Hardware User's Manual

Rota Rod

References:

LE8205 (76-0770), LE8305 (76-0771), LE8505 (76-0772), LE8355 (76-0773), LE8205IC (76-1214), LE8505IC (76-1215)

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1. WARRANTY

PANLAB warrants hardware for a period of 24 months (2 years) from the date of purchase. Where appropriate, PANLAB will repair or replace the unit for defects of workmanship or materials. This warranty does not extend to damage resulting from misuse, neglect, abuse, normal wear and tear, or accidental damage. This warranty extends only to the original purchaser.

IN NO EVENT SHALL PANLAB BE LIABLE FOR INCIDENTAL OR CONSQUENTIAL DAMAGES.[1] THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR USE, OR OF ANY OTHER NATURE.* PANLAB shall not be liable for any claims of any kind whatsoever, as to the equipment. Warranty is void if the instrument is modified, disassembled, repair carried out using unauthorized parts or by a service engineer not previously approved by PANLAB.

*Where the territory does not allow this exclusion or limitation, this term will not apply.

Returns

If any defect arises within or outside the warranty period, please contact:

PANLAB Technical Support

Email: support@panlab.com
Telephone (International): +34 934 750 697
Telephone (Spain): 934 190 709

Panlab, S.L.U.
C/ Energia,112
08940 Cornellà (Barcelona)
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United States Technical Support

Email: support@hbiosci.com
Telephone (Toll Free, US only): 800 272 2775
Telephone (Outside the US): 508 893 8999

84 October Hill Road
Holliston MA 01746
USA

Goods will not be accepted for return unless the RMA (Return Materials Authorization) number has been issued. The unit must be returned with the completed RMA forms and the Decontamination checklist. Please allow a reasonable period of time for completion of repairs or replacement.

Limitation of Liability

PANLAB does not accept responsibility, under any circumstances, for any harm or damage caused directly or indirectly by the incorrect interpretation of what is expressed in the pages of this manual.

Some symbols may have more than one interpretation by professionals unaccustomed to their usage.

PANLAB reserves the right to modify, in part or in total, the contents of this document without notice.

2. SYMBOLS TABLE

Recognising the symbols used in the manual will help to understand their meaning:

DESCRIPTION	SYMBOL
Warning about operations that must not be done, because they can damage the equipment.	
Warning about operations that must be done, otherwise the user can be exposed to a hazard.	
Protection terminal ground connection.	
Warning about a hot surface with a temperature that may exceed 65°C.	
Warning about a metal surface that can supply electrical shock when it is touched.	
Decontamination of equipment prior to disposal at the end of their operative life.	
Waste Electrical and Electronic Equipment Directive (WEEE)	

3. GOOD LABORATORY PRACTICE

Check all components periodically and after periods of storage to ensure they are still fit for use. Investigate all failures that may indicate a need for service or repair.

Good laboratory practice recommends that the unit be periodically serviced to ensure the equipment is suitable for its intended use. You must follow preventive maintenance instructions. Should equipment require servicing you can arrange this through your distributor. The equipment must be cleaned and decontaminated prior to inspection, servicing, repair or return.

Decontamination prior to equipment disposal

In use this product may have been in contact with biohazardous materials and might therefore carry infectious material. Before disposal, the unit and accessories should be thoroughly decontaminated according to your local environmental safety laws.

4. UNPACKING AND EQUIPMENT INSTALLATION

WARNING: Failure to follow the instructions in this section may cause equipment faults or injury to the user.

A. Inspect the instrument for signs of damage caused during transit. If any damage is discovered, do not use the instrument, and report the problem to your supplier.
B. Ensure all transport locks are removed before use. The original packing has been specially designed to protect the instrument during transportation. It is therefore recommended to keep the original carton, including foam inserts and accessory box(es), for re-use in case of future shipments. Warranty claims are void if improper packing results in damage during transport.
C. Place the equipment on a flat surface and leave at least 10 cm of free space between the rear panel of the device and the wall. Never place the equipment in areas with vibration or direct sunlight.
D. Equipment must be installed in a manner providing easy access to the main power swich.
E. Only use power cords that have been supplied with the equipment. If replacement is required, the new power cord must match the original specifications.
F. Observe all terminal ratings. Review the operating manual to learn the ratings on all electrical connections. **Never connect the equipment to a power outlet with a voltage range outside of the limits.**

WARNING

For electrical safety reasons you only can connect equipment t power outlets provided with earth connections.
This equipment can be used in installations with category II over-voltage according to the General Safety Rules.

The manufacturer accepts no responsibility for improper use of the equipment or the consequences of use other than that for which it has been designed.

PC Control

Some instruments are designed to be controlled from a PC. To preserve the integrity of the equipment it is essential that the attached PC itself conforms to basic safety and EMC standards and is set up in accordance with the manufacturers' instructions. If in doubt consult the information that came with your PC. In common with all computer operations the following safety precautions are advised.

WARNING

- To reduce the chance of eye strain, set up the PC display with the correct viewing position, free from glare and with appropriate brightness and contrast settings
- To reduce the chance of physical strain, set up the PC display, keyboard and mouse with correct ergonomic positioning, according to your local safety guidelines.

5. WARNINGS

WARNING: Failure to follow the instructions in this section may cause equipment fault.

- PRESS KEYS SOFTLY – Lightly pressing the keys is sufficient to activate them.
- Equipment does not require disinfection but does require cleaning for removal of urine, feces and odour. To do so, we recommend using a wet cloth or paper with unscented soap. NEVER USE ABRASIVE PRODUCTS OR SOLVENTS.
- NEVER pour water or liquids on the equipment.
- Once you have finished using the equipment turn it off with the main power switch. Clean and check the equipment so that it is in optimal condition for its next use.

6. INTRODUCTION

The LE8205 (76-0770), LE8305 (76-0771), LE8505 (76-0772) and LE8355 (76-0773) ROTA ROD units facilitate easy testing of motor coordination in rodents.

The ROTA ROD test is commonly used in a wide variety of research applications related with motor disabilities, such as for:

- Animal models of **neurodegenerative diseases** (Parkinson's disease, Huntington's disease)
- Animal models of **muscular diseases** (muscular dystrophy, Amyotrophic lateral sclerosis - ALS)
- Animal models of **cerebellar ataxia** or dystonia
- Assessment of neurological deficits after **brain damage** (ischaemic stroke, traumatic brain injury-TBI)
- Rodent **Phenotyping** (motor coordination function)
- **Drug screening** for compounds with potential action on motor coordination and fatigue.
- **Alcohol dependence**

In operation, the animal is placed on the rotating lane of the ROTA ROD and the timer is started. When the animal drops safely into its own lane, the latency time to fall (minutes and seconds) and final rotation speed are automatically recorded.
A removable upper separator for rat models is included to prevent interference between animals running in adjacent lanes.

The ROTA ROD is controlled by an advanced microprocessor, which provides precise timing control and ultra-accurate speed regulation. Rotation can be electronically set at a constant speed (2 to 90 RPM). Alternatively, an acceleration ramp with user-defined duration time (2 to 5999 sec, 1 sec increments). The Panlab ROTA ROD models also offer editable acceleration mode speed parameters, user-defined speed protocols and rocking modes. Together these features allow for exceptional flexibility in experimental design and implementation.

The new touchscreen graphic user interface provides clear visualization of timing and speed for each lane. Change modes, adjust speed, and create protocols directly from the main screen for greater flexibility with maximum functionality and usability.

Acquired data is saved in table form by lanes/trials. Through the SEDACOM software option, data from the ROTA ROD can transferred to a PC via USB communication for storage and further analysis.

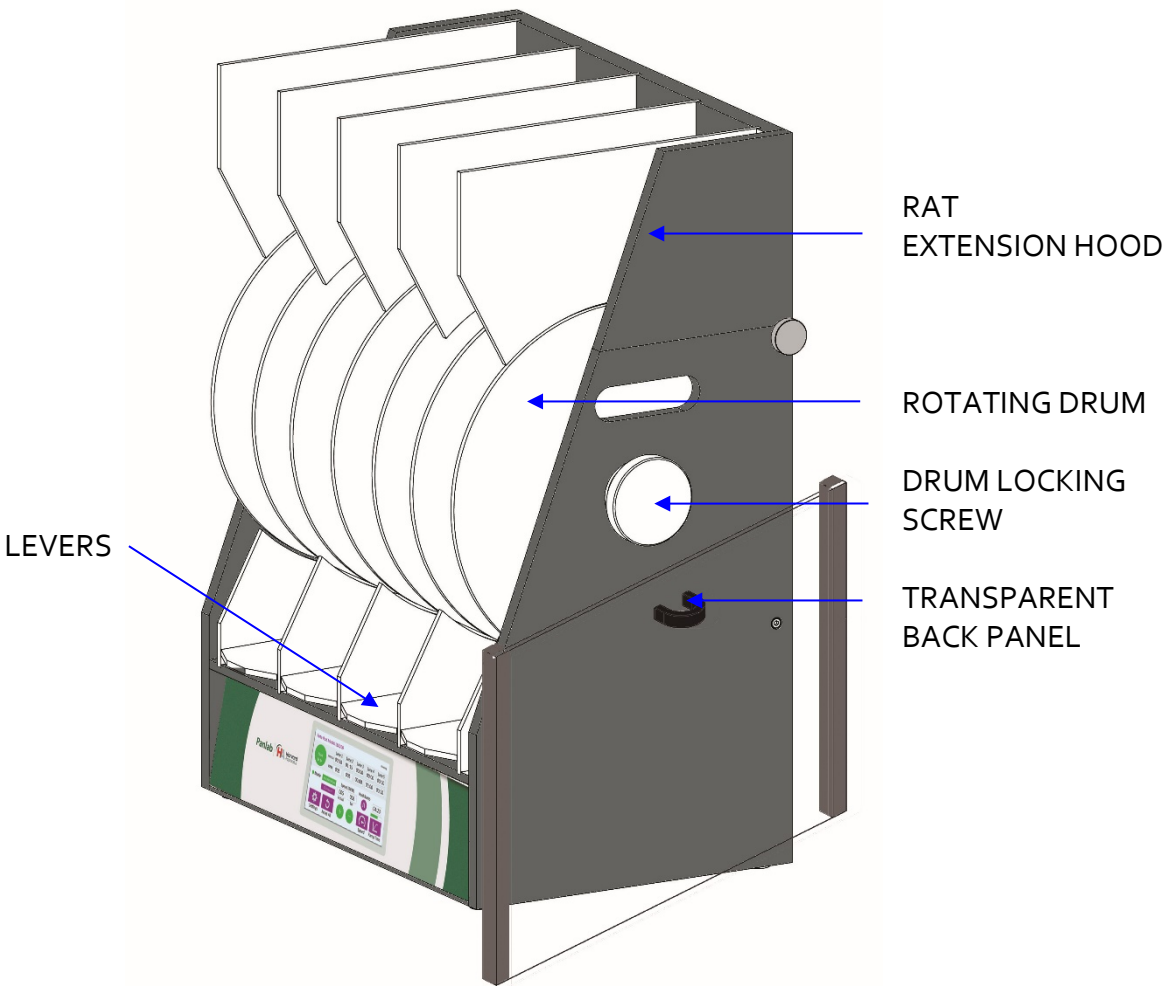
The SEDACOM software must be purchased separately (not included).

The available ROTA ROD models are:

- LE8205 (76-0770) is designed to work with up to 5 mice.
- LE8305 (76-0771) is designed to work with up to 4 rats.
- LE8505 (76-0772) is designed to work with up to 4 rats or 4 mice.
- LE8355 (76-0773) is designed to work with 2 large rats.

7. EQUIPMENT DESCRIPTION

7.1. ROTA ROD UNIT MAIN DESCRIPTION



The ROTA ROD LE8305 (76-0771) and the LE8505 (76-0772) have a rotating rod with 4 lanes. The LE8205 (76-0770) features 5 lanes and the LE8355 (76-0773), 2 lanes. Rodents (rats or mice depending on the instrument model) are placed in individual lanes, on the top of the rod. There is a transparent wall fixed with magnets to the rear side of the ROTA ROD to prevent any animal escape from the posterior side of ROTA ROD.

The 4-lane rat models (LE8305 and LE8505) feature an accessory to increase the height of the walls. This accessory, the extension hood, keeps the rats from accessing the neighbouring animals placed in adjacent lanes.

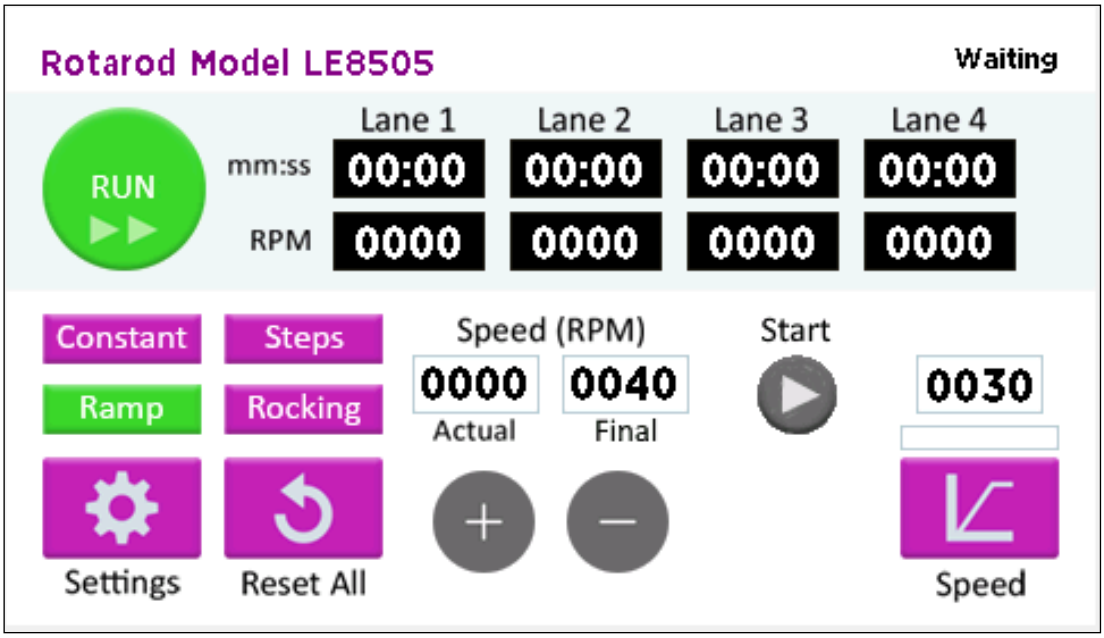
When the animal falls from the rod, it activates a lever. This lever is equipped with a magnetic switch that detects time.

A large white plastic screw is mounted on the right side of the unit. The screws secure the rod in place.

