



Accuracy Motion User Manual



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1. Introduction

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This chapter contains basic information about the structure of the document. Before handling the device, the user must read this document.

1.1 Equipment supplied with your **ONEOF® Accuracy Motion**

Accuracy Motion device

Power supply 5V / 0.5A

USB cable

Holding rubber bands (X2)

Quick start Guide

1.2 Foreword

This manual is intended for all users of an H2i Sàrl ONEOF® acoustic measuring device. It contains all the information necessary for its installation, commissioning, periodic maintenance and troubleshooting.

This manual has been compiled by Petitpierre SA with the same care as your acoustic measurement device of which it is an inseparable part. If you have any questions or misunderstandings, please contact your supplier immediately.

It is recommended that a copy of this manual should be given to anyone who may use the device.

When ordering parts or maintenance, please indicate :

- the type and serial number of your device,
- your exact address,
- the reference and type of the part to be replaced,

If you need to return the device, send an email at info@h2i.ch and send it to:

Petitpierre SA
Route de l'Europe 7
CH-2017 Boudry
+41 (0)32 843 44 22

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We reserve the right to change the contents of this document without notice.

1.3 Appropriate use

The device is intended for the precision acoustic measurement of watch parts. It can only be used by trained and authorized personnel.



This system is not intended to measure 100% of watches and it may be possible that some of them are not adapted to this device.

The device can only be used in conjunction with the corresponding software developed and supplied by H2i Sàrl.

The use of materials other than those described in this operating manual (e.g. unauthorized substances) is prohibited.



The instructions in this user's manual must be followed, especially the safety instructions.

1.4 Limitation of warranty

Even though the device and its software have been tested, it is strongly recommended to make a backup of the database before updating the software.

When the database is remote, the IT department takes care of the backup. If the database is local, it is possible to copy the data file (oneof.dat) available in the link **Application data folder** from the settings.



[See Application settings, page 30]

Petitpierre SA and H2i Sàrl are not responsible for :

- misuse of the device ;
- unauthorized modification (voluntary or not) ;
- failure to follow the instructions and recommendations in the various manuals supplied with the device and software ;
- non-compliance with the safety instructions in the various manuals ;
- damage related to the use of the device, in particular any loss of data or financial loss that may be related to the use of the software or the device.



The warranty will be null and void if it is found that the malfunction is due to abuse, misuse, unauthorized or inadequate maintenance or service, accidental deterioration, improper storage conditions, or use of the product outside of its stated limits, outside of its specifications, contrary to the instructions in this manual, or following recommendations other than those of the manufacturer.

Each **Accuracy Motion** is tested before delivery.

1.5 Typographical conventions

The styles used in this manual are the following:

Designation	Definition	Example
Ordered list	Used in conjunction with the illustration numbers, preceded by the corresponding numbers.	(1) First element (2) Second element (3) Etc...
Software commands	All software commands, buttons, function keys, windows and the like used in the manual is indicated in bold and italics.	The <i>On</i> button (Switching on) allows to switch the group on.
Procedure	Each step of the procedure to be followed by the user is preceded by a letter.	A. Remove the cover plate. B. Replace the defective element. C. Put the sheet back on.
Cross-reference	Link to further information.	 [See Typographical conventions, page 4]
Attention	Used to refer to a potentially hazardous situation that, if not avoided, may result in minor injury or property damage.	 ATTENTION The unit should be transported upright and should not be subject to shock.
Note	Used to accompany a general remark or a purely informative comment.	 The unit has been checked, adjusted and tested in our workshops.
Link to glossary	Used to link a word to its definition in the Glossary section.	<u>Lift angle.</u>

2. Safety and environment

This chapter defines the safety instructions for the proper operation of the **Accuracy Motion** device and the associated software. It also describes the handling and storage conditions.

2.1 Environmental conditions



The **Accuracy Motion** device must be used exclusively indoors.
The electrical safety of the device is guaranteed only if the electrical installation of the building complies with the regulations for industrial buildings, and if it functioning properly.
The device should not be exposed to heat, dust or excessive moisture.



The device should not be close to a powerful sound source as this may distort the results.

Operating values

Designation	Value	Unit
Max. ambient humidity	79	%
Ambient work place temperature	5-35	°C
Relative temperature range	-15 +15	°C

2.2 Safety and precautions for use

2.2.1 Importance of safety instructions



The safety and protection instructions in this manual must be followed to avoid injury, property damage or environmental pollution.

In the same way, the legal provisions, accident prevention and environmental protection measures, as well as the technical regulations to ensure safe and suitable working conditions applicable in the country and at the location where the device is used must be observed.



Use of the device in any manner other than that described in this manual may void the warranty.

2.2.2 General safety instructions and signs



Repair and maintenance work should only be carried out by a qualified service technician designated by the manufacturer.
Heed all warnings and follow all instructions provided on the device and in the the device and in the documentation.
The device should only be connected to the indicated power sources.
Never use components other than those supplied by the manufacturer.
The device must be installed on a flat, dry and stable surface.
Never force or stop the motor movements by hand.



The device must be used with the supplied software and accessories approved by the manufacturer.

2.2.2.1 Mechanical hazards



There is a risk of entrapment. Be careful not to leave your hand between the head and the base of the device during operation.

2.2.2.2 Electrical hazards



It is forbidden to open the device in any way.



A faulty main power supply (outside the range specified in the device features section) or a faulty cable can damage the device. If it is necessary to use the 2nd usb port, a standard usb charger (5v) can be used.



To turn the power off, disconnect the power cable by pulling on the connector, never pull directly on the cable.

2.2.3 Safety symbols

No specific signage is required for the **Accuracy Motion**.

If technical developments involve risks, symbols are placed on different parts of the device to draw attention to a potential danger, to prohibited operations or to the obligation to wear safety equipment.

2.2.3.1 Alert symbols

Symbol	Description
	ATTENTION : Warning (general), consult documentation.

2.2.3.2 Obligation Symbols

Symbol	Description
	Mandatory instructions: Only persons who have been trained in the handling of the device and who know these instructions may work on it.

3. General description

This chapter contains general information about the **ONEOF® Accuracy Motion**.

3.1 Introduction

The **ONEOF® Accuracy Motion** is an automated acoustic measuring instrument with backlash-free positioning. It is designed to measure watches or mechanical movements in production, laboratory or after-sales service.

One connector allow the device to be controlled by the software. The other one is an optionnal power supply (iPhone/iPad only).

No other access to the components of the device is possible outside the technical services of Petitpierre SA and H2i Sàrl.

3.2 Description

3.2.1 Overall view



FIG. 3-1 - Accuracy Motion (Overall view)

- | | | | |
|-----|----------------|-----|--------------------------------|
| (1) | Sensor | (5) | Base |
| (2) | Cart | (6) | USB Input 1 |
| (3) | Measuring head | (7) | USB Input 2 (iPhone/iPad only) |
| (4) | Alpha axis | (8) | Beta axis |

The motor control, based on an inertial measurement unit, allows to reach any position of the half-sphere with the required degree of accuracy. The device is supplied with a software allowing the control of several devices in real time. The software is also equipped with a sequence editor to automate the testing process. All data collected by the device can then be stored locally or in a database.

3.2.2 Rotation axes

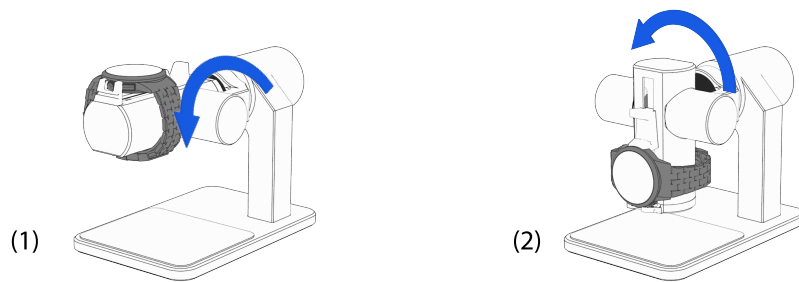


FIG. 3-2 - Accuracy Motion (Rotation axes)

The **Accuracy Motion** rotation axes are:

- Alpha (1) corresponds to movement from top (0°) to bottom (90°). The position in the illustration corresponds to 0° .
- Beta (2) corresponds to the rotation movement (360°), the positive direction is counterclockwise. The position in the illustration corresponds to 0° .

3.2.3 Measuring positions

The **Accuracy Motion** has 6 standard pre-registered positions which are the most commonly used positions, but the sequences also allow measurement at all intermediate positions.

