

Watch Movement Specification and Drawing

SOLAR SERIES

Cal. VS37A

Movement Size

10 1/2'''

Casing Diameter

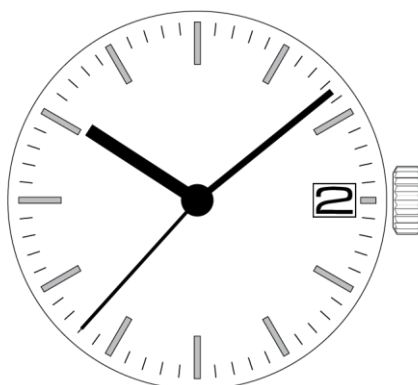
Ø 24.0mm

Height

2.98mm

Running Time

Approx. 12 months



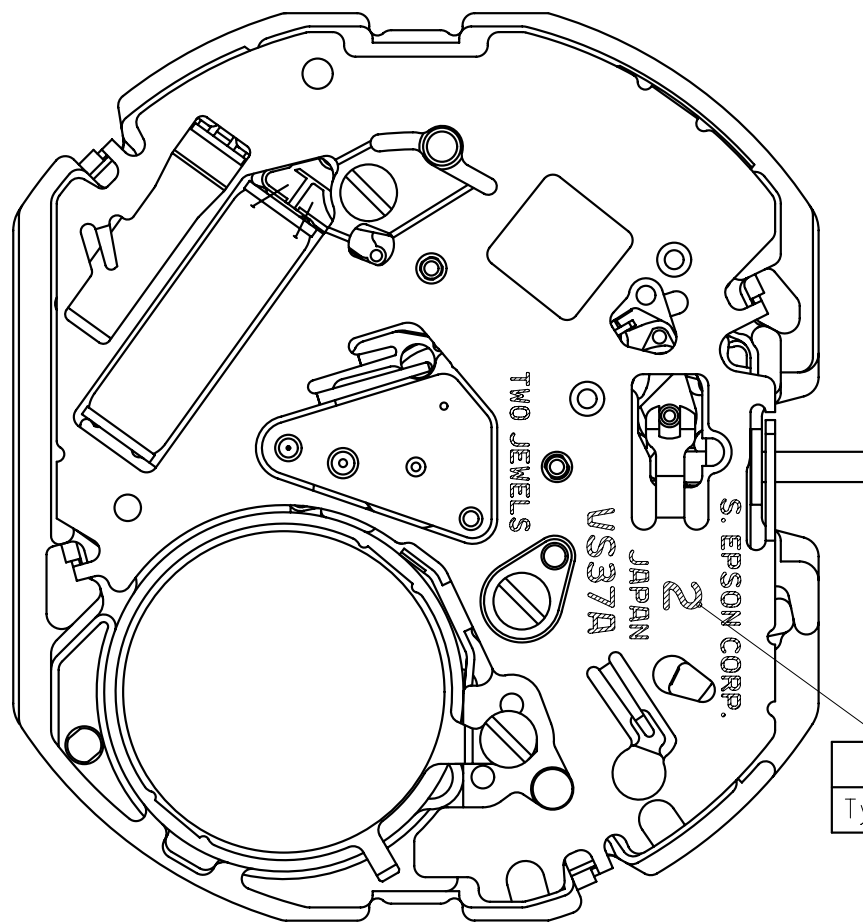
Date: 4/Aug./'23

Cal. VS37A

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Cal. VS37A	Features	Date : 4/Aug./'23 Rev. : 05
<div data-bbox="188 219 521 253" data-label="Section-Header"> <h3>1.Solar-powered watch</h3> </div> <div data-bbox="228 253 1431 318" data-label="Text"> <p>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.</p> </div> <div data-bbox="188 362 858 396" data-label="Section-Header"> <h3>2. Eliminating the need for battery replacement</h3> </div> <div data-bbox="228 396 1442 461" data-label="Text"> <p>Unlike conventional quartz watches, this watch does not use a silver oxide battery, thus eliminating the need for battery replacement.</p> </div> <div data-bbox="188 506 1136 539" data-label="Section-Header"> <h3>3. You can use the dial which light transmittance is more than 20%</h3> </div> <div data-bbox="228 539 1185 609" data-label="Text"> <p>It is possible to assemble the dial which transmits light on the solar cell. It enabled to cover the solar cell color, and you can design variety colors of dials.</p> </div> <div data-bbox="188 649 421 685" data-label="Section-Header"> <h3>4. Running time</h3> </div> <div data-bbox="228 683 1152 716" data-label="Text"> <p>Expected running time from full charge to stoppage will be around 12 months.</p> </div> <div data-bbox="188 757 708 792" data-label="Section-Header"> <h3>5. Power depletion warning function</h3> </div> <div data-bbox="228 790 1267 862" data-label="Text"> <p>The two-second intervals movement of the second hand is a signal of energy depletion. The watch continuous running time after two-second intervals movement is 1 day.</p> </div> <div data-bbox="188 900 510 934" data-label="Section-Header"> <h3>6. Quick start function</h3> </div> <div data-bbox="228 934 1176 1041" data-label="Text"> <p>This watch has a "Quick start function". It start running within a few seconds after exposure to a light more than 1000Lx. (Fluorescent lamp 30W/ 70cm)</p> </div> <div data-bbox="188 1081 817 1120" data-label="Section-Header"> <h3>7. Over charge prevent function is equipped</h3> </div> <div data-bbox="228 1120 1426 1182" data-label="Text"> <p>If the secondary battery is charged more than predetermined voltage, over charge prevent function is operated to prevent the secondary battery deterioration and breakage.</p> </div> <div data-bbox="188 1227 681 1263" data-label="Section-Header"> <h3>8. Structure of the separated parts</h3> </div> <div data-bbox="231 1303 1228 1957" data-label="Image"> <p>The diagram illustrates the exploded view of the watch assembly. It shows the following components and their assembly sequence from top to bottom:</p> <ul style="list-style-type: none"> Solar cell unit: Consists of a Holding ring for dial and a Solar cell. Solar cell lead terminal: Two terminals that connect the solar cell to the movement. Dial washer: A small circular washer that sits between the dial and the movement. Movement: The main mechanical component of the watch. Hand setting stem: A tool used to adjust the watch hands. </div>		

