

Version 2/2000_

ACW SERVICE MANUAL

Spyder / Stinger
Advanced Computer Watch

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SUUNTO OY

1. INTRODUCTION

1.1. AUTHORIZED SERVICE

This manual is intended as a guide for authorized service personnel that have been trained to service and repair the Suunto ACW Advanced Computer Watch. It is not intended for unauthorized or untrained service personnel or the consumer.

Authorized Suunto service centers can perform service activities that require opening of the product, namely replacement of the battery, seals, mineral crystal, bezel and push-buttons.

All the service activities that require disassembly of the internal computer module are only to be performed by Suunto Oy.

Each service or repair activity (with a date and the name of the service technician or shop) should be marked in the Service Card at the end of the Instruction Manual. An additional copy of the Service Card is provided at the end of this Service Manual.

The service activities must be performed in a dry (relative humidity maximum 40%) and clean place at room temperature (18-25°C [65-78°F]).

1.2. SAFETY PRECAUTIONS

This manual provides step by step instructions for the servicing of the Suunto ACW Advanced Computer Watch. It is recommended that all steps are followed in the order given. Read each section completely PRIOR to beginning the work described in that section. This will remind the repair technician of important precautions to take during servicing of the ACW.

Pay close attention to all WARNINGS and NOTES that are intended to draw your attention to items of importance.

Definitions of Warnings and Notes:

 **WARNING**

is used before a procedure that could potentially result in serious injury or death if performed incorrectly.

CAUTION is used in connection with a procedure that may cause damage to the equipment.

NOTE is used in connection with a procedure that requires special attention.

2. GENERAL PROCEDURES

2.1. MAINTENANCE SCHEDULE

Do not open any seals if not necessary. After opening a seal always replace the O-ring.

Battery replacement is necessary when the battery symbol is permanently displayed. The battery symbol indicates that the battery power is getting too low to ensure reliable operation of the unit. If the unit is stored or exposed to low temperatures (particularly below freezing point) for a period of time, the battery warning may be displayed although it may have enough capacity for extended use in warmer conditions. Also, an internal oxidation of the battery may cause the battery warning (blinking Err) even though the battery has enough capacity. In this case repeat the battery check procedure by reactivating the Dive Mode

The push-buttons and protective seals must be replaced if the operation of the push-buttons is stiff or rigid or a damage is detected. Replace the pushbuttons every two to five years, depending on the use of the buttons and to ensure the water resistance of the device.

The bracelet or strap and the buckle must be replaced, if there is damage that may impair their durability. **The spring bars** holding the bracelet or strap and the buckle should be replaced every two to three years or after 500 dives, and every time they have been damaged or their spring force has been reduced. It is important to check the bracelet, strap, buckle and spring bars for damage as their breakage may cause the product to be lost.

The mineral crystal of the display should be replaced, if scratches, cracks or other such damage that may impair its durability is detected. The mineral crystal must be checked for leaks, as moisture inside the device will seriously damage the unit.

CAUTION Damaged or faulty parts may seriously damage the product or the product may get lost.
--

2.2. HANDLING AND STORAGE OF THE SPARE PARTS

To maximize battery life, special precautions should be taken during the **handling and storage of batteries** to prevent them from shorting out. When handling a battery do not make contact with both of the poles (+ and -) at the same time as this can short out the battery.

When storing batteries do not allow the batteries to make contact with other batteries as this can also cause them to short out. It is best to store them in individual bags.

Expected battery life can vary significantly depending on environmental conditions and the type of use the product is exposed to. Please see the individual ACW Instruction Manual for expected average battery life.

The spare parts must be stored in a dry and dark place. When storing the seals, make sure that they are not exposed to dirt or other contaminants.

Do not handle **gold plated parts** with your bare hands. Oily or sweaty fingers may smear the gold plating and cause contact problems or be a reason for later damage on the gold plating. Always use protective gloves.

2.3. INFREQUENTLY USED PRODUCT

Do not assume that the product is in good condition because of infrequent use or because it has been in storage. Water or other contaminants could be present even while in storage and the seals can deteriorate over time. Water or other contaminants present during storage can cause corrosion or cause the device to go into dive mode reducing the expected battery life. If there is a battery installed in the ACW, the time keeping display of the ACW is always shown, even if the device is not in use, thus using battery power.

3. SUUNTO ACW[®] TEST PROCEDURES

3.1. OPERATIONAL TEST

The operational test is designed to confirm that the basic functions, push-buttons, strap/bracelet and other parts are performing properly.

Customer Name: _____

Model No. _____

Serial No. _____

Test Date: _____

OPERATIONAL TEST PROCEDURE

DESCRIPTION	CHECK ✓	TECHNICIAN'S COMMENTS
General check.		
1. Do all push-buttons make contact when pressed?		
2. Do all the main and submodes operate properly?		
3. Does the Electroluminescent backlight illuminate the display?		
4. Does the ACW text appear in Time mode i.e. does the water contact make contact when submerged or short circuited?		
Enter the Dive Mode.		
4. Do all the LCD segments display?		
5. Does the unit make a battery test?		
6. Does the buzzer sound? Does the backlight come on?		
Strap/bracelet		
7. Are the spring bars and buckle holding the strap or bracelet in good condition?		
8. Is the strap or bracelet in good condition?		

Signed by: _____

Service Technician

3.2. PRESSURE TEST

The pressure test consists of one dive in a wet pressure chamber to a pressure of 4 ATM (132 FSW) of simulated depth. The test is designed to confirm that basic functions of depth and dive time are performing properly. A master test gauge should be used to verify depth.

To ensure accuracy, the master test gauge should have been recently calibrated to be accurate to within 0.25%.

CAUTION The water resistance of the ACW should be tested before the pressure test.

CAUTION The ACW should be submerged in water when pressure testing.

