EMMYWATCH

VINTAGE RESTORATIONS

Seiko 2C20A,2C21A Movement Parts (1)

Compiled by EmmyWatch - https://www.emmywatch.com

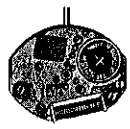
SEIKO

QUARTZ

Cal. 2C20A, 2C21A

PARTS CATALOGUE

Cal. 2C20A, 2C21A



125 211

125 212

139 213

231 214

231 215

☆241 212

261 121

☆270 212

☆270 214

☆271 123

☆271 216

281 211

282 122

☆351 225

☆351 226

383 213

384 213

388 211

391 211

391 212

491 121

491 122

493 120

493 130

701 211

4000 211

4000 212

4002 211

4002 212

4146 211

4146 212

4219 211

4219 212

4239 211

4239 212

4270 211

4270 212

4408 211

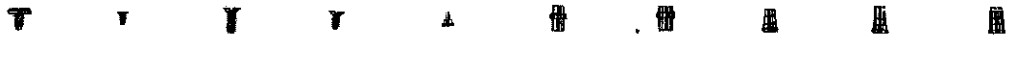
4408 213

4408 214

4457 211

4457 213

☆SEIKO TR521SW



012 490 012 796 012 799 012 820 017 596 017 665 017 666 017 669 017 671 017 672

2/1

Cal. 2C20A, 2C21A

Characteristics

Casing diameter : 15.1 mm
Maximum height : 2.2 mm (Cal. 2C20A), 2.4 mm (Cal. 2C21A) without battery
Jewels : 2 j
Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz ..... Cycles per second)
Driving system : Step motor (2 poles)
Regulation system : Trimmer condenser
Train wheel setting
Battery life indicator (Cal. 2C21A)

PART NO.	PART NAME
125 211	Train wheel bridge (Cal. 2C21A)
125 212	Train wheel bridge (Cal. 2C20A)
139 213	Lower bridge for third wheel
231 214	Third wheel & pinion (Cal. 2C21A)
231 215	Third wheel & pinion (Cal. 2C20A)
☆241 211	Fourth wheel & pinion (Cal. 2C21A)
☆**241 212**	Fourth wheel & pinion (Cal. 2C21A)
261 121	Minute wheel
☆270 211	Center minute wheel (Cal. 2C21A)
☆**270 212**	Center minute wheel (Cal. 2C21A)
☆270 213	Center minute wheel (Cal. 2C20A)
☆**270 214**	Center minute wheel (Cal. 2C20A)
☆271 121	Hour wheel (Cal. 2C21A)
☆**271 123**	Hour wheel (Cal. 2C21A)
☆271 215	Hour wheel (Cal. 2C20A)
☆**271 7 6**	Hour wheel (Cal. 2C20A)
281 211	Setting wheel
282 122	Clutch wheel
☆**351 225**	Winding stem
☆**351 226**	Winding stem
☆351 227	Winding stem
383 213	Setting lever
384 213	Yoke
388 211	Setting lever spring
391 211	Train wheel setting lever (Cal. 2C21A)
391 212	Train wheel setting lever (Cal. 2C20A)
491 121	Dial washer (Cal. 2C21A)
491 122	Dial washer (Cal. 2C20A)
493 120	Hour wheel ring (Thickness 0.03 mm) (Cal. 2C21A)
493 121	Hour wheel ring (Thickness 0.05 mm) (Cal. 2C21A)
493 122	Hour wheel ring (Thickness 0.07 mm) (Cal. 2C21A)
493 130	Hour wheel ring (Thickness 0.03 mm) (Cal. 2C20A)
493 131	Hour wheel ring (Thickness 0.05 mm) (Cal. 2C20A)
493 132	Hour wheel ring (Thickness 0.07 mm) (Cal. 2C20A)
701 211	Fifth wheel & pinion (Cal. 2C21A)
4000 211	Circuit block (Cal. 2C21A)
4000 212	Circuit block (Cal. 2C20A)
4002 211	Coil block (Cal. 2C21A)
4002 212	Coil block (Cal. 2C20A)

