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SWISS-PRODUCTION

Detailed User Manual

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LE CYLINDER

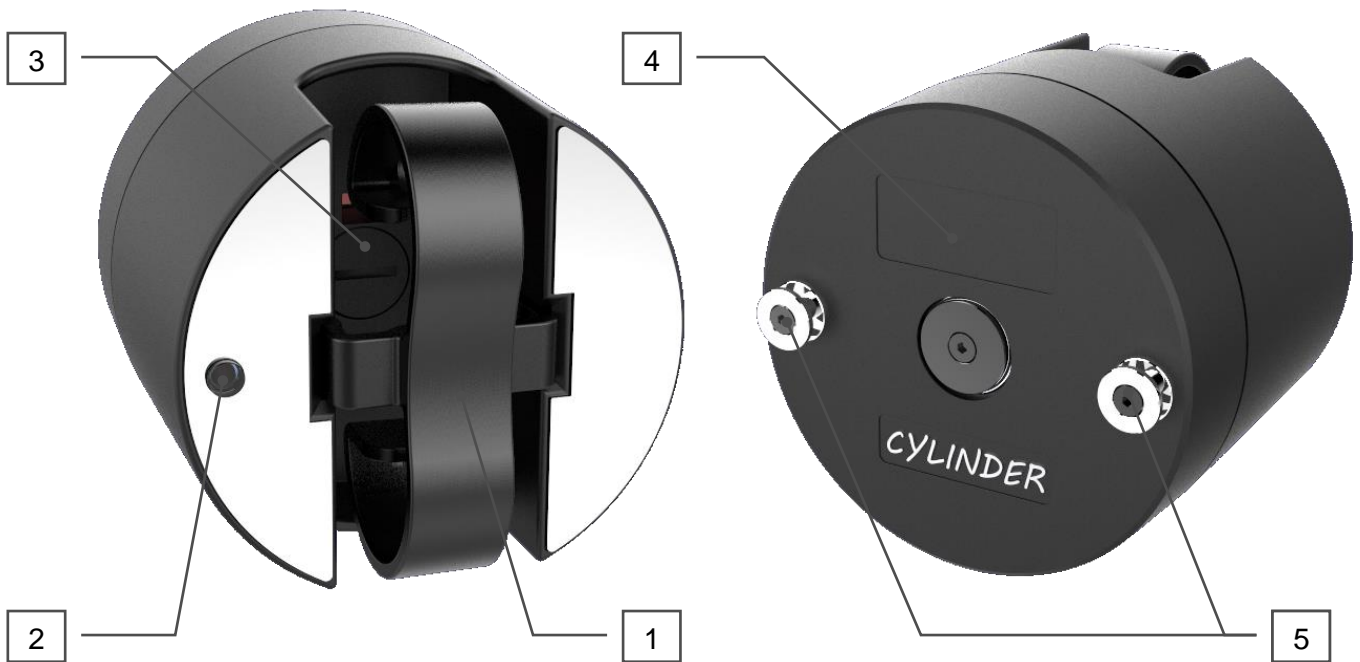
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1. The product

1.1 Product snapshot

Figure 1.1: Overview



- 1 - Watch holder
- 2 - ON/OFF button + LED indicator
- 3 - Top lid screw (for changing the battery)
- 4 - Location of serial number label
- 5 - Fixing screws

1.2 Operation

LE CYLINDER winds up automatic watches to keep them charged and showing the correct time. It can be turned on and off simply by pressing a button.

When **LE CYLINDER** is switched on, the white LED indicates the status of the batteries, and then the device positions itself vertically.

LE CYLINDER is equipped with an infrared sensor to detect the presence of a watch in the device. When it is empty, the device will remain in standby mode without draining its batteries.

A motor current control function stops the system if the movement jams. Once **LE CYLINDER** has detected a problem, it can only be restarted by pressing the button.

The number of rotations and the wait time can be configured using a computer interface that connects to **LE CYLINDER** via Bluetooth. There is even an advanced mode that also configures motor torque (which can influence rotation speed), torque limitation and the watch detection threshold.