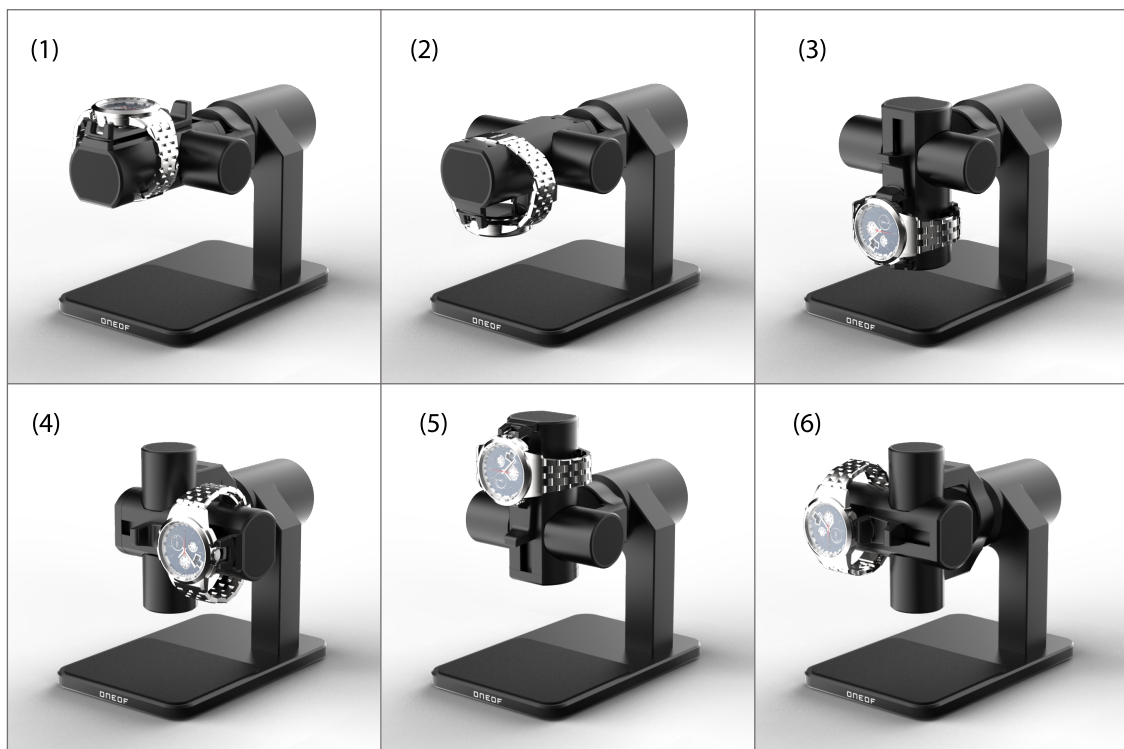


FIG. 3-3 - Accuracy Motion (Measuring positions)

- | | |
|---------------------|----------------------|
| (1) DU (Dial up) | (4) CR (Crown right) |
| (2) DD (Dial down) | (5) CU (Crown up) |
| (3) CD (Crown down) | (6) CL (Crown left) |

3.3 Technical specifications

3.3.1 Approximate dimensions and weight

Designation	Value	Unit
Length x Width	25 x 12	cm
Height	25	cm
Weight	1	kg

3.3.2 Power supply

Designation	Value	Unit
Type of cable	USB type-C	
Voltage	5	V
Current	0.5	A

4. Handling and storage

4.1 Handling (safety)



When handling the device, make sure that:

- it does not suffer from shock ;
 - there are no objects on or in the unit.
-

4.2 Transport



During transport, the device must be placed in its original packaging and not be subjected to shock.

5. Installation

5.1 Installation and commissioning



The device has been checked, adjusted and tested in our workshops.

5.1.1 Application installation

- A. Download and install the **ONEOF® Accuracy2** App for Windows at <https://h2i.ch/apps>

System requirements :

- Windows 10 version 1803 or higher
- 64 bits
- Intel i5 processor or higher
- 4GB RAM or higher



The **Accuracy Motion** is also compatible with iOS and macOS.

5.1.2 Commissioning

- A. Unhook a rubber band (1) from the bottom of the **Accuracy Motion**.



The rubber band will be used to secure the watch or movement to be measured on the **Accuracy Motion**.

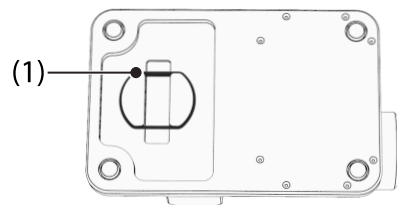


FIG. 5-1 - Holding rubber bands location

- B. Place the device on a flat surface before connecting it.
C. Connect the power cable (2).



The device can be used with a single power cable (2) on a computer but requires a second power cable (3) to be connected to a standard USB 5 V charger (phone charger type) when used on an iPhone or iPad with Lightning connector.

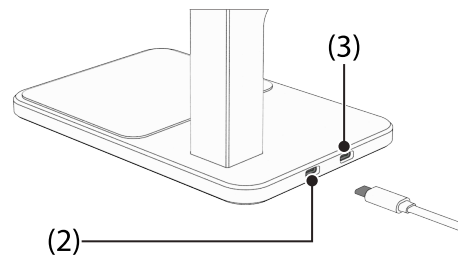


FIG. 5-2 - Electrical connections



A 5 cm space around the base of the **Accuracy Motion** must be left free to avoid any impact.

- D. The device goes to the initialization position
E. Wait 3 seconds during the calibration of the inertial measurement unit.



It is important not to touch the **Accuracy Motion** during this 3 seconds period.



The **Accuracy Motion** is closed-loop controlled and the measuring head cannot be moved. It is not recommended to move the device once connected.

- F. Open the cart and place the watch or piece to measure.
- G. Insert the holding rubber band into the lugs provided (4) and (5).



The holding rubber band is used to secure the watch or movement to be measured on the *Accuracy Motion*.



It is very important to secure the object to be measured with the holding rubber band provided for this purpose. Petitpierre SA and H2i Sàrl cannot be held responsible for any damage caused by a falling piece or a watch during a measurement.

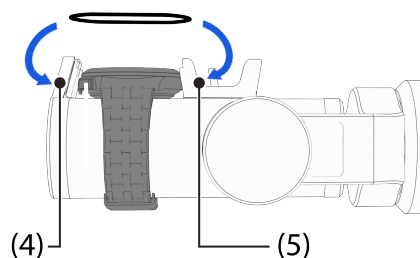


FIG. 5-3 - Position the rubber band



2 rubber bands are provided with the *Accuracy Motion*.



In case of loss or wear, contact Petitpierre SA to get new ones.

- H. Start the application.



It is very important not to touch the device during a measurement or during a change of position.

6. Using the application

6.1 Accuracy2 interface

To use the **Accuracy Motion** correctly, it is important to understand the different areas that make up the application window.

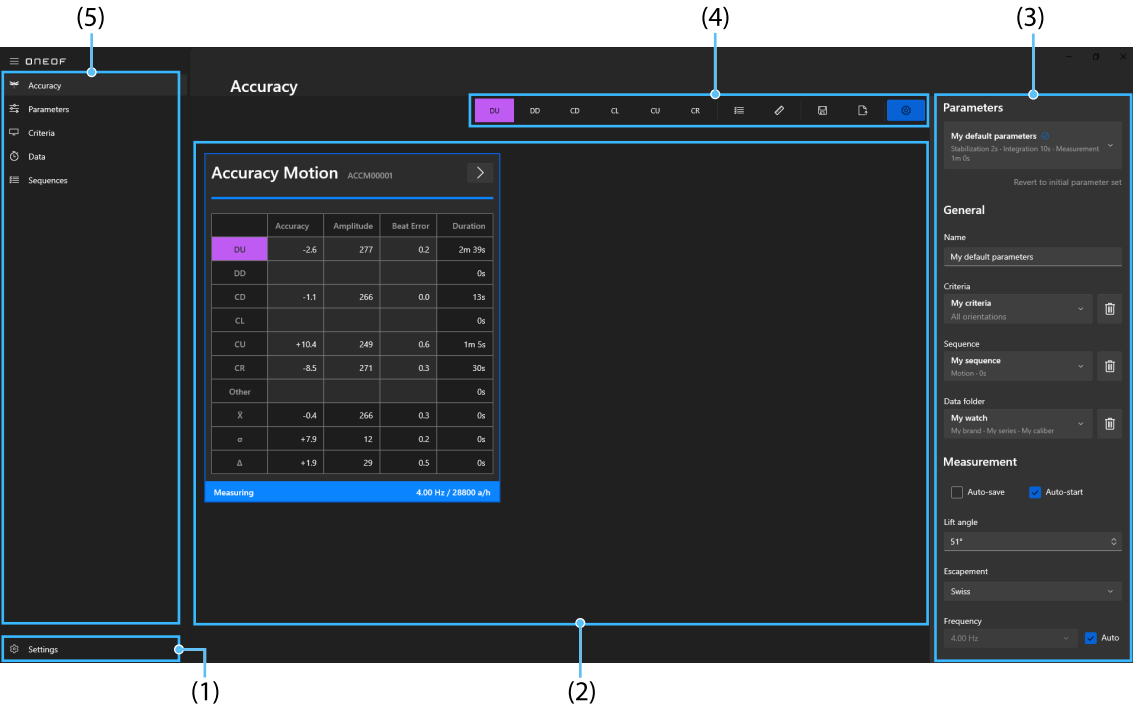


FIG. 6-1 - Accuracy Motion (User interface areas)

- | | |
|---------------------------------------|--------------------------|
| (1) Application settings control area | (4) Control area |
| (2) Results or listing area | (5) Contextual menu area |
| (3) Editing area | |



The editing area windows (3) can be shown or hidden

6.1.1 Description of the contextual menu tabs (5)

Accuracy

The **Accuracy** tab is dedicated to device overview and control. The **Accuracy2** application allows simultaneous control of multiple devices from the ONEOF® range. All connected devices are displayed directly on the screen in the accuracy window. From there you can start measurements, sequences and access all current data of your measurement.



