

User manual

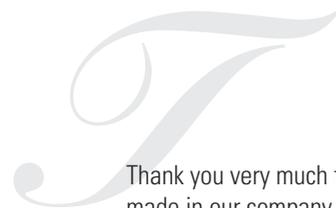


# Troja watch winder



ERWIN SATTLER  
MÜNCHEN

| Content  | Page      |
|--|-----------|
| <b>The Sattler watch winder technology</b>   | <b>4</b>  |
| <b>Grandfather clocks with watch winder</b>  |           |
| <b>Assembly instruction</b><br>for Troja 16 M, Troja Lunaris M<br>and Troja Sonata M | <b>6</b>  |
| <b>Troja 16 M</b>  | <b>8</b>  |
| The precision pendulum clock   | 9         |
| Start up the clock   | 10        |
| Start up the watch winder  | 16        |
| <b>Troja Lunaris M</b>   | <b>18</b> |
| The precision pendulum clock   | 19        |
| Start up the clock   | 20        |
| Start up the watch winder  | 26        |
| <b>Troja Sonata M</b>  | <b>28</b> |
| The precision pendulum clock   | 29        |
| Start up the clock   | 30        |
| Start up the watch winder  | 36        |
| <b>Troja Opus Temporis</b>   | <b>38</b> |
| The precision pendulum clock   | 39        |
| Assembly instruction   | 40        |
| Start up the clock   | 44        |
| Start up the watch winder  | 49        |
| <b>The Software »SMART INTERFACE«</b>  | <b>52</b> |
| <b>Fingerprintreader</b>   | <b>58</b> |
| <b>Phases of the moon</b>  | <b>66</b> |
| <b>The safe</b>  | <b>68</b> |
| Care, maintenance and FAQ's  | 74        |
| Space for your notes   | 75        |



Thank you very much for your confidence. Your watch winder has been made in our company with high manufactural expenditure and has been assembled and adjusted by our clockmakers in the traditional way. In order to have pleasure in your pendulum clock for many years, please take your time to read the following instructions and follow the advice given.

The clock and the watch winder are the result of our quest for aesthetic and mechanical perfection, coupled with top-level technical expertise in the field of watch winder technology.

The ROTALIS serie with the first »intelligent« watch winder technology enables optimum compatibility with almost every self-winding movement of the past, present and future.

We hope you enjoy

ERWIN SATTLER GmbH & Co. KG  
München

BELUWO®  
Herrieden

Made in Germany



### The purpose of a watch winder

An automatic wristwatch works best when it is kept permanently wound. Since watch collectors wear only one watch at the time, unworn watches will stop after a certain period of time. Resetting the watches especially with complications like perpetual calendars can often be time consuming.

Erwin Sattler watch winders will fulfil this task in a perfect way. The advanced ERWIN SATTLER - BELUWO - technology allows each single watch winder unit to adapt to any automatic watch movement.

### The advantages of the ERWIN SATTLER watch winders

- Each watch winding unit can be programmed and run independent from all other watch winding units
- No over-winding of the wristwatch mechanism
- Resinous deposits in the movement is prevented
- Direction of winding and rotations per day can be set individually for each wristwatch
- New movement data can easily be transferred to the memory of the Erwin Sattler watch winder
- Erwin Sattler watch winder positions the watches at the 12 o'clock position after each winding interval

# Assembly instruction

for the Troja 16 M, Troja Lunaris M and Troja Sonata M

The Troja 16 will be shipped in one box

## 1. Unpacking the case top

- a. Remove the cover and the upper side section from the case, remove the upper part of the case to the side
- b. Remove the pendulum and accessories below the removable floor

## 2. Unpacking the safe, the case bottom and the safe drawers

The safe is bolted to the box through the back wall and the bottom. The safe can only be opened in upright position.

- a. Unscrew the lower side of the box
- b. Remove the case bottom and the safe drawers
- c. Open the safe (Code = 123456)
- d. Unscrew the connection between the safe and the box (tool=17 mm bolt nut)
- e. tip over the box, unbolt and remove the screws from the bottom, straight up the box
- f. Unbolt the screws at the back wall between safe and box
- g. Remove the safe forward out of the box

## Installation of the Troja 16 M, Troja Lunaris M and Troja Sonata M

### 1. Take out the movement

Unscrew the four knurled movement holding nuts, pull the movement up to the front out of the case and put it carefully down on an even and firm underground with the dial downwards.

### 2. Unscrew the cover of the movement holding plate with enclosed special tool.

### 3. Place the safe at the final position.

### 4. The safe can be fixed at the wall or floor. Check for wiring in the wall or floor. To use the enclosed metal plug a 14 mm drill is required.

### 5. Place the case top on the case bottom and connect it with 6 screws from below.

### 6. Both connectors on the backside of the case bottom must be inserted in the matching jack.

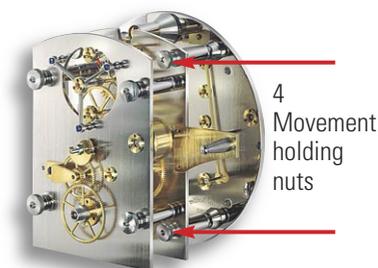
### 7. Push the complete case over the safe.

### 8. By using the adjustable feet you can level the case, if needed and the POM tube behind the cover plate (therefore you need the side of the special tool with the two pins).

### 9. The case must be fixed to the wall as follows:

- a. Mark drilling position with special tool
- b. Move case aside
- c. Drill (14 mm) and insert wall plug
- d. Connect the AC-adaptor to the power plug (located in the case bottom)
- e. Bring the case back into final position and secure it with the supplied screw

### 10. Fitting the movement and starting the clock , see the following pages



## Troja 16 M

Precision pendulum clock,  
extendible watch winder and safe



## The precision pendulum clock Caliber 1965

Your decision to purchase the precision pendulum clock with seconds pendulum shows that you belong to the very small circle of special connoisseurs of highest mechanical clockmaking art. Your new clock is after all a first-class product of our company concerning its construction, faithfulness to details and last but not least its great manufactural expense.

Such a precious instrument naturally has to be handled with a high degree of care. Let alone for this reason you should read the following information and follow the advice given. You will thus be able to enjoy your pendulum clock for many decades.

In order to protect them from corrosion, all brass parts of the clock are gold-plated. The exact fine machining and the arrangement of the bearings concerning the gears and all parts of the escapement ensure – good maintenance being presupposed – perfect function for generations.

One of the reasons why you decided to purchase this pendulum clock is its accuracy. The accuracy does, however, not only result from the mechanical factors of the clockwork. It does also depend upon external, physical influences. The period of oscillation of the pendulum is thus mainly determined by its physical length. Changes of temperature, as is generally known, result in a variation of length according to the longitudinal expansion coefficient of the materials employed. The pendulum rod of your clock consists of a material called super invar. This iron-nickel alloy reacts on changes of temperature only to very small extent. And this is to a very large extent compensated by an exactly calculated temperature compensation. Due to work tolerances during manufacture of the material a minimal compensation error may however occur. It is thus advisable to expose your clock to merely small changes of temperature. If you observe this when choosing the place for the clock, the deviations of accuracy may come to approx. 2 seconds per month.

Since the period of oscillation of a pendulum extends when air pressure rises, your clock is equipped with a barometric-error compensation. It consists of aneroid boxes and a weight, which is during changes of air pressure moved upwards or downwards to an exactly defined degree, thus reacting to a change of the period of oscillation.

Finally it has to be observed that vibrations transmitted to the pendulum and the suspension spring result in deviations of accuracy. While opening or closing the clock case you should therefore avoid shocks. The wall to which the clock is fixed should therefore also be as stable as possible.

## Start up the clock

See assembly instruction page 6.

### Caution!

With the clock, there is a protecting cover that has to be laid inside the bottom of the case! The cover has to be used, to avoid damages of the case! Please remove the cover only after the installation is complete!

## How to hang in the pendulum

### Caution!

Do always hold or carry the pendulum at the free pendulum rod, never at the adjusting-table or the plate of the barometer-instrument.

Since the movement is already removed, the nickel plated protection tube can be pulled off from the suspension spring block (located between the two upper movement holding pillars).

Remove the suspension spring and keep in reach. Now unscrew the protection cap from the tip of the pendulum. To avoid damage of the delicate suspension spring we recommend to insert it into the slot of the pendulum rod first, hold it in place and then hang the pendulum together with the suspension spring into the suspension spring block.

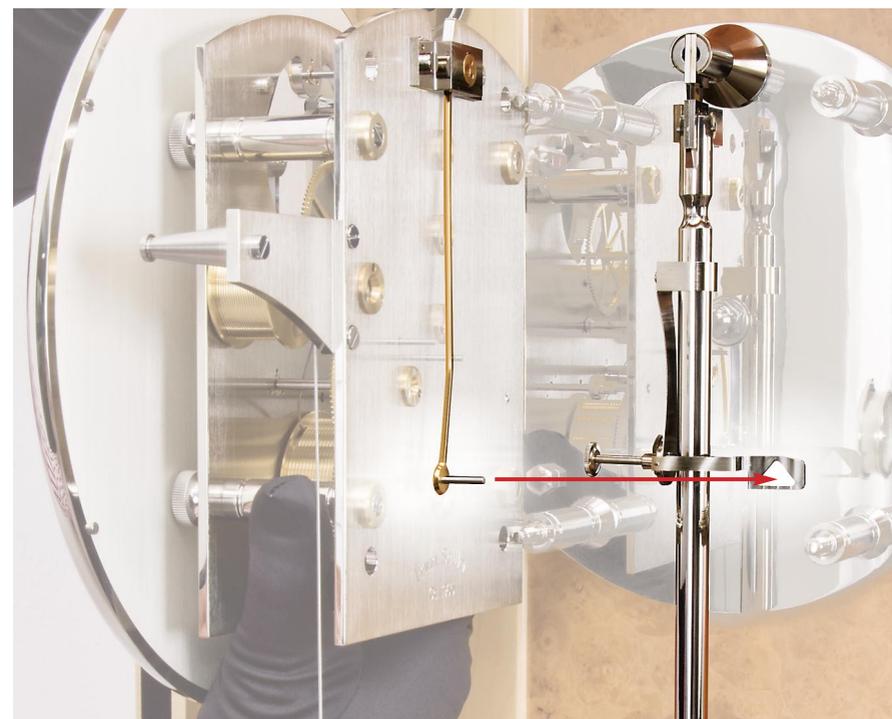


Push back the protection tube on the suspension spring block. Because of the lateral mounted air pressure compensation, the pendulum is pushed slightly from the centre position to the side. By turning the nuts at the sides of the pendulum scale you can adjust the pendulum scale in a position that the tip of the pendulum points exactly to »0«.

## How to fit in the movement

Remove the safety rubber band from the pallet lever. Push the movement on the 4 pillars and screw it down with the four knurled nuts. Remove the transport protection of the escapement lever.

So that motion can be transmitted from the movement to the pendulum, the driving pin of the pallet lever must be inserted in the triangular cut-out in the safety flap on the beat adjuster. To do so, reach behind the movement from the side, carefully press the lever with the cut-out backwards and upwards until the driving pin slots into the triangular cut-out.



## How to set the barometer hand

The scale of the barometer does not correspond to the display of changes of pressure measured in hectopascal, as is nowadays the case with barometers. The scale does rather display the changes of pressure, as it was formerly done, in millimetre mercury column. When the pressure at the destination of the clock is »normal« adjust the display by setting the hand of the barometer to zero by turning the knurled-head screw above the aneroid boxes.

You can now read the reactions of the barometer to changes of pressure as follows: High pressure is displayed in the upper half of the scale, in the »positive« range, low pressure is displayed in the lower half of the scale, in the »negative« range. If the pressure increases the period of oscillation of the pendulum lengthens, thus the clock is slow. By the compression of the aneroid boxes however, the weight located on them sinks towards the centre of the pendulum, resulting in the acceleration of the pendulum. The change in speed caused by the change of pressure is thus compensated.

## How to start the clock

Before hanging the weight into the pulley, make sure the cable runs in the front groove of the guide pulley.

Wind the clock with the crank one **turn counter clock wise**. Deflect the pendulum until a »tick«, caused by the drop of the escapement wheel tooth on the pallet, is audible. Watch the pendulum scale and note the angular minutes, indicated by the tip of the pendulum, exactly in the moment where the »tick« occurs. Now deflect the pendulum to the other side and again note the angular minutes when the »tick« is audible. It is ideal, when the angular minutes are equal on both sides.

If the pendulum has to be deflected more to the right side than to the left to hear the »tick«, you can correct this by turning the adjustment screw on the pendulum rod behind the movement to the right side.

## How to set the time

When setting the time, the minute hand may be turned forwards as well as backwards. The second hand shall not be turned. In order to synchronise the second hand to that of another clock (e.g. a radio clock) stop the pendulum when the second hand has reached the mark of the sixtieth second. Let the pendulum go when the second hand of the clock of comparison reaches the sixtieth second.

## How to adjust the accuracy

Your clock has been exactly adjusted in our workshop. The transport, the sea level and the geographic latitude of the place where the clock is hung up may however lead to a variation in the period of oscillation of the pendulum. You will therefore most probably have to adjust your clock once again.

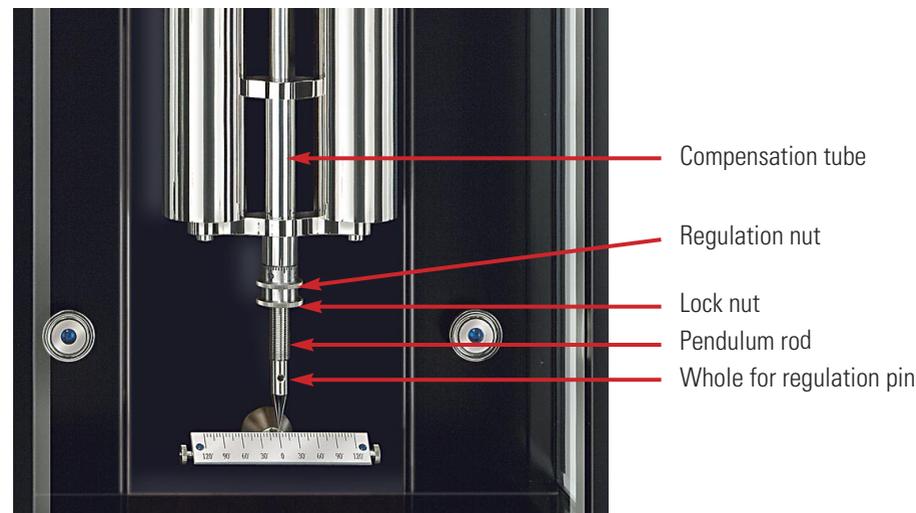
**Adjust your clock as follows:**

### 1) Coarse adjustment:

Should the accuracy deviate by more than one second per day it is necessary to adjust the clock by the adjusting nut.