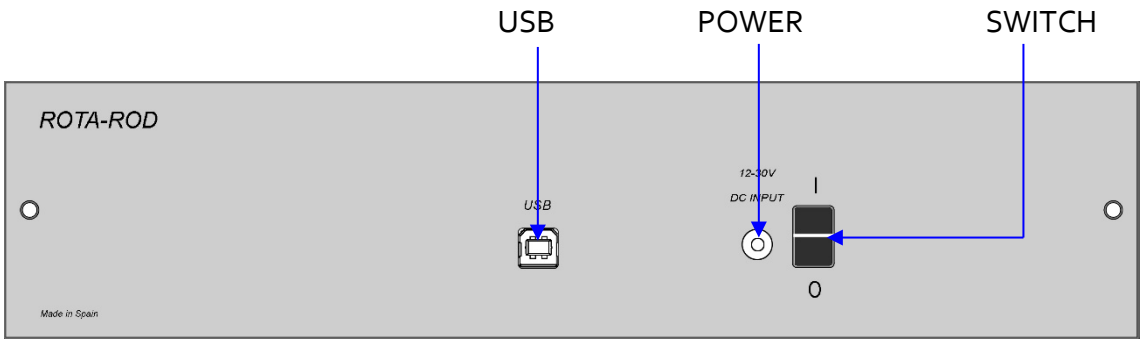
Cover options are available for the LE8205 and LE8305 ROTA RODS used for mice and can be used to helps confine the animals if they fall off the rod.

7.2. FRONT PANEL

The front panel gives access to the touchscreen user interface.
When the unit is switched, the touchscreen displays the main ROTA ROD runtime panel. The runtime screen shows the runtime data, provides control buttons and gives access to the settings panels.



7.3. REAR PANEL



- **USB:** USB B-type female connector used to connect the ROTA ROD to a computer USB port. Data is sent to the SEDACOM software through this connector.

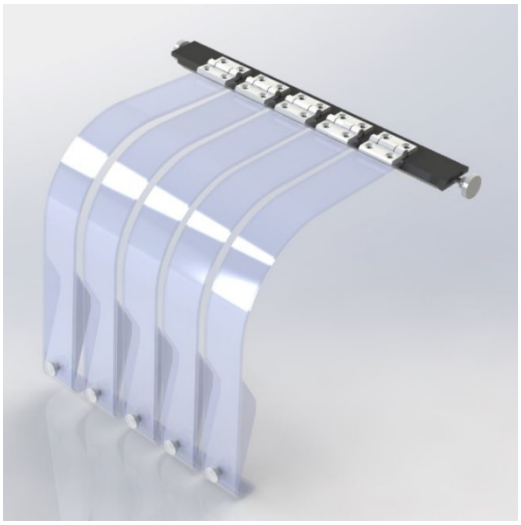
Do not connect the ROTA ROD to the computer if the SEDACOM software is not to be used for the experiment. If the corresponding USB port is not used in an SEDACOM active session, the driver of the USB port may enter in conflict with the correct functioning of the ROTA ROD in its stand-alone configuration.

- **POWER:** Male panel jack used to connect the ROTA ROD to the external power supply.
- **SWITCH:** Main switch used to turn on and off the ROTA ROD.

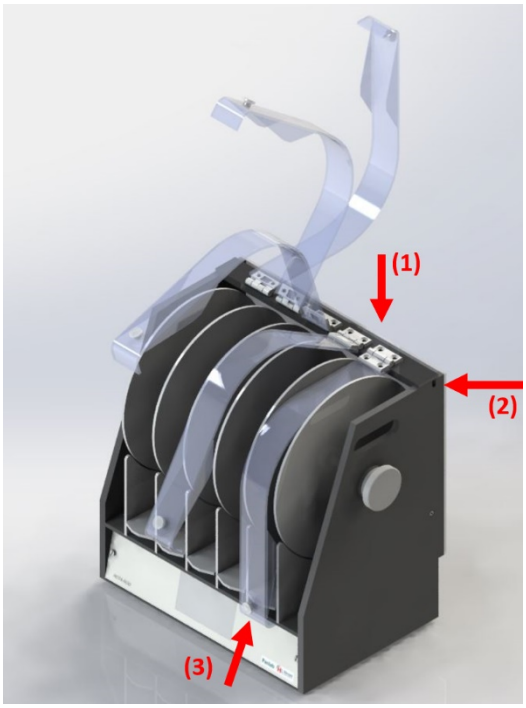
7.4. MOUSE COVER OPTIONS

Cover options are available for the LE8205 and LE8305 ROTA ROD s used for mice and can be used to helps confine the animals if they fall off the rod.

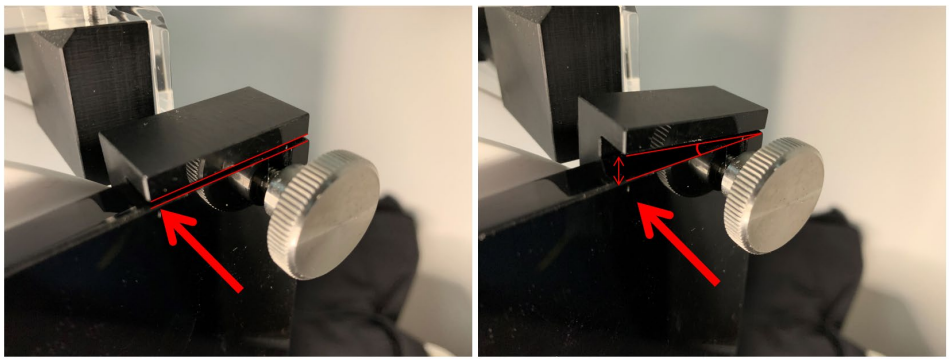
- LE8205IC (76-1214) cover for the LE8205 (76-0770) rotarod (5 mice)
- LE8505IC (76-1215) cover for the LE8505 (76-0772) rotarod (4 mice)



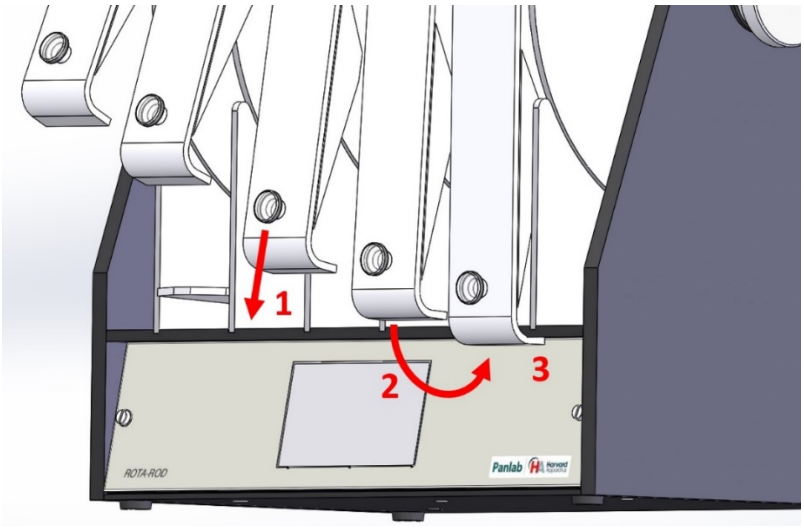
The assembly of the mouse cover is very simple:

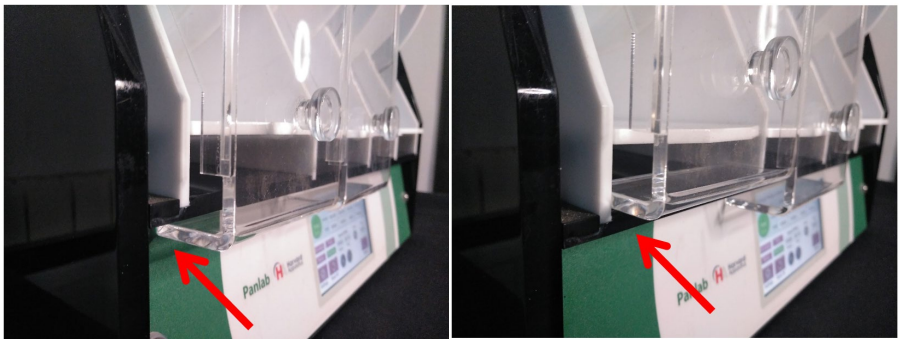


1. Standing in front of the ROTA ROD, place the cover accessory on the top of the rotarod, in line with the two lateral slots placed on the posterior part of the lateral panels – see image above (1), and pictures below.



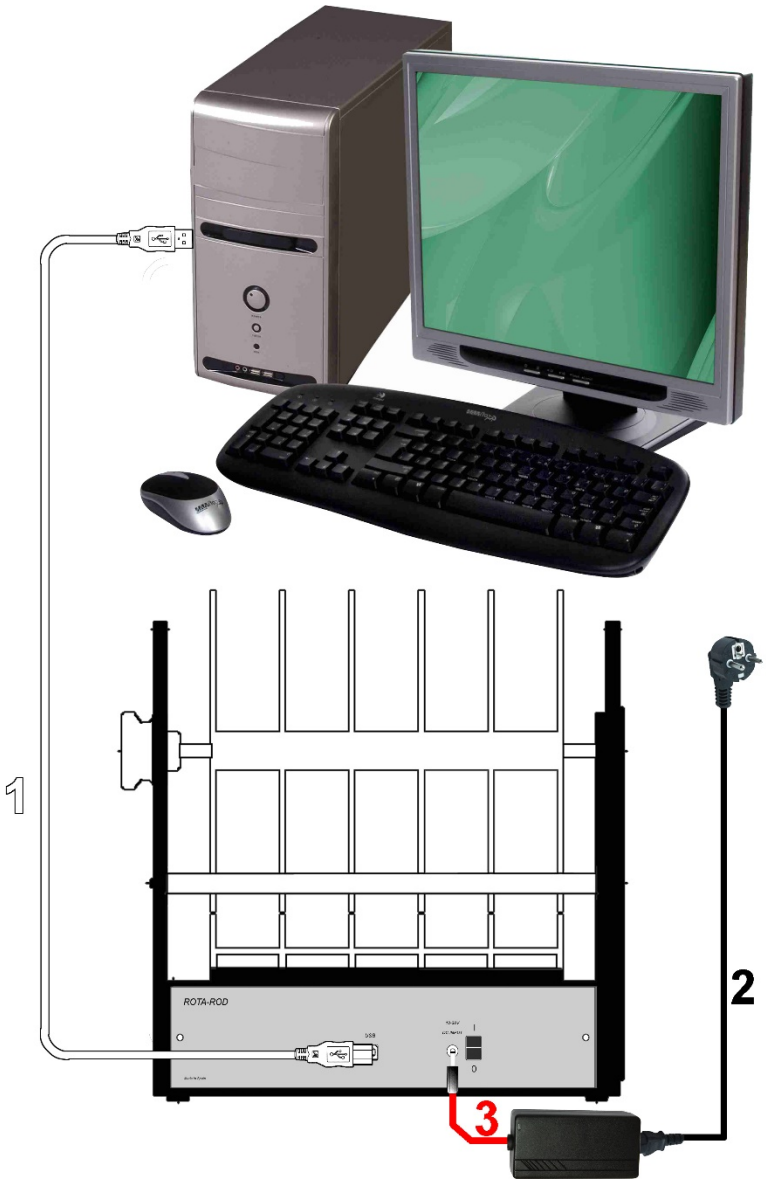
2. Maintain the cover in place by tightening the 2 lateral screws provided with this accessory. – see image above (2)
3. Close each lane separately by lowering, stretching out and securing each plastic cover below the black platform without touching the lever – see image (steps from 1 to 3) and pictures below.


1
2
3
ROTA-ROD
Panlab



8. EQUIPMENT CONNECTIONS

The equipment connections are shown in the drawing below.

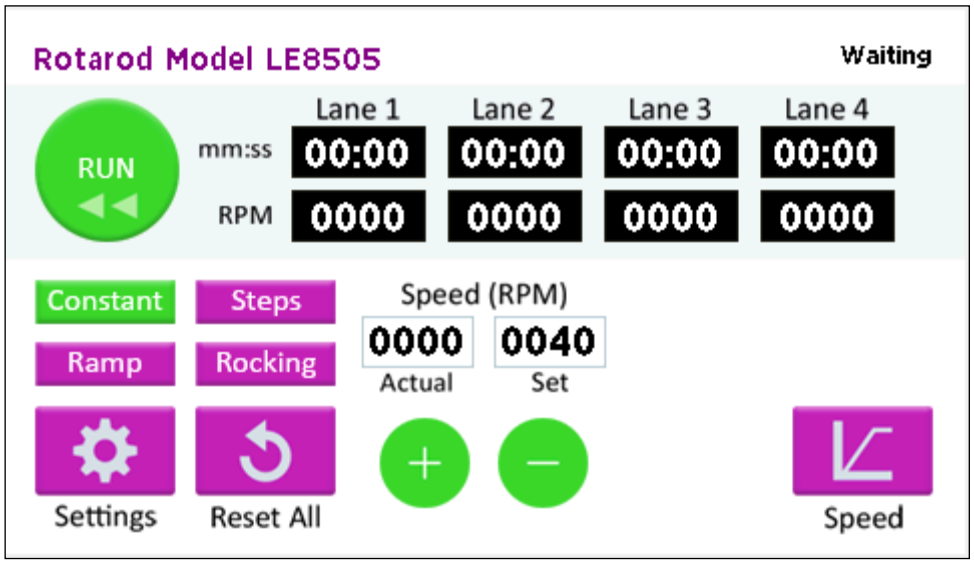


The connections and necessary cables are listed in the following table.