Customer Name: _____

Model No. _____

Serial No. _____

Test Date: _____

PRESSURE TEST PROCEDURE

DESCRIPTION	CHECK ✓	TECHNICIAN'S COMMENTS
Activate the unit using water contact.		
1. Does the unit activate properly using the water contact?		
2. Do all the LCD segments show?		
3. Does the depth show zero (0) m [ft] at the surface?		
Descend as rapidly as possible to 40 m [132 ft].		
4. Is depth accurate to within ± 1 m [3 ft]?		
Maintain depth for a minimum of 10 minutes.		
5. Is dive time accurate to within ± 1 minute?		
6. Does the unit go into decompression mode?		
Ascend as rapidly as possible to 10 m [33 ft].		
7. Does the rapid ascent trigger the SLOW warning?		
8. Is depth accurate to within ± 1 m [3 ft]?		
9. Is dive time accurate to within ± 1 minute?		

Ascend to ceiling, wait until decompression ceiling disappears and then resurface as rapidly as

possible. NOTE! ALWAYS MAKE THE NECESSARY DECOMPRESSION STOP BEFORE SURFACING!		
10. Does the rapid ascent trigger the SLOW warning?		

Remove the unit from the pressure chamber and wait 15 minutes.		
11. Does the SLOW warning stay on during surface interval?		
12. Does the unit record the surface interval properly?		
13. Do the push-buttons work properly?		
14. Does the unit enter the Planning Mode [PLAN]?		
15. Does the unit display the maximum depth of the previous dive?		
16. Does the unit also display the Do Not Fly icon in the Time keeping display.		

Signed by: _____
 Service Technician

4. SERVICE TOOLS

Tools for the service and repair of the ACW Advanced Computer Watches are listed below.

Fig 4.2 Special tools



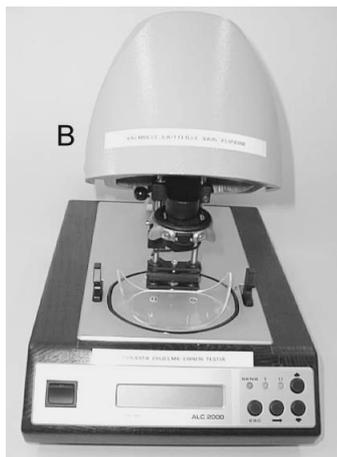


Fig. 4.1. Tools required for testing Fig. 4.3 General tools

General tools and material Fig. 4.3

- soft cloth for cleaning
- silicon grease or oil (in sponge cup)
- cleaning fluid (isopropanol)
- tweezers
- needle-nose pliers
- protective gloves

Testing equipment fig. 4.1

B – Electronic tester (Witchi)

Special tools fig. 4.2

ACW service tool kit

opening tool for all ACW bezels
 opening tool for push-buttons
 flat screwdriver 1 mm
 flat screwdriver 1,5 mm
 Phillips head screwdriver size 00
 working base
 tool for spring bars

module puller
 suction pad
 press tool for bracelet pins

Installing tube for pressure sensor O-ring

Code

Note

Suunto recommends to use electronic tester.

Note

Includes all the special tools

Quantity

Code

5990

1 pc. V5799

1 pc. V5786

1 pc. K5854

1 pc. K5855

1 pc. K5856

1 pc. V5787

1 pc. K5857

(spare fork K5858)

(spare pin K5859)

1 pc. K5851

1 pc. K5852

1 pc. K5860

(spare pin K5861)

1 pc. V5798

5. SPYDER AND STINGER ADVANCED COMPUTER WATCHES

5.1. CONSTRUCTION

The ACW is constructed to withstand the rigors of scuba diving and it consists of

- monolithic, metal case.
- mineral crystal, fastened with screwed down bezel
- screwed in push-buttons with triple O-rings.
- nitrile rubber O-ring seals
- bracelet or straps, fastened with spring bars
- depth sensor

The ACW is watertight up to the static pressure of 20 ATM (200 m [660 ft]).

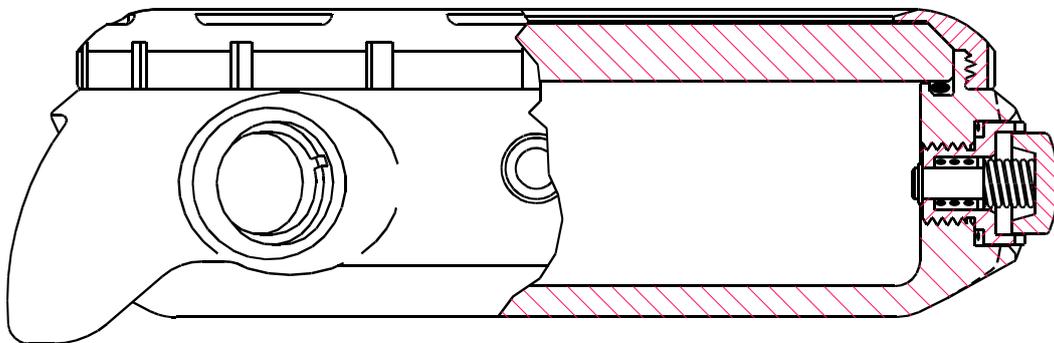


Fig. 5.1.1 Construction of the Advanced Computer Watch.

5.2. SPARE PART LIST

The spare parts for the service and repair of the ACW are listed in table 5.1. Pos. number refers to the numbers in Figures 5.2.1 (Appendix I) and 5.2.2 (Appendix II).

Table 5.1. Spare part list. **X** = not required for ordinary service.

