TIME MODULE

Cal. VS76A

ϕ27.0 mm
H 4.4 mm

Items	Rev.	Page
Specifications	00	1
Appearance	00	2
Casing	00	3
Hand fitting	00	4
Hand setting stem	00	5
Dial	00	6
Solar cell unit	00	7
Features	00	8
Attention-01	00	9
Attention-02	00	10
Operation-01	00	11
Operation-02	00	12

Date: 31/Oct./'12

S.EPSON Products

CAL. VS76A

Analog Quartz 12''' Center Second Chronograph Movement

1. MOVEMENT DIMENSIONS

Outside diameter	φ27.60mm(12H-6H) × 24.00mm(3H-9H)
Casing diameter	φ27.00mm(12H-6H)
Total height	4.4mm (including battery)

2. TIME STANDARD

Type of quartz oscillator	Tuning fork
Frequency of quartz oscillator	32,768 Hz
Accuracy	±20 seconds per month (on wrist)
Operating temperature range	−5℃ to +50℃
Regulation device	Nil (Pre-adjusted)

3. INDICATOR / FUNCTIONS

3 Hands	Hour / Minute / Second chronograph hand (Center)	
Small hands	Small second hand (9H) / 1/20 second chronograph hand (12H)	
	Minute chronograph hand (6H)	
Calendar	Instant setting device for date calendar	
Reset switch		
Power depletion warning function (BLD)		
(Second hand moves at 2-second intervals when voltage is 1.2V)		
Working time	Approx. 6 months (After fully charged)	
Charging time	Approx. 5 hours (Under 100 KLX sunlight)	
	Approx. 65 hours (Under 3000LX fluorescent lamp)	
Setting mechanism	Crown at normal position	: Free
	Crown pulled out 1st click	: Instant date change
	Crown pulled out 2nd click	: Time setting / Reset
		: Chronograph hand reset
Chronograph	2H button : start / stop	
	4H button : split / reset	

4. FEATURES

Jewels	0 Jewel	
Anti-magnetism	Over 1600A/m (Direct current magnetic field)	
Driving current consumption	Approx. 0.65μA (1.35V , Chronograph non-operates)	
Operation stopping voltage	1.0V	
Solar cell type	Amorphous silicon solar cell	
Maximum unbalance of hands	Small second hand	: 0.03μN･m (3μg･m)
	Minute chronograph hand	: 0.03μN･m (3μg･m)
	1/20 second chronograph hand	: 0.03μN･m (3μg･m)
	Second chronograph hand	: 0.06μN･m (6μg･m)
	Minute hand	: 0.70μN･m (70μg･m)
Moment of inertia	Second chronograph hand	: less than 0.12μg･m²

5. SECONDARY BATTERY

Type	Titanium-lithium-ion second battery
Size	φ9.5 × t 2.05 mm
Capacity	5mAh
Nominal voltage	1.5V

6. SEPARATED PARTS (Parts code)

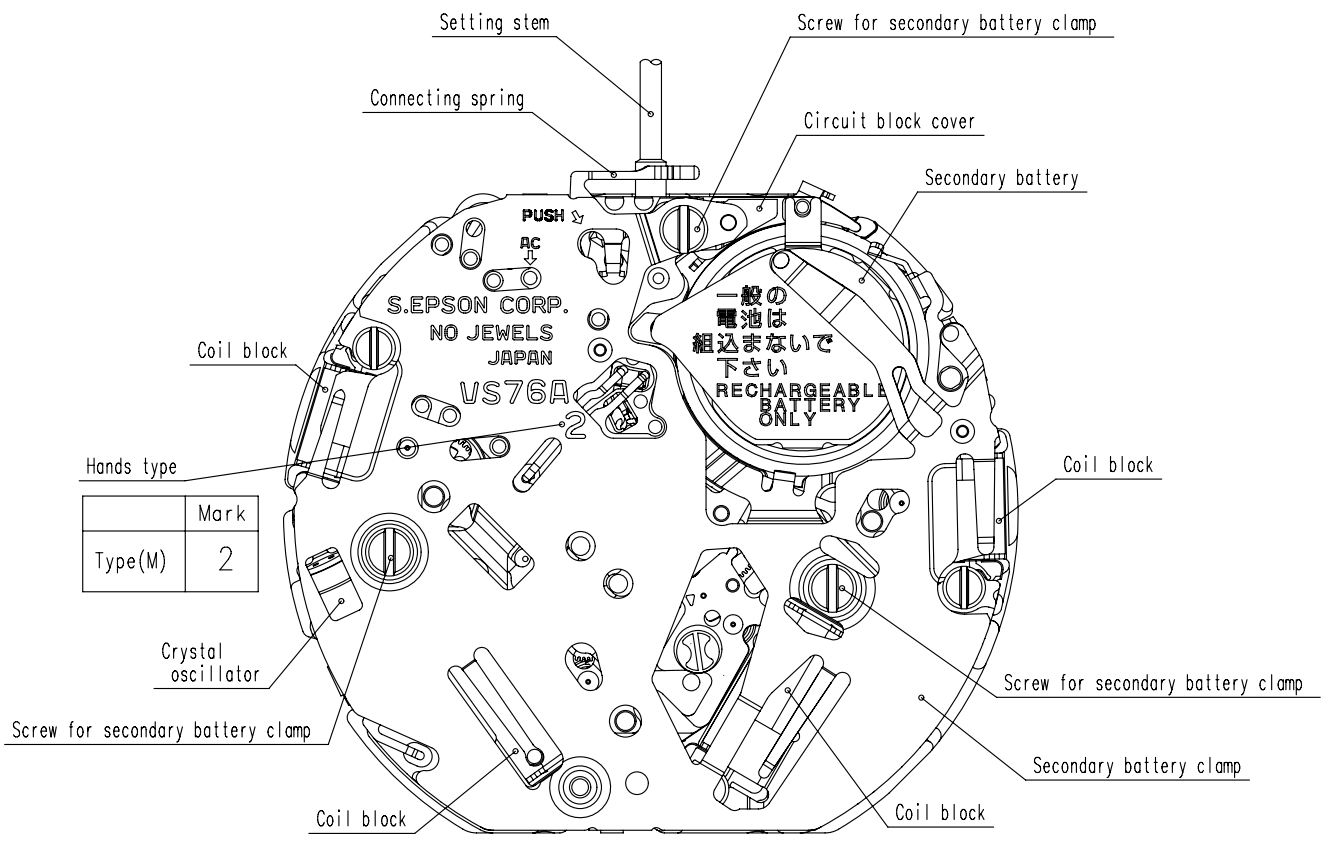
Hand setting stem	0351587
Secondary battery unit	302324H
Solar cell unit	4020551
Solar cell lead terminal (2 pcs)	4281516
Untransparent plate	4453500