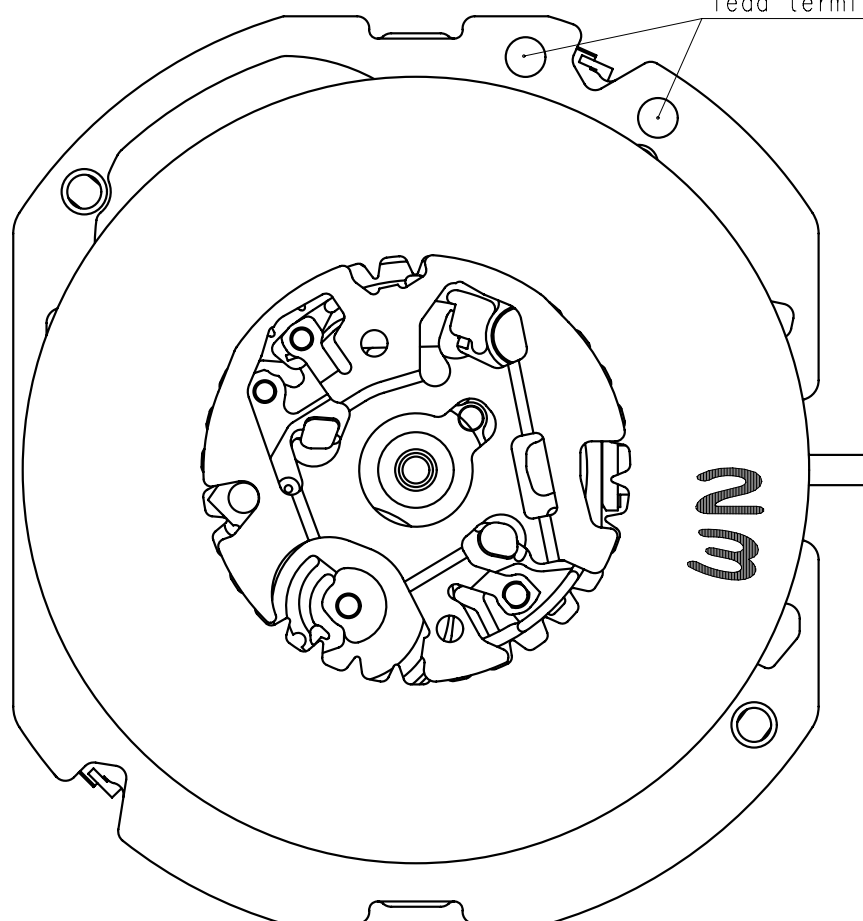
Cal.	VS37A	Specifications	Date : 4/Aug./'23
			Rev. : 06
Solar Quartz 10 1/2" Movement / Three hands(H/M/S) with Calendar			
1. MOVEMENT DIMENSIONS			
Outside diameter	φ 25.00mm × 21.30mm(3-9H) × 24.00mm(12-6H)		
Casing diameter	φ 24.00mm × 19.30mm(3-9H) × 23.30mm(12-6H)		
Total height	2.57mm (Including secondary battery : 2.98mm)		
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°C to +50°C		
Regulation device	Nil (Pre-adjusted)		
3. INDICATOR / FUNCTIONS			
3 Hands	Hour / Minute / Second		
Calendar	Instant setting device for date calendar		
Reset switch			
Power depletion warning function	(Second hand moves at 2-second intervals when voltage is 1.10V)		
Quick start function			
Running time	Approx. 12 months (After fully charged)		
Setting mechanism	Crown at normal position	: Free	
	Crown pulled out 1st click	: Instant date change	
	Crown pulled out 2nd click	: Time setting / Reset	
4. FEATURES			
Jewels	2 Jewels		
Anti-magnetism	Over 1600A/m (Direct current magnetic field)		
Driving current consumption	Approx. 0.6 μ A (1.35V)		
Operation stopping voltage	1.0 V		
Solar cell type	Amorphous silicon solar cell		
Maximum unbalance of hands	Second hand	: 0.05 μ N·m	
	Minute hand	: 0.80 μ N·m	
	Hour hand	: 0.50 μ N·m	
5. SECONDARY BATTERY (Installed)			
Type	Lithium metal batteries		
Size	φ 9.5mm × t 2.1mm		
Nominal voltage	1.5 V		
Capacity	5.5 mAh		
6. SEPARATED PARTS (Parts code)			
Solar cell unit	4020554		
Hand setting stem	0351177		
Solar cell lead terminal (2 pcs)	4246513		
Dial washer	0491735		
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.			

