

Watch Movement Specification and Drawing

SOLAR SERIES

Cal. AS37A

Movement Size

10 1/2'''

Casing Diameter

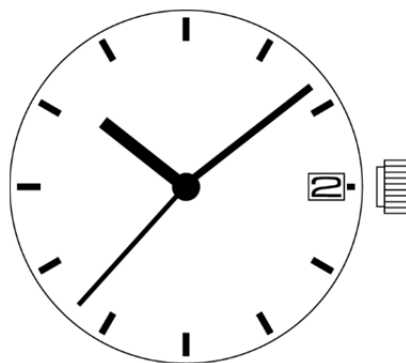
Ø 23.3mm

Height

4.61mm

Running Time

Approx. 2 months



Date: 31/Oct./'16

Cal. AS37A

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Cal.	AS37A	Date : 24/Apr.'15
Features		Rev. : 01

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.

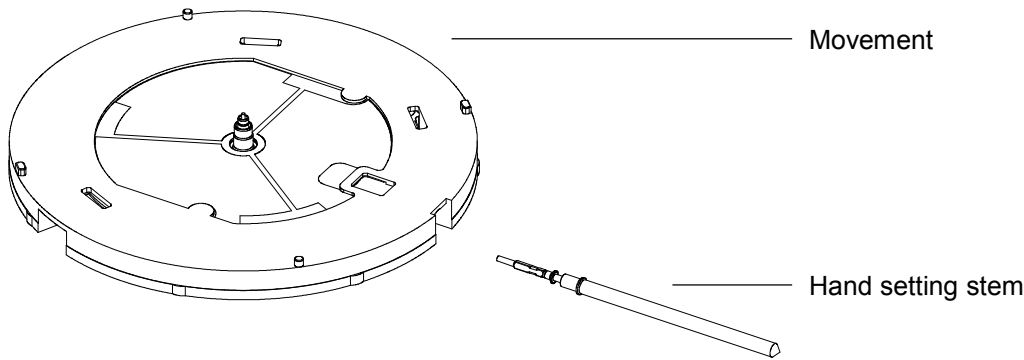
3. You can use the dial which light transmittance is more than 40%

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.

4. Running time

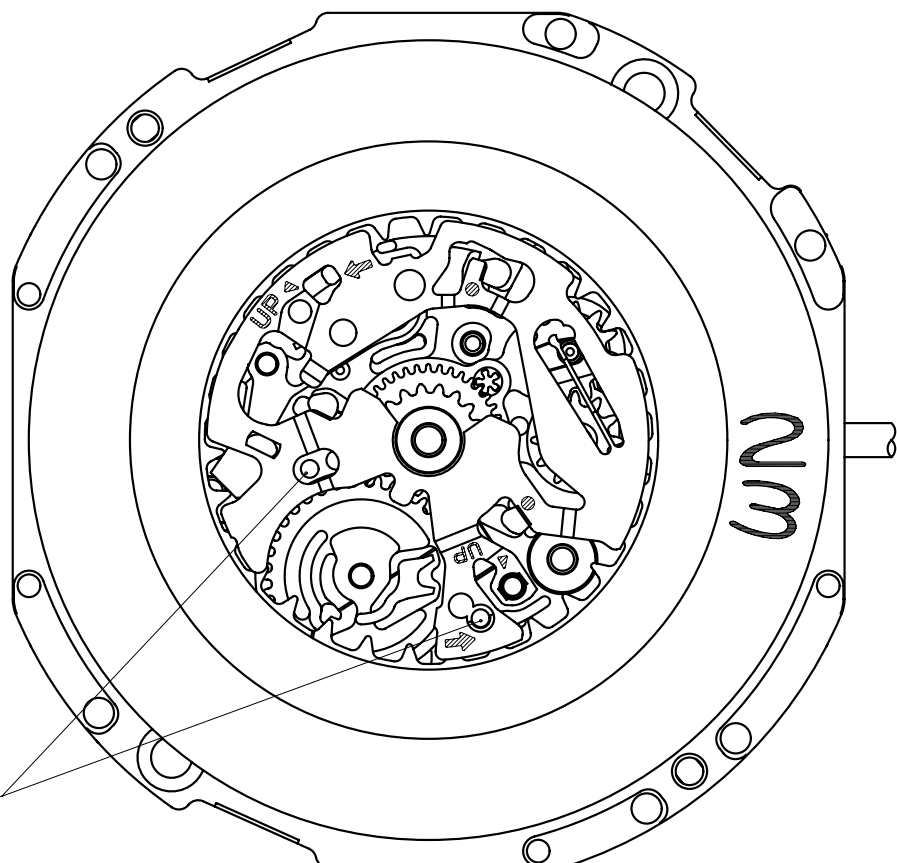
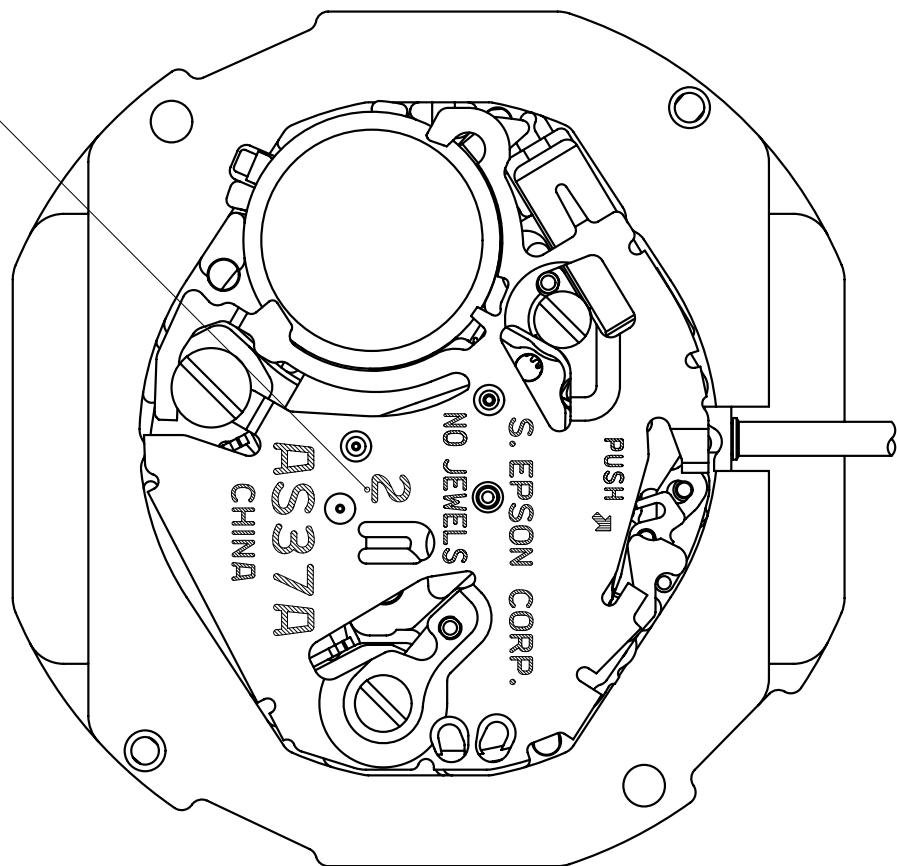
Expected running time from full charge to stoppage will be around 2 months.

