EPSON

Watch Movement Specification and Drawing

## SOLAR SERIES

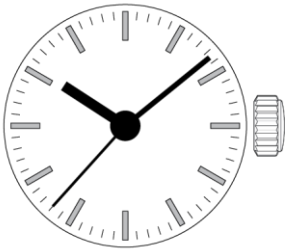
# Cal. VS17A

**Movement Size**

**5 1/2”’**

**Casing Diameter**

**11.8 × 15.15mm**



**Height**

**2.79mm**

**Running Time**

**Approx. 6 months**

Date: 4/Aug./'23

# Cal. VS17A


| Items | Rev. | Page |
|---|---|---|
| Features | 02 | 1 |
| Specifications | 07 | 2 |
| Appearance | 03 | 3 |
| Casing | 04 | 4 |
| Hand fitting | 01 | 5 |
| Hand setting stem | 01 | 6 |
| Dial-01 | 03 | 7-01 |
| Dial-02 | 03 | 7-02 |
| Dial-03 | 02 | 7-03 |
| Dial-04 | 01 | 7-04 |
| Dial-05 | 01 | 7-05 |
| Solar cell unit-01 | 03 | 8-01 |
| Solar cell unit-02 | 03 | 8-02 |
| Solar cell unit-03 | 02 | 8-03 |
| Solar cell unit-04 | 00 | 8-04 |
| Solar cell unit-05 | 00 | 8-05 |
| Attention-01 | 04 | 9-01 |
| Attention-02 | 00 | 9-02 |

| Cal. VS17A | Features | Date : 4/Aug./'23 |
|---|---|---|
| | | Rev. : 02 |

**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**

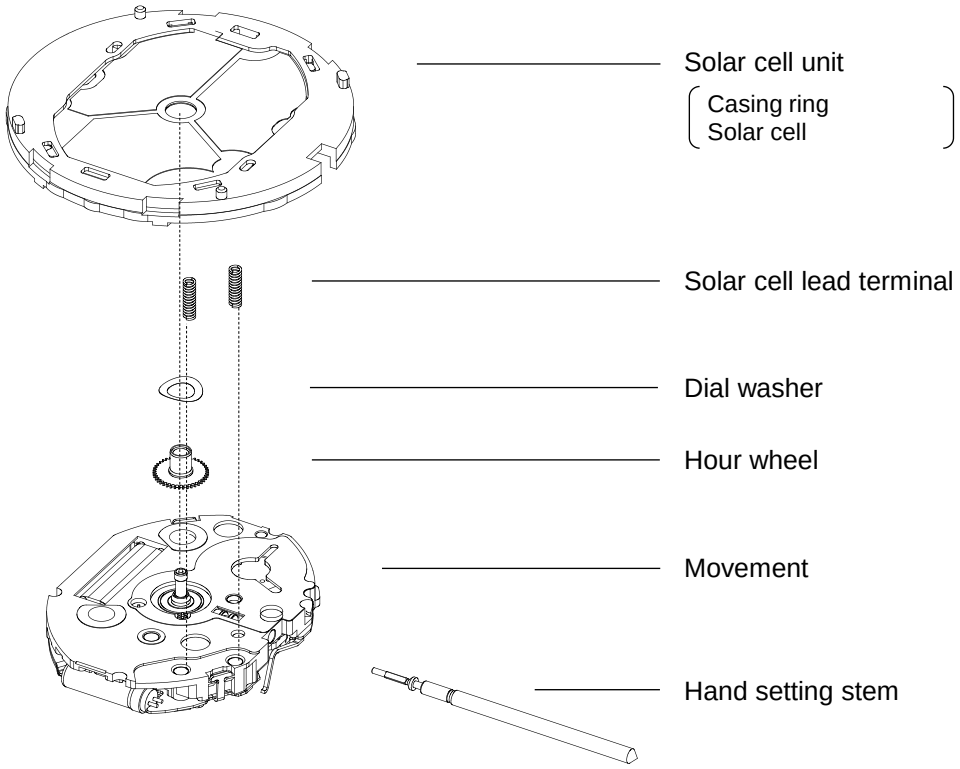
The two-second intervals movement of the second hand is a signal of energy depletion.

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. VS17A | Specifications | Date : 21/May/'21 |
|---|---|---|
| | | Rev. : 07 |

**Solar Quartz 5 1/2''' Movement / Three hands(H/M/S)**

## 1. MOVEMENT DIMENSIONS

| | |
|---|---|
| Outside diameter | 12.05mm(3-9H) × 15.55mm(12-6H) |
| Casing diameter | 11.8mm(3-9H) × 15.15mm(12-6H) |
| Total height | 2.39mm (Including solar cell : 2.79mm) |

## 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 | |
| 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 | : Time setting / Reset |

## 4. FEATURES

| | | |
|---|---|---|
| Jewels | 2 Jewels | |
| Anti-magnetism | Over 1600A/m (Direct current magnetic field) | |
| Driving current consumption | Approx. 0.40μA (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 | : 0.15μN･m |
| | Hour hand | : 0.13μN･m |
| Moment of inertia | Second hand | : less than 0.075μg･m² |

## 5. SECONDARY BATTERY (Installed)

| | |
|---|---|
| Type | Lithium metal batteries |
| Size | φ5.8mm × t 1.65mm |
| Nominal voltage | 1.5 V |
| Capacity | 1.8 mAh |

## 6. SEPARATED PARTS (Parts code)

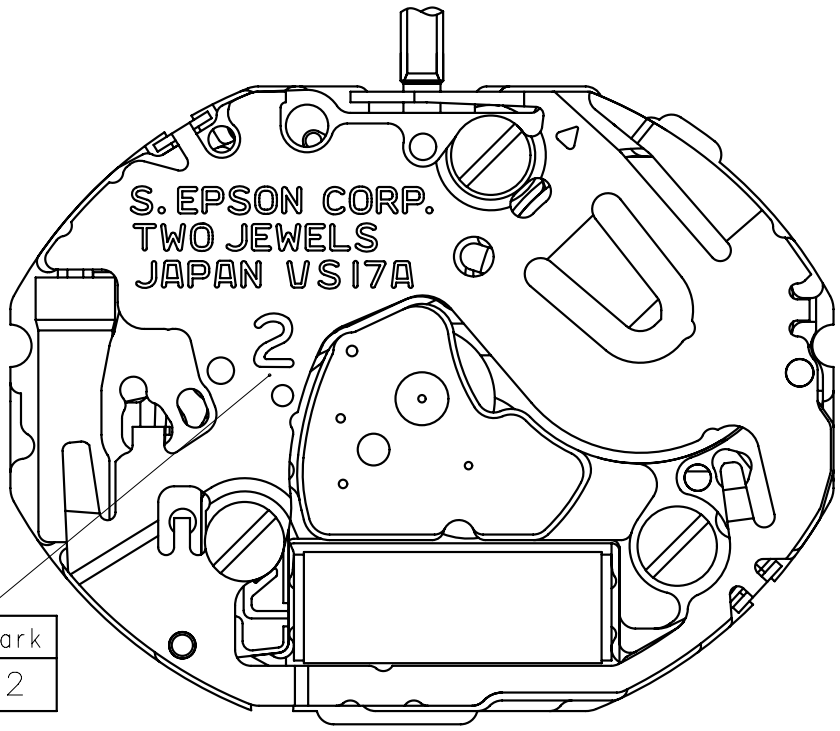
| | | |
|---|---|---|
| Solar cell unit | 4020583(ROUND) | 4020536(ROUND-2) |
| | 4020584(SQUARE-1) | 4020532(SQUARE-2) |
| | 4020585(TONNEAU) | |
| Hand setting stem | 0351819 | |
| Solar cell lead terminal (2 pcs) | 4246644 | |
| Hour wheel | 0271945 | |
| Dial washer | 0491735 | |

## 7. TEST OF ACCURACY

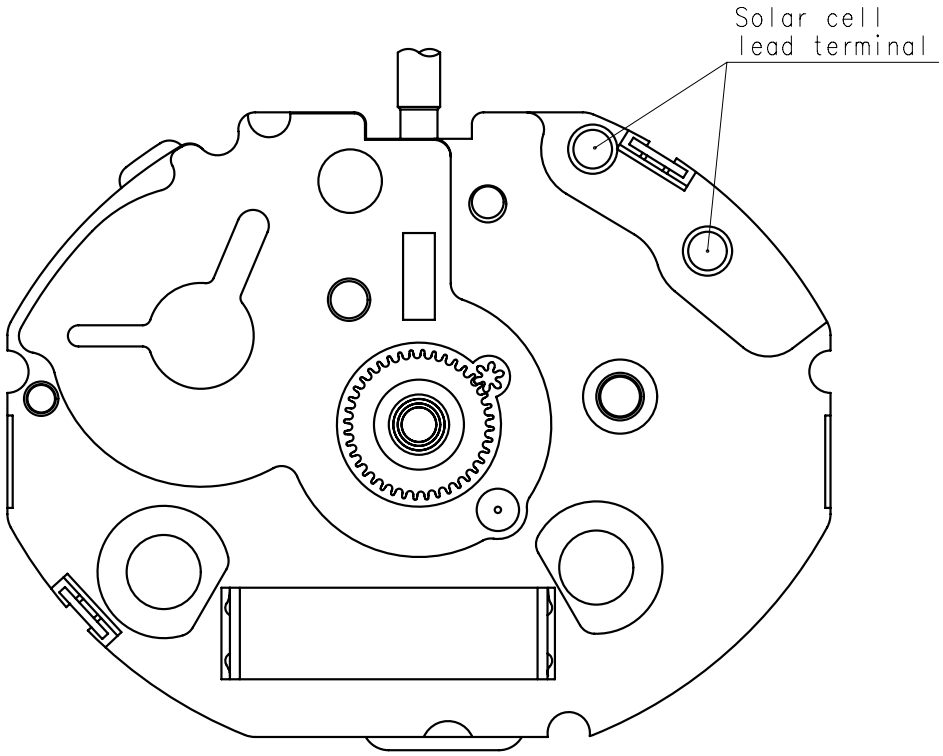
| | |
|---|---|
| Equipment to be used | SEIKO quartz tester QT-99, |
| | Greiner quartz timer-C , Witschi Q-tester 4000 |
| Duration of measurement | 10 seconds |
| Microphone to be used | Electromagnetic detection type |