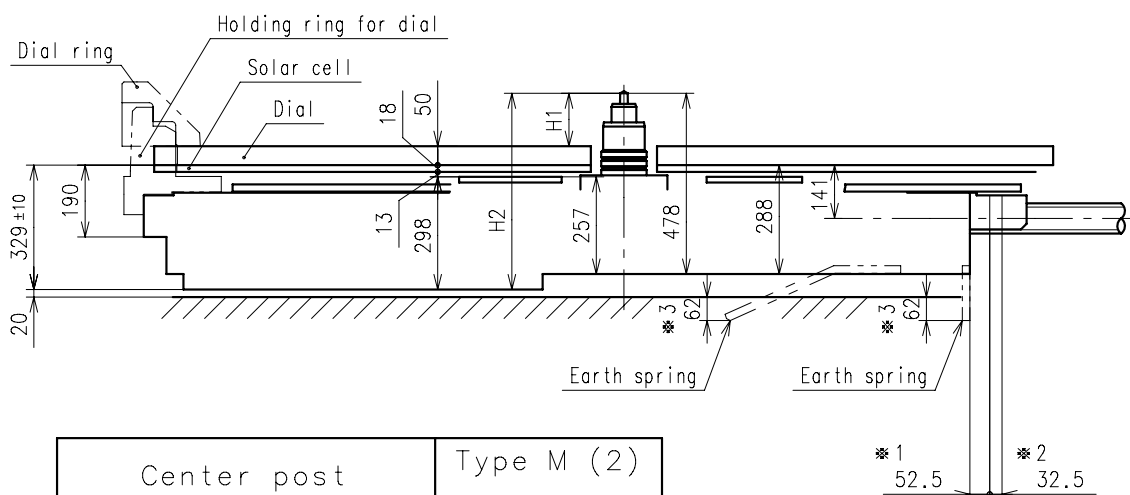


Hands type

	Mark
Type (M)	2

Solar cell
lead terminal



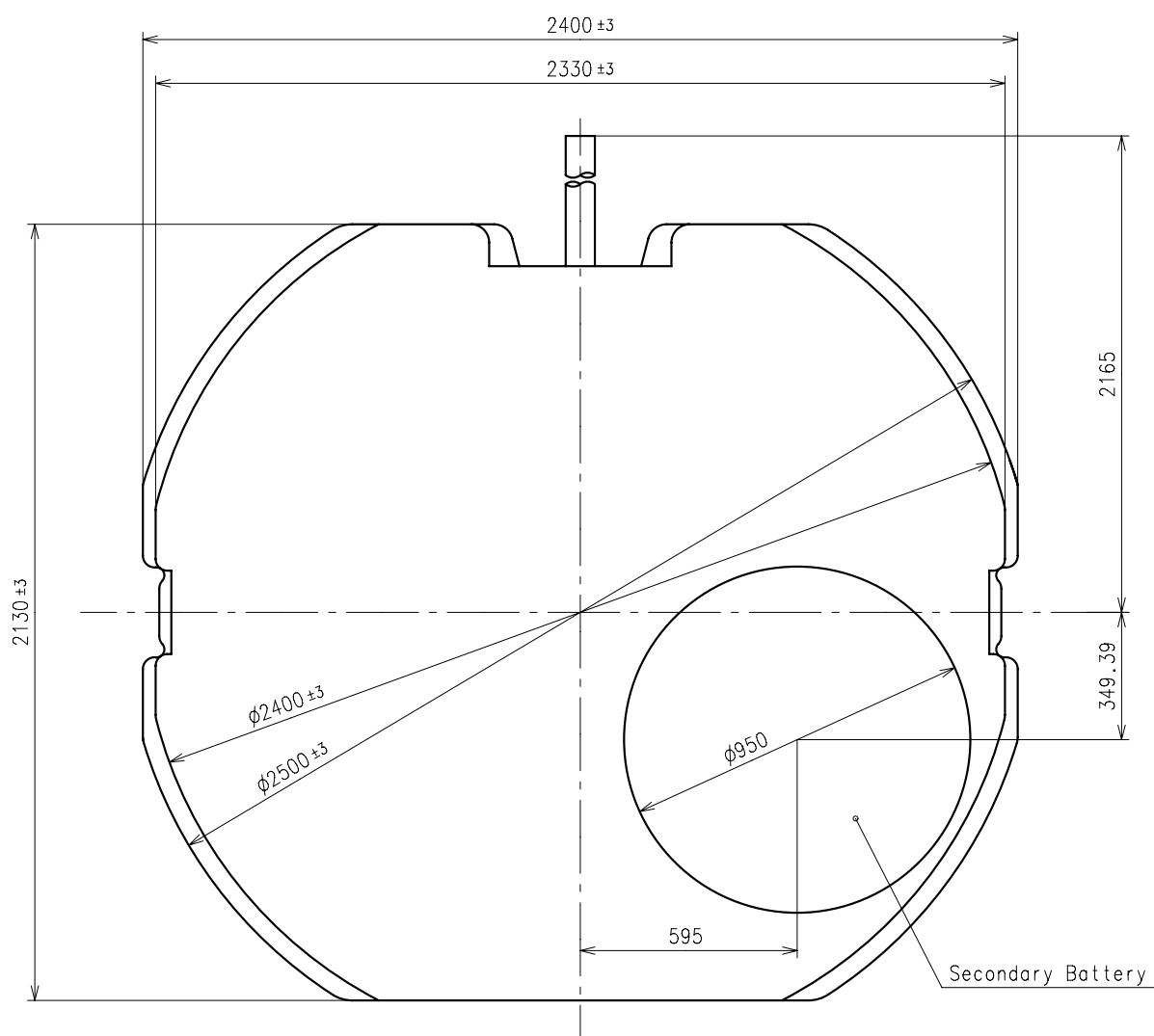


Center post		Type M (2)
Maximum height from dial	H1	140
Total height including movement	H2	526

