
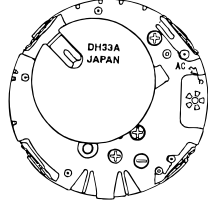


# PARTS CATALOGUE/TECHNICAL GUIDE

## Cal. DH33A

### ( For Movement Replacement )

#### [SPECIFICATIONS]

Item		Cal. No.	DH33A
Movement			  <p style="text-align: right;">(x 1.0)</p>
Movement size	Outside diameter	ø36.2mm	
	Casing diameter	_____	
	Height	9.0 mm	
Display Medium		Neumatic Liquid Crystal, FEM (Field Effect Mode)	
Liquid Crystal Driving System		1/5 Multiplex driving system	
Display System		<ul style="list-style-type: none"> <li>• TIME/CALENDAR display</li> <li>• REGULAR ALARM display</li> <li>• Dive mode display</li> <li>• FO<sup>2</sup> (NITROX) display</li> <li>• DIVE PLAN display</li> <li>• HOUR CORRECTION display</li> <li>• DIVE LOG display</li> </ul>	
Additional Mechanism		<ul style="list-style-type: none"> <li>• DIVE PLAN display</li> <li>• Daily Alarm function</li> <li>• NITROX Diving function</li> <li>• Dive Plan function</li> <li>• Dive Log function</li> <li>• Hour Correction function</li> <li>• Dive function</li> <li>• Warning Alarm function</li> <li>• Battery Life indicator</li> <li>• EL Backlight</li> </ul>	
Loss/Gain		Monthly rate at normal temperature range: less than 15 seconds	
Regulation System		Trimmer condenser	
Measuring Gate by Quartz Tester		Any gate can be used	
Battery		Lithium battery SEIKO CR2032	
		Voltage : 3V	
		Battery life is approximately 3 years	

Disassembling procedures Fig. : ① ← ⑩

Reassembling procedures Fig. : ⑩ ← ①

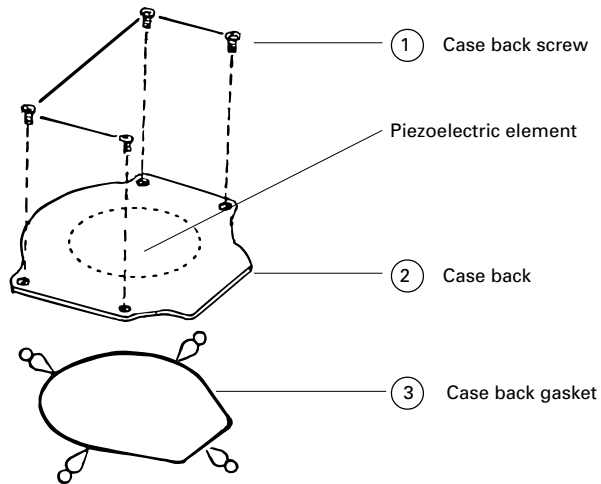
**Lubricating: Types of oil**

○▷ Silicone grease 500,000 c.s.

