

CHAPTER 4 INSPECTION

I. FUNCTION CHECK

After all the procedures of checking, adjustment and casing are finished, check the functions and performance of the watch as follows:

① ANALOGUE QUARTZ CHECK

Check Item	Description
Crown position	Pull out and push in the crown repeatedly to check that the crown can be changed over to the desired setting position and that the winding stem is not pulled off by such operation.
Bend (deflection) of the crown	Turn the crown to check that the stem is not bent.
Train wheel setting and reset conditions	Pull out the crown to the time setting position to check, with a quartz tester, that there is no output signal. Also check that the second hand starts moving one second after the crown is pushed in to the normal position.
Hands motion	Turn the hands clockwise and counterclockwise to check that they run smoothly without catching anywhere.
Hour and minute hands installing positions	By turning the hands to set them to 12:00, check that the minute hand is not noticeably out of alignment with the hour hand.
Second hand installing position	Check that the second hand does not noticeably deviate from each graduation on the dial when it is running.
Date and day shift condition	Turn the hands to check that the date and the day do not shift in a slippery way or do not stop halfway.
Date and day adjusting condition	Pull out the crown to the calendar setting position and turn the date dial and the day star with dial disk one cycle (31 dates, 7 days) to check that the date and the day are both adjusted correctly.

② DIGITAL QUARTZ CHECK

Check item	Description
Button condition	Operate all the buttons to check that the switches work properly (display changeover, illuminating light, etc.) and that the buttons return to the original positions when they are released.
Rotating bezel condition	Turn the rotating bezel to check that the switches are properly activated and that the rotating bezel turns in good condition (without heavy steps, with a click on each function position).
Alarm condition	Test the alarm to check that the alarm rings.

③ ACCURACY CHECK

With the watch complete, check time accuracy (timing rate).

Time accuracy (timing rate) may be affected by closing the case back. In such a case, in advance estimate how much accuracy will vary when the case back is closed and so adjust accuracy before closing the case back.

After the function check procedure is finished, proceed to page 88 ("PERSPIRATION/WATER RESISTANCE CHECK").

II. PERSPIRATION/WATER RESISTANCE CHECK

① PERSPIRATION/WATER RESISTANCE TEST

Quartz watches can be classified into the following three types according to their water resistance specifications. Identify the type of the watch in question and conduct its proper perspiration/water resistance test.

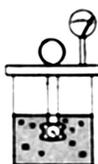
Spec. (Type)	Test method	Result
Non-water resistant watch	Using the Air Pressure Water Resistance Tester S-451A, test the watch to check that it is perspiration resistant.	If the watch is found poor in perspiration resistance, proceed to "② CHECKING AND REPAIRING PROCEDURE".
Watch: "WATER RESISTANT" is inscribed on the case back and designed to withstand up to 3 atmospheres of pressure/bar.	Using the Air Pressure Water Resistance Tester S-451, test the watch to check that it is water resistant.	If the watch is found poor in water resistance*, locate the defective place or part and proceed to "② CHECKING AND REPAIRING PROCEDURE".
Watch: "SPORTS 100" or "SPORTS 150" is shown on the panel cover or dial and designed to withstand up to 10 or 15 atmospheres of pressure/bar.	Using the Hydraulic Water Resistance Tester S-460, check that the watch is water resistant as required.	

* How to locate the source of a defect in water resistance

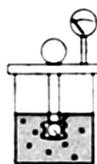
(1) Using a pressure application/reduction water resistance tester



Leave the watch in the air for a while under pressure.



Immerse the watch in water, keeping the chamber pressurized.



Let the air out of the chamber to return to normal atmospheric pressure.

(2) Using a pressure reduction water resistance tester



Immerse the watch in water and reduce pressure. Air inside the watch case bubbles out from a defective spot.



Pull up the watch into the air and return pressure to the normal level.



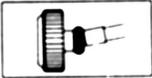
If there is a defect in water resistance somewhere, air inside the watch case bubbles out there.

Note:

At this time, air in the crown clearance or in the bezel clearance also bubbles out. Right after reducing pressure, get rid of these bubbles by turning the watch quickly to the right and left, and look for the bubbles from the weak water resistant part.

Note: For information on a diver's watch water resistance test, refer to each caliber's "PARTS CATALOGUE/TECHNICAL GUIDE".