PART NO.	PART NAME
4146 211	Step rotor (Cal. 2C21A)
4146 212	Step rotor (Cal. 2C20A)
4219 211	Battery connection insulator (Cal. 2C21A)
4219 212	Battery connection insulator (Cal. 2C20A)
4239 211	Rotor stator (Cal. 2C21A)
4239 212	Rotor stator (Cal. 2C20A)
4225 211	Battery clamp
4239 211	Rotor stator (Cal. 2C21A)
4239 212	Rotor stator (Cal. 2C20A)
4270 211	Battery connection (−) (Cal. 2C21A)
4270 212	Battery connection (−) (Cal. 2C20A)
4408 211	Circuit block spacer (Cal. 2C21A)
4408 213	Setting lever spring spacer
4408 214	Circuit block spacer (Cal. 2C20A)
4457 211	Circuit block cover (Cal. 2C21A)
4457 213	Circuit block cover (Cal. 2C20A)
011 334	Upper hole jewel for step rotor
011 334	Lower hole jewel for step rotor
012 466	Battery clamp screw
012 490	Train wheel bridge screw
012 490	Coil block screw
012 796	Screw for lower bridge for third wheel
012 799	Circuit block screw
012 820	Setting lever spring screw
017 596	Minute wheel pin
017 665	Tube for train wheel bridge (A)
017 666	Tube for train wheel bridge (B)
017 669	Tube for coil block
017 671	Tube for circuit block (A)
017 672	Tube for circuit block (B)
☆SEIKO TR521SW	Silver (II) oxide battery

☆ ⇨ Please see remarks on the reverse page.
Part numbers in light letters are not shown in photos.

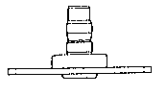
Cal. 2C20A, 2C21A

Remarks :

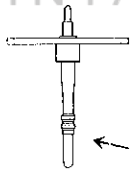
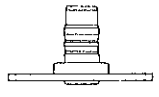
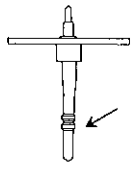
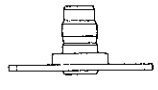
Fourth wheel & pinion, Center minute wheel, Hour wheel.

There are two different types as specified below.
Combination :

Cal. 2C20A

Type	Fourth wheel & pinion	Center minute wheel	Hour wheel
a	——	 ☆270 213	 ☆271 215
b	——	 ☆270 214	 ☆271 216

Cal. 2C21A

Type	Fourth wheel & pinion	Center minute wheel	Hour wheel
a	 ☆241 211	 ☆270 211	 ☆271 121
b	 ☆241 212	 ☆270 212	 ☆271 123

Winding stem

☆351 225
☆351 226
☆351 227
} ……If the combination of the winding stem and case is unknown, check the case number and refer to **"SEIKO Quartz Casing Parts Catalogue"** to choose a corresponding winding stem.

Refer to the photograph on the front page.

Battery

☆SEIKO TR521SW……The substitutive battery might be added to the applied battery in the future. In that case, please refer to separate **"BATTERY LIST FOR SEIKO QUARTZ WATCHES".**