Please stop the pendulum first. Now put the regulation pin enclosed in the case into the hole below the counter nut in the pendulum rod to avoid a twisting of the suspension spring during adjustment.

Loosen the lower nut, the lock nut, and then screw the adjusting nut one line to the left per second gained per day, i.e. one line to the right per second lost per day. Afterwards screw the lock nut slightly up again. After having watched the accuracy a couple of days you may readjust the clock as described above.



### 2) Precision adjustment:

For precision adjustment of the clock, i.e. for the correction of small deviations of accuracy, you don't need to stop the pendulum.

Precision adjustment is done by means of the timing weights in the case. Place them on the adjusting-table situated at the middle of the pendulum rod.

The heavier the timing weight, the greater the acceleration of the pendulum, i.e. the faster runs the clock.

By taking away a timing weight, the period of oscillation of the pendulum is lengthened, i.e. the clock goes slower.

### 3) How to correct deviations of 1 - 2 seconds from standard time:

You can correct deviations of 1 - 2 seconds from standard time with the aid of the two stainless steel regulation weights also enclosed in the case. You neither need to stop the pendulum, nor the second hand. One of the weights should thus always be located on the adjusting table.

In case the second hand deviates approx. minus 1 second from standard time, place the second weight onto the adjusting table as well. As soon as the deviation is recovered, take the weight off again.

A deviation of approx. plus 1 second shall be corrected by occasionally taking away the weight permanently located on the adjusting table.

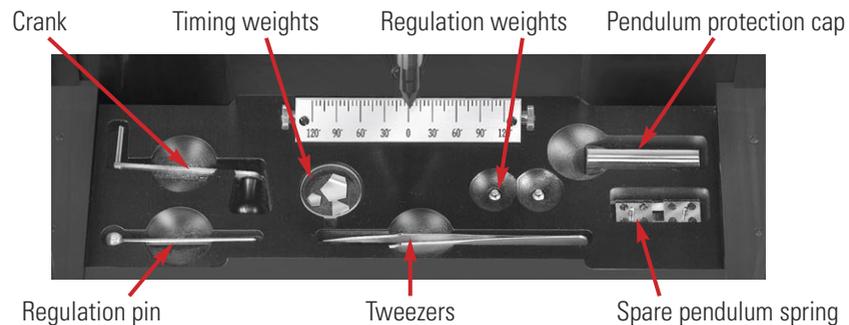
Due to the fact that every place on earth has a different gravitation, a clock that runs +/- 0 sec in Munich/Germany will gain or lose time if it is located somewhere else.

As an example see the list below:

| Place          | Gravitation<br>g in cms <sup>-2</sup> | Fast<br>in sec./day | Slow<br>in sec./day |
|----------------|---------------------------------------|---------------------|---------------------|
| Bangkok        | 978,321                               |                     | 106,2               |
| Berlin         | 981,288                               | 24,4                |                     |
| Budapest       | 980,852                               | 5,2                 |                     |
| Bukarest       | 980,554                               |                     | 7,9                 |
| Göttingen      | 981,176                               | 19,5                |                     |
| Hamburg        | 981,375                               | 28,2                |                     |
| Madrid         | 979,981                               |                     | 33,1                |
| München        | 980,733                               | 0                   | 0                   |
| Nürnberg       | 980,942                               | 9,2                 |                     |
| Rom            | 980,347                               |                     | 17,0                |
| St. Petersburg | 981,925                               | 52,5                |                     |
| Stockholm      | 981,843                               | 48,8                |                     |
| Stuttgart      | 980,901                               | 7,4                 |                     |
| Tokio          | 979,805                               |                     | 40,9                |

### The accessory box

When the front door is completely opened, you can pull out the box cover. In the bottom of the case you find the accessories as shown in the picture below.



### Technical specifications

#### Classica Secunda 1995 – Cal. 1965

- plates of 4 mm thick, rolled brass
- nuts of stainless steel
- main wheel and guide pulley running in ball-bearings – altogether 5 precision ball bearings
- gears and anchor mounted in 11 jewel bearings, in gold plated, screwed chatons (9 jewels in movement cal. 1955)
- pinions with high number of teeth (12 and 20) of hardened steel, polished
- gears finely crossed out, milled, precision-ground, bevelled and gold-plated
- Graham escapement with improved transmission system
- gold-plated escapement lever
- agate pallets
- suspension spring of rolled spring stainless steel
- pendulum rod of heat treated super invar
- pendulum weight turned of solid brass, nickel-plated
- temperature compensation
- barometric-error compensation with 5 aneroid boxes
- adjusting-table
- top plate of 6 mm thick brass, nickel-plated
- rope pulley polished and nickel-plated, mounted in a jewel bearing (1985) or ball bearing (1995)
- weight in nickel-plated brass tube, 3100g
- steel hands, hand-made and blued
- dial engraved, silver-plated
- bezel turned of solid brass, nickel-plated or gold-plated
- winding period of 4 weeks
- achievable accuracy: under optimal conditions- deviation of less than 1-2 sec. / month possible
- clock case of solid fine wood
- 3 bevelled crystal glass plates
- beat rate 3600 per hour

## Starting up your Troja 16 M watch winder

Please plug in the power supply. The Troja 16 M will start automatically.

The Troja 16 M's intelligent control system is pre-programmed in such a way that over 80% of all automatic movements will be reliably and carefully wound with no further settings being necessary.

If you desire to optimize the settings for your watch, you can do so by using the software »Smart interface«. How to use the software is described in chapter »Manual for software smart interface« (see page 52).

The intelligent control of the Erwin Sattler watch winders runs an active phase and sleeping phase.

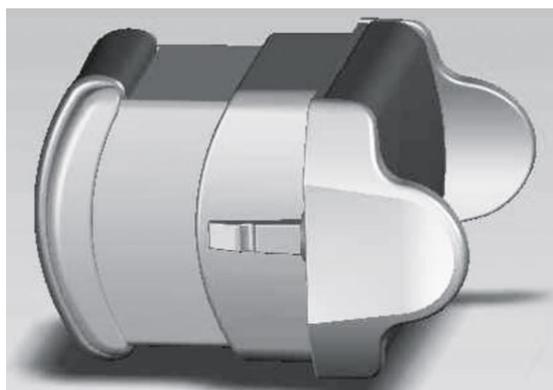
If you start up the Troja 16 M (connect it to the power supply) for the first time at 8.00 a.m., for example, the watch winder begins moving at 8.00 a.m. every day.

From this point on, the watch winder units will start from 8 a.m. till 12 p.m. every day so then have they a stationary phase lasting 10 hours. During this stationary phase, the mainspring in the wristwatch is slackened to allow the watch to function in an optimum operating range.

## Inserting watches

Before inserting the wristwatches, please make sure that the motor is stopped. Now you can place the watch on its watch holder.

To remove the watch from the watch winder unit, grab the watch holder at both levers and pull off from the holding mechanism.



Now you can push the watch with closed bracelet over the watch holder. For better handling the watch holder can be compressed. In order to secure the watch, the watch holder will expand to the width of the wristband.

Replace the watch holder in the housing of the winder.

Please make sure that the watches are always set at **12 o'clock position** when inserted. They will return to this position after each winding interval.

## Integrated drawer with control element

Holding on the drawer with both hands left and right and pull it out



Left button:

**Light on:** Press briefly once

**Open the base door:** Press and hold the button 3-4 seconds

Right button:

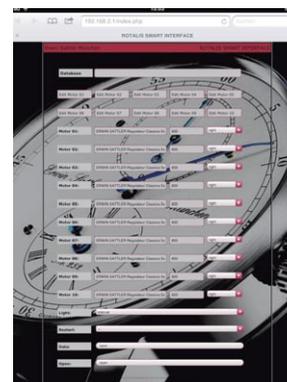
**Close the watch winder units:**  
Press and hold the button

## Fingerprint reader

You will find the manual for the fingerprint reader at page 58

## The software

How to use the software is described in chapter »Manual for software smart interface« see page 52



## The safe

You will find the manual for the safe at page 68



## Maintenance and FAQ's

See page 74

## Troja 16 M

### Technical data

Power supply:  
Operating voltage: 110 - 230V  
Netzfrequenz: 50/60 Hz  
Only with appropriate power supply adapter

### Dimensions

Height: 217 cm  
Width: 48 cm  
(with extended watch winders 70 cm)  
Depth: 40 cm

## Troja Lunaris M

Precision pendulum clock, calendar,  
moon phase, extendible watch winder and safe



## The precision pendulum clock Caliber 1915

Your decision to purchase the precision pendulum clock with seconds pendulum shows that you belong to the very small circle of special connoisseurs of highest mechanical clockmaking art. Your new clock is after all a first-class product of our company concerning its construction, faithfulness to details and last but not least its great manufactural expense.

Such a precious instrument naturally has to be handled with a high degree of care. Let alone for this reason you should read the following information and follow the advice given. You will thus be able to enjoy your pendulum clock for many decades.

In order to protect them from corrosion, all brass parts of the clock are gold-plated. The exact fine machining and the arrangement of the bearings concerning the gears and all parts of the escapement ensure – good maintenance being presupposed – perfect function for generations.

One of the reasons why you decided to purchase this pendulum clock is its accuracy. The accuracy does, however, not only result from the mechanical factors of the clockwork. It does also depend upon external, physical influences. The period of oscillation of the pendulum is thus mainly determined by its physical length. Changes of temperature, as is generally known, result in a variation of length according to the longitudinal expansion coefficient of the materials employed. The pendulum rod of your clock consists of a material called super invar. This iron-nickel alloy reacts on changes of temperature only to very small extent. And this is to a very large extent compensated by an exactly calculated temperature compensation. Due to work tolerances during manufacture of the material a minimal compensation error may however occur. It is thus advisable to expose your clock to merely small changes of temperature. If you observe this when choosing the place for the clock, the deviations of accuracy may come to approx. 2 seconds per month.

Since the period of oscillation of a pendulum extends when air pressure rises, your clock is equipped with a barometric-error compensation. It consists of aneroid boxes and a weight, which is during changes of air pressure moved upwards or downwards to an exactly defined degree, thus reacting to a change of the period of oscillation.

Finally it has to be observed that vibrations transmitted to the pendulum and the suspension spring result in deviations of accuracy. While opening or closing the clock case you should therefore avoid shocks. The wall to which the clock is fixed should therefore also be as stable as possible.

## Start up the clock

See assembly instruction page 6.

### Caution!

With the clock, there is a protecting cover that has to be laid inside the bottom of the case! The cover has to be used, to avoid damages of the case! Please remove the cover only after the installation is complete!

## How to hang in the pendulum

### Caution!

Do always hold or carry the pendulum at the free pendulum rod, never at the adjusting-table or the plate of the barometer-instrument.

Since the movement is already removed, the nickel-plated protection tube can be pulled off from the suspension spring block (located between the two upper movement holding pillars).

Remove the suspension spring and keep in reach. Now unscrew the protection cap from the tip of the pendulum. To avoid damage of the delicate suspension spring we recommend to insert it into the slot of the pendulum rod first, hold it in place and then hang the pendulum together with the suspension spring into the suspension spring block.

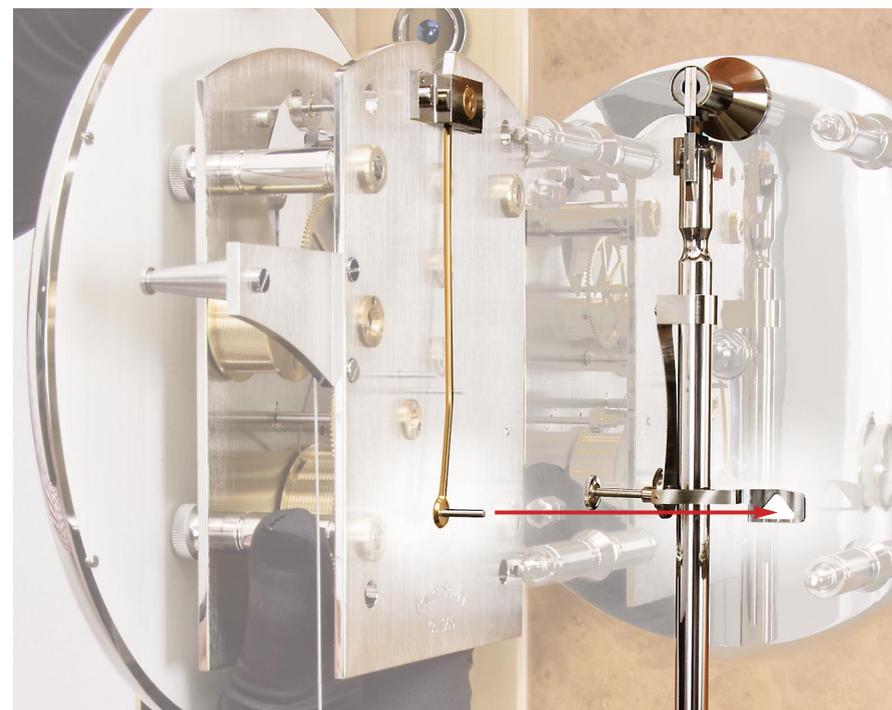


Push back the protection tube on the suspension spring block. Because of the lateral mounted airpressure compensation, the pendulum is pushed slightly from the centre position to the side. By turning the nuts at the sides of the pendulum scale you can adjust the pendulum scale in a position that the tip of the pendulum points exactly to »0«.

## How to fit in the movement

Remove the safety rubber band from the pallet lever. Push the movement on the 4 pillars and screw it down with the four knurled nuts. Remove the transport protection of the escapement lever.

So that motion can be transmitted from the movement to the pendulum, the driving pin of the pallet lever must be inserted in the triangular cut-out in the safety flap on the beat adjuster. To do so, reach behind the movement from the side, carefully press the lever with the cut-out backwards and upwards until the driving pin slots into the triangular cut-out.