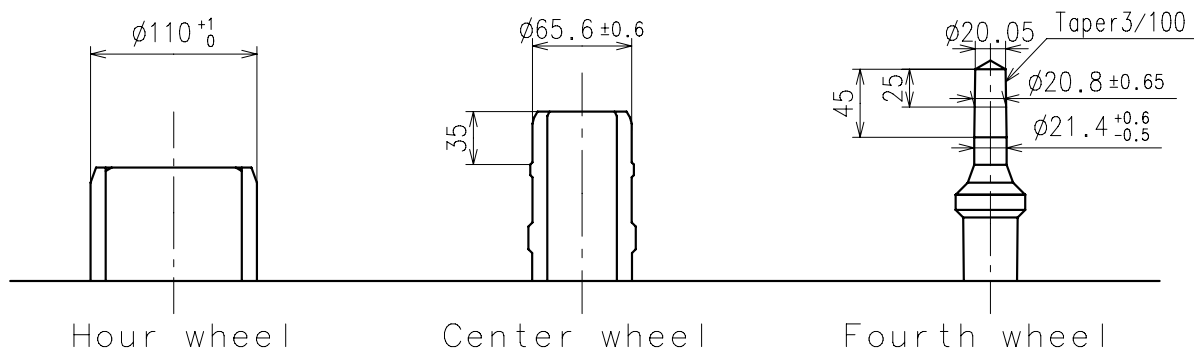
*1:First pullout stroke

*2:Second pullout stroke

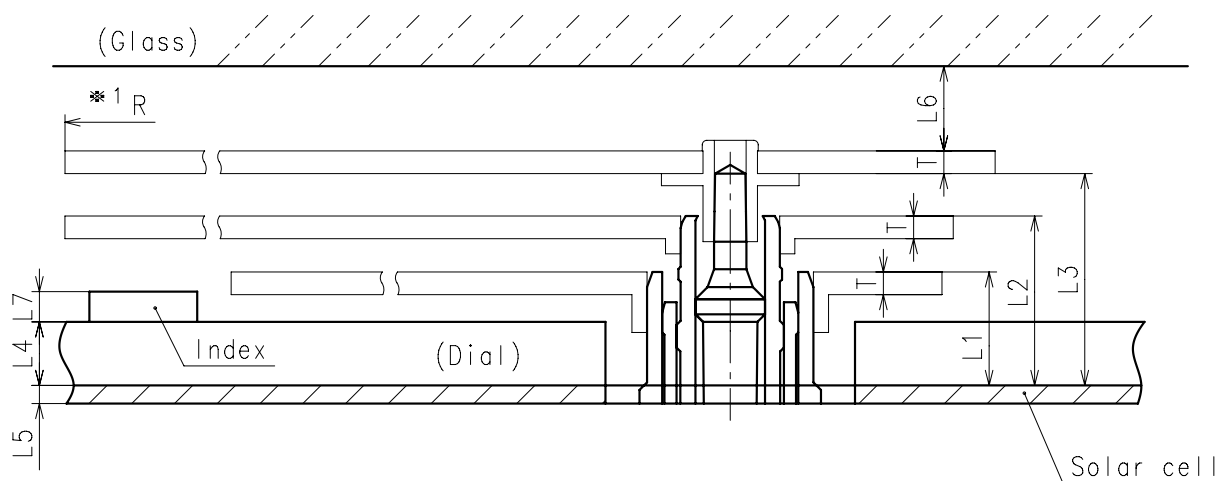
*3:The earth spring is absolutely placed in contact with the case back



- * Hour hand unbalance $\leq 0.5\mu \text{ N} \cdot \text{m}$ ($50\mu \text{ g} \cdot \text{m}$)
- * Minute hand unbalance $\leq 0.8\mu \text{ N} \cdot \text{m}$ ($80\mu \text{ g} \cdot \text{m}$)
- * Second hand unbalance $\leq 0.05\mu \text{ N} \cdot \text{m}$ ($5\mu \text{ g} \cdot \text{m}$)

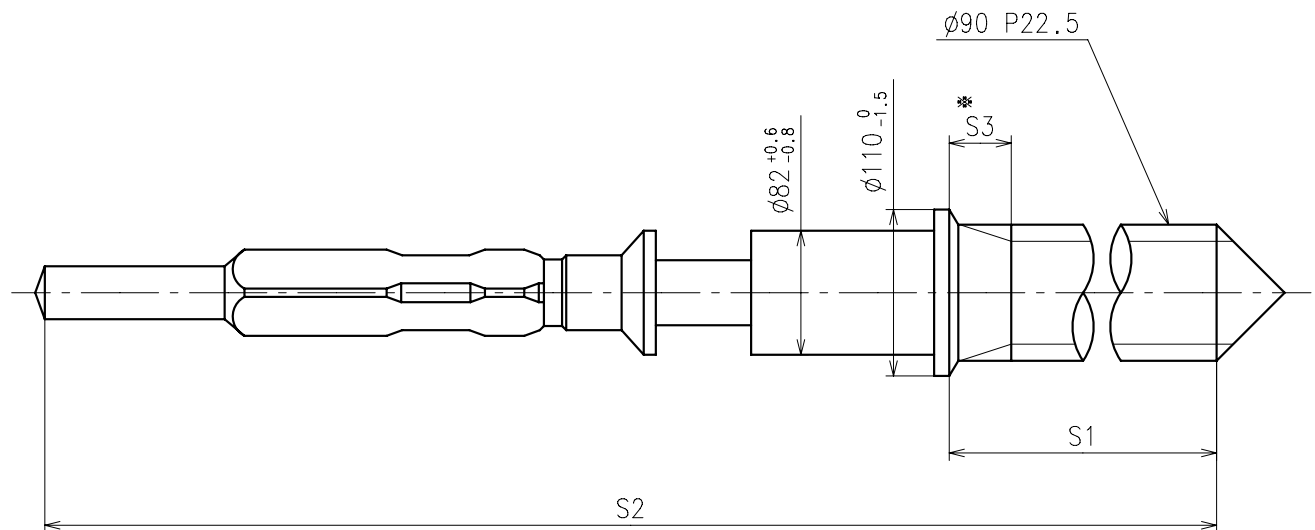


	Parts No.		
	Hour wheel	Center wheel	Fourth wheel
Type M (2)	0271948	0221939	0241934



	L1	L2	L3	L4	L5	L6	L7	T	*1 R
Type M (2)	113	162	190	50	18	MIN: 50	MAX: 50	15	MAX: 1250

*1: It is the size taken into consideration for hands attachment.
Please observe some standard value specified in unbalance when using long hands.