	FROM	TO	CABLE
1	ROTA ROD USB-B type (only if the device is used with the SEDACOM software)	PC USB Port	USB Cable
2	AC-DC adapter mains	Mains	Power cord
3	ROTA ROD power jack	AC-DC adapter	Jack cable

9. WORKING WITH THE EQUIPMENT

Once the equipment is turned on, the start-up screen appears after a few seconds and leads immediately to the ROTA ROD main screen:

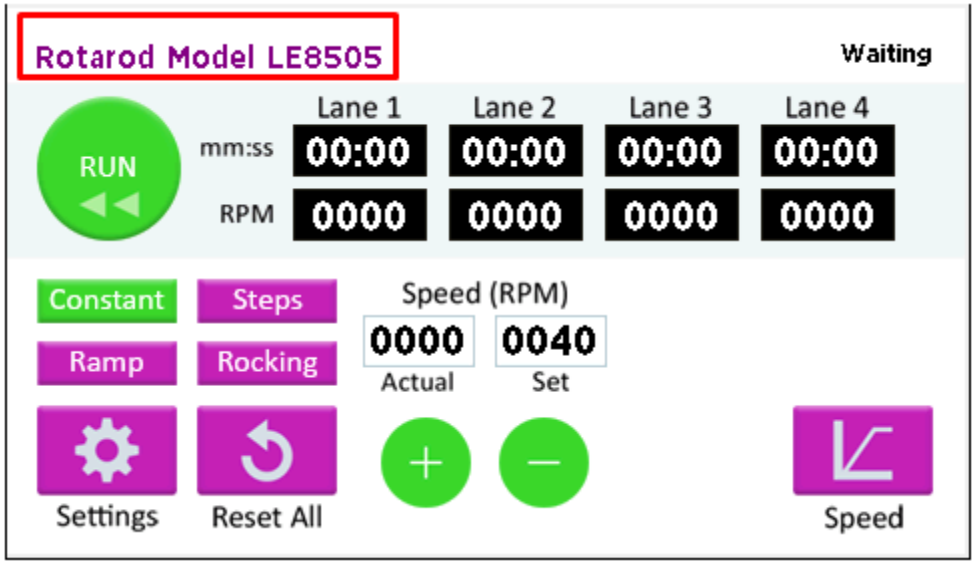


9.1. MAIN SCREEN DESCRIPTION

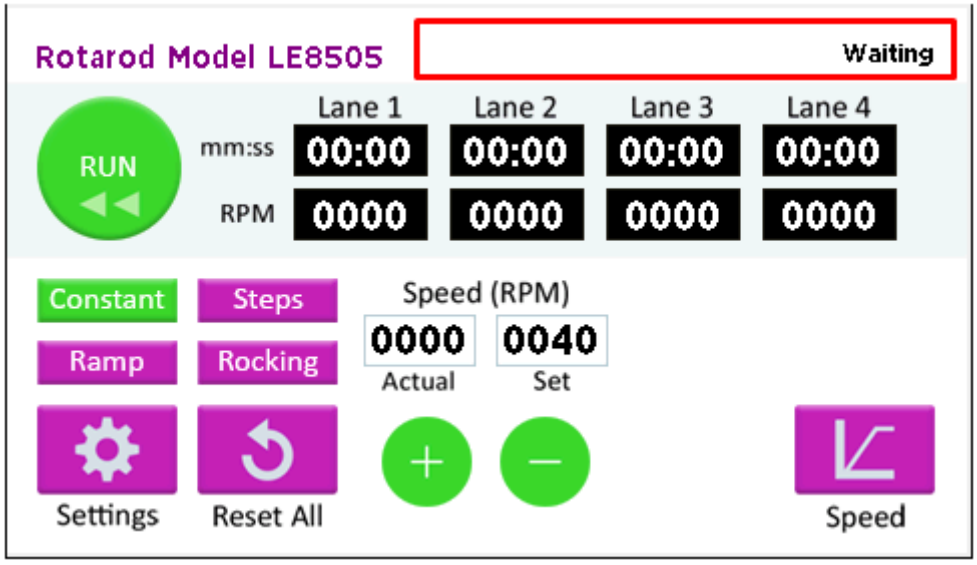
The screen is divided in several functional areas, listed below. The data types and functions displayed on this screen is dependent on the selected working mode.

Please see the working mode sections of this manual for more detailed information.

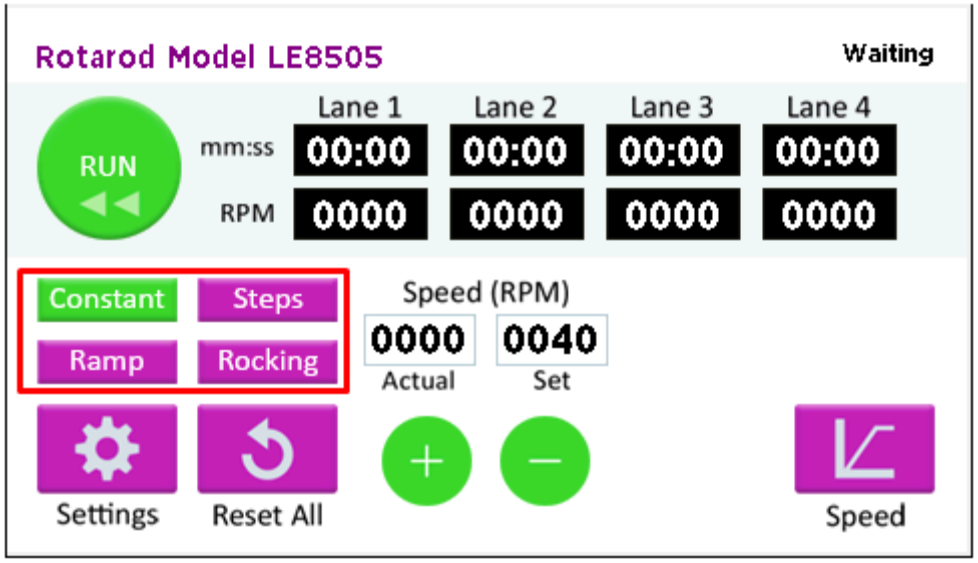
1. ROTA ROD Model Number



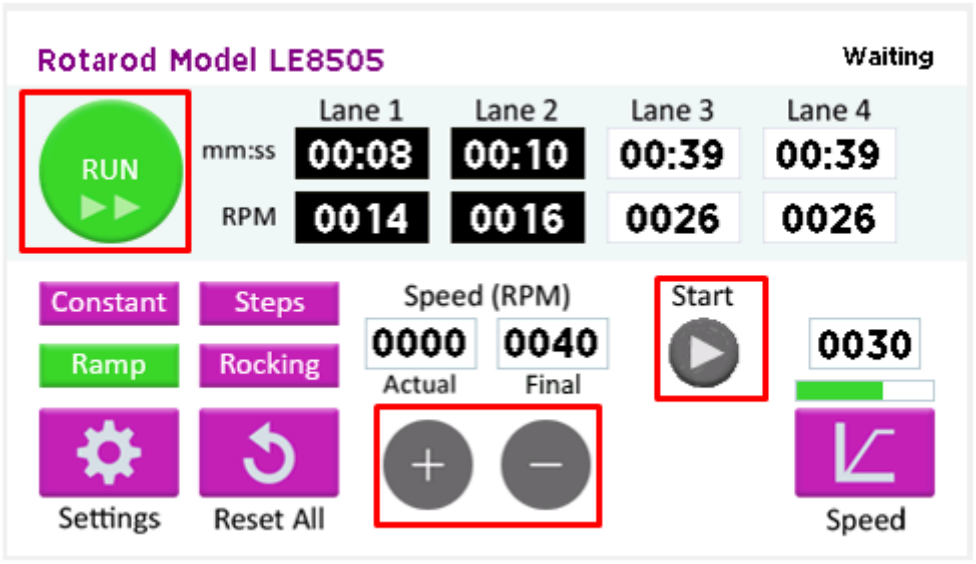
2. Status Message and Alerts



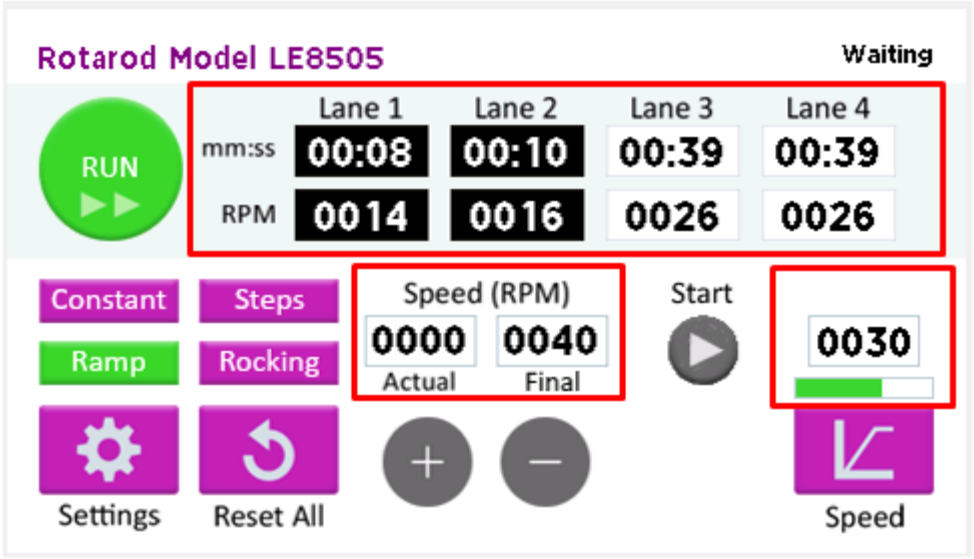
3. Working Mode Selection Options



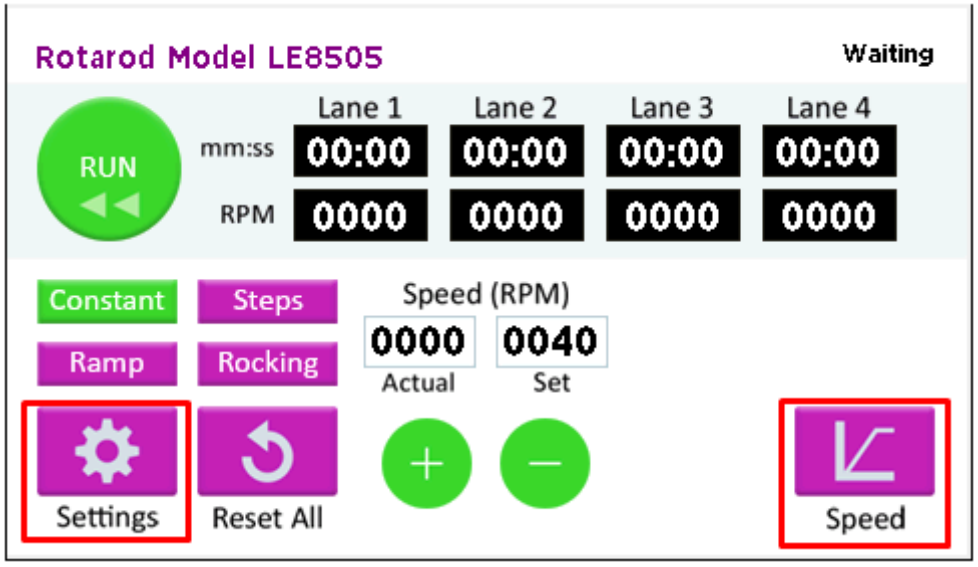
4. Experiment Control Options



5. Experimental Data and Parameter Displays

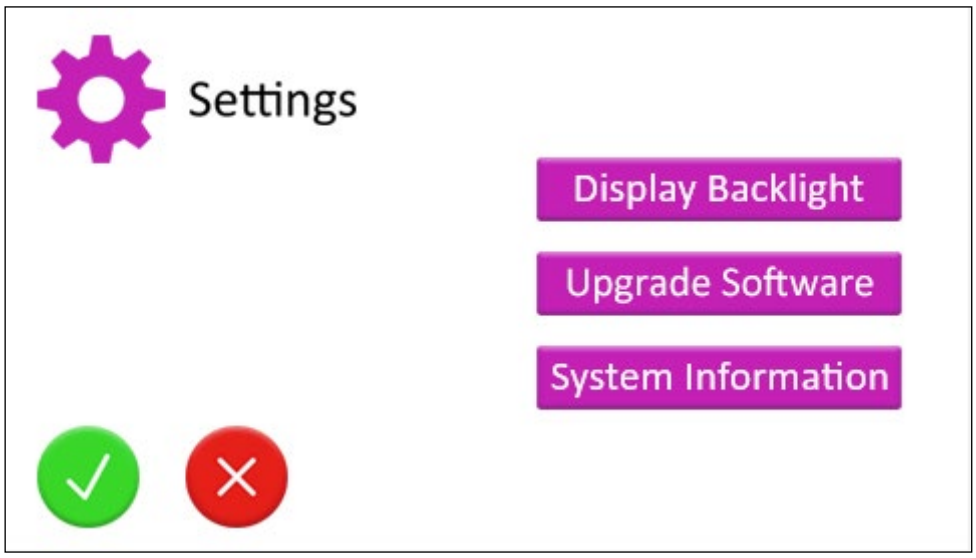


6. Main Settings and Speed Assignment Menu



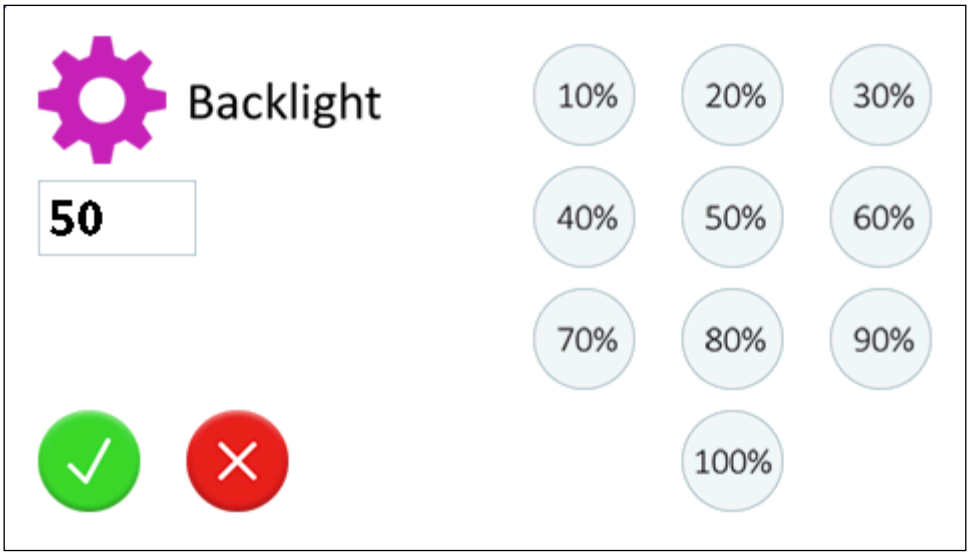
9.2. CHANGING THE MAIN SETTINGS

Press the Settings button to access to the main Settings screen.



The following settings are available:

- **Display Backlight**
  Establishes the backlight intensity for the display (10 to 100%). Press the value available on the right side of the screen and press the Validate green button to exit.

