EPSON

Watch Movement Specification and Drawing

SOLAR SERIES

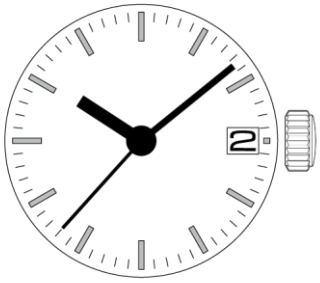
Cal. VS22B

Movement Size

7 3/4”’

Casing Diameter

Ø 18.1mm



Height

2.76mm

Running Time

Approx. 6 months

Date: 4/Aug./'23

Cal. VS22B

Cal. VS22B	Features	Date : 4/Aug./'23
		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 25%

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 6 months.

5. Power depletion warning function

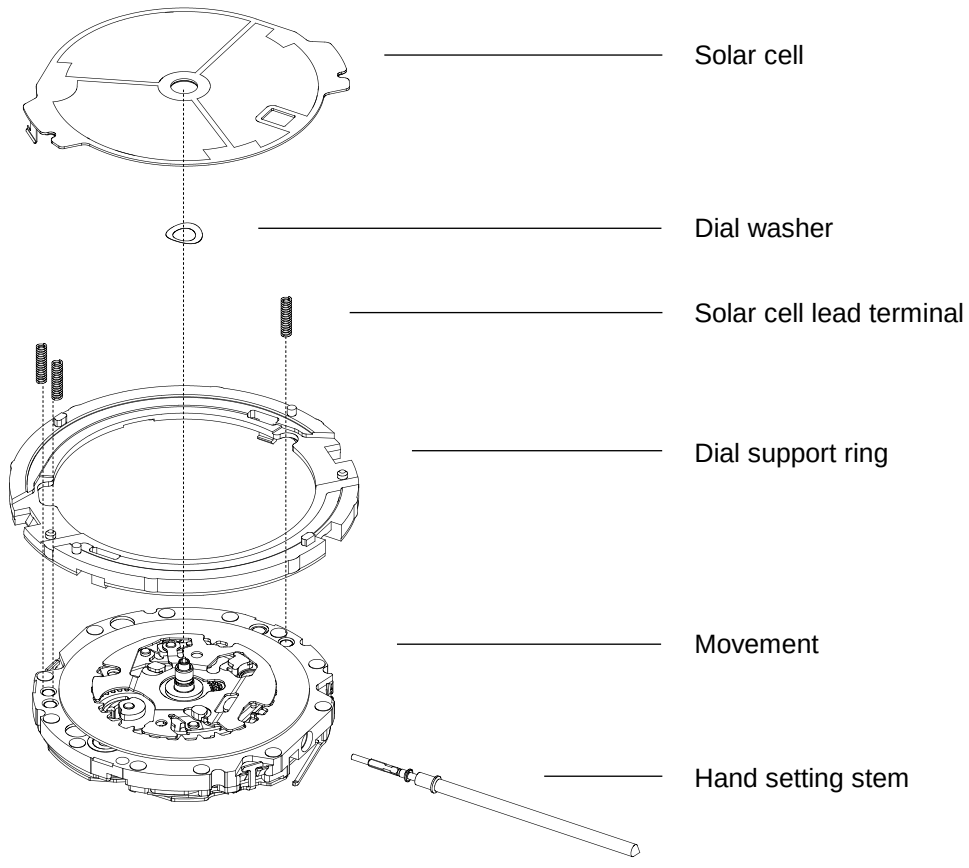
The two-second intervals movement of the second hand is a signal of energy depletion.

The watch continuous running time after two-second intervals movement is approximately 1 day.

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.

7. Structure of the separated parts



Cal. VS22B	Specifications	Date : 21/May/'21
		Rev. : 02

Solar Quartz 7 3/4''' Movement / Three hands(H/M/S) with Calendar

1. MOVEMENT DIMENSIONS

Outside diameter	ϕ18.50mm × 17.50mm(3-9H) ×18.36(12-6H)
Casing diameter	ϕ18.10mm
Total height	2.63mm (Including secondary battery : 2.76mm)

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	
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)		
Running time	Approx. 6 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. 0.56μA (1.35V)	
Operation stopping voltage	1.0 V	
Solar cell type	Amorphous silicon solar cell	
Maximum unbalance of hands	Second hand	: 0.03μN･m
	Minute hand	: 0.80μN･m
	Hour hand	: 0.50μN･m

5. SECONDARY BATTERY (Installed)

Type	Lithium metal batteries
Size	ϕ6.8mm × t 2.15mm
Nominal voltage	1.5 V
Capacity	2.5 mAh

6. SEPARATED PARTS (Parts code)

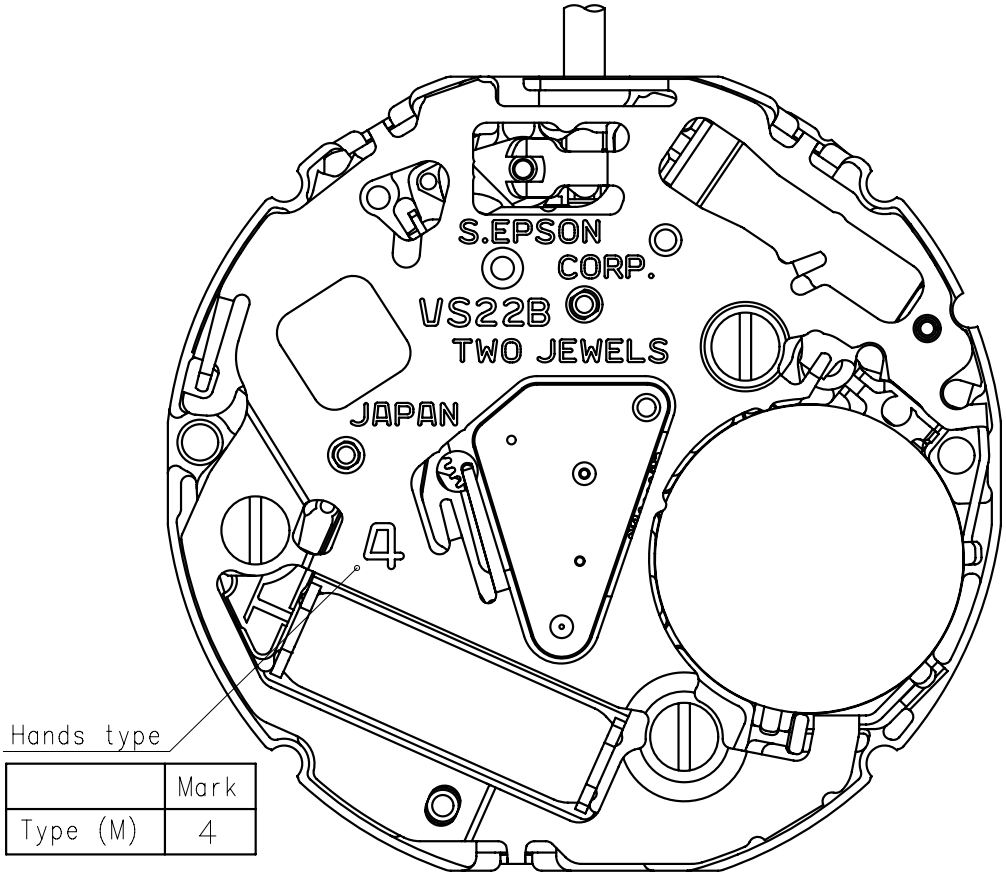
Solar cell	4025562
Dial support ring	0866878 or 0866898 or 0866883 or 0866922 or 0866925 or 0866888 or 0866892 or 0866882
Hand setting stem	0351177
Solar cell lead terminal (3 pcs)	4246529
Dial washer	0491735

7. TEST OF ACCURACY

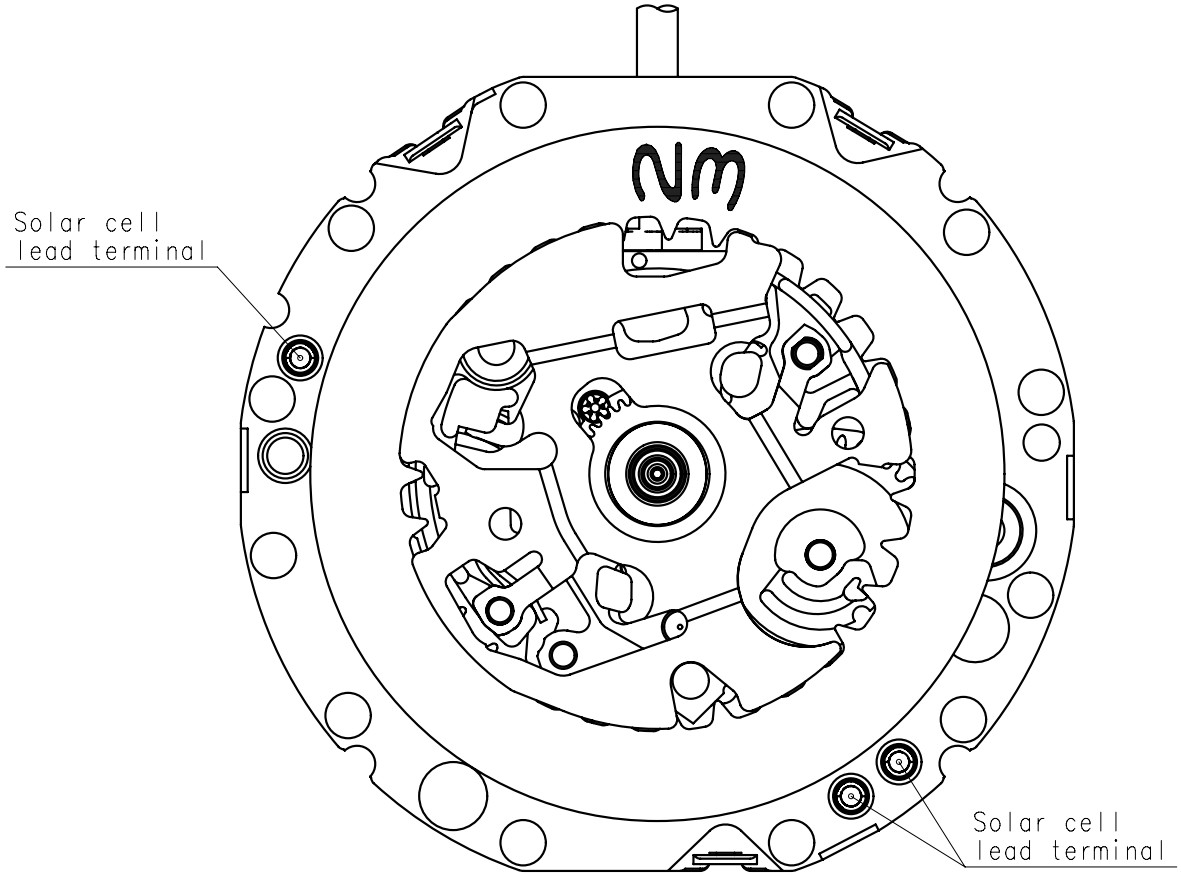
Equipment to be used	SEIKO quartz tester QT-99, Greiner quartz timer-C , Witschi Q-tester 4000
Duration of measurement	10 seconds
Microphone to be used	Electromagnetic detection type

All specifications are subject to change without notice.

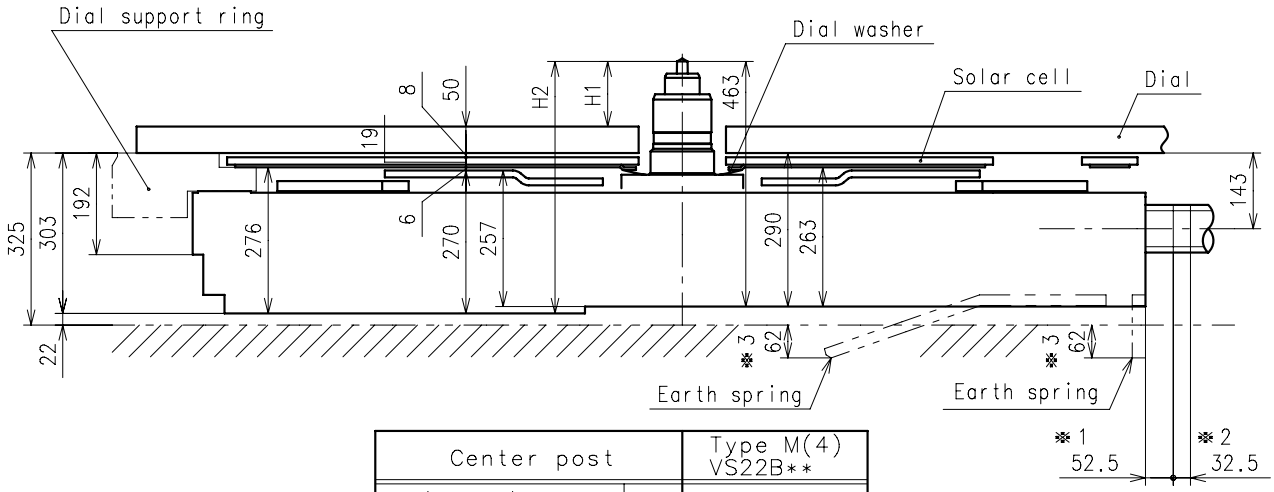
Cal. VS22B	Appearance	Date:26/Apr./'19
		Rev.:00