7. TEST OF ACCURACY

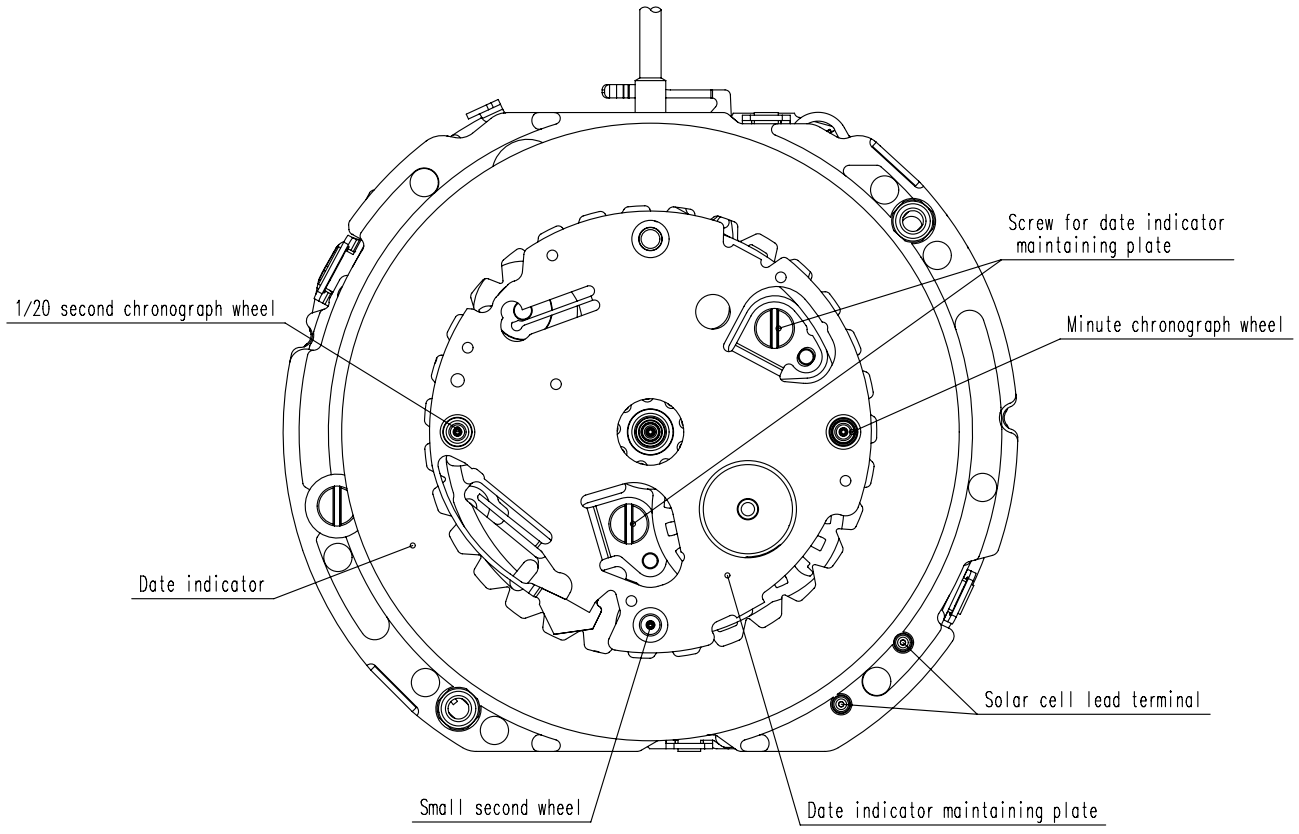
Equipment to be used	SEIKO quartz tester QT-99
	Greiner quartz timer-C , Witschi Q-tester 4000
Duration of measurement	10 seconds
Microphone to be used	Electromagnetic detection type

All specifications are subject to change without notice.