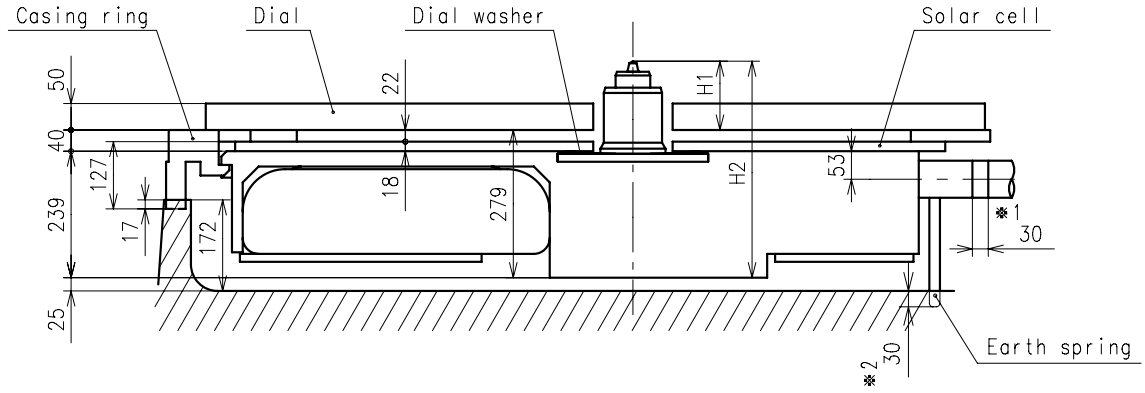
All specifications are subject to change without notice.

| Cal. VS17A | Appearance | Date:12/Apr./'19 |
|---|---|---|
| | | Rev.:03 |




| | Mark |
|---|---|
| Type(M) | 2 |

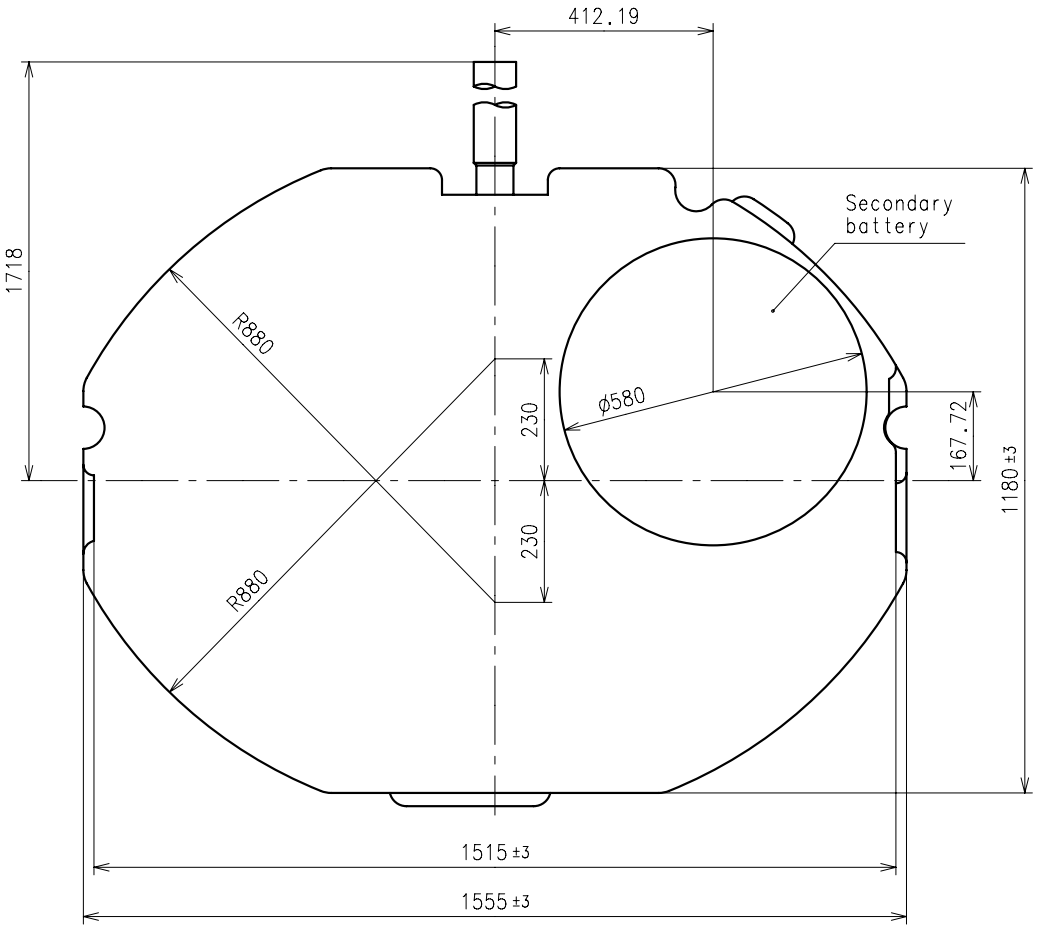





※1 pullout stroke

※2:The earth spring is absolutely placed in contact with the case back.

| Center post | | Type M (2) VS17A** |
|---|---|---|
| Maximum height from dial support | H1 | 157 |
| Total height including movement | H2 | 436 |

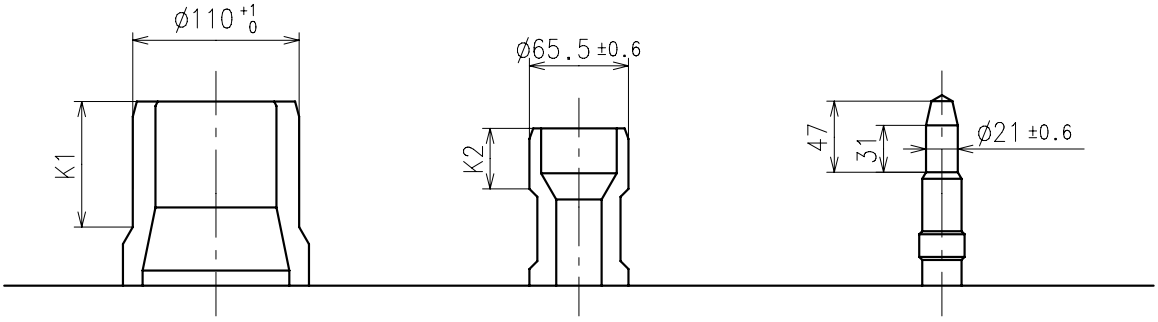


# Hand fitting

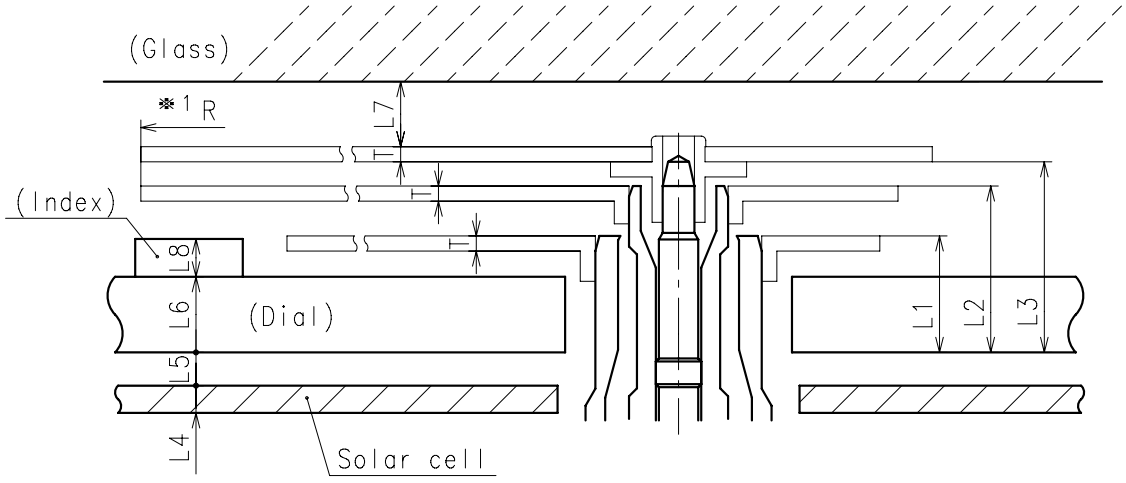


※Unbalance
- Hour hand ≦ 0.13μ N・m (13μ g・m)
- Minute hand ≦ 0.15μ N・m (15μ g・m)
- Second hand ≦ 0.03μ N・m ( 3μ g・m)