2. Instructions for Use

2.1 Switching LE CYLINDER on and off

To switch **LE CYLINDER** on, press the ON/OFF button (number 2 in figure 1.1). The white LED lights up to confirm that the button has been pressed. The LED will remain lit while the button is being pressed. **LE CYLINDER** will not start until the button is released. Do not press the button for more than four seconds, as this will start the Bluetooth configuration mode (see chapter 3).

LE CYLINDER's LED flashes to indicate the status of the batteries:

- 4 flashes: Batteries 100% charged
- 3 flashes: Batteries more than 60% charged
- 2 flashes: Batteries more than 30% charged
- 1 flash: Batteries nearly flat (<30% charged)

Once the batteries are nearly flat, the LED may no longer light up. The motor will continue to turn, but can be expected to do so more slowly. You should replace the batteries to ensure that the device functions correctly.

Once the battery level indicator has finished flashing, **LE CYLINDER** will position itself vertically, whether it contains a watch or not. If **LE CYLINDER** is already vertical, it will not move.

The preprogrammed cycle will then begin. The device will start the cycle by checking for the presence of a watch. If no watch is detected, **LE CYLINDER** will go into standby mode for the wait time previously defined in the settings (see chapter 3.2) before checking once again whether a watch is present.

If a watch is detected, **LE CYLINDER** will rotate 12 turns in each direction (only at the startup of **LE CYLINDER**) and then perform the defined number of rotations. If the movement chosen includes both clockwise and anticlockwise rotations, the device will begin by turning anticlockwise. Once **LE CYLINDER** has completed the defined number of anticlockwise rotations, it will stop in a vertical position for one second, and will then start rotating clockwise the defined number of times.

Once all the programmed rotations have been completed, **LE CYLINDER** will stop in a vertical position and go into standby mode for the defined length of time.

LE CYLINDER only checks for the presence of a watch when it begins to rotate. If the watch is removed while it is rotating, **LE CYLINDER** will not detect this until it starts a new movement (new cycle or change of direction). If **LE CYLINDER** is turning, we recommend that you turn it off before removing the watch.

To turn the device off, push the button briefly. If **LE CYLINDER** is moving, it will stop immediately.

LE CYLINDER will not be turned off completely until the button is released. (Until the button is released, the LED remains lit to indicate that it is being pressed.)

2.2 Putting a watch into LE CYLINDER or removing it

To put the watch into the case, we recommend that you turn off the device so that it does not turn. To do so, press the button once. If **LE CYLINDER** was already turned off, it will turn on again, showing the battery level. You should then turn it off again.

Once **LE CYLINDER** is turned off, pull on the watch holder to unclip it. Slide the watch onto the holder. (You may need to adjust the strap if it is set for a small wrist.) Put the watch and the holder back into **LE CYLINDER**, ensuring that the watch is positioned with midday upwards (otherwise it will stop upside down).

Press the button to turn the case on. The preprogrammed cycle will begin immediately.

If the device does not detect the watch correctly (**LE CYLINDER** does not move despite the fact that there is a watch on the holder), you can adjust the detection setting using the configuration tool's advanced mode (refer to chapter 3.3).

2.3 Torque limiter (protection against jamming)

LE CYLINDER has a motor current controller that protects against jamming. If the motor current exceeds a predefined value (see chapter 3.3), it will turn off completely to protect the mechanism and avoid draining the batteries.

The current is measured every two seconds, meaning that **LE CYLINDER** can take up to two seconds to detect a jam.

LE CYLINDER will not start up again until the user presses the button, after having ensured that nothing is stopping the mechanism from moving freely.