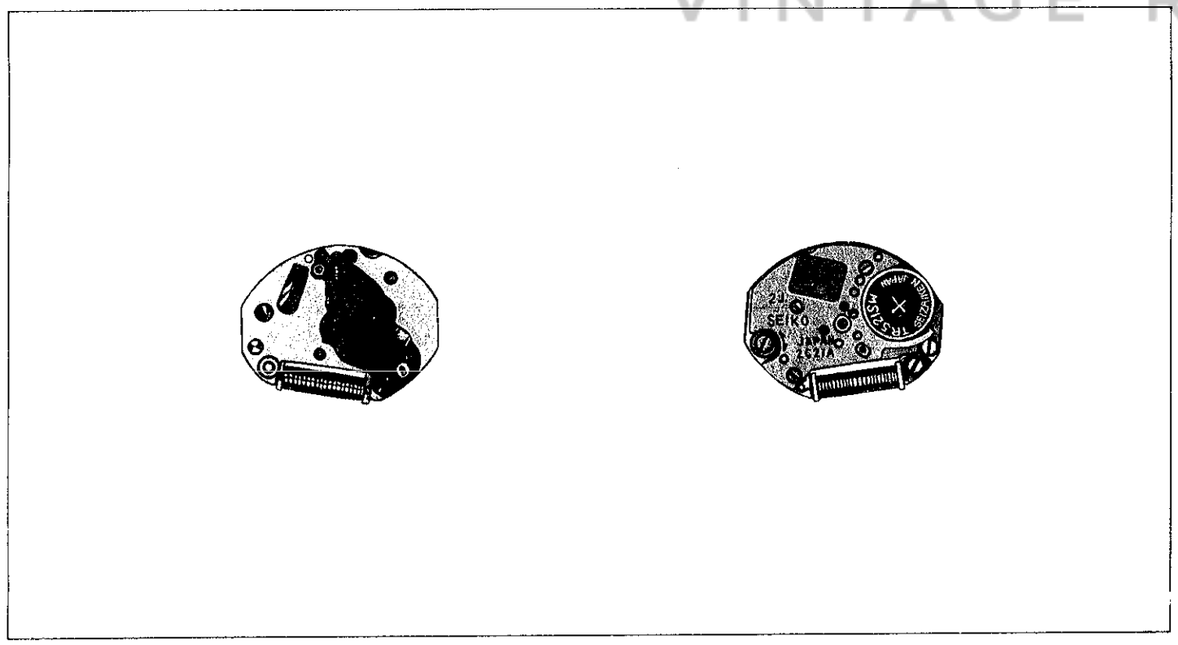
83. 5 Printed in Japan
83. 6 Revised

TECHNICAL GUIDE

SEIKO

QUARTZ

CAL. 2C20A
CAL. 2C21A

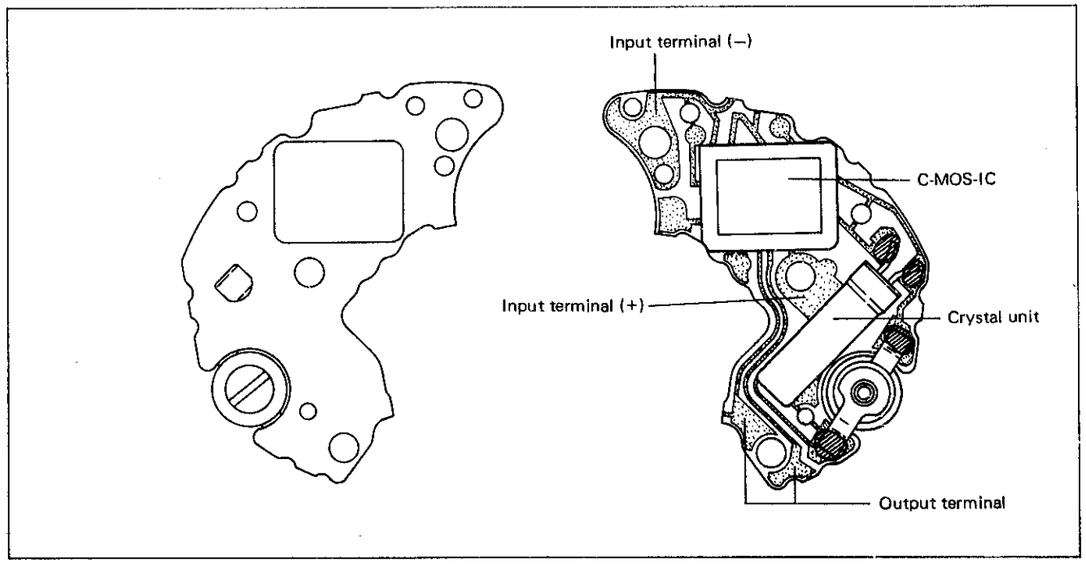


CONTENTS

I. SPECIFICATIONS

Item \ Cal. No.		2C20A	2C21A
Time indication		2 hands	3 hands
Additional mechanism		Train wheel setting device	
		Electronic circuit reset switch	
		—	Battery life indicator
Loss/gain		Monthly rate at normal temperature range: less than 15 seconds	
Movement size	Outside diameter	ϕ15.5 mm (15.5 mm between 6 o'clock and 12 o'clock sides 13.0 mm between 3 o'clock and 9 o'clock sides)	
	Casing diameter	ϕ15.1 mm	
	Height	2.2 mm without battery	2.4 mm without battery
Regulation system		Trimmer condenser	
Measuring gate by quartz tester		Use 10-second gate	Any gate is available.
Battery		SEIKO (SEIZAIKEN) TR521SW Voltage 1.55 V	
Battery life		Approximately 3 years	Approximately 2 years
Jewels		2 jewels	

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

Ex.: Cal. 2C21A

List of the screws used

Shape	Part No.	Name	Shape	Part No.	Name
	012 490	Train wheel bridge screw Coil block screw		012 799	Circuit block screw
	012 796	Screw for lower bridge for third wheel		012 820	Setting lever spring screw

Disassembling procedures Figs.: ① → ㉝
Reassembling procedures Figs.: ㉝ → ①

Lubricating:
Types of oil
- ∞ Moebius A
- ●● SEIKO Watch Oil S-6

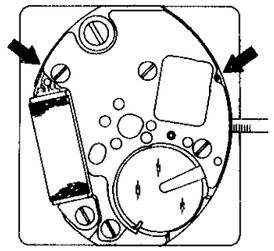
Oil quantity
- ∞ Normal
- ○ Extremely small

- Use the movement holder S-664 for disassembling and reassembling.