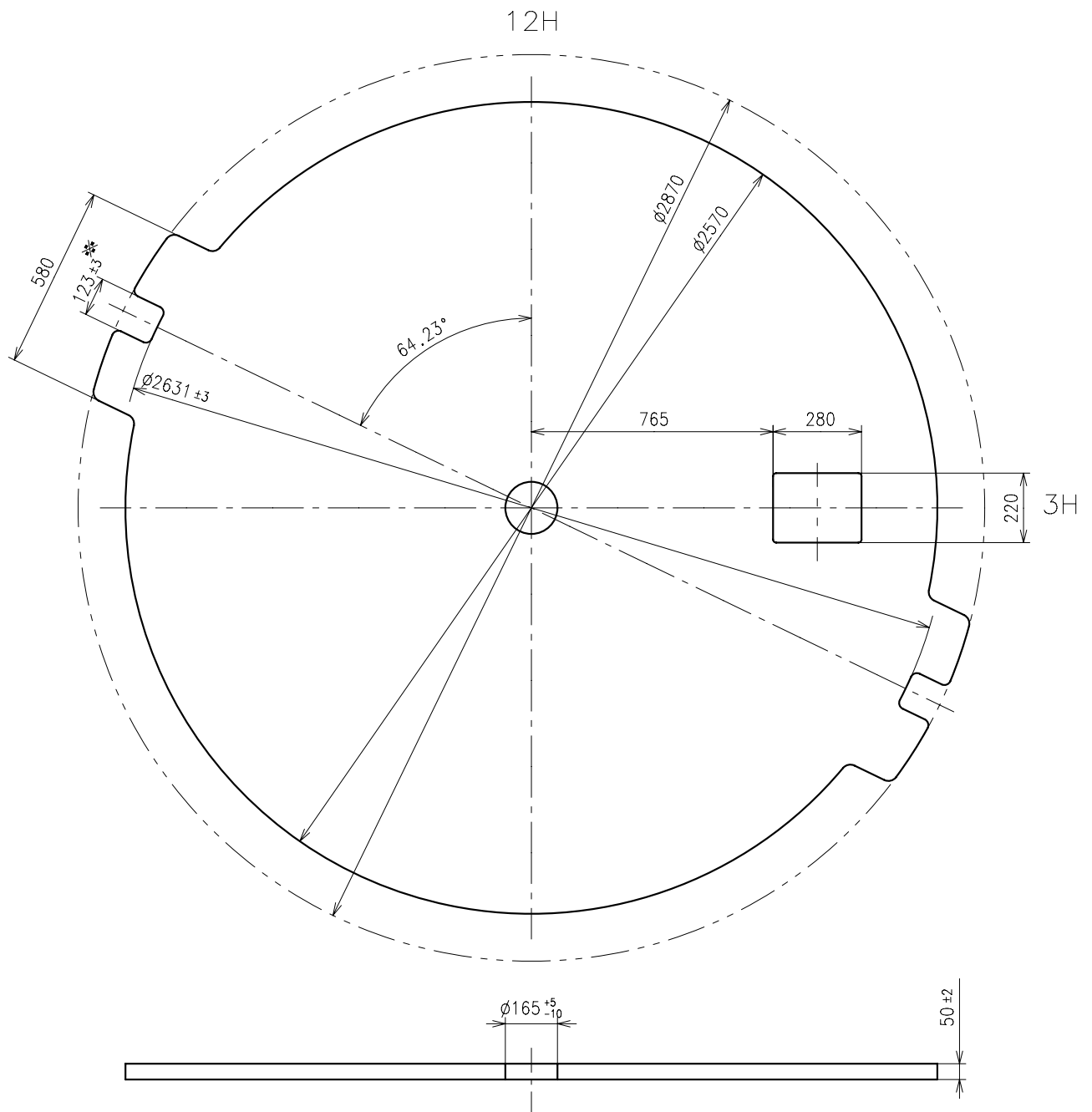


※ Not threaded

	Part No.	S1	S2	※ S3
Standard	0351177	1366	1964	60

Material : Steel

Hardness : Vickers 600±50



* If the dial holding structure on to the solar cell unit is without dial ring : 114±2

[Attention]

Each elements of solar cell must be kept the transparency rate of the dial more than 30%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

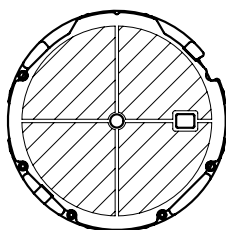
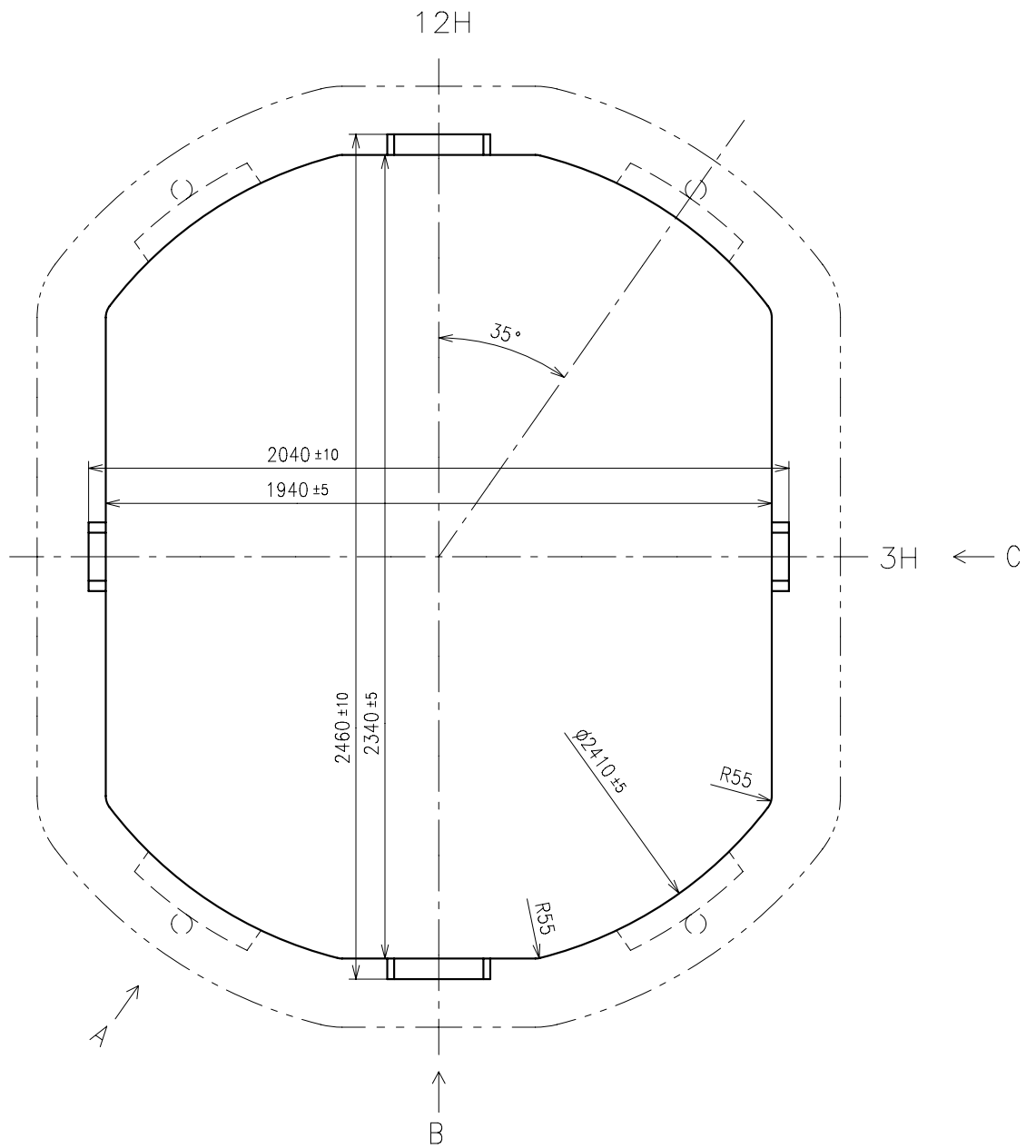
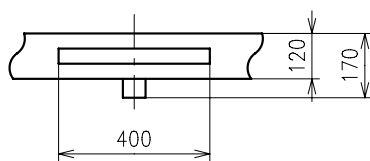