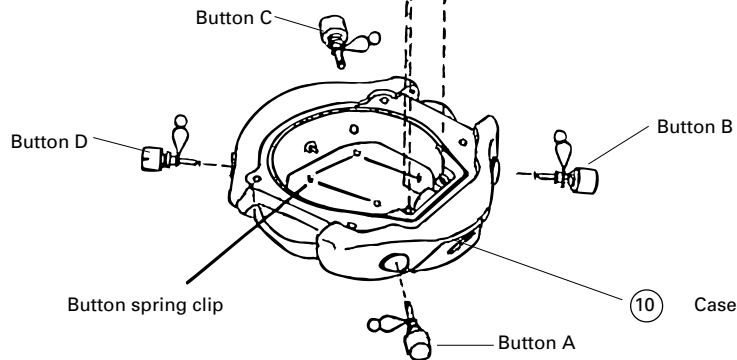
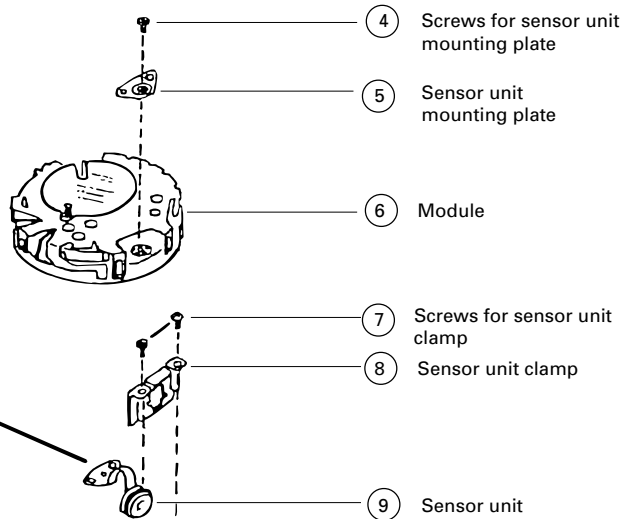
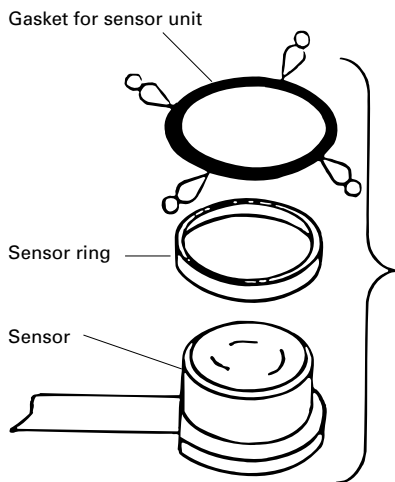
**Oil quantity**

○▷ Normal quantity

- The movement parts are not provided.
- The rotation movement code is UDH3320, which includes the parts ④ to ⑨.



**Structure of the sensor unit**



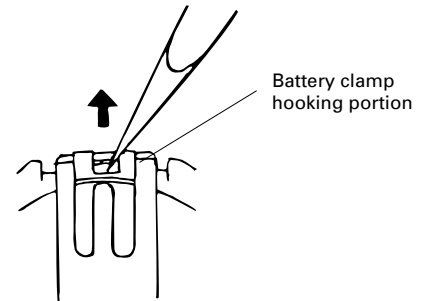
○ ▷ Please refer to "II. REMARKS ON DISASSEMBLING AND REASSEMBLING".

## I. REMARKS ON BATTERY CHANGE

When changing the battery, follow the procedures below.

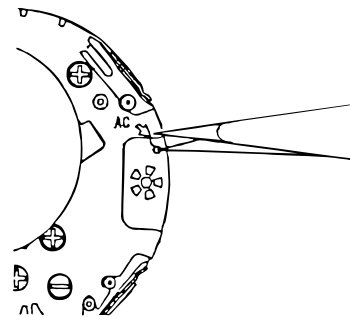
### <How to remove>

1. Remove the comment seal.
  - \* Check where the comment seal was put, as it must be put back to the same place.
2. Release the battery clamp hooking portion with a pair of tweezers as illustrated at right.
3. Remove the battery.



### <How to install>

1. Set the new battery.
2. Set the hooking portion of the battery clamp firmly.
3. Put the comment seal back where it was originally put.
4. Reset the circuit by pressing down the AC terminal of the circuit block and the circuit block cover with a pair of conductive tweezers.



## II. REMARKS ON DISASSEMBLING AND REASSEMBLING

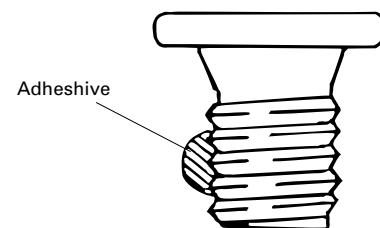
### ① Case Back Screw

#### ● Remarks on the adhesive

- The case back screw is fixed by using the adhesive.
- Use the "LOCTITE 241" of Loctite Corporation to fix the screws.
- Never use any other adhesive but "LOCTITE 241" in the market place or any joining material for band adjustable screw (S-312), otherwise it may cause difficulties when unscrewing or poor water resistance when screws become loose because of some unexpected shocks.