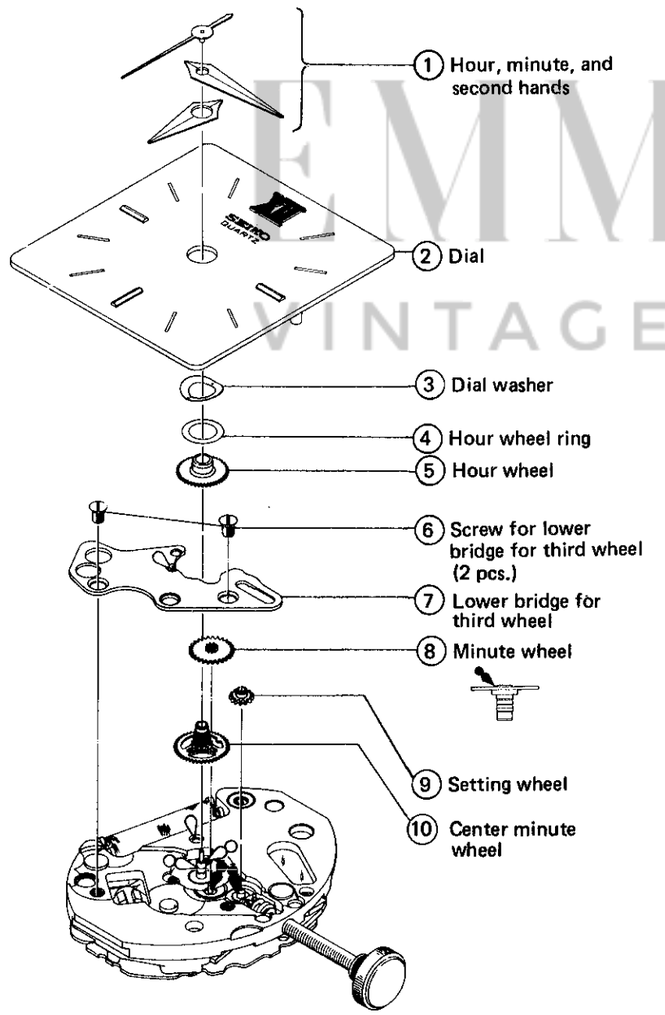
1. Hour, minute, and second hands ~ Center minute wheel

② Dial

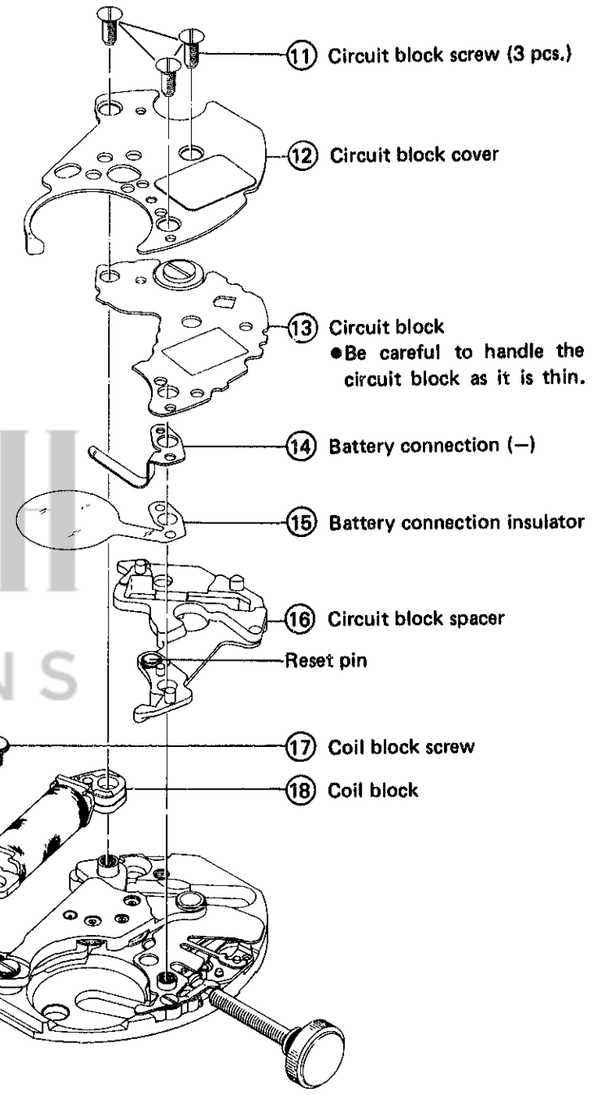
• How to remove
Insert a screwdriver gently into the arrow-marked clearance between the dial and the main plate, and remove the dial from the main plate by prizing it up from the both ends.