Cal. VS76A	Appearance	Date:31/Oct./'12
		Rev.:00

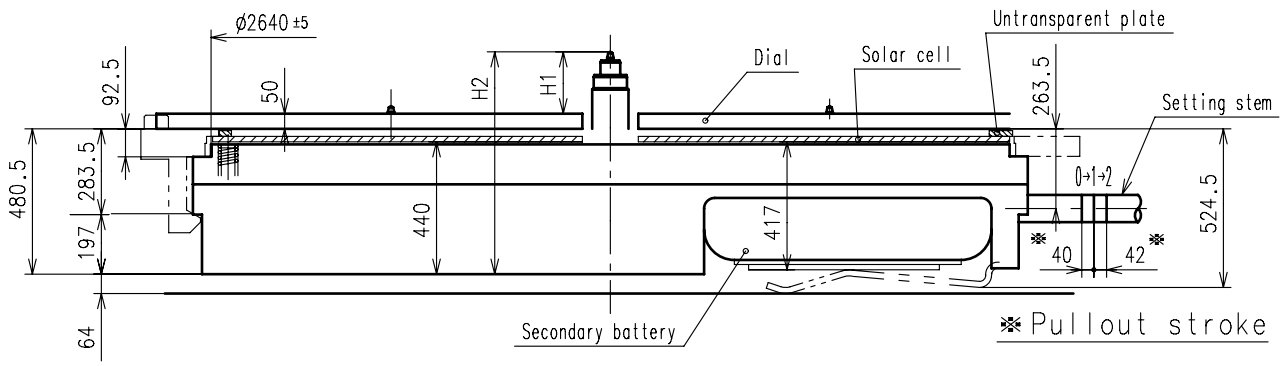


	Mark
Type(M)	2

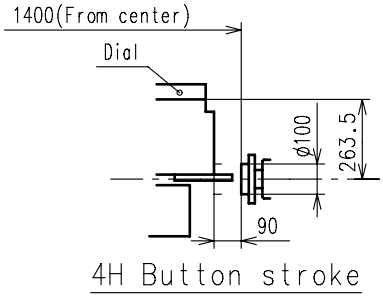


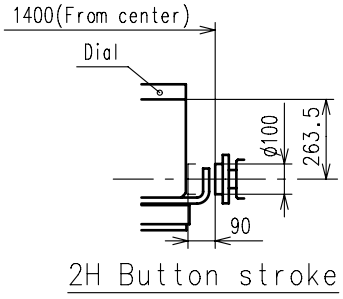
Unit : 1=1/100mm

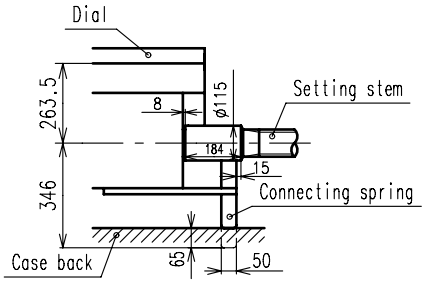
Cal. VS76A	Casing	Date:31/Oct./'12
		Rev.:00

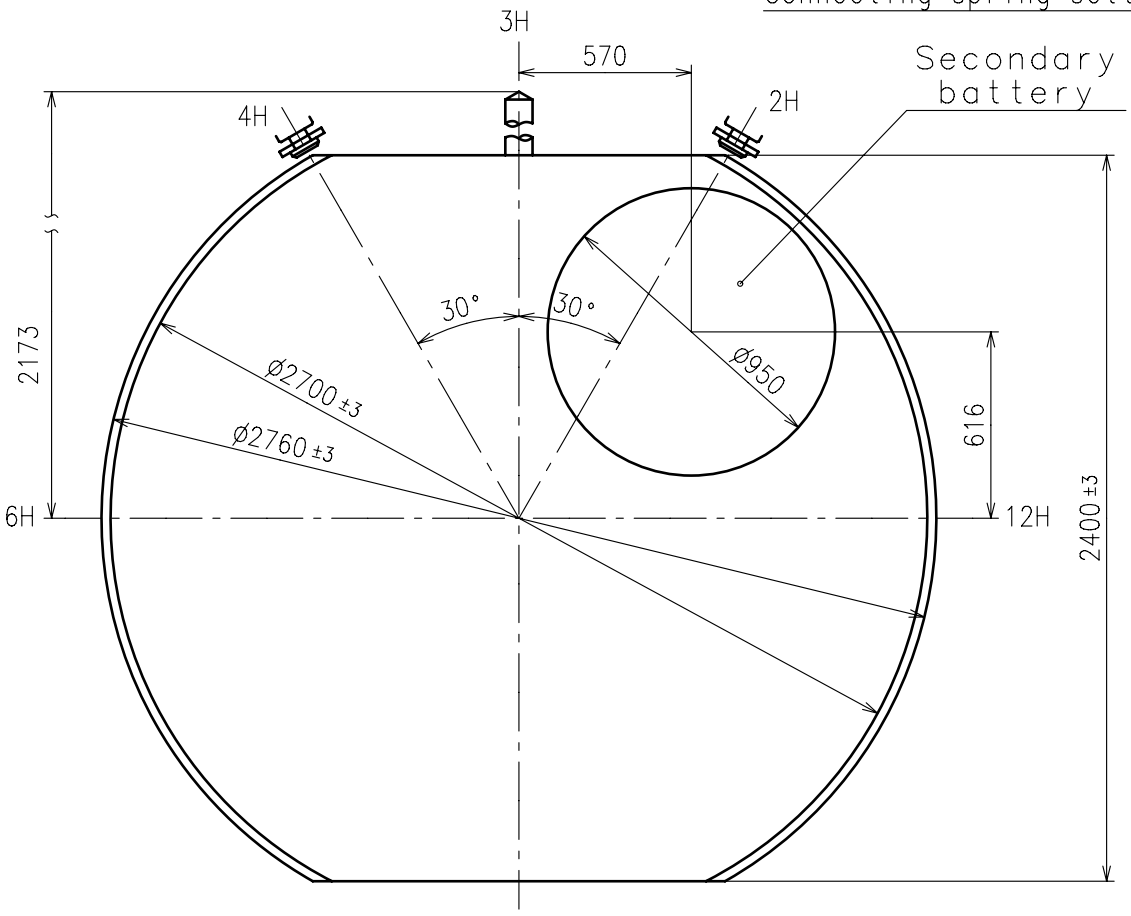


Center post		Type M (2) VS76A**
Maximum height from dial	H1	195.5
Total height incl. movement	H2	726