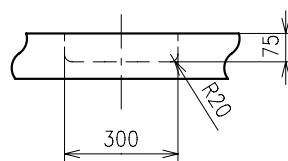
Fig.[1]  elements of solar cell



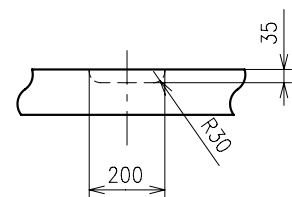
A view

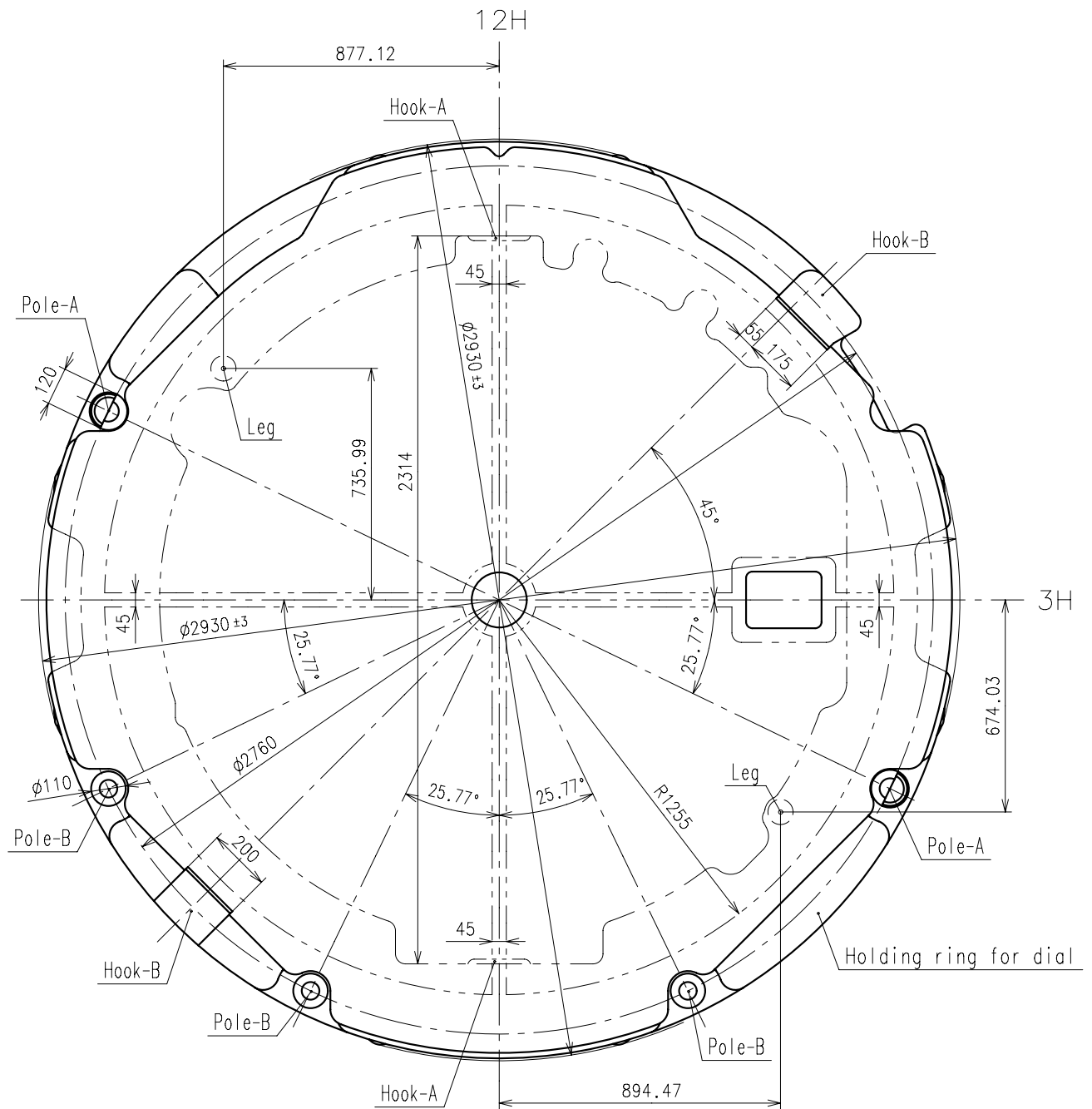


B view

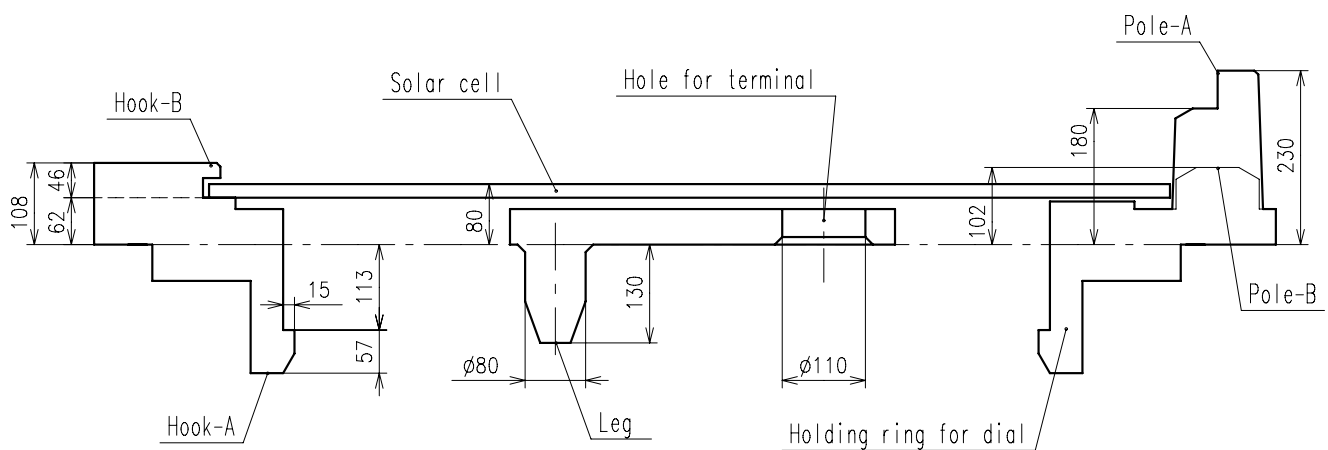


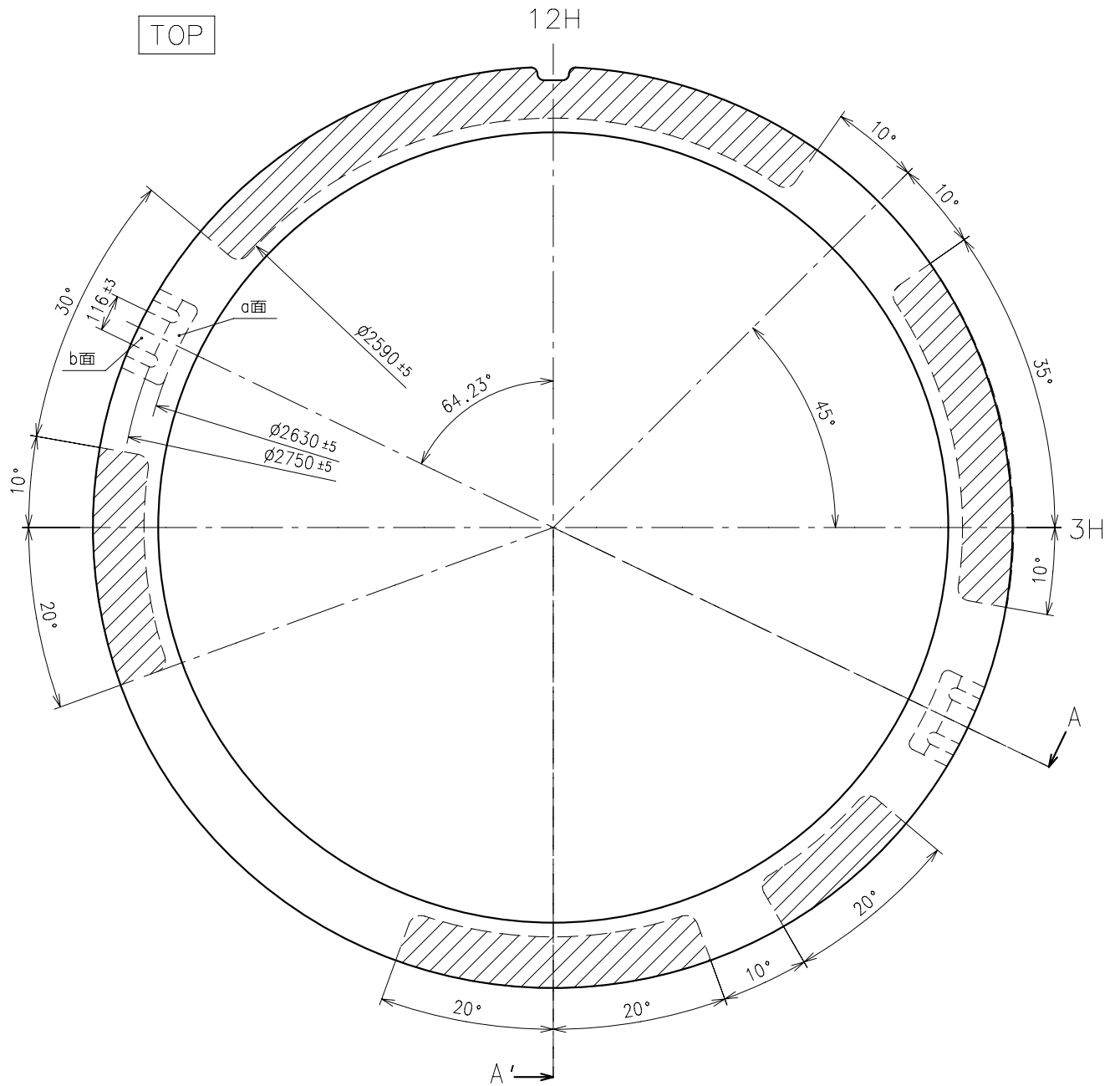
C view





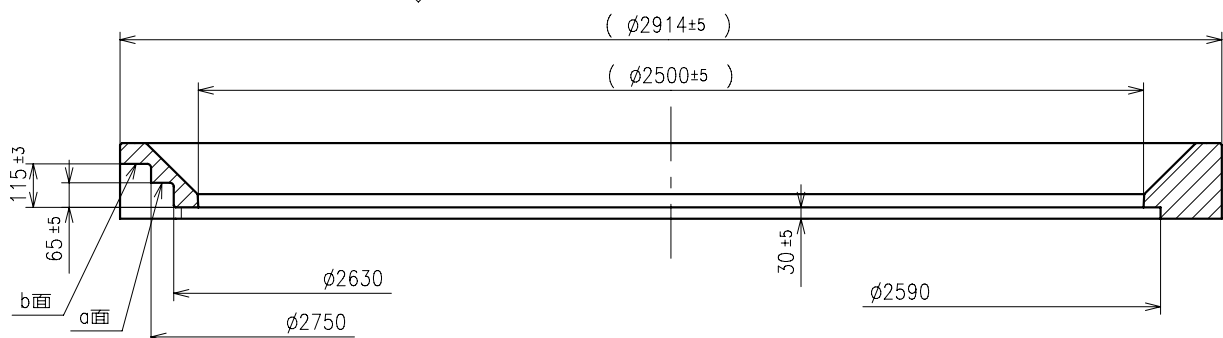
Case body inside diameter: $\phi 2930$





A-A' View

TOP
↓

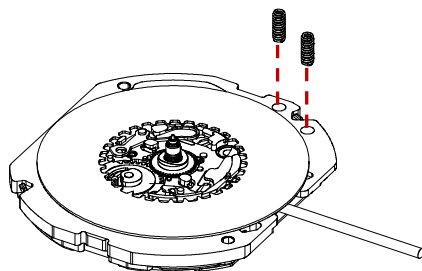


Cal.	VS37A	Attention-01	Date : 4/Aug./'23																																																						
			Rev. : 05																																																						
<div>1. How to remove the setting stem</div> <div>When removing the setting stem, put the setting stem at normal position and push the "setting lever" by tweezers.</div> <div>The "setting lever" can not be push if the setting stem is not at normal position.</div> <div>2. Attention for solar cell unit</div> <div>Pay attention not to touch and scratch the surface of the solar cell.</div> <div>3. Dial transparency rate</div> <div>Keep the transparency rate of the dial more than 20%.</div> <div>(Effective aperture is ϕ 25mm)</div> <div>Each elements of solar cell must be kept the transparency rate.</div> <div>4. The guideline of charging time is as in below</div> <table><tr><th rowspan="2">Illumination (Lx)</th><th rowspan="2">Source of light</th><th rowspan="2">Environment</th><th colspan="3">Dial transparency rate = 