## How to set the barometer hand

The scale of the barometer does not correspond to the display of changes of pressure measured in hectopascal, as is nowadays the case with barometers. The scale does rather display the changes of pressure, as it was formerly done, in millimetre mercury column. When the pressure at the destination of the clock is »normal« adjust the display by setting the hand of the barometer to zero by turning the knurled-head screw above the aneroid boxes.

You can now read the reactions of the barometer to changes of pressure as follows: High pressure is displayed in the upper half of the scale, in the »positive« range, low pressure is displayed in the lower half of the scale, in the »negative« range. If the pressure increases the period of oscillation of the pendulum lengthens, thus the clock is slow. By the compression of the aneroid boxes however, the weight located on them sinks towards the centre of the pendulum, resulting in the acceleration of the pendulum. The change in speed caused by the change of pressure is thus compensated.

## How to start the clock

Before hanging the weight into the pulley, make sure the steel cable runs in the front groove of the guide pulley.

Wind the clock with the crank one **turn counter clock wise**. Deflect the pendulum until a »tick«, caused by the drop of the escapement wheel tooth on the pallet, is audible. Watch the pendulum scale and note the angular minutes, indicated by the tip of the pendulum, exactly in the moment where the »tick« occurs. Now deflect the pendulum to the other side and again note the angular minutes when the »tick« is audible. It is ideal, when the angular minutes are equal on both sides. If the pendulum has to be deflected more to the right side than to the left to hear the »tick«, you can correct this by turning the adjustment screw on the pendulum rod behind the movement to the right side.

## How to set the time

When setting the time, the minute hand may be turned only clockwise. The second hand shall not be turned. In order to synchronise the second hand to that of another clock (e.g. a radio clock) stop the pendulum when the second hand has reached the mark of the sixtieth second. Let the pendulum go when the second hand of the clock of comparison reaches the sixtieth second.

## How to adjust the accuracy

The clock has been exactly adjusted in our workshop. Transport and variations of the geographical height can however lead to a change of the period of oscillation of the pendulum. It will thus in most cases be necessary to adjust your clock anew.

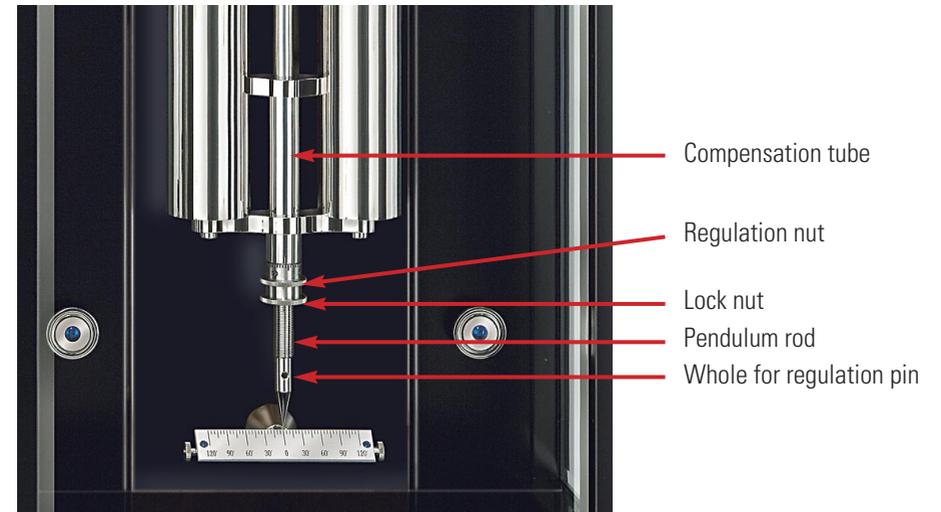
Adjust your clock as follows:

### 1) Coarse adjustment:

Should the accuracy deviate by more than one second per day it is necessary to adjust the clock by the adjusting nut.

Please stop the pendulum first. Now put the regulation pin enclosed in the case into the hole below the lock nut in the pendulum rod to avoid a twisting of the suspension spring during adjustment.

Loosen the lower nut, the lock nut, and then screw the adjusting nut one line to the left per second gained per day, i.e. one line to the right per second lost per day. Afterwards screw the counter nut slightly up again. After having watched the accuracy a couple of days you may readjust the clock as described above.



### 2) Precision adjustment:

For precision adjustment of the clock, i.e. for the correction of small deviations of accuracy, you don't need to stop the pendulum.

Precision adjustment is done by means of the timing weights in the case. Place them on the adjusting-table situated at the middle of the pendulum rod. The heavier the timing weight, the greater the acceleration of the pendulum, i.e. the faster runs the clock.

By taking away a timing weight, the period of oscillation of the pendulum is lengthened, i.e. the clock goes slower.

### 3) How to correct deviations of 1 - 2 seconds from standard time:

You can correct deviations of 1 - 2 seconds from standard time with the aid of the two stainless steel regulation weights also enclosed in the case. You neither need to stop the pendulum, nor the second hand. One of the weights should thus always be located on the adjusting table.

In case the second hand deviates approx. minus 1 second from standard time, place the second weight onto the adjusting table as well. As soon as the deviation is recovered, take the weight off again.

A deviation of approx. plus 1 second shall be corrected by occasionally taking away the weight permanently located on the adjusting table.

Due to the fact that every place on earth has a different gravitation, a clock that runs +/- 0 sec in Munich/Germany will gain or lose time if it is located somewhere else. As an example see the list below:

| Place          | Gravitation<br>g in cms <sup>-2</sup> | Fast<br>in sec./day | Slow<br>in sec./day |
|----------------|---------------------------------------|---------------------|---------------------|
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| Budapest       | 980,852                               | 5,2                 |                     |
| Bukarest       | 980,554                               |                     | 7,9                 |
| Göttingen      | 981,176                               | 19,5                |                     |
| Hamburg        | 981,375                               | 28,2                |                     |
| Madrid         | 979,981                               |                     | 33,1                |
| München        | 980,733                               | 0                   | 0                   |
| Nürnberg       | 980,942                               | 9,2                 |                     |
| Rom            | 980,347                               |                     | 17,0                |
| St. Petersburg | 981,925                               | 52,5                |                     |
| Stockholm      | 981,843                               | 48,8                |                     |
| Stuttgart      | 980,901                               | 7,4                 |                     |
| Tokio          | 979,805                               |                     | 40,9                |

## How to set date, day and moonphase

Date and day can be set by turning manually the hands clockwise.

**Caution: Don't set day and date between 11pm and 3am.**

The moonphase can be set by pushing the moonlever behind the dial at the »6 and 7 o'clock« position. Push the lever upwards so many times until the desired position is indicated.

**Don't set the moonphase between 9am and 12am.**

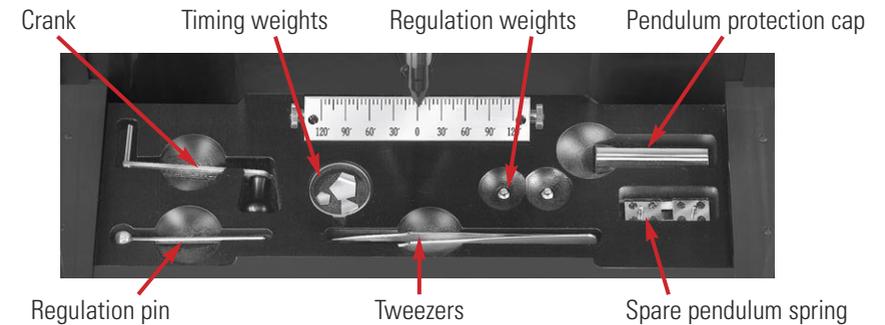
|           | 2016       | 2017     | 2018       | 2019       | 2020       | 2021     |
|-----------|------------|----------|------------|------------|------------|----------|
| January   | 10<br>24   | 12<br>28 | 2/31<br>17 | 6<br>21    | 10<br>24   | 13<br>28 |
| February  | 7<br>22    | 11<br>26 | 15<br>23   | 4<br>19    | 9<br>23    | 11<br>27 |
| March     | 9<br>23    | 12<br>28 | 2/31<br>17 | 6<br>21    | 9<br>24    | 13<br>28 |
| April     | 7<br>22    | 11<br>26 | 16<br>30   | 5<br>19    | 8<br>23    | 12<br>27 |
| May       | 6<br>21    | 10<br>25 | 15<br>29   | 4<br>18    | 7<br>22    | 11<br>26 |
| June      | 5<br>20    | 9<br>24  | 13<br>28   | 3<br>17    | 5<br>21    | 10<br>24 |
| July      | 4<br>19    | 9<br>23  | 13<br>27   | 2<br>16    | 5<br>20    | 10<br>24 |
| August    | 2<br>18    | 7<br>21  | 11<br>26   | 1/30<br>15 | 3<br>19    | 8<br>22  |
| September | 1<br>16    | 6<br>20  | 9<br>25    | 14<br>28   | 2<br>17    | 7<br>20  |
| October   | 1/30<br>16 | 5<br>19  | 9<br>24    | 13<br>28   | 1/31<br>16 | 6<br>20  |
| November  | 14<br>29   | 4<br>18  | 7<br>23    | 12<br>26   | 15<br>30   | 4<br>19  |
| December  | 14<br>29   | 3<br>18  | 7<br>22    | 12<br>26   | 14<br>30   | 4<br>19  |

● = Fullmoon    ○ = Newmoon

You will find the calendar of the moon phases at page 66

## The accessory box

When the front door is completely opened, you can pull out the box cover. In the bottom of the case you find the accessories as shown in the picture below.



## Technical specifications

### Secunda Lunaris – Cal. 1915

- plates of 4 mm thick, rolled brass
- nuts of stainless steel
- complete geartrain in ballbearings (9 Stainless steel ballbearings)
- 6 jewelled bearings
- 2 agate pallets
- pinions with high number of teeth, made of hardened steel and polished
- gears finely crossed out, milled, precision-ground, and gold-plated
- Graham escapement with improved transmission system
- gold-plated escapement lever
- hand painted moonphases-disc
- suspension spring of rolled spring stainless steel
- pendulum rod of heat treated super invar
- pendulum weight turned of solid brass, nickel-plated
- temperature compensation
- barometric-error compensation with 5 aneroids
- fine regulation table
- base plate of 6 mm thick brass, nickel-plated
- rope pulley with ball bearings
- weight in nickel-plated brass tube, 4500 g
- steel hands, hand-made and blued
- milled dial, silver-plated and printed
- bezel turned of solid brass, nickel-plated or gold-plated
- winding period of 30 days
- achievable accuracy: under optimal conditions +/-5 sec. / month
- clock case of solid fine wood
- 3 bevelled crystal glass plates
- beat rate: 3600/h = 60/min

## Starting up your Troja Lunaris M watch winder

Please plug in the power supply. The Troja Lunaris M will start automatically.

The Troja Lunaris M's intelligent control system is pre-programmed in such a way that over 80% of all automatic movements will be reliably and carefully wound with no further settings being necessary.

If you desire to optimize the settings for your watch, you can do so by using the software »Smart interface«. How to use the software is described in chapter »Manual for software smart interface« (see page 52).

The intelligent control of the Erwin Sattler watch winders runs an active phase and sleeping phase.

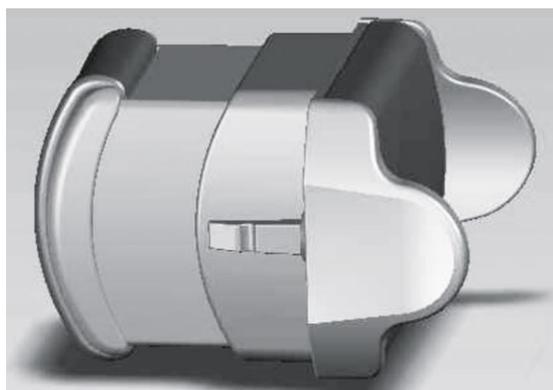
If you start up the Troja Lunaris M (connect it to the power supply) for the first time at 8.00 a.m., for example, the watch winder begins moving at 8.00 a.m. every day.

From this point on, the watch winder units will start from 8 a.m. till 12 p.m. every day so then have they a stationary phase lasting 10 hours. During this stationary phase, the mainspring in the wristwatch is slackened to allow the watch to function in an optimum operating range.

## Inserting watches

Before inserting the wristwatches, please make sure that the motor is stopped. Now you can place the watch on its watch holder.

To remove the watch from the watch winder unit, grab the watch holder at both levers and pull off from the holding mechanism.



Now you can push the watch with closed bracelet over the watch holder. For better handling the watch holder can be compressed. In order to secure the watch, the watch holder will expand to the width of the wristband.

Replace the watch holder in the housing of the winder.

Please make sure that the watches are always set at **12 o'clock position** when inserted. They will return to this position after each winding interval.

## Integrated drawer with control element

Holding on the drawer with both hands left and right and pull it out



Left button:

**Light on:** Press briefly once

**Open the base door:** Press and hold the button 3-4 seconds

Right button:

**Close the watch winder units:**

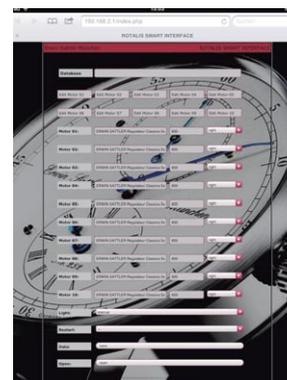
Press and hold the button

## Fingerprint reader

You will find the manual for the fingerprint reader at page 58

## The software

How to use the software is described in chapter »Manual for software smart interface« see page 52



## Maintenance and FAQ's

See page 74

## Troja Lunaris M

### Technical data

Power supply:  
Operating voltage: 110-230V  
Power frequency: 50/60 Hz  
Only with appropriate power supply adapter

### Dimensions

Height: 217 cm  
Width: 48 cm  
(with extended watch winders 70 cm)  
Depth: 40 cm

## The safe

You will find the manual for the safe at page 68



## Troja Sonata M

Precision pendulum clock, strike train,  
moon phase, extendible watch winder and safe



## The precision pendulum clock with strike train Caliber 2015

Your decision to purchase the precision pendulum clock with seconds pendulum shows that you belong to the very small circle of special connoisseurs of highest mechanical clockmaking art. Your new clock is after all a first-class product of our company concerning its construction, faithfulness to details and last but not least its great manufactural expense.

Such a precious instrument naturally has to be handled with a high degree of care. Let alone for this reason you should read the following information and follow the advice given. You will thus be able to enjoy your pendulum clock for many decades.