[See Accuracy Tab, page 14]

Parameters

The **Parameters** contain the data about the watch you want to measure (frequency, lift angle,...) but also how you want to measure it (how much integration time, stabilization,...). A measurement cannot be made without parameters. There is always at least one set of built in parameters called "default" that is used in situations where no parameters have been chosen.



[See Measurement parameters tab, page 23]

Criteria

The **Criteria** are used to control the way measures are displayed.



[See Criteria tab, page 29]

Data

Contains all saved results and measurements. Here you can create new watches (measurement folders), delete them, view old results and export your measurement data.



[See Data tab, page 21]

Sequences

Create and manage sequences involving movement operations and measurements.



[See Sequence tab, page 26]

6.2 Accuracy Tab

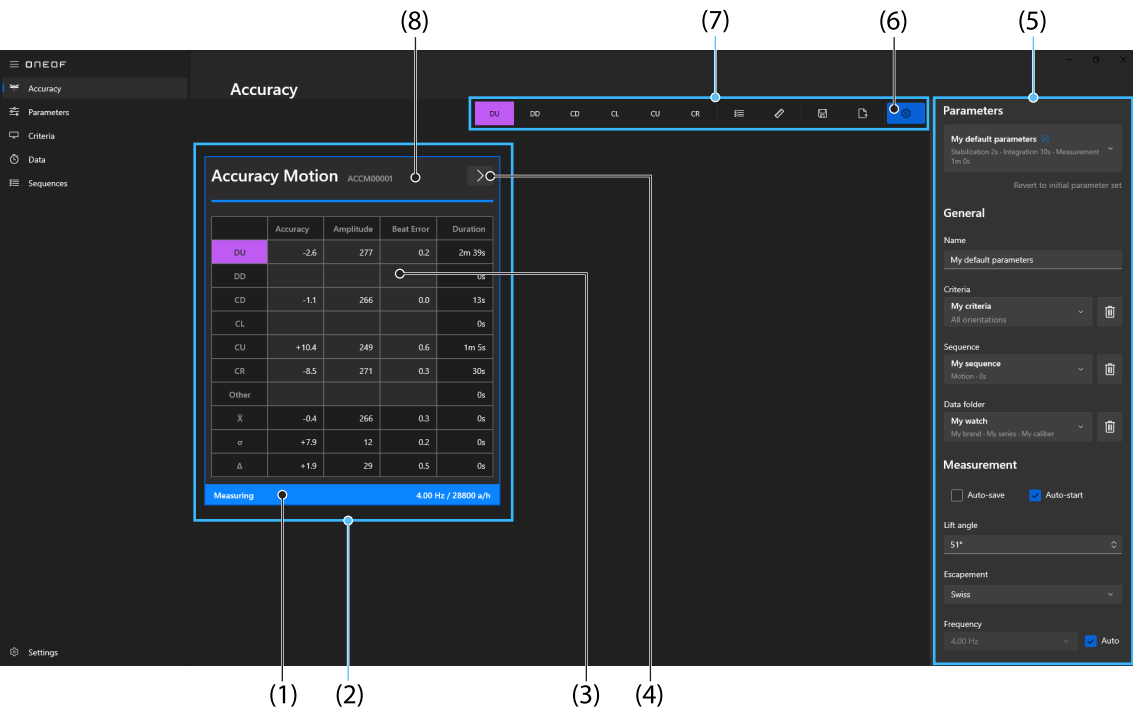


FIG. 6-2 - Accuracy Motion (Accuracy Tab)

- | | |
|----------------------------|------------------------------|
| (1) Device status | (5) Device parameters |
| (2) Device overview window | (6) Device parameters button |
| (3) Summary table | (7) Control bar |
| (4) Views | (8) Device name |



To make the *Device parameters* (5) appear, the *Device overview window* (2) must be selected before clicking the *Parameters* (6) button in the *Control bar* (7).

6.2.1 Control bar

The control bar allows you to select the standard measurement positions, to start or stop a measurements sequence, to start or stop a single measurement according to the chosen position, to save and to visualize the parameters related to the **Accuracy Motion**.

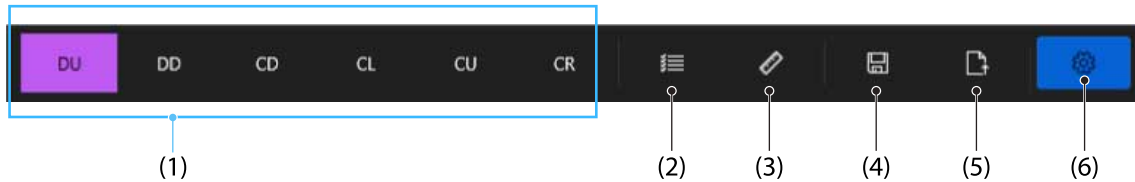


FIG. 6-3 - Accuracy Motion (Control bar)

- | | | | |
|-----|------------------------------|-----|--------------------|
| (1) | Measurement positions | (4) | Measurement saving |
| (2) | Measurement sequence control | (5) | Exporting results |
| (3) | Simple measures control | (6) | Device parameters |

6.2.1.1 Measurement positions



The standard available measurement positions are DU, DD, CD, CR, CU, CL.
[See **Measuring positions**, page 8]

6.2.1.2 Performing a measurement

Simple measures

The control bar (see FIG. 6-3) allows you to make a simple measurement by selecting a position.

The **Simple measures control** (3) button enables you to stop or restart the measurement.



Selecting a new position allows the measurement to be continued at the newly selected position.

Sequence measurement

The **Measurement sequence control** button (2) is used to start or stop a sequence of measurements.



A measurement cannot be performed without parameters. When a device is connected, a set of default parameter, defined in the parameters tab, will be used. If no default parameters are set in the parameters tab, the application will use the "built-in" parameters instead. . You can view these parameters by clicking on the **Device parameters** button (6) located in the **Control bar** (voir FIG. 6-3).



To view the **Device parameters**, remember to select the **Device overview** window.

6.2.1.3 Saving a measurement

The **Measurement saving** button (4) of the **Control bar** (see FIG. 6-3) enables you to save the measurement that has just been made.

6.2.2 Device Overview Window

This window allows you to select one or more devices, to display and edit the name (saved in database), and allows you to view the measurements table.

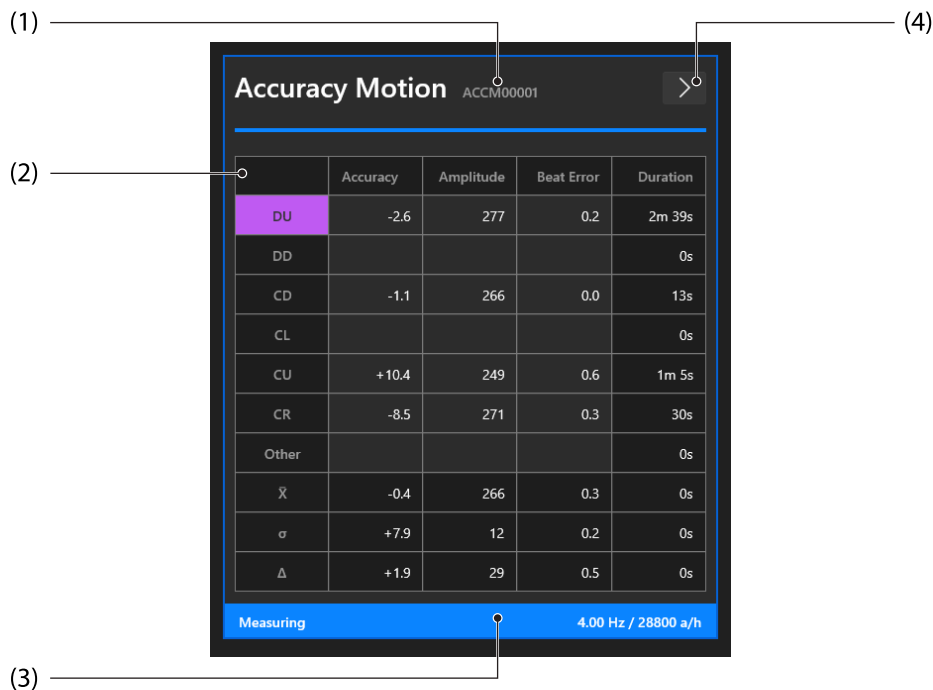


FIG. 6-4 - Accuracy Motion (Device overview)

- (1) Device name + serial number

(2) Summary table
- (3) Status bar

(4) Detail views

- In the **Status bar** (3), the message indicates whether the program is searching for the frequency, integrating, measuring or whether it is in standby.
- The **Detail views** (4) button gives access to the Scope, Graph, Diagram and Data view.



[See Detail views, page 17]



In order to access the different views, the device must be performing a measure.