20%</th><th colspan="3">Dial transparency rate = 30%</th></tr><tr><th>A (Approx. Hours)</th><th>B (Approx. Hours)</th><th>C (Approx. Minutes)</th><th>A (Approx. Hours)</th><th>B (Approx. Hours)</th><th>C (Approx. Minutes)</th></tr><tr><td>700</td><td rowspan="2">A fluorescent lamp</td><td>Inside the office</td><td>—</td><td>50</td><td>89</td><td>—</td><td>37</td><td>54</td></tr><tr><td>3,000</td><td>30W 20cm</td><td>120</td><td>12</td><td>25</td><td>80</td><td>8</td><td>12</td></tr><tr><td>10,000</td><td rowspan="2">Sun light</td><td>Cloudy</td><td>35</td><td>3.0</td><td>8</td><td>25</td><td>3</td><td>4</td></tr><tr><td>100,000</td><td>Fine weather</td><td>9</td><td>1.1</td><td>2</td><td>6</td><td>0.6</td><td>1</td></tr></table> <div>Condition A : Time required for full charge</div> <div>Condition B : Time required for steady operation</div> <div>Condition C : Time to charge 1 day of power</div> <div>5. Attention for the secondary battery unit</div> <div>Please set the exclusive secondary battery unit.</div> <div>(The secondary battery is Lithium metal batteries without any environmentally harmful substances.)</div> <div>If the silver oxide battery is accidentally set and charged, there is a possibility of battery explosion.</div> <div>To prevent from the battery explosion, it is adopted safety structure not to charge the silver oxide battery even if it is accidentally set.