	Mark
Type (M)	4

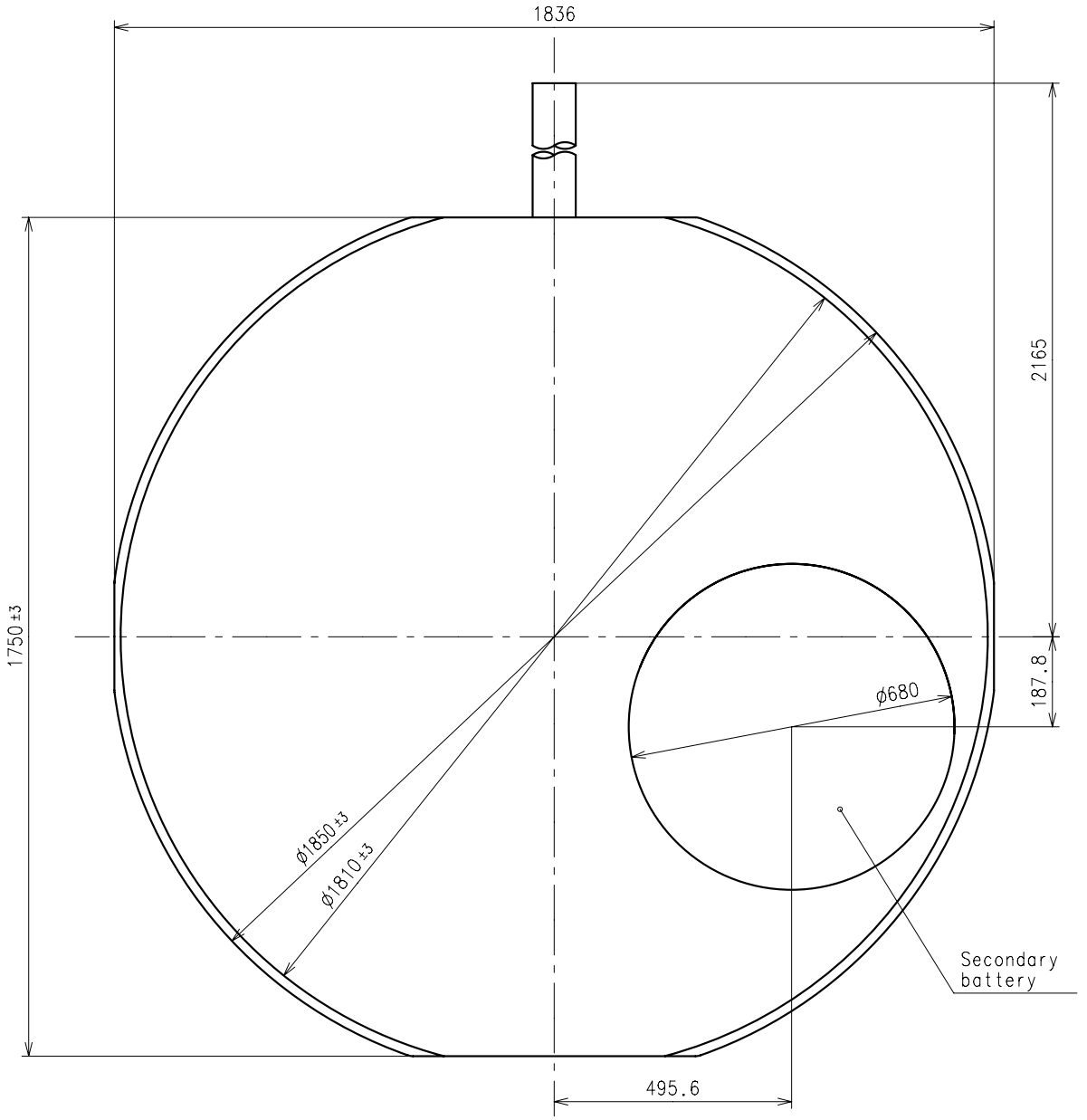


Cal. VS22B	Casing	Date:26/Apr./'19
		Rev.:00



Center post		Type M(4) VS22B**
Maximum height from dial	H1	123
Total height including movement	H2	476

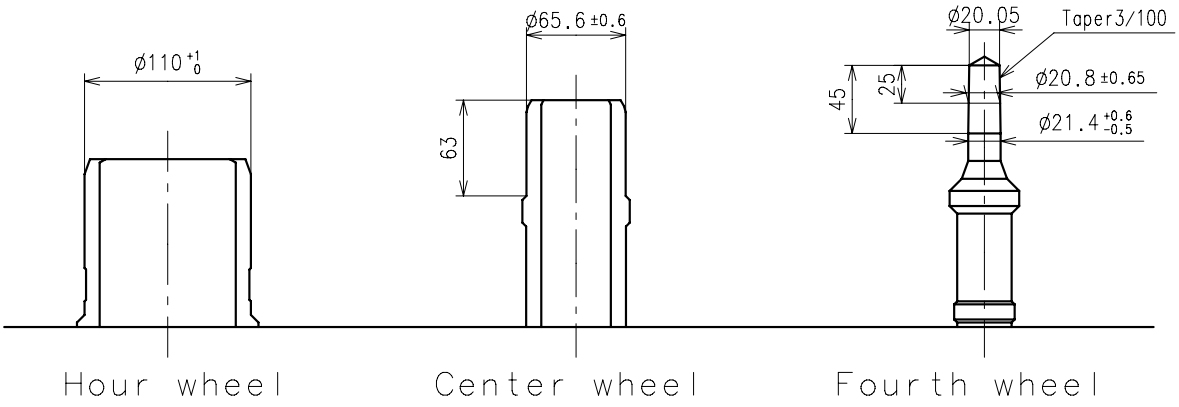
※1:First pullout stroke
※2:Second pullout stroke
※3:The earth spring is absolutely placed in contact with the case back



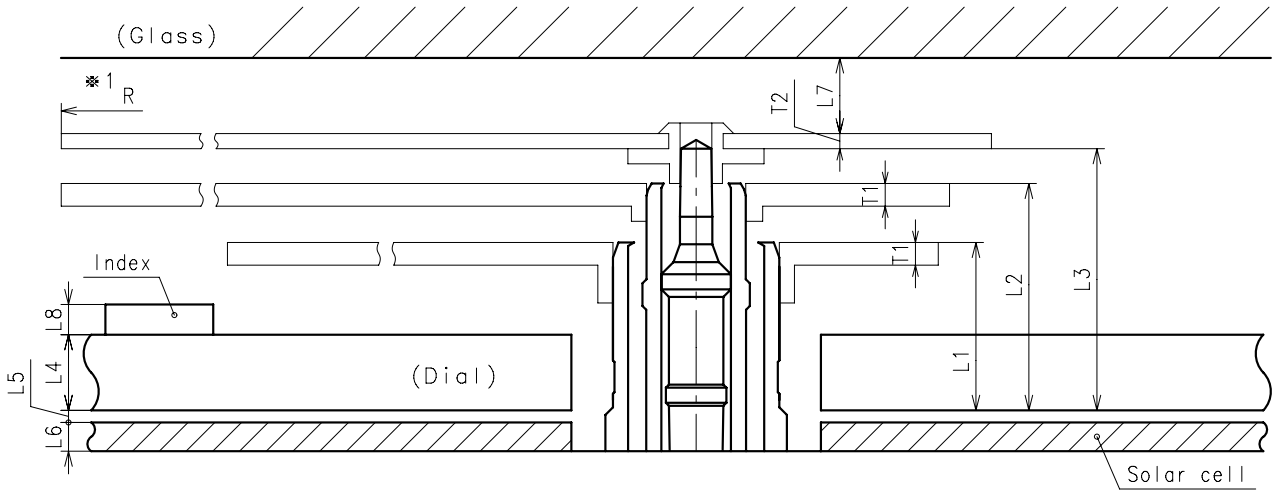
Unit : 1=1/100mm

Cal. VS22B	Hand fitting	Date:26/Apr./'19
		Rev.:00

※Hour hand unbalance ≦ 0.5μ N・m (50μ g・m)
※Minute hand unbalance ≦ 0.8μ N・m (80μ g・m)
※Second hand unbalabce ≦ 0.03μ N・m (3μ g・m)



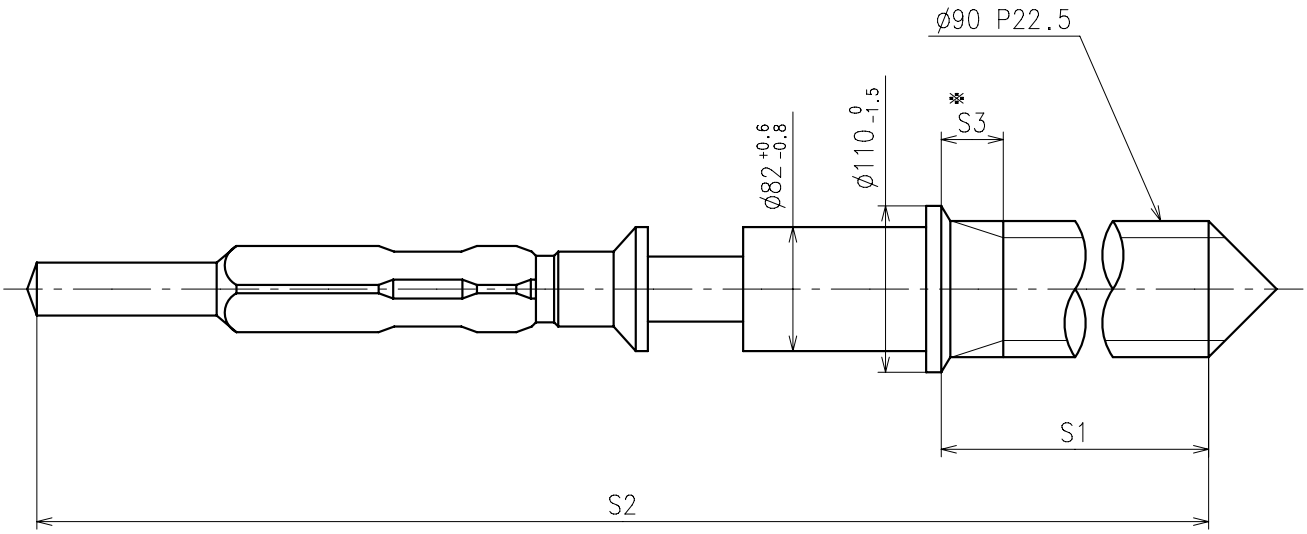
	Parts No.		
	Hour wheel	Center wheel	Fourth wheel
Type M (4) VS22B**	0271647	0221607	0241173



	L1	L2	L3	L4	L5	L6	L7	L8	T1	T2	※1 R
Type M (4) VS22B**	111	150	173	50	8	19	MIN: 40	MAX: 60	15	10	MAX: 1200

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

Cal. VS22B	Hand setting stem	Date:26/Apr./'19
		Rev.:00



※ Not threaded

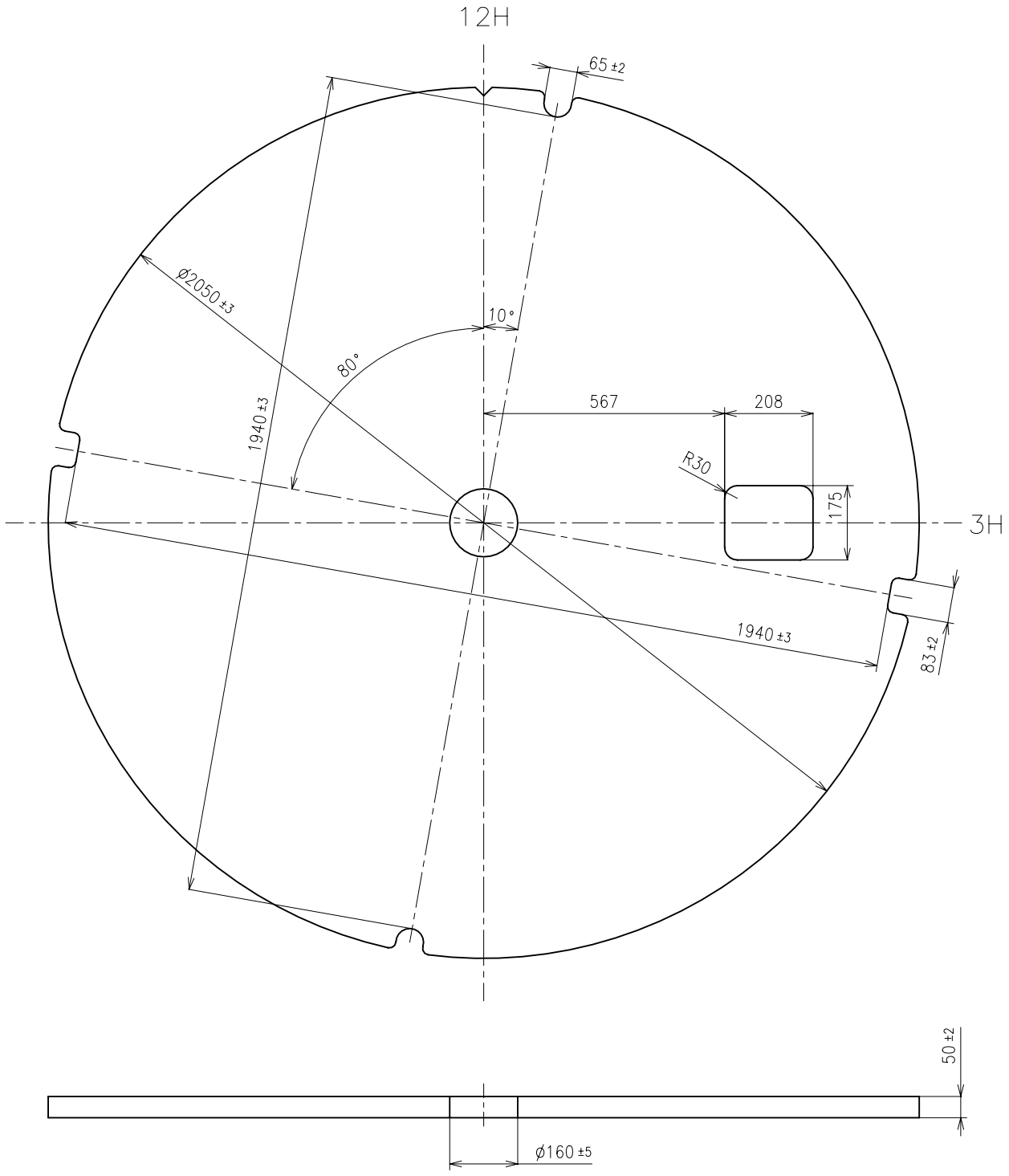
	Part No.	S1	S2	※ S3
Standard	0351177	1366	1964	60