2.4 Replacing the batteries

The batteries need to be replaced when they are no longer capable of turning **LE CYLINDER** (once every 2 years with average use). To avoid reaching the point where the batteries are no longer able to turn **LE CYLINDER**, they should be replaced once there is less than 30% charge remaining (one single flash on startup). To replace the batteries, proceed as follows:

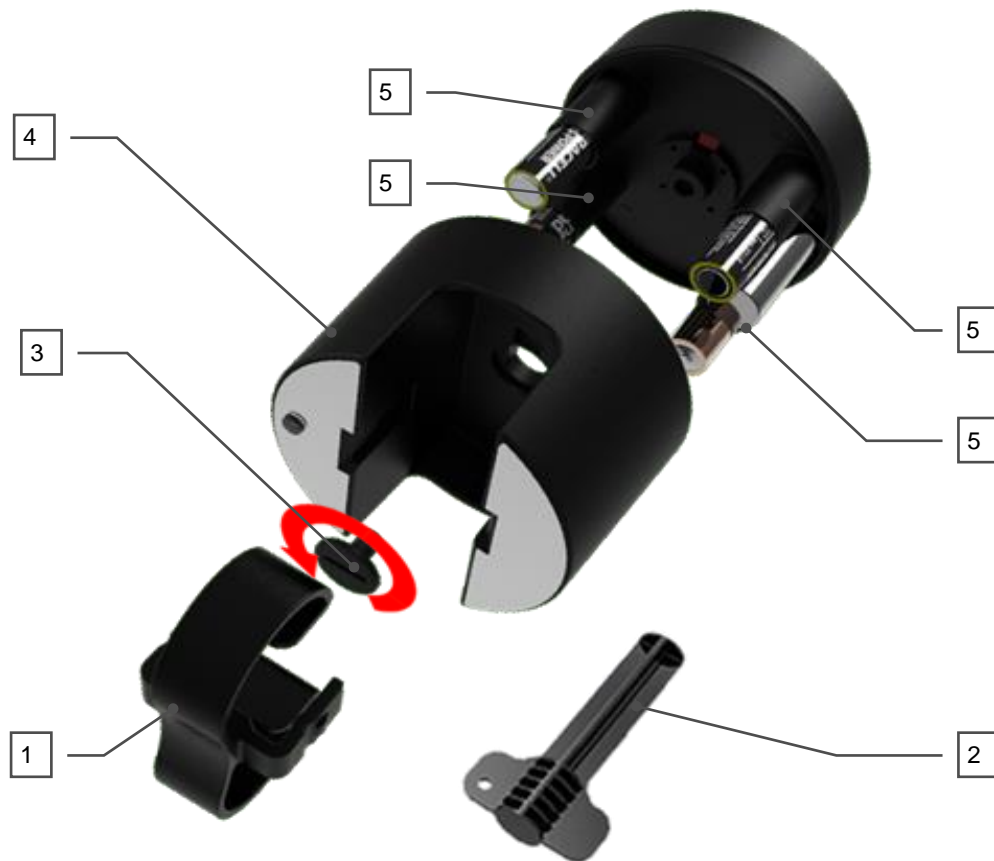


Figure 2.4: View of Le CYLINDER open

- Remove the watch holder (1) by unclipping it in line with **LE CYLINDER**.
- Using the special tool provided (2), unscrew the central screw (3) as shown.
- Remove the cover (4).
- Insert 4 AA lithium/alkaline 1.5V (LR6) batteries into the housings (5), ensuring that they are the right way round. (**Check the markings on the battery housings.**)
- Replace the lid carefully.
- Tighten the central screw using the special tool.
- Ensure that the lid turns freely.
- Press the button on the front to ensure that the device is charged and start the cycle. (**N.B. The cycle will only begin if there is a watch on the watch holder.**)

2.5 Battery polarity



Figure 2.5 Battery polarity

- Replace the top lid, ensuring it is the correct way round.
- Screw the top screw back in.
- Press the ON/OFF button to ensure that the system is functioning correctly.

3. **Configuring LE CYLINDER via Bluetooth**

3.1 **Activating Bluetooth mode**

By default, **LE CYLINDER**'s Bluetooth mode is deactivated, making it invisible to other Bluetooth devices. To activate the Bluetooth mode, hold the ON/OFF button down for more than four seconds. This can be done while **LE CYLINDER** is switched off.

The white LED will indicate that Bluetooth mode has been activated. While the button is held pressed in, it will initially be lit, then will go out before starting to flash after four seconds. You can then release the button.