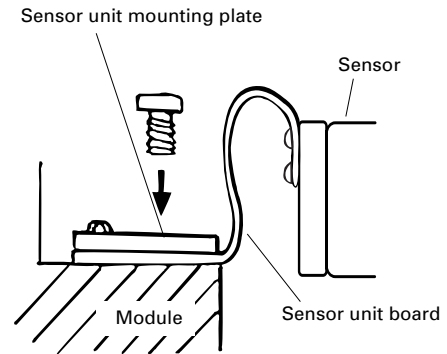
#### ● How to glue and fix the screws

1. Remove water drops, oil contents, dust and dirt from the screw and screw hole on the case.
2. Apply appropriate amount of the adhesive to a screw as illustrated at right.
3. Tighten up the screw securely with a torque driver (bit size: T5).
  - When tightening the screws up, tighten the screw one after another in diagonal order.
  - After tightening up all the screws, retighten all of them once again to fix them even more securely.
4. Leave them for approximately 24 hours under normal temperature so that the adhesive becomes dry enough and the screws get fixed securely.



⑤ Sensor unit mounting plate

- Set the sensor unit board to the inductive portion of the module, on which place the sensor unit mounting plate. Then screw them up tightly.



⑥ Module

- ❖ The module and sensor unit are provided in pair with their accuracy pre-adjusted. Therefore, even in case for a defect of the either one, replace both the module and sensor unit as one set.

**Caution**

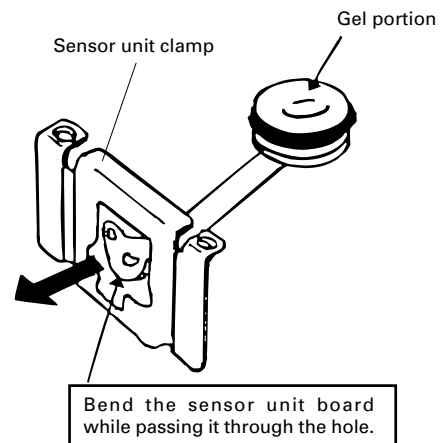
- Be careful not to damage the sensor unit board.
- Do not touch the trimmer for the accuracy adjustment.

⑧ Sensor unit clamp    ⑨ Sensor unit

- ❖ The sensor unit and module are provided in pair with their accuracy pre-adjusted. Therefore, even in case for a defect of the either one, replace both the sensor unit and module as one set.

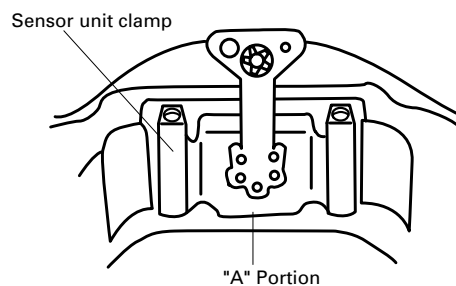
**<How to install>**

1. Remove dust and dirt from the sensor unit of the case.
2. Pass the sensor unit board through the hole of the sensor unit clamp toward the direction shown in the illustration at right. (Bend the tip of the sensor unit board while passing it through the hole.)



**Caution**

- Never touch the gel portion of the sensor.
3. Set the sensor unit firmly to the set position of the case.
  4. Put the sensor unit clamp into the groove portion of the case ("A" portion in the illustration at right), then screw it up securely.



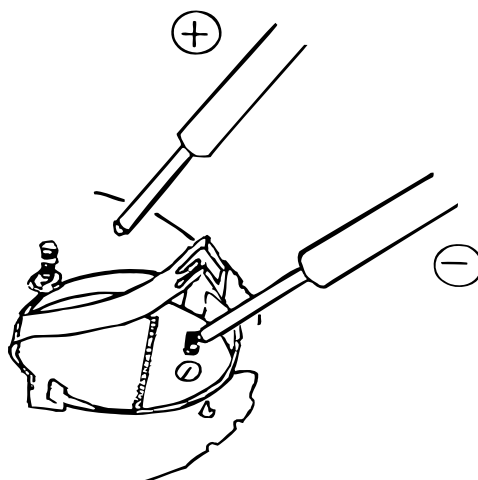
## IV. VALUE CHECKING AND ADJUSTMENT

### ● Current Consumption

For the whole module (in the WATCH mode) : Less than 2.5  $\mu$ A (With 3.0 V. supplied from a battery)

