RHEOLOGIC™
Caution: RHEOLOGIC must only be used by a clinician who has attended and passed an Össur ceritied RHEO KNEE education program.
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1 Installing RHEOLOGIC

**Install**
You should have received an email with a link to an Össur website that includes your license key for the software. Follow the instructions in the email to start the download and installation process.

*Note:* If you install the program as an Administrator, make sure RHEOLOGIC is accessible for the user from the start menu or as a desktop icon.

**Uninstall**
In the start menu, locate the folder ‘Ossur’ containing RHEOLOGIC and select “Uninstall.”

2 Connecting to the RHEO KNEE

RHEOLOGIC uses Bluetooth to connect to the RHEO KNEE *(Figure 1).* Bluetooth is a wireless connection that enables communication between your computer and the knee. Össur recommends that you use the Bluetooth already installed on your computer but if your computer does not come with Bluetooth capabilities you can order a Bluetooth USB dongle from Össur.

Before you can connect to your RHEO KNEE you have to add it to your computer operating system’s list of Bluetooth Devices (see instructions that come with your computer). Once you have done that, a COM port will be assigned to your RHEO KNEE. This COM port has to be provided when connecting to the knee.

*Figure 1*
1. Once RHEOLOGIC has been started, click the „Connect“ button (Figure 2).

![Figure 2](image)

2. Select the COM port of your RHEO KNEE from the list of COM ports and click „Connect“ (Figure 3).

![Figure 3](image)

**NOTE:** To find the COM port assigned to your RHEO KNEE, open Bluetooth Devices, and identify your RHEO KNEE. Select “Properties” and look for the COM port number, e.g. COM port 9. If a distinction is made between outgoing and incoming ports, note the incoming port. If you have problems connecting, refer to the troubleshooting guide in section 5.

3. RHEO KNEE is successfully connected when the Bluetooth indicator is blue and white and the status box changes from “Disconnected” to “Connected”.
RHEOLOGIC functions

Indicators
In the upper left corner, there is a battery indicator (Figure 4-1). The battery indicator depicts the status of the RHEO KNEE’s battery. When the battery is critically low, the user will receive a warning vibration and/or audio sound. In case of any disturbance to the connection, due to timeouts in software, battery status, or excessive distance to the RHEO KNEE, the Bluetooth connection icon (Figure 4-2) will change color according to the connection state.

A message board (Figure 4-5) is located below the battery and Bluetooth indicators. The message board will show messages related to the status of the RHEO KNEE. Pay attention if the message reads “Service required, please contact Össur representative”. If this message appears, RHEO KNEE has detected a problem, and the RHEO KNEE should be sent for a service check.

Change name
To make it easier for you to recognize the RHEO KNEE among the list of accessible Bluetooth devices, you can customize the name of the RHEO KNEE to each specific user. Össur recommends that you keep the serial number as a part of the name for unique identification (Figure 4-4).

Warning system
The RHEO KNEE provides audio and vibration warning systems, which alert the user that power is low or a system malfunction has occurred (Figure 4-6). Select the type of warning: audio, vibration, or both. Sliding the frequency bar will change the pitch of the audio warning (Figure 5).

Important: Make sure that the user recognizes the warning signals (some users are hearing impaired or have poor tactile sensitivity).
Calibration

Important: The RHEO KNEE should be calibrated before each new fitting, even when new from the box. Improper calibration affects the knee’s ability to perform optimally and may compromise the user’s safety.

To perform Calibration (Figure 6):

1. Ensure there is NO LOAD on the knee. DO NOT connect the socket to the knee.
2. Ensure the knee is FULLY extended.
3. Press the “Calibrate” button. Calibration is complete when a sound/vibration signal comes from the RHEO KNEE.

Important: The following values on “Calibrate” are acceptable ranges for angle and load. If the calibration values are out of the given ranges, calibration is required.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Angle</td>
<td>(0 to 3)</td>
</tr>
<tr>
<td>Posterior Load</td>
<td>(-2.5 to 2.5)</td>
</tr>
<tr>
<td>Anterior Load</td>
<td>(-2.5 to 2.5)</td>
</tr>
</tbody>
</table>
Automatic adjustment
The automatic adjustment enables the RHEO KNEE to learn and adjust to the unique gait of each individual amputee (Figure 7). The on/off buttons are used to activate and deactivate the auto adjustment feature of the RHEO KNEE. By activating the auto adjustment, all gait parameter settings are reset to default. Step-by-step instructions to this process are detailed in the Automatic Adjustment tab.

