

Watch Movement Specification and Drawing

CHRONOGRAPH

Cal. YM82A

Movement Size

12'''

Casing Diameter

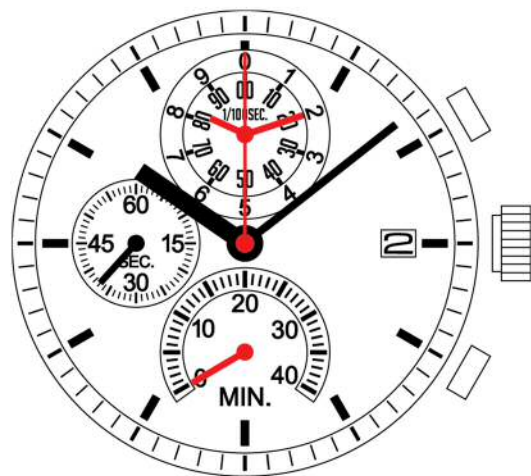
Ø 27.0mm

Height

3.7mm

Battery Life

3 years

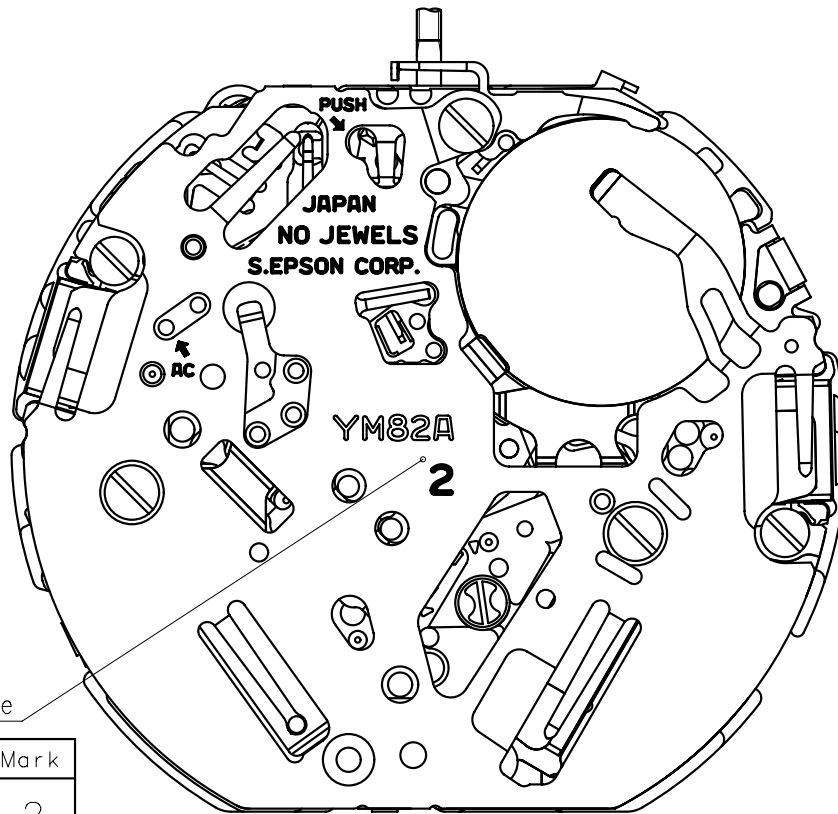


Date: 30/Jan./'15

Cal. YM82A

Items	Rev.	Page
Specifications	01	1
Appearance	01	2
Casing	01	3
Hand fitting	01	4
Hand setting stem	01	5
Magnetic shield plate	01	6
Dial-01	01	7-01
Dial-02	01	7-02
Holding ring for dial-01	02	8-01
Holding ring for dial-02	02	8-02
Attention for assembly	01	9
Attention of casing part structure	01	10
Attention of dial design	01	11
Operation-01	01	12-01
Operation-02	01	12-02

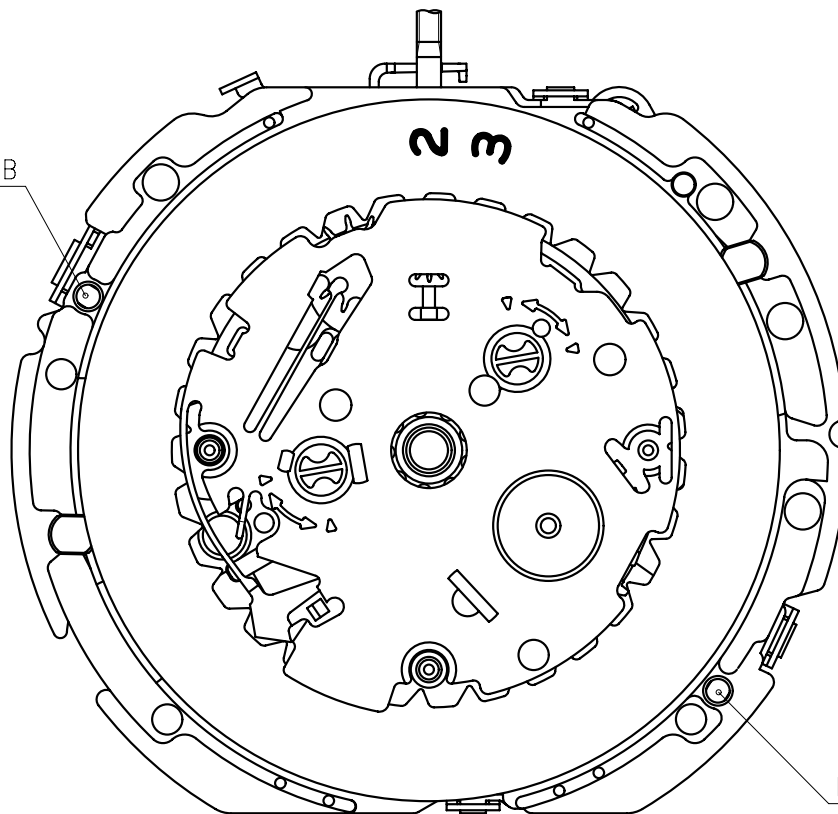
Cal. YM82A	Specifications	Date : 30/Jan./'15 Rev. : 01
Analog Quartz 12''' Center second Chronograph Movement		
1. MOVEMENT DIMENSIONS		
Outside diameter Casing diameter Total height	ϕ 27.60mm (12H-6H) × 24.00mm (3H-9H) ϕ 27.00mm (12H-6H) 3.7mm (including battery)	
2. TIME STANDARD		
Type of quartz oscillator Frequency of quartz oscillator Accuracy Operating temperature range Regulation device	Tuning fork 32,768 Hz \pm 20 seconds per month (on wrist) -5°C to +50°C Nil (Pre-adjusted)	
3. INDICATOR / FUNCTIONS		
3 Hands Small hands Calendar Reset switch System-reset switch Power depletion warning function (BLD) (Small second hand moves at 2-second intervals)	Hour / Minute / Second chronograph (Center) 1/100 second chronograph / 1/10 second chronograph (12H) 40 minute chronograph (6H) / Small second (9H) Instant setting device for date calendar	
Chronograph	The chronograph can measure up to 41 minutes in 1/100 second increments, capable of timing 120 minutes.	
4. FEATURES		
Jewels Anti-magnetism Maximum unbalance of hands Moment of Inertia	0 Jewels Over 1600A/m (Direct current magnetic field) Small second hand : 0.03 μ N·m 1/100 second chronograph hand : 0.005 μ N·m 1/10 second chronograph hand : 0.025 μ N·m 40 minute chronograph hand : 0.03 μ N·m Second chronograph hand : 0.06 μ N·m Minute hand : 0.70 μ N·m Second chronograph hand : less than 0.2 μ g·m ²	
5. BATTERY		
Type / Size Recommended battery Nominal voltage Battery life Driving current consumption Operation stopping voltage	Silver oxide battery / ϕ 9.5mm × t 2.73mm SR927W 1.55 V Approx. 3 years (120 minutes chronograph operation per day) Approx. 0.80 μ A 0.9 V	
6. SEPARATED PARTS (Parts code)		
Hand setting stem Holding ring for dial Battery Magnetic shield plate A.C. comment seal	0351584 (Standard) or 0351585 (Long) 0866650 (Standard) or 0866789 (Special) SR927W 4259519 0110705	
7. TEST OF ACCURACY		
Equipment to be used Duration of measurement Microphone to be used	SEIKO quartz tester QT-99, QT2100 Greiner quartz timer-C , Witschi Q-tester 4000 10 seconds Electromagnetic detection type	
All specifications are subject to change without notice.		