In order to protect them from corrosion, all brass parts of the clock are gold-plated. The exact fine machining and the arrangement of the bearings concerning the gears and all parts of the escapement ensure – good maintenance being presupposed – perfect function for generations.

One of the reasons why you decided to purchase this pendulum clock is its accuracy. The accuracy does, however, not only result from the mechanical factors of the clockwork. It does also depend upon external, physical influences. The period of oscillation of the pendulum is thus mainly determined by its physical length. Changes of temperature, as is generally known, result in a variation of length according to the longitudinal expansion coefficient of the materials employed. The pendulum rod of your clock consists of a material called super invar. This iron-nickel alloy reacts on changes of temperature only to very small extent. And this is to a very large extent compensated by an exactly calculated temperature compensation. Due to work tolerances during manufacture of the material a minimal compensation error may however occur. It is thus advisable to expose your clock to merely small changes of temperature. If you observe this when choosing the place for the clock, the deviations of accuracy may come to approx. 2 seconds per month.

Since the period of oscillation of a pendulum extends when air pressure rises, your clock is equipped with a barometric-error compensation. It consists of aneroid boxes and a weight, which is during changes of air pressure moved upwards or downwards to an exactly defined degree, thus reacting to a change of the period of oscillation.

Finally it has to be observed that vibrations transmitted to the pendulum and the suspension spring result in deviations of accuracy. While opening or closing the clock case you should therefore avoid shocks. The wall to which the clock is fixed should therefore also be as stable as possible.

## Start up the clock

See assembly instruction page 6.

### Caution!

With the clock, there is a protecting cover that has to be laid inside the bottom of the case! The cover has to be used, to avoid damages of the case! Please remove the cover only after the installation is complete!

## How to hang in the pendulum

### Caution!

Do always hold or carry the pendulum at the free pendulum rod, never at the adjusting-table or the plate of the barometer-instrument.

Since the movement is already removed, the nickel-plated protection tube can be pulled off from the suspension spring block (located between the two upper movement holding pillars).

Remove the suspension spring and keep in reach. Now unscrew the protection cap from the tip of the pendulum. To avoid damage of the delicate suspension spring we recommend to insert it into the slot of the pendulum rod first, hold it in place and then hang the pendulum together with the suspension spring into the suspension spring block.

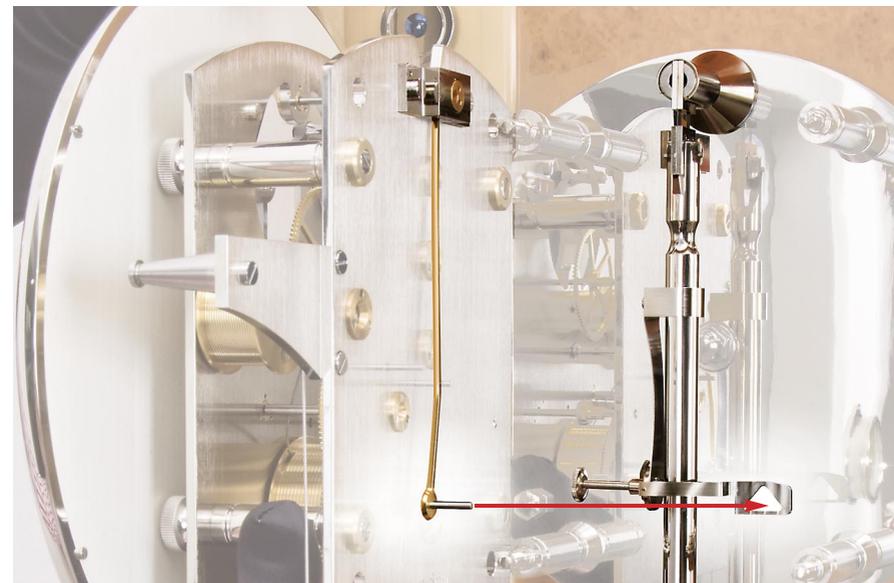


Push back the protection tube on the suspension spring block. By turning the nuts at the sides of the pendulum scale you can adjust the pendulum scale in a position that the tip of the pendulum points exactly to »0«.

## How to fit in the movement

Remove the safety rubber band from the pallet. Push the movement on the 4 pillars and screw it down with the four knurled nuts. Remove the transport protection of the escapement lever.

So that motion can be transmitted from the movement to the pendulum, the driving pin of the pallet lever must be inserted in the triangular cut-out in the safety flap on the beat adjuster. To do so, reach behind the movement from the side, carefully press the lever with the cut-out backwards and upwards until the driving pin slots into the triangular cut-out.



## How to start the clock

When hanging the weights in the pulleys, please make sure that the steel cable is properly seated in the groove of the pulley in each case.

Please note that: the weight with the marking/inscription on the bottom »left« must be suspended from the left pulley – it is the heavier weight. Using the crank, the clock is wound up one revolution in anti-clockwise direction. While precisely observing the tip of the pendulum and the scale, you now very slowly deflect the pendulum sideways until – brought about by the escape wheel falling against the pallet lever – a »tick« is heard. You must then make a note of the number of angular minutes shown on the scale precisely at the point the tick is heard. Then you deflect the pendulum to the other side until you hear the »tock«.

Ideally this should occur at the same number of minutes on the scale in the other direction. If, for example, the pendulum has to be deflected further to the right for the tick to be heard than to the left, you can correct this by turning the adjuster screw on the pendulum rod behind the movement clockwise.

## How to set the time

When setting the time, the minute hand may be turned only clockwise. The second hand shall not be turned. In order to synchronise the second hand to that of another clock (e.g. a radio clock) stop the pendulum when the second hand has reached the mark of the sixtieth second. Let the pendulum go when the second hand of the clock of comparison reaches the sixtieth second.

## Adjusting the striking mechanism

The striking mechanism's hammer is generally factory adjusted. If, however, the hammer should have gone out of adjustment (perhaps as a result of being transported), it can be readjusted by means of a special mechanism on the rear of the movement. This will be necessary if the hammer is too far from the gong (so that the gong is then too quiet) or too close to it (so that the gong »buzzes«).

**Please note: do not on any account bend the gong!**

At the 7:30 position on the clock face you will see behind the movement a knurled thumbwheel protruding vertically downwards. By turning it, you can precisely set the hammer gap.

## Disabling the striking mechanism

The Classica Sonata has a facility for disabling the striking mechanism. It consists of a small lever located behind the 9:30 position on the clock face on the inside of the rear plate. If that lever is pressed downwards as far as the stop, it disengages the hammer from the striking mechanism so that the clock no longer strikes.

If you want to re-enable the striking mechanism, press the lever upwards as far as the stop. Please note: the hammer weight continues moving even when the striking mechanism is disabled.

## Setting the time

When setting the time, the minute hand may be turned only clockwise. The second hand shall not be turned. To every full and half hour you should allow the striking mechanism to finish every gong. In order to synchronise the second hand to that of another clock (e.g. a radio clock) stop the pendulum when the second hand has reached the mark of the sixtieth second. Let the pendulum go when the second hand of the clock of comparison reaches the sixtieth second.

## How to adjust the accuracy:

The clock has been exactly adjusted in our workshop. Transport and variations of the geographical height can however lead to a change of the period of oscillation of the pendulum. It will thus in most cases be necessary to adjust your clock anew.

Adjust your clock as follows:

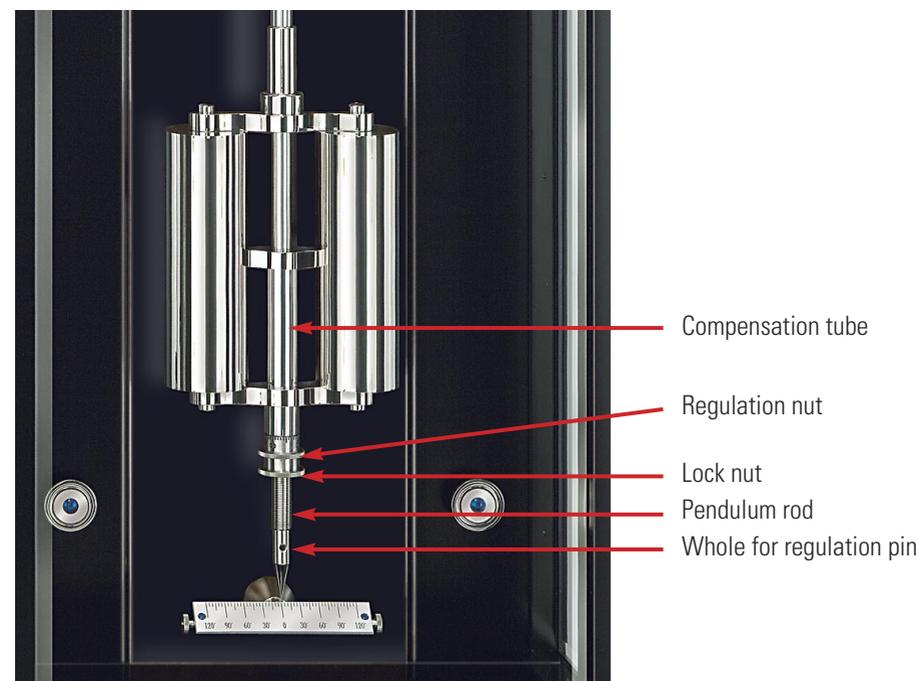
### 1) Coarse adjustment:

Should the accuracy deviate by more than one second per day it is necessary to adjust the clock by the adjusting nut.

Please stop the pendulum first. Now put the regulation pin enclosed in the case into the hole below the counter nut in the pendulum rod to avoid a twisting of the suspension spring during adjustment.

Loosen the lower nut, the counter nut, and then screw the adjusting nut one line to the left per second gained per day, i.e. one line to the right per second lost per day.

Afterwards screw the counter nut slightly up again. After having watched the accuracy a couple of days you may readjust the clock as described above.



### 2) Precision adjustment:

For precision adjustment of the clock, i.e. for the correction of small deviations of accuracy, you need not stop the pendulum.

Precision adjustment is done by means of the timing weights in the case. Place them on the adjusting-table situated at the middle of the pendulum rod.

The heavier the timing weight, the greater the acceleration of the pendulum, i.e. the faster goes the clock

By taking away a timing weight, the period of oscillation of the pendulum is lengthened, i.e. the clock goes slower.

### 3) How to correct deviations of 1 - 2 seconds from standard time:

You can correct deviations of 1 - 2 seconds from standard time with the aid of the two stainless steel weights also enclosed in the case. You neither need to stop the pendulum, nor the second hand. One of the weights should thus always be located on the adjusting table. In case the second hand deviates approx. minus 1 second from standard time, place the second weight onto the adjusting table as well. As soon as the deviation is recovered, take the weight off again.

A deviation of approx. plus 1 second shall be corrected by occasionally taking away the weight permanently located on the adjusting table.

Due to the fact that every place on earth has a different gravitation, a clock that runs +/- 0 sec in Munich/Germany will gain or loose time if it is located somewhere else. As an example see the list below:

| Place          | Gravitation<br>g in cms <sup>-2</sup> | Fast<br>in sec./day | Slow<br>in sec./day |
|----------------|---------------------------------------|---------------------|---------------------|
| Bangkok        | 978,321                               |                     | 106,2               |
| Berlin         | 981,288                               | 24,4                |                     |
| Budapest       | 980,852                               | 5,2                 |                     |
| Bukarest       | 980,554                               |                     | 7,9                 |
| Göttingen      | 981,176                               | 19,5                |                     |
| Hamburg        | 981,375                               | 28,2                |                     |
| Madrid         | 979,981                               |                     | 33,1                |
| München        | 980,733                               | 0                   | 0                   |
| Nürnberg       | 980,942                               | 9,2                 |                     |
| Rom            | 980,347                               |                     | 17,0                |
| St. Petersburg | 981,925                               | 52,5                |                     |

## Setting the moonphase

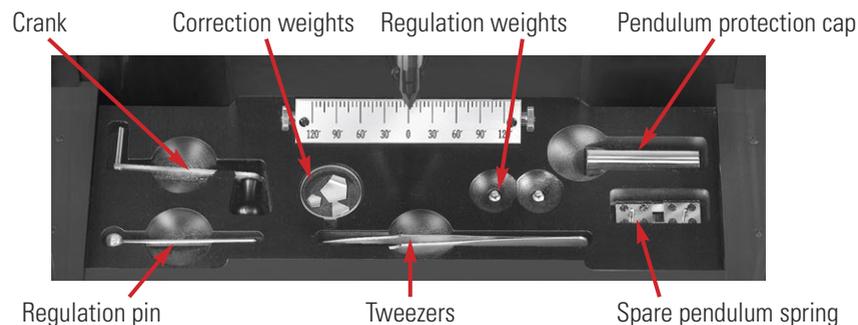
The moonphase can be set by reaching behind the dial at the »6 o'clock« position. There you can feel the moon disc and by turning the disc

Please note: Don't set the moonphase between 10 am and 2 pm and also between 10 pm and 2 am.

You will find the calendar of the moon phases at page 66.

## The accessory box

When the front door is completely opened, you can pull out the box cover. In the bottom of the case you find the accessories as shown in the picture below.



## Technical specifications

### Secunda Sonata – Cal. 2015

- plates of 4 mm thick, rolled brass
- 4 jewelled bearings
- 2 agate pallets
- complete geartrain in ballbearings (20 Stainless steel ballbearings)
- pinions with high number of teeth, made of hardened steel and polished
- gears finely crossed out, milled, precision-ground, and gold-plated
- Graham escapement with improved transmission system
- gold-plated escapement lever
- hand painted extra-large moonphase
- suspension spring of rolled spring stainless steel
- pendulum rod of heat treated super invar
- pendulum weight turned of solid brass, nickel-plated
- temperature compensation
- double barometric-error compensation with together 10 aneroids
- fine regulation table
- base plate of 6 mm thick brass, nickel-plated
- rope pulleys with ball bearings
- weight 4500 g for going train right side & 5000 g for striking mechanism left side
- steel hands, hand-made and blued
- milled dial, silver-plated and printed
- lunette turned of solid brass, nickel-plated or gold-plated
- winding period of 30 days
- achievable accuracy: under optimal conditions +/- 3-5 sec. / month
- clock case of solid fine wood with metal inlays
- bevelled crystal glass plates
- beat rate: 3600/h = 60/min

## Starting up your Troja Sonata M watch winder

Please plug in the power supply. The Troja Sonata M will start automatically.