LE CYLINDER can now be detected by a Bluetooth device. It will remain in this mode for one minute. If no computer has connected to it within this time (Bluetooth connection established and interface paired), **LE CYLINDER** will revert to standard mode and resume its cycle.

To connect to **LE CYLINDER**, use a Windows computer equipped with a Bluetooth peripheral (flash drive or integrated module). Once **LE CYLINDER** has been recognised (name "Cylinder"), connect using the access code "1234" (this will be requested at the first connection only). The computer will allocate the device a serial port number (COM7 for example). Select this serial port number in the graphic interface before connecting.

Once the interface is connected to **LE CYLINDER**, it will remain in Bluetooth mode as long as the interface remains open. If the interface is closed or the device is disconnected, **LE CYLINDER** will revert to its normal mode.

If the user pushes the button while the Bluetooth mode is active, whether the interface is connected or not, **LE CYLINDER** will switch off immediately.

3.2 Configuring standard settings

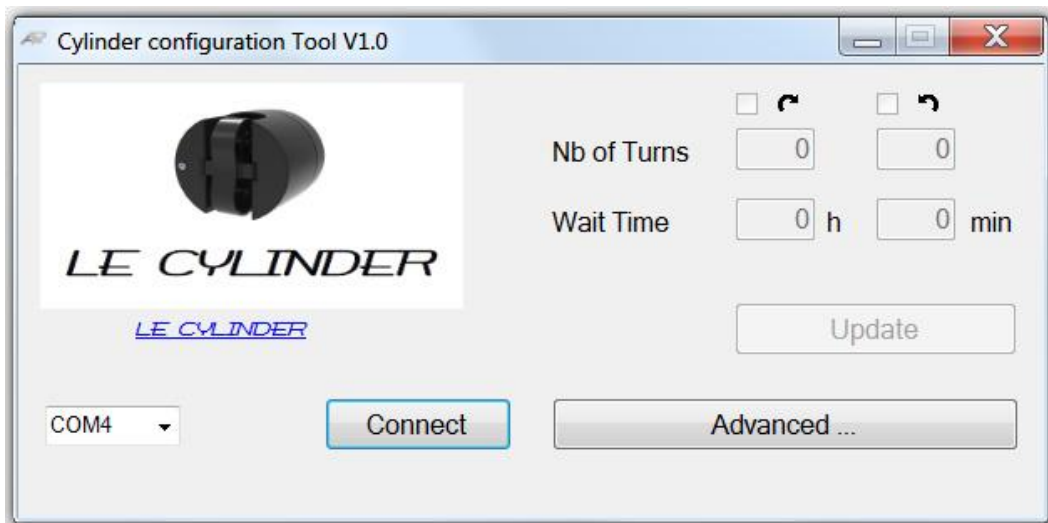


Figure 3.2: View of the interface (currently under development)

Once the computer has allocated the case a COM port number, use the drop-down menu to select it, then click the "Connect" button. The interface will automatically retrieve **LE CYLINDER**'s current settings and display them in the appropriate fields.

Should an error message appear, check that the correct COM number has been selected and that **LE CYLINDER** is still in Bluetooth mode (LED flashing every two seconds). If **LE CYLINDER** has reverted to normal mode (because the one-minute window has been missed), press the button for four seconds to restart Bluetooth mode and then attempt to reconnect the interface.

This interface can be used to select the direction of rotation (clockwise, anticlockwise or both). If one direction only is selected, the box corresponding to the number of turns for the opposite direction is greyed out. Otherwise, both settings can be edited. The number of clockwise turns and the number of anticlockwise turns are entirely independent of each other. It is therefore possible to set the device, for example, to 500 clockwise turns and 200 anticlockwise turns. The maximum number of turns in one direction or the other is 65,535.

The final setting ("Wait Time") can be used to set the amount of time between two turn cycles. This is measured from the time the device finishes one set of revolutions until it starts the next. For example, if the turn cycle lasts 1 hour and the wait time is set to 23 hours, the complete cycle will be repeated once every 24 hours. The maximum wait time is 1,092 hours and 15 minutes.