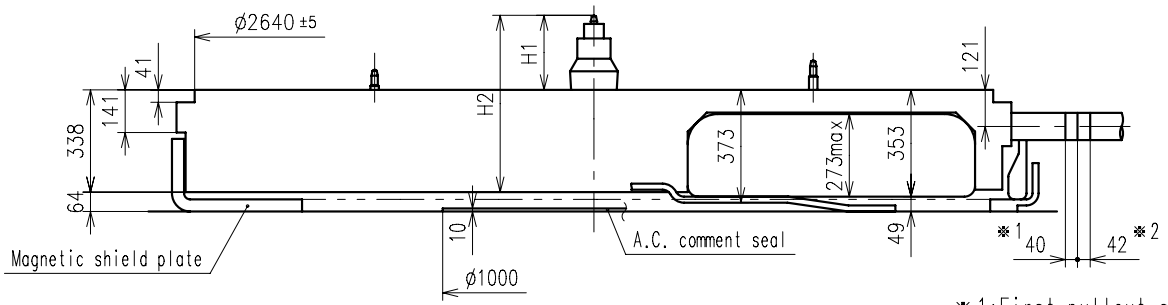
Hands type

	Mark
Type(M) YM82A**	2

Dial leg hole B

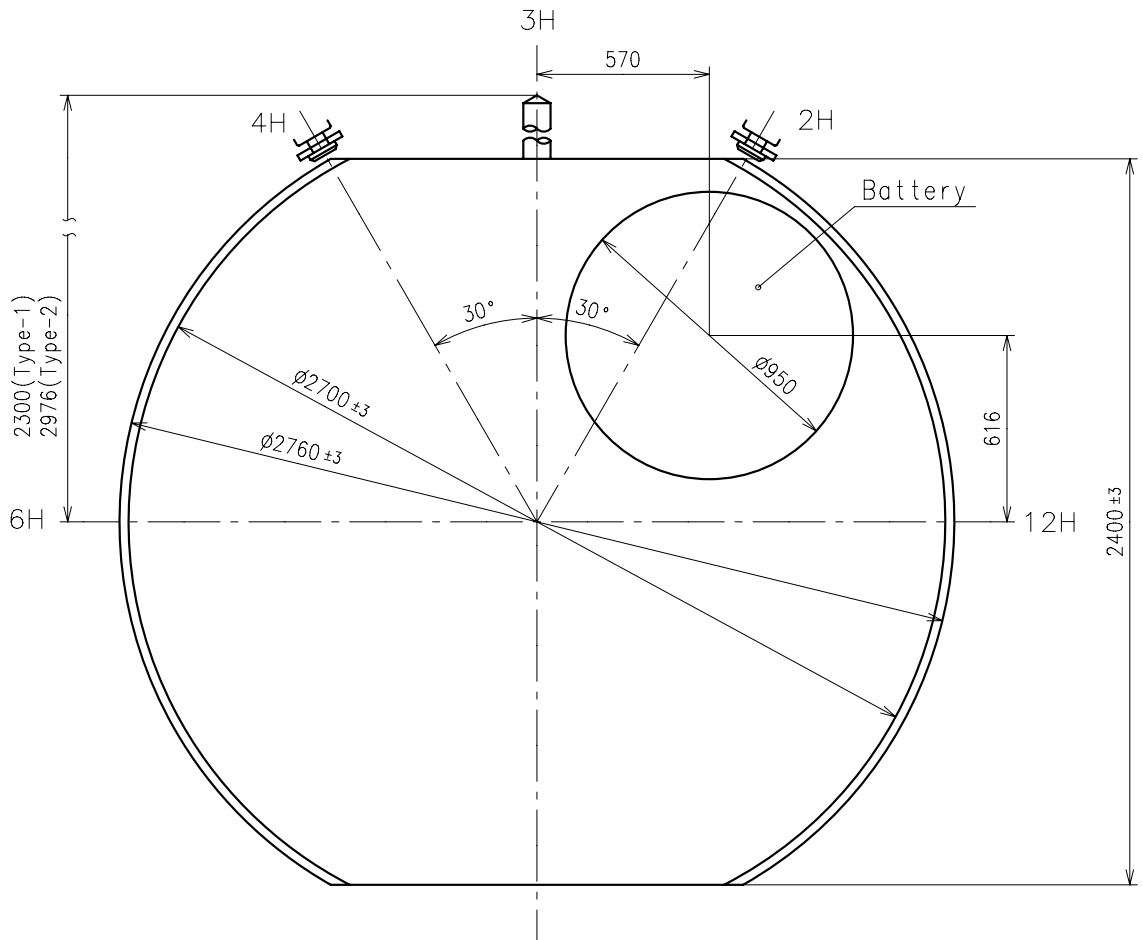
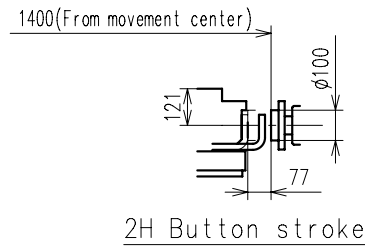
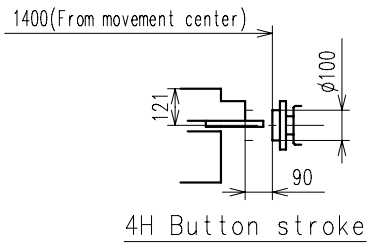


Dial leg hole A

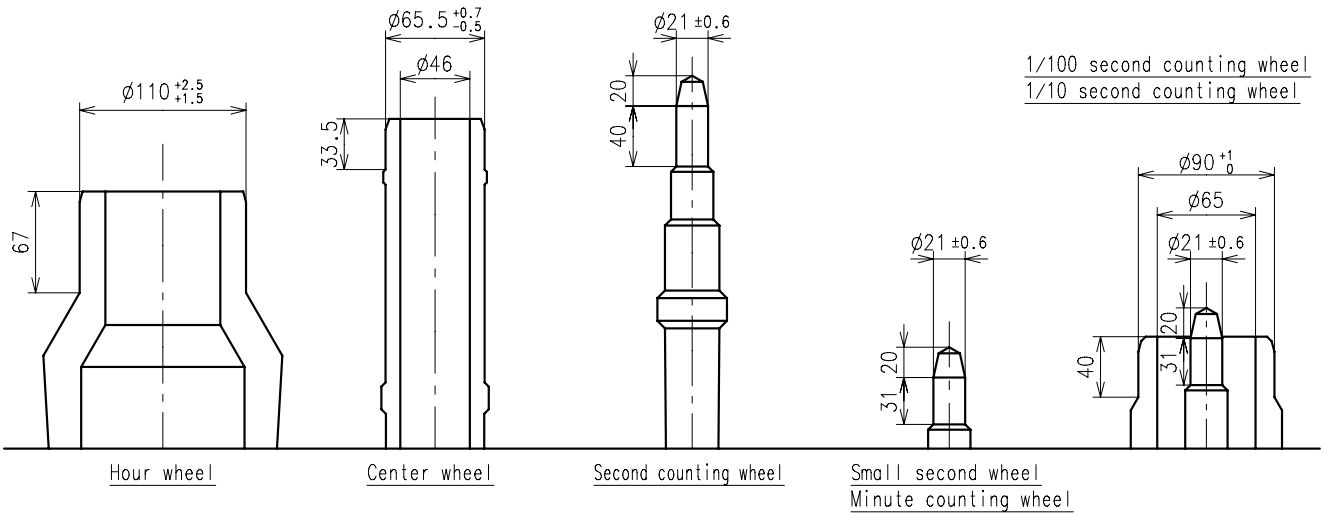


Center post		Type M (2) YM82A**
Maximum height from dial support	H1	246.5
Total height including movement	H2	584.5