</div> <div>6. Caution</div> <div>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.</div>									Illumination (Lx)	Source of light	Environment	Dial transparency rate = 20%			Dial transparency rate = 30%			A (Approx. Hours)	B (Approx. Hours)	C (Approx. Minutes)	A (Approx. Hours)	B (Approx. Hours)	C (Approx. Minutes)	700	A fluorescent lamp	Inside the office	—	50	89	—	37	54	3,000	30W 20cm	120	12	25	80	8	12	10,000	Sun light	Cloudy	35	3.0	8	25	3	4	100,000	Fine weather	9	1.1	2	6	0.6	1
Illumination (Lx)	Source of light	Environment	Dial transparency rate = 20%			Dial transparency rate = 30%																																																			
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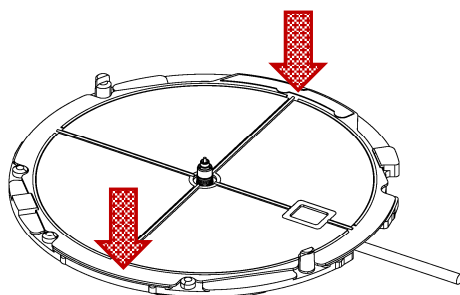
7. How to set the solar cell lead terminal

Please set 2pcs of solar cell lead terminals in accordance with this illustration.

As to the solar cell lead terminal shape, there is no distinction between upper and lower.

**8. How to set the solar cell unit**

Push above part of each hook on the solar cell unit into main plate certainly.

**9. How to set the dial**

Standard dial setting structure is not fixed to the solar cell unit by dial itself, but sandwiched by the dial ring fixed to the pole A of solar cell unit.

If the dial setting structure is without dial ring, make the slit width of the dial slit to the dimension shown in ※ on P.7 and check the dial holding condition.