Pos.	Code	Description	Quantity	Note
1-1	K5828	Bezel, Spyder, st. steel sandblasted, w/o coating	1	
1-2	K5773	Bezel, Spyder, st. steel sandblasted, treated PVD black	1	
1-3	K5813	Bezel, Spyder, st. steel sandblasted, treated PVD gold	1	
1-4	K5837	Bezel, Spyder, st. steel polished, w/o coating	1	
2	K5899	Bezel Spyder Titanium	1	Replaces K5877
3	K5899	Bezel, Stinger std	1	
4	K5897	Bezel, Stinger Titanium	1	
5	K5775	Mineral crystal	1	All models
6	K5776	O-ring for mineral crystal	1	All models
7	K5774	Stainless steel pusher, polished steel	4	
8	K5814	Stainless steel pusher, treated PVD gold	4	
9	K5803	O-ring for stainless steel pusher	4	All models
10	K5778	Water contact core stainless steel	1	
11	K5779	Water contact tube	1	
12	K5785	Special screw stainless steel M 1.4	2	
13	K5802	Hexacon nut stainless steel for depth sensor support	2	
14	K5787	O-ring for special screw K5785	4	
15	K5777	Crosshead screw for sensor cover, st. steel	2	
16	K5822	Crosshead screw for sensor cover, st. steel treated PVD gold	2	
17	K5786	O-ring for depth sensor	2	
18	V5776	Retainer plate	1	
19	K5800	Fixing screw M1 for retainer plate	1	
20	K5808	Insulator plate for beeper	1	All models
21-1	V5778	Dial, Spyder	1	
21-2	V5779	Dial, Spider	1	Japan only
22-1	V5851	Dial, Spyder Titanium	1	
22-2	V5852	Dial, Spider Titanium	1	Japan only
23	V5884	Dial, Stinger std	1	
24	V5885	Dial, Stinger Titanium	1	
25	V5770	Depth sensor cover	1	All models
26	K5806	Depth sensor shade/filter	1	All models
27	K5767	Battery CR 2430	1	All models
28	V5771	Depth sensor support	1	
29	L5780	Strap black (complete with 2 spring bars and extension)	1	Replaces K5780
30	L5838	Strap grey (complete with 2 spring bars and extension)	1	Replaces K5838
31	K5781	Buckle (incl. Frame + tongue)	2	
32	K5821	Spring bar for buckle	2	
33	K5782	Spring bar (stainless steel) for strap or bracelet	2	
34	L5812	St. steel bracelet with middle links polished steel (complete with two spring bars and end pieces)	1	Replaces K5812
35	L5815	Spyder st. steel bracelet with middle links treated PVD gold (complete with two spring bars and end pieces)	1	Replaces K5815
36-1	L5873	Spyder Titanium bracelet (complete with two spring bars and end pieces)	1	Replaces K5873

36-2	L5898	Stinger Titanium bracelet (complete with two spring bars and end pieces)	1	Replaces K5898
37	K5868	End piece for bracelet (polished lines)	2	
38	K5867	End piece for bracelet (golden lines, Spyder only)	2	
39-1	K5890	End piece for Spyder Titanium bracelet	2	
39-2	K5903	End piece for Stinger Titanium bracelet	2	
40	K5864	Clasp for Spyder K5812 st. steel bracelet	1	
41	K5889	Clasp for Spyder Titanium K5873 bracelet	1	
42	K5865	Spring bar for clasp	2	

5.3. SERVICE MEASURES

Do not attempt to open the ACW before reading these instructions. Open the ACW only in a dry and clean place at room temperature (18-25°C [65-78°F]).

5.3.1. DISASSEMBLY OF THE UNIT

A. Disassembly of the unit:

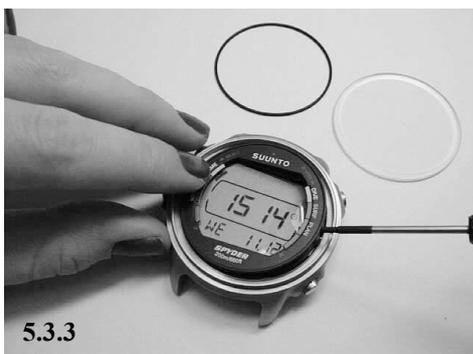
1. Remove the strap or bracelet with the spring bar tool (Fig. 5.3.1).



2. Loosen the bezel by turning it counter clockwise with the bezel opening tool (Fig. 5.3.2). NOTE: The opening tool in the Figure is not the current one in use).



3. Remove the mineral crystal with the suction pad. Remove the O-ring. Do not reuse the old O-ring, even if it seems to be in good condition. Do not touch the display screen.
4. Remove the dial (Fig. 5.3.3).



5. Carefully remove the watch module by lifting it out from the case with the module puller. The puller hooks go into the holes of the module. (Fig. 5.3.4) Do not damage the internal parts of the module with the hooks. Avoid damaging the flexprint that connects the module to the pressure sensor and touching the gold plated contacts.



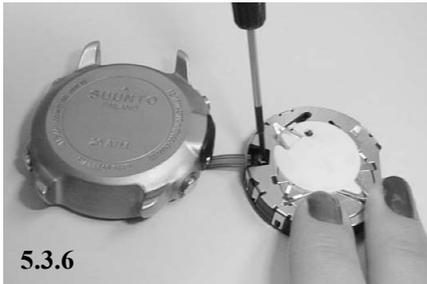
6. Place the case carefully on a clean surface so that the module back and battery side are facing up (Fig. 5.3.5).



B. Disconnecting the module from the flexprint

NOTE Do not open the connection between the module and flexprint unless you have detected a fault in this connection. Never separate the module from the flexprint. They are marked in the factory to be in pairs.

1. Remove the battery (see section 5.3.3.).
2. Unscrew the screw at the module end of the flexprint (Fig. 5.3.6).



5.3.6

3. Carefully lift off the screw and plastic retainer part.
4. Lift off the flexprint (Fig. 5.3.7)



5.3.7

5.3.2. REASSEMBLY OF THE UNIT

NOTE If you detect any damages or flaws in the components, replace them with new ones.

If you have disconnected the module start from step B.

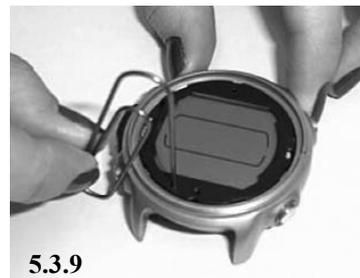
A. Reassembly of the unit

1. Clean the inside of the case and the O-ring groove and bezel threads. Carefully inspect the sealing surfaces and the case for any signs of contamination, scratches, nicks, dents, lint, dust and hair.
2. Check that the flexprint is connected.
3. Clean the threads of the bezel.
4. Carefully insert the module into the case.
IMPORTANT: Guide the water contact connector tongue into its correct position with a screwdriver (Fig 5.3.8).



5.3.8

5. Clean the LCD.
6. Check that the O-ring is clean, undamaged and lubricated with a thin film of pure silicone grease. Install the O-ring into its groove.
7. Reset the module.
 - a) Connect the reset point to the case (Fig. 5.3.9).
 - b) Hold this contact for 2 seconds (display must be blank).
 - c) Open the contact (Time mode activates).
 - d) Make sure that the time starts from 18:00 (6:00 PM).