The Troja Sonata M's intelligent control system is pre-programmed in such a way that over 80% of all automatic movements will be reliably and carefully wound with no further settings being necessary.

If you desire to optimize the settings for your watch, you can do so by using the software »Smart interface«. How to use the software is described in chapter »Manual for software smart interface« (see page 52).

The intelligent control of the Erwin Sattler watch winders runs an active phase and sleeping phase.

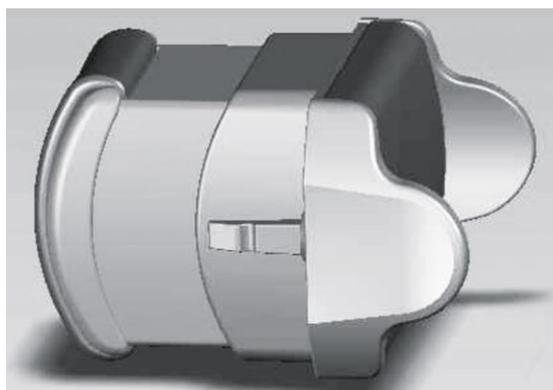
If you start up the Troja Sonata M (connect it to the power supply) for the first time at 8.00 a.m., for example, the watch winder begins moving at 8.00 a.m. every day.

From this point on, the watch winder units will start from 8 a.m. till 12 p.m. every day so then have they a stationary phase lasting 10 hours. During this stationary phase, the mainspring in the wristwatch is slackened to allow the watch to function in an optimum operating range.

## Inserting watches

Before inserting the wristwatches, please make sure that the motor is stopped. Now you can place the watch on its watch holder.

To remove the watch from the watch winder unit, grab the watch holder at both levers and pull off from the holding mechanism.



Now you can push the watch with closed bracelet over the watch holder. For better handling the watch holder can be compressed. In order to secure the watch, the watch holder will expand to the width of the wristband.

Replace the watch holder in the housing of the winder.

Please make sure that the watches are always set at **12 o'clock position** when inserted. They will return to this position after each winding interval.

## Integrated drawer with control element

Holding on the drawer with both hands left and right and pull it out



Left button:

**Light on:** Press briefly once

**Open the base door:** Press and hold the button 3-4 seconds

Right button:

**Close the watch winder units:**

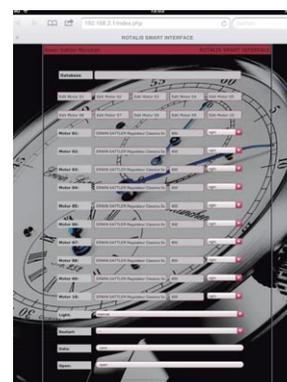
Press and hold the button

## Fingerprint reader

You will find the manual for the fingerprint reader at page 58

## The software

How to use the software is described in chapter »Manual for software smart interface« see page 52



## The safe

You will find the manual for the safe at page 68



## Maintenance and FAQ's

See page 74

## Troja Sonata M

### Technical data

Power supply:  
Operating voltage: 110-230V  
Power frequency: 50/60 Hz  
Only with appropriate power supply adapter

### Dimensions

Height: 217 cm  
Width: 48 cm  
(with extended watch winders 70 cm)  
Depth: 40 cm

## Troja Opus Temporis

Precision pendulum clock with moonphase, strike train, perpetual calendar, extendible watch winder and safe



## SATTLER- PRECISION PENDULUM CLOCK CALIBRE 2050

Thank you very much for your confidence. Your decision to purchase the precision pendulum clock with seconds' pendulum shows that you belong to the very small circle of special connoisseurs of highest mechanical clock making art.

Your new clock is after all a first-class product of our company concerning its construction, faithfulness to details and last but not least its great manufacture expense.

Such a precious instrument naturally has to be handled with a high degree of care. Let alone for this reason you should read the following information and follow the advice given. You will thus be able to enjoy your pendulum clock for many decades.

One of the reasons why you decided to purchase this pendulum clock is its accuracy. The accuracy does, however, not only result from the mechanical factors of the clockwork. It does also depend upon external, physical influences. Its physical length thus mainly determines the period of oscillation of the pendulum.

Changes of temperature, as is generally known, result in a variation of length according to the longitudinal expansion coefficient of the materials employed. The pendulum rod of your clock consists of a material called super invar. This iron-nickel alloy reacts on changes of temperature only to very small extent. And this is to a very large extent compensated by exactly calculated temperature compensation. Due to work tolerances during manufacture of the material a minimal compensation error may however occur.

It is thus advisable to expose your clock to merely small changes of temperature. If you observe this when choosing the place for the clock, the deviations of accuracy may come to approx. 2-4 seconds per month.

Since the period of oscillation of a pendulum extends when air pressure rises, your clock is equipped with barometric-error compensation. It consists of 2 aneroid boxes and 2 weights, which is during changes of air pressure moved up-wards or downwards to an exactly defined degree, thus reacting to a change of the period of oscillation.

If the pressure increases the period of oscillation of the pendulum lengthens, thus the clock is slow. By the compression of the aneroid boxes however, the weight located on them sinks towards the centre of the pendulum, resulting in the acceleration of the pendulum.

The change in speed caused by the change of pressure is thus compensated. If the pressure increases the period of oscillation of the pendulum lengthens, thus the clock is slow. By the compression of the aneroid boxes however, the weight located on them sinks towards the centre of the pendulum, resulting in the acceleration of the pendulum.

Finally it has to be observed that vibrations transmitted to the pendulum and the suspension spring result in deviations of accuracy. While opening or closing the clock case you should therefore avoid shocks. The wall to which the clock is fixed should therefore also be as stable as possible.

The movement of the Opus Temporis is equipped with a perpetual calendar, which means the movement can indicate the different lengths of the months and the leap years. The date must be corrected in the year 2100 for the first time.

# Assembly instruction

## for the Troja Opus Temporis

The Troja Opus Temporis will be shipped in one box

### 1. Unpacking the case top

- a. Remove the cover and the upper side section from the case, remove the upper part of the case to the side
- b. Remove the pendulum and accessories below the removable floor

### 2. Unpacking the safe, the case bottom and the safe drawers

The safe is bolted to the box through the back wall and the bottom.  
The safe can only be opened in upright position

- a. Unscrew the lower side of the box
- b. Remove the case bottom and the safe drawers
- c. Open the safe (Code = 123456)
- d. Unscrew the connection between the safe and the box (tool=17 mm bolt nut)
- e. tip over the box, unbolt and remove the screws from the bottom, straight up the box
- f. Unbolt the screws at the back wall between safe and box
- g. Remove the safe forward out of the box

### Installation of the Troja Opus Temporis

1. Place the safe at the final position
2. The safe can be fixed at the wall or floor. Check for wiring in the wall or floor. To use the enclosed metal plug a 14 mm drill is required
3. Place the case top on the case bottom and connect it with 6 screws from below
4. Both connectors on the backside of the case bottom must be inserted in the matching jack
5. Push the complete case over the safe
6. By using the adjustable feet and the POM tube behind the cover plate (therefore you need the side of the special tool with the two pins) you can level the case
7. The case must be fixed to the wall as follows:
  - a. Mark drilling position with special tool
  - b. Move the case aside
  - c. Drill (14 mm) and insert wall plug
  - d. Connect the AC-adaptor to the power plug (located in the case bottom)
  - e. Put the case back into final position and secure it with the supplied screw
8. Allow the watch winder units to extend. When viewed from the front, there is a magnetic cover panel with openings for sound on the left-hand side of the clock. Please remove this cover panel and take out the protective material from the earthenware pipes. Then refit the cover panel.
9. Fitting the movement and starting the clock , see the following pages

### Caution!

With the clock, there is a protecting cover that has to be laid inside the bottom of the case! The cover has to be used, to avoid damages of the case! Please remove the cover only after the installation is complete!

### Adjusting the gong

With the eccentric at the case plate the clearance between hammer and gong tube can be adjusted for a good sound of the gong.

### How to hang in the pendulum

#### Caution!

Do always hold or carry the pendulum at the free pendulum rod, never at the adjusting-table or the plate of the barometer-instrument.

Since the movement is already removed, the nickel plated protection tube can be pulled off from the suspension spring block (located between the two upper movement holding pillars).

Remove the suspension spring and keep in reach.

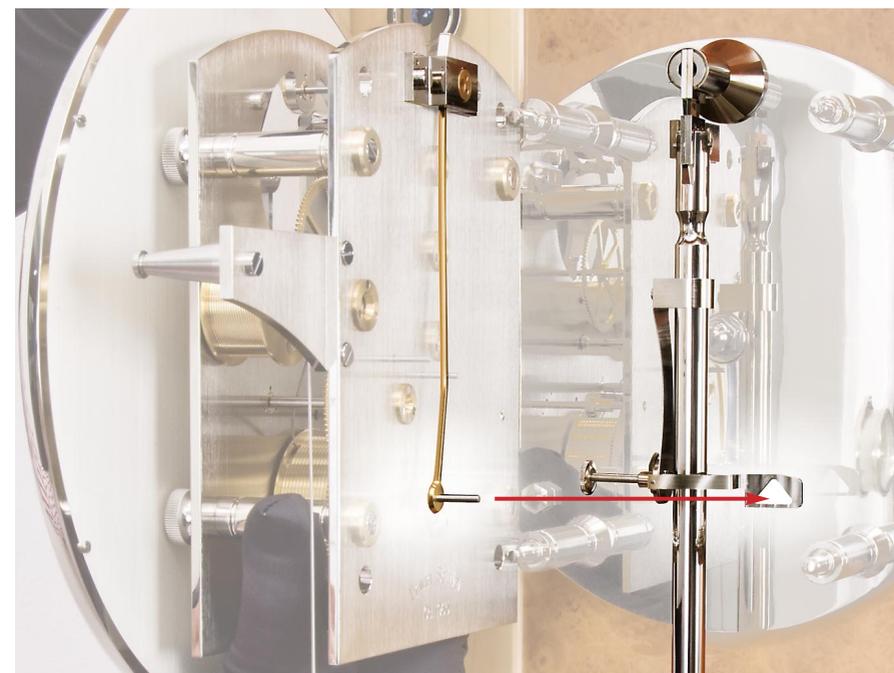
Now unscrew the protection cap from the tip of the pendulum. To avoid damage of the delicate suspension spring we recommend to insert it into the slot of the pendulum rod first, hold it in place and then hang the pendulum together with the suspension spring into the suspension spring block.



Push back the protection tube on the suspension spring block. By turning the nuts at the sides of the pendulum scale you can adjust the pendulum scale in a position that the tip of the pendulum points exactly to »0«.

### How to fit in the movement

Put the movement on the two brackets and screw it down with the two hexagon screws through the lower movement pillars. So that motion can be transmitted from the movement to the pendulum, the driving pin of the pallet lever must be inserted in the triangular cut-out in the safety flap on the beat adjuster. To do so, reach into the movement from the side, carefully press the lever with the cut-out backwards and upwards until the driving pin slots into the triangular cut-out.



### How to start the clock

Before hanging the weights into the pulleys, make sure the cables run in the foremost groove of the drum wheel.

Wind the clock with the crank one turn counter clock wise. Deflect the pendulum until a »tick«, caused by the drop of the escapement wheel tooth on the pallet, is audible. Watch the pendulum scale and note the angular minutes, indicated by the tip of the pendulum, exactly in the moment where the »tick« occurs. Now deflect the pendulum to the other side and again note the angular minutes when the »tick« is audible. It is ideal, when the angular minutes are equal on both sides. If the pendulum has to be deflected more to the right side than to the left to hear the »tick«, you can correct this by taming the adjustment screw on the pendulum rod behind the movement to the right side.

## How to set the time

### Caution!

Do not adjust the hands by hand!

Connect the crank with the square behind the dial at 2 o'clock. Push the arbour with the crank to the inside and turn hands clockwise. In order to synchronise the second hand to that of another clock (e.g. a radio clock) stop the pendulum when the second hand has reached the mark of the sixtieth second. Let the pendulum go when the second hand of the clock of comparison reaches the sixtieth second.

## How to adjust the calendar and the moon phase

All pushers are located behind the dial

Day push left lever

Date push lower lever

Month push right lever

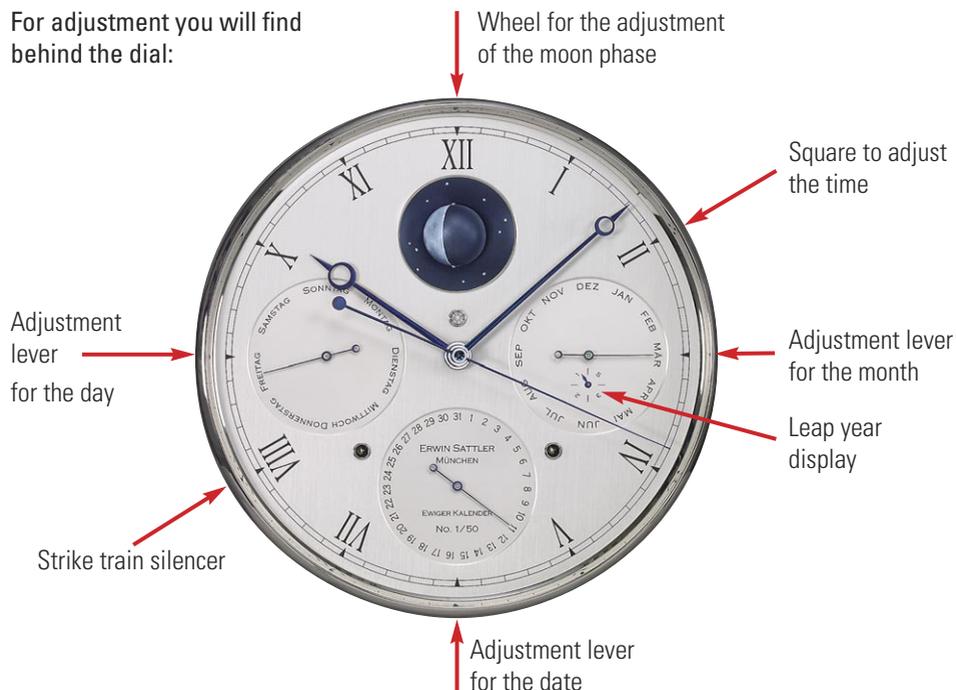
Caution: consider the small leap year indication on the dial!

The moonphase can be set by reaching behind the dial at the "12 o'clock" position.