Material : Steel

Hardness : Vickers 600±50

Unit : 1=1/100mm

Cal. VS22B	Dial-01	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

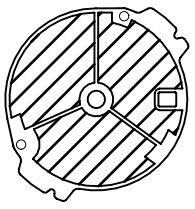
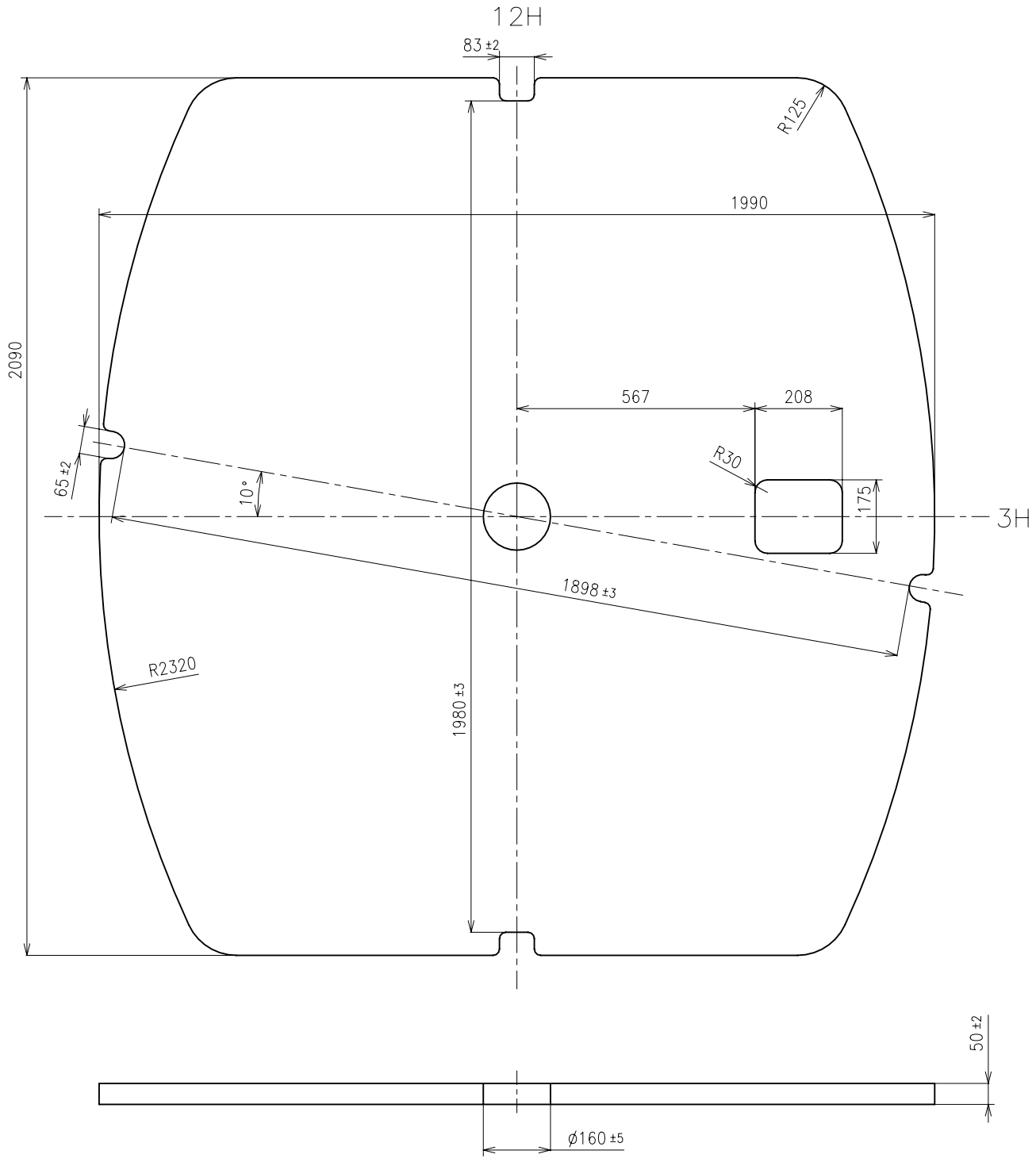


Fig.[1] elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-02	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

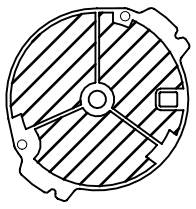
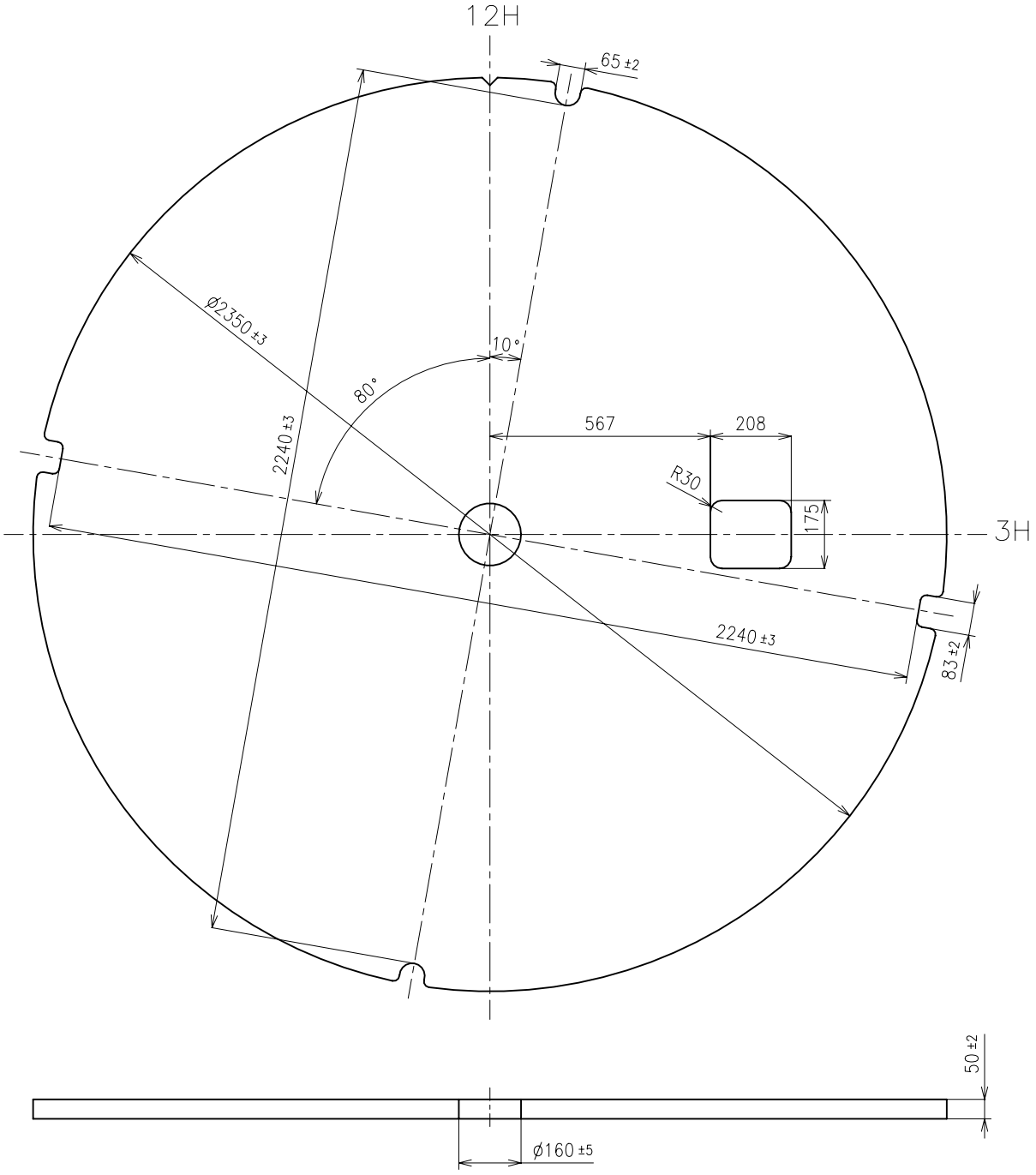


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-03	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

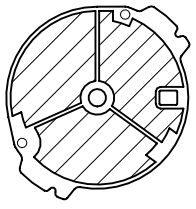
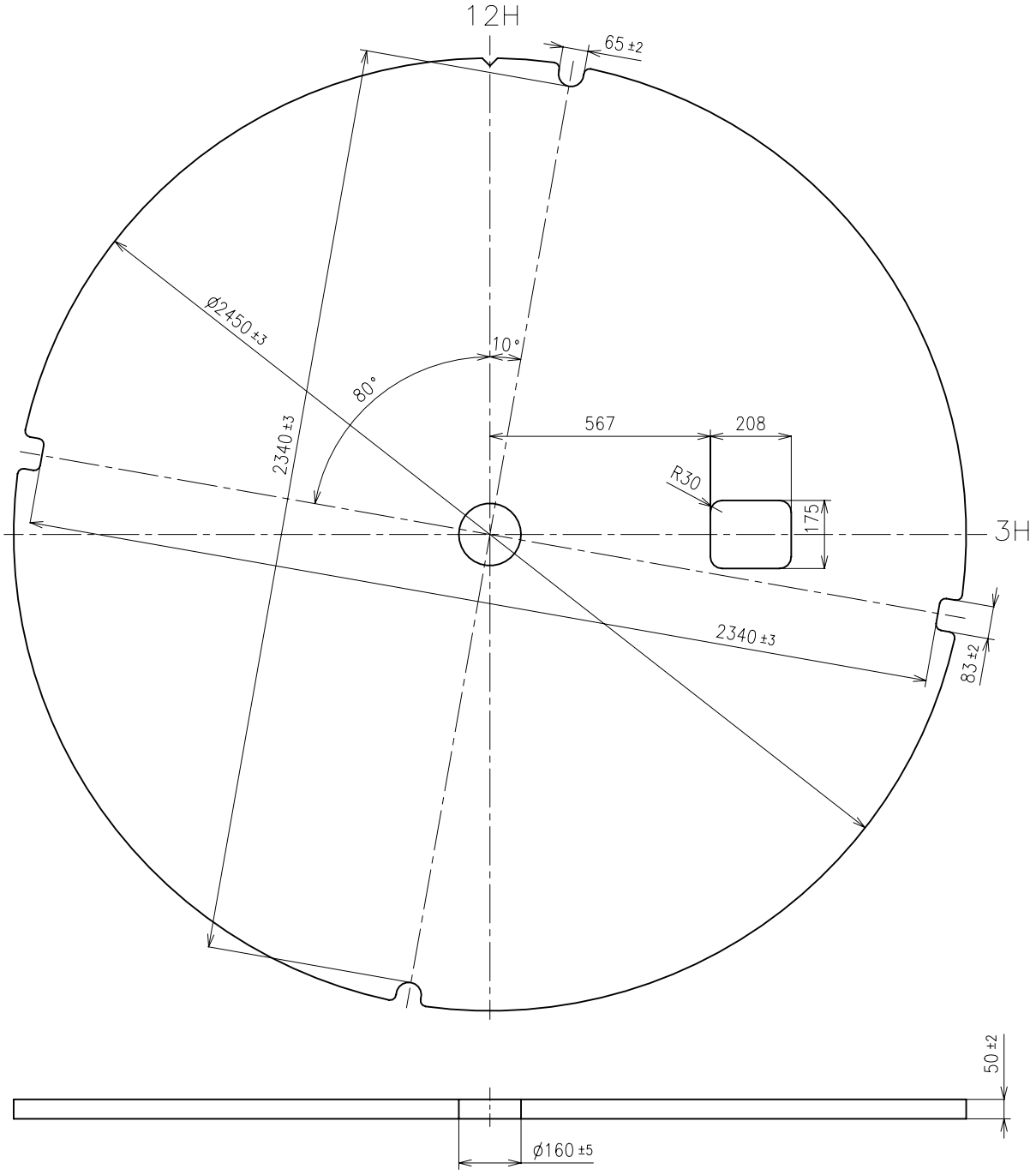


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-04	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

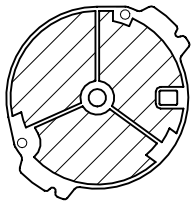
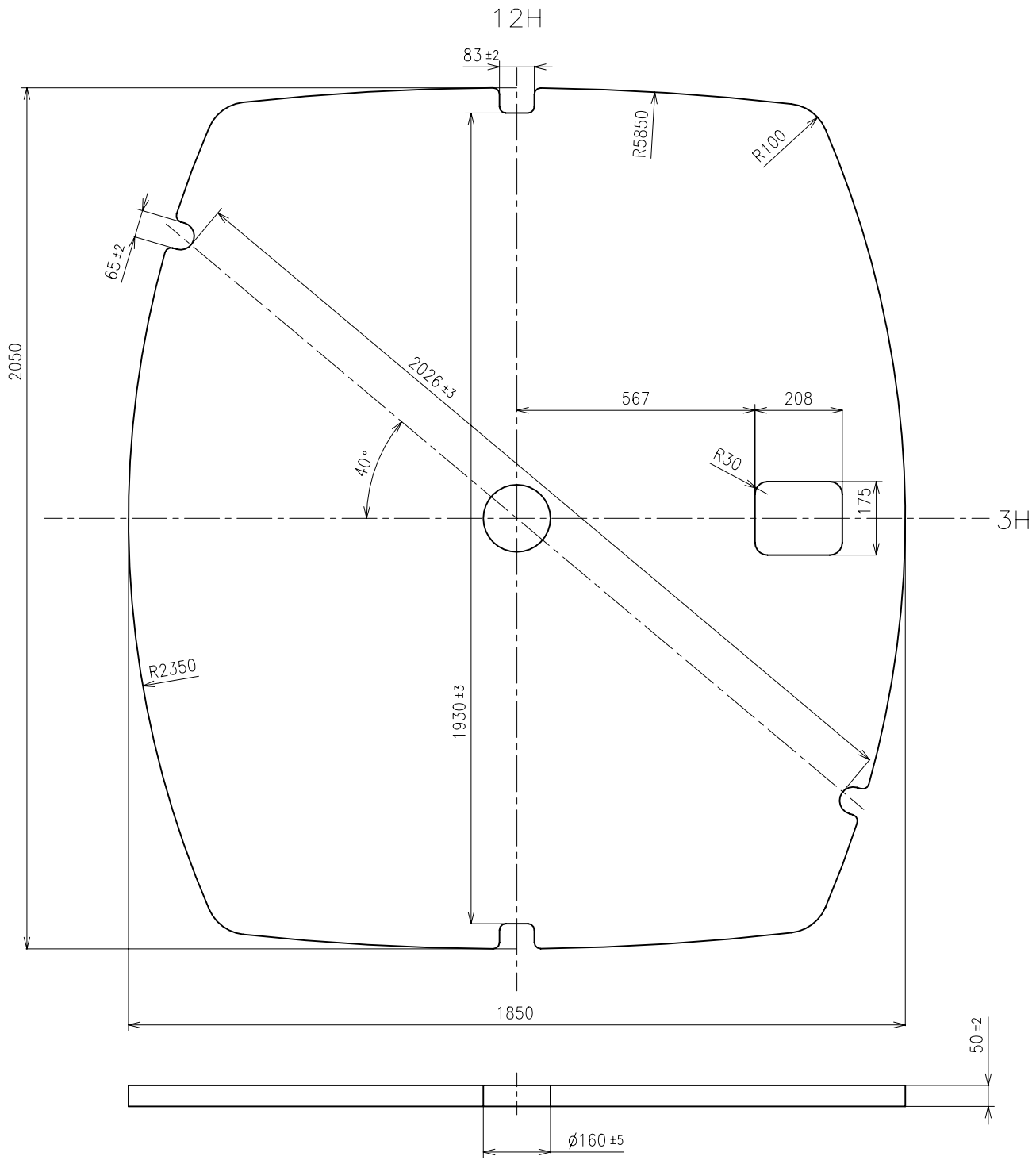


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-05	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