#### <How to measure the current consumption>

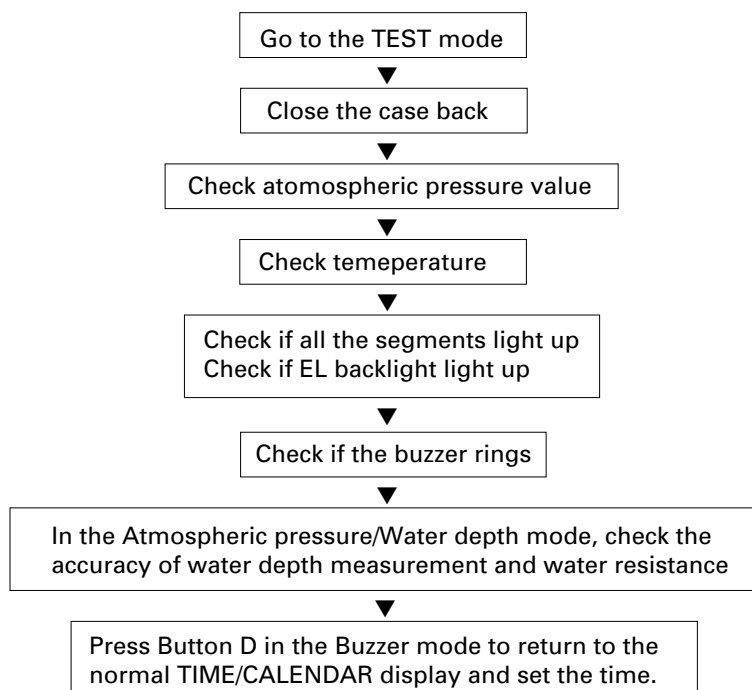
1. Remove the lithium battery and connect the tester as illustrated below.
2. With the tester connected to the movement, reset the circuit.  
(To reset the circuit, refer to "I. Remarks on Battery Change".)
3. When stable measurements can be obtained, read the measurement.



### ● Functional Checks

After replacing module with a new one, Cal.DH33 requires checks for the accuracy of data such as 1: water depth measurement, 2: pressure index value and 3: temperature measurement . Those checks should be performed in the TEST mode.

#### Functional check procedure



## 1. How to set the watch to the TEST mode.

- To show the "TEST mode", reset the circuit while keeping Button A (MODE button) and Button C (SELECT button) pressed. (See Illustration 1 and 2.) If this is not done properly, the display becomes blank or return to the normal TIME/CALENDAR display. (To reset the circuit, refer to "I. REMARKS ON BATTERY CHANGE" on page 3.)



Illustration 1

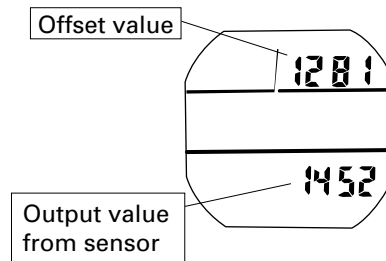
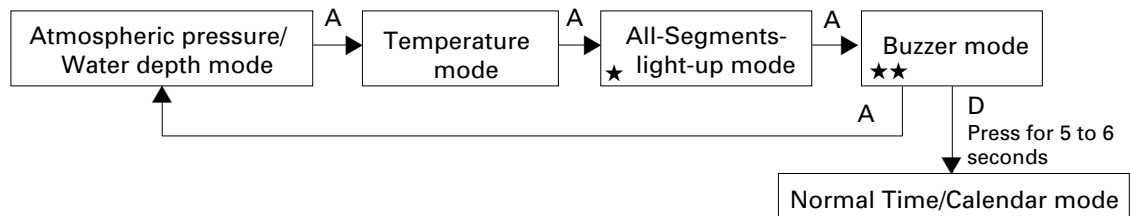


Illustration2 - Offset

While in the TEST mode, the mode changes as follows with each press of Button A.



- ★ While in the All-Segments-Light-Up mode, if Button D is pressed, EL backlight illuminates the display for 2 to 3 seconds.
- ★★ While in the Buzzer mode, if Button C is pressed, the buzzer rings for 5 to 6 seconds, and if Button D (SET button) is kept pressed for 5 to 6 seconds, the display returns to the normal TIME/CALENDAR display.