6.2.2.1 Detail views

- A. Clic on the **Detail views** button (4) of the **Device overview** window (see FIG. 6-4). In the **detail view**, you can analyze the current measurements of your watch. You can select different views to get a better overview of the data.



The **Scope view** opens by default

Scope view

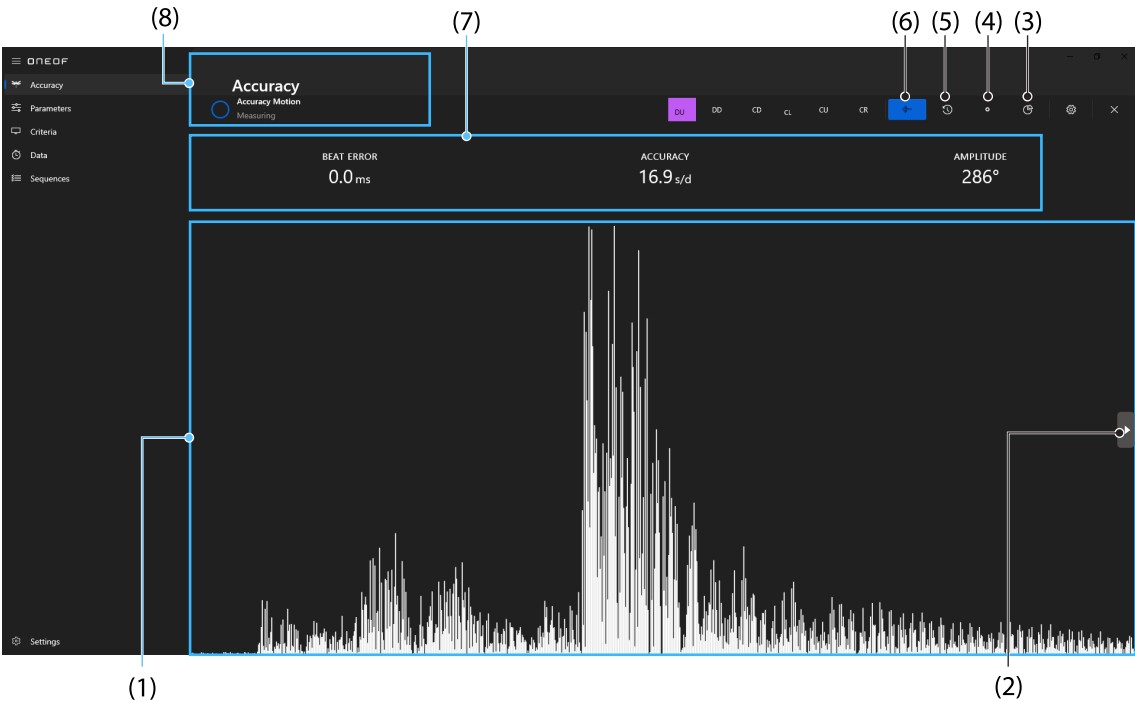


FIG. 6-5 - Accuracy Motion (Scope view)

- | | | | |
|-----|---------------------|-----|---------------------|
| (1) | Selected view | (5) | Graphic view button |
| (2) | Next view button | (6) | Scope view button |
| (3) | Data view button | (7) | Results area |
| (4) | Diagram view button | (8) | Device status |



The **Results area** (7) displays the result of the measurement in real time. It includes the beat error, the accuracy and the amplitude of the measured watch. Each of these values is updated every second.

The **Scope view** is the graphic display of the ticking signal of the watch movement. Through the bezel, expert watchmakers can detect problems with the escapement phase. It is also a very useful tool to determine if the upcoming signal is good enough for a correct measurement of the watch.



The Swiss lever escapement is composed of 3 distinct impulses. The first pulse is temporally very accurate and is therefore used for the calculation of the rate accuracy and the beat error. The second pulse is very irregular and cannot be used. The third pulse, the most powerful, is used to estimate the amplitude of the balance wheel.

Graphic view



FIG. 6-6 - Accuracy Motion (Graphic view)

- | | | | |
|-----|----------------------|-----|---------------------|
| (1) | Graphic view | (3) | Next view button |
| (2) | Previous view button | (4) | Graphic view button |

Every second, a new value of precision rate, amplitude and beat error is added to the graph. It is always interesting to check how these two values vary over time. Some particular and natural fluctuations may appear, such as the impact of gear train defects, the drop of the amplitude at the time of change, or more generally the variation of the rate over the whole power reserve of the watch. Each position is represented by a color.

Diagram view

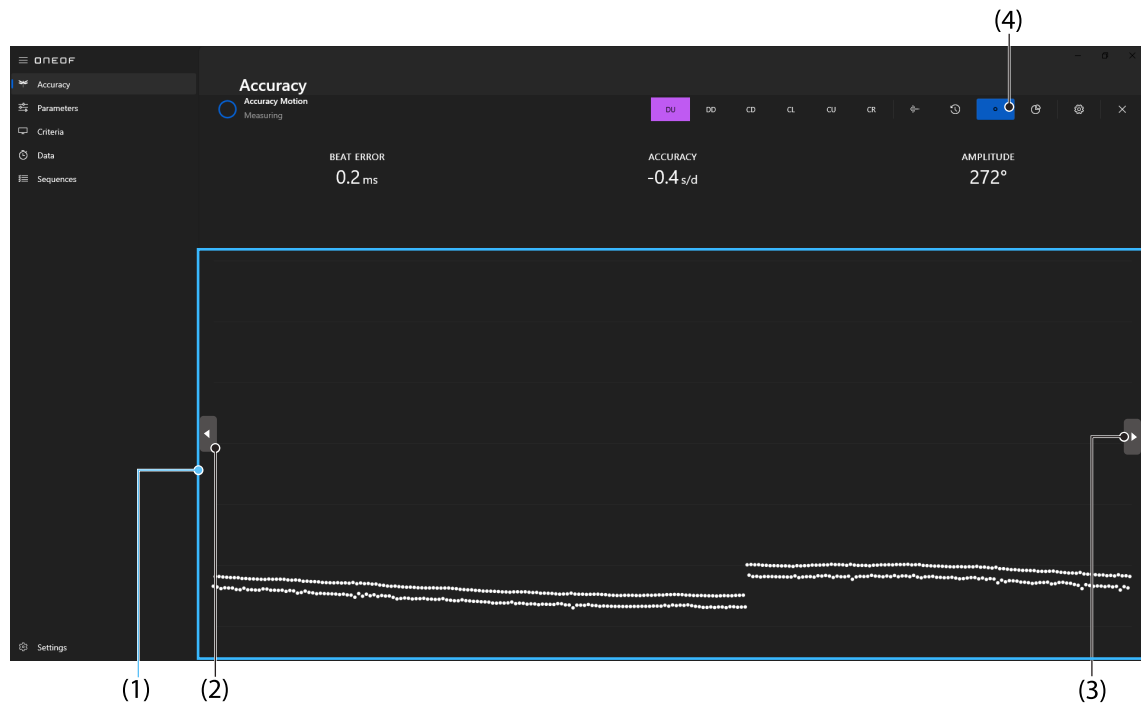


FIG. 6-7 - Accuracy Motion (Diagram view)

- | | | | |
|-----|----------------------|-----|---------------------|
| (1) | Diagram view | (3) | Next view button |
| (2) | Previous view button | (4) | Diagram view button |

As soon as the frequency is detected, the diagram starts to display the results. Each point represents a tick or a tock in time, which is shown as two lines.

- If the watch tends to run faster, the slopes are positive.
- If the watch tends to slow down, the slopes are negative.
- If the watch is perfectly accurate, the graph displays flat lines.

If the watch has no beat error, the two lines are superimposed. If the beat error is greater than 0.0 ms, the lines are spaced. The greater the beat error, the greater the space between the lines.

Data view

When you measure a watch in several common positions, the data view provides a summary of the current measurement. The different parts of the data are shown in the figure below.