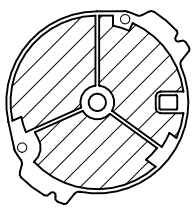
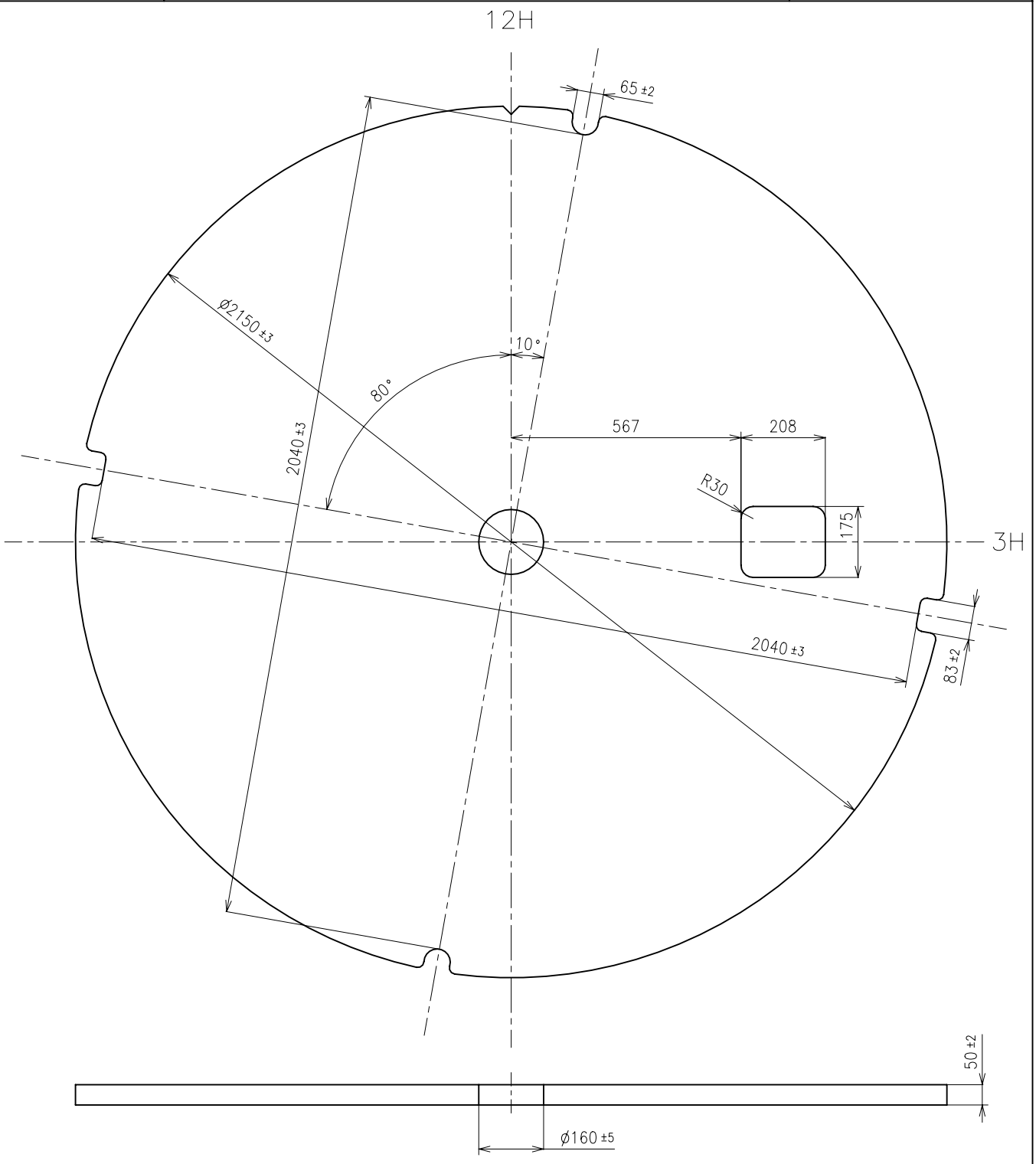


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-06	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

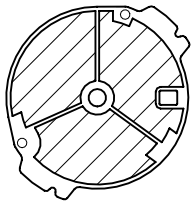
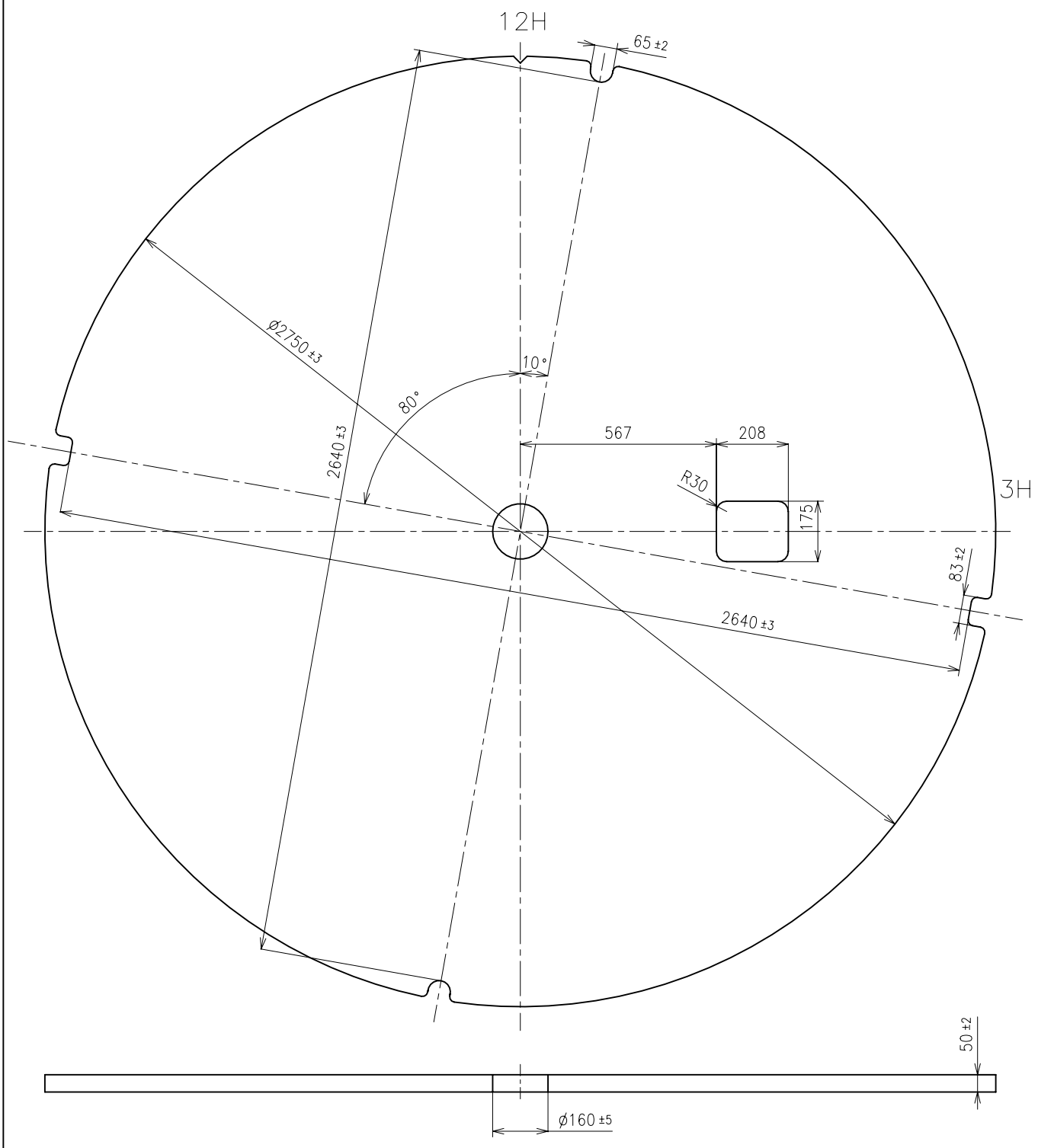


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-07	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

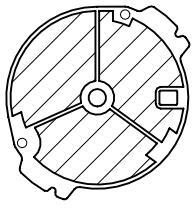
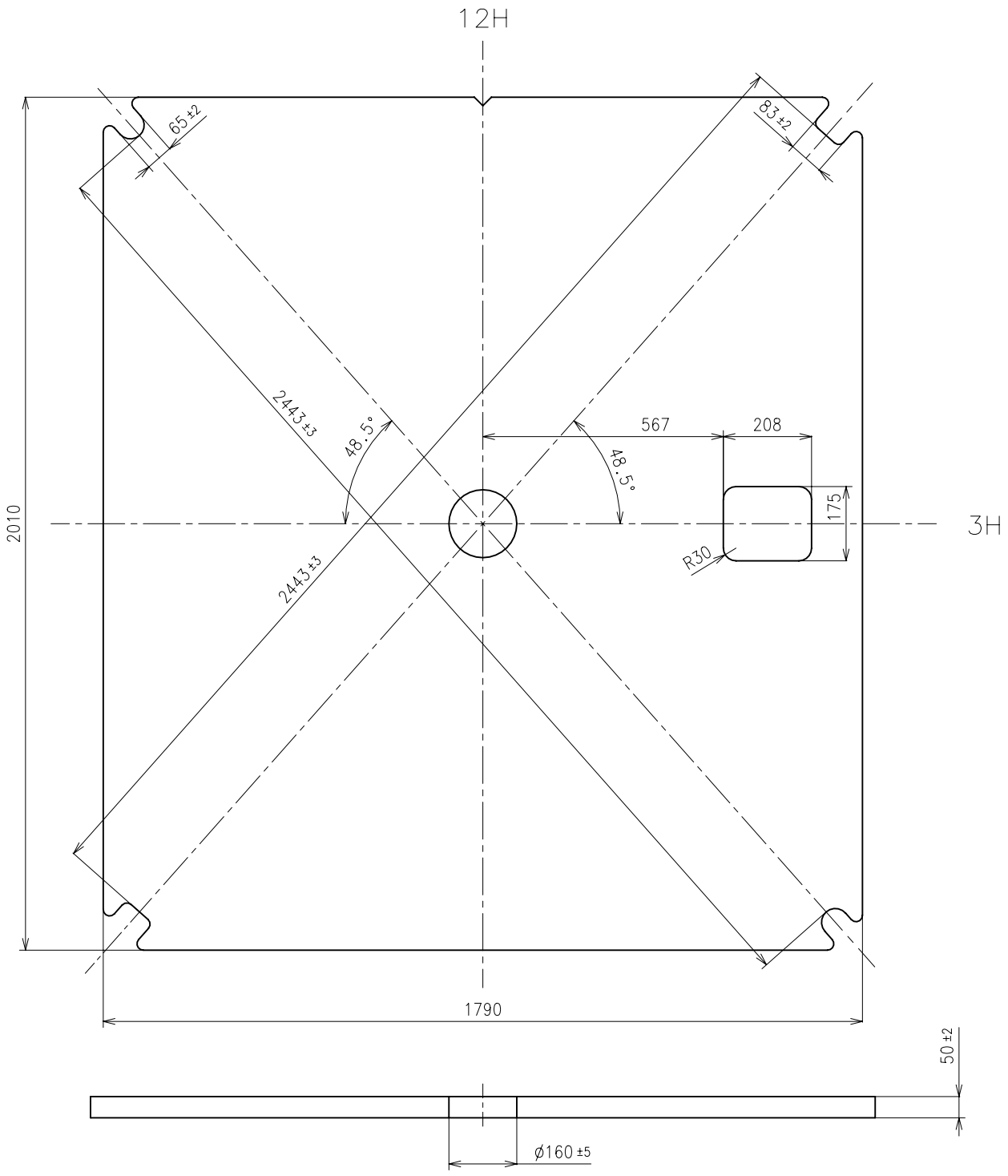


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

Cal. VS22B	Dial-08	Date: 4/Aug./'23
		Rev.:01



[Attention]
Each elements of solar cell must be kept the transparency rate of the dial more than 25%.
Refer to the Fig.[1] or [Solar cell unit] page instruction as to the shape of solar cell.

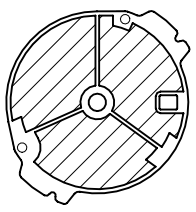
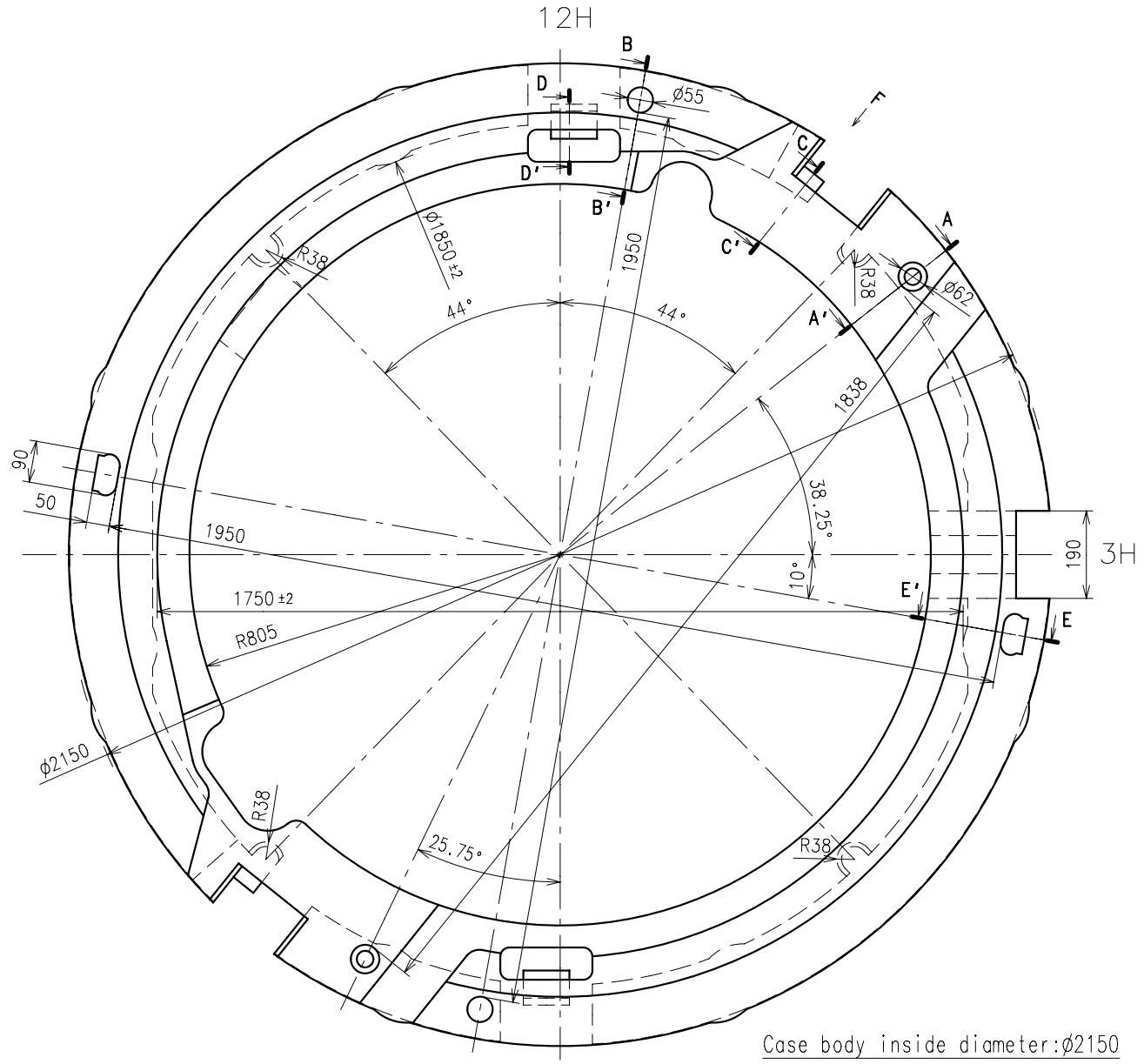