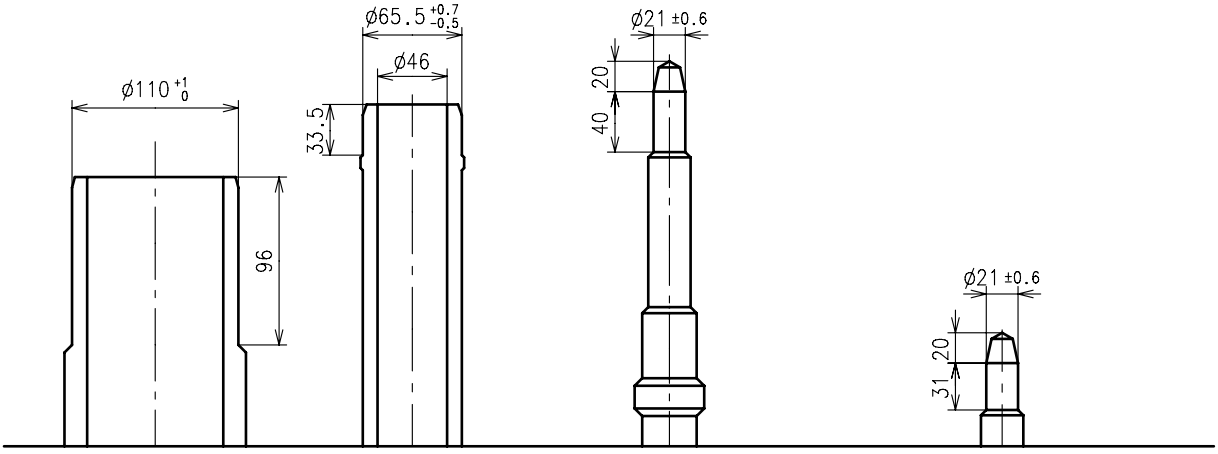
Unit : 1=1/100mm

※Unbalance

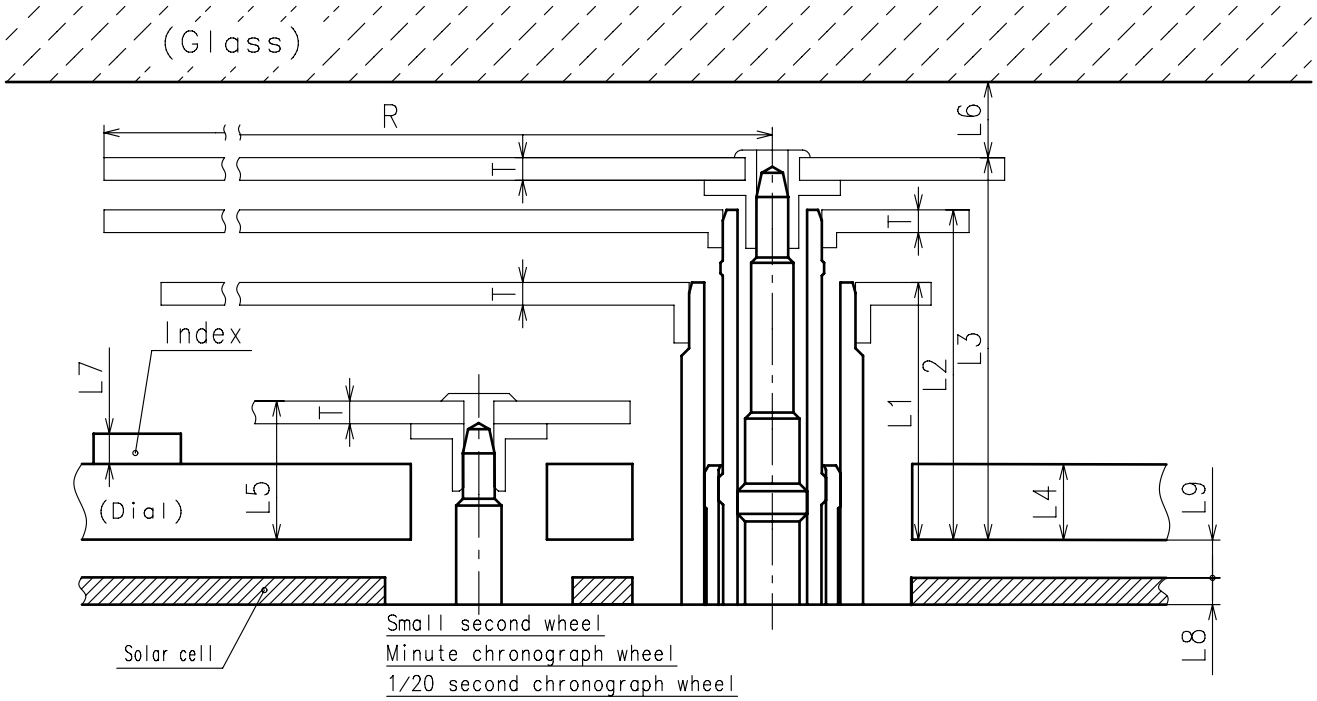
· Small second hand	≦	0.03μ N · m (3μ g · m)
· Minute chronograph hand	≦	0.03μ N · m (3μ g · m)
· 1/20 second chronograph hand	≦	0.03μ N · m (3μ g · m)
· Second chronograph hand	≦	0.06μ N · m (6μ g · m)
· Minute hand	≦	0.70μ N · m (70μ g · m)

※Moment of inertia

· Second chronograph hand	≦	0.12μ g · m²



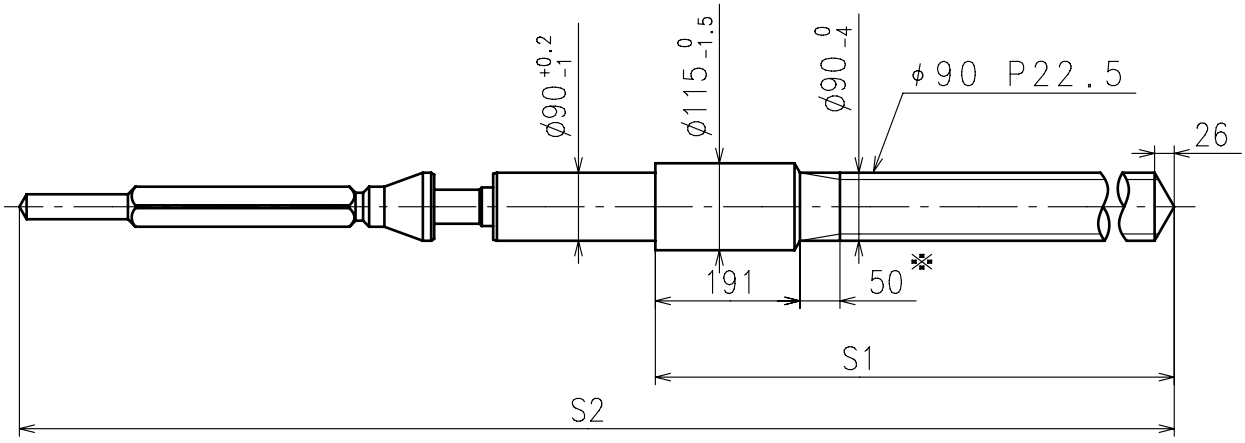
	Parts No.					
	Hour wheel	Center wheel	Second chronograph wheel	Small second wheel	Minute chronograph wheel	1/20 second chronograph wheel
Type M (2) VS76A**	0271636	0221604	0888501	0240511	0902500	0902500