※Moment of inertia
- Second hand ≦ 0.075μ g・m²



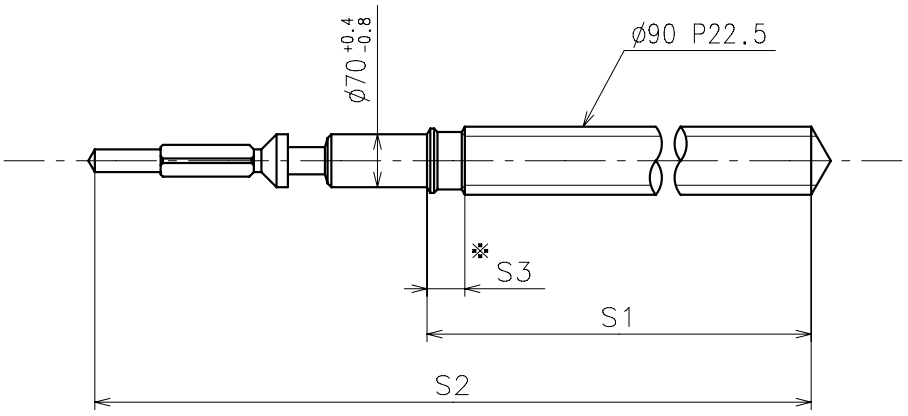

| | Parts No. | | | Dimension | |
|---|---|---|---|---|---|
| | Hour wheel | Center wheel | Fourth wheel | K1 | K2 |
| Type M (2) VS17A** | 0271945 | 0221968 | 0241967 | 94 | 40 |




| | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | T | ※1 R |
|---|---|---|---|---|---|---|---|---|---|---|
| Type M (2) VS17A** | 90 | 137 | 157 | 18 | 22 | 50 | MIN: 40 | MAX: 34 | 10 | MAX: 750 |

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

| Cal. VS17A | Hand setting stem | Date:24/Apr./'15 Rev.:01 |
|---|---|---|



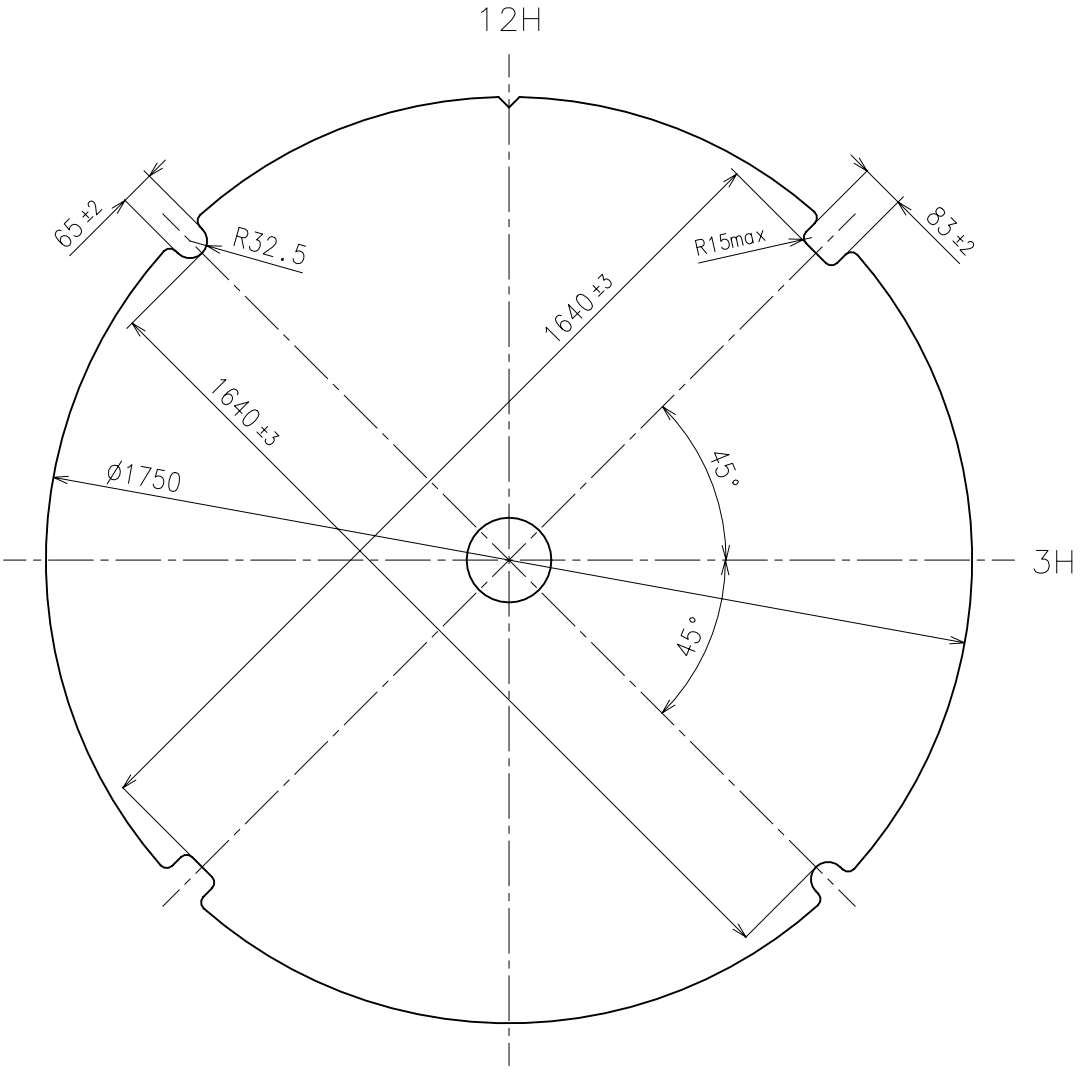

※ Not threaded

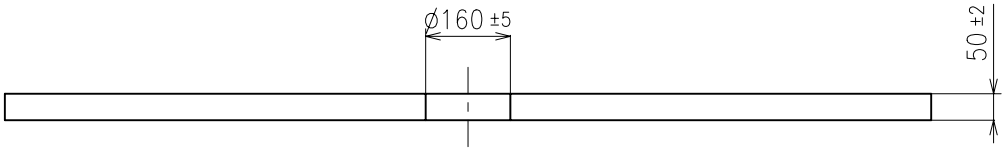
| | Part No. | S1 | S2 | S3 |
|---|---|---|---|---|
| Standard | 0351819 | 1148 | 1577 | 50 |

Material : Steel

Hardness : Vickers 600±50

| Cal. VS17A | Dial-01 | Date: 4/Aug./'23 |
|---|---|---|
| | | Rev.:03 |




[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.

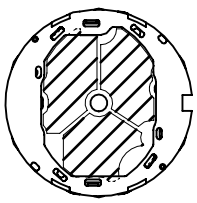
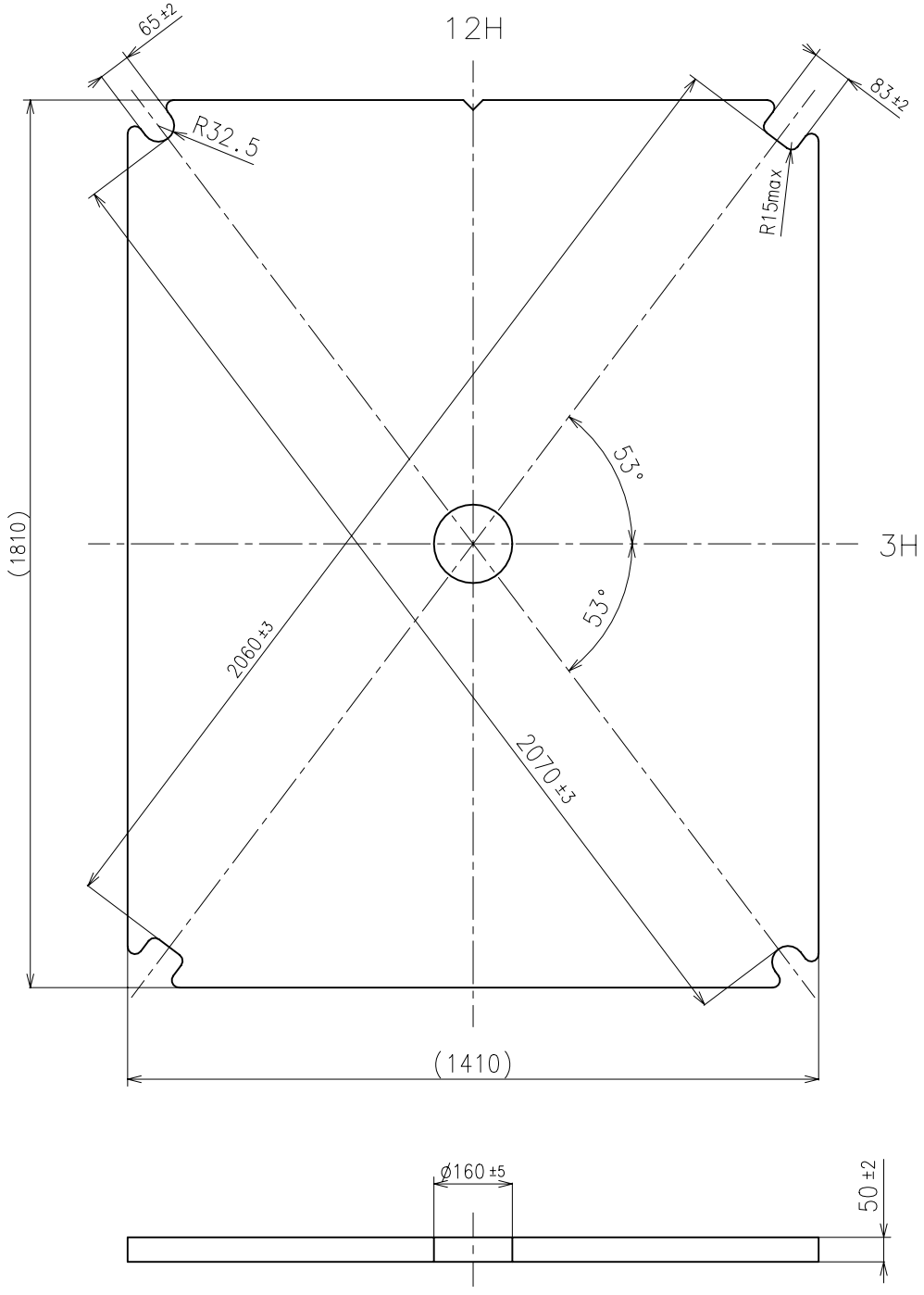


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

| Cal. VS17A | Dial-02 | Date: 4/Aug./'23 |
|---|---|---|
| | | Rev.:03 |




[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.