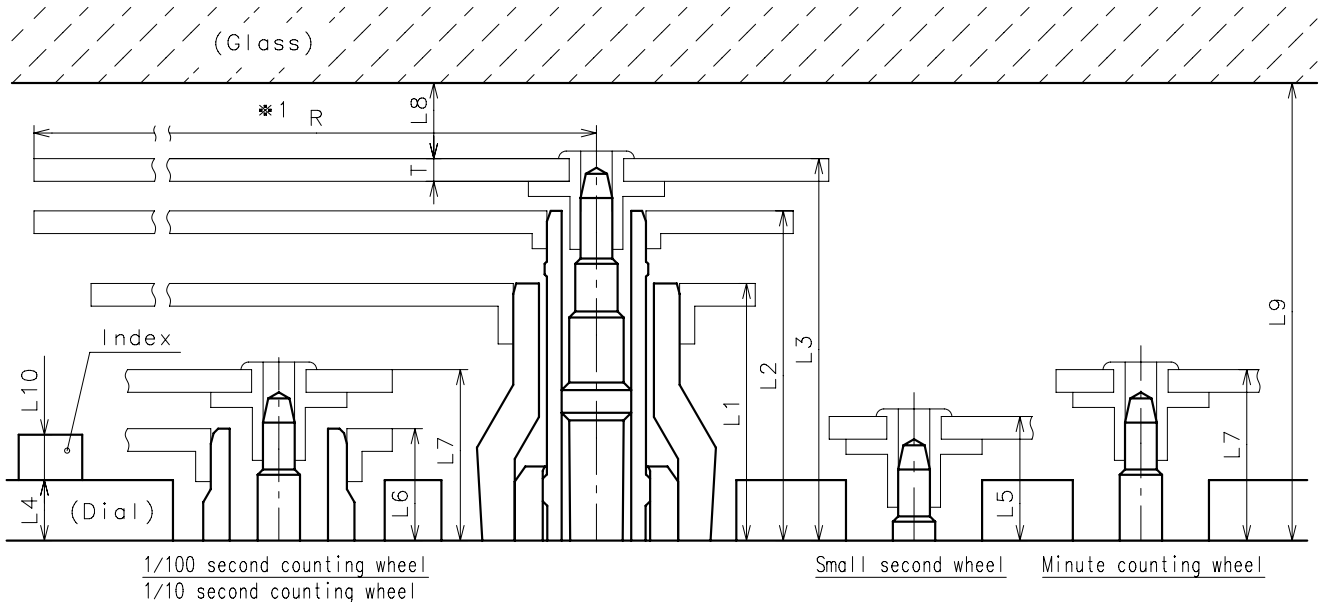
*1: First pullout stroke
*2: Second pullout stroke



- * Unbalance
 - Small second hand $\leq 0.03\mu\text{ N}\cdot\text{m}$ ($3\mu\text{ g}\cdot\text{m}$)
 - 1/100 second chronograph hand $\leq 0.005\mu\text{ N}\cdot\text{m}$ ($0.5\mu\text{ g}\cdot\text{m}$)
 - 1/10 second chronograph hand $\leq 0.025\mu\text{ N}\cdot\text{m}$ ($2.5\mu\text{ g}\cdot\text{m}$)
 - 40 minute chronograph hand $\leq 0.03\mu\text{ N}\cdot\text{m}$ ($3\mu\text{ g}\cdot\text{m}$)
 - Second chronograph hand $\leq 0.06\mu\text{ N}\cdot\text{m}$ ($6\mu\text{ g}\cdot\text{m}$)
 - Minute hand $\leq 0.70\mu\text{ N}\cdot\text{m}$ ($70\mu\text{ g}\cdot\text{m}$)
- * Moment of inertia
 - Second chronograph hand $\leq 0.2\mu\text{ g}\cdot\text{m}^2$

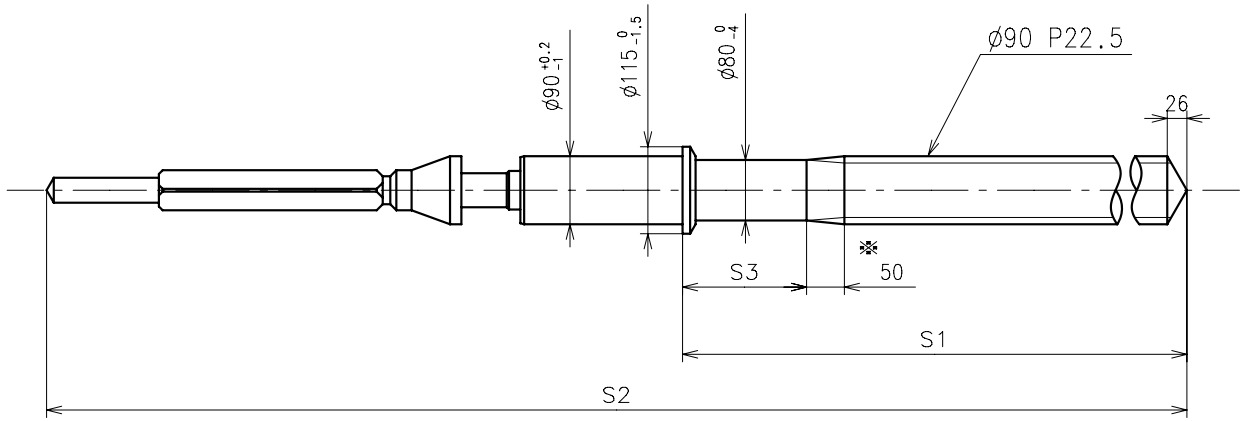


	Parts No.						
	Hour wheel	Center wheel	Second counting wheel	Small second wheel	Minute counting wheel	1/100 second counting wheel	1/10 second counting wheel
Type M (2) YM82A**	0271588	0221583	0888582	0240580	0270582	0888593	0271583



	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	T	*1 R
Type M (2) YM82A**	170	218	252.5	40	77	74	113	MIN: 50	MIN: 302.5	MAX: 50	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.