Fig.[1] ▨ elements of solar cell

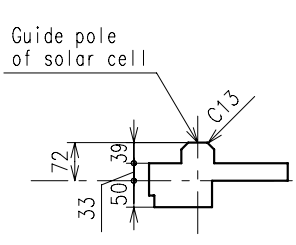
Unit : 1=1/100mm

Cal. VS22B	Dial support ring-01	Date:26/Apr./'19
		Rev.:00

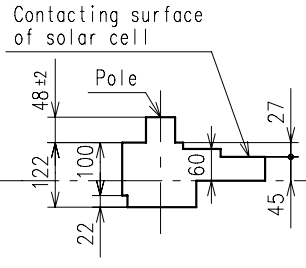


Case body inside diameter:ø2150

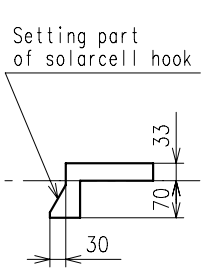
A-A' section



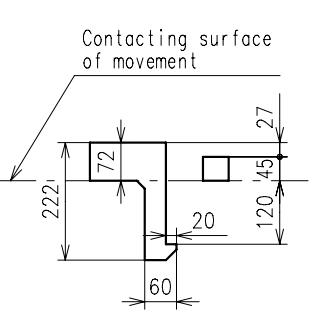
B-B' section



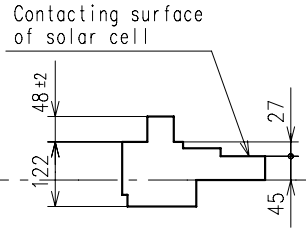
C-C' section



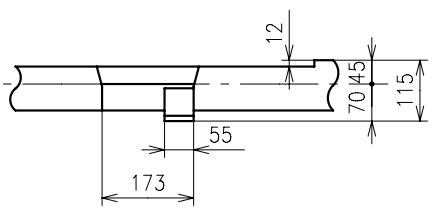
D-D' section



E-E' section

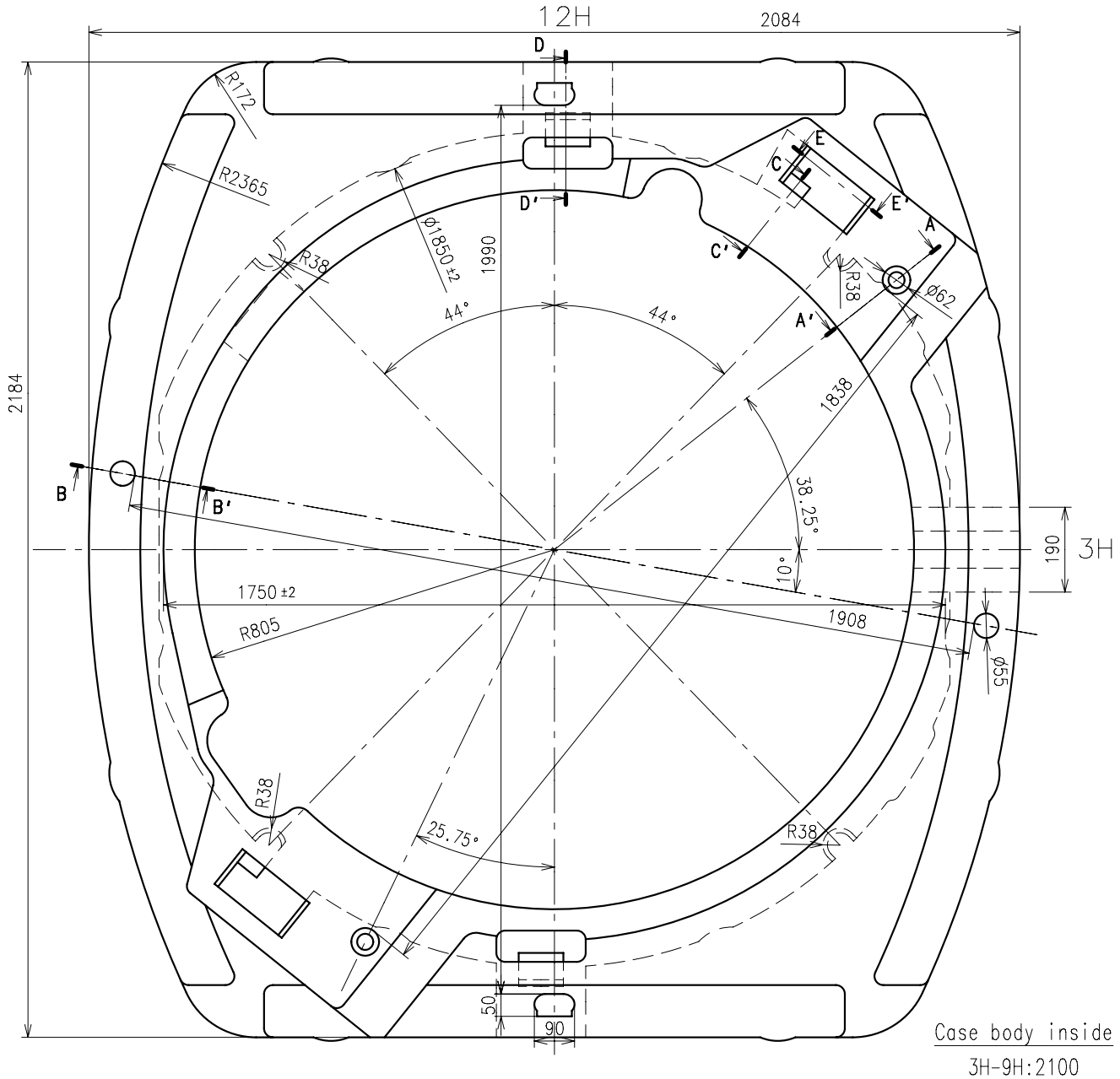


F view



Unit : 1=1/100mm

Cal. VS22B	Dial support ring-02	Date:26/Apr./'19
		Rev.:00

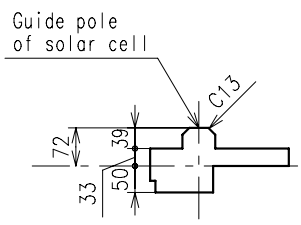


Case body inside

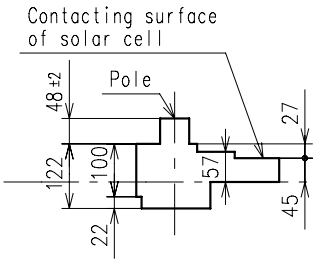
3H-9H:2100

12H-6H:2200

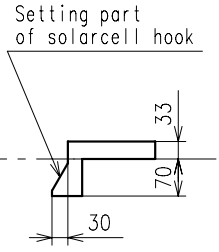
A-A' section

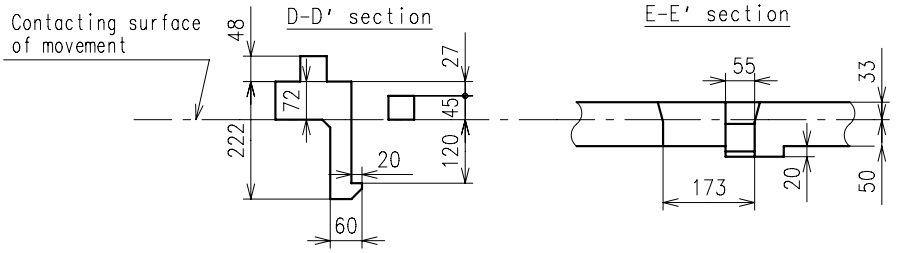


B-B' section



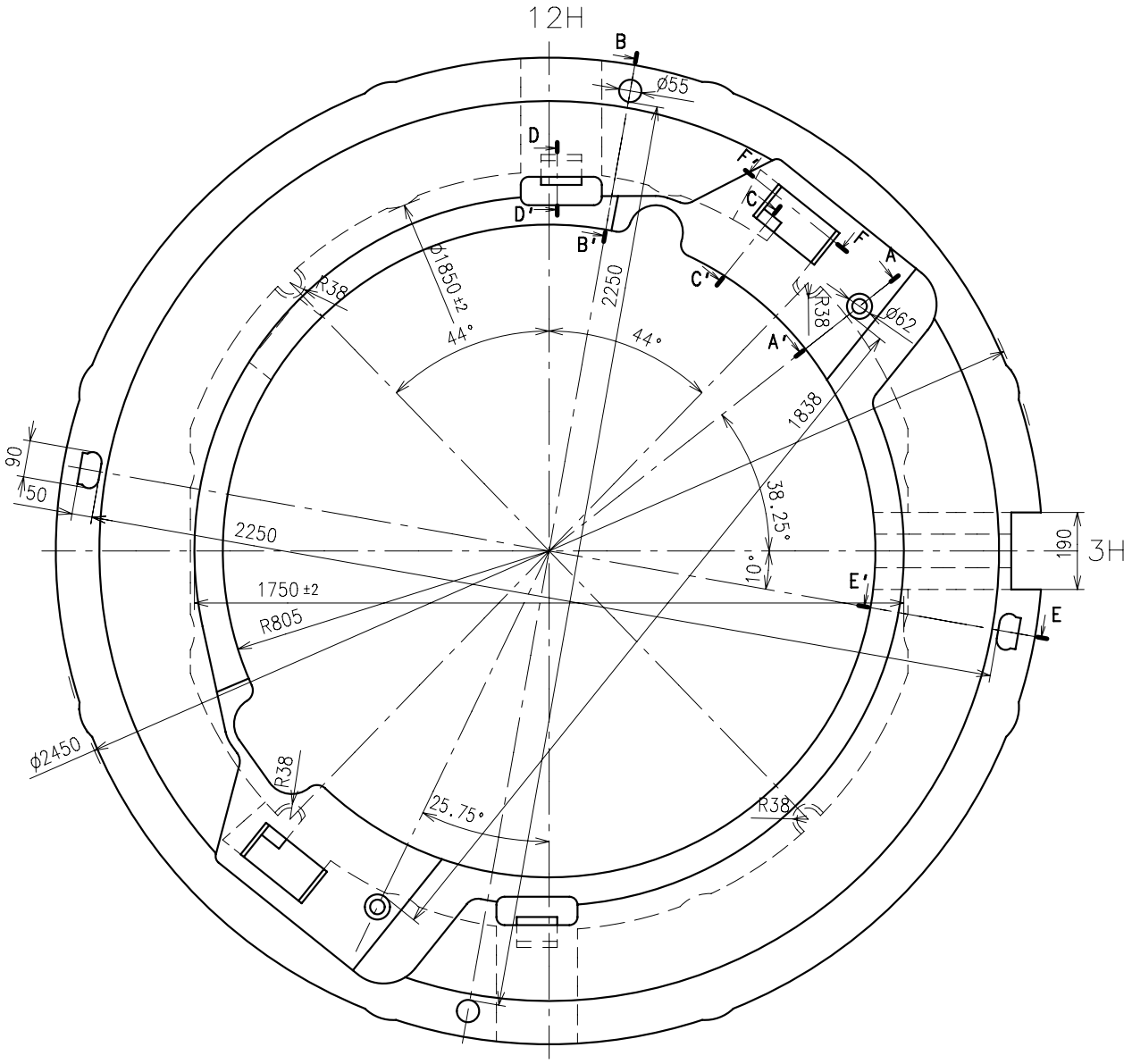
C-C' section





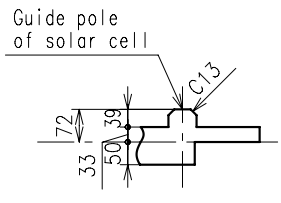
Unit : 1=1/100mm

Cal. VS22B	Dial support ring-03	Date:26/Apr./'19
		Rev.:00

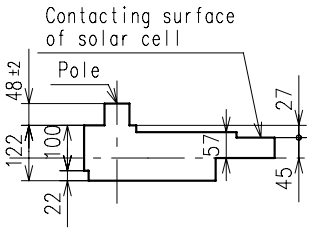


Case body inside diameter:ø2450

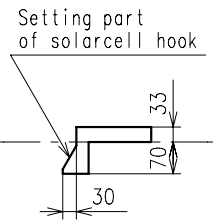
A-A' section