5. Structure of the separated parts

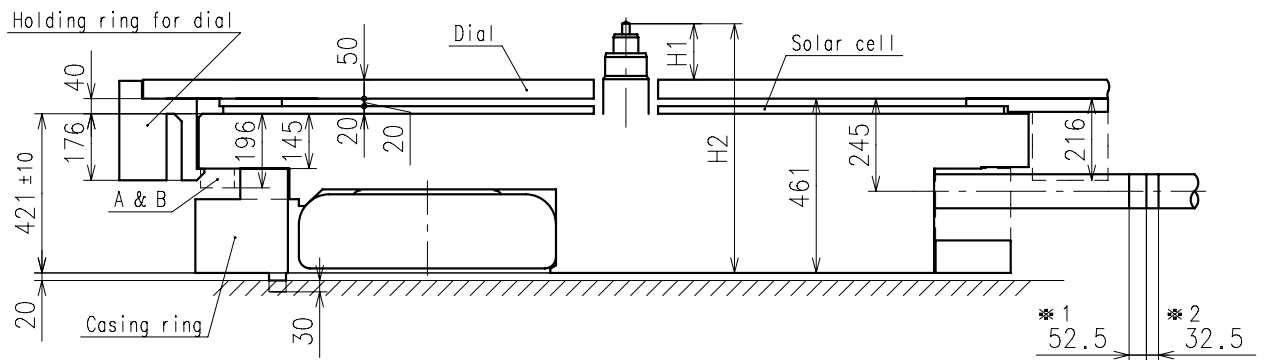


Cal.	AS37A	Specifications		Date : 24/Apr./'15	
				Rev. : 01	
Solar Quartz 10 1/2" Movement / Three hands(H/M/S) with Calendar					
1. MOVEMENT DIMENSIONS					
Outside diameter		φ 23.70mm × 22.00mm(3-9H) × 22.60mm(12-6H)			
Casing diameter		φ 23.00mm			
Total height		4.21mm (Including solar cell : 4.61mm)			
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					
Running time		Approx. 2 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		0 Jewels			
Anti-magnetism		Over 1600A/m (Direct current magnetic field)			
Driving current consumption		Approx. 1.64 μ A (1.4V)			
Operation stopping voltage		1.2 V			
Solar cell type		Amorphous silicon solar cell			
Maximum unbalance of hands		Second hand		: 0.06 μ N·m	
		Minute hand		: 0.6 μ N·m	
		Hour hand		: 0.5 μ N·m	
Moment of inertia		Second hand		: less than 0.6 μ g·m ²	
5. SECONDARY BATTERY (Installed)					
Type		Titanium-lithium-ion secondary battery			
Size		φ 6.8mm × t 2.15mm			
Nominal voltage		1.5 V			
Capacity		2.5 mAh			
6. SEPARATED PARTS (Parts code)					
Hand setting stem		0351177			
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	
Type	Mark
Type M	2