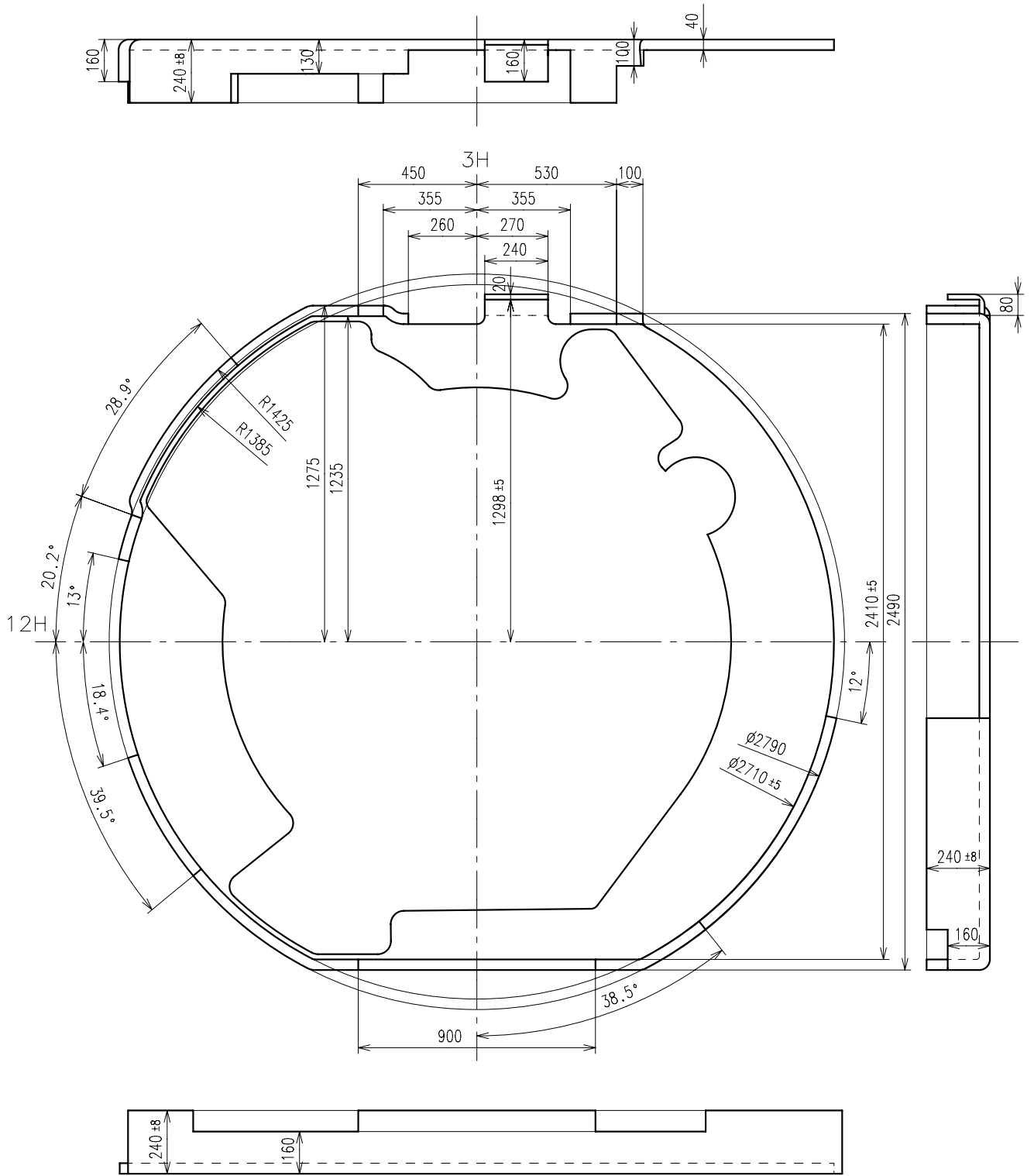
※ Not threaded

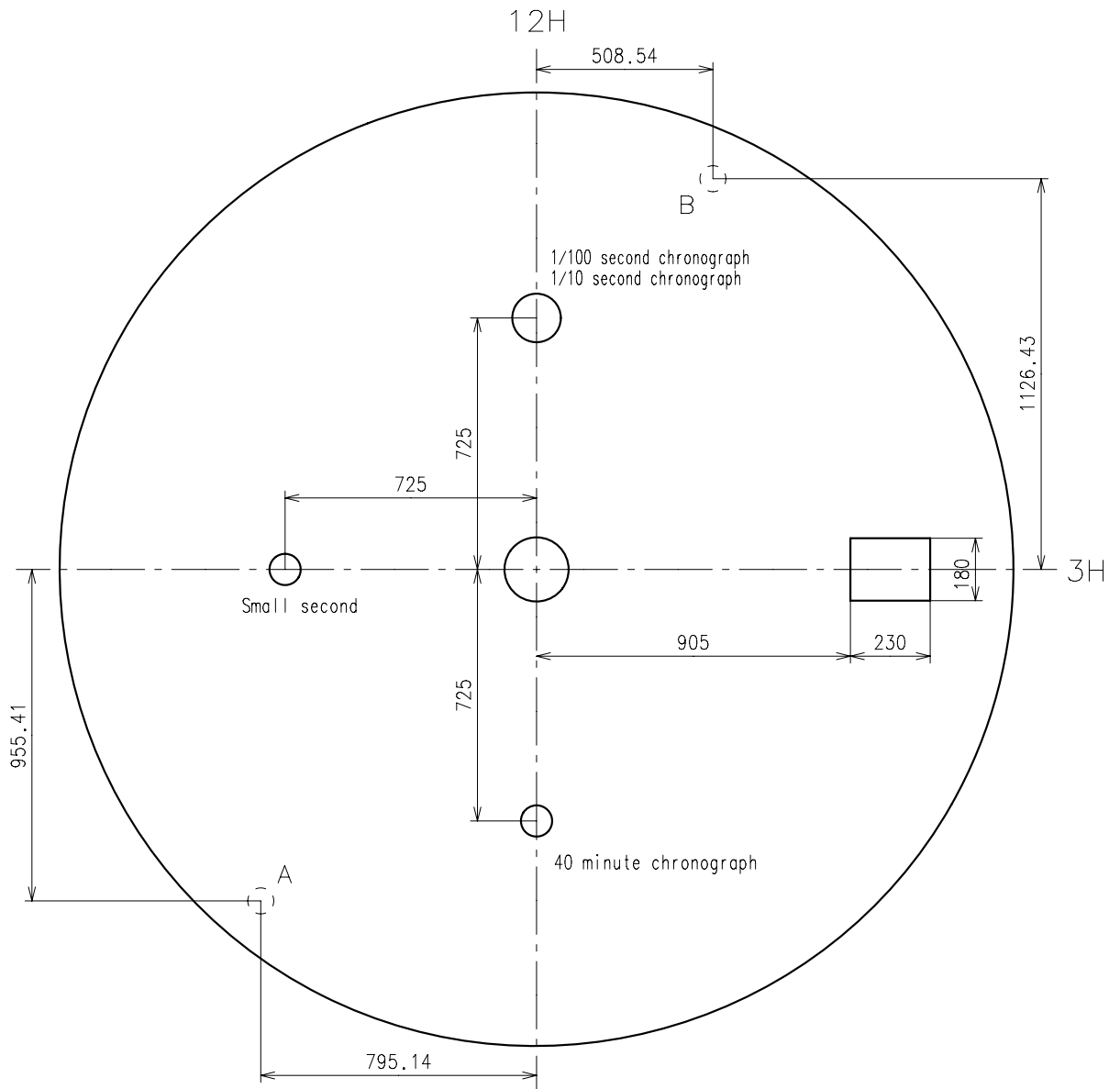
	Part No.	S1	S2	S3
Type-1 (Standard)	0351584	1164	2005.5	164
Type-2 (Long)	0351585	1840	2681.5	750