Please note: Don't set the moonphase between 4 am and 7 am.

You will find the calendar of the moon phases at page 66.

For adjustment you will find behind the dial:



Adjust all indications (date, day, moon phase) to the previous day and then turn hands with the crank over 24° o'clock (midnight), allow striking mechanism to chime, calendar indicators will step forward, and set actual time.

Information: By using the pushers, the movement does not consider the different lengths of the months, which mean every month has 31 days.

Striking mechanism On / Off: The lever is at the 7 o'clock position behind the dial

Striking off: move the lever up

Striking on: move the lever down

## How to adjust the accuracy

The clock has been exactly adjusted in our workshop. Transport and variations of the geographical height can however lead to a change of the period of oscillation of the pendulum. It will thus in most cases be necessary to adjust your clock new.

Adjust your clock as follows:

### a) Coarse adjustment:

Should the accuracy deviate by more than one second per day it is necessary to adjust the clock by the adjusting nut.

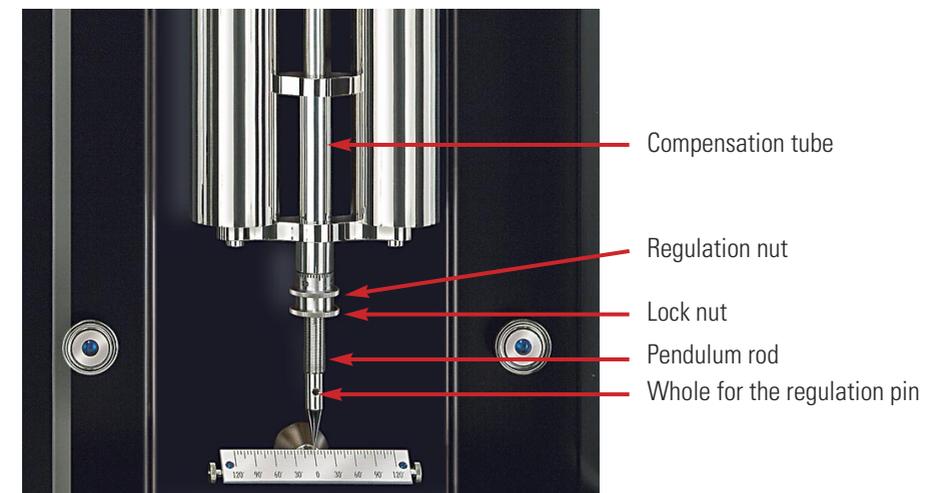
Please stop the pendulum first. Now put the regulation pin enclosed in the case into the hole below the counter nut in the pendulum rod to avoid a twisting of the suspension spring during adjustment.

Loosen the lower nut, the counter nut, and then screw the adjusting nut one line to the left per second gained per day, i.e. one line to the right per second lost per day.

Afterwards screw the counter nut slightly up again.

After having watched the accuracy a couple of days you may readjust the clock as described above.

By taking away a timing weight, the period of oscillation of the pendulum is lengthened, i.e. the clock goes slower.



**b) How to correct deviations of 1 - 2 seconds from standard time:**

You can correct deviations of 1 - 2 seconds from standard time with the aid of the two stainless steel weights also enclosed in the case. You neither need to stop the pendulum, nor the second hand. One of the weights should thus always be located on the adjusting table.

In case the second hand deviates approx. minus 1 second from standard time, place the second weight onto the adjusting table as well. As soon as the deviation is recovered, take the weight off again.

A deviation of approx. plus 1 second shall be corrected by occasionally taking away the weight permanently located on the adjusting table.

**c) Precision adjustment:**

For precision adjustment of the clock, i.e. for the correction of small deviations of accuracy, you don't need to stop the pendulum. Precision adjustment is done by means of the timing weights in the case. Place them on the adjusting-table situated at the middle of the pendulum rod. The heavier the timing weight, the greater the acceleration of the pendulum, i.e. the faster runs the clock. By taking away a timing weight, the period of oscillation of the pendulum is lengthened, i.e. the clock goes slower.

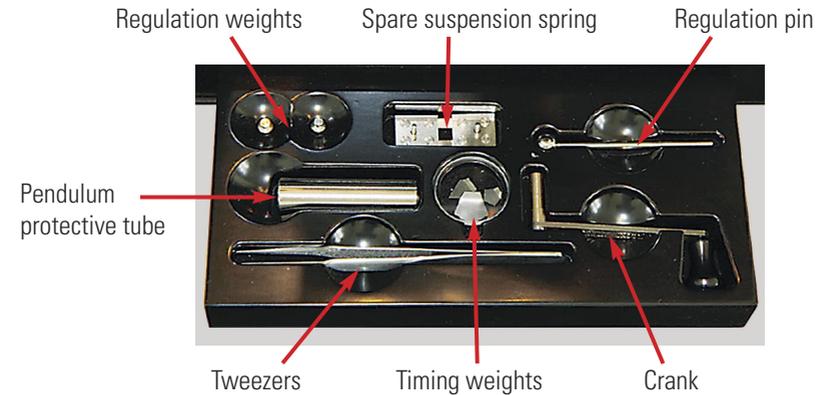
Due to the fact that every place on earth has a different gravitation, a clock that runs +/- 0 sec in Munich/Germany will gain or loose time if it is located somewhere else.

As an example see the list below:

| Place          | Gravitation<br>g in $\text{cms}^{-2}$ | Fast<br>in sec./day | Slow<br>in sec./day |
|----------------|---------------------------------------|---------------------|---------------------|
| Bangkok        | 978,321                               |                     | 106,2               |
| Berlin         | 981,288                               | 24,4                |                     |
| Budapest       | 980,852                               | 5,2                 |                     |
| Bukarest       | 980,554                               |                     | 7,9                 |
| Göttingen      | 981,176                               | 19,5                |                     |
| Hamburg        | 981,375                               | 28,2                |                     |
| Madrid         | 979,981                               |                     | 33,1                |
| München        | 980,733                               | 0                   | 0                   |
| Nürnberg       | 980,942                               | 9,2                 |                     |
| Rom            | 980,347                               |                     | 17,0                |
| St. Petersburg | 981,925                               | 52,5                |                     |
| Stockholm      | 981,843                               | 48,8                |                     |
| Stuttgart      | 980,901                               | 7,4                 |                     |
| Tokio          | 979,805                               |                     | 40,9                |

**The accessory box:**

In the bottom of the case you find the accessories as shown in the picture below.



## Technical specifications

### Opus Temporis – Caliber 2050

- plates of 4 mm thick, rolled brass
- 48 ball bearings
- 4 jewelled bearings
- 2 agate pallets
- pinions with high number of teeth (12 and 20), made of hardened steel and polished
- gears finely crossed out, milled, precision-ground, and gold-plated
- Graham escapement with improved transmission system
- gold-plated escapement lever
- suspension spring of rolled spring stainless steel
- pendulum rod of heat treated super invar
- pendulum weight turned of solid brass, nickel-plated
- temperature compensation
- double barometric-error compensation with together 10 aneroids
- fine regulation table
- base plate of 6 mm thick brass, nickel-plated
- rope pulley with ball bearings
- weight 6800 g for going train right side & 6800 g for striking mechanism left side
- steel hands, hand-made and blued
- 4 piece dial milled and silver-plated
- lunette turned of solid brass, nickel-plated or gold-plated
- winding period of 30 days
- achievable accuracy: under optimal conditions +/- 2-4 sec. / month
- clock case of solid fine wood with metal inlays
- Hand painted 3 dimensional moon phase with 10 diamonds
- beat rate: 3600/h = 60/min

## Starting up your Troja Opus Temporis watch winder

Please plug in the power supply. The Troja Opus Temporis M will start automatically.

The Troja Opus Temporis M's intelligent control system is pre-programmed in such a way that over 80% of all automatic movements will be reliably and carefully wound with no further settings being necessary.

If you desire to optimize the settings for your watch, you can do so by using the software »Smart interface«. How to use the software is described in chapter »Manual for software smart interface« (see page 52).

The intelligent control of the Erwin Sattler watch winders runs an active phase and sleeping phase.

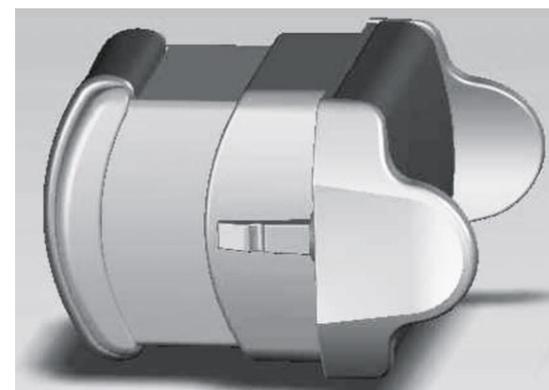
If you start up the Troja Opus Temporis M (connect it to the power supply) for the first time at 8.00 a.m., for example, the watch winder begins moving at 8.00 a.m. every day.

From this point on, the watch winder units will start from 8 a.m. till 12 p.m. every day so then have they a stationary phase lasting 10 hours. During this stationary phase, the mainspring in the wristwatch is slackened to allow the watch to function in an optimum operating range.

## Inserting watches

Before inserting the wristwatches, please make sure that the motor is stopped. Now you can place the watch on its watch holder.

To remove the watch from the watch winder unit, grab the watch holder at both levers and pull off from the holding mechanism.



Now you can push the watch with closed bracelet over the watch holder. For better handling the watch holder can be compressed. In order to secure the watch, the watch holder will expand to the width of the wristband.

Replace the watch holder in the housing of the winder.

Please make sure that the watches are always set at **12 o'clock position** when inserted. They will return to this position after each winding interval.

## Integrated drawer with control element

Holding on the drawer with both hands left and right and pull it out



Left button:

**Light on:** Press briefly once

**Open the base door:** Press and hold the button 3-4 seconds

Right button:

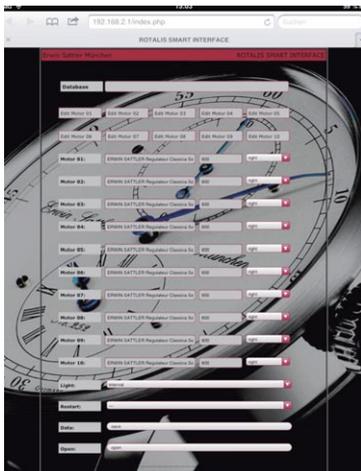
**Close the watch winder units:**  
Press and hold the button

## Fingerprint reader

You will find the manual for the fingerprint reader at page 58

## The software

How to use the software is described in chapter »Manual for software smart interface« see page 52



## The safe

You will find the manual for the safe at page 68



## Maintenance and FAQ's

See page 74

## Troja Opus Temporis

### Technical data

Power supply:

Operating voltage: 110-230V

Power frequency: 50/60 Hz

Only with appropriate power supply adapter

### Dimensions

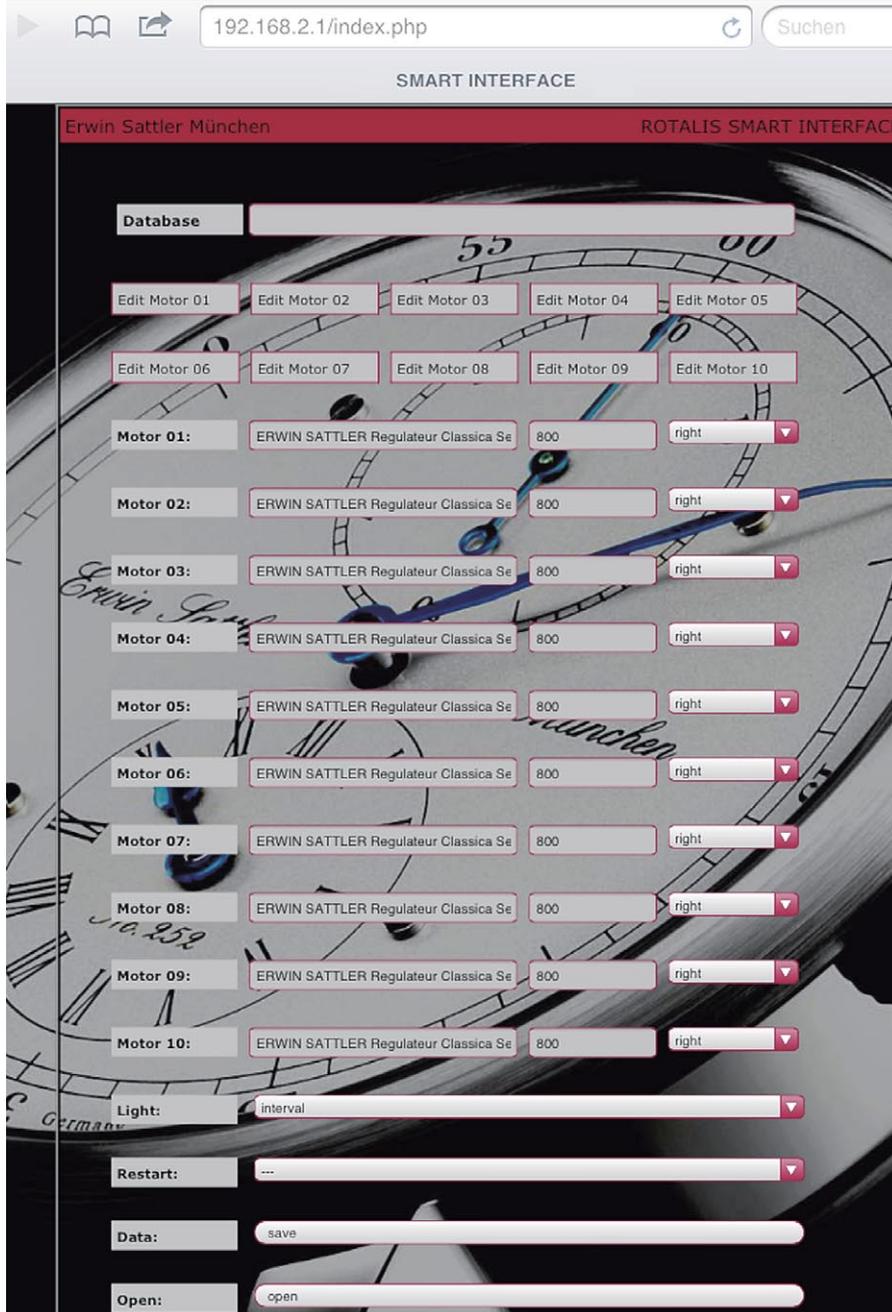
Height: 222 cm

Width: 47,5 cm

(with extended watch winders 72 cm)

Depth: 43 cm

# The Software »SMART INTERFACE«



## Starting your watch winder:

The SMART INTERFACE is the user interface via which all functions of your watch winder can be controlled.

