorded in the dive function and indicated graphically by the number of bars.
De-compression stop depth	The depth at which the diver should make a decompression stop. It is calculated on the basis of the diving data collected during the dive, and selected from 15, 12, 9, 6 and 3 m (50, 40, 30, 20 and 10 ft). If the diver ascends to a depth shallower than the indicated depth, a decompression stop violation warning is given.

Terms	Explanation
De-compression stop time	The time period during which the diver should stay at the decompression stop depth. It is calculated on the basis of the diving data collected during the dive, and is counted down while the decompression stop is being made.
Total ascent time	The minimum time required to stay underwater before surfacing, including the decompression stop.
PO₂ (Partial pressure of oxygen)	PO ₂ is calculated on the basis of the depth and the FO ₂ setting (percentage of oxygen in gas mixture). When PO ₂ exceeds 1.5, a warning is given.
Oxygen limit indicator	The amount of excess oxygen in the diver's body is indicated graphically in 9 levels by the number of bars shown on the display. In nitrox diving, the diver is exposed to higher levels of oxygen. If all the indicator bars light up, ascend to a shallower depth, as you are in danger of suffering from oxygen toxicity.



BATTERY CHANGE

3
Years

The miniature battery which powers your watch should last approximately **3 years**. However, because the battery is inserted at the factory to check the function and performance of the watch, its actual life once in your possession may be less than the specified period. When the battery expires, be sure to replace it as soon as possible to prevent any malfunction. It will be replaced at cost. For battery replacement, we recommend that you contact an AUTHORIZED SEIKO DEALER and request **SEIKO CR2032** battery.

* The battery life may be less than 3 years if the regular alarm is used more than 10 seconds a day, the illuminating light more than 10 seconds a day, and/or the diving function more than 50 times a year, one hour per dive.

Battery life indicator

If the battery mark is shown on the display, the watch will stop operating in about a week. Take the watch to the retailer from whom it was purchased to replace the battery with a new one.



Battery mark

• While the mark is shown, the watch cannot be used for diving.

* While the battery mark is shown, the dive function will not start. If the battery mark starts flashing, the battery is nearing its end. Take the watch to the retailer from whom it was purchased immediately for battery replacement.

Notes:

1. The log data stored in the dive log function is not erased when the battery is replaced with a new one. It is possible, however, for the stored log data to be inadvertently erased during the function checking procedures after battery replacement. It is recommended that the log data in memory be noted down in your log book before requesting a battery change.
2. For battery replacement, take the watch to the retailer from whom it was purchased. The work of replacing the battery is conducted at a SEIKO SERVICE CENTER. For safety's sake, the watch will also undergo a strict check on its water resistant quality and depth measurement function in addition to battery replacement. Therefore, it will take approximately 2 weeks before the watch is returned to you.
3. After the battery is replaced with a new one, "meters (m) and centigrade (°C)" are automatically set for the measurement units. Before diving, therefore, set the measurement units as required. (See "SELECTION OF MEASUREMENT UNITS")

⚠ WARNING

- Do not remove the battery from the watch.
- If it is necessary to take out the battery, keep it out of the reach of children. If a child swallows it, consult a doctor immediately.

⚠ CAUTION

- Never short-circuit, heat or otherwise tamper with the battery, and never expose it to fire. The battery may burst, become very hot or catch fire.
- The battery is not rechargeable. Never attempt to recharge it, as this may cause battery leakage or damage to the battery.

TO PRESERVE THE QUALITY OF YOUR WATCH

■ TEMPERATURES



Your watch works with stable accuracy within a temperature range of 5°C and 35°C (41°F and 95°F). Temperatures over 60°C (140°F) or below -10°C (+14°F) may cause a slight time loss or gain or battery leakage or shorten the battery life.

However, the above conditions will be corrected when the watch returns to normal temperature.

■ SHOCKS & VIBRATION



Be careful not to drop your watch or hit it against hard surfaces.

■ MAGNETISM



Your watch will not be affected by magnetism.

■ CHEMICALS



Be careful not to expose the watch to solvents, mercury, cosmetic spray, detergents, adhesives or paints. Otherwise, the case, bracelet, etc. may become discolored, deteriorated or damaged.

■ CARE OF CASE AND BRACELET



To prevent possible rusting of the case and bracelet, wipe them periodically with a soft dry cloth.

■ PERIODIC CHECK



It is recommended that the watch be checked once every 2 to 3 years. Have your watch checked by an AUTHORIZED SEIKO DEALER or SERVICE CENTER to ensure that the case, buttons, gasket and crystal seal remain intact.

■ PRECAUTION REGARDING CASE BACK PROTECTIVE FILM



If your watch has a protective film and/or a sticker on the case back, be sure to peel them off before using your watch.

■ STATIC ELECTRICITY



The IC (Integrated Circuit) used in your watch will be affected by static electricity, which may disturb the display. Keep the watch away from close contact with objects such as TV screens, which emit strong static electricity.

