



*Saebo***ReJoyce**

USER MANUAL

Revision B
2017-08

User Assistance Information

For maintenance or assistance with the device, contact Saebo, Inc. at:

888-284-5433

For health-related concerns, contact your health care professional.

Waste Electrical and Electronic Equipment (WEEE) Directive



In the European Union, this symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

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EMC Compliance

- This device complies with the Canadian Interference-Causing Equipment Standard #3 (ICES-003).
- This device complies with the EMC Directive of the European Union.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Note that FCC regulations provide that changes or modifications not expressly approved by Rehabtronics could void authority to operate.

Recycling Information

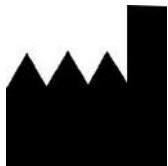
Rehabtronics considers the environment in all aspects of the product lifecycle, from design and engineering to packaging and recycling. We recommend that customers dispose of their used **SaeboReJoyce** in an environmentally sound manner. Potential methods include reuse of parts or whole products and recycling of products, components, and /or Materials.

Technical Specifications

General Specifications

SaeboReJoyce Model	1.0
Medical Device Class	Class I Medical Device (Canada, EU) Class II Medical Device (USA)
Weight	5.53 kg (Arm, Base & Manipulandum only)
Storage and Transport Conditions	-18°C to ~60°C (32°F to ~140°F) 15% to 90% Relative Humidity (non-condensing)
Operating Conditions	5°C to 35°C (41°F to 95°F) 25% to 90% Relative Humidity (non-condensing) 101kPa to 81kPa (approximate altitude pressures between sea-level and 1,950m (6,398 feet))

Manufacturer Information



Rehabtronics, Inc.

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Edmonton, AB, Canada T5J4P6
Phone: 1-866-896-7277
Web: www.rehabtronics.com

General Safety & Device Information

Symbol Conventions

Symbol	Meaning
	Warning
	Caution
	Pinching Hazard
	Read Instructions
	Do not dispose with household waste

SaeboReJoyce Safety Information

Warnings

Safety warnings are important instructions that, if not followed, may lead to irreparable damage to the **SaeboReJoyce**, or severe injury. The following warnings should always be followed:

- Do not use other cables or power-adaptors other than those supplied with the **SaeboReJoyce**.
- Do not operate the device near water or other liquids.
- To avoid risk of electrical shock, the **SaeboReJoyce** computer should always be connected to an outlet with a protective earth.

- ⚠ Never attempt to disassemble or service the **SaeboReJoyce** or any of its components.

Precautions

Safety precautions are instructions that should be followed in order to avoid minor injury or damage to the **SaeboReJoyce**.

- ⚠ Exercise caution when unpacking – The arm is spring-loaded.
- ⚠ Do not lean or hang anything on the **SaeboReJoyce** arm - The **SaeboReJoyce** arm is not intended to support weight.
- ⚠ Use only under clinician supervision – Overuse can result in physical exhaustion or injury.
- ⚠ Ensure that the **SaeboReJoyce** is properly installed prior to each use:
 - o Always check that the table clamp is tight before use.
 - o Ensure that the table surface is flat, stable, and sturdy enough to support the weight of the **SaeboReJoyce**.
- ⚠ Exercise caution while using and handling the **SaeboReJoyce**.
 - o Ensure adequate space when operating to avoid collisions with other objects or bystanders.
 - o Do not place your hands or fingers in the **SaeboReJoyce** arm joints.

Customer Support

NOTE: On the back of the SaeboReJoyce Base and Manipulandum are labels indicating the device serial numbers. Please refer to these labels when contacting customer support.

Contact **SaeboReJoyce** customer support via any of the following channels:

Phone: 888-284-5433

Email: sales@saebo.com

Website: www.saebo.com

European Union

The manufacturer declares that the CE marked device is in compliance with the applicable essential requirements of the Council Directive 93/42/EEC.



1. Ensure that the USB cable is securely connected to both the computer and to the **SaeboReJoyce**.
2. Ensure that the Manipulandum is securely attached to the **SaeboReJoyce** arm. The threaded metal sleeve should be tightened such that no threads are visible.
3. Run the **SaeboReJoyce** Test Tool, and check to see if moving the **SaeboReJoyce** results in the appropriate movement of the on-screen 3D model.
4. If not, run the Calibration Utility to re-calibrate the system.
5. If the problem persists, there may be an issue with the hardware. In this case, please contact our customer support as detailed in the following section.