	L1	L2	L3	L4	L5	L6	L7	L8	L9	T	R
Type M (2) VS76A**	178	226	261	50	90	MIN: 50	MAX: 50	18	20	15	MAX: 1250

Unit : 1=1/100mm

Cal. VS76A	Hand setting stem	Date:31/Oct./'12
		Rev.:00



※ Not threaded

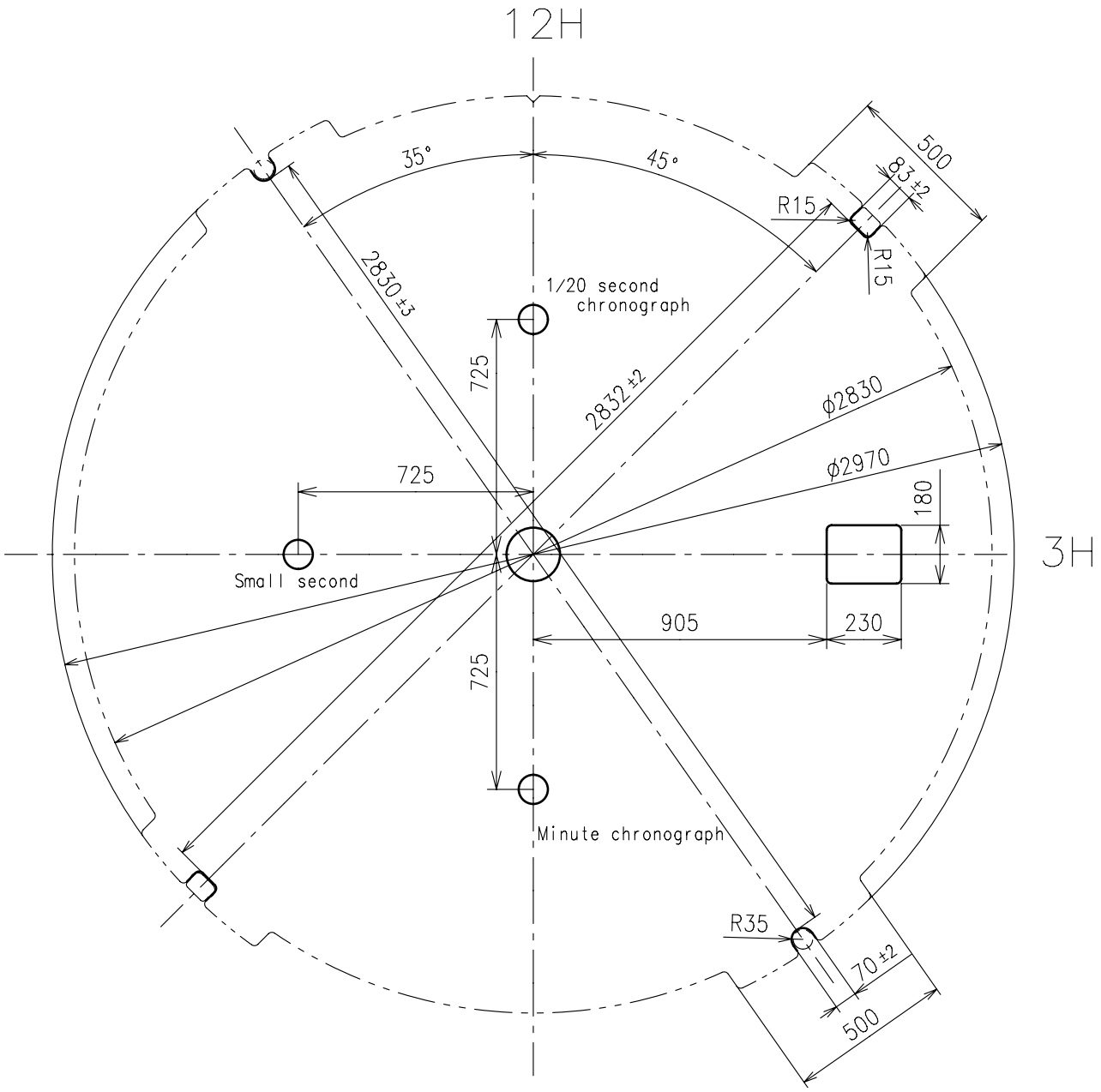
	Part No.	S1	S2
Standard	0351587	1367	2208