• How to set
Put the dial legs into the holes of the main plate and set so that there is no clearance between the dial and the main plate.

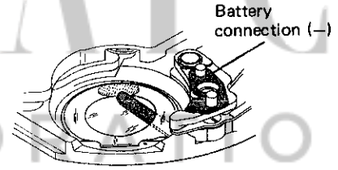


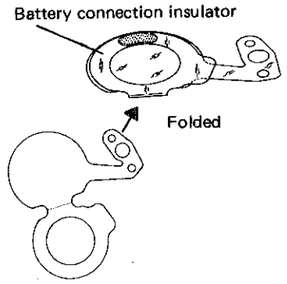
2. Circuit block screw ~ Coil block



⑭ Battery connection (–) (in case of Cal. 2C20A)

Set the tip of the battery connection (–) between the sheets of a battery connection insulator which is folded as below.



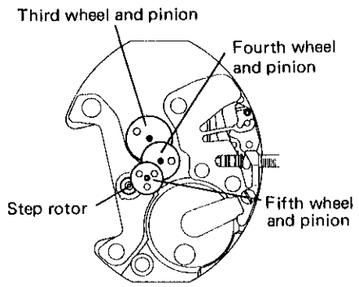


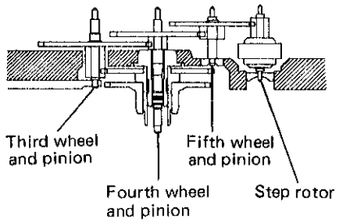
⑯ Circuit block spacer

Before installing the circuit block spacer, push the crown in to the normal position. If it is installed with the crown at the first click position, the reset portion of the yoke may be deformed or the reset pin may come up. Make sure that the reset pin is set in a right position.

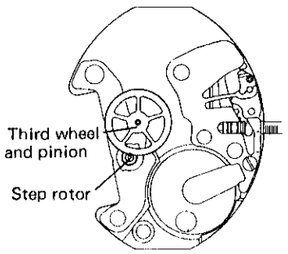
3. Train wheel bridge screw ~ Clutch wheel

• **Setting position of the gear train**
[For 3 hand watches]