② CHECKING AND REPAIRING PROCEDURE

Place to be checked	Checking item	Repair
Case back	<ul style="list-style-type: none"> • Check that the case back is not loose in engagement and that the case back gasket does not bulge out. • Check that the case back gasket is not broken, scratched, or deformed.  • Check that the contact surfaces of the case back and the case back gasket are not scratched or rusted.   • Check that there is no dust or lint accumulating on the case back gasket. 	<p>Reset the case back in position.</p> <p>Replace the case back gasket with a new one.</p> <p>Replace the case or the case back with a new one.</p> <p>Wash off dust or lint.</p>
Crown and buttons	<ul style="list-style-type: none"> • Check that the crown and the buttons are not deformed.  • Check that the crown gasket and/or the button gaskets are not broken, scratched, or deformed. • Check that there is no dust accumulating on the crown gasket and/or the button gaskets. • Check that the stem pipe and the button axles (1) are not loosened or deformed, and (2) are not contaminated or dusty. 	<p>Rectify bend or replace the defective part with a new one.</p> <p>Replace the gasket with a new one.</p> <p>Wash off dust or lint.</p> <p>(1) Replace the case with a new one.</p> <p>(2) Wash off contamination or dust.</p>
Glass	<p>Non-water resistant</p> <ul style="list-style-type: none"> • Check that the glass is not broken or chipped on its circumference. • Look into the clearance between the glass and the case with a microscope to check that the glass is not separated or glue is not pulled away from glass at any point. 	<p>Replace the glass with a new one.</p> <p>Glue the glass well again.</p>
	<p>Water resistant</p> <ul style="list-style-type: none"> • Check that the bezel is not loose in installment or fixing. • Check that the glass is not broken or chipped on its circumference. • Check that the glass gasket is not broken, scratched, or deformed.  • Check that the contact surfaces of the case middle and the glass gasket are not scratched or rusted.  • Check that there is no dust or lint accumulating on the glass gasket. 	<p>Reset the bezel in position.</p> <p>Replace the glass with a new one.</p> <p>Replace the glass gasket with a new one.</p> <p>Replace the case with a new one.</p> <p>Wash off dust or lint.</p>

Note:

- Lubricate the case back gasket (except plastic gaskets), crown gasket, and button gaskets with silicone oil.
- Replace any plastic gasket with a new one every time the glass is disassembled.
- After the checking and repairing procedure is finished, check perspiration/water resistance again.

After the perspiration/water resistance check is finished, proceed to page 90 ("LOW-TEMPERATURE TEST").

III. LOW-TEMPERATURE TEST

A low-temperature test will detect difficulty with hands rotation arising from hands' touching, oil flowout, or defective contact of conductive portions which could be sources of stoppage/time loss or blank display. Strictly in accordance with the precautionary instructions, conduct the following test to check quality after repair.

① TESTER

Use the Air Temperature Test Chamber or a home refrigerator.

② TEST TEMPERATURE

The test temperature range is $+5^{\circ}\text{C} \sim -5^{\circ}\text{C}$ ($41^{\circ}\text{F} \sim 23^{\circ}\text{F}$).

When using a refrigerator, put the watch into the ordinary cold storage and not in the freezer compartment, since the latter cannot be controlled to the desired temperature level.

Also be sure to leave a thermometer in the refrigerator to check the temperature inside and control the temperature at the desired level.

③ TEST TIME

Continue the test for at least 5 hours.

④ TIME SETTING FOR TESTING

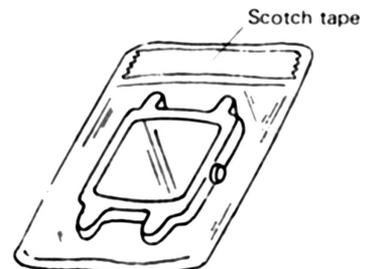
(1) Water resistant watches

After setting the time, put the complete watch directly into the tester.