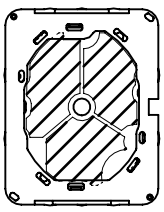
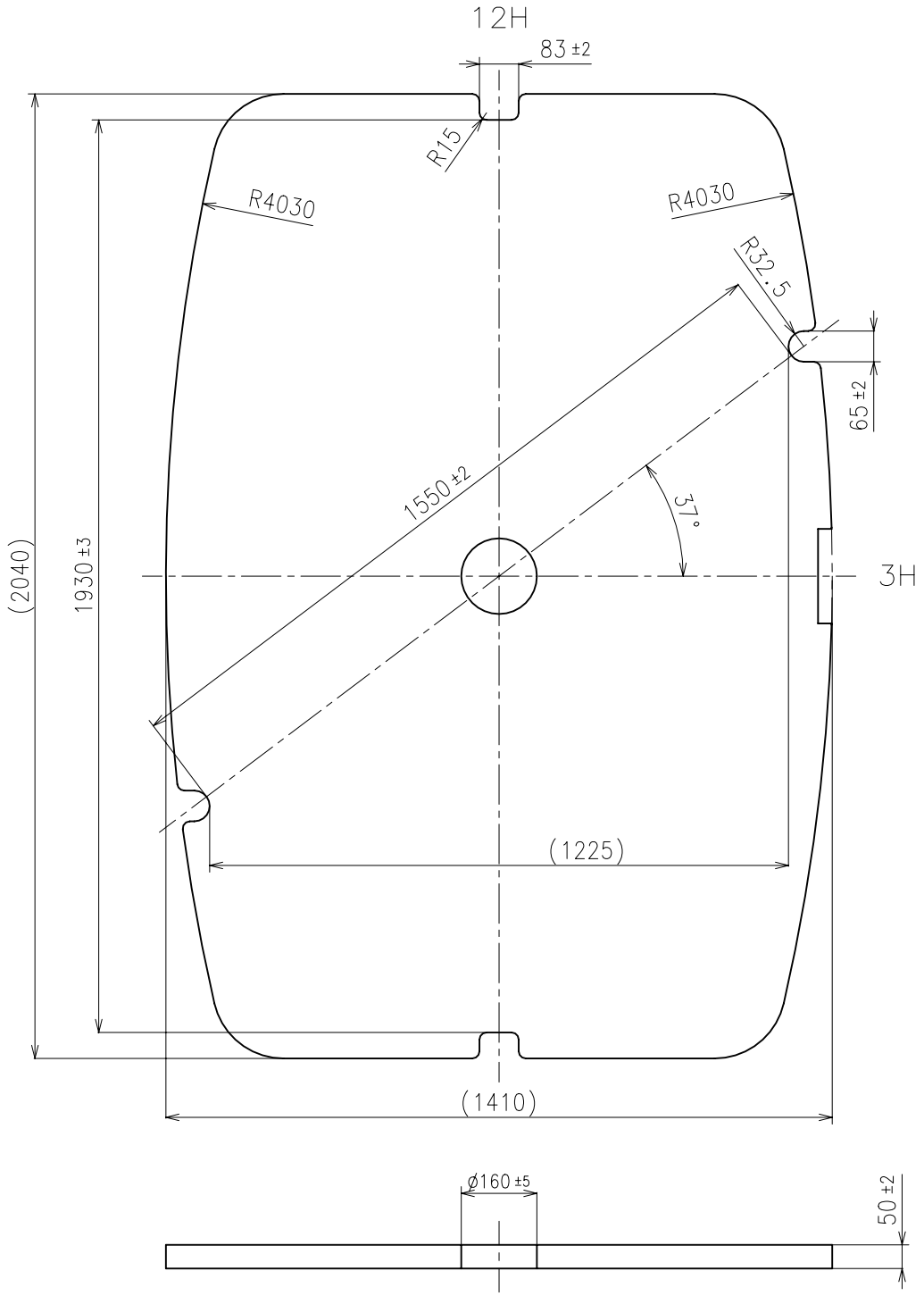


Fig.[1] elements of solar cell

Unit : 1=1/100mm

| Cal. VS17A | Dial-03 | Date: 4/Aug./'23 |
|---|---|---|
| | | Rev.:02 |




[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.

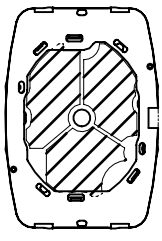
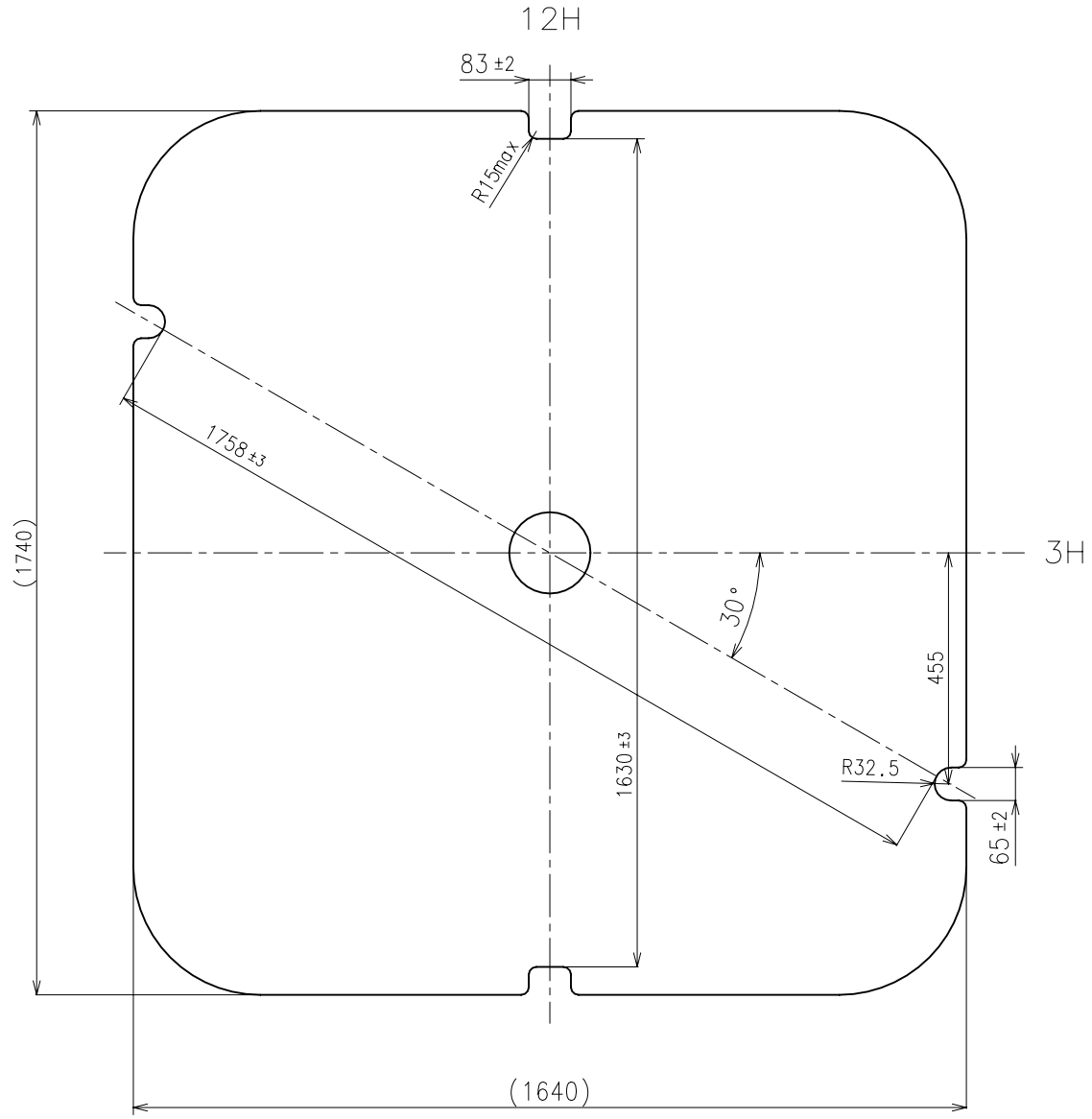
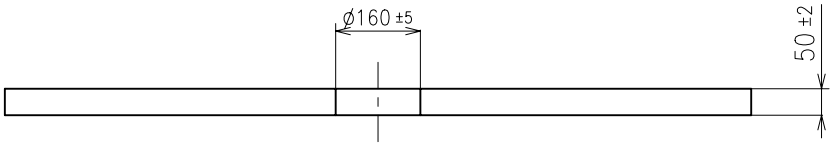


Fig.[1] ▨ elements of solar cell

| Cal. VS17A | Dial-04 | Date:31/Jul./'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.