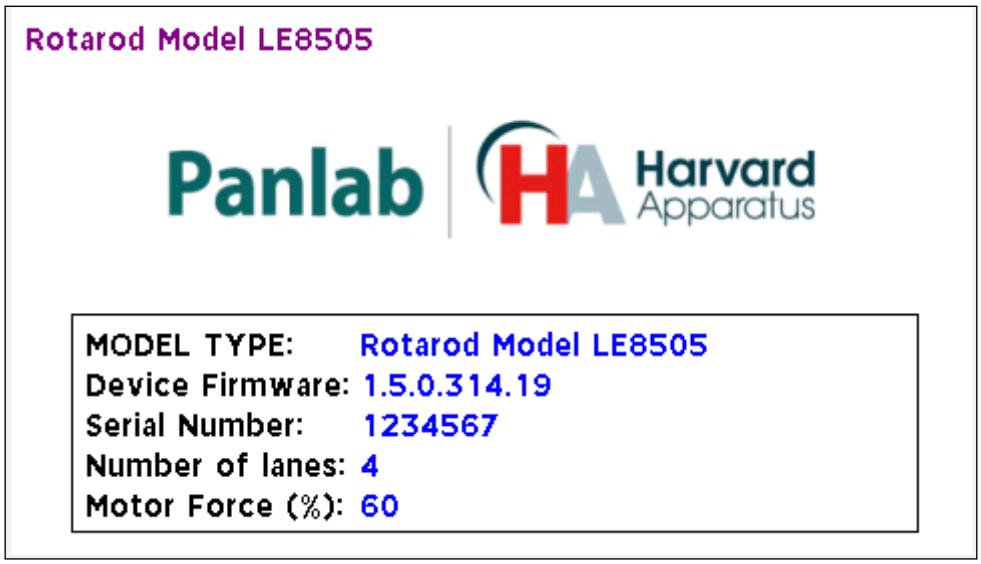


- **Upgrade software**

  Used to update the firmware to the latest version (see chapter 11).

- **System Information**

  Displays the ROTA ROD model type, the firmware version number and serial number of the device.



Please have this information available if contacting our support team for technical assistance.

9.3. ROTA ROD WORKING MODES

The ROTA ROD provides 4 working modes: CONSTANT (fixed) speed, RAMP (accelerating) speed, STEPS and ROCKING modes.

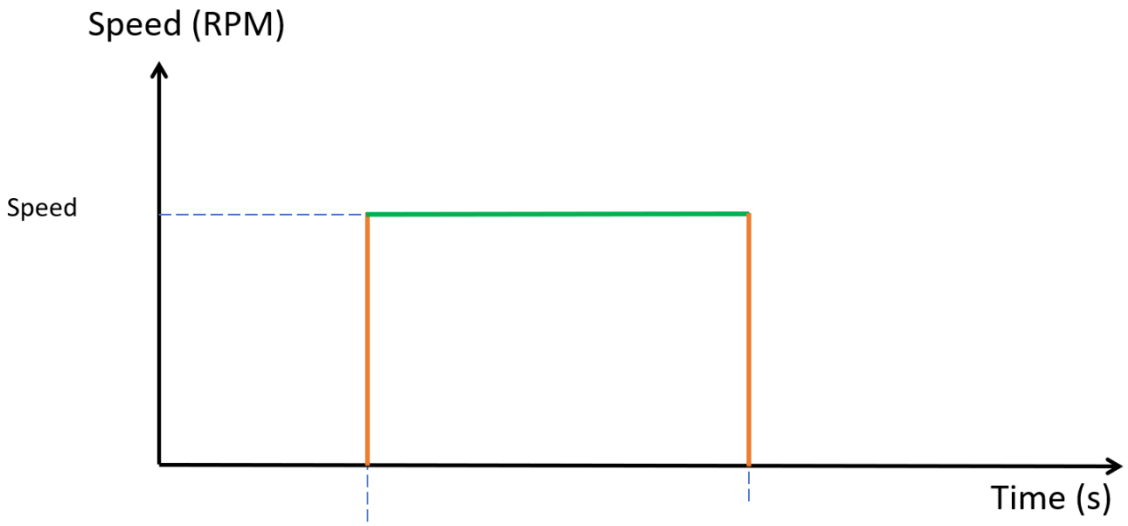
There are advantages to each working mode within a Rotarod study. A researcher may choose to use one or several working modes throughout the course of an experiment, depending on the application.

Most common are constant fixed speed protocols for studying motor coordination and fatigue and the ramp/accelerating protocols for motor coordination and learning. The use of acceleration is notably reported to reduce interindividual variability in the data.

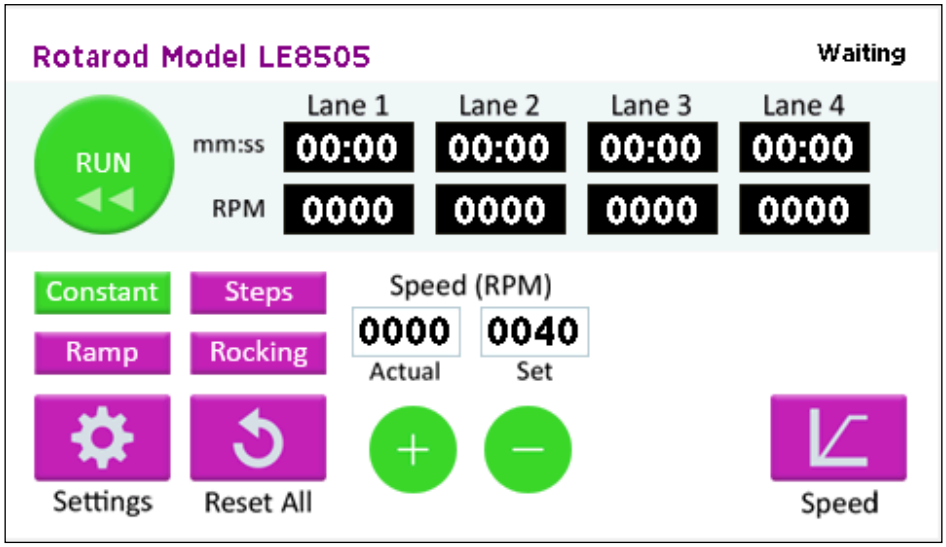
Multi-speed (“steps”) and rocking protocols are employed to enhance test sensitivity by increasing the difficulty of the task. This is accomplished by programming different speed intervals and/or by reversing the direction of rotation. The use of these speed/rotation configurations allow the observation of fine performance deficits that are not detected in common ROTA ROD measurements involving constant speed or accelerating conditions.

9.4. CONSTANT WORKING MODE (OR FIXED SPEED)

In CONSTANT mode, the speed of the ROTA ROD will be maintained a fixed value during the experiment.



9.4.1. Select the CONSTANT mode



- To select the CONSTANT working mode, press the Constant button. The button of the selected working mode will highlight in a green colour.

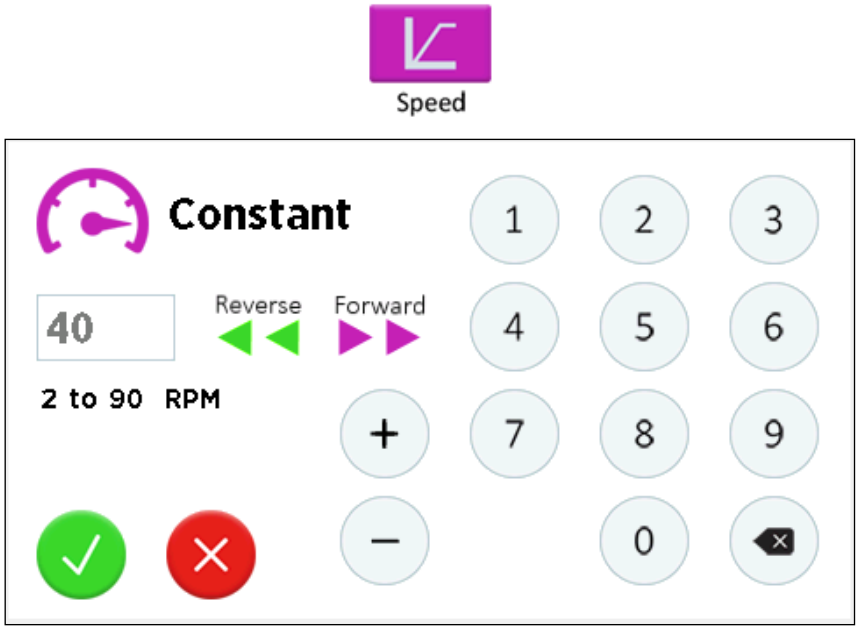
9.4.1. CONSTANT mode main panel

See description below:

Rotarod Model LE8505	**ROTA ROD Model** The top left space on the runtime screen indicates the model of the ROTA ROD.
Waiting Running Place all levers down.	**Status Messages and Alerts** The top right of the runtime screen is used to display the status of the experiment (Waiting/Running) and instructions/alert messages when needed.
	**Run/Stop button** Control button used to start or stop the experiment
Constant Steps Ramp Rocking	**Working mode selector** The selected Constant mode button is shown in green colour.
Speed (RPM) 0000 0010 Actual Set	**Rod speed indicators** Display the Actual current rotation speed and the rotation speed set by the user.
	**Lane counters**: The number of counters depends on the ROTA ROD model (2, 4 or 5 lanes). The top row displays the time spent on the rod until the animal is detected to have fallen (TIMER). The bottom row displays the current rotation speed.
	**Settings screen** Go to the main Settings screen.
	**Speed** Go to Speed setting screen.
	**Speed increase/decrease buttons** Control buttons to manually increase or decrease the rotation speed (1 RPM increment). This control button only applies to the Constant speed working mode.

9.4.2. Set the CONSTANT speed

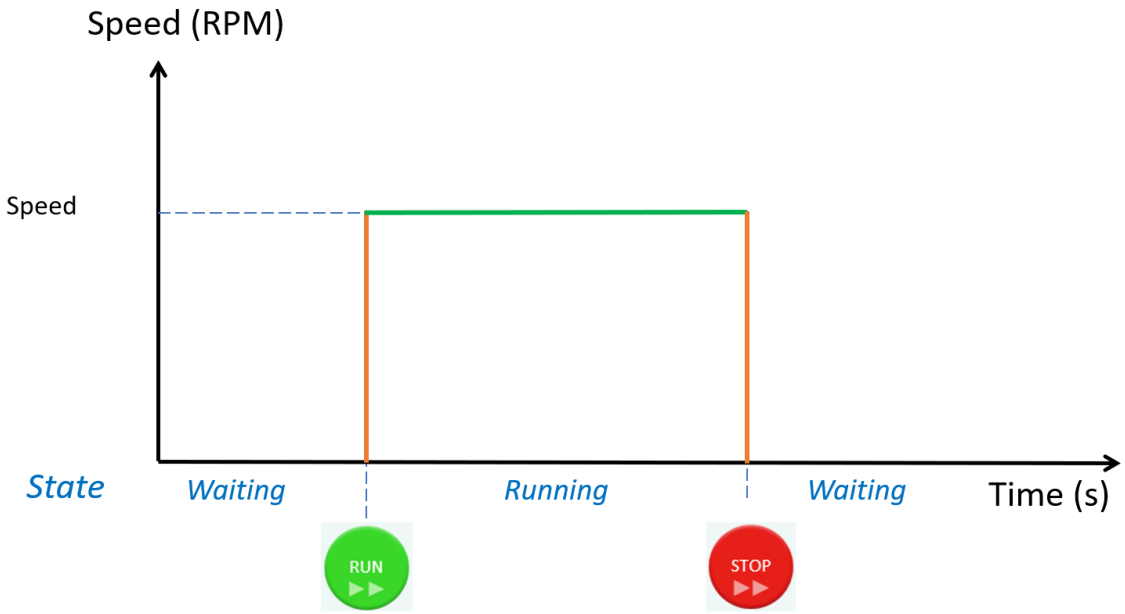
- Press the **Speed** Button to access to the **Constant** speed setting panel.

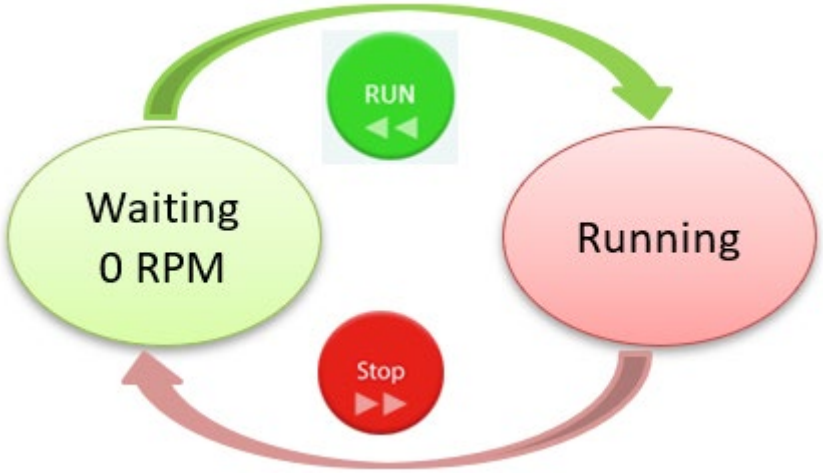


  - Use the numeric keyboard for directly entering the value of the speed or use the **+** or **–** button to increment or decrease of the speed value by steps of 1 RPM.
  - The range of selectable speeds is 2 to 90 RPM.
  - Choose the direction of the rotation by selecting **Forward** or **Reverse** option. **Forward** is selected by default.

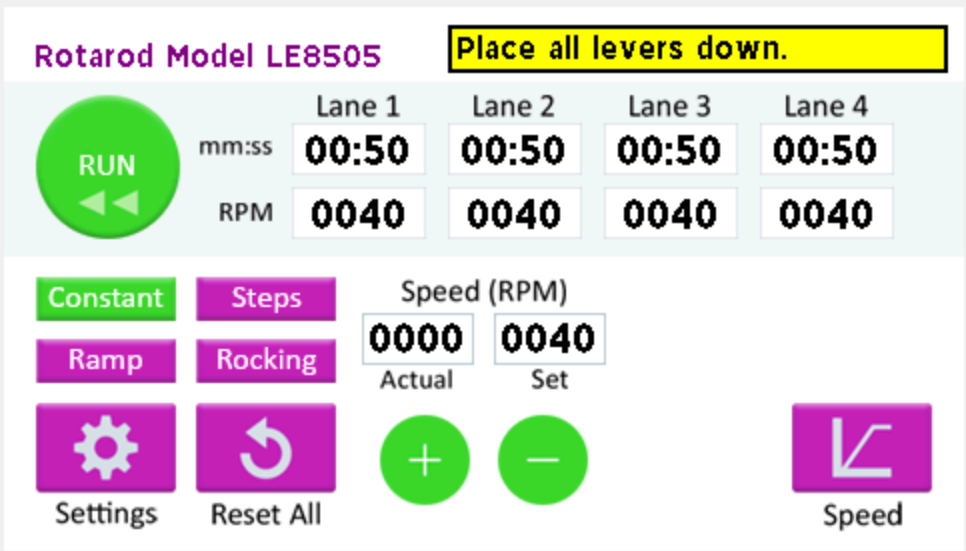
9.4.3. Running an experiment using the CONSTANT mode

- The CONSTANT mode has 2 operational states: **Waiting** and **Running**.