## 2. Pressure Sensor

- Remarks on atmospheric pressure

Pressure index value is determined by the following calculation.

$$\text{Pressure index value} = \text{Output value from sensor} - \text{Offset value}$$

In the case of the display in Illustration 2,

$$\text{Pressure index value} = 1452 - 1281 = 171$$

so the pressure index value is 171.

In order to calculate the atmospheric pressure out of the pressure index value, the calculation is as follows.

$$\text{Atmospheric pressure (hPa)} = (\text{Pressure index value} + 5) \times 2.5 + 550$$

In the case of the display in Illustration 2,

$$\text{Atmospheric pressure (hPa)} = (171 + 5) \times 2.5 + 550 = 990 \text{ (hPa)}$$

so the atmospheric pressure is 990 hPa.

The table 1 below shows the pressure index value corresponding to the atmospheric pressure. The variance in the pressure index value is within  $\pm 1$  count.

[ Table 1 ]

pressure index value	atomospheric pressure (hPa)	pressure index value	atomospheric pressure (hPa)	pressure index value	atomospheric pressure (hPa)
209	1085	185	1025	161	965
208	1083	184	1023	160	963
207	1080	183	1020	159	960
206	1078	182	1018	158	958
205	1075	181	1015	157	955
204	1073	180	1013	156	953
203	1070	179	1010	155	950
202	1068	178	1008	154	948
201	1065	177	1005	153	945
200	1063	176	1003	152	943
199	1060	175	1000	151	940
198	1058	174	998	150	938
197	1055	173	995	149	935
196	1053	172	993	148	933
195	1050	171	990	147	930
194	1048	170	988	146	928
193	1045	169	985	145	925
192	1043	168	983	144	923
191	1040	167	980	143	920
190	1038	166	978	142	918
189	1035	165	975	141	915
188	1033	164	973	140	913
187	1030	163	970	139	910
186	1028	162	968	138	908

[ Table 2 ]

Altitude rank by pressure index value

Altitude rank	A/D index value
0	148 ~
1	116 ~ 147
2	84 ~ 115
3	- 31 ~ 83

- Remarks on the accuracy of the pressure sensor / Water resistance check

Water depth is preadjusted to measure about 10 m for 400 counts. It is not readjustable.

Apply pressure by water resistance tester and check if the water pressure falls within the range of {(the current pressure x 1.028)  $\pm$  3 %}.

### 3. Temperature check

Check if the temperature falls within  $\pm 2$  of the current temperature.

### 4. Adjustment Screws

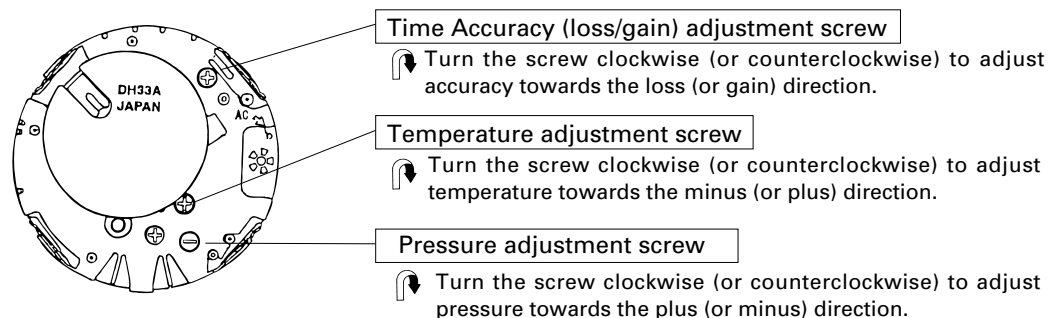


Illustration - The back of the module

- ❖ Do not touch the adjustment screws unless any adjustment is required.

## ● Time Accuracy

- In order to measure time accuracy, light up all the segments of the display.
- Any gate of the quartz tester can be used for measurement.

### <How to light up all the segments>

1. Press Button A several times to show the TIME/CALENDAR mode.
2. Press Button B only once to change the display to the TIME SETTING mode.
3. While in the TIME SETTING mode, press Button C first, and while keeping it pressed, push Button D in to light all the segments of the display.
4. To return to the normal display, press any button. The watch will return to the TIME/CALENDAR mode.