Material : Steel

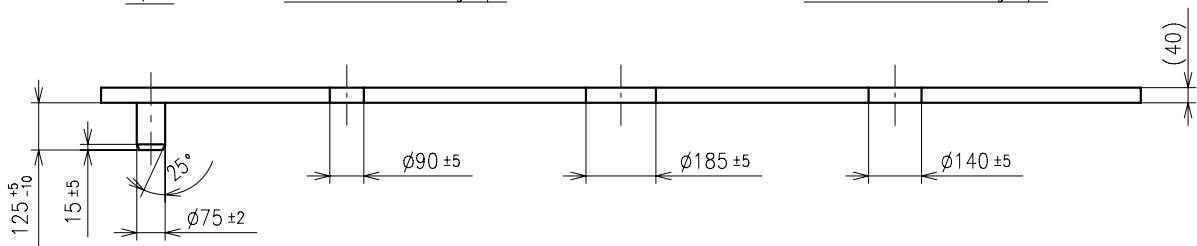
Hardness : Vickers 600±50

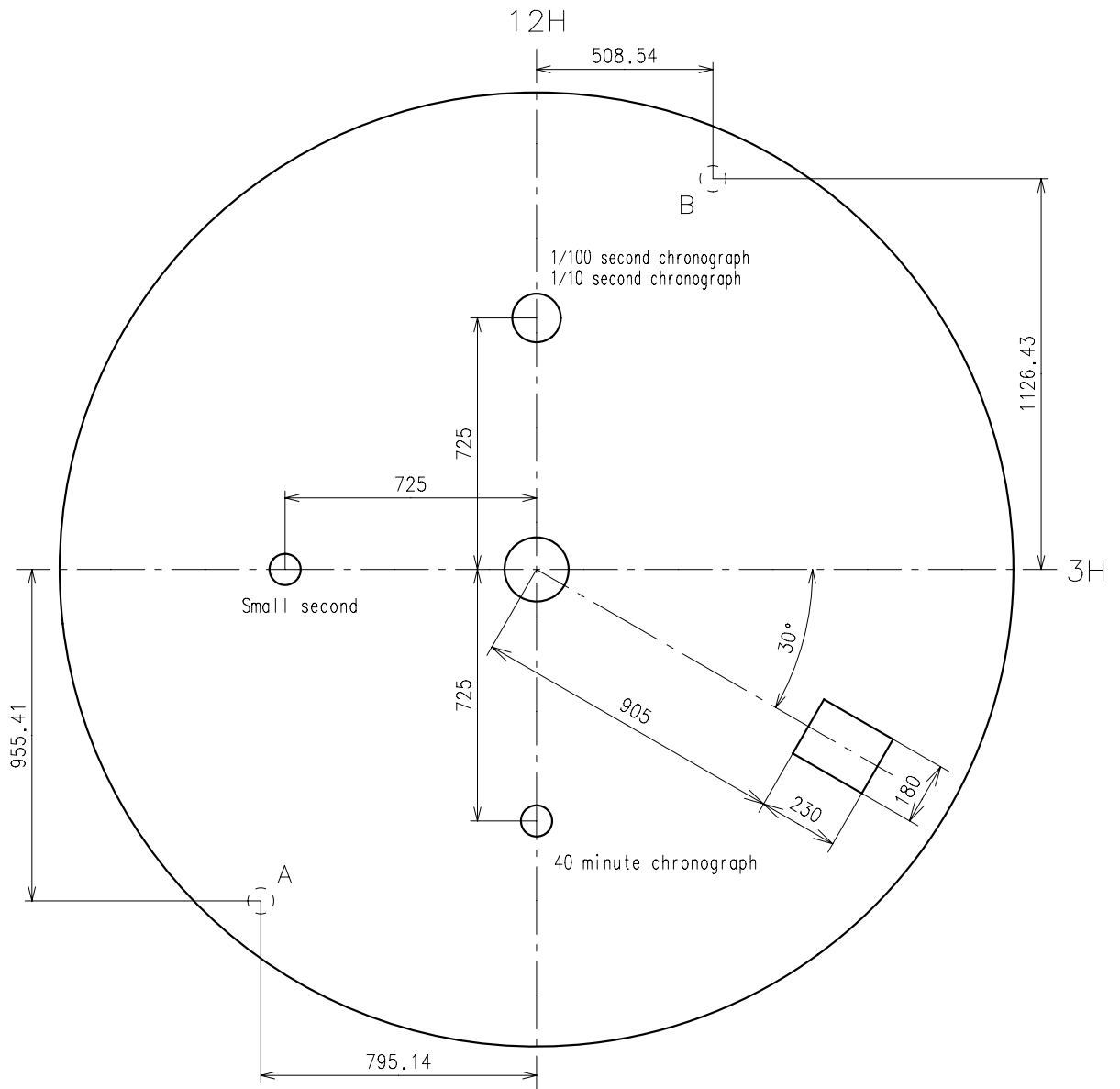
Part No. : 4259519



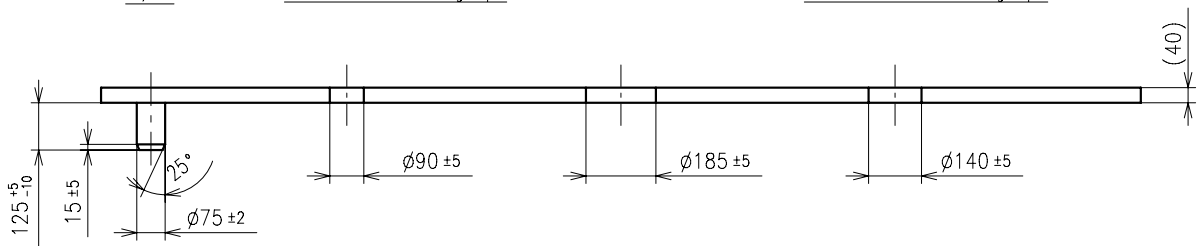


A, B Small second 1/100 second chronograph
40 minute chronograph 1/10 second chronograph

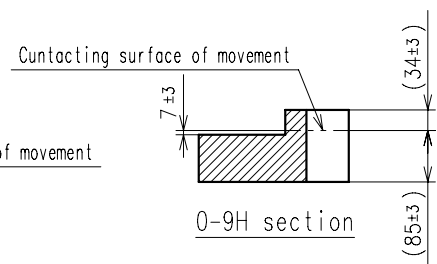
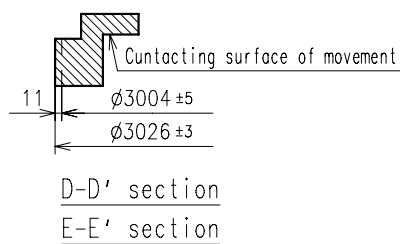
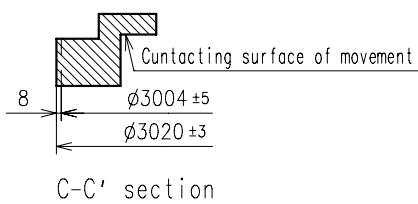
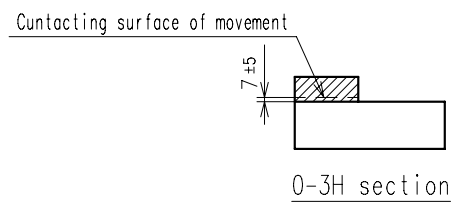
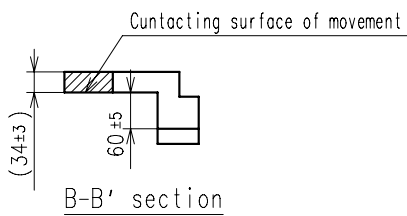
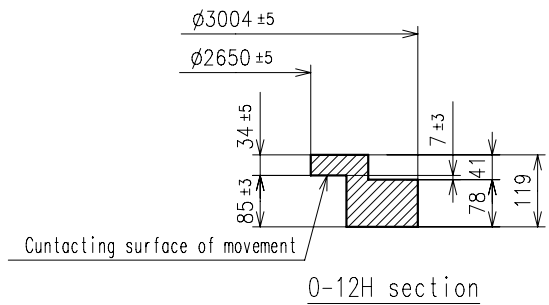
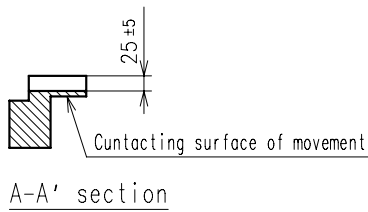
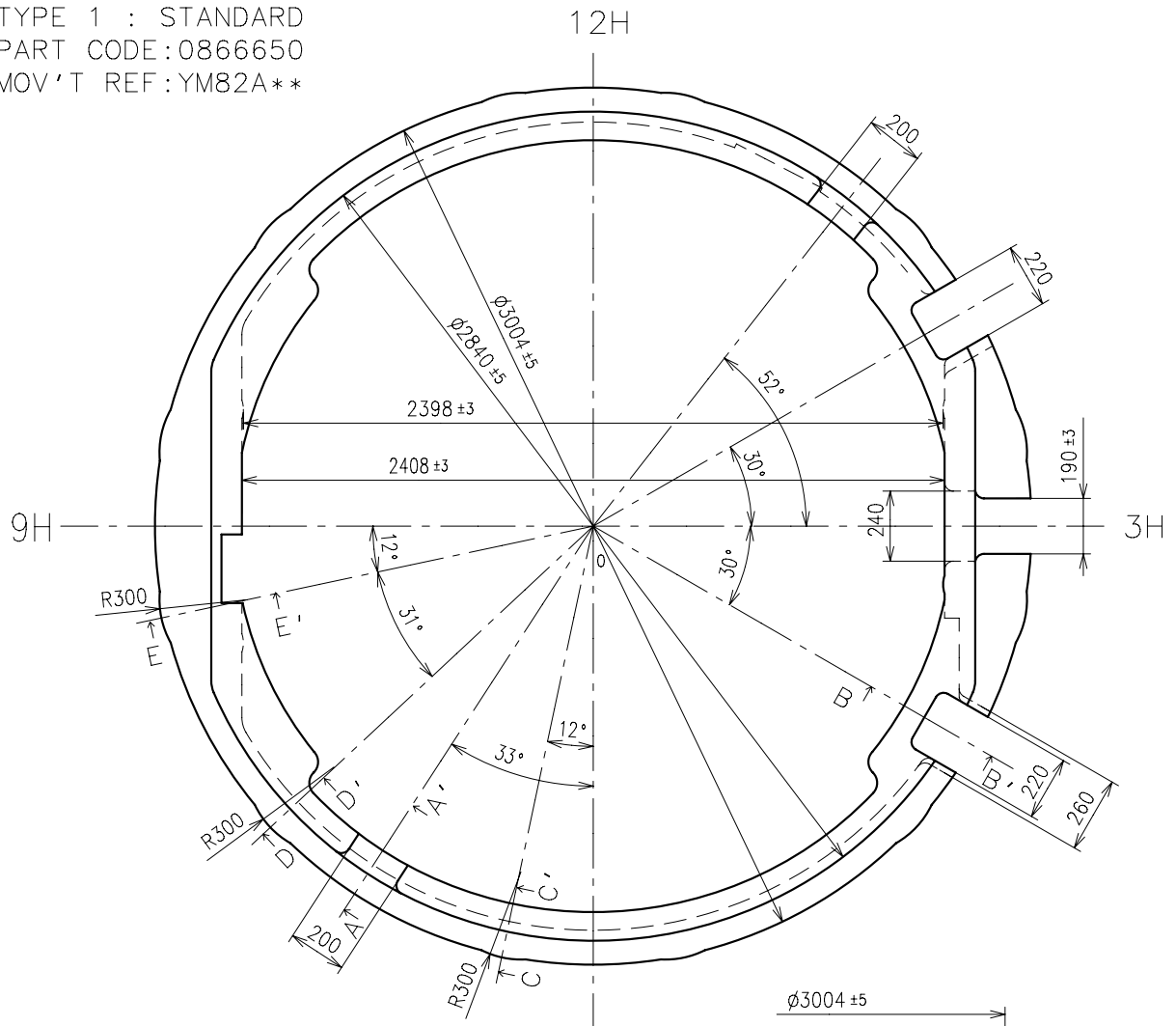