5.3.9

8. Put the dial on the module (check orientation).

9. Clean the mineral crystal and check it for damage. Put the crystal on the dial.
10. Fasten the bezel by turning it clock wise (Fig. 5.3.10).



5.3.10

11. Tighten the bezel with the bezel tool (Fig. 5.3.11 New tool is shown in fig.4.1 on page 5)



5.3.11

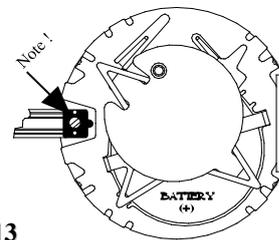
12. Clean the surface of the case.
13. Fasten the strap or bracelet.

1. Clean the contact surfaces of the module and flexprint (Fig. 5.3.12).



5.3.12

2. Install the flexprint onto the locator studs (flexprint contact surface against module contact surface). Note orientation! (Fig. 5.3.13).



5.3.13

3. Install **new** retainer part.
4. Install and tighten the connector screw (Fig. 5.3.14). Do not overtighten.



5.3.14

B. Connecting the module to the flexprint

5.3.3. BATTERY REPLACEMENT

Required materials

- lithium battery (K5794)
(Toshiba CR2430 3,0V lithium battery)
- O-ring (K5776) (38.50x1.00)

NOTE Do not disconnect the battery until 10 minutes has elapsed since the previous dive. Otherwise the dive will not be stored in the memory.

When battery replacement is needed

Battery replacement is necessary when the battery symbol is permanently displayed. The battery symbol indicates that the battery power is getting too low to ensure reliable operation of the unit. If the unit is stored or exposed to low temperatures (particularly below freezing point) for a period of time, the battery warnings may be displayed although the battery has enough capacity in warmer conditions. Also, an internal oxidation of the battery may cause the battery warning (blinking Err) even though the battery has enough capacity. In this case repeat the battery check procedure by reactivating the Dive Mode.

⚠ WARNING

All nitrogen uptake information is lost when the battery is removed. Forty-eight (48) hours must elapse after the last dive and prior to starting a new dive. Failure to heed this warning could result in serious injury or death to the user.

NOTE All history and profile data will remain in the memory after the battery change. However, the clock time and date will be lost.

Replacement of the battery

1. Disassemble the unit as instructed in section 5.3.1. A.
2. Remove the star shaped battery attachment plate (together with isolator disk) (Fig. 5.3.15).



5.3.15

3. Remove the battery (Fig. 5.3.16).



5.3.16

4. Check that the electric contact surfaces (battery compartment, battery holder and the lid) are clean. Clean if necessary.
5. Gently insert the battery being careful to match the polarities (+/-) (Fig. 5.3.17).



5.3.17

6. Attach the battery attachment plate (together with isolator disk).
7. Make sure that the isolator and plate are in their correct positions (Fig 5.3.18).



5.3.18

8. Check that piezobuzzer spring is moving freely through the isolator disc.
9. Reassemble the unit as instructed in section 5.3.2. A.

NOTE ALWAYS Reset the unit after battery replacement. See section 5.3.2 A (7).

NOTE Make sure that no moisture is left in the unit.

NOTE Test the operation of the unit after battery replacement.

After a battery change for some time a few additional pixels (LCD segments) may be visible on the display. These pixels are visible in particular when the display is viewed from an angle. This is caused by a high battery voltage typical to a new battery (3.2V) and will disappear or become less visible after a couple of weeks, when the battery voltage has dropped to its nominal level (3.0V).

5.3.4. SERVICE OF THE DEPTH SENSOR

Does not belong to ordinary service. Do not open the seals if not necessary.

Required materials

- Depth sensor O-ring, 2 pcs. (K5786) (7.00 x 0.80)
- O-ring for the two depth sensor screws, 4 pcs. (K5787) (0.80 x 0.50)

When the service is necessary

The depth sensor must be serviced whenever

- it is dirty (only the depth sensor cover is opened and the area around it is cleaned),
- there is a leak.

CAUTION The depth sensor is a sophisticated precision instrument. Remember to treat it as such. Never pull or otherwise stress the flexprint to sensor solder joints. Damage to these joints can be seen as light colored breakage areas from the flexprint back at the joints. Do not touch contact surfaces with your bare fingers. Never reuse a sensor with any damage.

Disassembly of the depth sensor O-rings and cover

1. Unscrew the two screws of the depth sensor cover with the Phillips head screwdriver (Fig. 5.3.19).



5.3.19

2. Remove the depth sensor cover and filter.
3. Remove the O-rings (Fig. 5.3.20).



5.3.20

Detachment of the depth sensor

NOTE Detachment of the depth sensor is necessary only if there is a leak through the two depth sensor screws.

1. Disassemble the unit as instructed in section 5.3.1. A.
2. Disassemble the depth sensor as instructed above.
3. Unscrew the two screws holding the depth sensor with a screwdriver (Fig. 5.3.21).



5.3.21

4. Remove the sensor black plastic support part.
5. Detach the depth sensor from the case. Push, if needed, from the case outside on the pressure sensor outer steel sleeve (Fig. 5.3.22).



5.3.22



5.3.25

Attachment of the depth sensor

1. Clean the area around the depth sensor and its sleeve.
2. Carefully insert the depth sensor in its place.
3. Install the new O-rings on the screws (Fig. 5.3.23). Check that the O-rings are clean, undamaged and lubricated with a thin film of pure silicone grease.



5.3.23

4. **Carefully** insert the screws into their holes (Fig. 5.3.24). **Avoid damaging the O-rings!**



5.3.24

5. Install the sensor support with the nuts in their pockets. Don't push the screws out of their holes.
6. Tighten the screws with a screwdriver.

Reassembly of the depth sensor O-rings and cover

1. Clean the area around the depth sensor.
2. Install the two new O-rings with a installing tube for o-ring (tool not shown in Fig. 5.3.25). Check that the O-rings are clean, undamaged and lubricated with a thin film of pure silicone grease. Make sure you push the rings to the bottom.