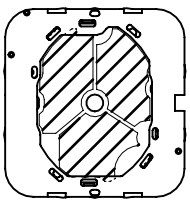
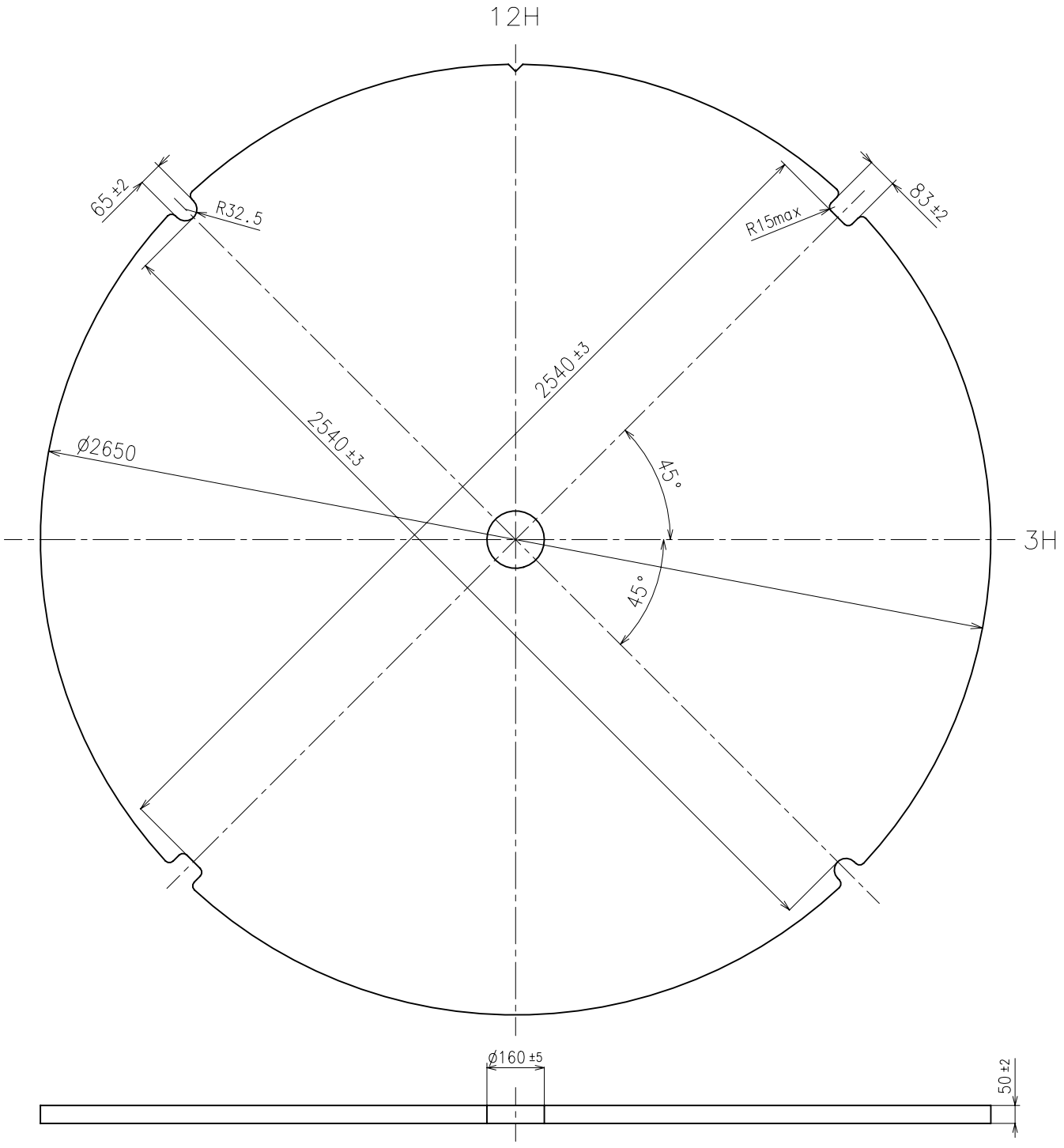


Fig.[1] ▨ elements of solar cell

Unit : 1=1/100mm

| Cal. VS17A | 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.

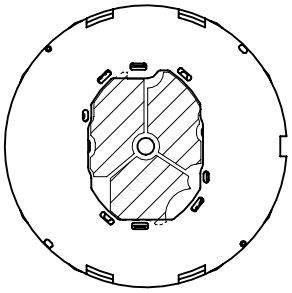
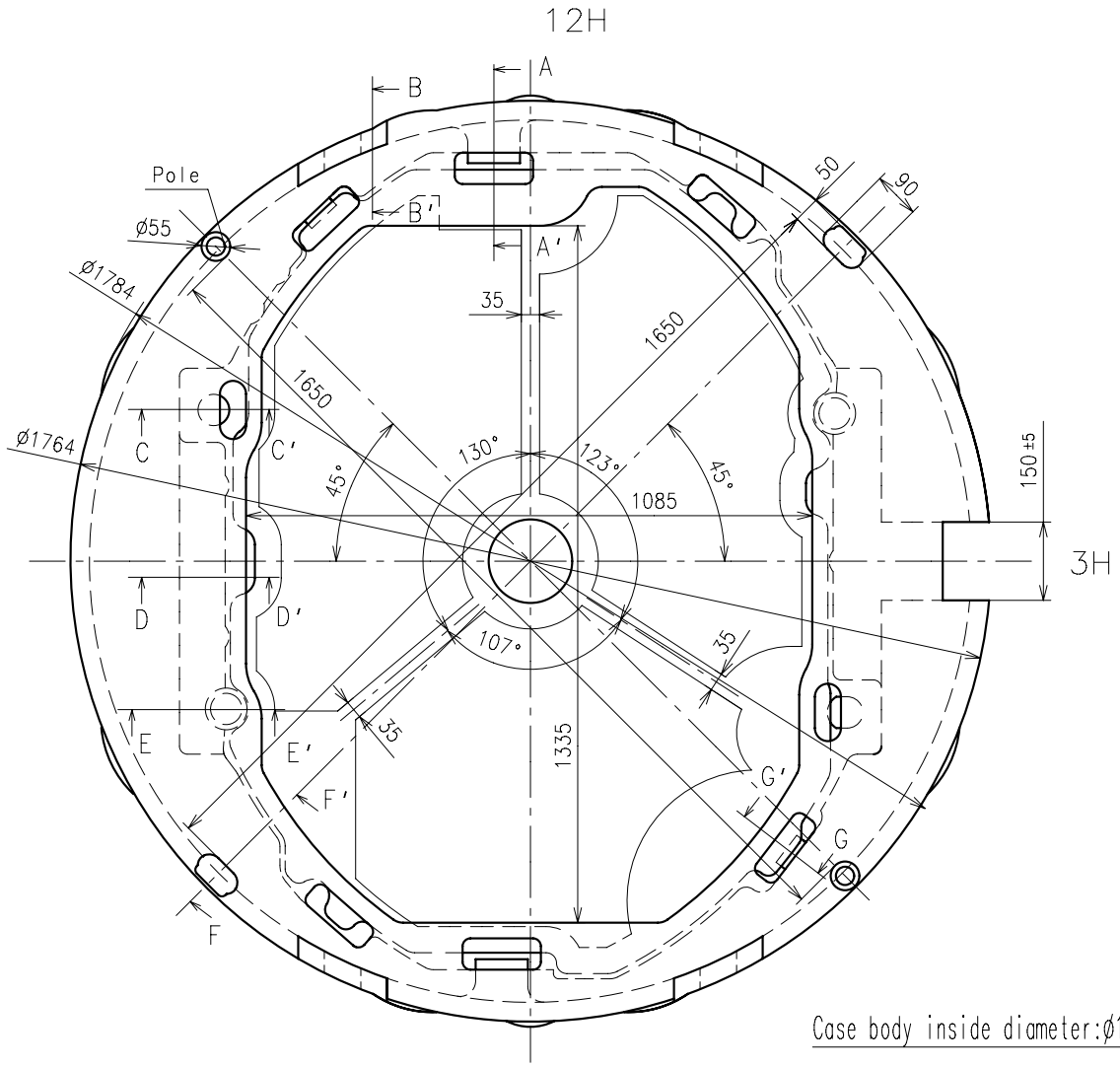