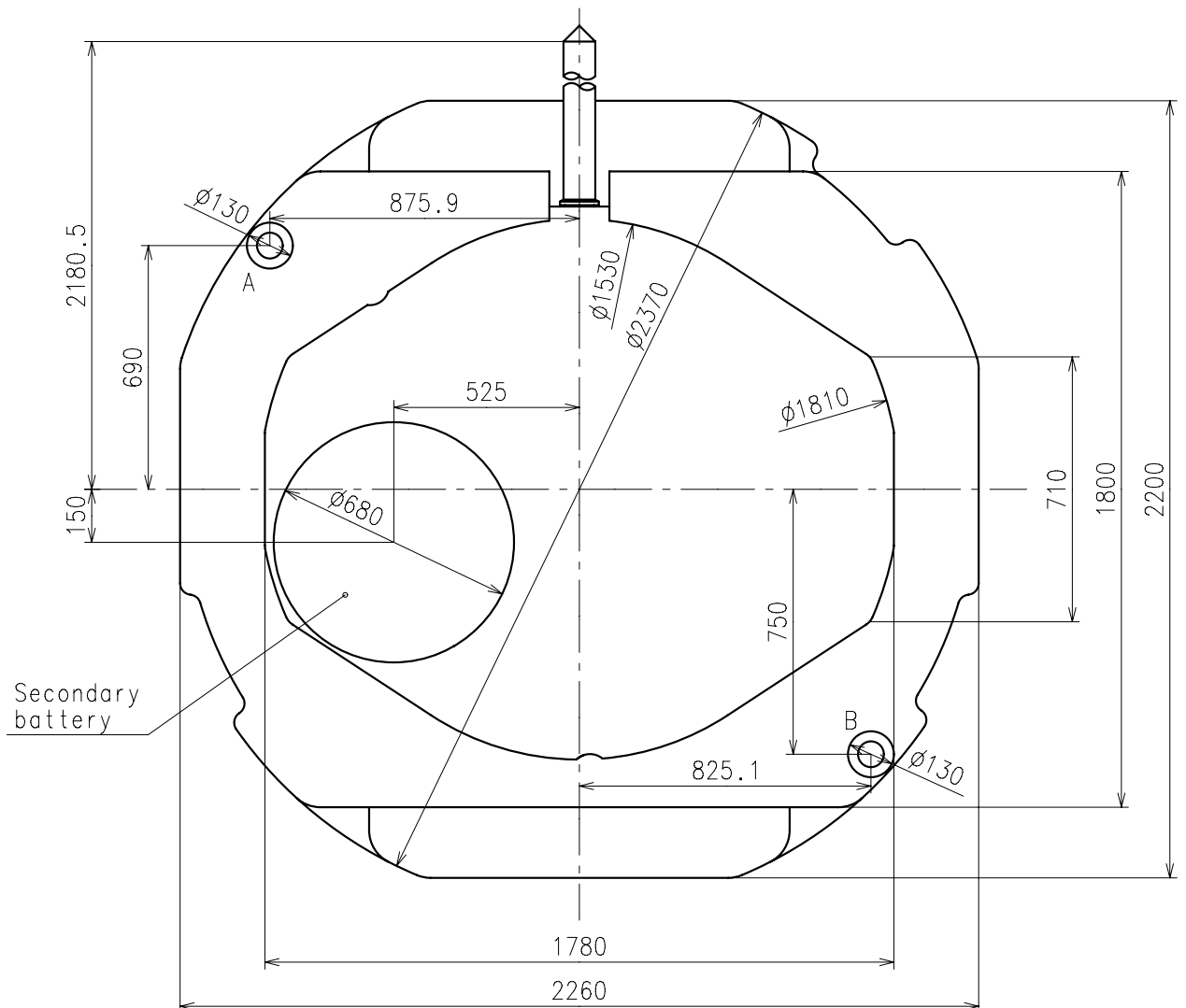
Solar cell
lead terminal



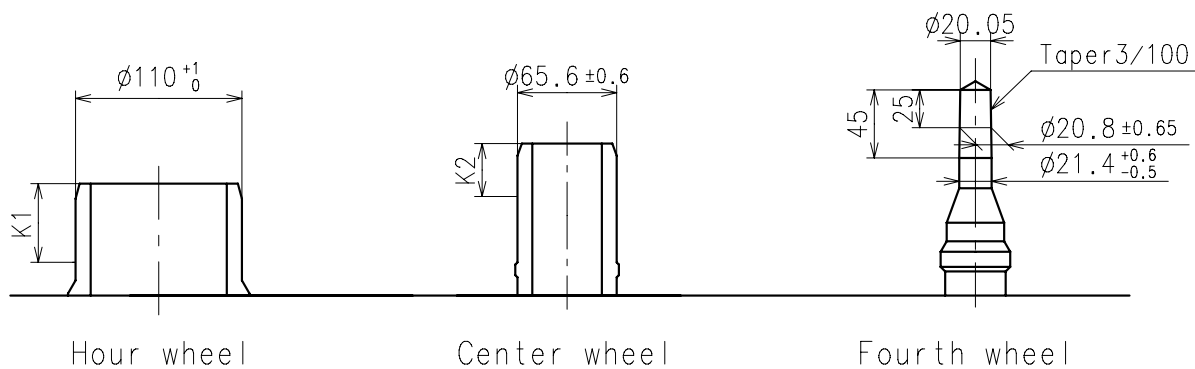
Center post		Type M (2) AS37A**
Maximum height from dial	H1	148
Total height including movement	H2	659