3. Fasten the filter and the depth sensor cover (Fig. 5.3.26) with screws.



5.3.26

CAUTION Make sure you have installed the filter before replacing the depth sensor cover. The filter protects the depth sensor from pricks from sharp objects.

5.3.5. SERVICE AND REPLACEMENT OF THE WATER CONTACT

The water contact must be cleaned every time the unit is serviced.

Required materials

- Soft pencil eraser
- Contact tube (K5779)
- Contact core (K5778)
- Epoxy glue 3 M DP190

When the service is necessary

- Clean the water contact every time the unit is serviced.
- Replace the water contact only when there is a leak.

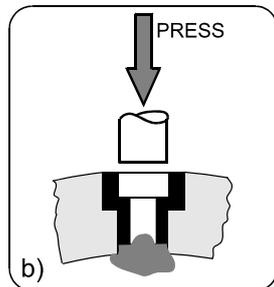
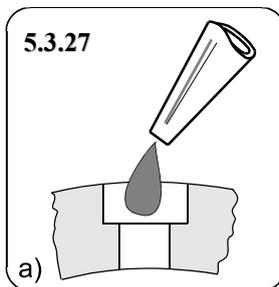
Service of the water contact

Clean the water contact with a soft pencil eraser, small brush (e.g. toothbrush) or with a wooden stick. If needed use a mild detergent, e.g. soap

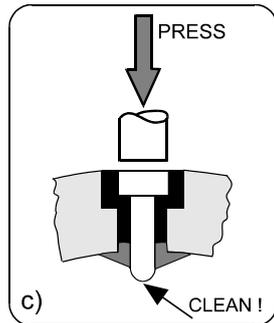
water. Rinse it with fresh water and dry with a soft towel.

Replacement

1. Disassemble the unit as instructed in section 6.3.1. A.
2. Press the water contact out from the case by pressing it from the inside.
3. Clean the water contact hole.
4. Clean the replacement contact tube and core with cleaning detergent (isopropanol). Dry them with a soft towel.
5. Fill the water contact hole with epoxy glue (Fig. 5.3.27 a).
6. Insert the contact tube into the hole (Fig. 5.3.27 b).



7. Insert the contact core (Fig. 5.3.27 c).
8. Remove the excess glue.
9. Let the glue cure overnight.
10. Clean the contact end mechanically to make sure the tongue makes good contact (Fig. 5.3.27 c).



5.3.6. REPLACEMENT OF THE PUSH-BUTTONS

Required materials

- Push-button (K5774 steel), (K5814 PVD-gold)
- O-ring (K5803) (4.50 x 0.60)

When the service is necessary

The push-buttons must be replaced, if

- the push-buttons appear stiff or rigid,
- there is a leak,
- dent, nick or other damage is detected.

Replace the push-button unit and its O-rings. It is not reasonable to disassemble and service the unit itself.

Disassembly of the push-buttons

1. Unscrew the push-button with the push-button tool (Fig 5.3.28. NOTE: The push-button tool in the Figure is not the current one in use).



2. Remove the O-ring (Fig. 5.3.29).



Reassembly of the push-buttons

1. Clean the push-button hole.
2. Install a new O-ring. Check that the O-ring is clean, undamaged and lubricated with a thin film of pure silicone grease.
3. Screw in the new button with the tool (Fig 5.3.30). Check that it is securely fastened.
4. Test the operation of the push-button.



5.3.7. OTHER SERVICE MEASURES

Does not belong to ordinary service.

Push-button contact service

Push-button contact service is carried out if the push-buttons do not make a contact properly.

1. Disassemble the unit as instructed in section 5.3.1. A.
2. Clean the contact surface of the printed circuit board and connector plate with a wooden stick (Fig. 5.3.31). If necessary use cleaning detergent (isopropanol).



5.3.31

3. Reassemble the unit as instructed in section 5.3.2. A.

Service of depth sensor connections

The depth sensor connections are serviced when the depth sensor does not make proper contact with the printed circuit board. Follow the instructions given in section 5.3.1. B and 5.3.2. B.

5.3.8. WATER RESISTANCE TEST

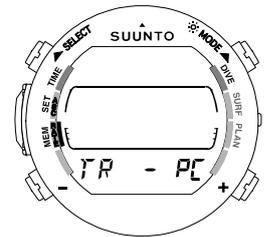
NOTE The water resistance test must be carried out with care and it requires special training and equipment.

When the water resistance test is necessary

The water resistance of the unit must be tested every time

- the unit has been disassembled,
- a leak is suspected.

The ACW should be in TR-PC Mode when testing the water resistance (Fig. 5.3.32). This way the ACW will not go into diving mode and no dive is recorded in the memory. Note that the ACW returns to the Time Mode automatically, if no button is operated.



5.3.32

NOTE Set the ACW in TR-PC mode when making the water resistance test to avoid having a dive recorded in the memory.

! WARNING
A leak must be corrected without delay, as moisture will seriously damage the unit.

Do not test the unit for more than 5 minutes in air and do not exceed 10 bar.

General instructions for water resistance test and test dive

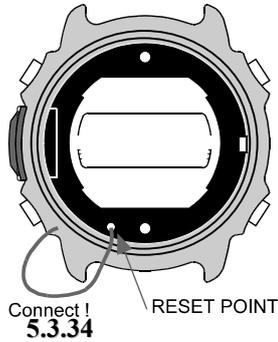
- Observe the restrictions for the testing. Failure to heed the restrictions may damage the unit.
- Never finish the test dive or water resistance test while the ACW is in the permanent Error Mode. Always make the necessary decompression stops before surfacing.
- Never allow the ceiling to exceed 10 m [32 feet] during the test dive or water resistance test (Fig. 5.3.33). Deeper ceiling depths may be difficult to handle with



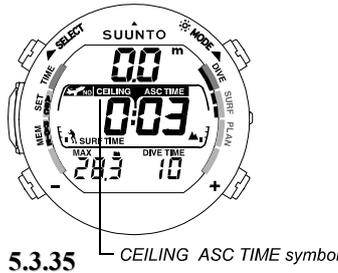
5.3.33

the water tester or may lead to long testing time.