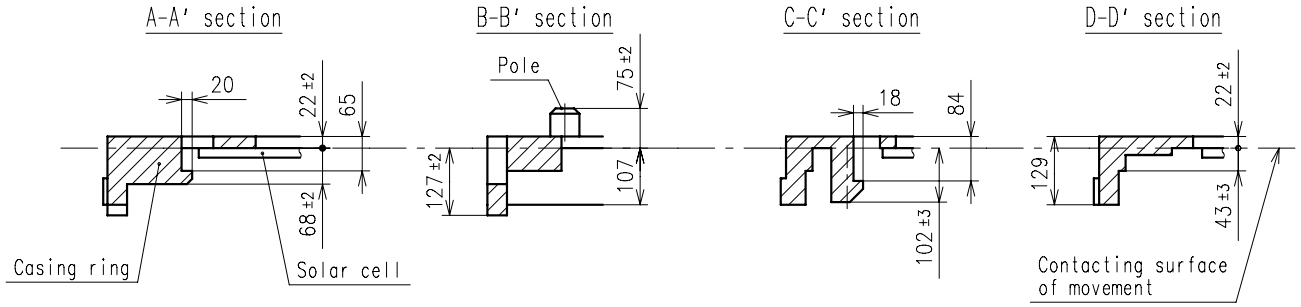
Fig.[1] elements of solar cell

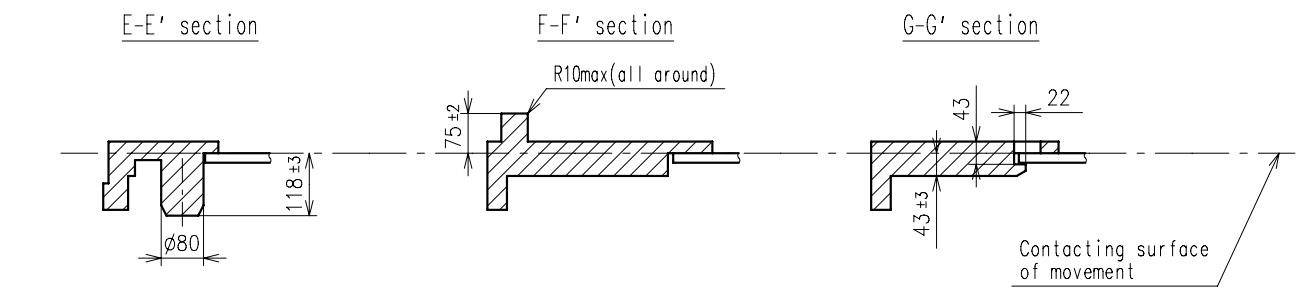
Unit : 1=1/100mm

| Cal. VS17A | Solar cell unit-01 | Date:24/Apr./'15 |
|---|---|---|
| | | Rev.:03 |



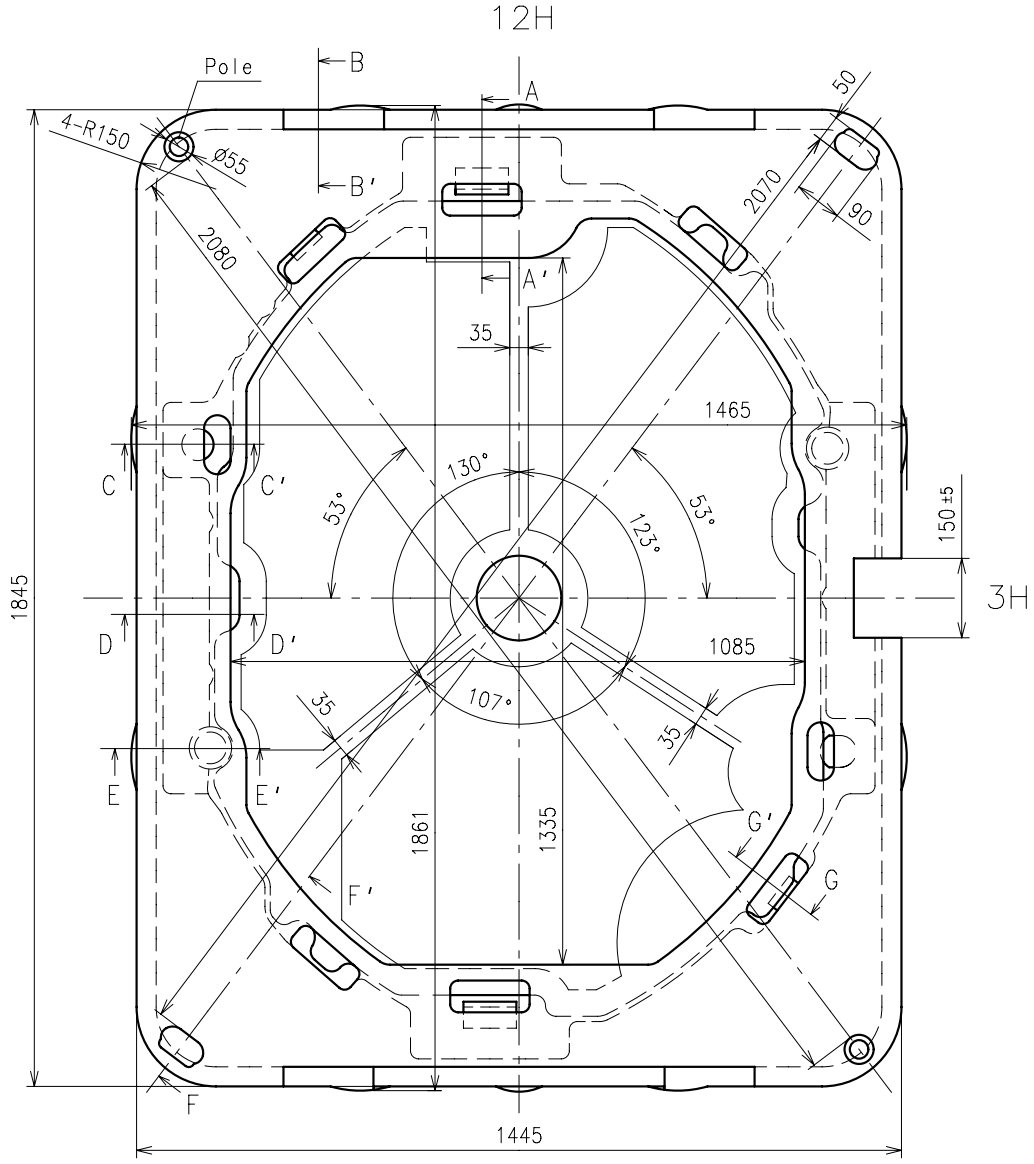

Case body inside diameter:ø1780



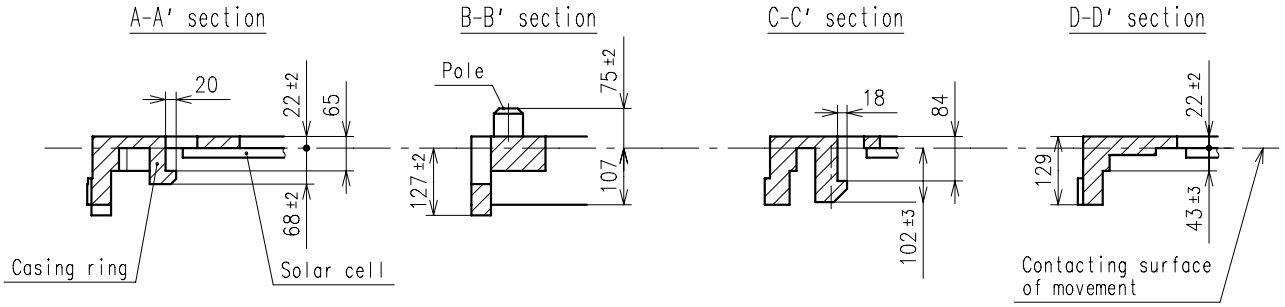



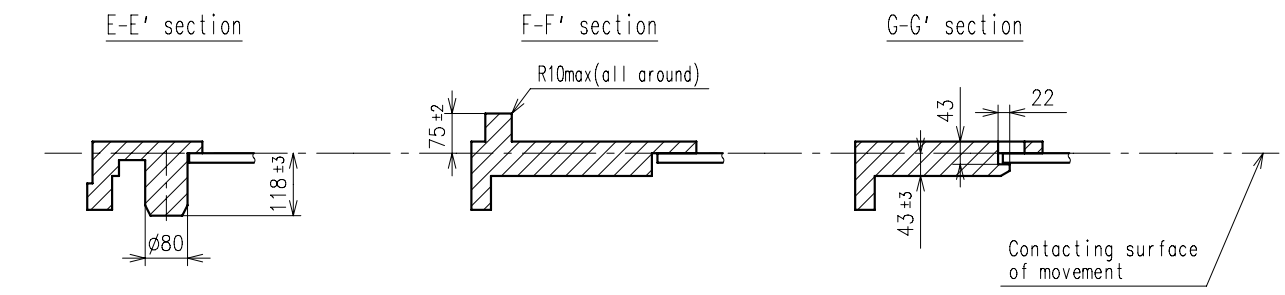

Unit : 1=1/100mm

| Cal. VS17A | Solar cell unit-02 | Date:24/Apr./'15 |
|---|---|---|
| | | Rev.:03 |