Before this can be used, the following settings must be made:

1. Connect your WIFI-enabled device (smartphone, tablet, PC etc.) to the watch winder by selecting the "ES\_RO10\_022" network in the WIFI settings for your device.

The network name is made up as follows:  
ES\_watch winder short name\_serial number

Watch winder short names: Troja 16 M ES\_TROJA \_ (serial number\*)  
Troja Lunaris M ES\_TROJA \_ (serial number\*)  
Troja Sonata M ES\_TROJA \_ (serial number\*)  
Troja Opus Temporis ES\_TROJA \_ (serial number\*)

(\*Serial number: see certificate)

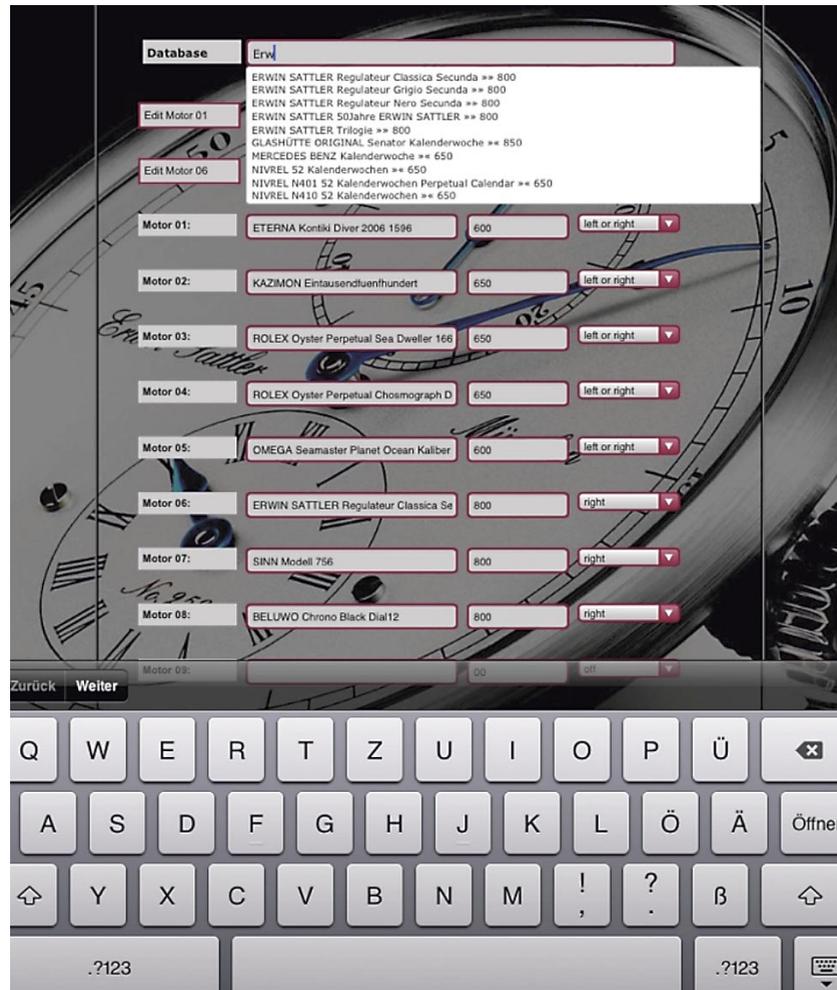
It will take up to one minute to establish the connection.

2. At the prompt, enter the required password . . . . .  
Now you should be connected to the watch winder network
3. Start your browser (Internet Explorer, Mozilla, Safari, etc.) and enter the IP address of the watch winder. It is as follows: 192.168.2.1
4. Open the search function of your browser.

The following start screen should look like the image at the left. This interface shows a clear overview of all functions. For ease of use, functions that are not required are only shown when necessary.

The following functions can be selected directly:

1. **Database:** Enter the first three letters of the desired watch brand, e.g. ERW, the automatic sort function is started and all watches beginning with the relevant letters are listed.



2. **Edit Motor 01 – Edit Motor 16,** the values selected from the database can be assigned to the relevant motor here.

**Troja:**

The 16 watch winder are divided into 2 panels,  
top left to bottom left and top right to bottom right.

z.e.g. top left = Motor 1  
top right = Motor 9

3. **Motor 01 – Motor 16,** text and the direction of rotation (left, right, left or right, off) and tpd (turns per day) can be changed here manually.
4. **Light,** the light of the watch winder can be set to on, off and interval (the light switches on automatically when the winders are turning) here.
5. **Restart,** this button can be used to preset a desired start time for the watch winder, and the WIFI module can be switched off if active WIFI is no longer required after the data transfer. Please note that data transfer is not possible with the WIFI module switched off. This can be reactivated after a brief interruption in voltage (disconnect and reconnect the power pack).
6. **Open,** the laterally extendable watch winders units of the Troja models can be opened via WIFI here.
7. **Data:** With this button, the settings are transferred to the watch winder and saved.
8. **Attention:**  
If the settings are changed and the data transfer has not been completed, the data in the control unit may not be the same as is shown on the screen.

## Setting the Rotalis by using a practical example:

Activate the »Database« field; the keyboard for your smartphone or tablet PC is shown automatically.

Enter the first three letters of the desired watch brand, e.g. ERW, the automatic sort function is started and all watches beginning with the relevant letters are listed.

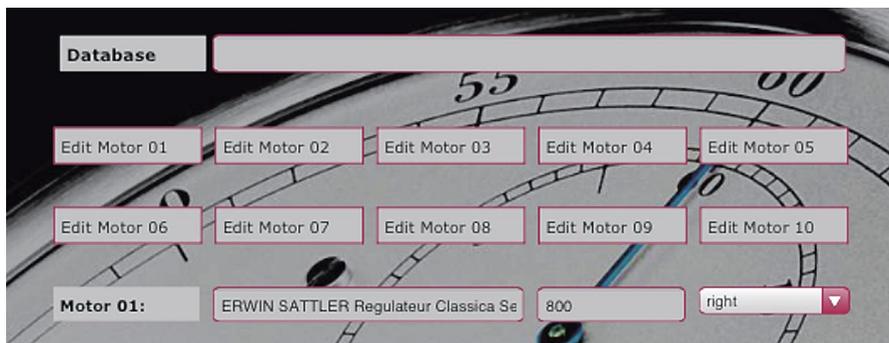


Select the desired watch.

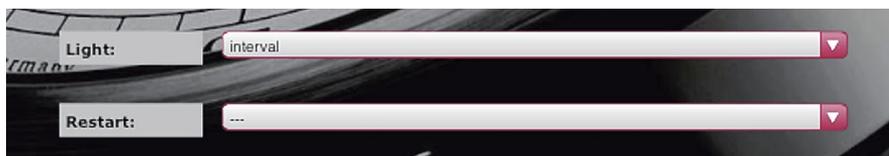
The selected watch is copied into the »Database« field and can now be assigned to any motor by pressing the »Edit Motor 01« – »Edit Motor ...« button (in the example, Motor 01 is being edited).

The data for the watch now includes a description, tpd (turns per day) and direction of rotation in the relevant field.

Repeat this process until all motors have been programmed.



Once all watches have been set, you can transfer the data to the Rotalis by pressing the »Save« button.



## Space for notes

# OPERATING MANUAL – Fingerprint reader



## Function keys of the remote control:

The watch winders and their components should only be installed by qualified personnel. If you have any questions in this regard, please contact your specialist retailer or Erwin Sattler directly.

### Shortcuts:

- M** = Masterfinger
- E** = Enroll
- R1** = Relay 1
- R2** = Relay 2
- D** = Delete (userfinger)
- DA** = Delete All ( incl. Masterfinger)
- H** = Security (High)
- M** = Security (Medium),
- L** = Security (Low)
- RT** = Relay-time
- B** = Block (of IDs)
- UB** = Unblock (unblock of IDs)



## Overview of all functions

|   |   |   |
|---|---|---|
| Masterfinger enrollment                       | Define Masterfinger                               | deliefery condition<br>→ 3x scan Masterfinger |
| Userfinger enrollment for Relay 1 und Relay 2 | Enrollment of new users in combination with an ID | M → E → ID → OK → scan userfinger → M         |
| Userfinger enrollment for Relay 1             | Enrollment of new users in combination with an ID | M → E → R1 → ID → OK → scan userfinger → M    |
| Userfinger enrollment for Relay 2             | Enrollment of new users in combination with an ID | M → E → R2 → ID → OK → scan userfinger → M    |
| Change allocation of ID to Relay 1            |   | M → ID → OK → R2 → OK                         |
| Open drawers                                  |   | Scan userfinger                               |
| Delete userfinger                             | Distinct deletion via ID                          | M → D → ID → OK → M                           |
| Delete all fingers (Reset)                    | Reset to default settings                         | 3x Scan masterfinger                          |
| Assign security level High                    | Security High = 5 digit PIN-Code                  | M → H → OK                                    |
| Assign security level Medium                  | Security Medium = 4 digit PIN-Code                | M → M → OK                                    |
| Assign security level Low                     | Security Low = 3 digit PIN-Code                   | M → L → OK                                    |
| Assign Relay time                             | Relay Cycle time: 1 s to 65 s                     | M → RT → (1-65) → OK                          |
| Disabel IDs                                   | Disabel ID (temporary)                            | M → B → ID → OK                               |
| ID check                                      | Check if ID is already assigned                   | OK → ID → OK                                  |
| Unlock fingerprint reader                     |   | 2x Scan stored user-user- or masterfinger     |
| Delete all fingers (Reset)                    | Reset to default settings                         | Enter erase code via remote controll          |

## Detailed description

### 1. Masterfinger enrollment

After activating the device for the first time or after reset to default settings, a masterfingers has to be enrolled (different masterfingers are possible).

The need of the masterfinger enrollment is indicated by the red, green and blue LED are on at the same time.

To enroll, the finger has to be scanned over the sensor. When successful, the red and green LED ,are on for a short time to confirm the storage process.The fingerprint is stored automatically.

Scan finger 3 x

If masterfinger enrollment was successful, the red and green LED are off the blue LED is on.

### 2. Enrollment of userfingers associated with an ID

- A** Enter the programming mode by scanning the masterfinger
  - B** Red and green LED are on for a short time
  - C** Press button »E« (Enrollment) on the remote control
  - D** Enter unused ID (0, 1, 2...150) via remote control
  - E** Confirm with »OK«
  - F** Enroll one or more user fingers
  - G** If enrollment was successful the green LED is on
  - H** If quality was not sufficient the red LED is on. To optimize the recognition rates, every user finger is supposed to be scanned 3x
  - I** All fingers are saved to the entered ID
  - J** Close the program mode by scanning the masterfinger
    - Red and green LED are on for a short time
- It is possible to save several userfingers with one ID. But all actions related to this ID, like disable access or deletion will affect to all userfingers with this ID.
- For fingers which are difficult to register (e.g. those of small children or people with very dry skin), it may be necessary to scan the user finger up to six times or use a different finger as the user finger
  - If the program mode is not closed within 10 sec. after last enrollment of a userfinger, the process will quit without saving the last userfinger.

### 3. Open the watch winder units

Scan a valid userfinger over the sensor

- Access is granted -> the green LED is on and the relay is connected
- Access is denied -> the red LED is on

### 4. Delete userfingers

- Enter the program mode by scanning the masterfinger
  - Red and green LED are on for a short time
- Press the button »D« on the remote control – the red LED is two times on for a short time
- Enter the ID of the userfinger(s) to be deleted and press the button »OK« to confirm – green LED is on shortly
- Close the program mode by scanning the masterfinger
  - red and green LED are on for a short time

### 5. Delete all fingers (incl. masterfinger) at the control unit

- The recommended way to delete all fingers is via reset code:
  - Erase-code (5-6 digit code, located on the back of the remote control)  
Hold the infrared remote control directly in front of the fingerprint reader:  
Press: DA → Erase-code → OK  
After that, the fingerprint reader is set to default settings (red + green + blue LED light up continuously)  
Changing the reset code: D → E → old code → OK → new code → OK
- Scan masterfinger 3 times.
  - After the 2nd time the red LED will start to blink to indicate the delete mode will be activated with one more scan of the master finger.  
After the 3rd time the masterfinger has been scanned, the green LED will be blinking to indicate the deletion process is active.  
When deletion has finished all LEDs are on.
  - The device is in the delivery condition – the red, green and blue LED are on permanent
- If there is no master finger or reset code available, the device can only be reset to default setting in the interior of the watch winder. This procedure should only be carried out by qualified personnel.
  - Press delete button of the control unit (internal) for some seconds until LED on the control unit starts to blink
  - The green LED on finger print reader unit will blink for approx. 30 sec.
  - The device is in the delivery condition – the red, green and blue LED are on permanent.

### 6. Change of Security Level

- Enter the program mode by scanning the masterfinger
- Press button »H«/»M« or »L«
- Confirm with »OK«
  - »L« means low security level (Corresponds 3- digit PIN security code)
  - »M« means medium security level (Corresponds 4- digit PIN security code)
  - »H« means high security level (Corresponds 5- digit PIN security code)
  - Red and green LED are on shortly two times if level has been changed successfully
  - Default setting (delivery condition) is medium security

## 7. Change of relay circuit time

- Enter the program mode by scanning the masterfinger
- Press the button »RT« on the remote control
- Enter the relay circuit time in seconds (1 to 65 seconds) by using the numbers
- Confirm with »OK«
  - Default setting (delivery condition) for relay circuit time is 5 seconds.