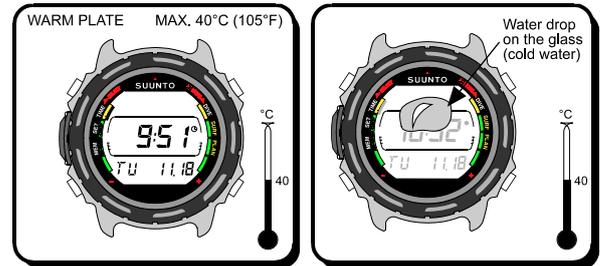
- If the ACW goes into a permanent Error Mode during the test dive or water resistance test, RESET THE UNIT: Remove the battery, replace it and make a reset contact as follows
 - a) Place the movement module back to the case.
 - b) Connect the reset point to the case (Fig. 5.3.34).
 - c) Hold this contact for more than 2 seconds (display must be blank).
 - d) Open the contact (Time Mode activates).
 - e) Make sure that the time starts from 18:00 (6:00 PM)



- Make sure that the ACW is not in a permanent Error Mode after the test dive or water resistance test. Enter the Dive mode and check the Surface display. The ACW is in the permanent Error Mode if the ASC TIME symbol is displayed (Fig. 5.3.35.) In that case you must RESET THE ACW as instructed above.



4. Make a water condensation test. Warm up the unit e.g. on a warm plate to about 40°C [104°F]. Drop cold water on the glass and inspect the unit. If there is any evidence of moisture inside the unit, there is a leak (Fig. 5.3.38 a and b).



Testing , electronic testers
(Witshi, Grainer, etc.)

1. Test the unit in low pressure of 1 bar for 60 seconds (in air) (Fig. 5.3.36). If the unit passes the test, take step 2.
2. Test the unit in high pressure (min 6 bar, max 9 bar) for 60 seconds (in air). If the unit passes the test, take step 3.
3. Keep the unit in water at 3 bar for 8 minutes (Fig 5.3.37).



Testing with water testers only

(e.g., Bergeon 5555)

NOTE NOT RECOMMENDED ANYMORE TO USE THIS INSTRUMENT

1. Keep the unit in pressure of 3 bar for 3 minutes in air (Fig. 5.3.39).
2. Put the unit into water and remove the pressure (Fig. 5.3.40).
3. Check if there are bubbles coming from the case. If there is no evidence of bubbles, take step 4. If there are bubbles, there is a leak. Raise the ACW immediately above the water.



4. Test the unit in pressure of 3 bar for 8 minutes in water (see Fig. 5.3.37).
4. Make a water condensation test. Inspect the unit. If there is any evidence of moisture inside the unit, there is a leak (see Fig. 5.3.38).

If there is a leak

If there is a leak, find out where it is and repair it.

5.3.9. INSPECTION

1. Activate the unit and check:
 - That all the LCD segments are working
 - The low battery symbol is off.
 - It displays zero (0) depth. NOTE! Due to temperature or air pressure changes the unit may show small depths (0.1 ... 0.3m) for a while after activation.
 - The CEILING ASC TIME symbol is not displayed in the Surface Mode.
 - The correct units are displayed (feet/meters).
 - The altitude setting is correct.
 - The date and time is set correctly.
2. Reset date and time.

3. Perform a pressure test as per the Pressure Test procedure in section 3.2.

6. ACW TROUBLESHOOTING

SYMPTOM	CAUSE	ACTION REQUIRED
When water contact is activated, computer goes directly into Dive mode (no ACW text displayed).	Spyder that uses an old software version.	Send to distributor or factory for update free of charge.
Computer returns to ACW mode after 5/10 minutes of diving.	Water contact does not work properly.	Send to factory for repair.
	Pressure sensor does not work properly	Send to factory for repair.
Computer stays unusually long in the ACW mode after diving (more than 20 minutes even though water contact is dry).	Water has leaked between gasket of the case and the water contacts.	Send to factory for repair.
	Water contact spring is bent so that it touches the case directly (can happen during battery change).	<ol style="list-style-type: none"> 1. If spring is in contact with case, remove the module and bend the spring back to correct position so that it only touches the water contact tip. 2. If this does not help, send to factory for repair.
	Protection varnish of the circuit board has pealed.	Send to factory for repair.
Depth display shows wrong readings.	Leak in the pressure sensor or defective sensor.	Send to factory for repair.
	Resetting forgotten during the battery change.	Reset the computer.
Backlight and/or buzzer does not operate.	Coil is broken or buzzer plate damaged.	Send to factory for repair.

7. GENERAL SERVICE AND CARE OF THE ACW®

The SUUNTO Advanced Computer Watch is a sophisticated precision instrument. Remember to treat it as such.

7.1. REPLACEMENT OF THE STRAP AND BRACELET

When the replacement is necessary

The strap or the bracelet must be replaced, if there is damage that may impair its durability.

7.1.1. STRAP REPLACEMENT

Required materials

- Elastic strap (K5780 black strap or K5838 grey strap)
- Spring bar, 2 pcs. (K5782)

Replacement

1. Detach the existing strap from the case with the spring bar tool (see Fig. 5.3.1).
2. Clean the surface of the case.
3. Attach the new strap to the case
4. Make sure that the strap is securely fastened (Fig. 6.1.1).



6.1.1

7.1.2. BRACELET REPLACEMENT

Required materials

- Bracelet
- End pieces (included in the bracelet)
- Spring bar, 2 pcs. (K5782)

Replacement

1. Detach the existing bracelet from the case.
2. Clean the surface of the case.
3. Attach the new bracelet to the case.
4. Make sure that the bracelet is securely fastened.

5. Remove protecting films.
6. Shorten the bracelet, if necessary (see section 7.4.).

NOTE Form the bracelet end piece with adhesive tape covered needle-nose pliers so that it fits the case perfectly.

7.2. REPLACEMENT OF THE BUCKLE AND THE CLASP

When the replacement is necessary

The buckle or the clasp must be replaced, if there is damage that may impair its durability.

7.2.1 BUCKLE REPLACEMENT

Required materials

- Buckle (K5781)
- Spring bar (K5821)

Replacement

1. Detach the existing buckle from the strap.
2. Insert the buckle tongue correctly oriented in its groove.
3. Insert the spring bar.
4. Attach the buckle frame to the spring bar.
5. Make sure that the buckle is securely fastened.