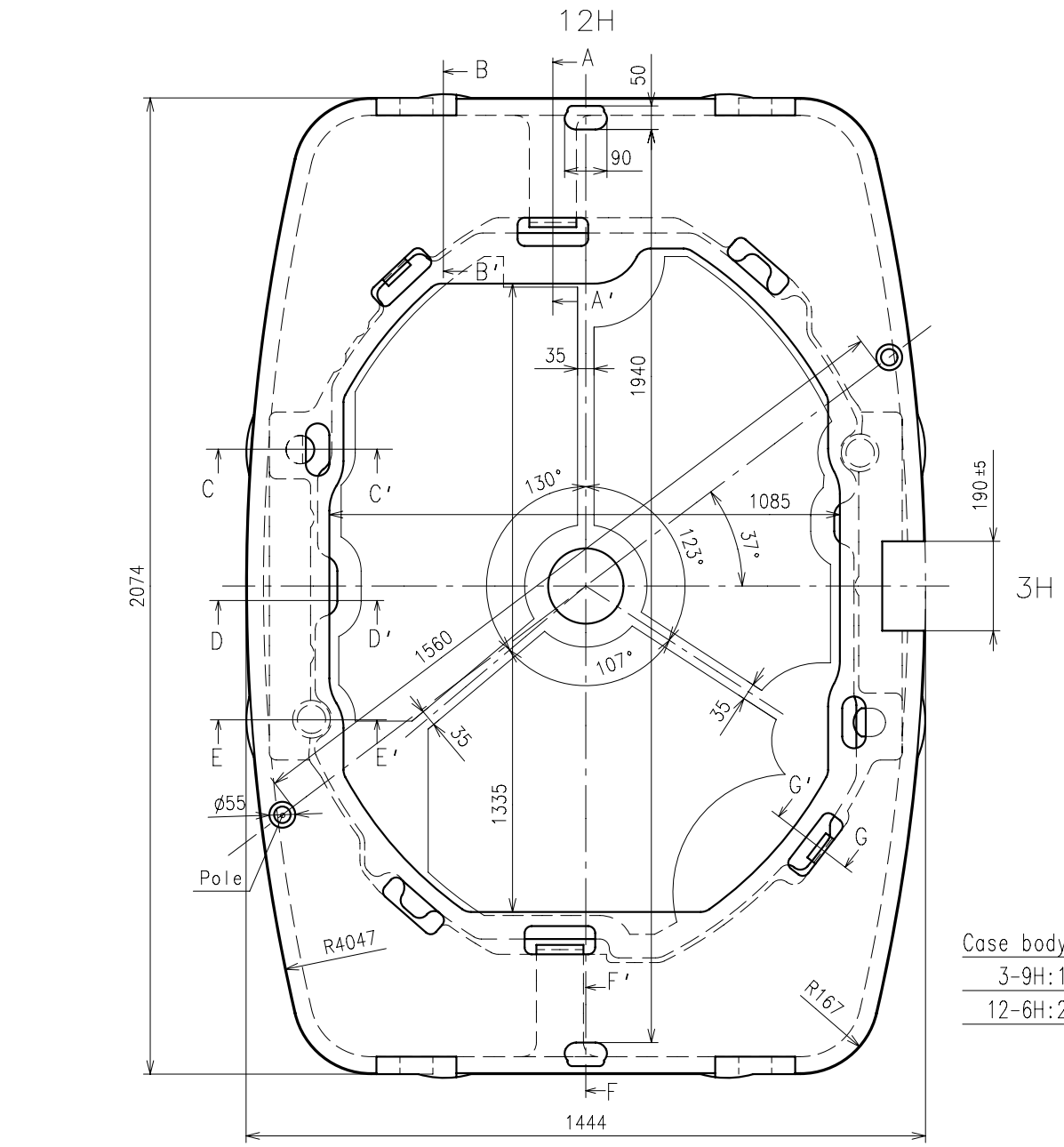

Case body inside dimension:1461×1861



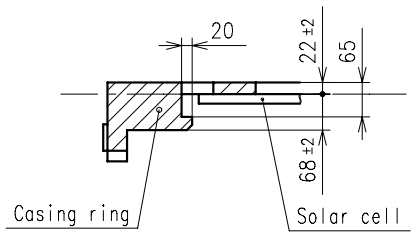

Unit : 1=1/100mm

| Cal. VS17A | Solar cell unit-03 | Date:24/Apr./'15 |
|---|---|---|
| | | Rev.:02 |

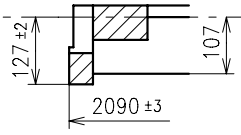



Case body inside
3-9H:1460
12-6H:2090

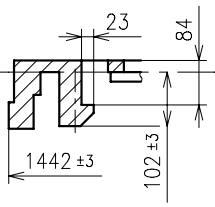
A-A' section



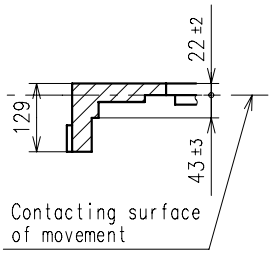

B-B' section



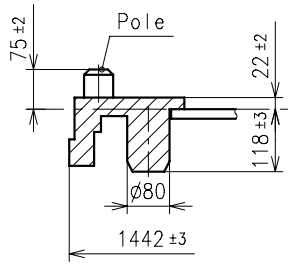

C-C' section



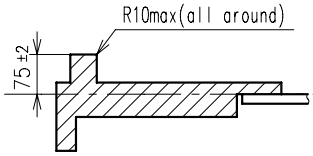

D-D' section



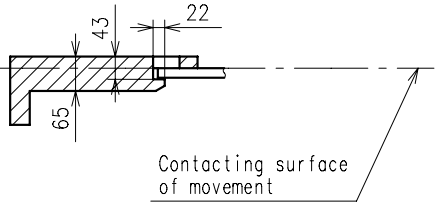

E-E' section




F-F' section

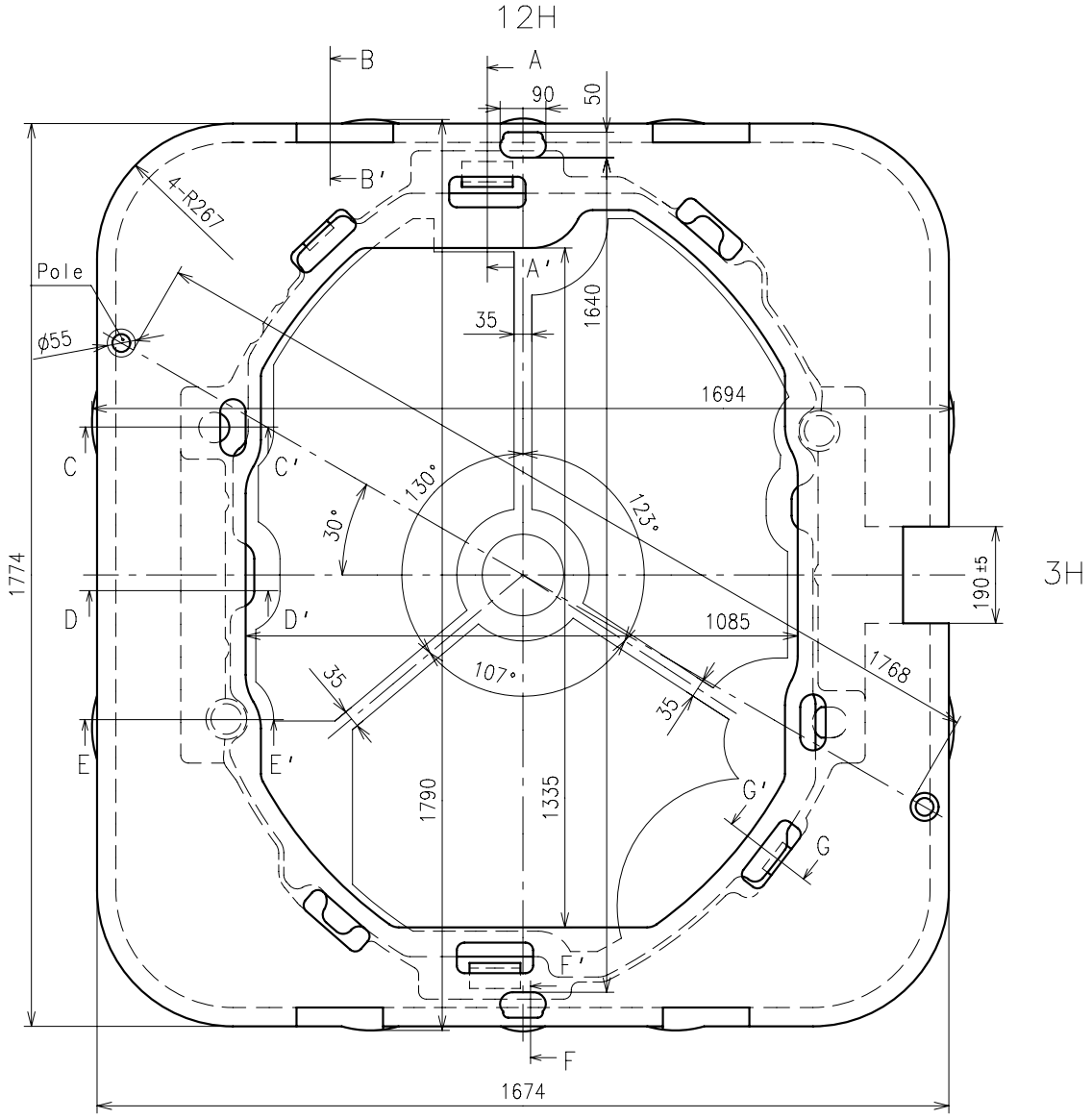



G-G' section



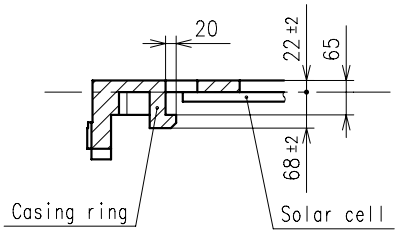

Unit : 1=1/100mm

| Cal. VS17A | Solar cell unit-04 | Date:31/Aug./'17 |
|---|---|---|
| | | Rev.:00 |