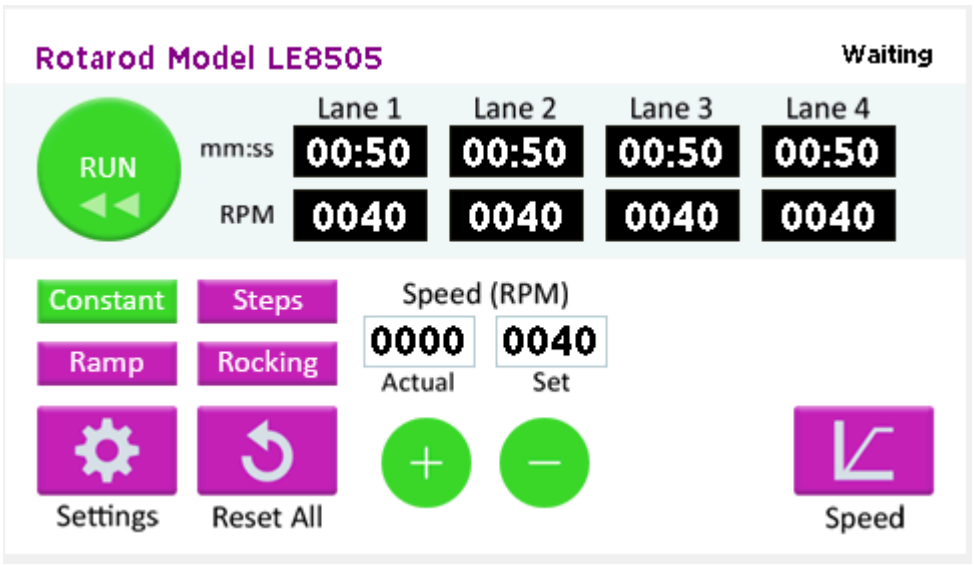




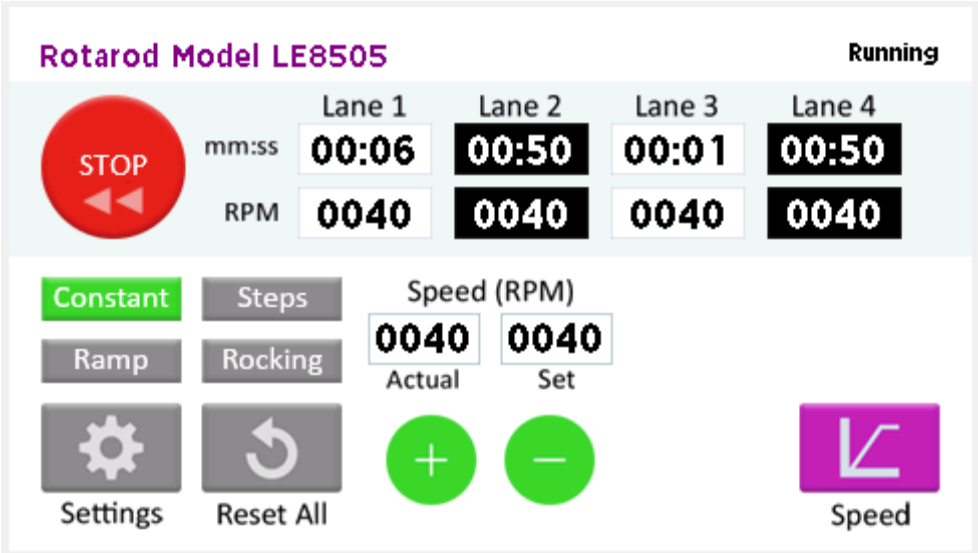
- **Waiting state** – Constant mode protocols begin in the **Waiting** state, with the motor and rod rotation off. If all levers are down, pressing the **RUN** button will initiate the **Running** state where the rod begins to rotate at the selected speed setting. If one or more lever is raised when the **RUN** button is pressed, the message "**Place all levers down**." is displayed and the ROTA ROD remains in **Waiting** state.



In the **Waiting** state, when the levers are in the down position, the counters of the inactive lanes are displayed in white text on black background colour.



- **Running state** – When the **RUN** button is pressed, the ROTA ROD enters in the **Running** State. In this state, the motor rotates at the set speed. While placing the subject on the rotating rod, the user must raise the corresponding lever so to reset and start the time and speed counters. The counters of the active lanes are displayed in black text on white background colour.

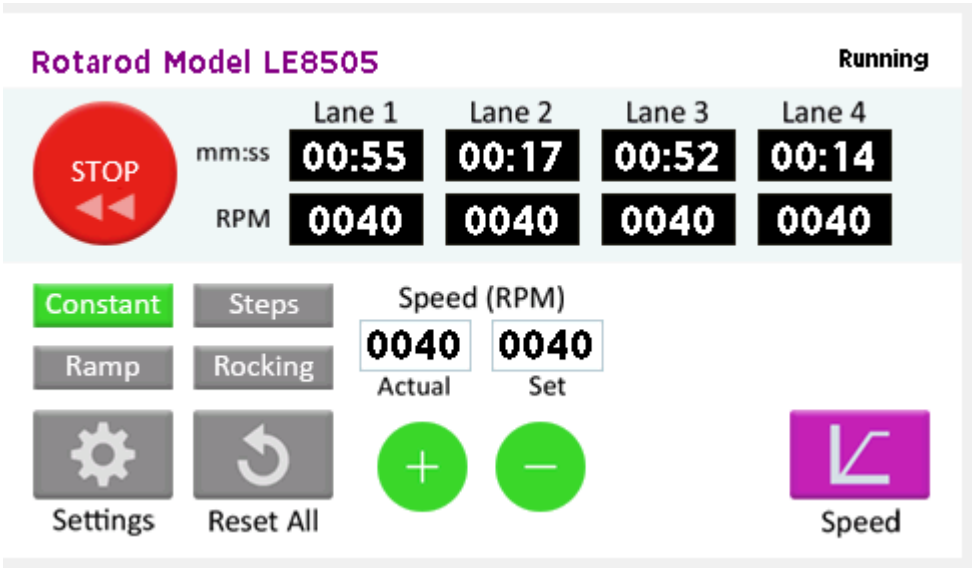


While running, the speed can be manually changed by the user by using the green **+** and **–** buttons available on screen.

When pressing the **STOP** button, the ROTA ROD returns to the **Waiting** state and the motor stops rotating.

9.4.4. Data output

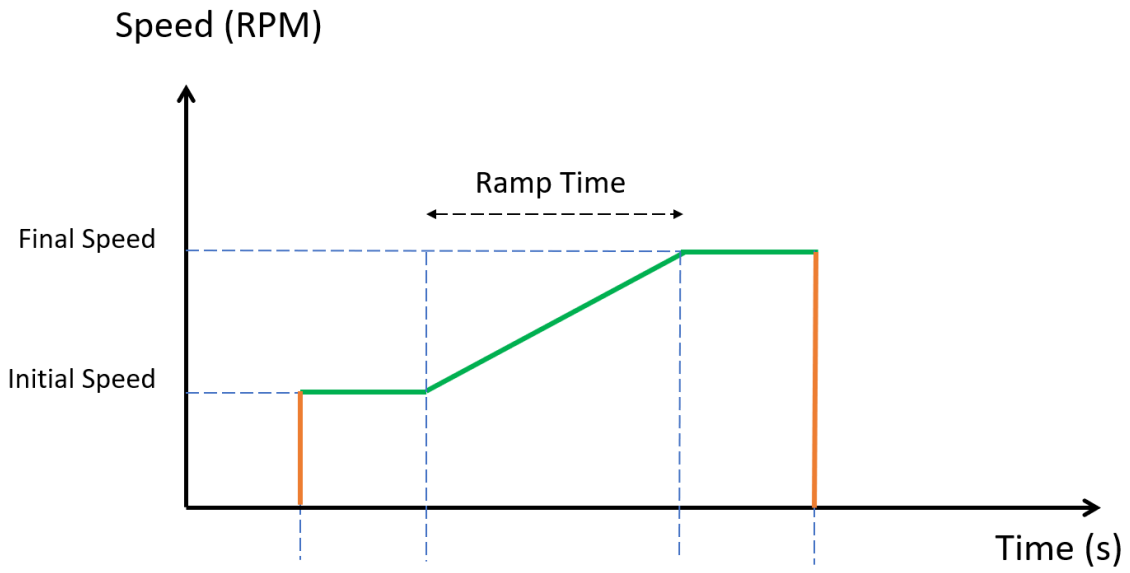
- When a subject drops down on the lever during the **Running** state, the counters (time and speed) automatically stop and display the last value.



- When the SEDACOM software is used, the fall latency and corresponding speed is recorded in the software each time a lever is activated (pressed down).

RAMP MODE (OR ACCELERATION)

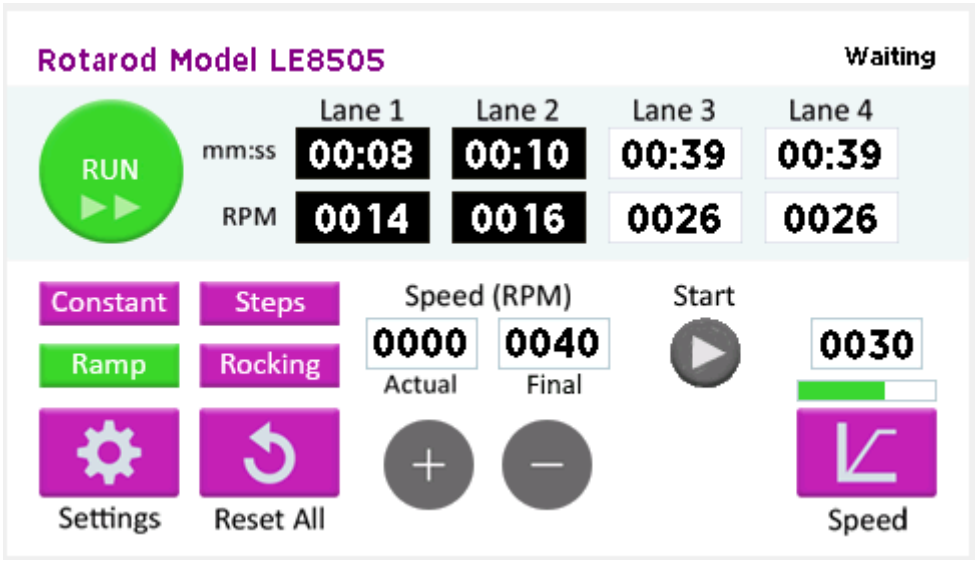
In the RAMP mode, the speed of the ROTA ROD will progressively and linearly increase from an initial speed to a final speed within a defined interval time (Ramp time), thus producing a constant acceleration or deacceleration of the rotation of the rod.



If the Initial Speed is lower than the Final Speed, the speed is accelerating.

If the Initial Speed is higher than the Final Speed, the speed is deaccelerating.

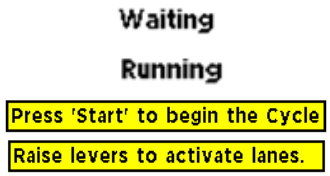
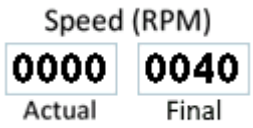
9.4.5. Select the RAMP mode



- To select the RAMP working mode, press the **Ramp** button. The button of the selected working mode will highlight in a green colour.

9.4.1. RAMP mode main panel

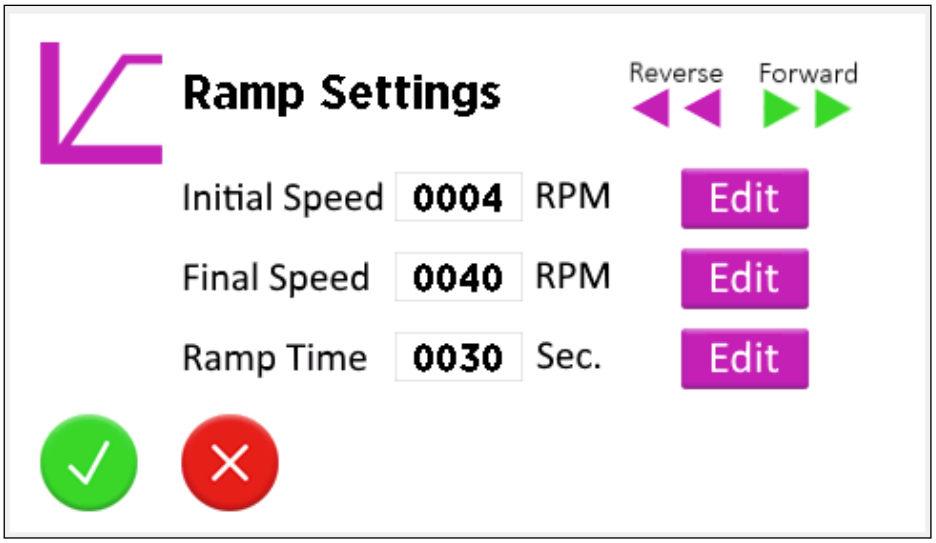
See description below:

	**ROTA ROD Model** The top left space on the runtime screen indicates the model of the ROTA ROD.
	**Status and Message/Alerts** The top right of the runtime screen is used to display the status of the experiment (Waiting/Running) and some instructions/alert messages when needed.
	**Run/Stop button** Control button used to start or stop the experiment
	**Working mode selector** The selected Ramp mode button is shown in green colour.
	**Rod speed indicators** Display the Actual current rotation speed and final speed set by the user.
	**Lane counters**: The number of counters depends on the ROTA ROD model (2, 4 or 5 lanes). The top row displays the time spent on the rod until the animal is detected to have fallen (TIMER). The bottom row displays the current rotation speed.
	**Settings screen** Go to the main Settings screen.
	**Speed** Go to Speed Setting screen.

	**Start/Hold button** 1. When pressed for the first time, this button starts the selected speed ramp. The lane counters are reset, and the counting process is started. 2. When pressed for the second time, acceleration stops, and the rod speed is maintained at the last current speed value.
	**Speed increase/decrease button** Control buttons to manually increase or decrease the rotation speed (1 RPM increment). This control button only applies to the Constant speed working mode.
	**Runtime Timer** This indicator shows the set Ramp duration and the time progression of the ramp.