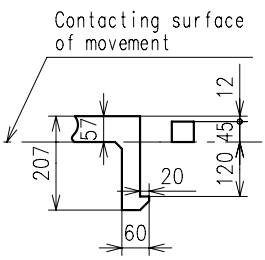
B-B' section



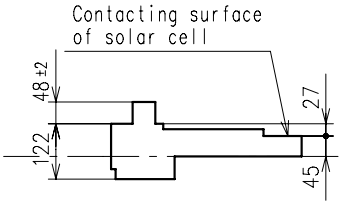
C-C' section



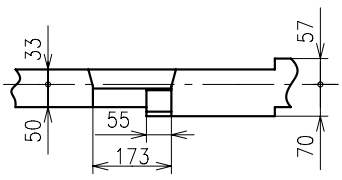
D-D' section



E-E' section

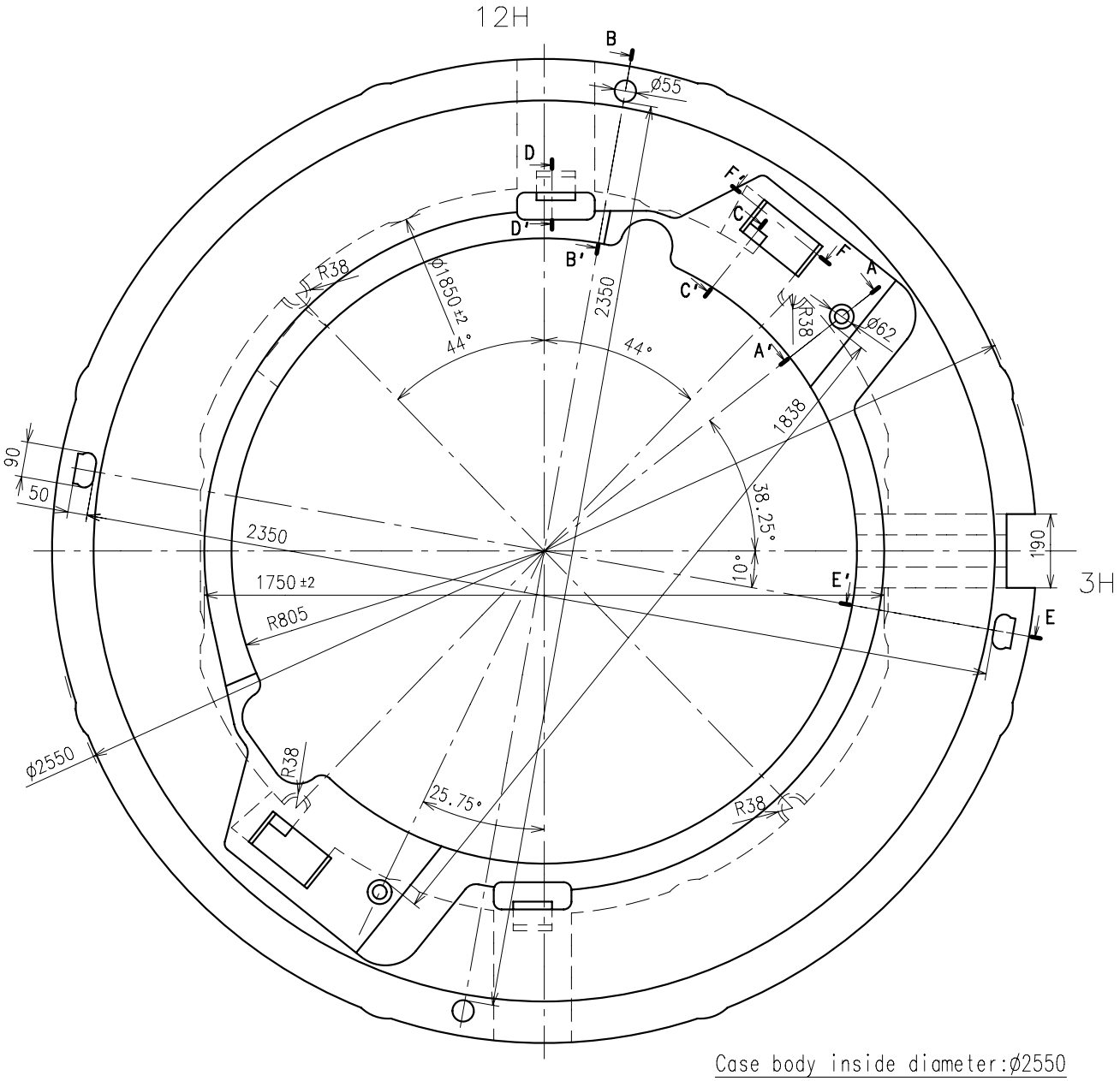


F-F' section

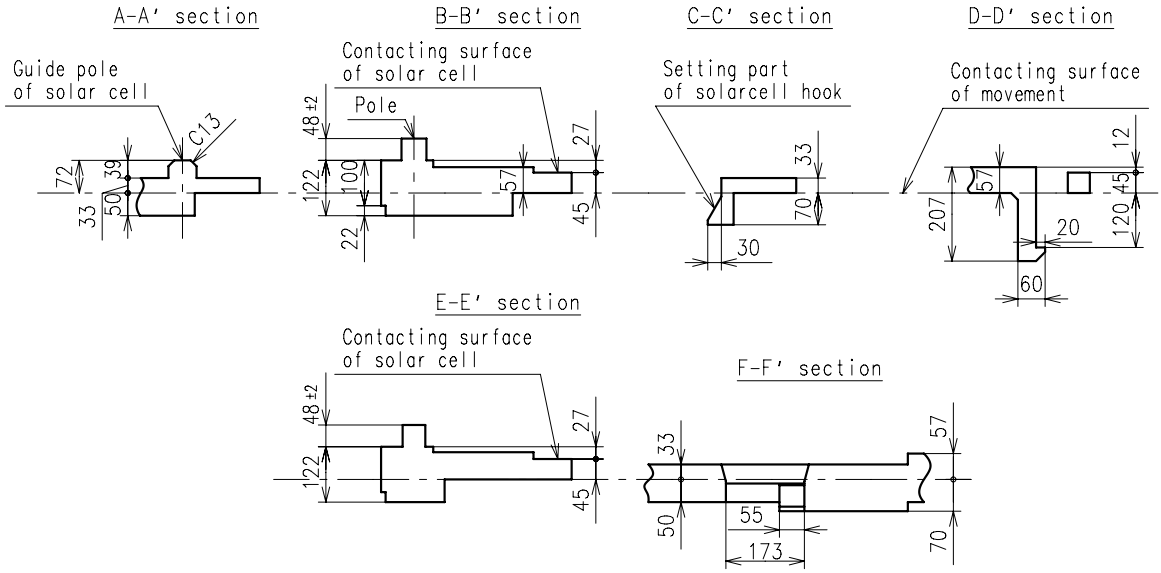


Unit : 1=1/100mm

Cal. VS22B	Dial support ring-04	Date:26/Apr./'19
		Rev.:00

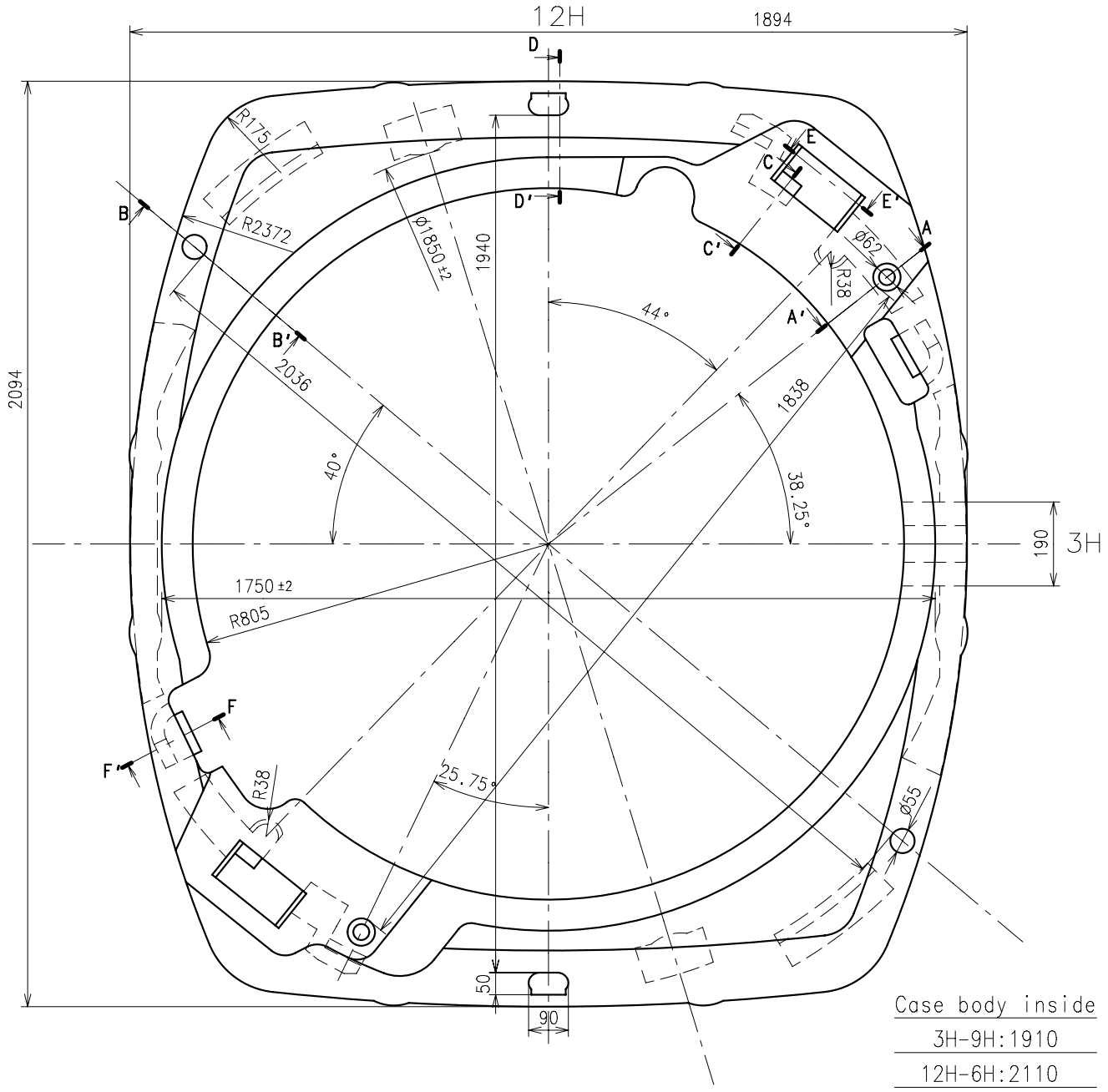


Case body inside diameter:Ø2550



Unit : 1=1/100mm

Cal. VS22B	Dial support ring-05	Date:26/Apr./'19
		Rev.:00

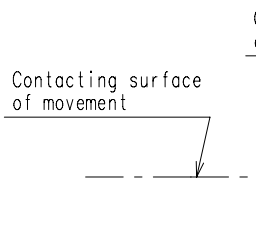


Case body inside

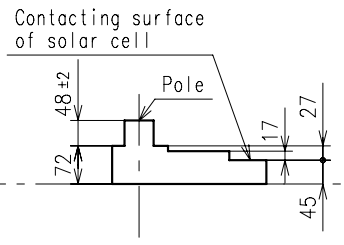
3H-9H:1910

12H-6H:2110

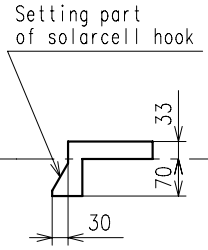
A-A' section

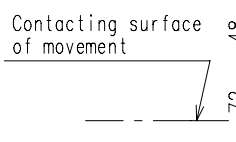


B-B' section

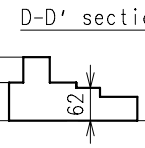


C-C' section

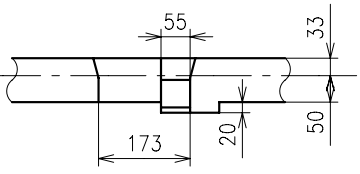




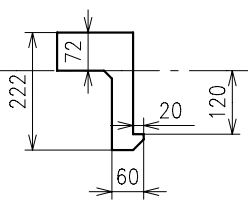
D-D' section



E-E' section

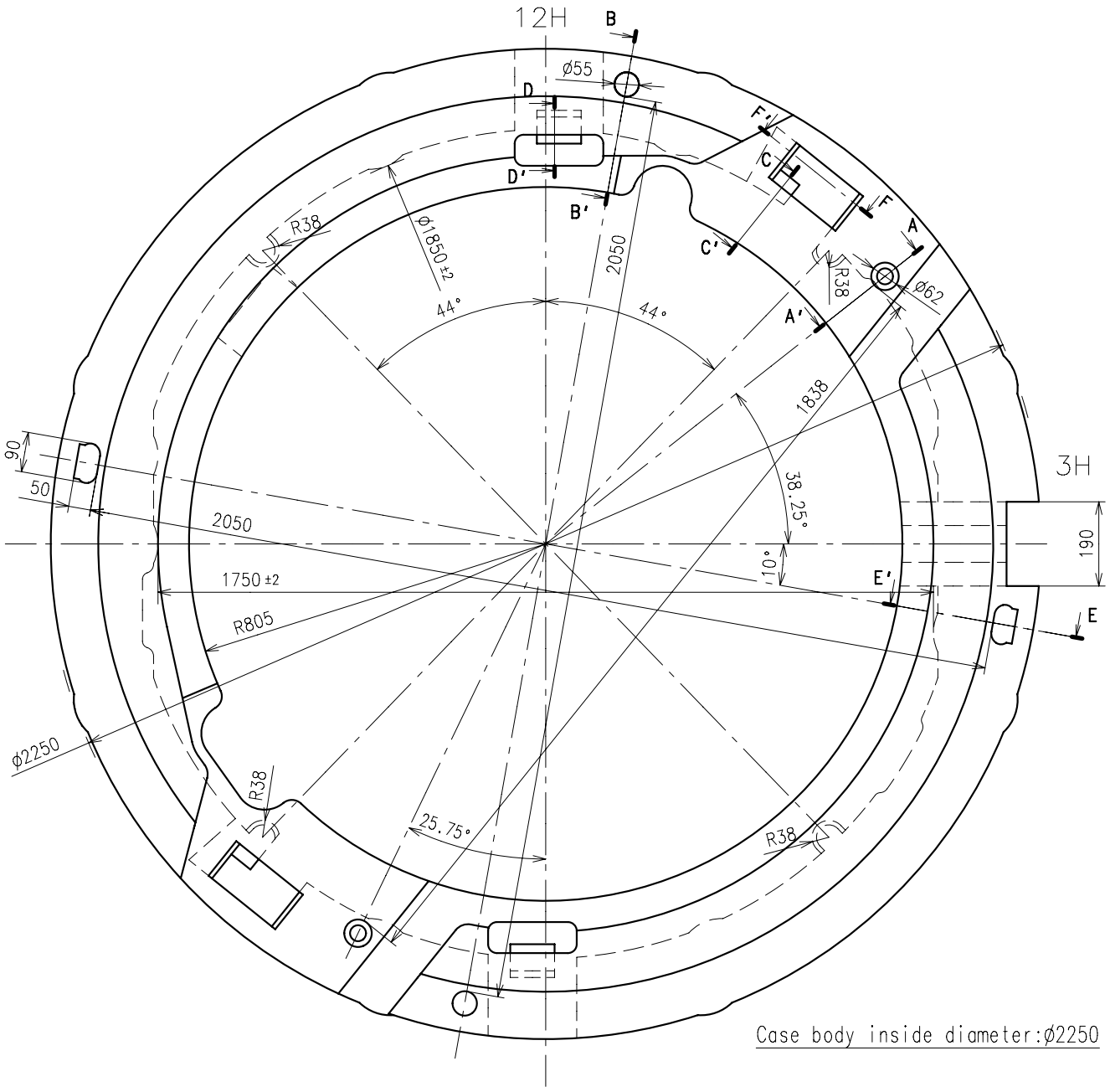


F-F' section

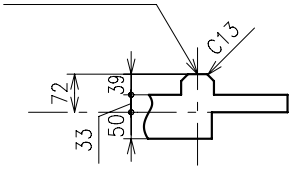


Unit : 1=1/100mm

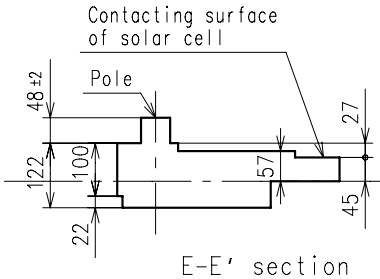
Cal. VS22B	Dial support ring-06	Date:26/Apr./'19
		Rev.:00