## 8. Disable ID s (temporary users like guests...)

- Enter the program mode by scanning the masterfinger
- Press the button »B«
- Enter the ID to be disabled
- Confirm with »OK«
  - Access of all userfingers assigned to this ID will be denied

## 9. Enable temporary disabled ID s

- Enter the program mode by scanning the masterfinger
- Press the button »UB«
- Enter the ID to be enabled
- Confirm with »OK«
  - Access of all userfingers assigned to this ID will be granted

## 10. Lock mode

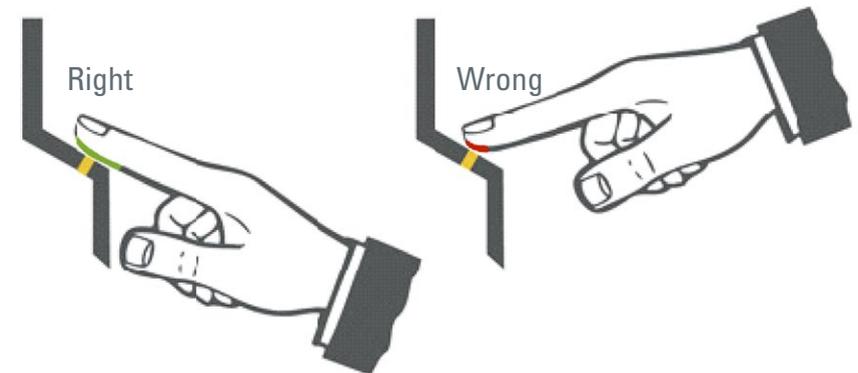
- **Blocking:**  
If a finger which is not enrolled, is scanned over the sensor 5 times (red LED is ON), the module will be switch to lock mode. This will stop unauthorised users from unlimited trials to access the system.
  - If the system is in lock mode, the red LED is blinking. Initially the mode is only temporary for 1 minute but will extended with every 5 faulty attempts to access. (Lock intervals: 1 minute, 5 minutes, 30 minutes, 60 minutes, permanent).
- **Unlock:**  
Lock mode can be ended prematurely by swiping a registered finger (master finger or user finger) over the sensor two times directly after one another.

## 11. Check if an ID is already assigned

- Press button »OK«
- Enter the ID to be checked
- Press button »OK«
  - If the ID is already assigned both LEDs (red and green) are on
  - If the ID is not assigned, it can be assigned, only the red LED is on

### Please notice:

1. The blue LED indicates that the device is powered on (blue LED is on permanently)
2. Some useful hints for getting better fingerprint when scanning the finger over the sensor:
  - Slide your finger with a constant speed and slightly pressure over the sensor
  - The area of the finger that contacts with the line sensor should be as large as possible (Refer to the figure below)



### 3. Which finger should be used?

- Fingertips with many scars, injuries or an extremely poor structure are not suitable for »user fingers«
- Fingers that are prone to be injured (e.g. while working manually) should not be used
- If the fingers are very strong, the forefinger or little finger can be a good choice
- If the fingers are very thin or of children, the thumb should be preferred
- The fingertips of the left hand of left-handed persons are usually more nagged than those of the right hand of right-handed persons
- It is recommended to save 2 different fingers for each person to still have one available in case of an injury
- If only a few persons use the device, more fingers for each person could be acquired because it figures out later which finger is the favorite



# THE PHASES OF THE MOON

2016 - 2021



## THE MOON

The moon circles the earth at a distance of 384.405 km and its diameter is 3.476 km.

The moon's volume is 50 times less than that of the earths. The gravitational pull is significantly less than that of the earths and all weights on the moon are 6 times lighter. The temperature of the moon's surface during the exposure to sunlight is 130° Celsius, while during the moonlight night which lasts two weeks is -158° Celsius.

It takes the moon 29 days, 12 hours, 44 minutes and 2.8 seconds to circle the globe.

The moon always shows the earth the same face. It rotates once around its owns axis during this revolution.

|           | 2016           | 2017         | 2018           | 2019           | 2020           | 2021         |
|-----------|----------------|--------------|----------------|----------------|----------------|--------------|
| January   | ☾ 10<br>☀ 24   | ☀ 12<br>☾ 28 | ☀ 2/31<br>☾ 17 | ☾ 6<br>☀ 21    | ☀ 10<br>☾ 24   | ☾ 13<br>☀ 28 |
| February  | ☾ 7<br>☀ 22    | ☀ 11<br>☾ 26 | ☾ 15           | ☾ 4<br>☀ 19    | ☀ 9<br>☾ 23    | ☾ 11<br>☀ 27 |
| March     | ☾ 9<br>☀ 23    | ☀ 12<br>☾ 28 | ☀ 2/31<br>☾ 17 | ☾ 6<br>☀ 21    | ☀ 9<br>☾ 24    | ☾ 13<br>☀ 28 |
| April     | ☾ 7<br>☀ 22    | ☀ 11<br>☾ 26 | ☾ 16<br>☀ 30   | ☾ 5<br>☀ 19    | ☀ 8<br>☾ 23    | ☾ 12<br>☀ 27 |
| May       | ☾ 6<br>☀ 21    | ☀ 10<br>☾ 25 | ☾ 15<br>☀ 29   | ☾ 4<br>☀ 18    | ☀ 7<br>☾ 22    | ☾ 11<br>☀ 26 |
| June      | ☾ 5<br>☀ 20    | ☀ 9<br>☾ 24  | ☾ 13<br>☀ 28   | ☾ 3<br>☀ 17    | ☀ 5<br>☾ 21    | ☾ 10<br>☀ 24 |
| July      | ☾ 4<br>☀ 19    | ☀ 9<br>☾ 23  | ☾ 13<br>☀ 27   | ☾ 2<br>☀ 16    | ☀ 5<br>☾ 20    | ☾ 10<br>☀ 24 |
| August    | ☾ 2<br>☀ 18    | ☀ 7<br>☾ 21  | ☾ 11<br>☀ 26   | ☾ 1/30<br>☀ 15 | ☀ 3<br>☾ 19    | ☾ 8<br>☀ 22  |
| September | ☾ 1<br>☀ 16    | ☀ 6<br>☾ 20  | ☾ 9<br>☀ 25    | ☀ 14<br>☾ 28   | ☀ 2<br>☾ 17    | ☾ 7<br>☀ 20  |
| October   | ☾ 1/30<br>☀ 16 | ☀ 5<br>☾ 19  | ☾ 9<br>☀ 24    | ☀ 13<br>☾ 28   | ☀ 1/31<br>☾ 16 | ☾ 6<br>☀ 20  |
| November  | ☀ 14<br>☾ 29   | ☀ 4<br>☾ 18  | ☾ 7<br>☀ 23    | ☀ 12<br>☾ 26   | ☾ 15<br>☀ 30   | ☾ 4<br>☀ 19  |
| December  | ☀ 14<br>☾ 29   | ☀ 3<br>☾ 18  | ☾ 7<br>☀ 22    | ☀ 12<br>☾ 26   | ☾ 14<br>☀ 30   | ☾ 4<br>☀ 19  |

☀ = Fullmoon      ☾ = Newmoon

## The safe

SAFE DEPOSIT SYSTEM Special edition Erwin Sattler  
VdS-resistance unit 1



Kärcher  
TRESORBAU

## Assembly and operating instructions

for a free-standing safe from the »MÜNCHEN« series

(Euro/VdS Category I) German test institute for fire protection and security))  
Insurance cover for private use up to €65,000.00\*  
Insurance cover for commercial use up to €20,000.00\*

By purchasing this safe, you have chosen a high-quality product which offers anti-burglary protection defined according to Euro/VdS category I.

Please take a moment of your time to read through these instructions carefully.

### 1. Security:

According to Euro/VdS category I, guaranteed anti-burglary protection exists only when safes with a dead weight of less than 1000 kg are fixed to the floor properly in their place of installation. The safe is fixed to the floor by the two holes in the floor using size M12 heavy-duty plugs.

The diameters of the holes in the floor are designed in such a way that installation can be carried out according to the push-through method, i.e. the plug hole can be created and the plug can be installed directly through the holes in the floor.

For example, **TOX knock-in anchors type E M 12x50, Upat USA M 12 knock-in anchors** or an equivalent fixing element from another manufacturer are suitable for this purpose.

Observe the installation instructions of the relevant plug manufacturer, as this is the only way to guarantee the minimum required extraction forces for these fixing elements.

\* Please discuss all **issues relating to insurance** with your **property insurer**.

If it is not possible to fix the safe to the floor properly for technical reasons (underfloor heating, etc.), please speak to your **property insurer** in this case as well.

#### Please note:

If the safe is not fixed to the floor or is fixed to the floor improperly, your property insurer is not liable for any material or property damage which may occur.

### 2. Operation

Your safe is equipped with an electronic code lock

The lock is operated using a six-digit numeric code. A second opening code (second code) may be permitted. Each press of a button is confirmed by a signal consisting of a beep and a flash.

A double signal is emitted when a valid code is entered and a long beeping signal is emitted when an invalid code is entered. If you pause for more than 10 seconds between each press of a button, the code that you started to enter will be deleted.

## 1. Open and locking

### Open:

Enter code (factory code = 1-2-3-4-5-6), unlock the door and open it. If not opened within 3 seconds, the lock secures automatically. If code entry failed on first attempt wait 20 seconds before re-entering. Three long beeps indicate the lock bolt is jammed. Release the handle and re-enter code.

### Locking:

Close door and turn handle fully to closing position. The lock is secured. Control blocking status by trying to turn handle back.

### Manipulation protection:

Entry of four consecutive invalid codes – keypad is blocked for 5 minutes. During this period, the light flashes every 10 seconds and any key press causes a long signal. After expiration, entry of two more invalid codes, restarts the 5 minute blocking period.

### Safety reference:

All codes are to be securely stored. Do not use personal data (i.e. Birthdays, telephone numbers etc.) as the code. Change the factory code before you start using the safe!



## 2. Activate the second opening code

Press and hold key »1« until double signal.

The light remains on during the following actions:

- Enter main code
- Enter secondary code twice (double signal after each)  
( The secondary code can be changed like the main code. With the main code, the secondary code can be deleted. The main code cannot be deleted.)

## 3. Time Delay (max. 99 min) and open window (max. 19 min)

Press and hold key »9« until double signal.

during the following actions:

- Enter main code (double signal)
- Enter time delay and open window time, f.i.  
2612 for 26 time delay and 12 minutes  
open window(double signal)
- repeat values (double signal)

**Note: Changing the time delay values can only be done in open window time!**

## What if....

- ...you hear a long beep after your combination last digit and the lock does not open?  
You entered a not valid code. Repeat the operation, but pay attention for enter the right code.
- ...a light signal flashes every 10 sec., and, when you push a button you hear a long beep?  
You entered 4 times a wrong code and the lock is in time penalty. Wait 5 minutes and try again. Two more consecutive invalid codes will restart additional 5 minutes penalty period.
- ..you do not hear any beep when you push a button?  
Replace the battery. If the problem is not solved, call your service centre.
- ...you can open, but you hear a long sequence of beeps after your code last digit?  
Immediately replace the battery. (Use only 9 V Alkaline or energizer batteries)



### • Battery empty with closed door:

In case the battery is drained completely, uncover the power terminals in the front of the Entry Unit and power with fresh 9 V Alkaline battery. The battery compartment is located inside the safe. (see figure above)

**Attention: Keep battery pressed against the terminals until lock is completely open.**



## 4. Change code: (with safe door open)

Press and hold key »0« until double signal

The light remains on during the following action:

- Enter old code (double signal)
  - Enter new code (double signal)  
and enter the new code again (double signal)
- Attention: If mistakes are made (long signal) the old code remains active.**

## 5. Delete the secondary code

Press and hold key »3« until double signal.

The light remains on during the following actions.

- Enter main code

The secondary code is deleted.

## Repair and maintenance

- It is necessary to re-lubricate the door hinges depending on how frequently the safe is used. Spray the hinge with commercially available penetrating oil (e.g. »BALLISTOL«) and wipe away oil that is dripping off.
- The locking pins can be oiled easily when they are in their extended position.
- The interior and exterior can be cleaned using a moistened cloth.

## Operational reliability and warranty

- The manufacturer does not assume any liability for damage to material or property resulting from the non-observance of maintenance guidelines, as well as improper handling and operation.
- **Keep the password in a safe place;** if you lose it, the only way you can access the contents is by opening the safe using force. We would like to explicitly point out that tampering with the safe even to the slightest degree voids any guarantee in terms of safety and function. This is especially true in the case of fires and break-in attempts.

### Important note for qualified personnel carrying out maintenance and repair work on the lock and locking mechanism:

To remove and fit the fire-protection panel, bend the panel's bending limb only as far as necessary. If the bending resistance is noticeably reduced in this case, the fire-protection panel must be replaced.

## Safe deposit system special edition Erwin Sattler



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### Security features

VdS-resistance unit I in acc. with EN 1143-1. Defined protection against burglary with 30/50 RU against attacks by burglary tools with a mechanical and thermal effect.

Insurance cover (non-binding guideline): commercial use € 20.000,- / private use € 65.000,-.

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### Standard model

|             |   |
|-------------|---|
| Fittings:   | empty   |
| Lock:       | electronic locking system (model EM 20.20)            |
| Door hinge: | DIN right   |
| Varnish:    | RAL 9005 deep black structured                        |
| Anchorage:  | 2 holes in the floor- and<br>3 holes in the rear side |

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### Dimensions and weights:

|                  |                      |
|------------------|----------------------|
| Ext.dimension:   | H/B/T 610/405/340 mm |
| Int. dimensions: | H/B/T 504/312/221 mm |
| Doorway:         | H/B 504/265 mm       |
| Weight:          | aprox. 110 kg        |

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## Care and Maintenance:

The following maintenance tips will ensure that you enjoy your Troja for many years.

We therefore advise you never to keep the clock case open over a long period of time, in order to prevent dust from depositing on the clockwork. Please do not use caustic or abrasive cleaners on the housing. Clean with a damp soft cloth that may be moistened with a mixture of water and pH neutral soap.

After 10 years the latest you should entrust your pendulum clock to a competent clockmaker's work-shop in order to have the clockwork cleaned and oiled anew. In the case of a pendulum clock, which keeps precious time over many years, 24 hours a day, exactly to the second, this should be self-evident. It will then untiringly do good service over decades and will be passed on with pride from generation to generation as a precious chronometer.

## FAQs

If the watch winder fails to start after powering on:

- defective fuses – check the fuse behind the top cover on the right hand side and replace if necessary
- No programming – use software Smart interface to program

If you are unable to solve the problem satisfactorily with the above tips, please contact your retailer or Erwin Sattler service department.

## Recycling

This product is made from high-quality materials and parts. These are recyclable and may be reused.

At the end of its lifespan, this product should not be disposed of in the ordinary household trash. It should be brought to a collection centre for electrical and electronic devices. This is indicated by the recycling symbol on the label, in the instructions or on the packaging. Your local government can give you information about the location of these collection centres.

This will make an important contribution to protect our environment by recycle resources.



## Space for your notes



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