9.4.2. Define the Ramp parameters

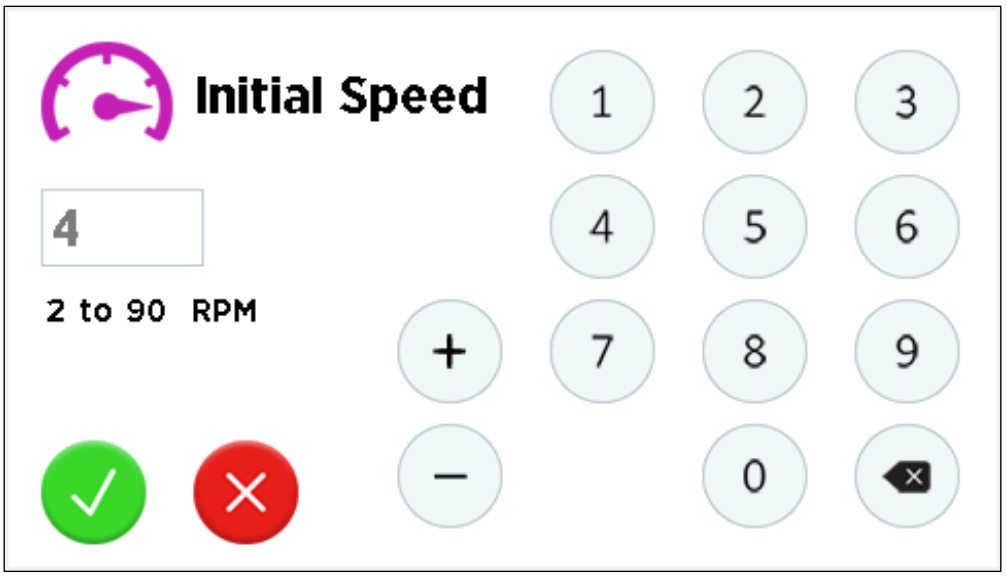
- Press the **Speed** Button to access to the **Ramp Setting** panel.

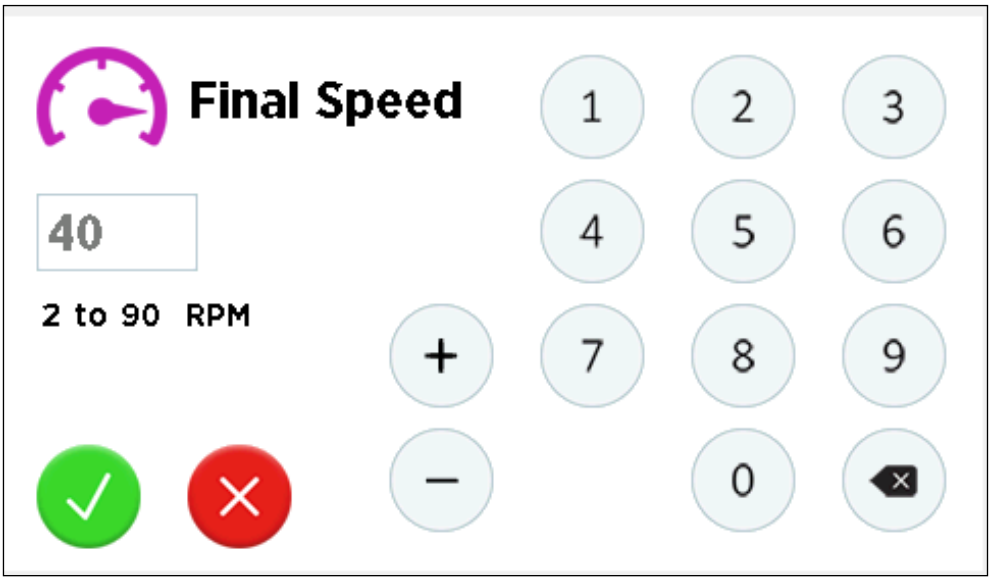


The Ramp (acceleration) is defined by 4 parameters:

- Initial Speed
- Final Speed
- Ramp Time
- Rotation Direction (Reverse or Forward)

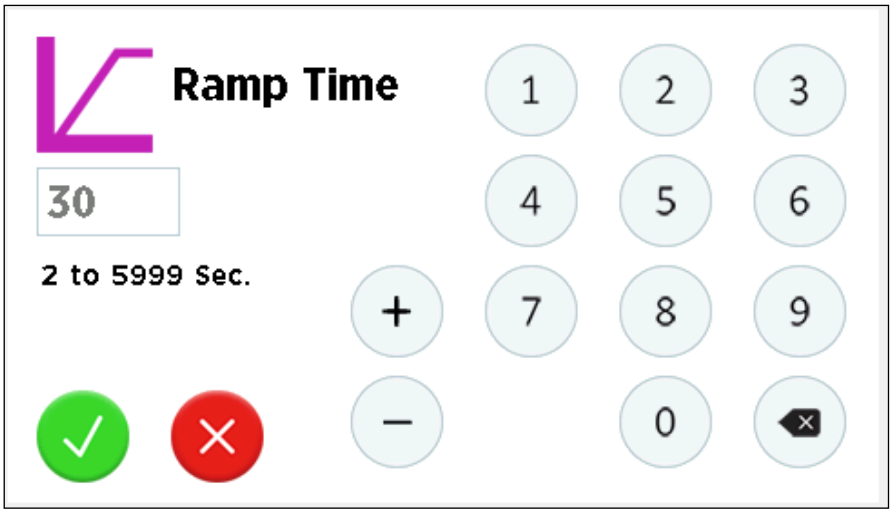
- To select the **Initial and Final speed**, select the corresponding **Edit** button and set the desired RPM value.





  - Use the numeric keyboard for directly entering the speed value or use the **+** or **–** button to increase or decrease the value by steps of 1 unit.
  - The range of selectable speed is 2 to 90 RPM.

- To set the **Ramp time**, select the corresponding **Edit** button and enter the desired value. The ramp time value defines the time it takes the Rotarod to accelerate from the initial speed to the final speed.

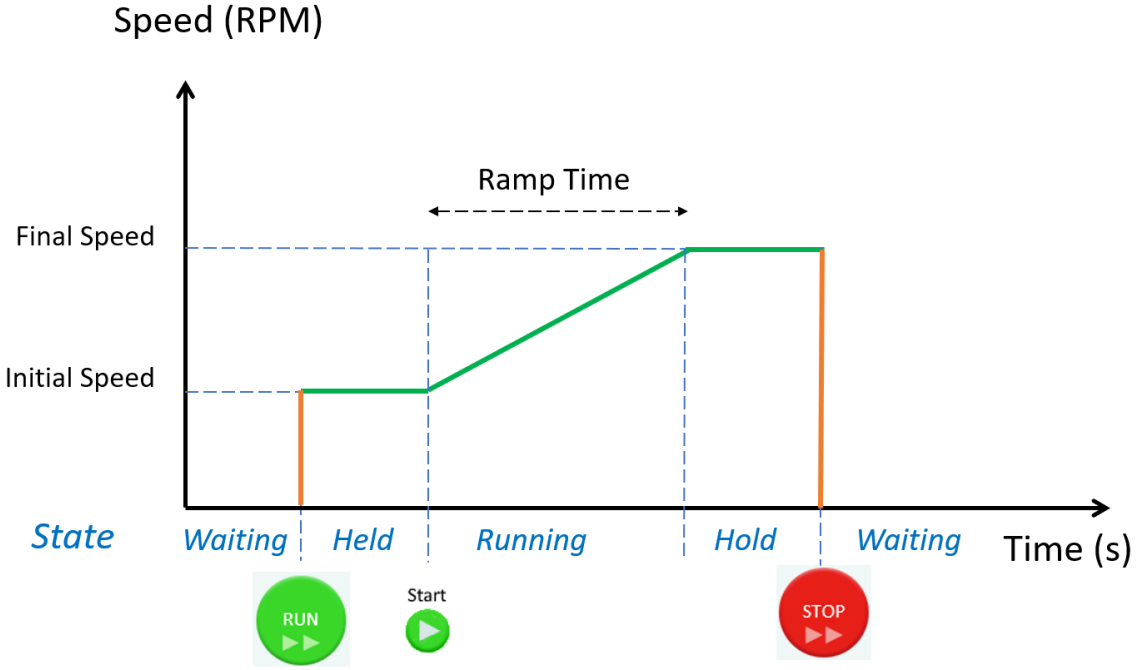


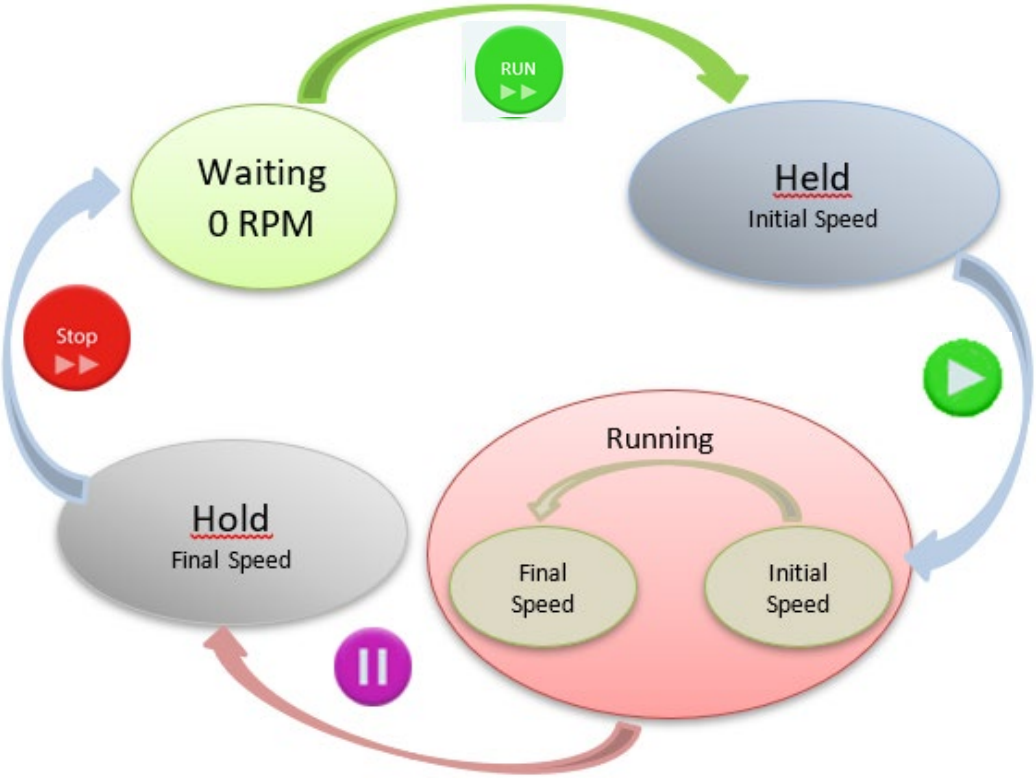
  - Use the numeric keyboard for directly entering the time value or use the + or – button to increment or decrease of the value by steps of 1 unit.
  - The range of selectable time is 2 to 5999 seconds.

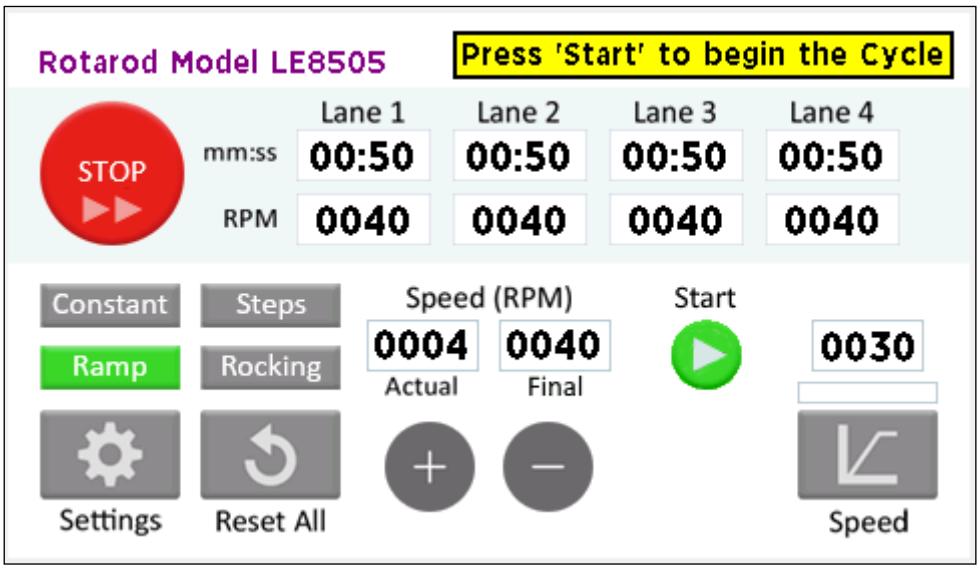
- Choose the direction of the rotation by selecting Forward or Reverse option. Forward is selected by default.

9.4.3. Run an experiment using the RAMP mode

The RAMP mode has 4 operational states: **Held**, **Running**, **Hold** and **Waiting**.