Purpose of the Device

The **SaeboReJoyce** is a rehabilitation device intended to measure, evaluate and increase the strength of muscles and the range of motion of joints of the upper extremities.

The **SaeboReJoyce** helps patients to retrain and condition their muscles by using their hands and arms to play interactive computer games.

The activities required by the computer games are similar to tasks used in everyday life, such as pouring a drink or opening a jar. Practicing these motions will help patients to replicate them in real life.

NOTE: The SaeboReJoyce is intended to be used only under clinician supervision.

System Components

The **SaeboReJoyce** System has four parts (see Figure 1 on the following page):

1. The Base:
 - Clamps to your computer desk or table
 - Attaches to the USB cable
2. The Arm:
 - Supports the Manipulandum
 - Provides resistance to motion in all directions
3. The Manipulandum:
 - Consists of the peg, coins, jar lid, doorknob, key, gripper, and handles used to play the computer games
4. The computer, USB Cable and Power-Supply Adaptor:
 - Supplies power to the **SaeboReJoyce** (draws power from the wall outlet and supplies power via the USB connection)
 - Runs the interactive **SaeboReJoyce NeuroGaming™** software

Troubleshooting

This section lists common questions and issues that can arise when using the **SaeboReJoyce** system. In case the answers given are insufficient, or you experience other issues, please contact our support staff (see Contact Information in the following section).

Issue: I already have my own personal computer. Can I use it with the SaeboReJoyce?

No. The software is pre-installed on the supplied computer only. This is done to ensure that the system has adequate hardware requirements, and that there are no software or operating system conflicts.

Issue: The application is slow to respond or there is a problem with the software.

Close the application and reboot the computer. If the problem persists please contact customer support as detailed in the following section.

Issue: The hardware is not responding or is behaving unpredictably.

Do the following:

An alcohol-based cleaning solution, similar to that used in sterilization pads, is ideal for cleaning your **SaeboReJoyce**.

- ⚠ **WARNING: DO NOT immerse the device when cleaning. DO NOT use water to clean the device.**
- ⚠ Remember to unplug the USB cord before cleaning.

Software Updates

The software will check for updates automatically each time the program is run.

The auto-update requires that the computer be connected to the internet.