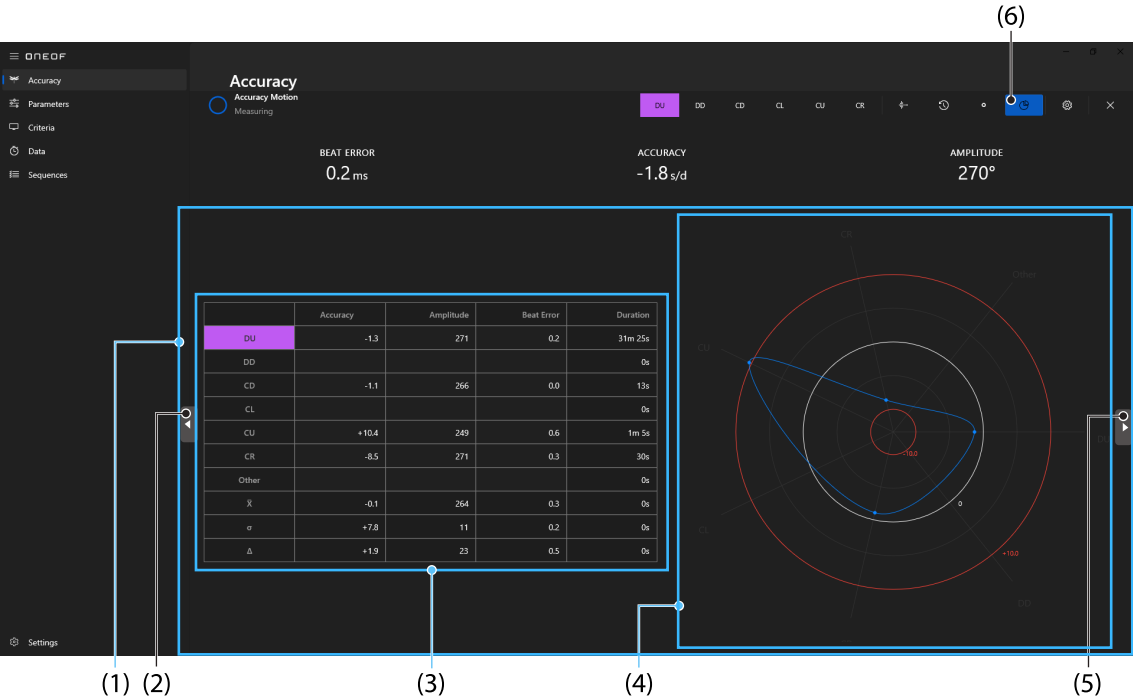


FIG. 6-8 - Accuracy Motion (Data view)

- | | |
|--------------------------|----------------------|
| (1) Data view | (4) Radar chart |
| (2) Previous view button | (5) Next view button |
| (3) Data table | (6) Data view button |

- Measurement of the standard position: In the upper part of the **Data table** (3), you have all the average values of the chronometric quantities (precision, amplitude and beat error) as well as the total time spent in each standard position.
- In the lower part of the **Data table** (3), you get the statistical data of all positions (each position has the same weight regardless of the duration of their measurement). From top to bottom, the average, the standard deviation and the maximum amplitude.
- **Radar chart** (4): represents the average precision values in the 6 common positions (DU, DD, CD, CR, CU, CL) in the form of a polar graph. This display allows you to quickly detect if the accuracy of the watch is perfect in all positions.



[See Data view / Radar chart, page 21]

Data view / Radar chart

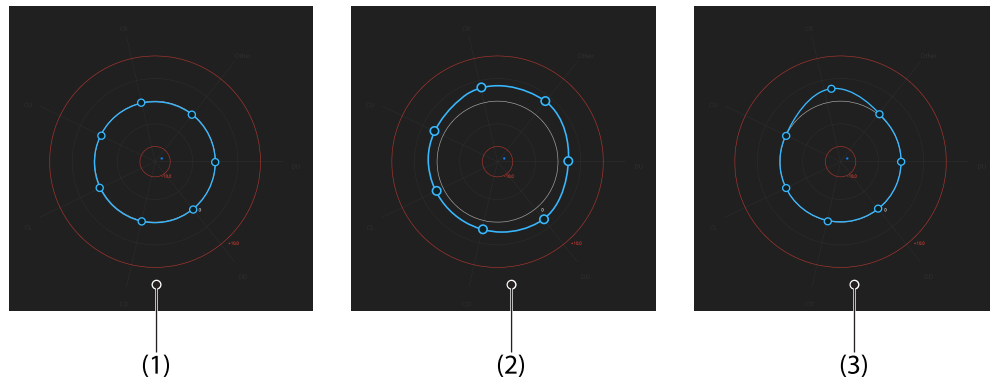


FIG. 6-9 - Accuracy Motion (Radar chart)

The watch can for example be perfectly accurate (1), can gain a few seconds per day (2), or have a problem with the CR position (3).

6.3 Data tab

This section allows access to the recorded data.

6.3.1 Opening a registered measure

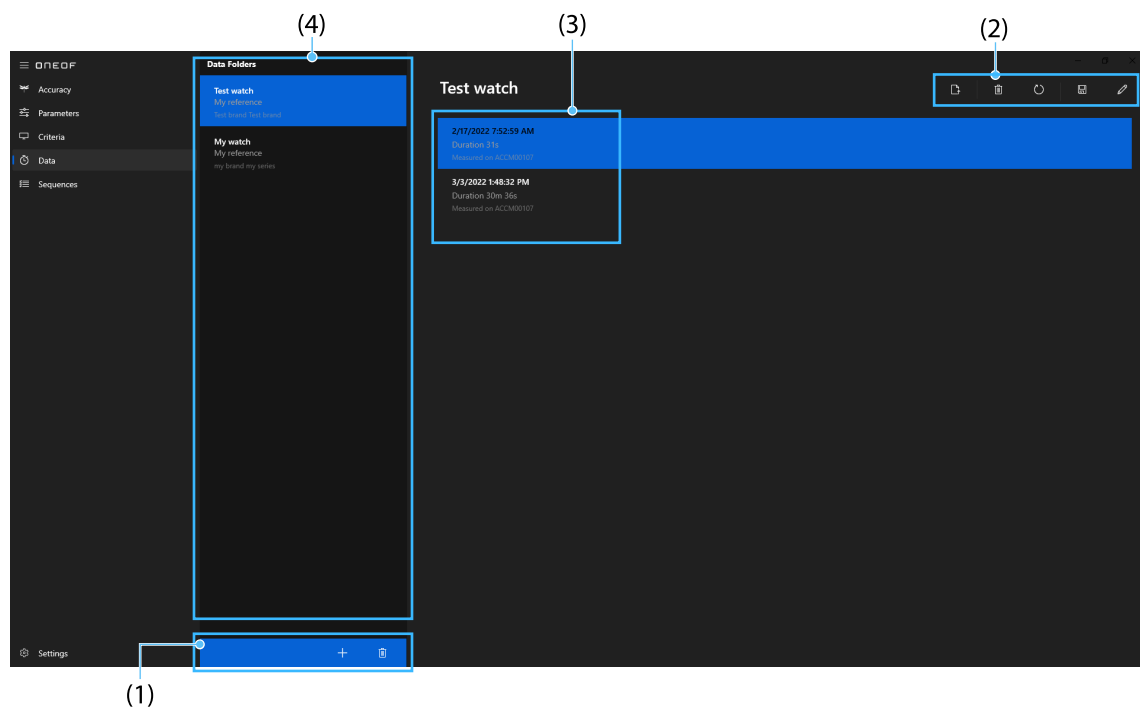


FIG. 6-10 - Accuracy Motion (Opening measures)

- | | | | |
|-----|--------------------------|-----|----------------------|
| (1) | Data folders control bar | (3) | List of measures |
| (2) | Data control bar | (4) | List of data folders |

- Once the **Data** tab is selected, a click on a data folder from the **List of data folders** (4), displays the list of measures (3).
- Once the measurement is selected, the **data control bar** allows you to export, delete, refresh, save and modify the measurement data.

6.3.2 Viewing the results of a recorded measurement

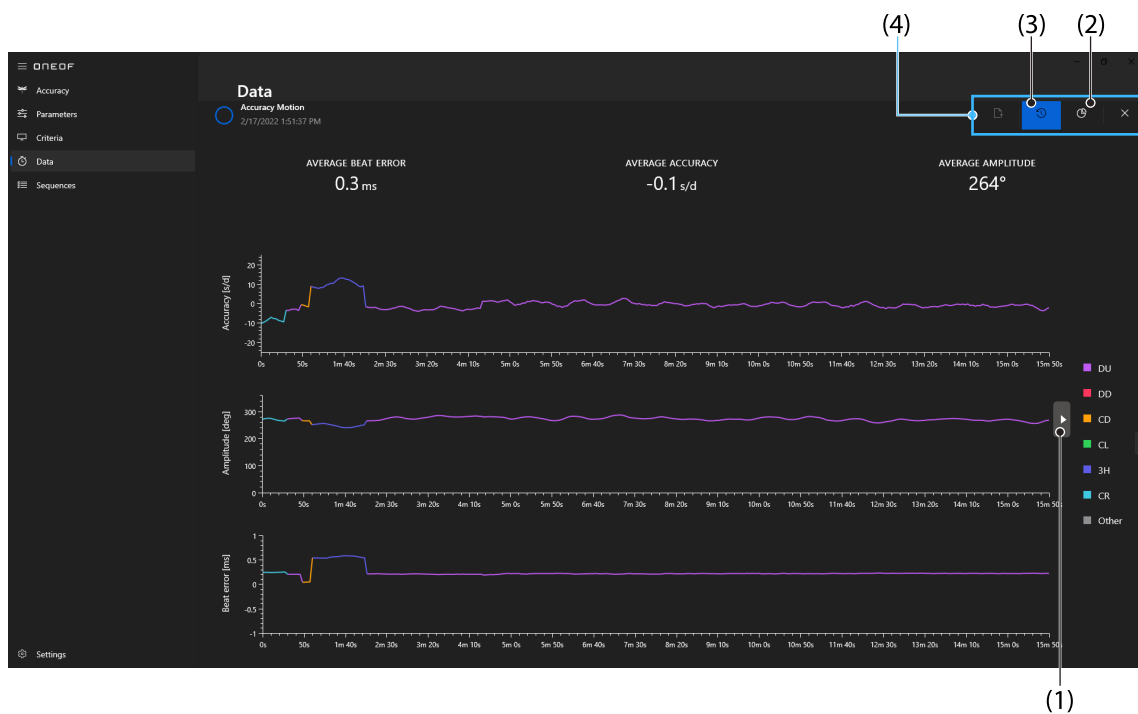


FIG. 6-11 - Accuracy Motion (Recorded measurement viewing)

- A double-click on the selected measurement gives access to the **Graphic view** and the **Data view**.