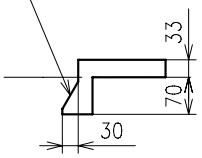
A-A' section



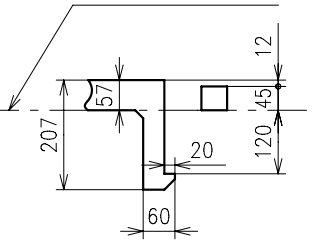
B-B' section



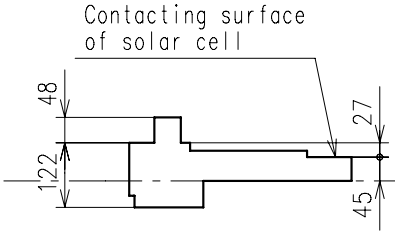
C-C' section



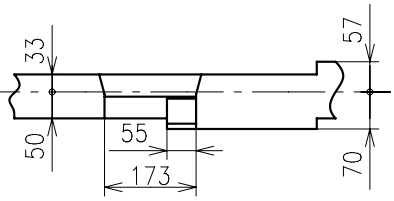
D-D' section



E-E' section

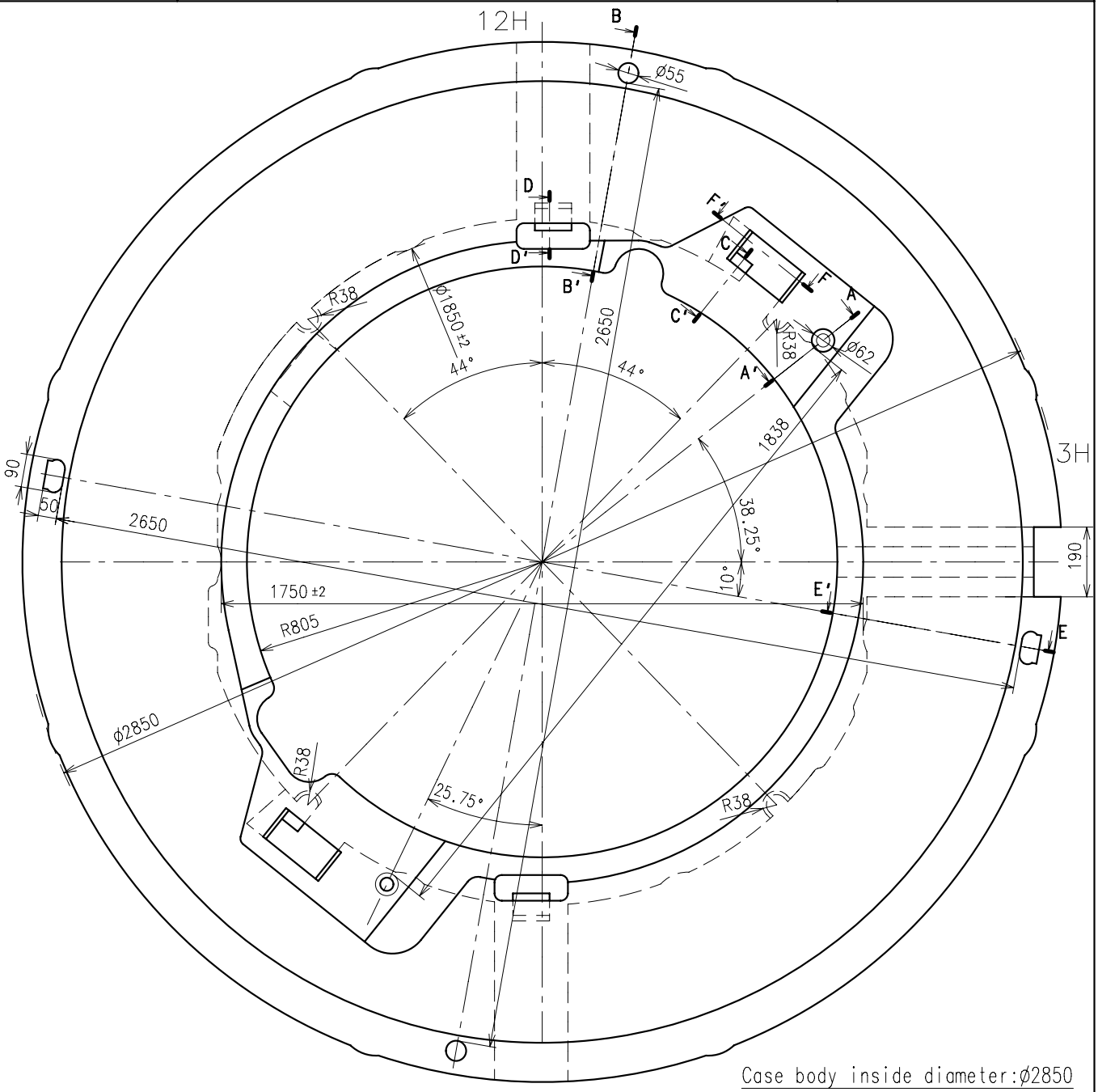


F-F' section



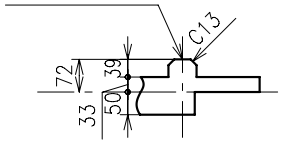
Unit : 1=1/100mm

Cal. VS22B	Dial support ring-07	Date:26/Apr./'19
		Rev.:00

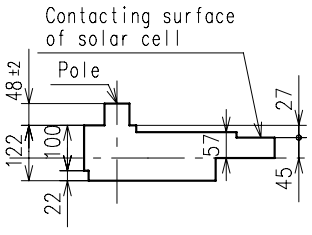


Case body inside diameter:Ø2850

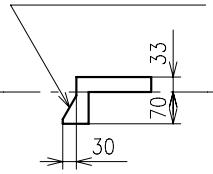
A-A' section



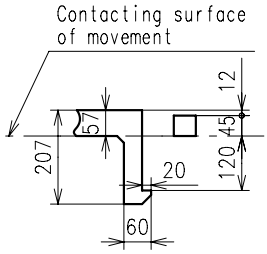
B-B' section



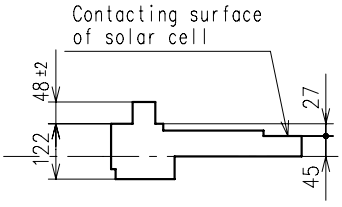
C-C' section



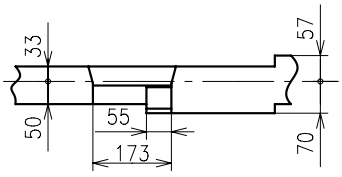
D-D' section



E-E' section

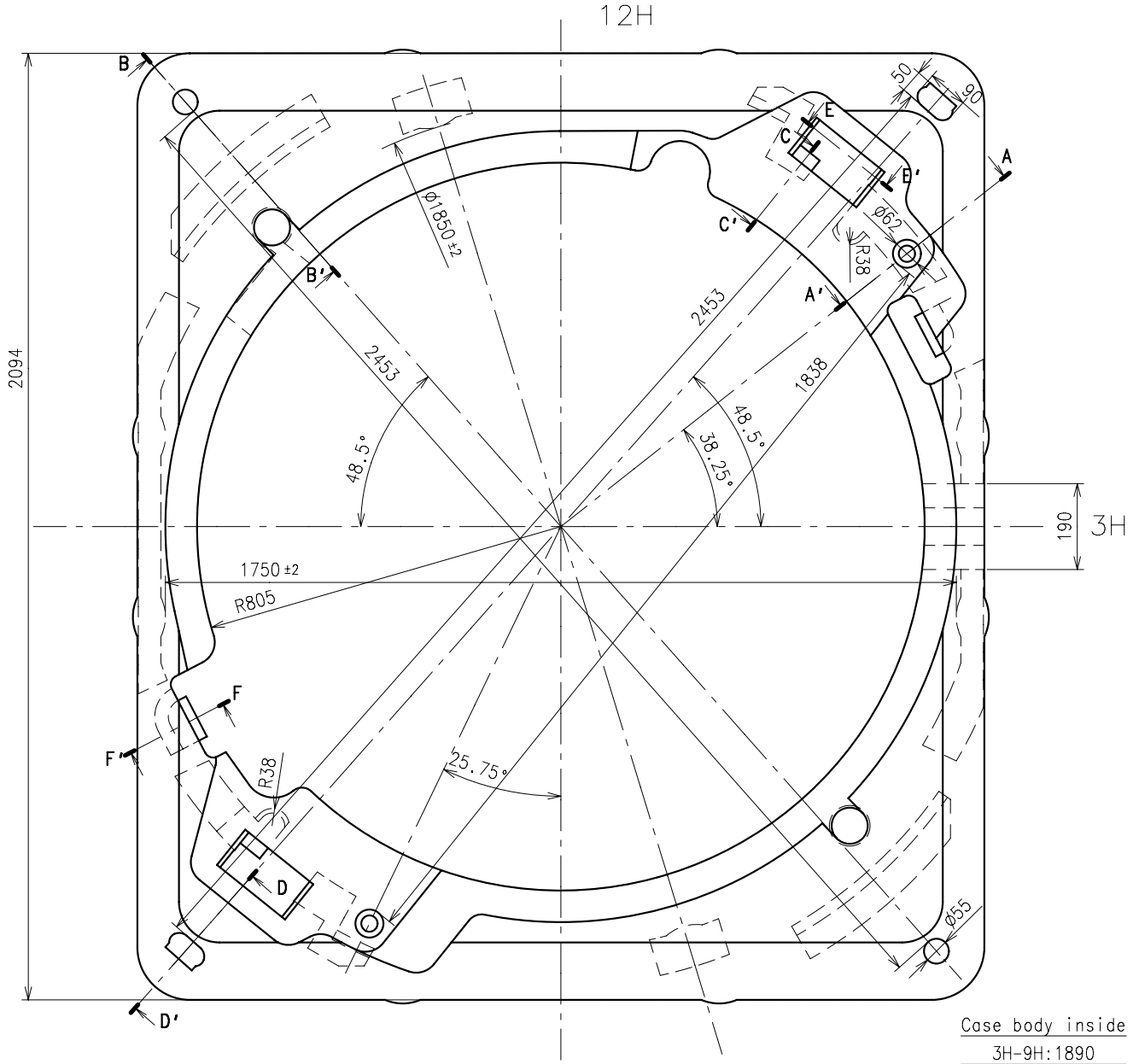


F-F' section



Unit : 1=1/100mm

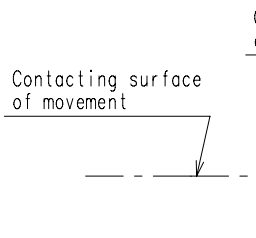
Cal. VS22B	Dial support ring-08	Date:29/Jun./'20
		Rev.:00