■ LIQUID CRYSTAL PANEL



The normal life expectancy for a liquid crystal panel is approximately 7 years. After that it may decrease in contrast, becoming difficult to read. Please contact your AUTHORIZED SEIKO DEALER or SERVICE CENTER if you wish to have a new panel fitted (guaranteed one year).

TROUBLESHOOTING

Problem	Possible cause	Solution
The display became blank.	The battery has run down.	Take the watch to the retailer from whom it was purchased immediately for battery replacement. **
The battery life indicator is shown. The battery life indicator is flashing.	The battery is nearing its end.	
The watch gains/loses occasionally.	The watch was left in low or high temperatures.	The accuracy will be corrected when the watch returns to normal temperature. Set the time before using the watch. It is so adjusted that it operates with stable accuracy when used on the wrist within a temperature range between 5° C and 35° C (41° F and 95° F).
A blur inside the glass persists.	The gasket is deteriorated, and water got inside the watch.	Consult the retailer from whom it was purchased.
Three altitude rank indicator bars are flashing.	Unless you are at an altitude over 6,000 m (19,700 ft), the pressure sensor is out of order.	
The number of residual nitrogen indicator bars on the display increased while on the surface.	You moved to a higher altitude across the altitude ranks.	The watch senses the atmospheric pressure change and re-calculates residual nitrogen. The obtained residual nitrogen will be taken into consideration in calculations in the dive plan function.
The number of residual nitrogen indicator bars on the display increased during flight.	The atmospheric pressure inside airplanes corresponds to altitude rank "2", and the watch has re-calculated the altitude.	
The display will not return to the TIME/CALENDAR after diving.	Water remains on the auto switch.	Wipe the auto switch with a dry cloth.
The dive function was shown while on the surface, and a depth of more than 1.5 m (5 ft) was displayed.	Water remains on the auto switch, or the auto switch was turned on during flight and the airplane landed.	Make sure that the auto switch is always clean and dry. In a place such as inside an airplane where the atmospheric pressure changes sharply, take utmost care not to leave the auto switch wet.
The dive function will not start.	A dive beyond the specified limit was made within the past 48 hours.	Do not use the watch for diving for 48 hours.
	The battery life indicator is lighting up or flashing.	Take the watch to the retailer from whom it was purchased immediately for battery replacement.
	Three altitude rank indicator bars are flashing.	The watch cannot be used for diving at an altitude over 6,000 m (19,700 ft). Unless you are at an altitude over 6,000 m, the pressure sensor is out of order. Consult the retailer from whom it was purchased.

Problem	Possible cause	Solution
The watch calculates decompression diving even after a dive.	The diver ascended defying the decompression stop violation warning.	When the surface interval time is less than 5 minutes, making a decompression stop as indicated by the watch will return the display for no-decompression diving.

**The log data stored in the dive log function will not be erased when the battery is replaced with a new one. If any malfunction is found during checking, however, the stored log data may be erased when the watch is repaired. It is recommended that the log data in memory be noted down in your log book before requesting a battery change.

SPECIFICATIONS

1 Frequency of crystal oscillator ...	32,768 Hz (Hz = Hertz ... Cycles per second)	DIVE LOG display	Log No., date of dive, dive time, entry/exit time, FO ₂ setting, average depth, maximum depth, water temperature at maximum depth, and residual nitrogen/oxygen at end of dive
2 Loss/gain (Monthly rate)	Less than 15 seconds at normal temperature range (5° C ~ 35° C) (41° F ~ 95° F)	HOUR CORRECTION display ..	Hour and minutes
3 Operational temperature range...	-5° C ~ +40° C (23° F ~ 104° F) for depth measurement, alarm sound, display and illuminating light -10° C ~ +60° C (14° F ~ 140° F) for timing function <i>* In very low temperatures, the display light may dim, and the change of digits may become slow.</i>	Dive mode	No-decompression limit, dive time, current depth, maximum depth, water temperature, residual nitrogen, FO ₂ setting, current time, PO ₂ value and residual oxygen
4 Display system		5 Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
TIME/CALENDAR display	Hour, minutes, seconds, month, date, and day [surface interval time and desaturation time]	6 Battery	SEIKO CR2032, 1 piece
REGULAR ALARM display	Regular alarm time (hour and minutes)	7 Battery life	Approx. 3 years
FO ₂ (NITROX) display	FO ₂ setting	8 Illuminating light	Electroluminescent panel
DIVE PLAN display	Depth rank and no-decompression limit [surface interval time and desaturation time]	9 Sensor accuracy	Depth: Within ±3% of the displayed value + 0.5 m (2 ft) Water temperature: ±2° C (4° F)
		10 IC (Integrated Circuit)	C-MOS-LSI, 2 pieces Non-volatile memory, 1 piece

* The specifications are subject to change without prior notice for product improvement.