A new menu appears (4) with the two buttons for viewing the **Graphic view** (3) and the **Data view** (2).



It is also possible to switch from one view to another by means of a system of arrows (1) that appear when the mouse cursor is placed to the right of the screen, or to the left to return to the **Graphic view**.

6.4 Measurement parameters

6.4.1 Measurement parameters tab

The **Measurement parameters** contains the data related to the watch you want to measure (frequency, lift angle,...) but also the way you want to measure it (how much integration time, stabilization time,...). A measurement cannot be made without parameters. The default parameters are the parameters assigned to a connection with a device. If no default parameter is assigned, the built-in parameter is used by default.

The **Measurement parameters** is organized as follows:

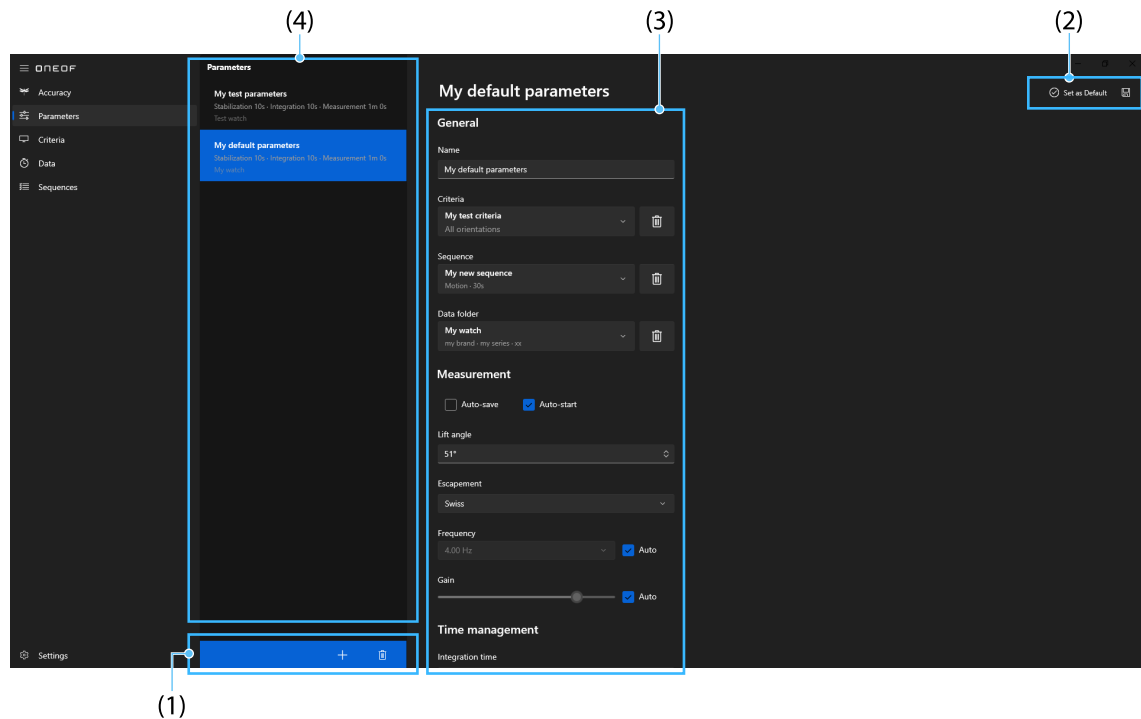


FIG. 6-12 - Accuracy Motion (Measurement parameters organisation)

- | | | | |
|-----|------------------------------|-----|----------------------|
| (1) | Parameter control bar | (3) | Parameters editing |
| (2) | Set as default and save menu | (4) | Parameters list area |

6.4.1.1 Creation of parameters

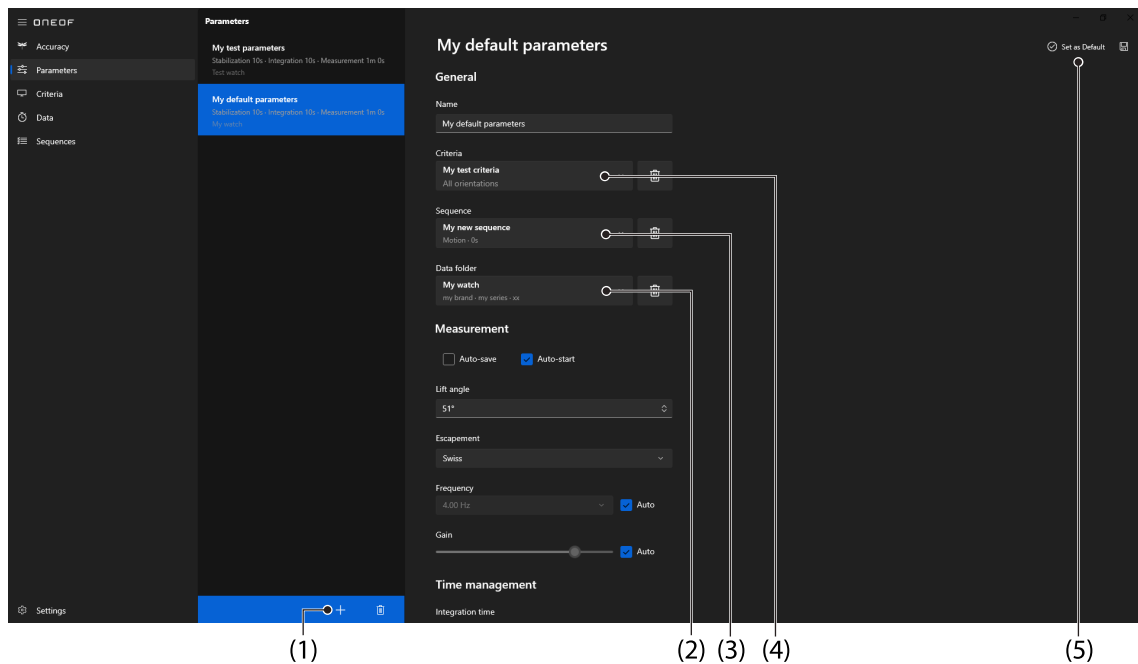


FIG. 6-13 - Accuracy Motion (Creation of parameters)

- Create a new set of parameters by clicking **Add Parameters** (1).
- Set as default: "Default" means that when a new device is connected, the measurement will be made with this parameter. If no default parameter is selected, the "built-in" parameter will be used. You can choose a set of parameters to be used as default by clicking the option at the top right of the screen (5).
- Criteria: possibility to link parameters to display criteria (4).
- Sequence: possibility to link parameters to a sequence (3).
- Data folder: Here you can define where to save your results (2).

- **Lift angle**: manufacturer's data.
- **Escapement**: manufacturer's data.
- **Frequency**: number of oscillations of the balance wheel. The frequency can be set to automatic by checking the **Auto** box.
- **Gain**: can also be found automatically by checking the **Auto** box.
- **Integration time**: value between 2 and 240 seconds.
- **Stabilization time**: to be used when the device stays within the same position type.
- **Stabilization time horizontal and vertical**: to be used when the device changes from vertical to horizontal position or vice versa.



There are two types of position: The horizontal positions that includes DU and DD and the vertical ones that includes CR, CU, CD and CL.

FIG. 6-14 - Accuracy Motion (Creation of parameters 2)

6.4.1.2 Launch measurement parameters

- Either define the parameters to be default parameters.
[See **Creation of parameters**, page 24]
- Or choose them from **Accuracy**, in the **Device measurement parameters"** window.
[See **Accuracy Tab**, page 14]

6.4.2 Sequence tab

The **Sequences** window is organized according to the following illustration:

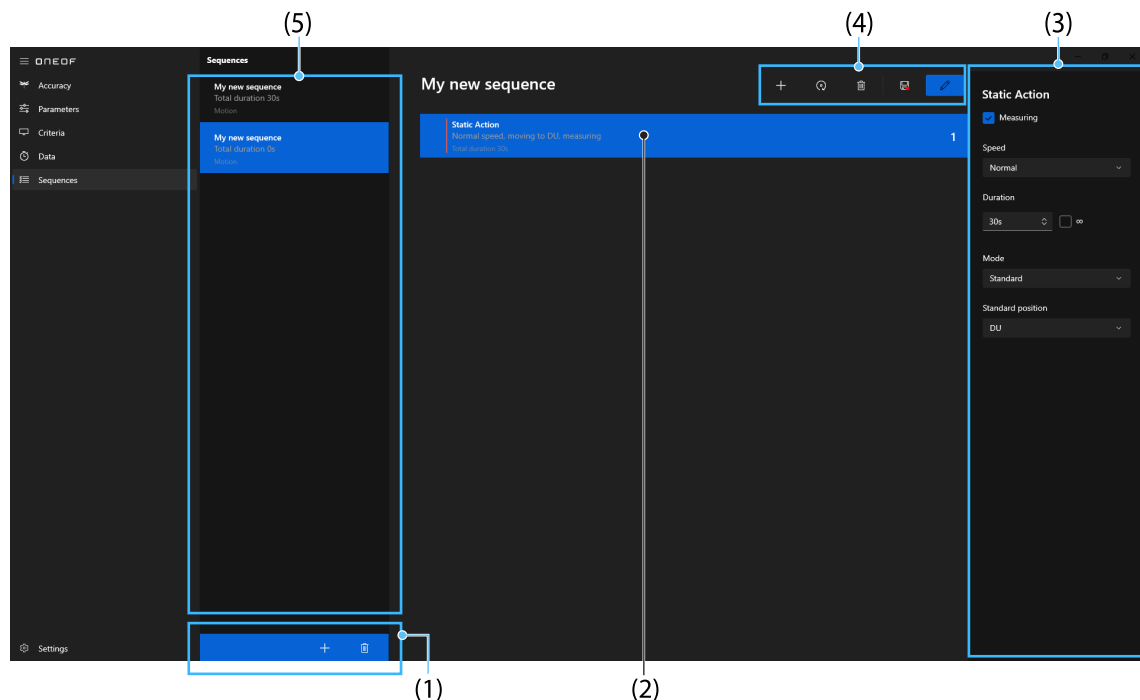


FIG. 6-15 - Accuracy Motion (Sequences)

- | | | | |
|-----|-------------------------|-----|-----------------------|
| (1) | Sequences command bar | (4) | Operation control bar |
| (2) | Sequences actions list | (5) | Sequences list |
| (3) | Operations editing area | | |

6.4.2.1 Create a measurement sequence:

- Click on the **ADD** button on the **Sequences command bar** (1). The software will ask you to select the type of device you want to create the sequence with.
- Select **Accuracy Motion**.
- If you want to change the name of your sequence, you can do so in the **Operations editing area** (3) if no **Operation** (2) is selected.

6.4.2.2 Add operations to the sequence:

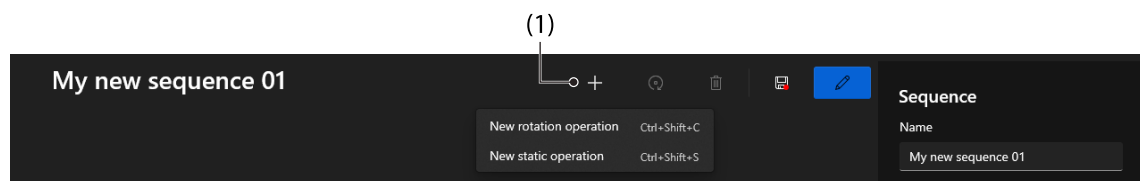


FIG. 6-16 - Accuracy Motion (Add operations)

You can choose to create a **New rotation operation** or a **New static operation** by hitting the **ADD** button (1).

The static operation corresponds to a standard measurement in a specific position.

- A. Measuring: Takes the measurement when the device reaches the requested position.



If selected, the device will hold the sequence until a watch is detected

- B. Speed: Set the speed of movement, normal or slow.



A slower speed generally reduces the mechanical noise of the Accuracy Motion during a movement.

- C. Duration: Corresponds to the measurement time (in seconds) in a position. If the measurement is not selected, the duration is simply a waiting time.
- D. Mode: There is 3 position modes: **Standard** represents the 6 standard positions, **Angle** allows you to choose different angles, **Random** allows you to use a random position.

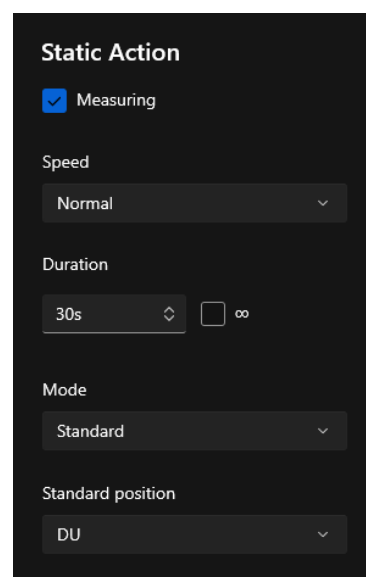


FIG. 6-17 - Accuracy Motion (Static operation)

The continuous operation corresponds to a continuous rotational movement. In this operation, the speed can be controlled from one degree per second up to 84 degrees per second (12 revolutions per minute). At a high speed, this operation can be used as a watch winder with no rate measurement. At a relatively low speed, depending on the sound power of the watch escapement, measurement of the rate of rotation is still possible. For example, you can use this function to measure a tourbillon movement: with a counter-rotation equal to the speed of the tourbillon, the result of the rate measurement is independent of the balancing of the tourbillon cage.

- A. Measuring: Takes the measurement when the device is in motion.
- B. Speed: Defines the speed of movement in degrees per second.



Generally, if you want to measure, it is best to stay below 12 degrees per second.

- C. Duration: Corresponds to the measurement time (in seconds) at the position. If the measurement is not selected, the duration is simply a waiting time.
- D. Alpha: Defines the alpha angle. **Current** means that the alpha angle keeps the previous position, **Fixed** allows you to choose the rotation angle, **Random** randomly sets the alpha angle during the operation.

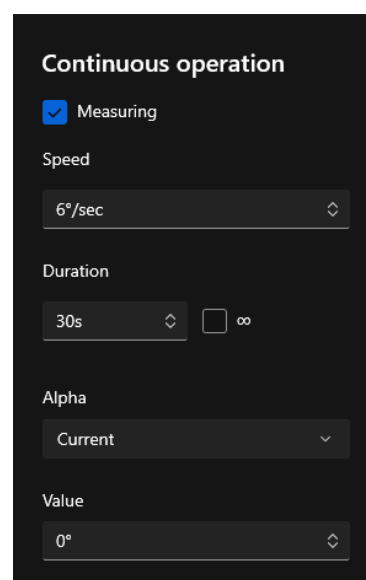


FIG. 6-18 - Accuracy Motion (Continuous operation)

6.4.2.3 Save a sequence

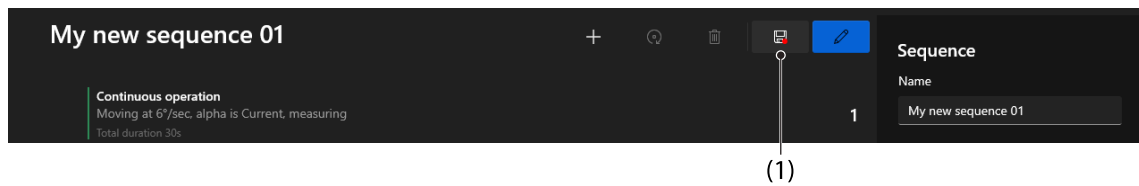


FIG. 6-19 - Accuracy Motion (Save a sequence)

Once the sequence is completed, click the **Save** button (1) on the command bar to save the sequence.



If you forget to save, before accessing another section, the application will ask you if you want to save the changes.

6.4.3 Criteria tab

6.4.3.1 Define Criteria

The **Criteria** define the display of the measurement data. The criteria will change the information displayed in the **Device Overview** window.

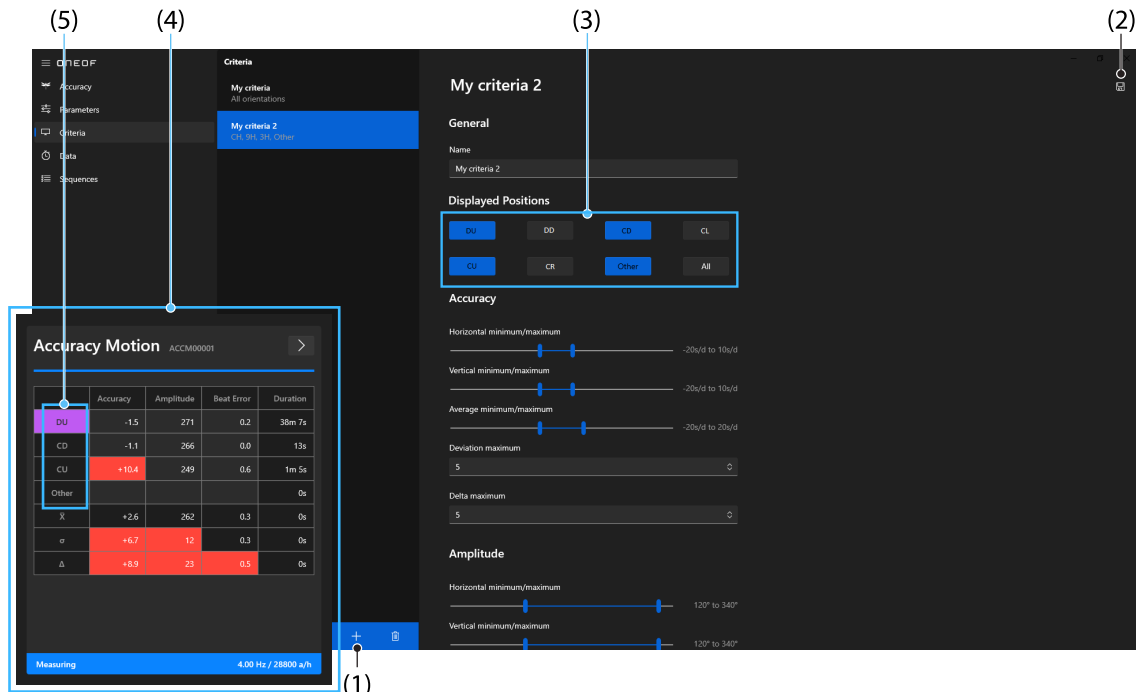


FIG. 6-20 - Accuracy Motion (Criteria for displaying the measures)

- | | | | |
|-----|------------------------|-----|---------------------------------|
| (1) | Create criteria button | (4) | Device overview window |
| (2) | Save button | (5) | Displayed measurement positions |
| (3) | Displayed Positions | | |



In the example above, only the DU, CD, CU and OTHER positions selected in **Displayed positions** (3) will be displayed in the **Device Overview** window (4) for the **Accuracy** tab.