Note: Auto adjustment affects stance flexion and swing flexion only.

Note: If the auto adjustment mode is not manually disabled, it will automatically disable itself on the 200th step. The minimum number of steps is 60. For primary amputees, a personalized gait setting is recommended, which should be updated as the gait improves. When the primary amputee is able to walk 60–90 steps, the auto adjustment procedure should be performed.

Manual adjustments
Important: When making adjustments, make sure that the user is in a stable standing position or seated. All RHEO KNEE functions (including stance phase stability) will be interrupted during the period in which the settings are updating.

The Manual Adjustments tab contain five settings to adjust gait parameters – and one feature that allows for keeping the knee locked in extension (Figure 8).
**Stance flexion**

Stance flexion (level ground) depicts the prosthetic limb in stance phase moving into knee flexion. This adjustment is the primary mechanism of providing additional knee stability to the user when walking on level ground. It also allows for the user to walk using a stance flexion ambulation pattern. Adjustment varies from 0–100. The default value is 50.

Stance flexion (stairs and ramps) depicts a set of stairs and ramp. This setting will allow for independent resistance to be established for ramp and stair walking. Adjustment varies from 0 – 100. The default value is 50.

Increasing the stance flexion resistance allows for a faster increase in stance support for the user. On level ground, the stance flexion rate may be slower and will require increased loading to initiate. On stair/ramp descent, the user will descend more slowly and with greater support. Decreasing the stance flexion resistance allows for slower increase in stance support for the user. On level ground, this means that the stance flexion rate may be more rapid and will require decreased load to initiate. On stair/ramp descent, the user will descend more rapidly and with less support.

The RHEO KNEE requires one step to transition between level ground walking resistance and stair/ramp resistance. The RHEO KNEE stance control settings may be customized to maximize security or terrain recognition depending on the user’s preference.

Optimal stability: The level ground value is increased to match the stair/ramp value. Recommended when stability is critical on all walking surfaces and stance flexion ambulation pattern is not being utilized. The user will experience a high degree of stance resistance on all walking surfaces, including the first step of terrain transition.

Variable stance resistance: When the level ground value is less than the stair/ramp value, easier stance flexion walking is possible. A greater difference in resistance will be noticed during the first step of terrain transition. Ensure alignment through knee center or 5mm posterior to knee center.
Important: Foot alignment is critical. Posterior foot position may lead to difficulties in stance release. Anterior foot position may lead to toe stubbing when walking in stance flexion.

**Stance extension**
Stance extension depicts the prosthetic limb in stance phase and moving into extension. This adjustment controls how rapidly the resistance increases with knee extension rate. The adjustment is required only when the user is walking in a stance flexion ambulation pattern and assists in providing proper timing of stance flexion/extension reciprocation and enhanced comfort. The default value is 30. Increasing the stance extension resistance allows for more rapid increase in resistance to knee extension and slower knee extension rate when load is placed on the prosthesis.

**Flexion target angle**
The flexion target angle depicts the prosthetic limb at its maximum knee flexion angle during the swing phase. Adjustment of target angle varies from 45–80°. The default value is 60°.

Increasing the flexion target angle allows for increased heel rise and delays knee extension. Decreasing the flexion target angle allows for decreased heel rise and promotes more rapid knee extension.

Important: For most individuals, the flexion target angle should remain at the default setting, 60 degrees. When manually adjusting the flexion target angle, make small changes one or two degrees at a time.

**Swing extension**
Swing extension (level ground) depicts the prosthetic knee moving into extension during the swing phase on a level walking surface. Adjustment varies from 0–100. The default value is 20. Swing extension (ramps and steps) depicts swing extension resistance for stair/ramp walking. Resistance activates after one step onto the step/ramp.

This adjustment is minimized and set to zero so that rapid extension may occur on ramps and stairs for increased security. Adjustment varies from 0 – 100. The default value is 0.

Increasing the extension resistance slows the extension rate towards the end of swing phase. Decreasing the extension resistance increases the extension rate towards the end of swing phase.

**Terminal swing (TS)**
Terminal swing is the last phase of swing extension prior to full knee extension. The terminal swing adjustment feature in RHEO KNEE is divided into two interlinked parameter settings:

Terminal swing resistance (TSR) controls the velocity of the terminal swing. Increasing the TSR values increases the resistance. Decreasing the TSR values decreases the resistance. The default value is 20.
Terminal swing point (TSP) controls the rate of the terminal swing. Increasing the TSP values delays the resistance onset. Decreasing the TSP values hastens the resistance onset. The default value is 20.