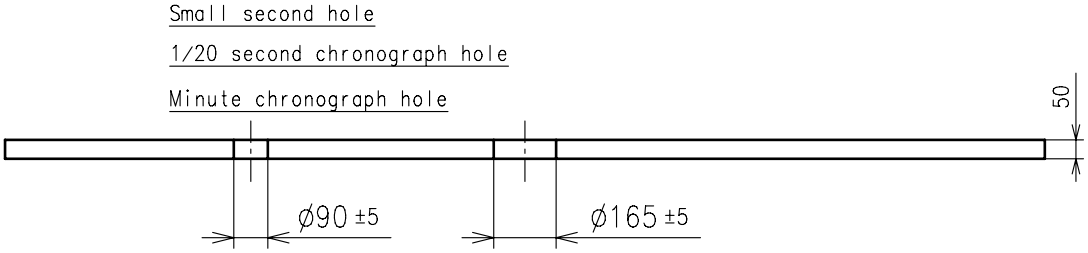
Material :Steel

Hardness :Vickers 600± 50

Cal. VS76A	Dial	Date:31/Oct./'12
		Rev.:00

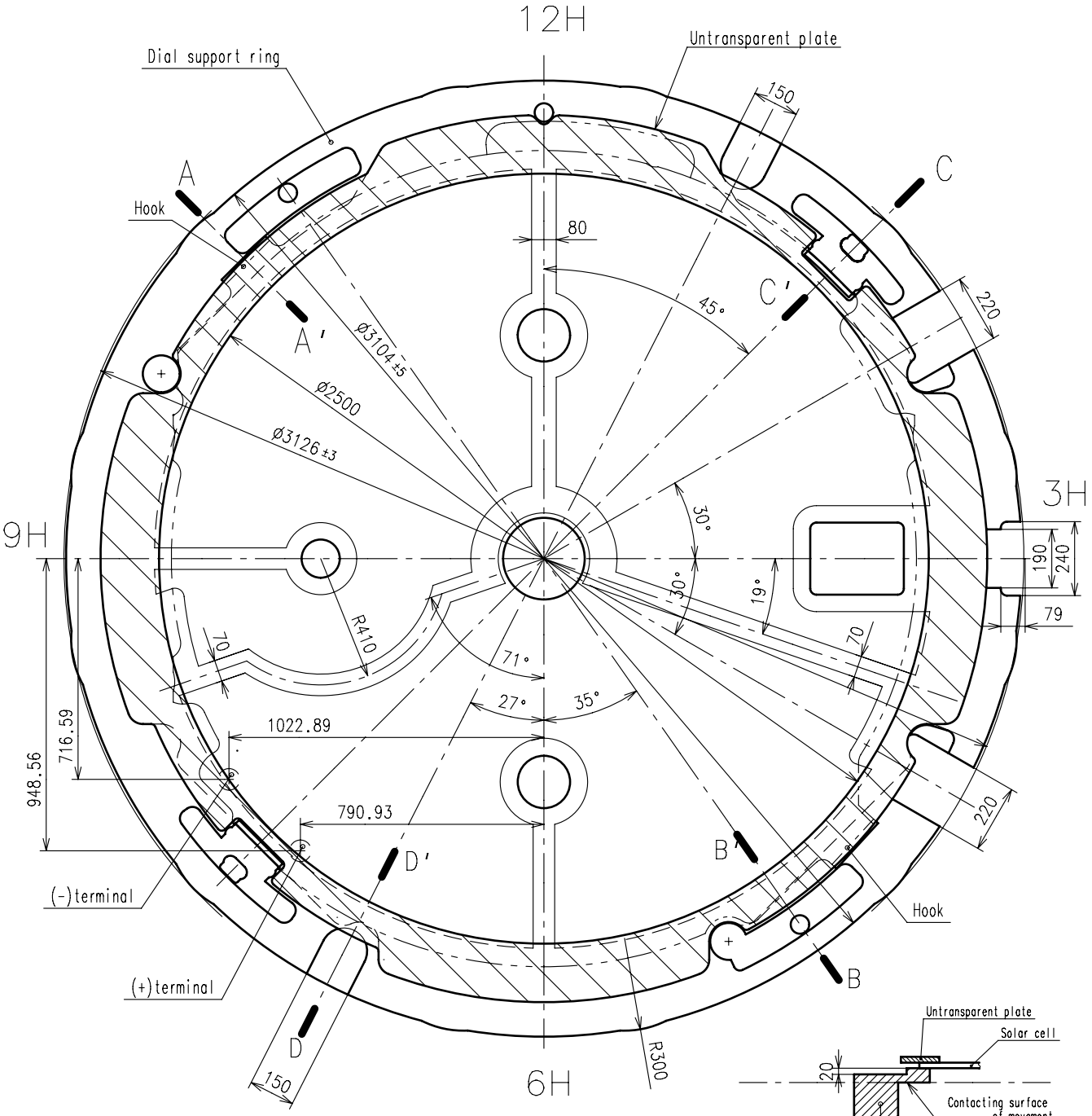
Transmit light more than 30%

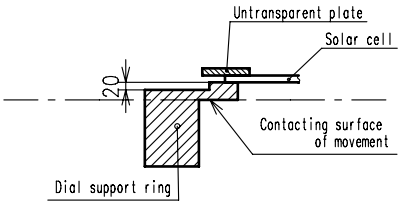




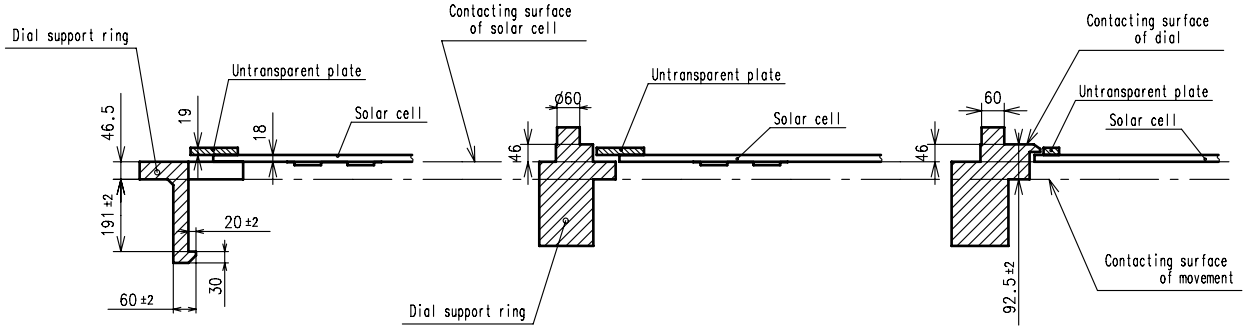
Unit : 1=1/100mm

Cal. VS76A	Solar cell unit	Date:31/Oct./'12
		Rev.:00





D-D' section



A-A' section B-B' section C-C' section

Date : 31/Oct./'12
Rev. : 00

VS76A Features

1. Solar-powered watch

This watch is a solar-powered watch containing a solar cell underneath the dial to convert any form of light into " electrical energy" and store the power in a secondary battery.

2. Eliminating the need for battery replacement

Unlike conventional quartz watches, this watch does not use a silver oxide battery, thus eliminating the need for battery replacement.

3. Working time

Expected life per charge from full charge to stoppage will be around 6 months.

4. Power depletion warning function

The two-second interval movement of the second hand is a signal of energy depletion.
The watch continuous working time after two-second interval movement is approximately 1 week.
When the second hand starts moving at two-second intervals, please charge the watch by exposing it to light.

5. Eco-friendly

The secondary battery is Titanium-lithium-ion battery without any environmentally harmful substances.

6. Over charge prevent function is equipped

If the secondary battery is charged more than predetermined voltage, over charge prevent function is operated to prevent the secondary battery deterioration and breakage.

Date : 31/Oct./'12
Rev. : 00

VS76A Attention-01

1. Attention for solar cell unit

・Please pay attention not to scratch the surface of solar cell unit.