The different fields to define the criteria are:

- Name: Define a criteria name
- Displayed positions: The positions selected in this section (3) will be displayed in the **Device Overview** window (4).
- Accuracy: allows you to define the upper and lower limits of your display in seconds/day. In the Summary table of the **Device overview** window (4), a value outside the limits will be displayed on a red background and on a black background when the value is within the defined limits. This is very useful if you want to check your measurement quickly.
- Amplitude: can be set in the same way as the Accuracy.
- Beat error: The Beat Error is always positive, you can only set the upper limit.

6.4.3.2 Save Criteria

- A. Save the criteria by clicking the **Save** button (2).

6.5 Application settings

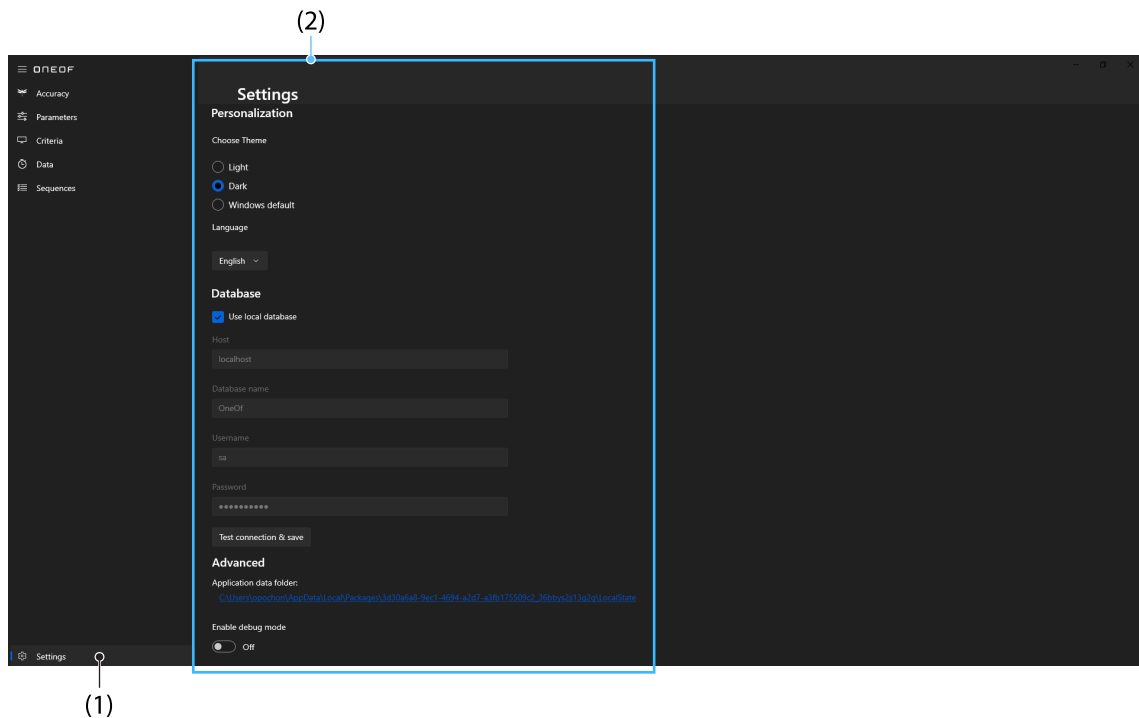


FIG. 6-21 - Accuracy Motion (Application settings)

(1) Application settings button

(2) Settings editing area

6.5.1 Display setting

The color theme as well as the language can be changed in the **Personalization** section.

6.5.2 Language

Choose the application displayed language.

6.5.3 Database

This section contains all the fields to connect to the database and to test the connection.



In the case a remote database is used, it must be an SQL Server database.

6.5.4 Advanced

This section allows you to:

- Access the folder where the application is saved.
- Debug mode: Save logs in the application folder to help developer to fix a bug.

6.5.5 About this application

You will find here:

- Information about the application version
- The link to our website

7. Maintenance

7.1 Cleaning the device

Clean the ***Accuracy Motion*** with a dry or damp cloth.

7.2 Periodic maintenance

- No particular periodic maintenance is required.

8. Troubleshooting

8.1 The device is not detected by your computer

Check after each of the following steps if the problem is solved:

- A. Unplug and plug the device again.
- B. Restart the software.
- C. Send the Application data folder logs (accuracy-standalone.txt and one-of.txt) to info@h2i.ch

8.2 The device is not detected by your tablet

Check after each of the following steps if the problem is solved:

- A. Unplug and plug the device again.
- B. Restart the software.
- C. Send the Application data folder logs (accuracy-standalone.txt and one-of.txt) to info@h2i.ch

8.3 The device does not work correctly

This device being a high-precision measuring instrument, it may happen that the measurement is disturbed by electrostatic discharges.

- A. Unplug and plug the device again.
- B. Restart the software.

9. Recycling



To protect people and the environment, all equipment and accessories must be disposed of properly. It is imperative that the local laws and regulations concerning waste disposal are observed. The machine may only be disassembled and dismantled by a qualified technician.



Parts and subassemblies removed by the technician may not be reused without written approval from the manufacturer. Any future application must be specifically described in the application.



The machine does not contain any hazardous metals.

10. Annexes

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11. Glossary

Escapement:

The escapement is a mechanism usually placed between the energy source (spring, weight, etc.) and the regulating organ. The purpose of the escapement is to maintain and count the oscillations of the balance wheel of a watch. It allows the transmission of time information from a regulating device (balance wheel) to the device to be regulated (the hands of a watch, for example), and to supply the regulating device with energy.

Frequency:

The frequency is the number of oscillations that the pendulum makes in time. The Accuracy Windows application expresses the frequency in beats per hour [b/h]. By default, the beat frequency of a watch is automatically detected within 2 seconds. The range covers the most common beat rates, from 2Hz (14'400b/h) to 10Hz (72'000b/h). The user can manually set the frequency and thus disable the frequency detection.

Integration time:

Due to phenomenons related to the acoustic physics, the rate accuracy must be averaged over a period called the integration time, expressed in seconds [s]. The integration time values cover a range from 2s to 240s. The lower the time integration, the less stable the measurement. However, a low integration time allows the measurement to show more detailed fluctuations. Basically, you would use a long integration time (30 or 60s) for inaccurate vintage watches or if you use the Accuracy Pro in a noisy environment. If the watch is stable, accurate, and you are doing the measurement in a calm environment, you can use a lower integration time. However, we highly recommend to always use an integration time higher than 10s.

Gain:

As all watch signals are different, the Accuracy Pro integrates an AGC, for Automatic Gain Control. By default, the gain is set to automatic which means that weak signals are boosted (Gain > 70%) and strong signals are reduced (Gain < 30%). The AGC is ON until the Measuring State is reached. By ticking the check box, the user can set a manual gain and thus disable the AGC.

Lift angle:

The lift angle is the angle in degrees covered by the balance wheel between the first and third peak of the escapement signal. It is a geometric characteristic, determined by construction and given by the manufacturer. In the watch industry, the angle of lift is known to be very imprecise: between 2 movements of the same production, a variation of +/- 3° of the angle of lift is not rare. As a variation of 1° is equivalent to a variation of about 7° of the amplitude value, this is the reason why the acoustic measurement of the amplitude is always an estimate. For most standard watch movements, the angle of lift is about 51°.

Measurement time:

By default, the measurement time is infinite, which means that the measurement will only stop when the watch reaches its power reserve or if it is removed from the sensor. The user can set a specific measurement up to 92h. If done, the measurement will automatically stop, with a message at the top of the window.

Stabilization time:

If set, the stabilization time is a countdown that appears after each change of testing position. It can be seen as a dead time with no measurement done during that time and serves 2 purposes:

- When a watch changes of position, it can take some time for the balance wheel to reach its full work amplitude.

- When the testing position is changed, noises appear in the signal due to the oscillating mass rotation. Setting a stabilization time can avoid bad results after a change of position.