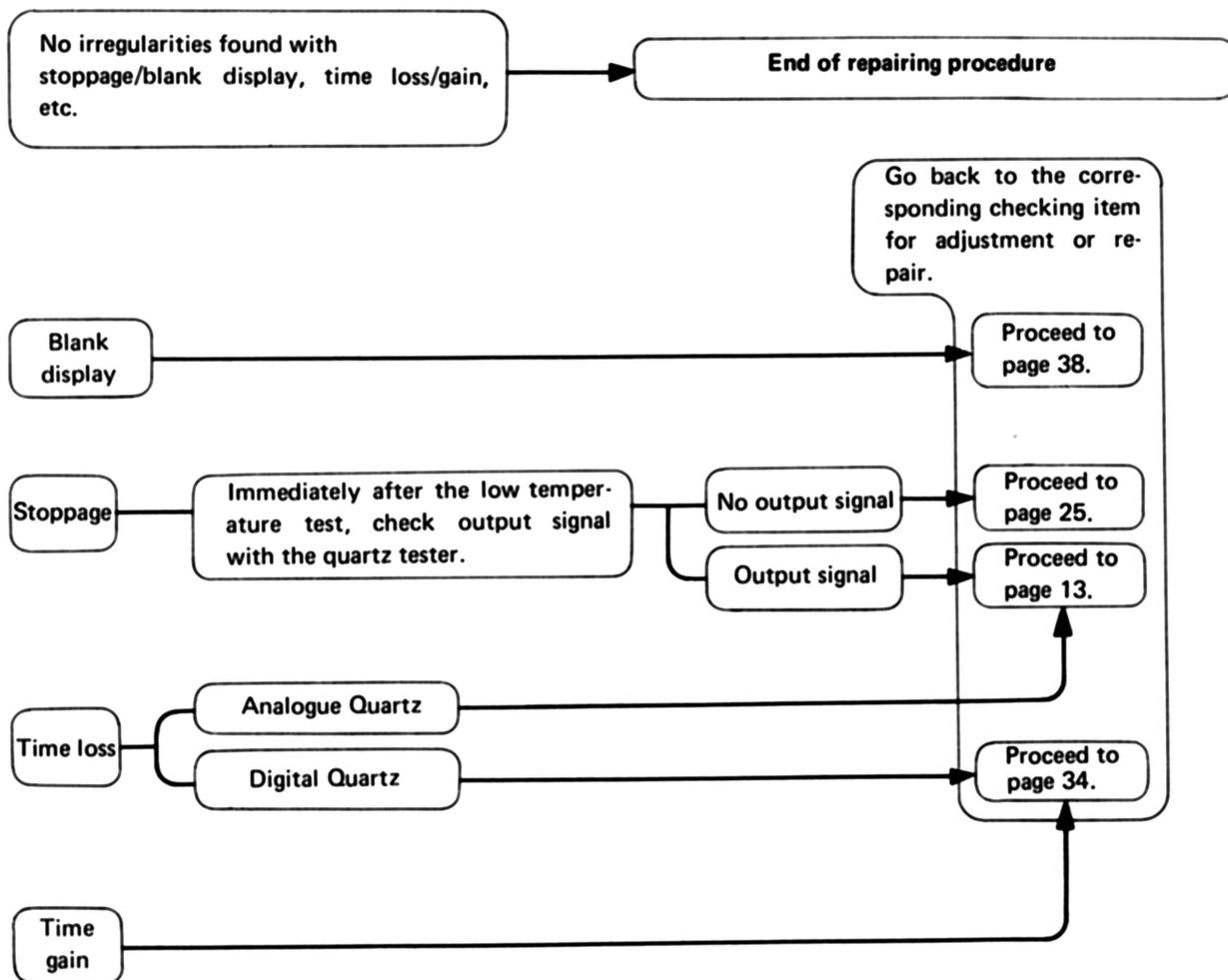
(2) Non-water resistant watches

After setting the time, be sure to put the complete watch into a vinyl bag and seal it up for testing. After the test is over, keep the watch inside the bag for a while until it returns to room temperature.

If the complete watch is placed directly in the tester, dew condensation will rust the inside of the watch.



5 INFERENCES



Note:

- When a low temperature test is conducted, the watch may lose up to 5 seconds in half a day owing to the crystal's temperature characteristics. But this is not a malfunction.
- However, the above inference does not apply to those watches which have an annual rate level accuracy. Measure time loss/gain and consider it a malfunction. Watches with an annual accuracy rate should not be significantly affected by low temperature.
- Digital quartz watches are affected by the cold, since it may cause the liquid crystal to become inactive, which in turn may cause the change of digits to become slow. However, this condition will be corrected when the watches return to normal temperature.