*1:First pullout stroke

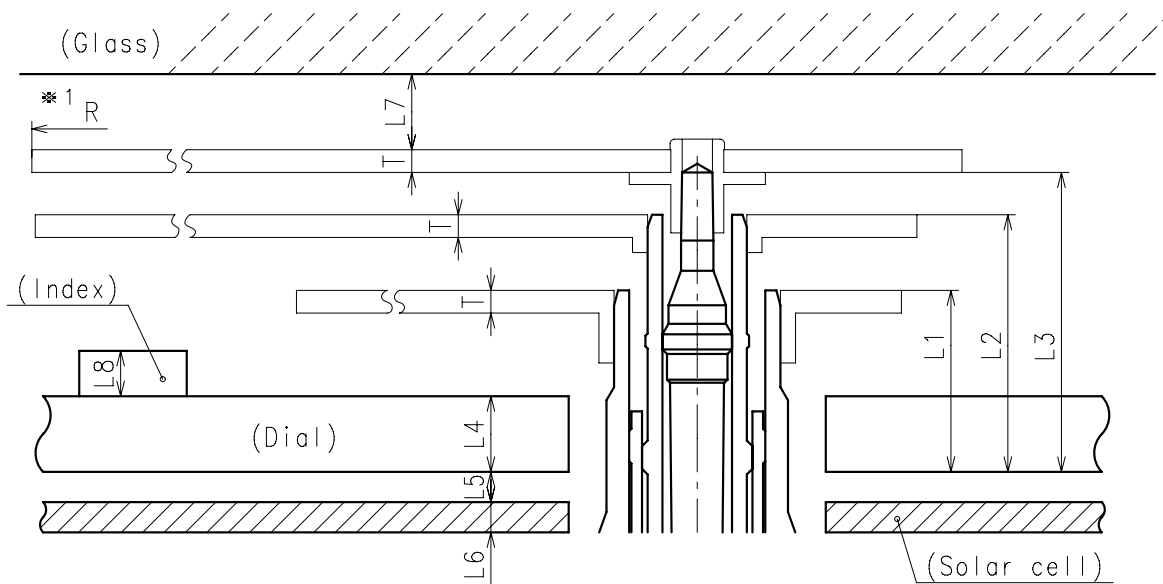
*2:Second pullout stroke



- ※ Unbalance
- Hour hand $\leq 0.5\mu \text{ N} \cdot \text{m}$ ($50\mu \text{ g} \cdot \text{m}$)
 - Minute hand $\leq 0.6\mu \text{ N} \cdot \text{m}$ ($60\mu \text{ g} \cdot \text{m}$)
 - Second hand $\leq 0.06\mu \text{ N} \cdot \text{m}$ ($6\mu \text{ g} \cdot \text{m}$)
- ※ Moment of inertia
- Second hand $\leq 0.6\mu \text{ g} \cdot \text{m}^2$



	Parts No.			Dimension	
	Hour wheel	Center wheel	Fourth wheel	K1	K2
Type M (2) AS37A**	0271649	0221654	0241584	60	35

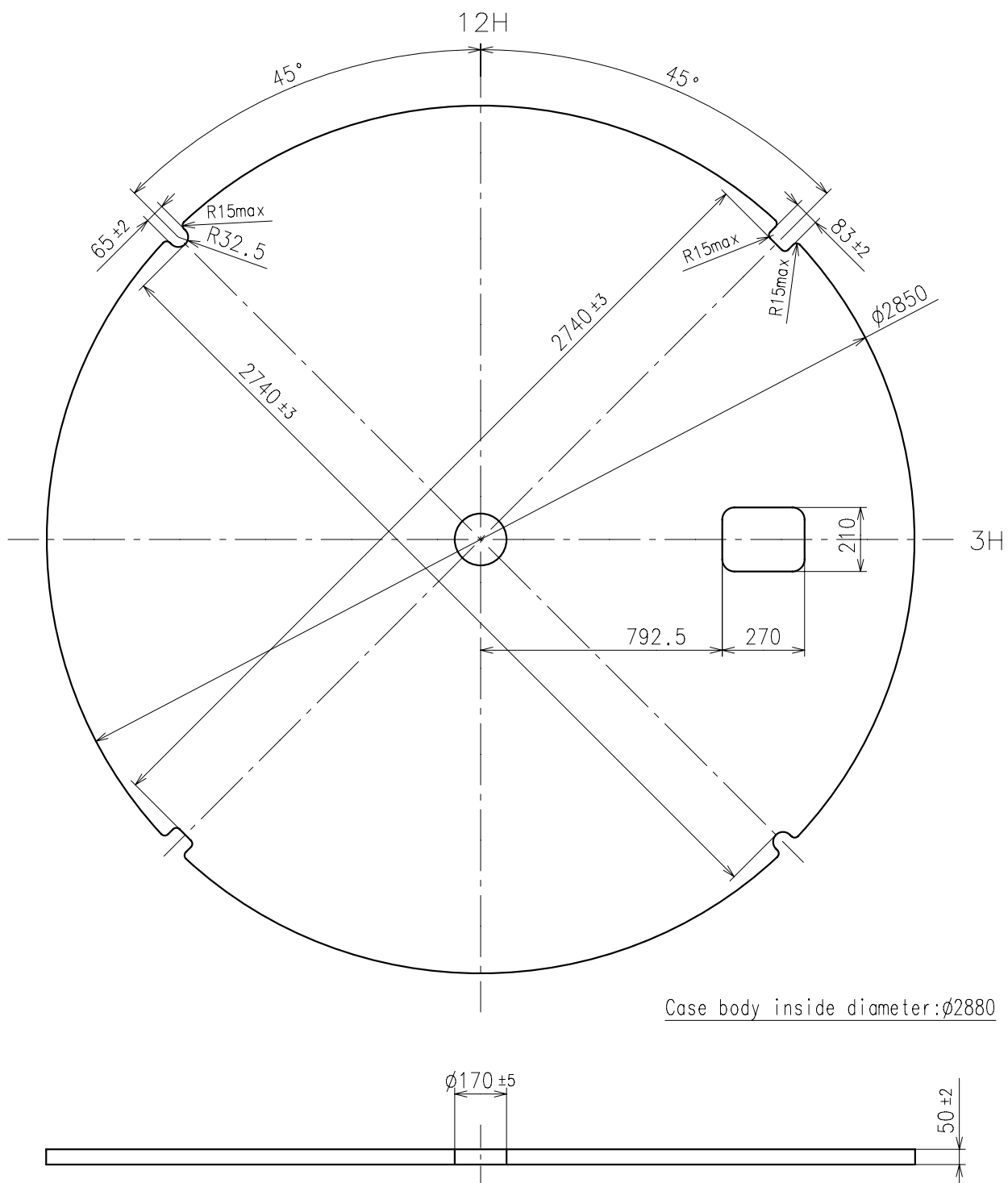


	L1	L2	L3	L4	L5	L6	L7	L8	T	*1 R
Type M(2) AS37A**	120	170	198	50	20	20	MIN: 50	MAX: 30	15	MAX: 1250

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



Hardness : Vickers 600±50



[Attention]

Each elements of solar cell must be kept the transparency rate of the dial more than 40%.
Refer to the Fig.[1] or [Solar cell unit-01] page instruction as to the shape of solar cell.