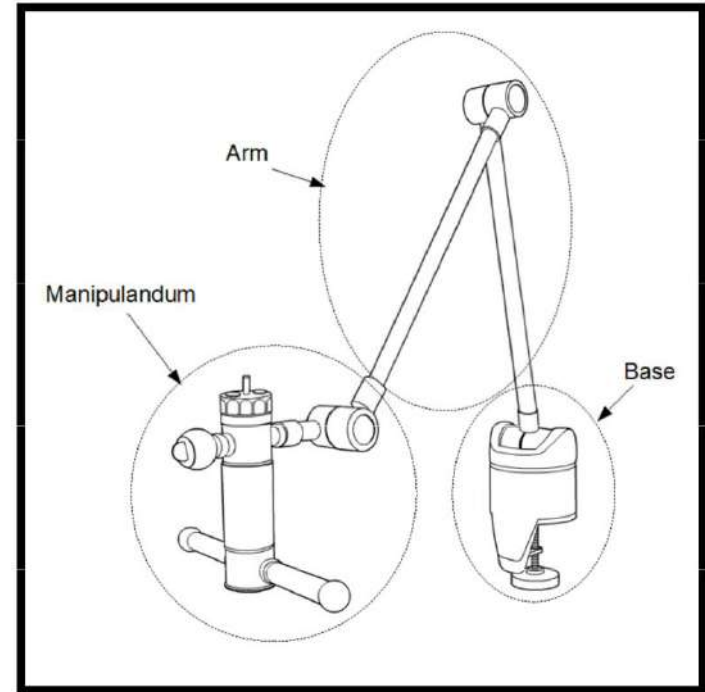


Figure 1: SaeboReJoyce Hardware Components

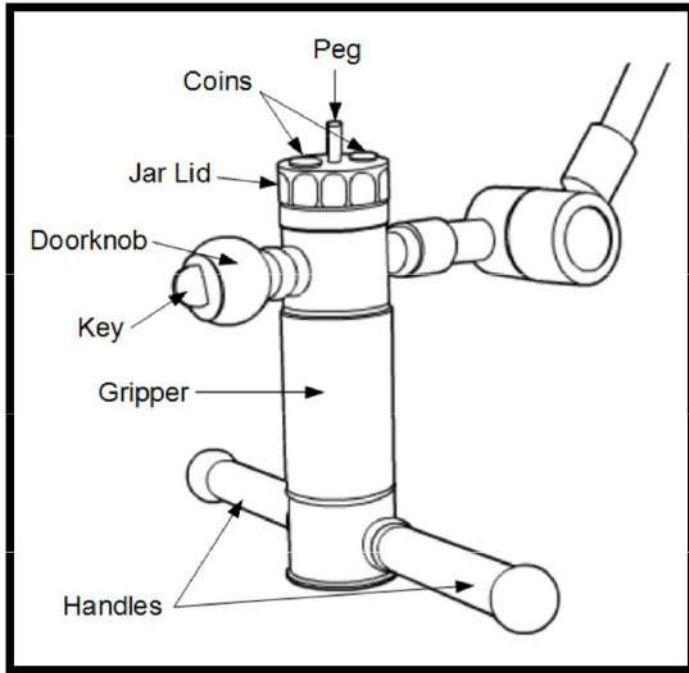


Figure 2: Manipulandum Components

Maintenance

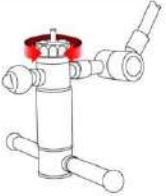
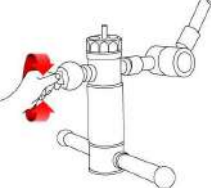
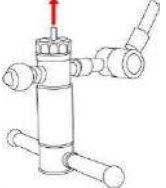
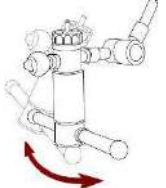
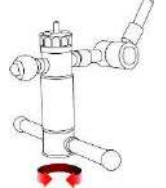
Moving the SaeboReJoyce

NOTE: While the SaeboReJoyce system is designed to be portable, it is recommended that physical relocation of the device is minimized.

1. Turn off the computer and unplug the USB cable and power-supply.
2. Re-apply the Velcro safety-strap around the tubes of the arm.
3. Loosen the clamp securing the base to the table-top.
4. Move the **SaeboReJoyce** using two hands and supporting it at the base.

Cleaning

Regular cleaning of the **SaeboReJoyce** ensures that no bacteria or viruses are transmitted during use of the device. If the device is used daily, it is recommended that cleaning be done at least once a week. If the **SaeboReJoyce** is to be used by multiple people, it should be cleaned between uses.

	<p>Jar</p> <ul style="list-style-type: none"> - Spherical grasp - Grasp and release
	<p>Key</p> <ul style="list-style-type: none"> - Later "key" Pinch - Pronation and supination
	<p>Peg</p> <ul style="list-style-type: none"> - Tip-to-tip pinch
	<p>Swing</p> <ul style="list-style-type: none"> - Pronation and supination
	<p>Swivel</p> <ul style="list-style-type: none"> - Wrist flexion and extension - Functional range-of-motion

Operating Instructions

System Requirements

- A sturdy table or desk between .75 inches to 1.5 inches (2cm and 4cm) thick is required to mount the **SaeboReJoyce**.
- The **SaeboReJoyce** is intended for use in indoor environments between 40°F and 95°F (5°C and 35°C). Operation outside this temperature range may affect hardware performance.
- The **SaeboReJoyce** must only be used with the supplied computer, which has the necessary hardware requirements and system software pre-installed.
- Only the supplied USB cable should be used to connect the **SaeboReJoyce** to the computer. The supplied USB cable ensures adequate data transfer rates and electromagnetic shielding.
- Only the supplied power-adaptor should be used to power the **SaeboReJoyce** system (through the supplied PC). The supplied adaptor ensures adequate and safe power is delivered to the **SaeboReJoyce**.

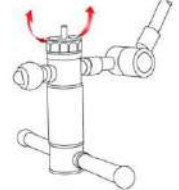

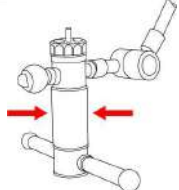
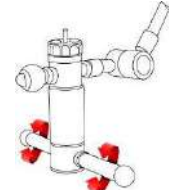
Setup Instructions

NOTE: Ensure adequate space around the table where the SaeboReJoyce is to be installed. At least 28" (70cm) of space is required behind and to the left and right of the edge of the table. There should be at least 40" (1m) of unobstructed space in front of where the SaeboReJoyce is to be mounted.