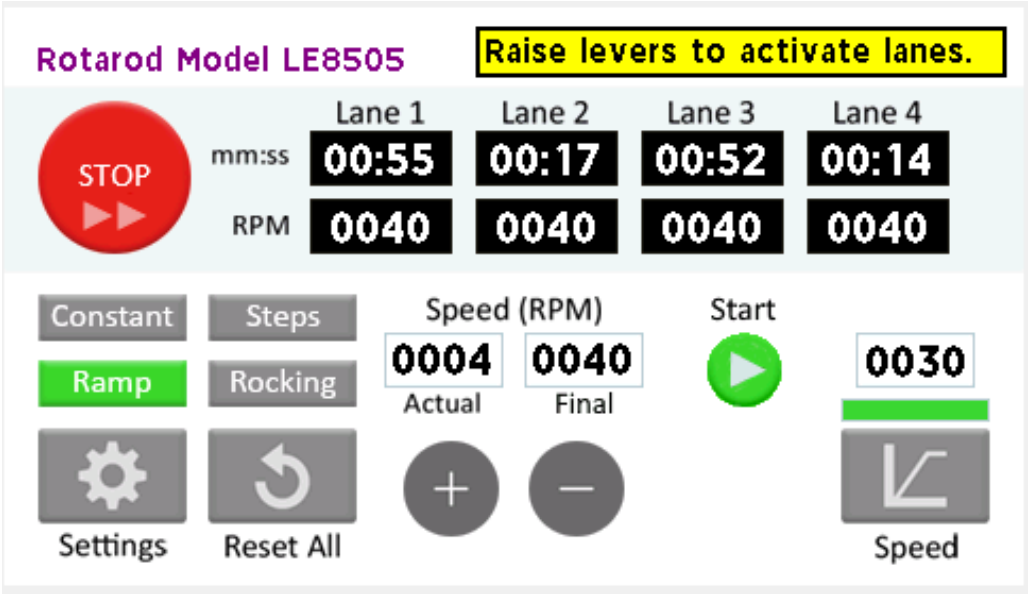


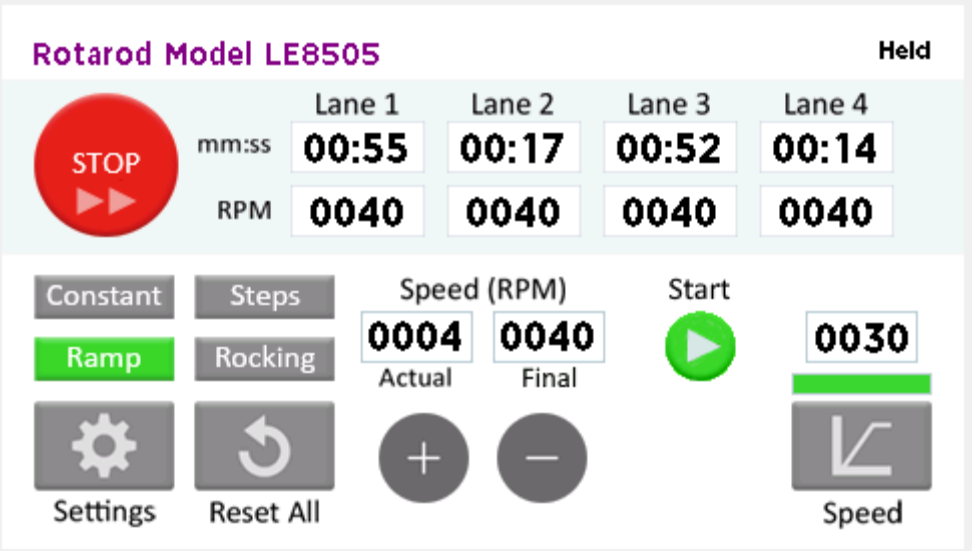
- 



In the **Held** state state, the message "**Press 'Start' to begin the Cycle**" is displayed, meaning that the unit is waiting for the user to press the **Start** button for initiating the speed ramp/acceleration. In the meantime, the speed of the rod is maintained to 4 rpm.

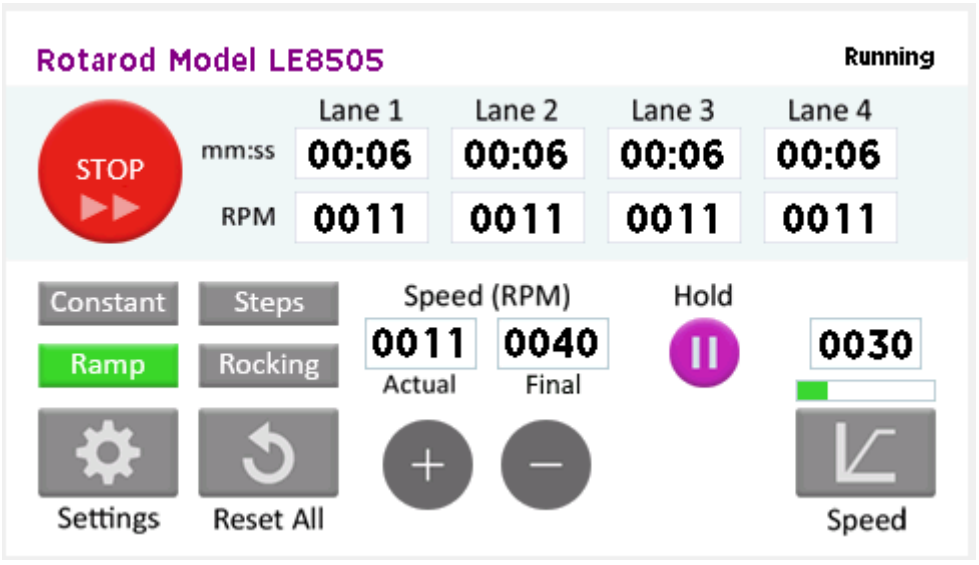
With the unit running at the initial speed, each animal is placed on the rod in its respective lane. The levers must be raised as prerequisite before beginning the experiment.



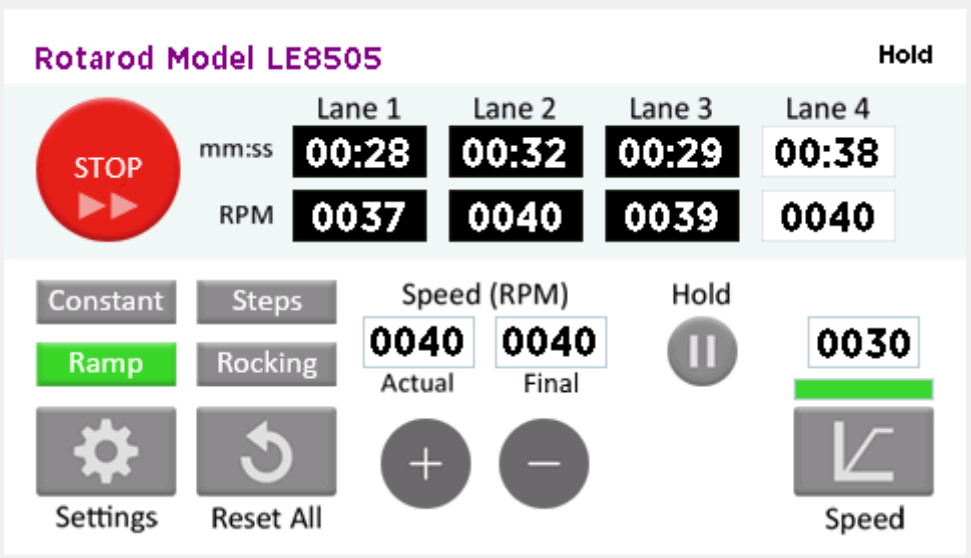


When pressing the **Start** Green button, the ROTA ROD switches to the **Running** state.

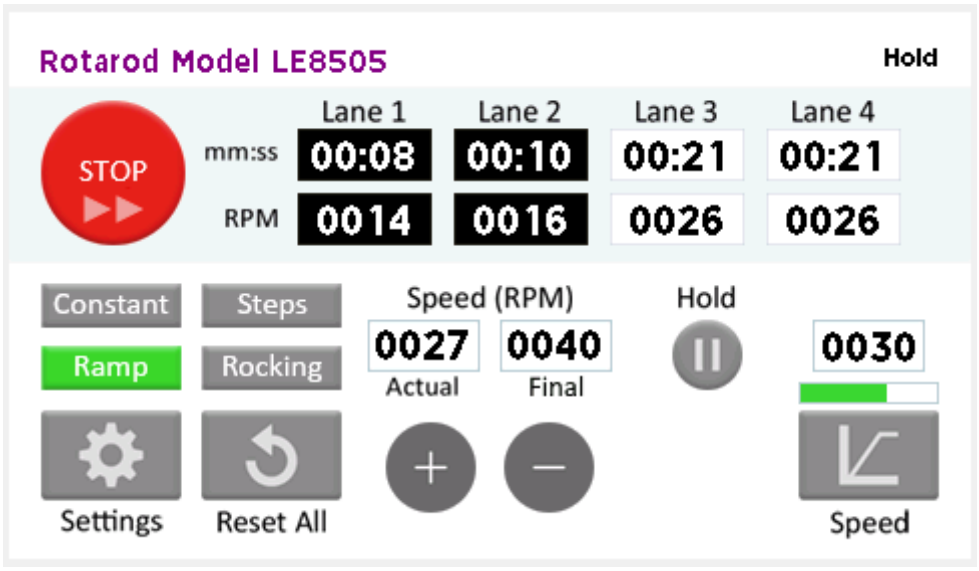
- **Running state** –In the **Running** mode, the speed of the ROTA ROD progressively increases from the **Initial Speed** to the **Final Speed** within the defined **Ramp Time**. When starting the **Running** mode, all the lane counters are reset.



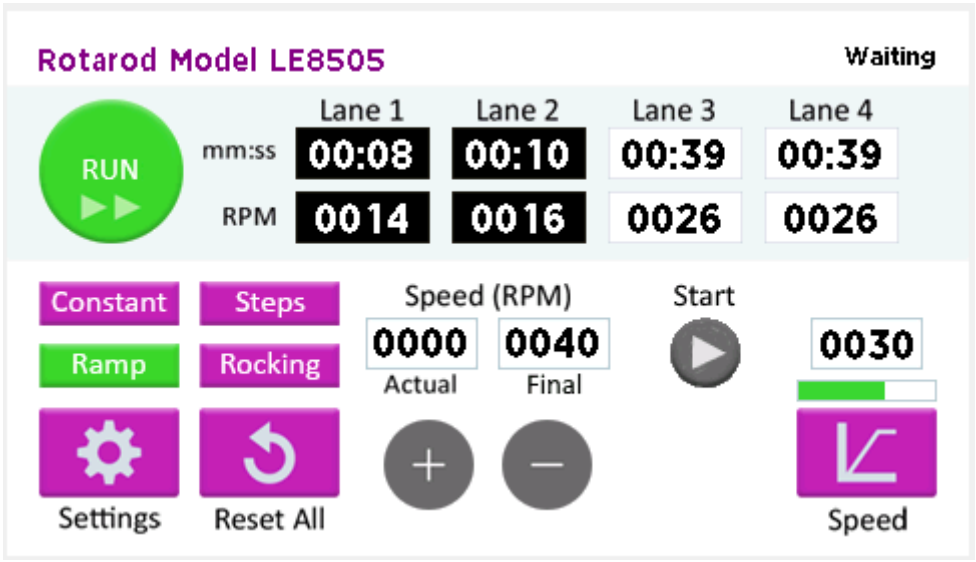
Once the **Ramp Time** is elapsed the speed of the ROTA ROD is maintained constantly at the **Final Speed** and automatically switches to the **Hold** state.



If the **Hold** button is pressed during the ramp/acceleration process, the ramp/acceleration is interrupted, and the rod will continue to rotate at last speed value.



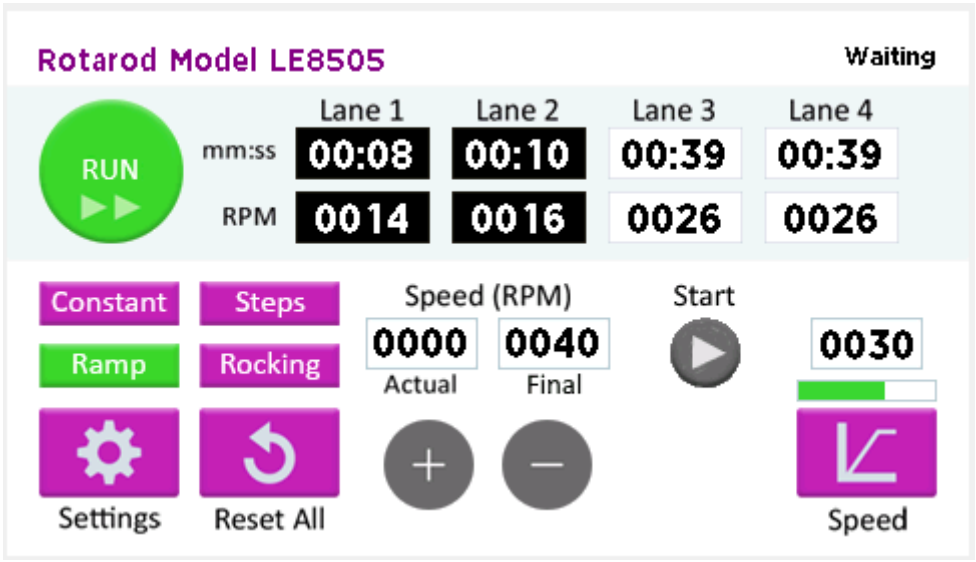
When pressing the **STOP** button, the ROTA ROD switches from the **Hold** to the **Waiting** state and the motor stops rotating.



The ROTA ROD automatically applies the **STOP** function and goes back to the **Waiting** mode after all animals have fallen.

9.4.4. Data output

- When a subject drops down on the lever in the **Running** state, the counters (time and speed) are automatically stopped at the last displayed values. In the RAMP (acceleration) mode, the speed at which each animal falls may differ in addition to the latency time.

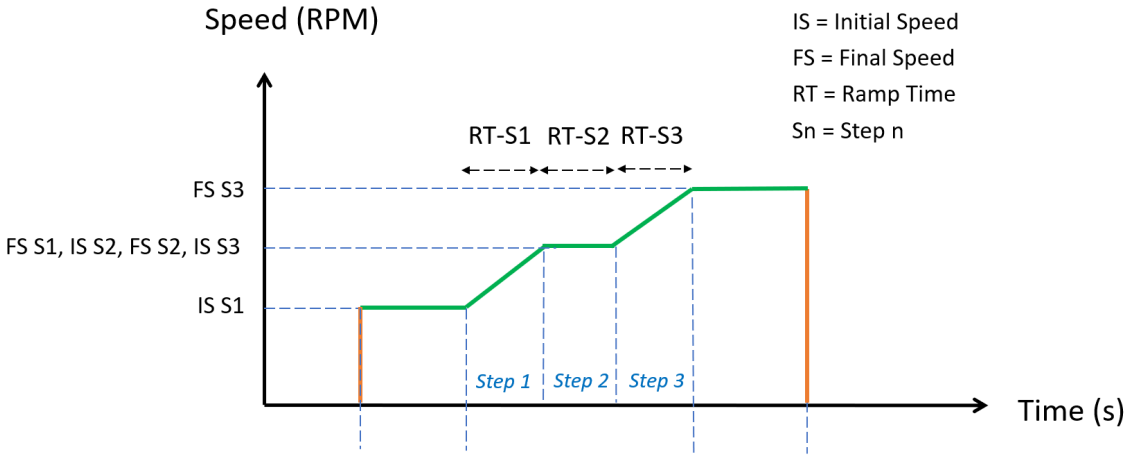


- When the SEDACOM software is used, the fall latency and corresponding speed is recorded in the software each time a lever is activated (pressed down).