**Note:** The terminal swing parameter settings should only be utilized when the swing extension parameter has been optimized to the user’s gait.

**Extension hold**
This setting is active when the box next to “Extension Hold” is checked. The setting is useful for vehicle entry/exit, especially in low-rise vehicles. When active, the user may kick the knee into extension by using rapid hip flexion followed by hip extension. A lock then activates to prevent the knee from flexing against the force of gravity. The user is not forced to hold the shin in extension while entering the vehicle. After 3 seconds, the shin automatically unlocks and moves into flexion with gravity.

**Managing users**
The User Manager can be accessed from "Database" in the file menu. You can add a new user or edit and delete existing users. Below is a detailed description of how to add, edit or delete users (Figure 9).

1. Add a new user by clicking the “New” button. Insert the name, address, and/or insurance/benefit ID and click “OK.”
2. Edit an existing user by selecting the user’s name and click the “Edit” button. Change the name, address, and/or insurance/benefit ID and click “OK.”
3. Delete an existing user by selecting the user’s name and click the “Delete” button.

**Hint:** If the list of users is long, you can mark one of the users and then type the first letter of the name you are looking for. This will automatically scroll to the names starting with this letter.

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**Figure 9**

1. List of Users
2. Add User
3. Edit User
4. Delete User
5. Name
6. Address
7. Insurance/Benefit ID
Managing settings
It is possible to add, restore, and delete settings to the RHEO KNEE. You can find the different options in the file menu.

1. When the settings are optimized for the user, select "Save Settings" (Figure 10). Select an existing user from the drop-down menu or add a new one by clicking "Add." Select an existing setting from the drop-down menu to overwrite previous settings or click "Add" to save new ones. If adding new ones, a window will open up, where you can insert the name of the setting. Click “OK” to save the name. The settings will show to the right, under stored user settings. Click "Save" to save the setting and close the window.

![Figure 10](image)

2. If you want to activate or restore a previously saved setting, open "Restore Settings" from the file menu. Select the correct user – then the correct setting. The settings are listed to the right. Click the “Restore” button to activate the settings and close the window.

3. If a setting has been added, but you want to change the setting, change the relevant gait parameters and make sure they are acceptable for the user. Open "Save Settings" from the file menu. Select the user – then the setting you want to change – and click the “Save” button below. This will update the setting to contain the new gait parameters.

4. Settings can be deleted by opening "Delete Settings" in the file menu. Select the correct user and the correct setting, and press the "Delete" button.
More information

Quick Reference Card, Instructions for Use and Technical Manual for the RHEO KNEE and RHEOLOGIC are all accessible under the Help menu as PDF files. A link to online help for RHEOLOGIC is also available in the Help menu.

If you experience problems you are not able to solve, please contact your Össur Customer Representative, who will be happy to assist you.
Troubleshooting the connection with your RHEO KNEE

Have you installed RHEOLOGIC? If so, you should see the icon on your desktop or in the start menu.

Do you have Bluetooth installed on your computer?

Windows 7/ Windows Vista
Do you see a Bluetooth icon in the Notification area? It may be hidden, click the little arrow.

Windows XP
Do you see “My Bluetooth Places” on the desktop or a Bluetooth icon in the Notification area?

Have you added the RHEO KNEE as a Bluetooth Device?

Do you know where to find what COM Port has been assigned to your RHEO KNEE? (This may change each time you connect)

If you are still unable to connect to your RHEO KNEE please contact Össur Customer Service.
When searching for Bluetooth Devices make sure the RHEO KNEE is turned on, has sufficient battery and is within range.

If your RHEO KNEE is not displayed in the list of available devices it may be added already.

If the icons did not appear, make sure you did not install it under another user’s profile.

If your computer has a built-in Bluetooth capability follow instructions provided with the computer to install Bluetooth. If not you can order and install a Bluetooth USB dongle from Össur.

Open Bluetooth Devices and “Add New Device”. Follow the instructions on the screen. Make sure you select the correct RHEO KNEE and type the PIN number. Write down what COM Port is being used.

The PIN number is the last 4 digits of the serial number, found on the back of the RHEO KNEE.

When searching for Bluetooth Devices make sure the RHEO KNEE is turned on, has sufficient battery and is within range.

If your RHEO KNEE is not displayed in the list of available devices it may be added already.

Open Bluetooth Devices, identify your RHEO KNEE, select “Properties” and look for the COM port number, e.g. COM port 9. If a distinction is made between outgoing and incoming ports, note the incoming port.

You need to provide the COM port number when connecting to the RHEO KNEE.