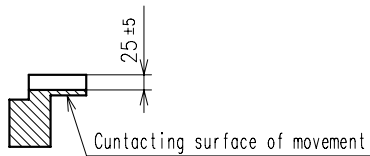
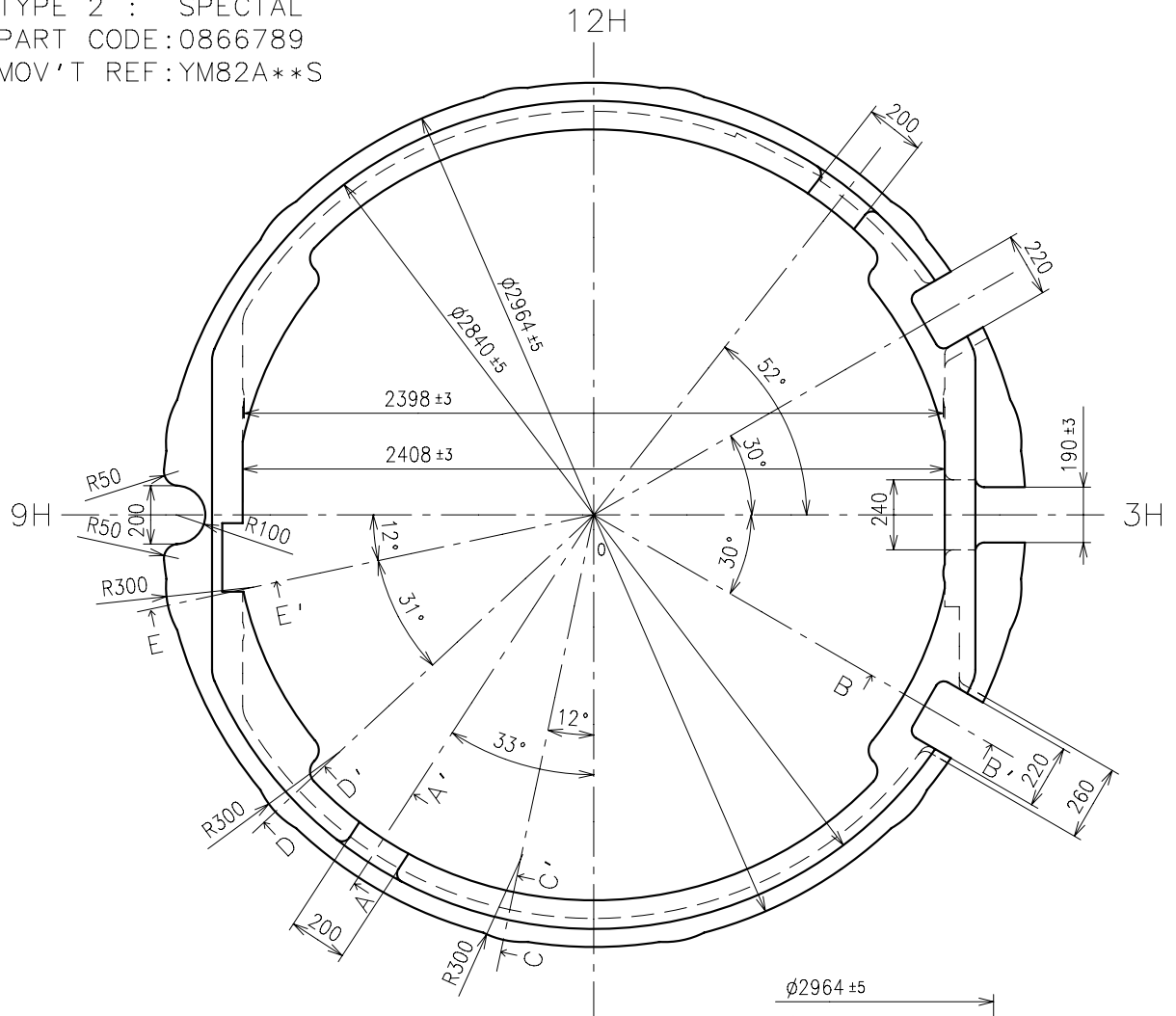
A, B Small second 1/100 second chronograph
40 minute chronograph 1/10 second chronograph



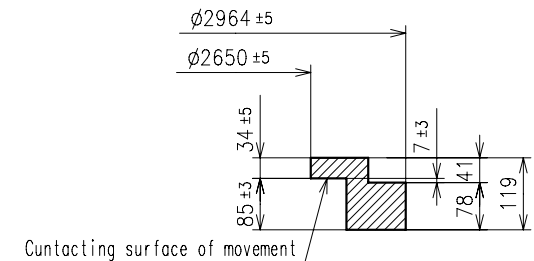
TYPE 1 : STANDARD
PART CODE: 0866650
MOV'T REF: YM82A**