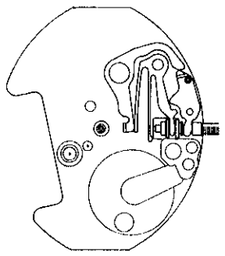


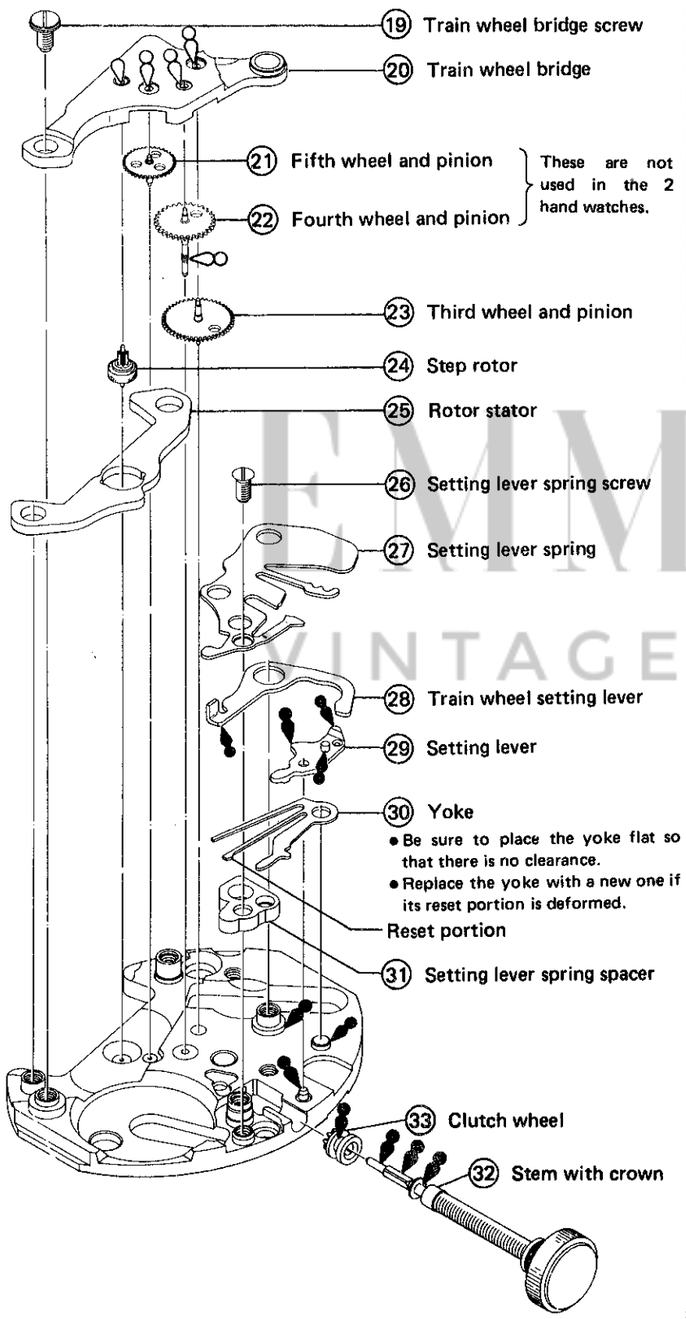


[For 2 hand watches]



Setting position of (33) ~ (28)





IV. CHECKING AND ADJUSTMENT

• The explanation here is for the particular points of Cal. 2C20A and 2C21A.
Refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTION" for SEIKO Analogue Quartz for details.

Procedure

CHECK OUTPUT SIGNAL

Result:

[For 3 hand watches]
Normal: Input indicator blinks every second.
Defective: Input indicator does not blink every second.

[For 2 hand watches]
Normal: Input indicator blinks every 10 seconds.
Defective: Input indicator does not blink every 10 seconds.

CHECK BATTERY VOLTAGE

Use the volt-ohm-meter.
Range to be used: DC 3V

Result:

Normal: More than 1.5V
Defective: Less than 1.5V
Replace the battery with a new one.

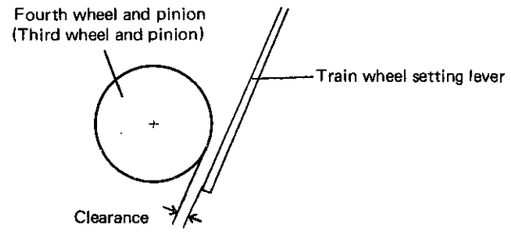
CHECK RESET AND TRAIN WHEEL SETTING CONDITION

Prior to checking, assemble up to the train wheel bridge screw.

(1) Check train wheel setting condition.

Check the clearance between the train wheel setting lever and the fourth wheel and pinion. (For 2 hand watches, check the clearance between the train wheel setting lever and the third wheel and pinion.)

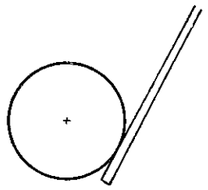
• **With the crown at the normal position**



Result:

Normal: Clearance
Defective: No clearance
Replace the train wheel setting lever with a new one.

• **With the crown at the first click position**



Result:

Normal: No clearance
Defective: Clearance
Replace the train wheel setting lever with a new one.

Procedure

(2) Check reset condition.

Reset condition can be confirmed by checking output signal with a battery installed.

- **With the crown at the normal position**

Result:

[For 2 hand watches]
Normal: Input indicator blinks every 20 seconds.
Defective: Input indicator does not blink every 20 seconds.

[For 3 hand watches]
Normal: Input indicator blinks every second.
Defective: Input indicator does not blink every second.
Replace the train wheel setting lever with a new one.

- **With the crown at the first click position**

Result:

[For 2 hand watches]
Normal: Input indicator does not blink every 20 seconds.
Defective: Input indicator blinks every 20 seconds.

[For 3 hand watches]
Normal: Input indicator does not blink every second.
Defective: Input indicator blinks every second.
Replace the train wheel setting lever with a new one.

CHECK BATTERY CONDUCTIVITY

Check to see whether the battery voltage is transmitted to the circuit block.

CHECK CONDUCTIVITY OF CIRCUIT BLOCK

Check for any short circuit or defective conductivity of the conductive part of the circuit block.