2. Attention for dial transparency rate

・Please use the dial with transparency rate more than 30%.
(Effective aperture is ϕ2700)

3. The guideline of charging time is as in below

(Dial transparency rate = 30%)

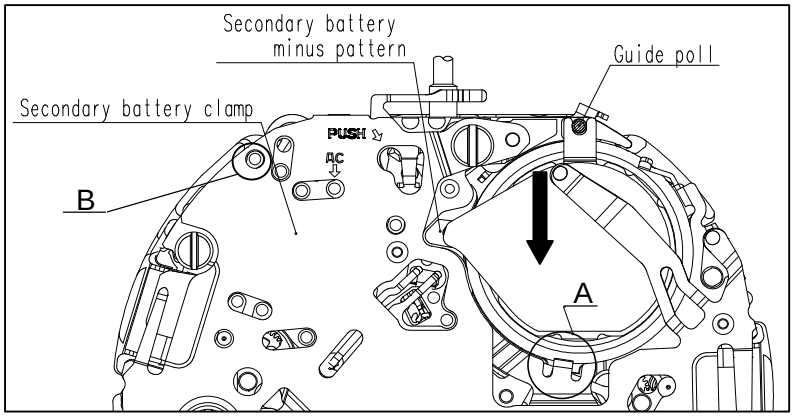
Illumination (Lx)	Source of light	Environment	A (Approx. hours)	B (Approx. hours)	C (Approx. minutes)
700	A fluorescent lamp	Inside the office	—	35	90
3,000		30W 20cm	65	8	20
10,000	Sun light	Cloudy	18	2.5	6
100,000		Fine weather	8	1	2

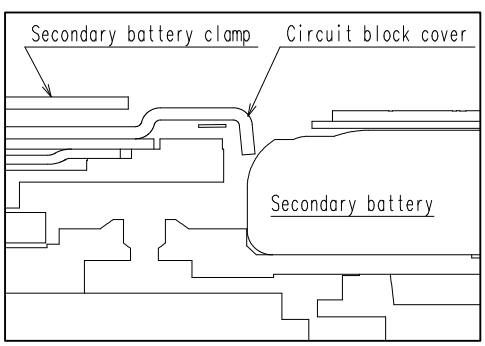
* For reference: 1,000Lx is 70cm under from 30W fluorescent lamp

Condition A : Time required for full charge
Condition B : Time required for steady operation
Condition C : Time to charge 1 day of power

4. Secondary battery replacement

・Please set the exclusive secondary battery.
・Please set the secondary battery with the plus part toward the inside of the watch.
・When you assemble or change the secondary battery, it is recommended to pull out three screws for secondary battery clamp first, and then take out the secondary battery clump in order not to add the damage to the movement part.
・When you assemble the secondary battery without taking out the secondary battery clump, please refer to the picture in below and set the secondary battery from the [→] direction.
・Secondary battery guide must be connected to "Guide pole" (Please refer to this illustration.)
・Please check whether the secondary battery lead plate is surely connected to the secondary battery minus pattern.
・Regarding the [A] part of the following chart, it is recommended that the secondary battery must be under the circuit block cover.
・It is necessary to do system-reset, after assembling the secondary battery.
Please short the circuit pattern “AC” and the secondary battery clamp for more than 2 seconds.
Please short out the circuit pattern “B” and the secondary battery clamp more than 2 seconds.
It sense the polarity of each motor automatically.
・Please set the 1/20 second chronograph hand, second chronograph hand and minute chronograph hand at “0” position.





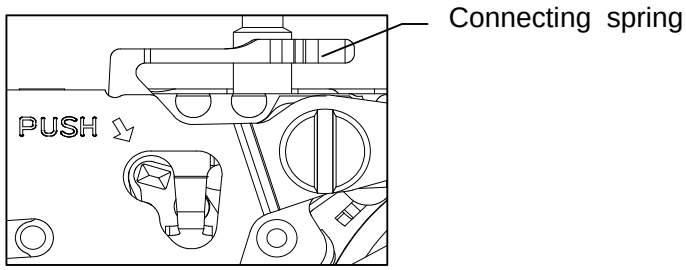
[A] Section

Date : 31/Oct./'12
Rev. : 00

VS76A Attention-02

5. How to pull out the setting stem

・Please pull out the crown at 1st click and then pull out the stem while you are pressing the hollow part of the setting lever by tweezers.
・If the stem is not at 1st position, it is impossible to be pulled out. (Crown pulled out at 1st click)
・Please do not transform the Connecting spring.



6. Attention of casing part structure

・Please use the exclusive dial support ring to fix the movement tightly inside of the case, and to stabilize the button switching stroke. As to the shape and tolerance, please refer to the [Solar cell unit] page instruction.
・Please use the metal case to prevent movement from being mal-functioned by static electricity.
・In order not to push the minute hand too much, the second wheel have a safety stopper structure. However, please pay attention for the friction between hour hand and minute hand.

7. Attention to set each hand

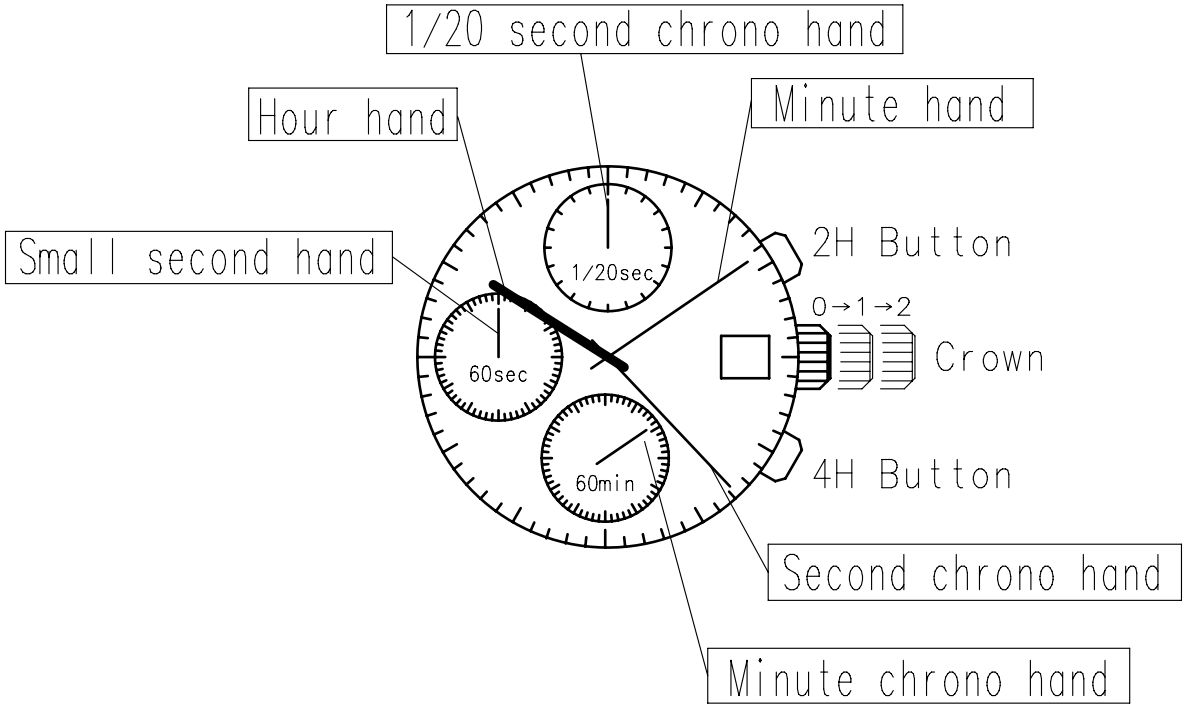
・Hand moves at one-second interval. Please set the each hand at correct position according to the scale of the dial in order not to make a mistake to read the time.