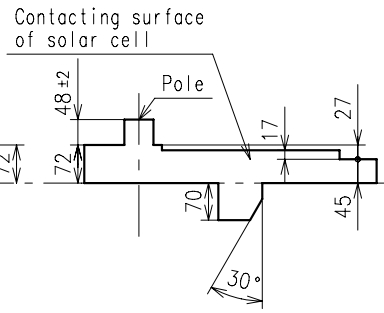
Case body inside

3H-9H:1890
12H-6H:2110

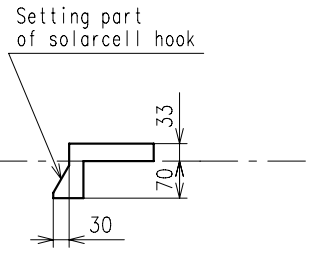
A-A' section

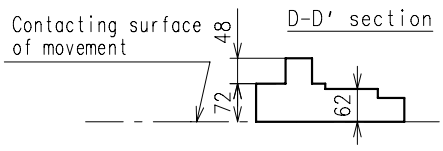


B-B' section



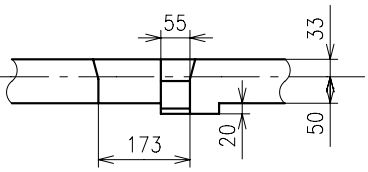
C-C' section



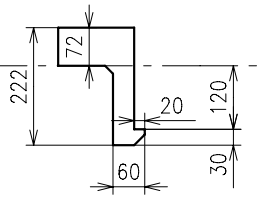


D-D' section

E-E' section

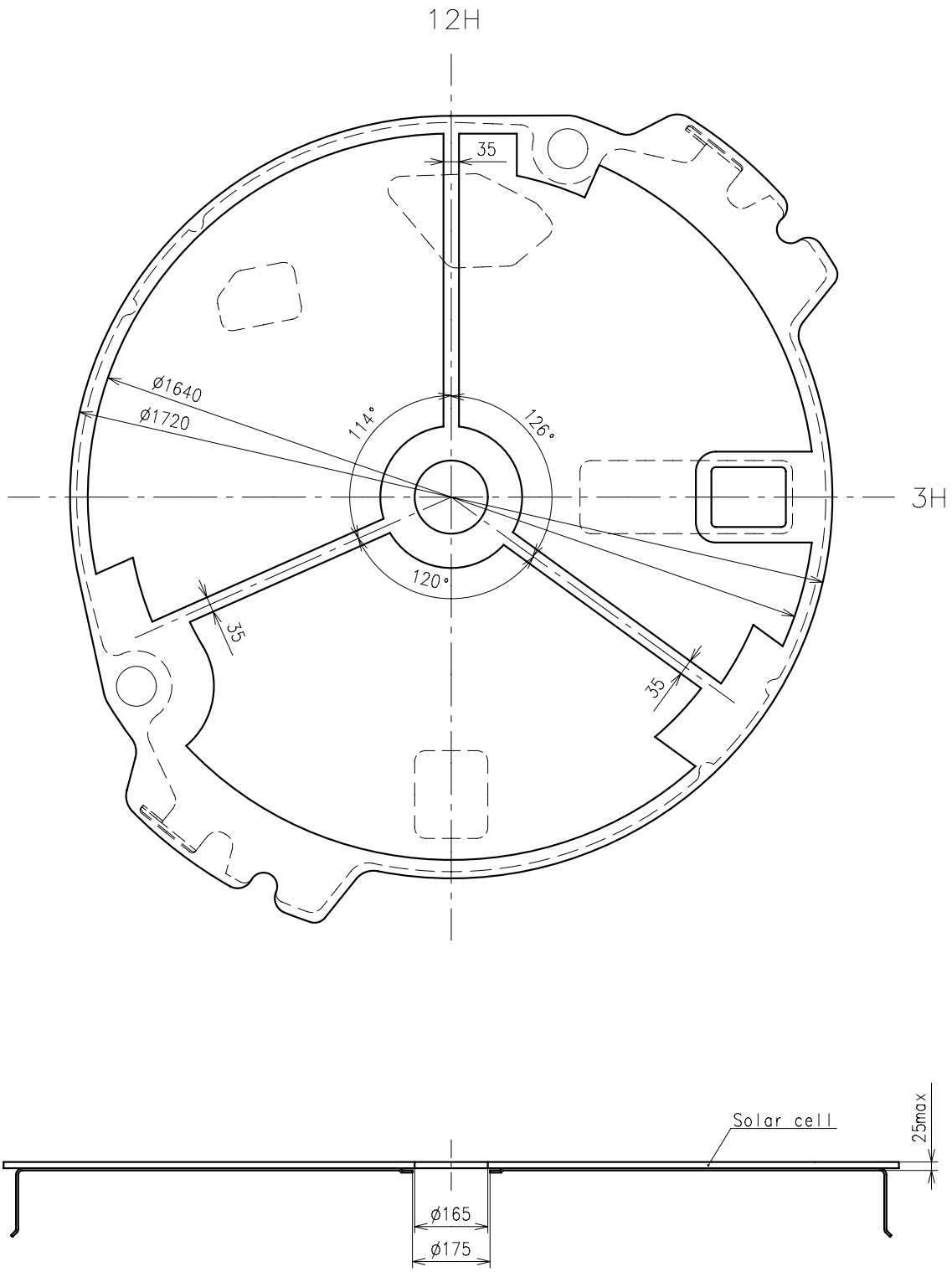


F-F' section



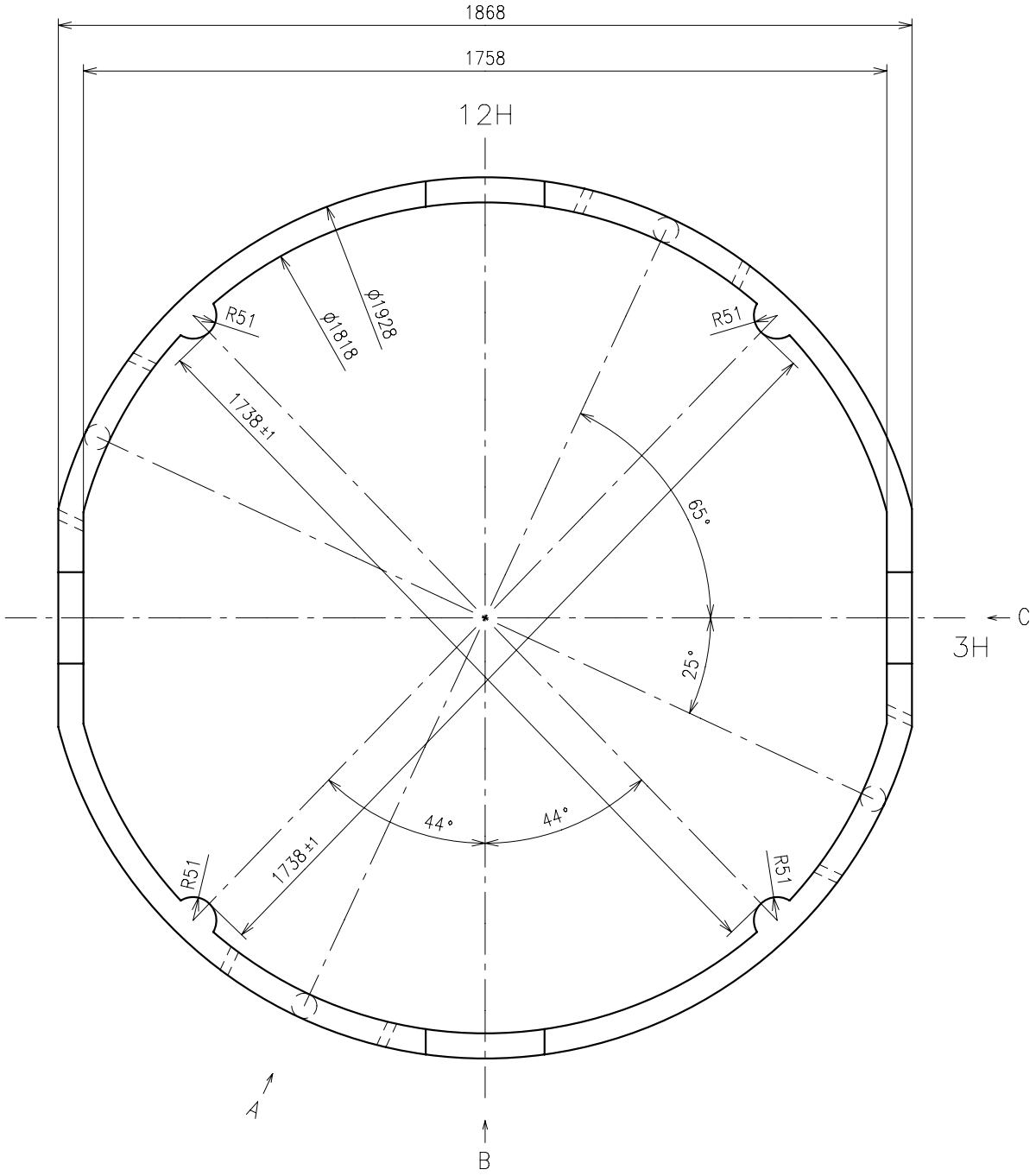
Unit : 1=1/100mm

Cal. VS22B	Solar cell	Date:26/Apr./'19
		Rev.:00

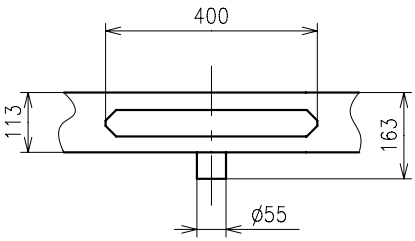


Unit : 1=1/100mm

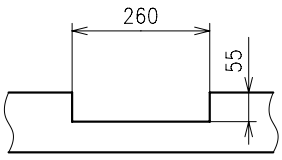
Cal. VS22B	Casing ring	Date:26/Apr./'19
		Rev.:00



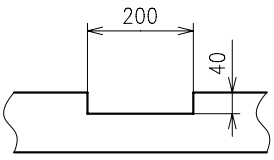
A view



B view



C view



Unit : 1=1/100mm

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.

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

2. Attention for solar cell

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 25%.

(Effective aperture is ϕ17.5mm)

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

4. The guideline of charging time is as in below

			Dial transparency rate = 25%			Dial transparency rate = 30%		
Illumination (Lx)	Source of light	Environment	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	–	30	90	–	25	70
3,000		30W 20cm	75	10	25	60	8	20
10,000	Sun light	Cloudy	25	2.5	7	20	2	6
100,000		Fine weather	8	0.5	2	6	0.4	2

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 Lithium metal batteries 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 disassembled, please use tweezers or screwdriver and remove the battery in accordance with illustration. (Refer to the Fig.[1], [2] in below.)

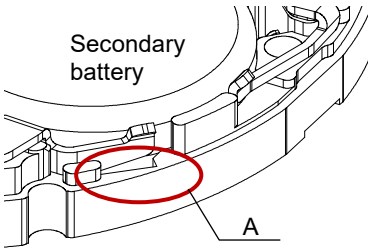


Fig.[1]

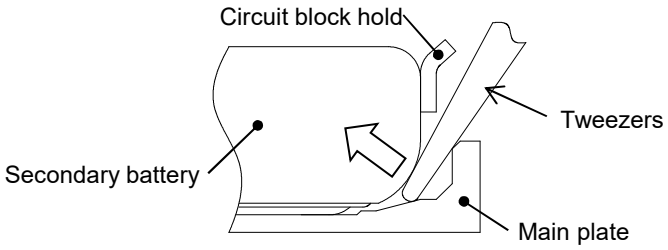


Fig.[2] A section

When the secondary battery is assembled, please match the phase in accordance with illustration and push the battery vertical direction. (Refer to the Fig.[3], [4] in below.)
Please pay attention not to deform the battery lead plate.

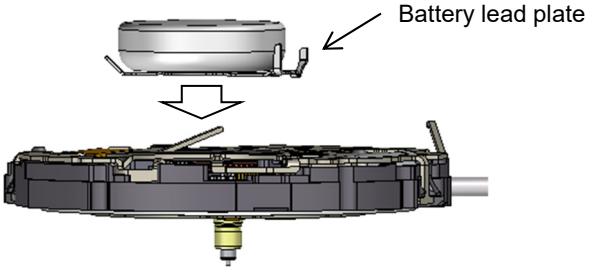


Fig.[3]

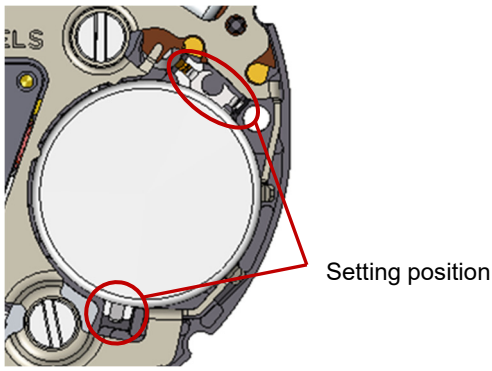


Fig.[4]

7. How to set the dial support ring

Please match the dial support ring on the movement with setting stem notch toward 3H position.
There are 2 parts of dial support ring hook at 6H and 12H position.
Please gently slide the dial support ring and set hooks to the movement until it click into place.
(Refer to the Fig.[5] in below.)

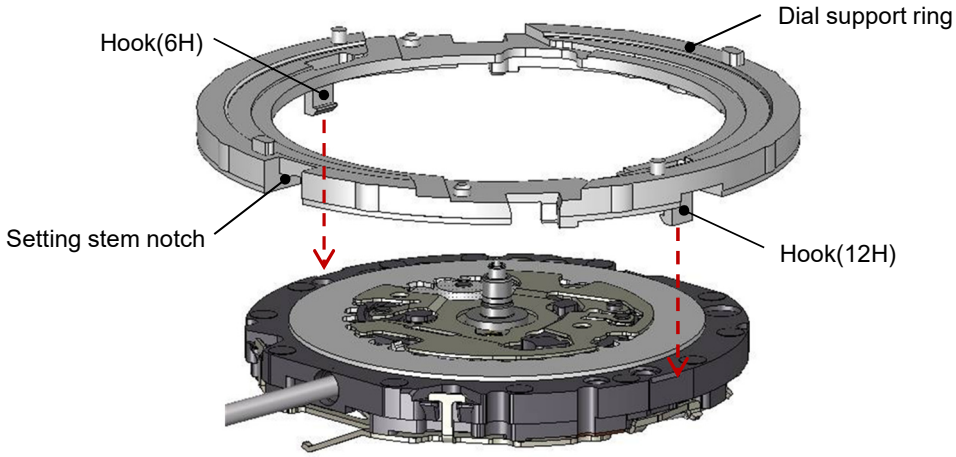


Fig.[5]

8. How to set the solar cell lead terminal and solar cell

(1) Solar cell lead terminal

Please set 3pcs of solar cell lead terminals in accordance with illustration.

(Refer to the Fig.[6] in below.)

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

(2) Solar cell

There are 2 parts of guide pole on the dial support ring, set the solar cell toward these guide poles.

There are 2 parts of solar cell hook at 2H and 8H position, gently slide the solar cell hooks toward the dial support ring and set it until it click into place. (Refer to the Fig.[6] in below.)

《 Attention 》

When the solar cell is set to the dial support ring, push lightly the part "B" in accordance with illustration. (Refer to the Fig.[6], [7] in below.)

Pay attention not to touch the surface of solar cell except the part "B".

When the solar cell is disassembled from the dial support ring, pay attention not to broaden hooks of solar cell too much to avoid deformation of the hook.

Before assemble the solar cell to the dial support ring, check whether the hook of solar cell is not deformed.

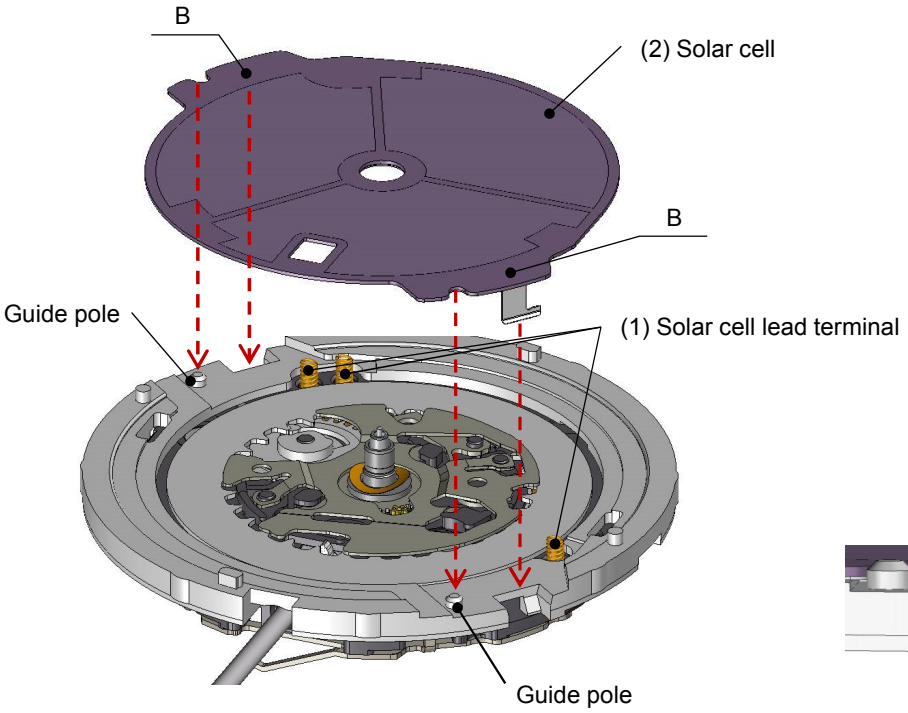


Fig.[6]

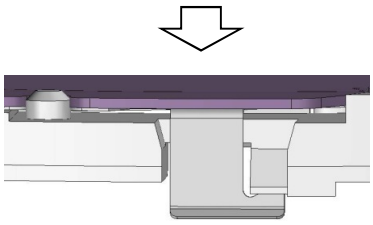


Fig.[7] B section

9. How to set the dial

The dial is held by the four guide poles on the dial support ring.