7.2.2 CLASP REPLACEMENT

Required materials

- Clasp (K5864 steel/gold) or (K5889 titanium)
- Spring bar, 2 pcs (K5865)

Replacement

1. Detach the existing clasp from the strap.
2. Insert the new spring bars to the bracelet.
3. Attach the clasp to the spring bar.
4. Make sure that the clasp is securely fastened.

7.3. REPLACEMENT OF THE SPRING BARS

When the replacement is necessary

The spring bars holding the bracelet or strap and the buckle or the clasp must be replaced when

- they are bent, deformed or corroded,
- their spring force has been reduced,

Required materials

- Spring bars (K5782/strap, K5821/buckle, K5865/clasp)

Replacement

1. Remove the strap or bracelet with the spring bar tool.
2. Remove the existing spring bar.
3. Check that outer tube has not deformed or its openings widened where the pins enter it. Push the pins into the outer tube and check that they automatically extend again. Replace it with a new one, if needed.
4. Make sure that the strap/bracelet and the buckle/clasp are securely fastened.

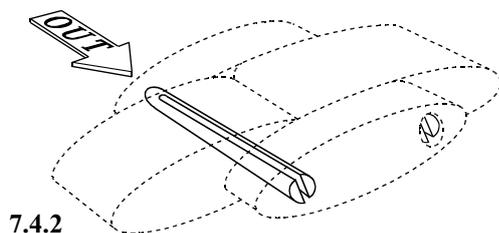
7.4. ADJUSTING THE LENGTH OF THE BRACELET

To shorten the bracelet:

1. Fit the bracelet to its user and count how many pieces must be taken off.
2. Press out the hinge pin with the special tool (Fig. 7.4.1) or with the tool for spring bar with pin (K5857). Note the direction (Fig. 7.4.2).



7.4.1



7.4.2

3. Remove the extra pieces.
4. Connect the ends and reinstall the hinge pins in the correct direction – split end in last.
5. Check the bracelet and its functionality and make sure the bracelet fits its user.

NOTE Take pieces alternately from both ends and be careful not to shorten the bracelet too much. The bracelet is adjusted to its proper length when you can insert two fingers between the wrist and the bracelet.

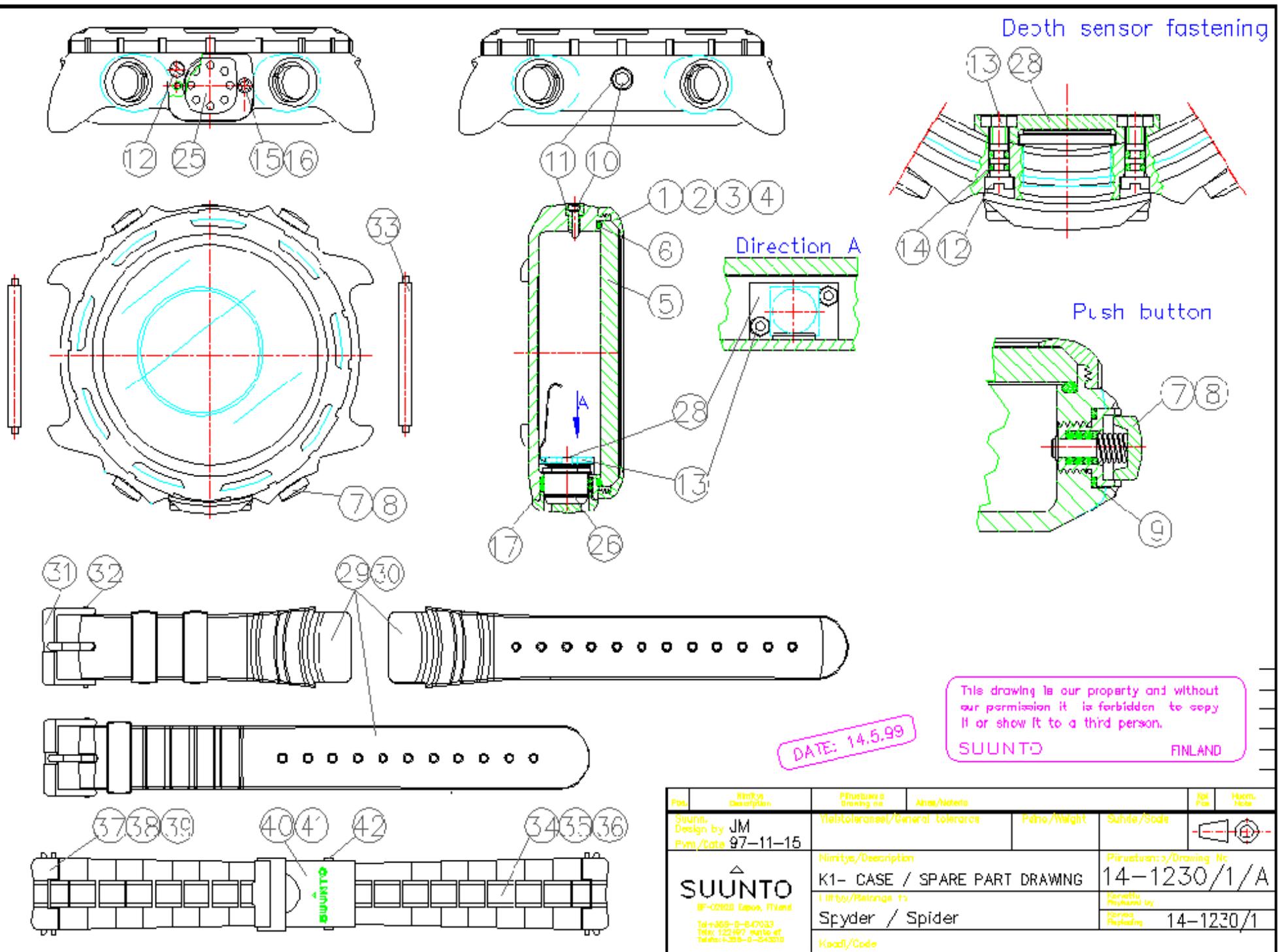
7.5. CARE OF THE ACW®

If left without care for an extended period, a thin film (often invisible to the eye) will cover the unit. Much like the buildup on the glass of an aquarium, this film is the result of organic contaminants found in both salt and fresh water. Suntan oil, silicone spray and grease will speed up this process. As a result of this buildup, moisture will be trapped next to the water contact and will not allow your ACW to operate properly.