Once the desired settings have been configured, press the update button to transfer these setting to **LE CYLINDER**. Once the configuration is complete, press the Disconnect button. (The settings will not be saved by **LE CYLINDER** until this has been done.)

This action will deactivate Bluetooth mode and return **LE CYLINDER** to normal operation.

If the user presses the button to turn **LE CYLINDER** off before the interface has been disconnected, the new settings will not be recorded.

3.3 Configuring advanced settings

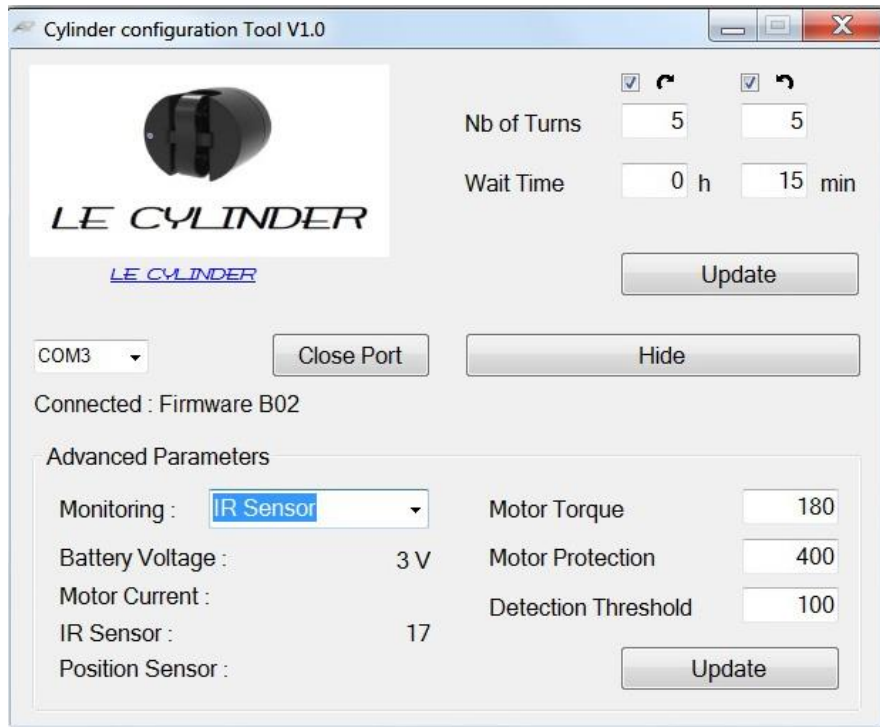


Figure 3.2: View of the Advanced interface

The Advanced settings mode can be used to adapt the device to specific situations (e.g. the watch not being detected due to a special strap, insufficient torque to drive the system, torque limit too low, etc.). To enter this mode, a special combination of buttons will be required, or a code will be requested once the user clicks the advanced button. This has yet to be decided.

Once the window is open, the current firmware revision and battery voltage are shown in the bottom left-hand corner of the interface and the current device settings are shown in the appropriate fields. We recommend that users note these factory settings on a piece of paper so as not to lose them before making any changes.

In the same way as for standard settings, changes are sent to the device using the Update button. They are only saved definitively once the interface has been disconnected.

If the case is turned off manually (using the ON/OFF button) the changes made will not be recorded.

Motor Torque

The first setting (Motor Torque) adjusts the motor torque by acting on the motor's PWM. This value can be configured between 30 (minimum PWM to turn the case) and 200 (100% PWM). The higher the value, the more torque the motor will have, but the more power it is likely to use. To understand the effects of changes, adjust the torque value, press Update, disconnect the device and let it run in normal mode..

4. *Technical Specifications*

Dimensions:	∅ 90mm x 90mm
Weight:	440g (with four AA batteries)
Power supply:	Four AA LR6 lithium/alkaline 1.5V batteries
Battery life:	Around 2 years (at 700 turns per day)
Rotation speed:	10 turns per minute
Configuration:	By Bluetooth connection
Protection:	Motor torque limiter
Watch detection:	By IR sensor