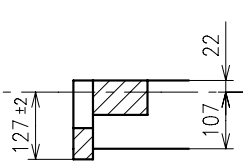



Case body inside dimension:1690×1790

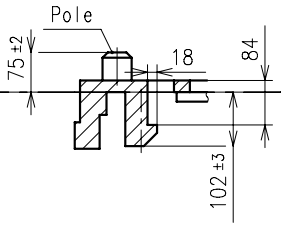
A-A' section



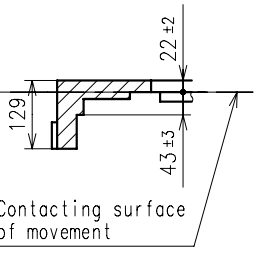

B-B' section



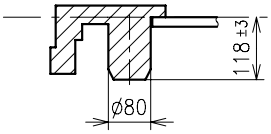

C-C' section



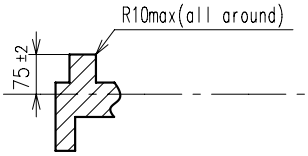

D-D' section



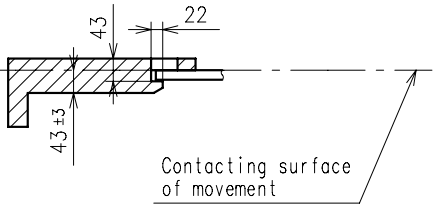

E-E' section




F-F' section

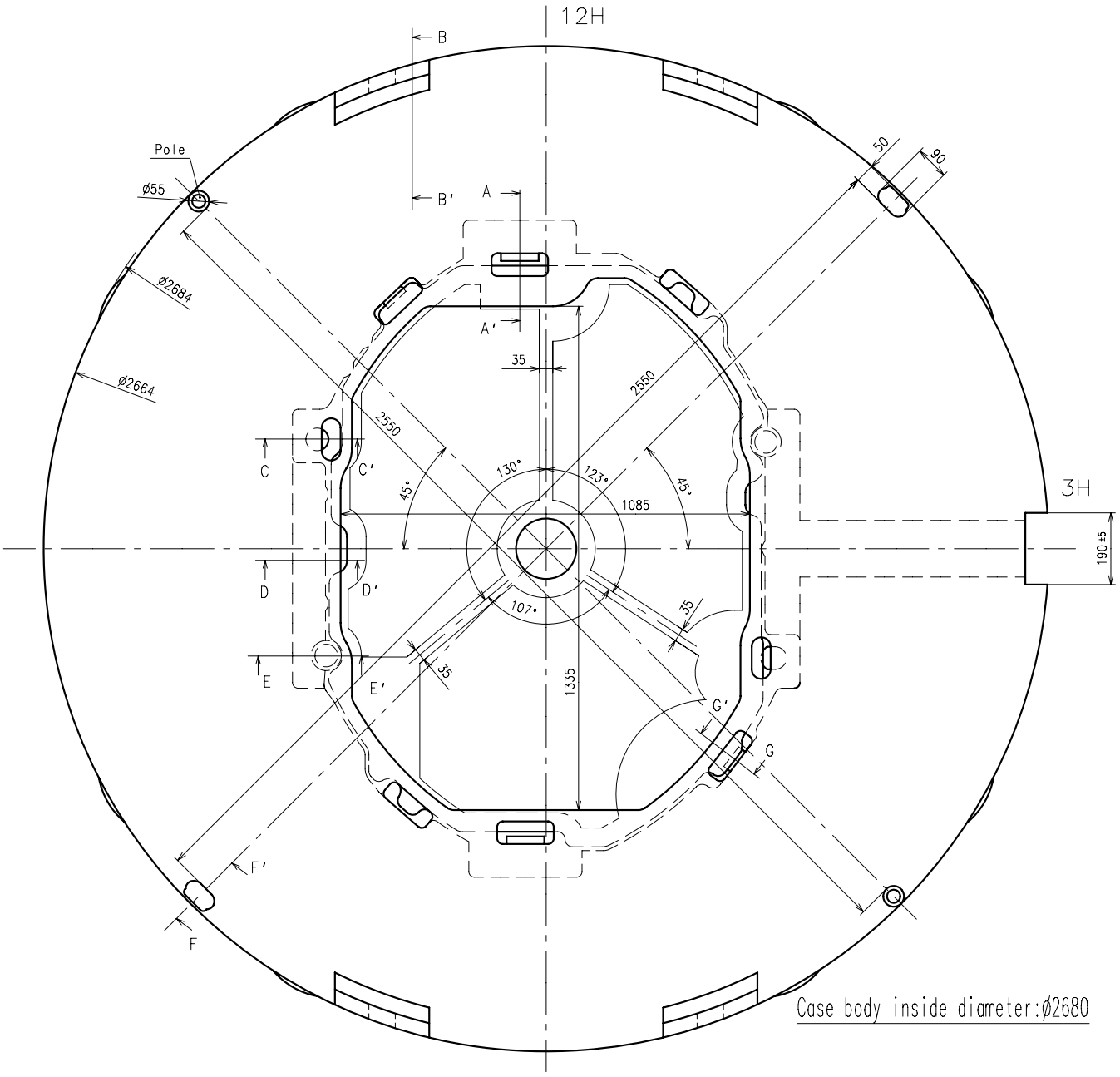



G-G' section



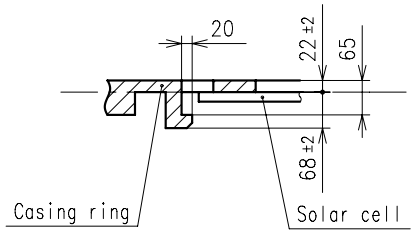

Unit : 1=1/100mm

| Cal. VS17A | Solar cell unit-05 | Date:10/Aug./'18 |
|---|---|---|
| | | Rev.:00 |

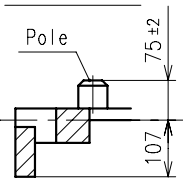



Case body inside diameter:ø2680

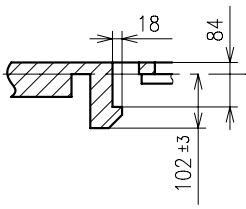
A-A' section



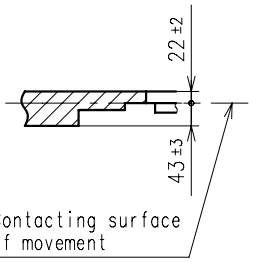

B-B' section



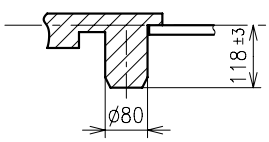

C-C' section



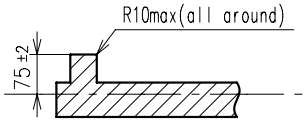

D-D' section



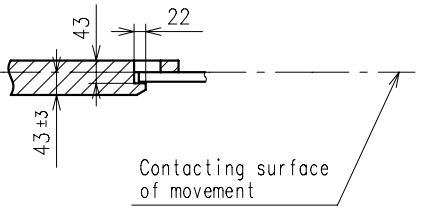

E-E' section




F-F' section




G-G' section




Unit : 1=1/100mm

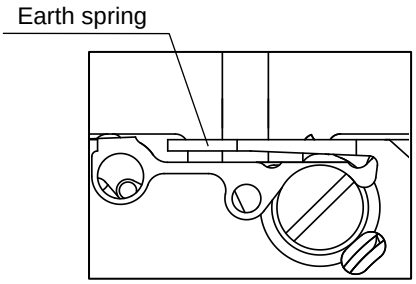
## 1. How to remove the setting stem

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.

When removing the setting stem, pay attention not to break or not to cut off the circuit block.

Please do not transform the earth spring.




## 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 25%.

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 | – | 60 | 180 | – | 45 | 115 |
| 3,000 | | 30W 20cm | 180 | 10 | 35 | 85 | 10 | 28 |
| 10,000 | Sun light | Cloudy | 60 | 4.0 | 12 | 25 | 3 | 8 |
| 100,000 | | Fine weather | 10 | 0.5 | 2 | 4 | 0.42 | 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. 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.

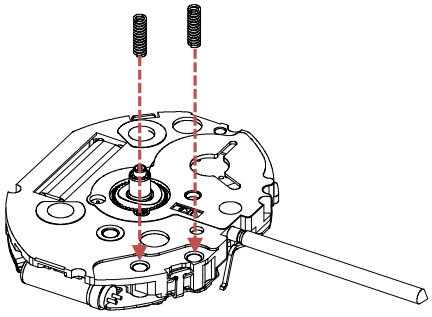
## 6. Caution

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.

**7. How to set the solar cell lead terminal**

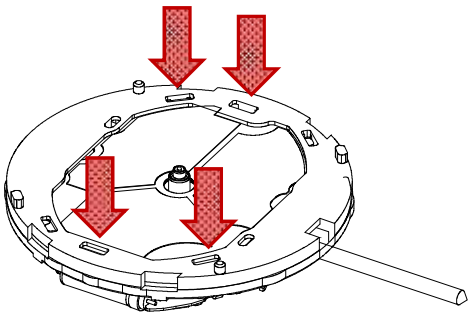
Please set 2pcs of solar cell lead terminals in accordance with this illustration.

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**

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