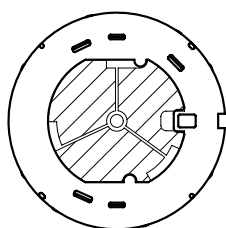
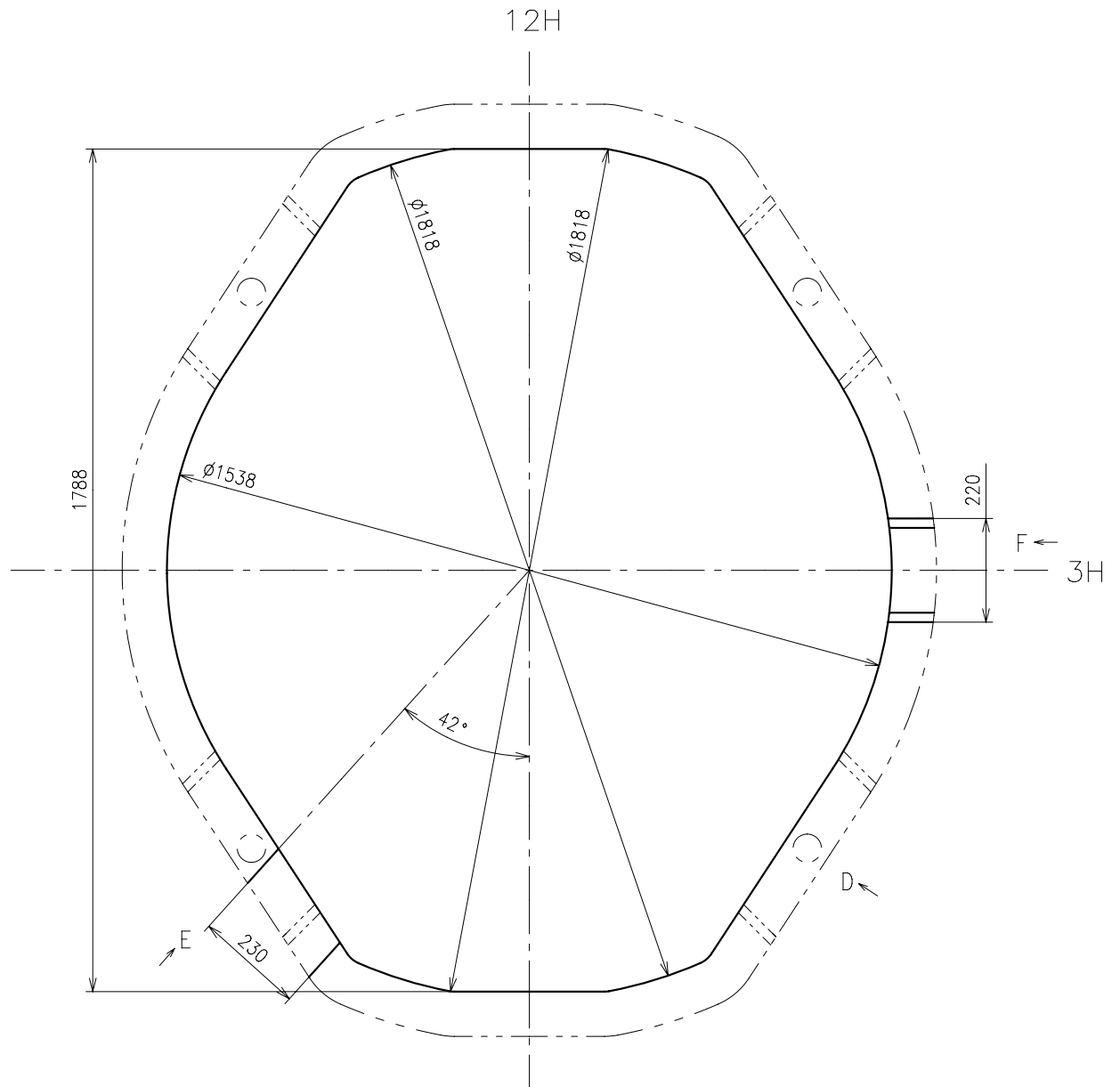
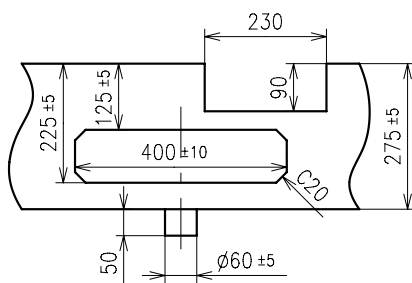