Clean the water contact with a soft pencil eraser, small brush (e.g. toothbrush) or with a wooden stick.

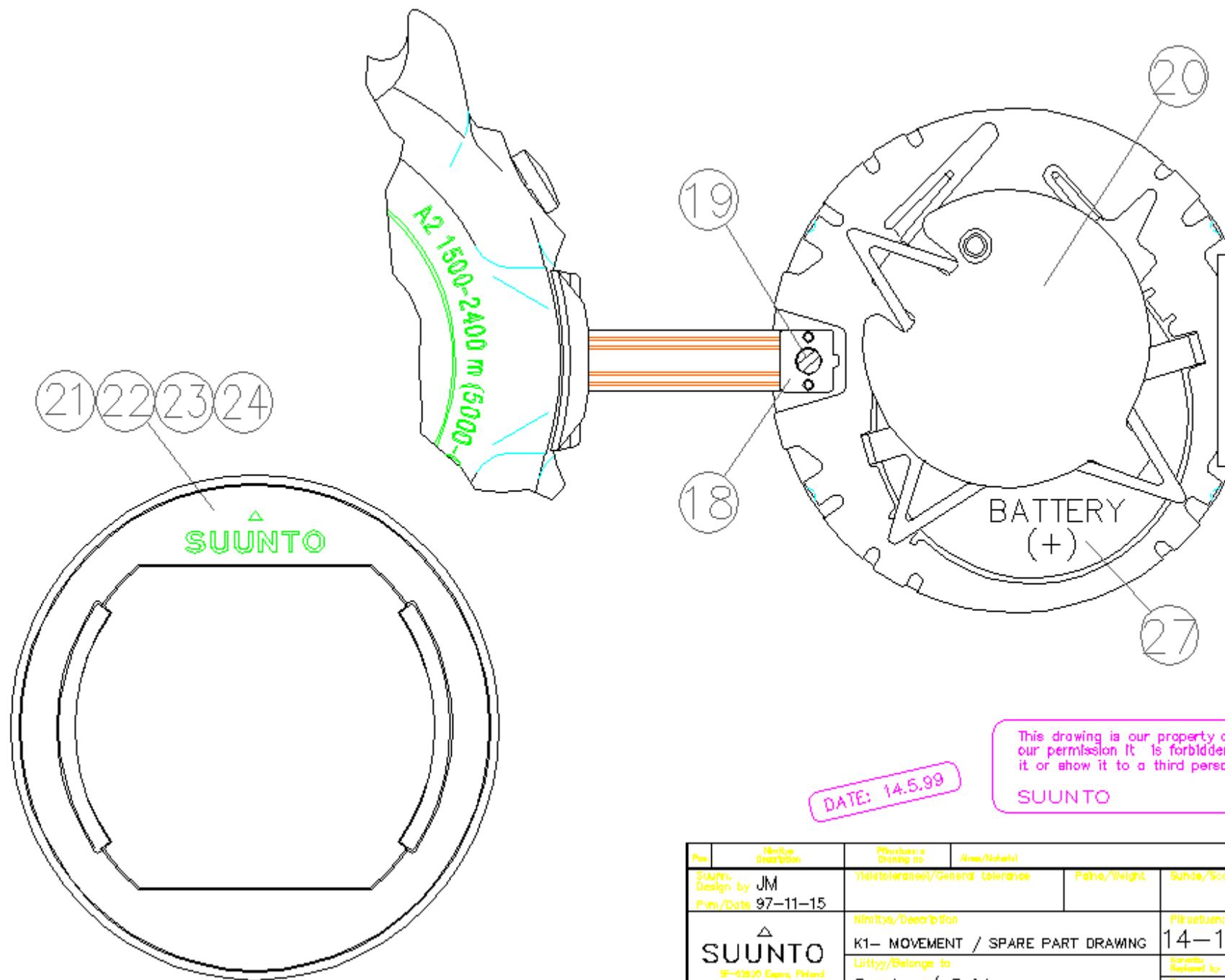
IMPORTANT: The unit should be soaked, then thoroughly rinsed with fresh water and then dried with a soft towel after each dive. Make sure that salt crystals and sand particles have been flushed out. Check the mineral crystal for possible moisture or water. **DO NOT** use the ACW if you detect any moisture or water inside.

CAUTION Do not use solvents or other cleaning fluids that might cause damage.



Pos.	Nimitys / Description	Piirustus / Drawing no.	Alue / Material	Paino / Weight	Suhte / Scale	Yht. / Total	Huom. / Notes
	Suunn. / Design by JM Pvm / Date 97-11-15	Yleistoleranssi / General tolerances					
	SUUNTO SF-02020 Espoo, Finland Tel: +358-0-847033 Tel: 122492 ext. 41 Tel: +358-0-843010	Nimitys / Description K1- CASE / SPARE PART DRAWING I luku / Part no. 13			Piirustusno. / Drawing No. 14-1230/1/A		
					Korkeus / Height by Korkeus / Height 14-1230/1		
				Koodi / Code			

APPENDIX I
Fig. 5.2.1



DATE: 14.5.99

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 SUUNTO FINLAND

Pos.	Nimitys/Description	Piirustus/ Drawing no.	Alue/Notes	Kpl/Pie.	Hum./Kats.
SUUNTO Design by JM Pvm/Date 97-11-15		Yleistoleranssi/General tolerance Paino/Weight Suhte/Scale			
SUUNTO SF-0200 Espoo, Finland Tel:+358-0-847033 Fax: +358-0-847034 Internet: +358-0-843510		Nimitys/Description K1- MOVEMENT / SPARE PART DRAWING Liitty/Belongs to Spyder / Spider Koodi/Code		Piirustus/Drawing No 14-1230/2/A Korvattu/Replaced by Korvaa/Replaces 14-1230/2	

APPENDIX II
 Fig. 5.2.2