CHECK COIL BLOCK

Check for any broken wire or short circuit of the coil block.
Use the volt-ohm-meter, and be sure to make a zero-ohm adjustment.
Range to be used: OHMS x 100

Result:

[For 2 hand watches]
Normal: 1.7KΩ ~ 2.3KΩ
Defective — Less than 1.7KΩ (Short circuit)
Defective — More than 2.3KΩ (Broken wire)

Procedure

[For 3 hand watches]
Normal: 2.8KΩ ~ 3.4KΩ
Defective — Less than 2.8KΩ (Short circuit)
Defective — More than 3.4KΩ (Broken wire)
Replace the coil block with a new one.

CHECK GEAR TRAIN MECHANISM

Check alignment and play in the step rotor and in the wheels, and also check to see whether the gear train is contaminated with dust or lint and whether it is properly lubricated.

CHECK SETTING MECHANISM

Check alignment and play in the wheels, and also check to see whether the setting mechanism is contaminated with dust or lint and whether it is propery lubricated.

CHECK CURRENT CONSUMPTION

- Do not check current consumption under an incandescent lamp since strong light may cause a watch to consume excess current.
- Be sure to protect the movement from light with a black cloth, etc. while measuring.

Use the Digital Multi-Tester S-840A.
Set the A-V switch of the multi-adapter to the "A" position and the mode switch of the tester to the "μA".
The tester's value-averaging calculation function automatically takes average of a maximum and a minimum current consumption values.
Read the figure displayed to attain the averaged value.

Check current consumption for the whole of the movement.

Place the battery on the train wheel bridge, and then check current consumption.

Probe red . . . . . Battery connection (—)
Probe black . . . . . Battery (—) surface

Result:

[For 2 hand watches]
Normal: Less than 0.5μA
Defective: More than 0.5μA

[For 3 hand watches]
Normal: Less than 0.8μA
Defective: More than 0.8μA

***How to find defects when the current consumption is more than 0.5μA for 2 hand watches and more than 0.8μA for 3 hand watches.**

Check current consumption for the circuit block alone with the crown at the first click position.

Result:

[For 2 hand watches]
Normal (Circuit block): Less than 0.25μA
Check the gear train mechanism.
Defective (Circuit block): More than 0.25μA
Replace the circuit block with a new one.

Procedure

[For 3 hand watches]

Normal (Circuit block):	Less than 0.3μA Check the gear train mechanism.
Defective (Circuit block):	More than 0.3μA Replace the circuit block with a new one.

In case of using a volt-ohm-meter, calculate the current consumption as below:

As a 2 hand watch moves at 20 second intervals, the pointer of the tester swings once every 20 seconds when measuring the current consumption.

When the (+) and (–) probes of the tester are applied to a watch, the pointer swings slightly, indicating the current is flowing in the IC. After 20 seconds, the motor driving current flows besides the current flowing in the IC and the pointer swings again.

The current consumption is calculated as follows:

Example

IC current = 0.25μA

IC current + Motor driving current = 0.85μA

The current necessary for driving a motor alone is 0.6μA.
This value, however, shows the current consumption for 20 seconds.
Therefore, it must be converted into the current consumption per second.
Reduce the value 0.6μA to 1/20, and the current consumption necessary only for the step motor is about 0.03μA.
Accordingly the value of current consumption by this watch is:
0.25μA + 0.03μA = 0.28μA

CHECK ACCURACY

Use the electromagnetic detection microphone.
Range to be used:
For 2 hand watches: Use 10-second gate.
For 3 hand watches: Any gate is available.

CHECK BATTERY LIFE INDICATOR

Check to see if the second hand moves at 2-second intervals when the output voltage is set on 1.30V ~ 1.48V.

CHECK WATER RESISTANCE

CHECK APPEARANCE AND FUNCTIONING

All procedures of Disassembling, Reassembling, Lubricating, Checking and Adjustment are completed.

SEIKO QUARTZ TECHNICAL GUIDE
Cal. 2C21A with Components

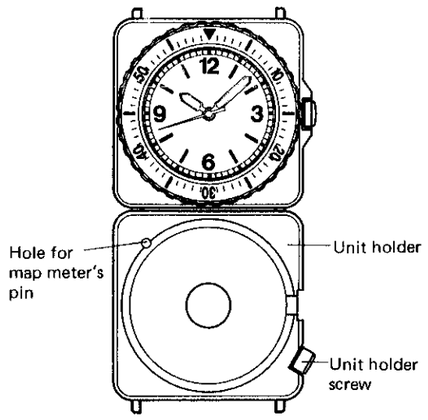
The explanation here is only for a map meter (curvimeter) unit and compass unit which the watch of Cal. 2C21A provides.
As for the watch complete, please refer to the "TECHNICAL GUIDE for Cal. 2C21A".