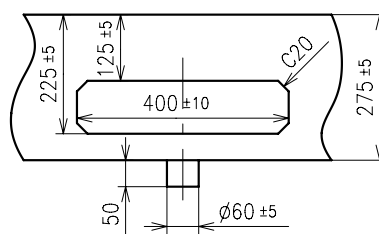
Fig.[1]  elements of solar cell



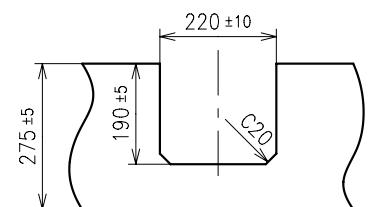
E view



D view

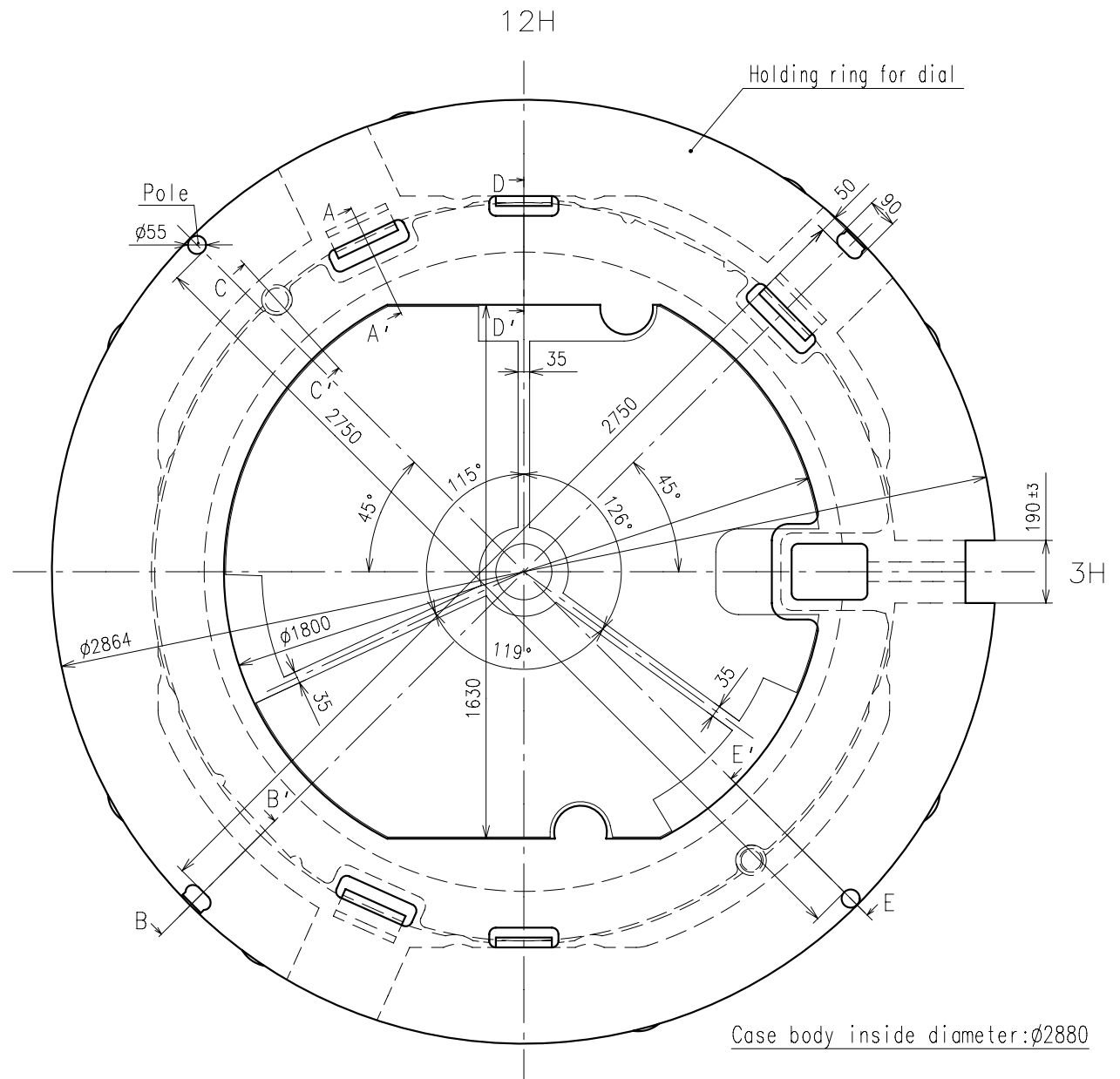


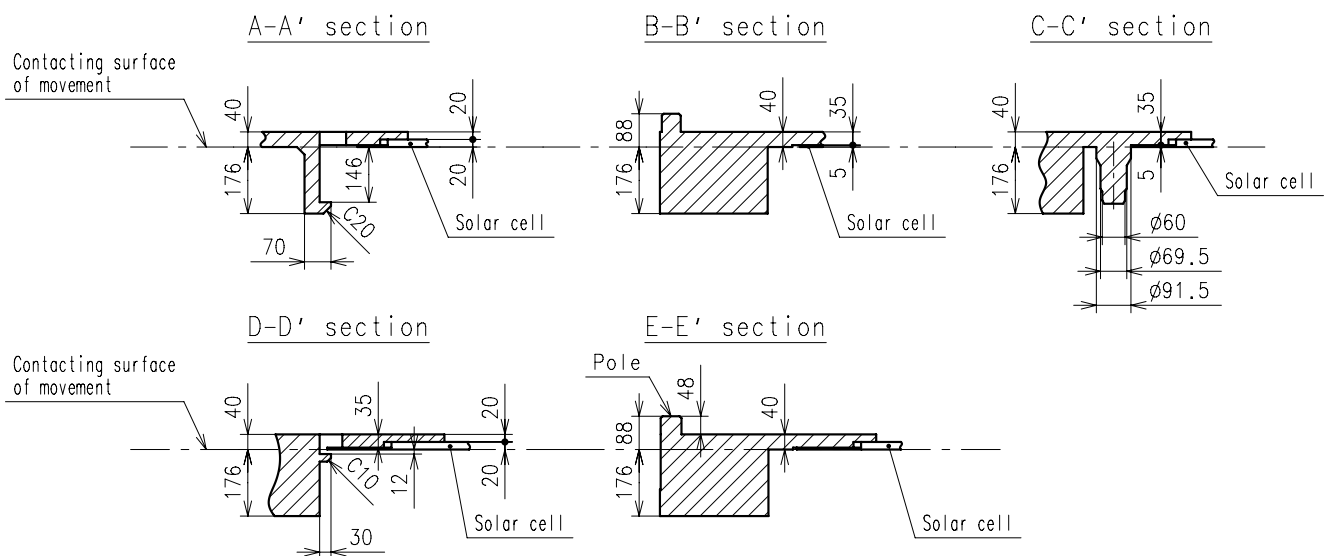
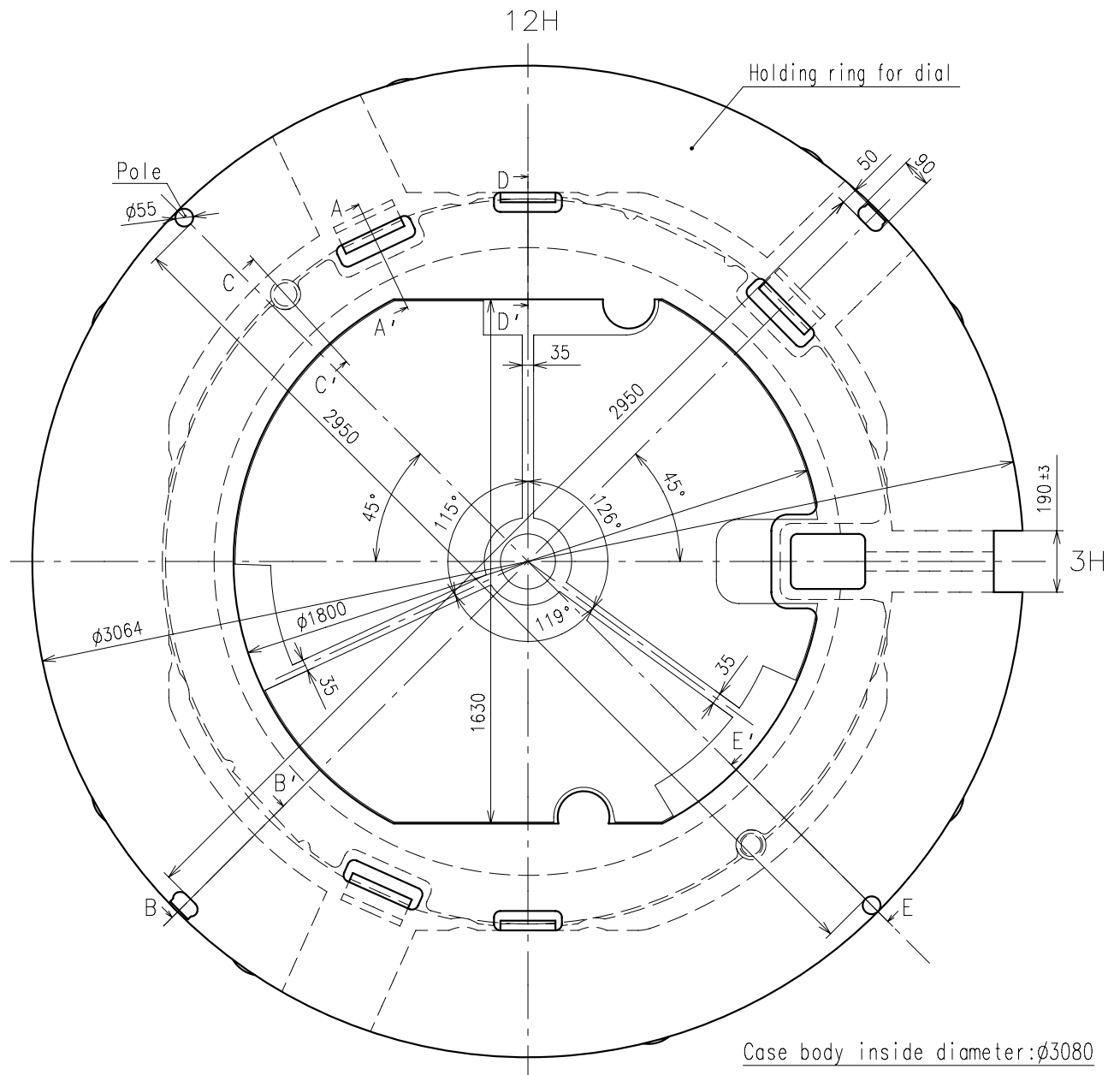
F view



[Attention]

When designing the casing ring, refer to the [Casing] page instruction as to the shape of movement (Pole of A & B).





1. How to remove the setting stem

When removing the setting stem, put the setting stem at normal position and push the "setting lever" by tweezers. (Refer to the Fig.[0].)

The "setting lever" can not be push if the setting stem is not at normal position.

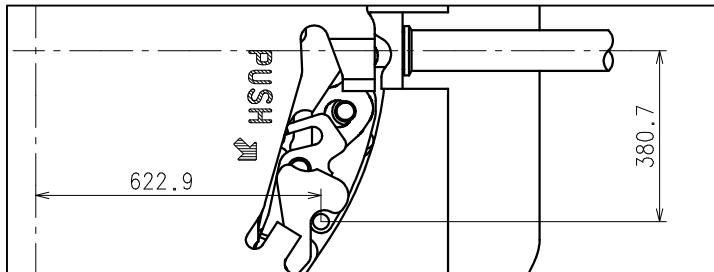


Fig.[0]

2. Attention for solar cell unit

Pay attention not to touch and scratch the surface of the solar cell.

3. Dial transparency rate

Keep the transparency rate of the dial more than 40%.

(Effective aperture is ϕ 19mm)

Each elements of solar cell must be kept the transparency rate.

4. The guideline of charging time is as in below

(Dial transparency rate = 40%)

Illumination (Lx)	Source of light	Environment	A (Approx. Hours)	B (Approx. Hours)	C (Approx. Minutes)
700	A fluorescent lamp	Inside the office	—	45	132
3,000		30W 20cm	60	4	33
10,000	Sun light	Cloudy	20	1.5	11
100,000		Fine weather	5	15 minutes	2.5

Condition A : Time required for full charge

Condition B : Time required for steady operation

Condition C : Time to charge 1 day of power

5. 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.

6. Attention for the secondary battery unit

Please set the exclusive secondary battery unit.