TYPE 2 : SPECIAL
PART CODE: 0866789
MOV'T REF: YM82A**S

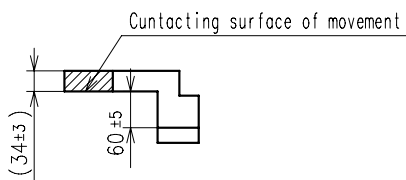


A-A' section

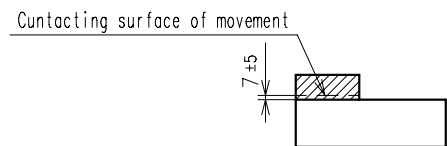


Cuntacting surface of movement

0-12H section

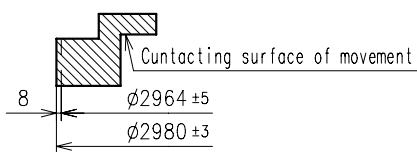


B-B' section

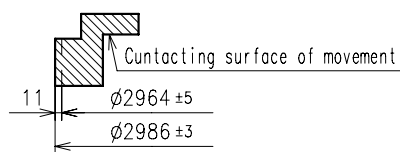


Cuntacting surface of movement

0-3H section

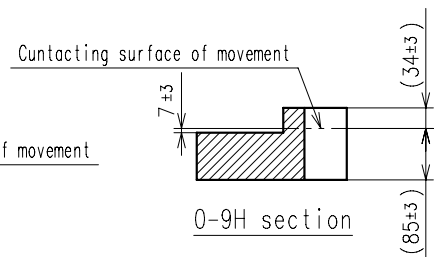


C-C' section



D-D' section

E-E' section



Cuntacting surface of movement

0-9H section

1.How to replace the battery

- Please use the specified battery to keep the stable performance for a long time.
- Please install the minus part of the battery towards inside of the watch.
- When installing or changing the battery, it is recommended to remove three battery clamp screws first, then remove the battery clamp not to damage the movement parts.
If you install the battery without removing the battery clamp, please install the battery from [→] direction as illustrated below Fig.[1].
- Install the battery under the circuit cover as illustrated below Fig.[1] and Fig.[2].
- System-reset is required as below.
After installing battery, short the circuit pattern "AC" to battery clamp for more than 2 seconds.
Then, under time setting condition, set 1/100 second chronograph / 1/10 second chronograph hand, second chronograph hand and 40 minute chronograph hand at "0" position.

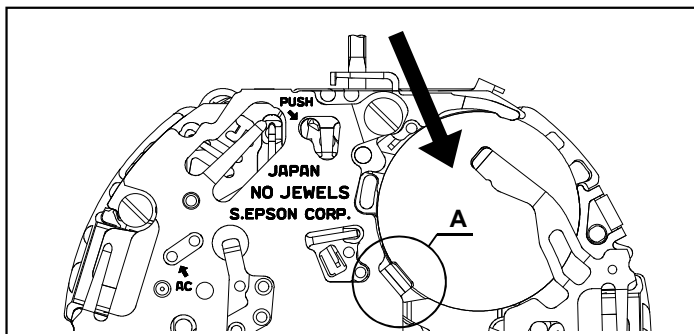


Fig.[1]

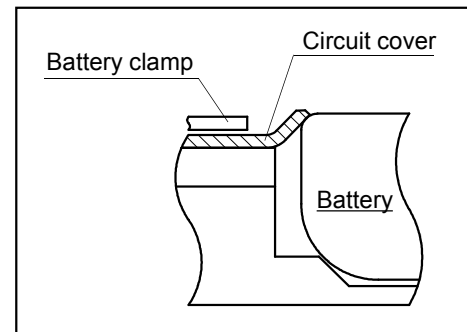


Fig.[2] A section

2.How to remove the stem

When removing the stem, pull out the crown at 1st click position and then remove the stem while pressing the hollow portion of setting lever by tweezers. (Refer to the Fig.[3].)

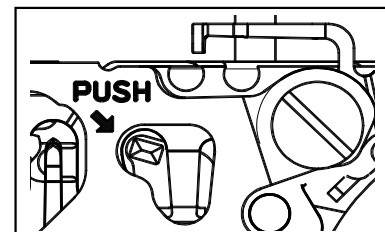


Fig.[3] Crown pulled out at 1st click

3.How to set the hands

- Each hand moves at step interval. Set the each hand at correct position according to the scale on the dial in order not to make a mistake in reading time.
- Do not turn the hand forcibly.

4.How to remove the hands

- When removing the hands, use exclusive fork-shaped tools.
- Do not remove the dial under the condition that any hands are set.

5.How to test the accuracy

When measuring the time accuracy, use specified Quartz Tester and change the gate time in 10 seconds.

1. Minute hand

The center wheel have a safety stopper structure to prevent the minute hand from being pressed too much. However pay attention to the contact between hour hand and minute hand.

2. Holding ring for dial

Use the specified holding ring for dial to prevent rotation of the movement inside of the case in order to stabilize the button operation.

Refer to the [Holding ring for dial] page instruction as to the shape and tolerance.

3. Case

Use the metal case to prevent from the movement mal-function by static electricity.

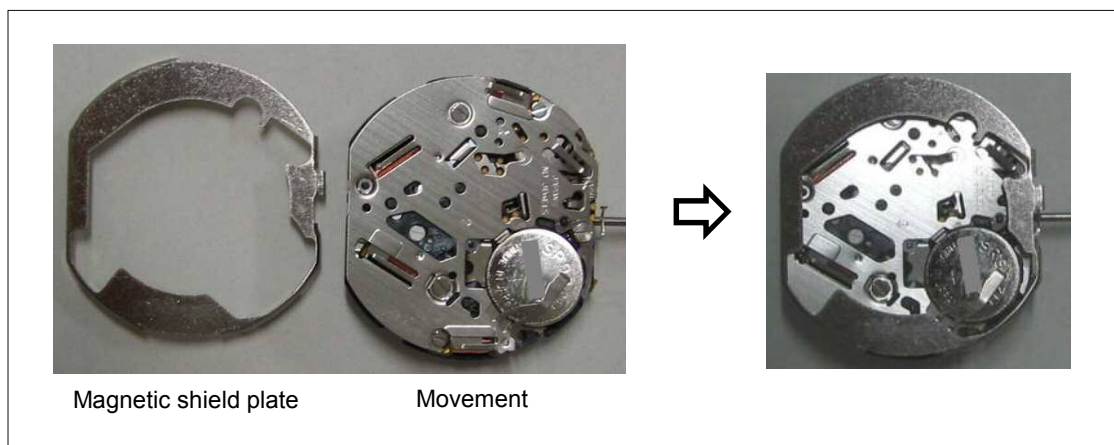
4. Hour wheel

When set and remove the hour hand repeatedly, it may reduce the hand fixing torque because the hour wheel is made by plastic.

To ensure the enough fixing torque, it isn't recommended to re-assemble the hour hand more than five times.

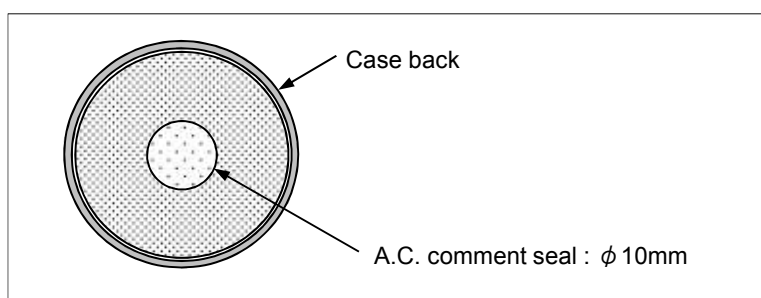
5. Magnetic shield plate

Install magnetic shield plate on the movement(on battery clamp) before assembling the case back.
Refer to the following picture not to install magnetic shield plate incorrect direction.