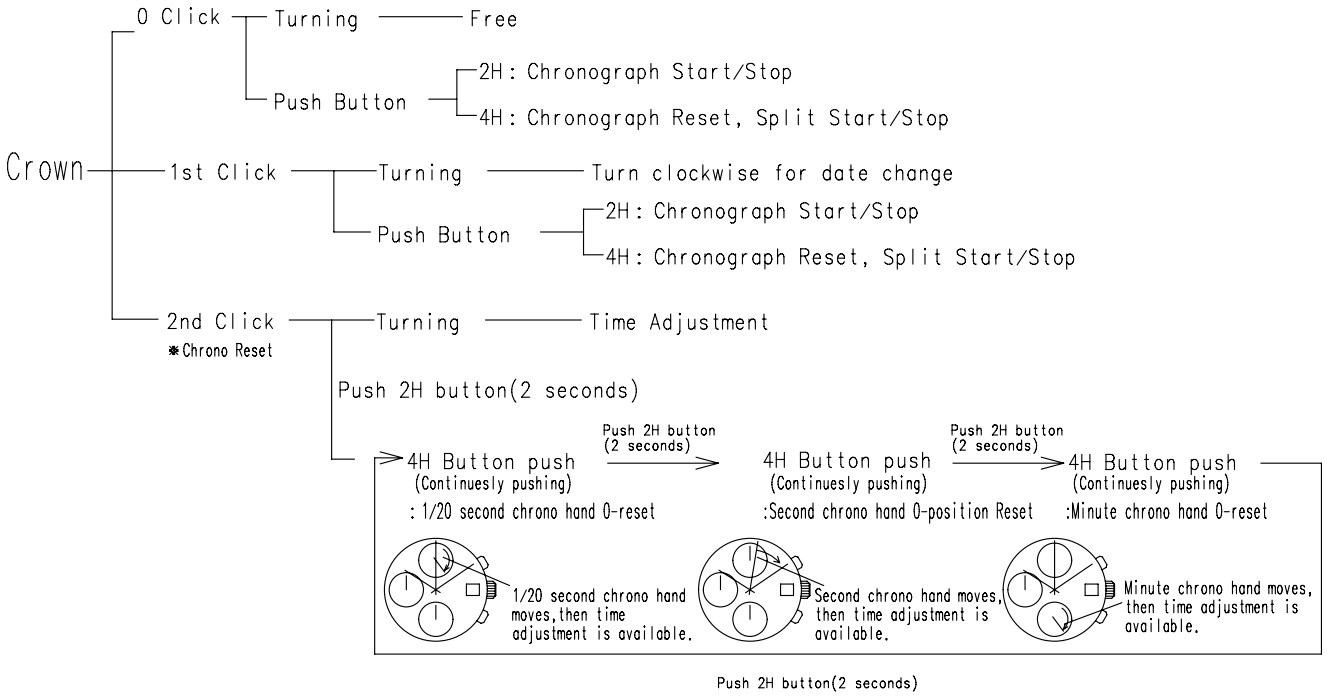
8. How to take off the hand

・When you take off the hand, please use the fork-shaped exclusive tools.
・Please do not take the dial when any hands are assembled.

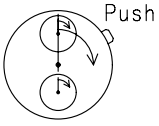
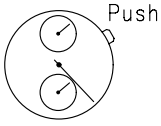
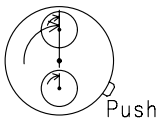
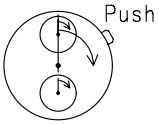
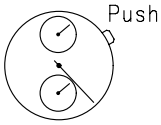
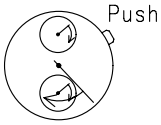
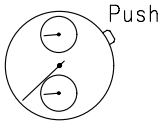
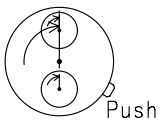
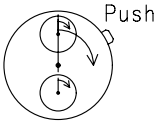
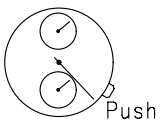
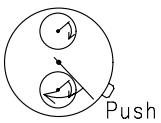
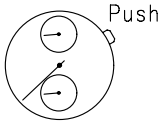
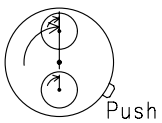
9. Caution

・When charging the watch, do not place it too close to fluorescent lamp or other light sources as the watch temperature will become extremely high, causing damage to the parts inside the watch.





At 2nd click position, system-reset is possible by pushing the 2H button and 4H button for more than 2 seconds simultaneously.

Chronograph Operation					
Total Time	START	STOP			RESET
					
Accumlated Time	START	STOP	RESTART	STOP	RESET
					
Split Time	START	SPLIT	RESPLIT	STOP	RESET
					

Chronograph hand stop running after 60 minutes.
1/20 second chronograph hand stop running after 1 minute.

Chronograph function invalid at second hand moves at 2-second intervals.