1. Clear the desk or table of any loose objects or obstructions other than the supplied computer.
2. Remove the Base/Arm assembly from its packaging.
 - ▲ Do not unfasten arm retainer strap until installation is complete.
 - ▲ Always use 2 hands when moving and/or installing the **SaeboReJoyce**. Always support the **SaeboReJoyce** at the base.
3. Slide the Base/Arm assembly onto the table so that the table is between the bottom of the base and the top of the clamp screw.
4. Tighten the clamp by rotating the black handle clockwise until it cannot be easily loosened.
5. Remove the Manipulandum from its packaging.

Guide to the Manipulanda

The following table lists the various manipulanda used in the **SaeboReJoyce** games, and the types of exercises to which they are conducive.

	<p>Coins</p> <ul style="list-style-type: none"> - Fine motor tasks - Pinch grip - Small object manipulation
	<p>Doorknob</p> <ul style="list-style-type: none"> - Spherical or tripod grasp - Pronation and supination - Grasp and release
	<p>Gripper</p> <ul style="list-style-type: none"> - Grip strength - Grasp and release
	<p>Handles</p> <ul style="list-style-type: none"> - Cylindrical Grasp - Wrist flexion and extension - Grasp and release

- Reaching and grasping objects – Example: reaching for and moving the handles, rotating and moving the doorknob
- Placement tasks – Example: repositioning and squeezing and releasing the gripper
- Large object manipulation tasks – Example: undoing a jar lid or practicing a pouring motion by swinging the gripper

Manipulanda ideally suited for this training include the handles, the gripper, the jar lid and the doorknob.

Fine Motor Tasks

These exercises involve the careful manipulation of small objects in order to improve skilled reaching and manipulation.

Manipulanda ideally suited for this training include the coins, peg and key.

6. Insert the threaded part of the Manipulandum into the connector at the end the arm.
 - ▲ Ensure that the yellow guides on the Manipulandum connector align with the ones on the arm connector, and that the red marks are aligned.
7. Turn the threaded metal sleeve at the end of the arm clockwise until it cannot be easily loosened, and the Manipulandum is secured to the end of the arm.
8. Unfasten the Velcro strap from the arm.
9. Plug in the computer using the supplied power-adaptor.
10. Start the computer and wait for the operating system to load.
11. Use the supplied USB cable to connect the computer to the back of the base of the **SaeboReJoyce**.
12. Double-click on the **SaeboReJoyce** icon on the screen to launch the **SaeboReJoyce** application.

Patient Orientation

NOTE: Patients should undergo clinician examination prior to beginning use of the SaeboReJoyce. Patients with trunk weakness, balance impairments, or other stability issues may be at risk of falling. If necessary, make sure patients have sufficient support such as chair straps BEFORE using SaeboReJoyce.

Position the patient in a stable, armless chair in front of the **SaeboReJoyce** such that the patient's affected shoulder and arm is in-line with the **SaeboReJoyce**, and that the Manipulandum is suspended just above the patient's leg, half-way between the patient's knee and hip.

The advanced mode displays a graph of each of the sensors on the **SaeboReJoyce**. It outputs the sensor values in real-time.

Exercises with the SaeboReJoyce

The **SaeboReJoyce** can be used for a variety of functional uni-manual and bi-manual upper extremity exercises including balance, trunk stability training, functional range of motion exercises, gross motor training and practicing fine motor tasks.

Balance and Trunk Stability

The **SaeboReJoyce** can be used to train reaching and movement abilities by having the patient extend one or both arms away from the body, thereby forcing the individual to stabilize the movement with his or her trunk muscles. Difficulty can be increased by having the patient sit on an exercise ball.

Manipulanda ideally suited for this include the handles and the gripper.

Range-of-Motion and Gross Motor Tasks

These exercises involve combining gross motor movements with functional tasks in the following categories:

Calibration Utility

NOTE: Avoid re-calibration unless you have been instructed to do so by support personnel.

The Calibration Utility allows software to be re-calibrated to the **SaeboReJoyce** hardware. The system is shipped pre-calibrated, but in the event of hardware change or troubleshooting, recalibration may be necessary.

When using the calibration utility, ensure that after every task the **SaeboReJoyce** is returned to its resting position before continuing. It is recommended that following calibration, the **SaeboReJoyce** Test Tool app be run to verify correct calibration.

SaeboReJoyce Test Tool

The **SaeboReJoyce** Test Tool is used for diagnosing hardware problems. It consists of two modes: basic and advanced.

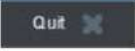


The basic mode displays a 3D model of the

SaeboReJoyce which is updated in real-time. It also allows testing of the Manipulandum LEDs, gripper, rotary-sensors and binary-sensors.