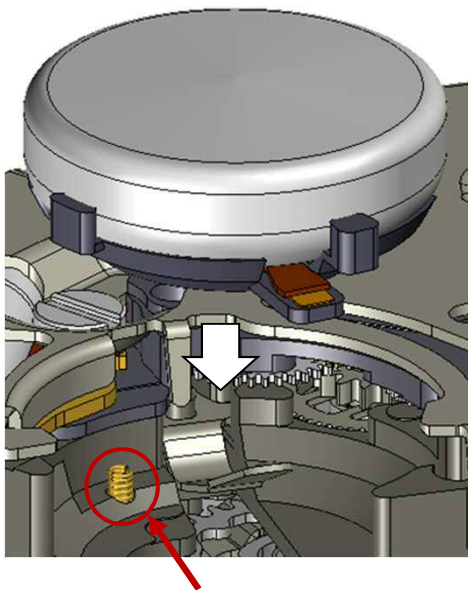
(The secondary battery is Titanium-lithium-ion battery without any environmentally harmful substances.)

If the silver oxide battery is accidentally set and charged, there is a possibility of battery explosion.

To prevent from the battery explosion, it is adopted safety structure not to charge the silver oxide battery even if it is accidentally set.

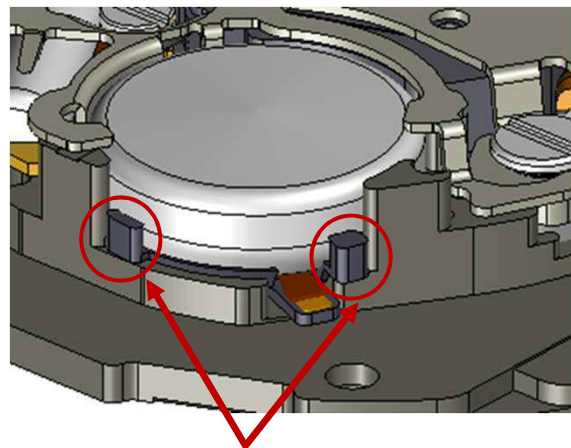
When the secondary battery is assembled, please match the phase in accordance with illustration and push the battery vertical direction. (Refer to the Fig.[1], [2] in below.)

Please pay attention not to bend the solar cell lead terminal.



Solar cell lead terminal

Fig.[1]



Setting position

Fig.[2]

When the secondary battery is disassembled, please broaden the spring of circuit block cover toward the (⇒) direction and remove the battery in accordance with illustration. (Refer to the Fig.[3] in below.)

Please refrain from touching the diode element on the back side of the secondary battery.

(Refer to the Fig.[4] in below.)

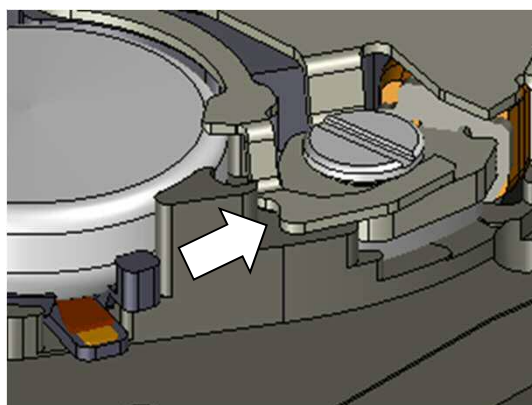


Fig.[3]

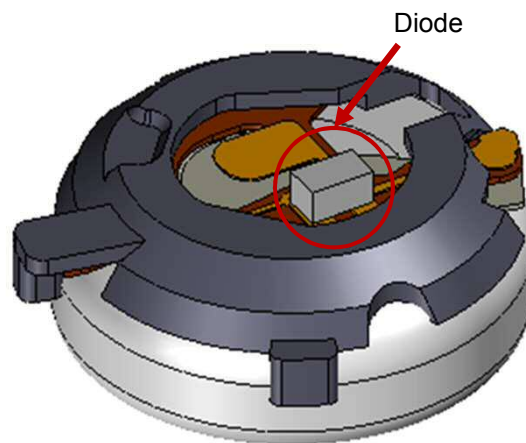
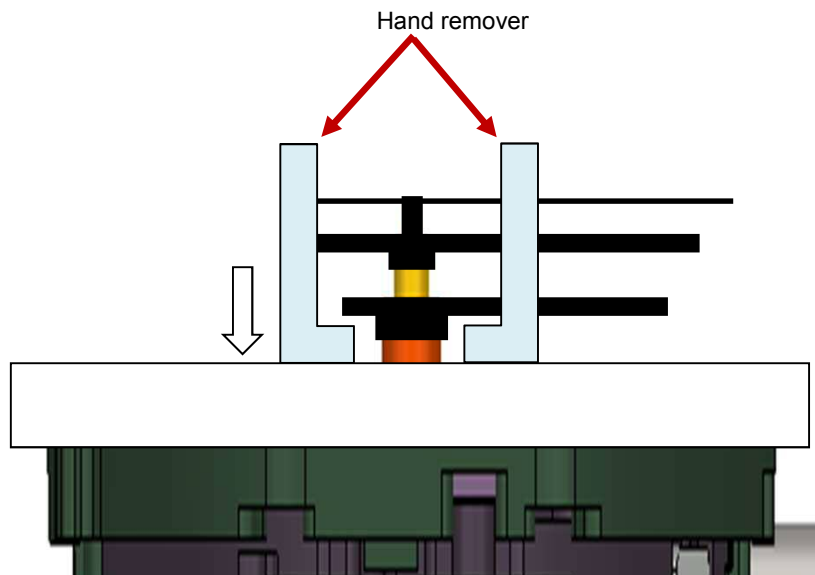


Fig.[4]

7.Attention for hands disassemble

When the hand is disassembled, please be sure to hold the dial.

If the hand is disassembled without holding the dial, it may have a possibility to break the movement.

**8. How to set the dial**

The dial is held by the four guide poles on the solar cell unit.