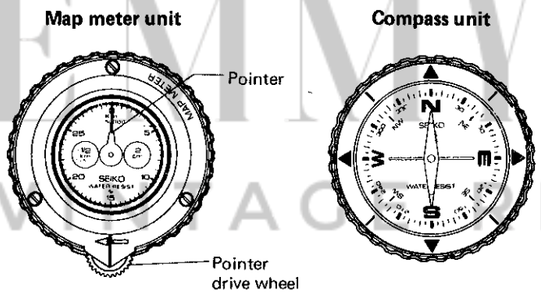
Map meter unit (Parts code: GA990140)

Distance indication	A pointer (indicates a real distance by rolling the pointer drive wheel on a map.)
cale	1 graduation = 100 m (in case of a map of a scale of 1 : 50,000)

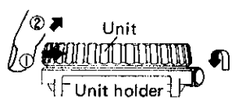
Compass unit (Parts code: GA990150)

Accuracy	Error of direction : Less than 1° (Less than 5° when the compass is attached onto the unit holder and affected by magnetization of the unit holder.)



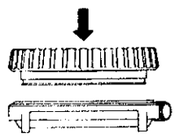


How to remove the unit



1. Turn the unit holder screw counterclockwise until it stops.
2. While pressing the unit with a finger in the direction of ①, lift it up in the direction of ② to remove it as shown in the illustration on the left.

How to attach the unit



1. First, check that the unit holder screw is loosened.
2. Press the unit down onto the unit holder horizontally.
   - The map meter is provided with a setting position guide pin on its 6 o'clock position.
     Set the pin into the hole of the unit holder.
3. Turn the unit holder screw clockwise to fix the unit.

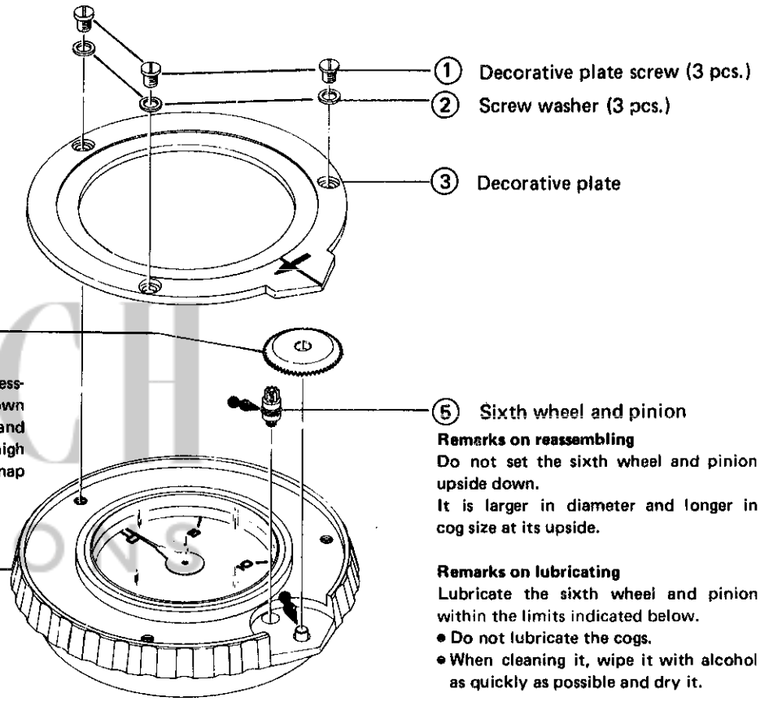
DISASSEMBLING, REASSEMBLING, AND LUBRICATING OF THE MAP METER (CURVIMETER) UNIT

- If there arises difficulty with the rotation of the driving wheel, replace the whole unit with a new one.

Disassembling procedures Figs.: ① → ⑤
Reassembling procedures Figs.: ⑤ → ①

Lubricating

Type of oil:
SEIKO Watch Oil S-6
Normal quantity



④ Driving wheel

Remarks on disassembling
Remove the driving wheel while pressing the sixth wheel and pinion down with finger, since the sixth wheel and pinion may pop out due to the high pressure from inside when the map meter unit is left in a hot place.

⑤ Sixth wheel and pinion

Remarks on reassembling
Do not set the sixth wheel and pinion upside down.
It is larger in diameter and longer in cog size at its upside.

Remarks on lubricating
Lubricate the sixth wheel and pinion within the limits indicated below.
- Do not lubricate the cogs.
- When cleaning it, wipe it with alcohol as quickly as possible and dry it.