6. A.C. comment seal

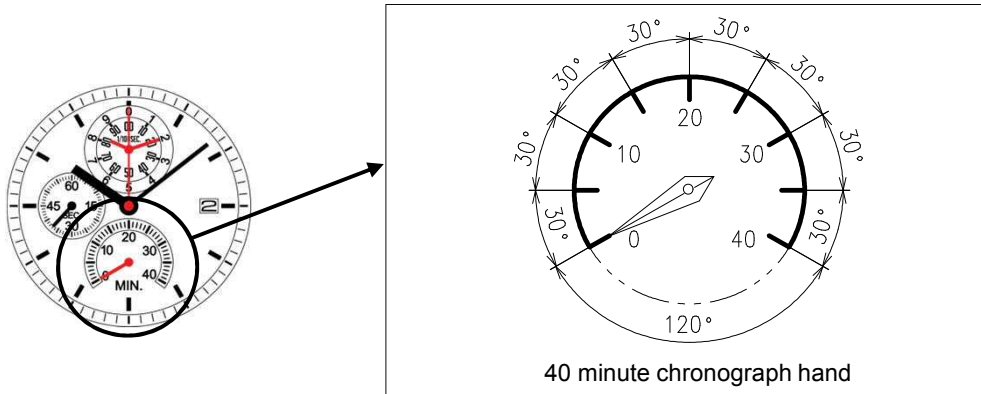
Stick A.C. comment seal to the center of case back.



Sticking position

- The amount of the misalignment between the center of case back and A.C. : 0.50mm and less comment seal

1.The index design instruction of chronograph hand



(1) Chronograph function

When the chronograph function is activated, the 40 minute chronograph hand moves 240 degrees from the start point.



(2) Set to "0" position

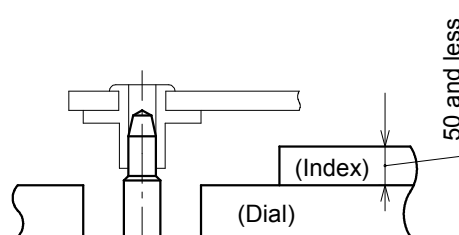
When the 40 minute chronograph hand set to "0" position, the 40 minute chronograph hand turns a full round.



(3) Dial index design

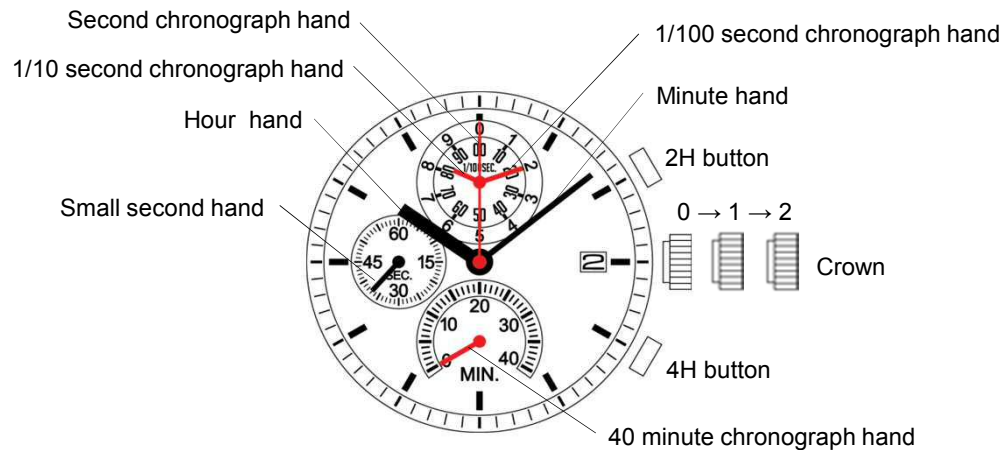
The dial index must be designed on the assumption that the 40 minute chronograph hand turns a full round.

Index height : 50 and less



2.The start position of chronograph hand

The start position of the 40 minute chronograph hand can be set on the arbitrary positions in the range of 360 degrees.



	Crown position		
	0 click	1st click	2nd click
Crown	Free	Turn clockwise for date change	Time setting
2H button	Chronograph Start/Stop Restart	Chronograph Start/Stop Restart	[*1]
4H button	Chronograph Reset [*2] Split Split release	Chronograph Reset Split Split release	[*1]

[*1] "0" position / System-reset (Crown position : 2nd click)

How to set the "0" position

Pull crown out to the 2nd click position.

↓
Press 2H button for 2 seconds.

1/100 second chronograph and 1/10 second chronograph hands turns a full round and can now be set to correct "0" position.

↓
→ Press 4H button repeatedly to set it to "0" position.

↓
Press 2H button for 2 seconds.

Second chronograph hand turns a full round and can now be set to correct "0" position.

↓
Press 4H button repeatedly to set it to "0" position.

↓
Press 2H button for 2 seconds.

40 minute chronograph hand turns a full round and can now be set to correct "0" position.

↓
Press 4H button repeatedly to set it to "0" position.

→ Press 2H button for 2 seconds here will allow you to resume the procedure again as indicated by the arrow if necessary.

↓
Push crown back to normal position.

System-reset

Pull crown out to the 2nd click position.

↓
Press 2H and 4H buttons at the same time for longer than 2 seconds.

It is necessary to set the "0" position after system-reset.

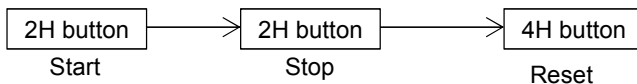
[*2] How to view the demonstration (Crown position : 0 click)

Reset the chronograph, press 4H button for 3 seconds.

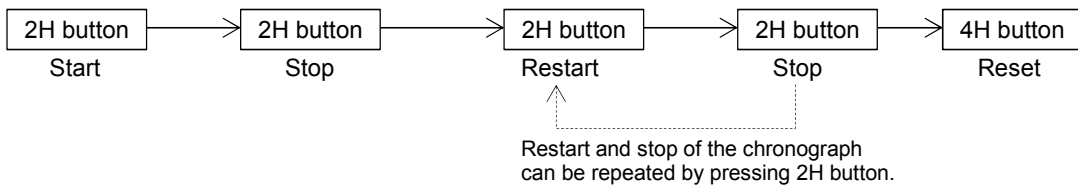
Chronograph function

- The chronograph can measure up to 41 minutes in 1/100 second increments, capable of timing 120 minutes.
- When the measurement reaches 120 minutes, the chronograph automatically stops counting. Each hand stops at following position.
 - 1/100 second chronograph hand : Stop at 0 position
 - 1/10 second chronograph hand : Stop at 0 position
 - Second chronograph hand : Stop at 0 position
 - 40 minute chronograph hand : Stop at 40 minute position
- After the chronograph is started or restarted or split released, the 1/100 second chronograph and 1/10 second chronograph hands move for 3 minutes and automatically stop at the "0" position. (counting continues inside.)
- 40 minute chronograph hand
 - When the minute counting reaches 41 minutes, the hand immediately returns and continues counting from "1" position and again after 120 minutes. (40 minutes x 3 times)

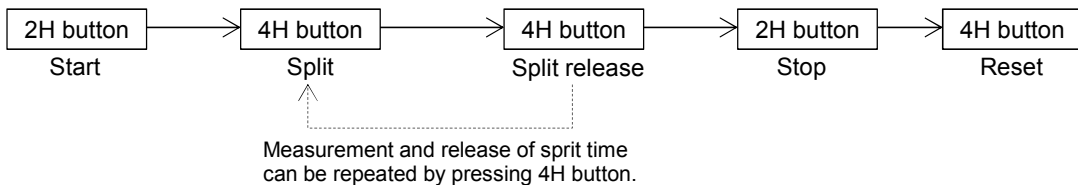
■ Standard measurement



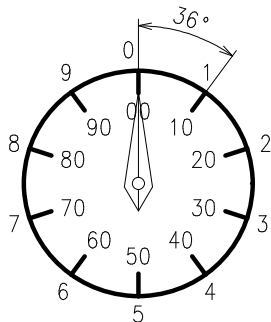
■ Accumulated elapsed time measurement



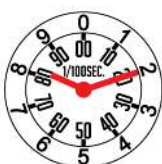
■ Split time measurement



■ Indicator of 1/100 second chronograph hand and 1/10 second chronograph hands



■ How to view the 1/100 second chronograph hand display



The left side picture shows 0.82 second.