Saebo NeuroGaming™ Software

General Navigation

At the top-right of most screens in the software are the following buttons:

Button	Description
	Click this to exit the program at anytime. Progress will be saved automatically.
	Click this to return to the Main Menu.
	Click this to open help text about the current screen.

Main Menu

With the computer plugged in, and connected to the **SaeboReJoyce**, open the **SaeboReJoyce** application. After a quick check for software updates, the application will display the Main Menu, shown in Figure 3.



Figure 3: Main Menu

The Main Menu consists of the following options:

Button	Description
Quickstart	Click this if you only want to play the games, without keeping track of statistics.
Select Patient	Click this to load a pre-existing patient-profile.
New Patient	Click this to create a new patient-profile.
Settings	Click this to access software settings such as language preferences, sound volume and default game difficulties.

Exercise Games



SaeboReJoyce's NeuroGaming™ software challenges patients to use the SaeboReJoyce to perform movements that mimic tasks of daily living. From the Apps Menu, games can be selected and configured.



Figure 7: Game Options

Depending on the game selected, the following options can be adjusted:

Control Component	Select the control component that will be used to play the game. A picture of the selected control component is shown at the right of the screen.
Hand	Select the affected hand.
Difficulty	The selected difficulty will affect factors such as the pace and the range-of-motion necessary to play the game.

Button	Description
 Export spreadsheet file (eg to excel)	This will export the statistics to a Comma Separated Values (CSV) file, which can be opened using common spreadsheet applications such as Excel.
 Print to your local printer	This will export the statistics to a PDF file which can be emailed or printed.

SaeboReJoyce Arm Hand Function Test

The **SaeboReJoyce** Arm Hand Function Test objectively assesses the functional ability of the patient's affected arm. The results of each test are time-stamped and stored in the patient Stats Window. The most recent results are also used to suggest difficulty levels for the rehabilitation games.

The test is fully automated, and will give instructions for each task. The test will take between 4 and 15 minutes, depending on the patient's abilities.

NOTE: In order to derive the most meaningful results, it is recommended that no assistance or guidance be given to the patient during the test.

NOTE: The test must be completed in full for statistics to be recorded. Statistics will not be kept for tests that are exited midway.

Apps Menu

Once a patient profile is selected, the Apps Menu will be displayed, shown in Figure 4.






Figure 4: The Apps Menu

The left column of the Apps Menu allows you to select from the following apps:

- Games
- Hand Function Test (not available through Quickstart)
- Calibration Utility
- Testing/Debug Utility

In addition, there are three tabs at the top which allow access to patient-specific information.

Tab	Description
 Apps	Displays the Apps Menu where you can select apps.
 Profile	Opens the Profile Window for the currently selected patient. Here, you can record patient information.
 Stats	Opens the Stats Window for the currently selected patient. Shows results of Hand Function Tests.

Profile Window

The Profile Window, shown in Figure 5, allows information to be recorded about the currently selected patient. All information entered is saved automatically.



Figure 5: The Profile Window

While all the fields are optional, it is recommended that the following items be set:

- Treated Hand – This will set the default hand selected when running apps.
- Preferred Game Difficulty – This will set the default difficulty when playing games.

Stats Window

The Stats Window keeps track of all the Hand Function Test results for the currently selected patient. The software keeps track of both the scores and times taken for each task.

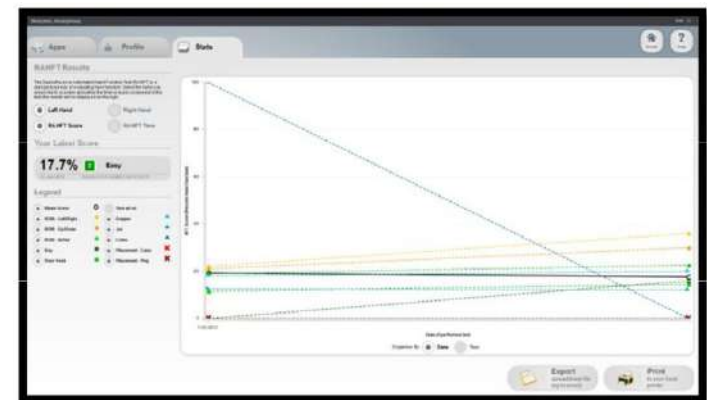


Figure 6: The Stats Window

At the bottom-right are buttons that allow for the statistics to be exported.