9.5. STEPS MODE (OR PROTOCOL)

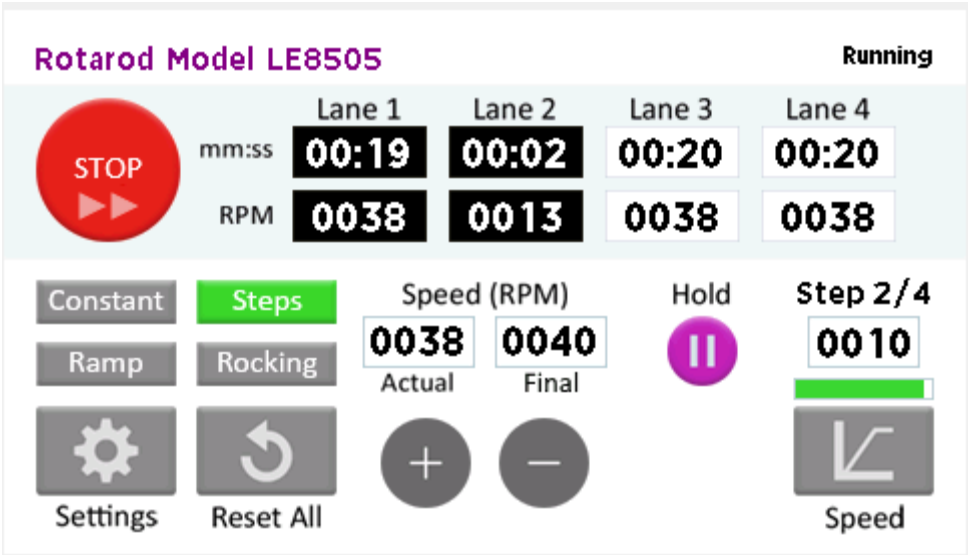
9.5.1. STEP protocol

In the STEPS mode, the user can define a protocol involving multiple fixed and accelerating speeds. A protocol is a set of steps, each of them containing an initial speed, a final speed and a step duration (ramp time).



Up to 10 steps can be defined in a protocol.

9.5.2. Select the STEP mode



To select the STEPS working mode, press the **Steps** button. The button of the selected working mode will highlight in a green color.

9.5.3. STEPS mode main panel

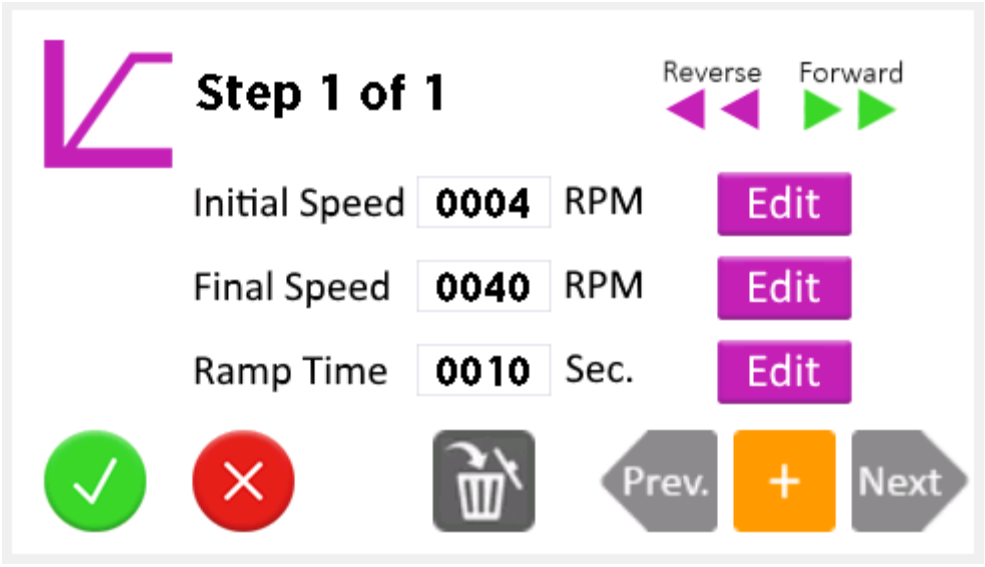
See description below:

Rotarod Model LE8505	**ROTA ROD Model** The top left space on the runtime screen indicates the model of the ROTA ROD.
Waiting Running Raise levers to activate lanes. Press 'Start' to begin the Cycle	**Status and Message/Alerts** The top right of the runtime screen is used to display the status of the experiment (Waiting/Running) and some instructions/alert messages when needed.
	**Run/Stop button** Control button used to start or stop the experiment
Constant Steps Ramp Rocking	**Working mode selector** The selected Steps mode button is shown in green color.
Speed (RPM) 0000 0040 Actual Final	**Rod speed indicators** Display the Actual current rotation speed and final speed set by the user.
	**Lane counters**: The number of counters depends on the ROTA ROD model (2, 4 or 5 lanes). The top row displays the time spent on the rod until the animal is detected to have fallen (TIMER). The bottom row displays the current rotation speed.
	**Settings screen** Go to the main Settings screen.
	**Speed** Go to Speed Setting screen.

	**Start/Hold button** 1. When pressed for the first time, this button starts the selected speed ramp. The lane counters are reset, and the counting process is started. 2. When pressed for the second time, the rod speed is maintained constantly at the last current speed value.
	**Speed increase/decrease button** Control buttons to manually increase or decrease the rotation speed (1 RPM increment). This control button only applies to the Constant speed working mode.
	**Runtime Timer** This indicator shows the current step number, the corresponding step duration, and the time progression of the step.

9.5.4. Define the speed steps

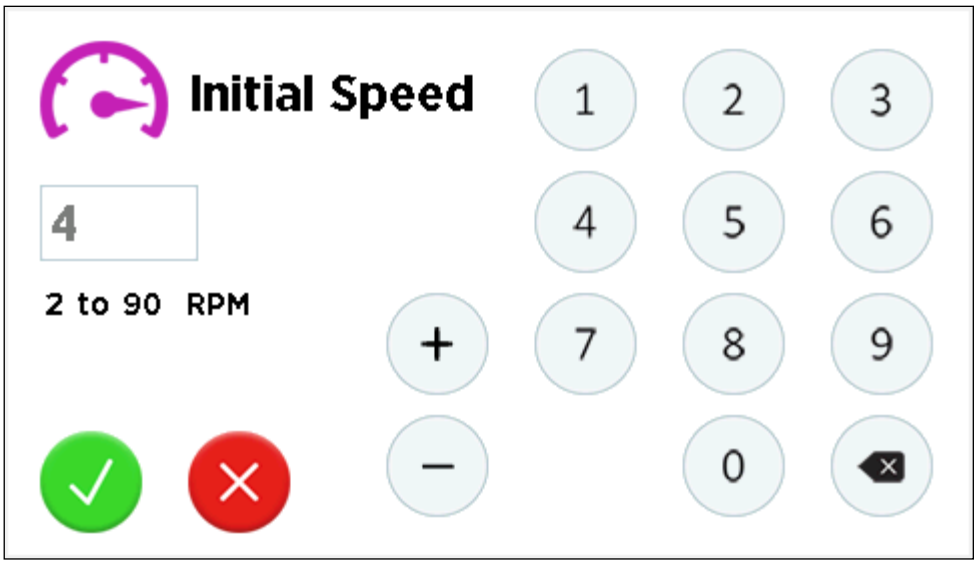
- Press the **Speed** Button to access the **Step 1** panel.

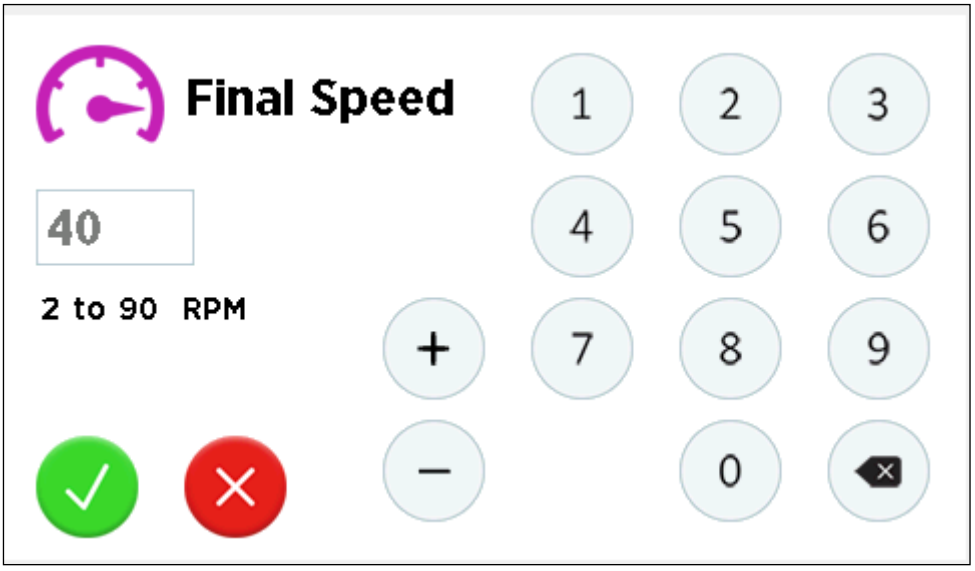


The Steps are defined by 4 parameters:

- Initial Speed
- Final Speed
- Ramp Time
- Rotation Direction (Reverse or Forward)

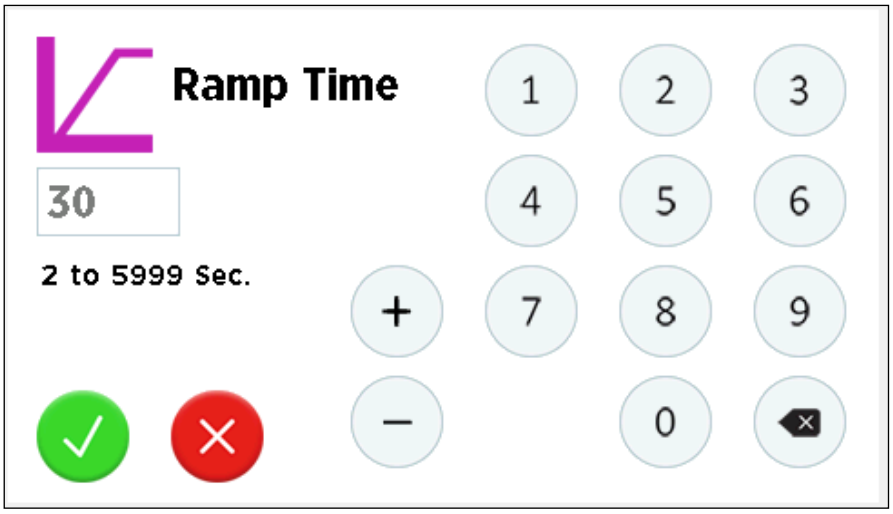
- To select the **Initial** and **Final speed**, select the corresponding **Edit** button and set the value of the speed.





  - Use the numeric keyboard for directly entering the value of the speed or used the **+** or **–** button to increment or decrease of the value by steps of 1 unit.
  - The range of selectable speed is 2 to 90 RPM.

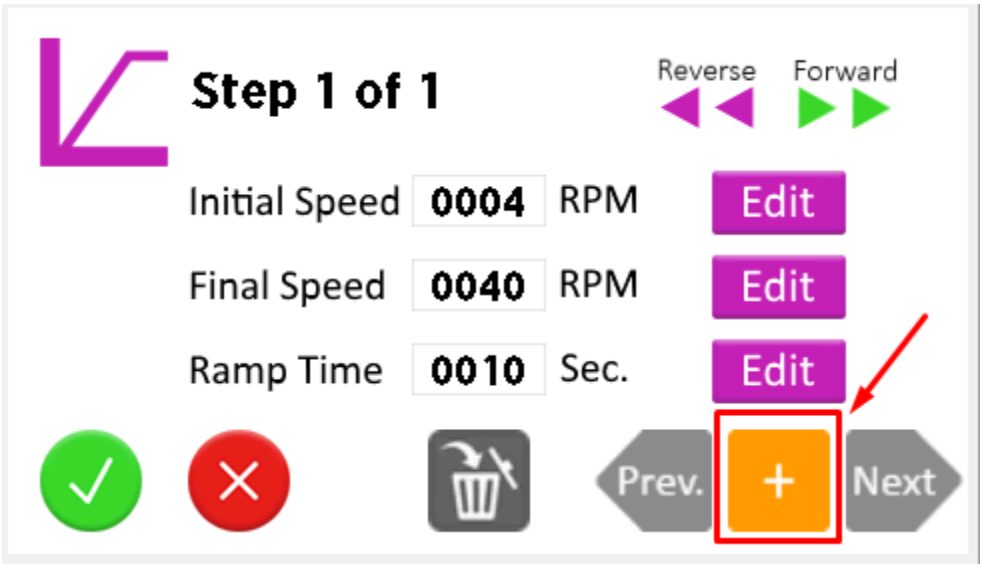
- To select the **Ramp time**, select the corresponding **Edit** button and enter the value of the interval of time the ROTA ROD would need to go from the initial speed to the final speed.

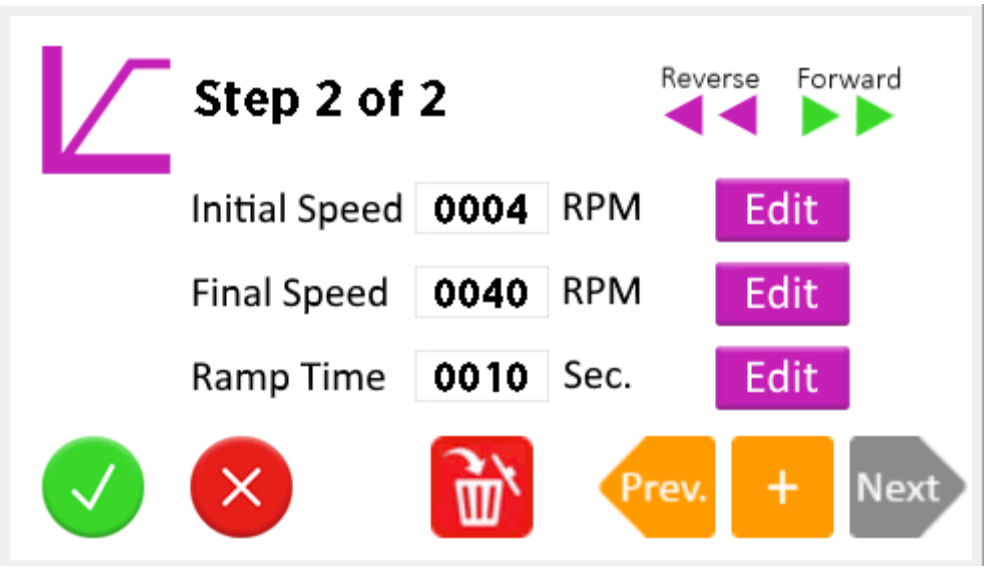


  - Use the numeric keyboard for directly entering the value of the time or used the **+** or **–** button to increment or decrease of the value by steps of 1 unit.
  - The range of selectable time is 2 to 5999 seconds.

- Choose the direction of the rotation by selecting **Forward** or **Reverse** option. Forward is selected by default.

- To add a new Step, press the **+** button. Then select the Speed, Time and Direction parameters for the new Steps as described for the first step.





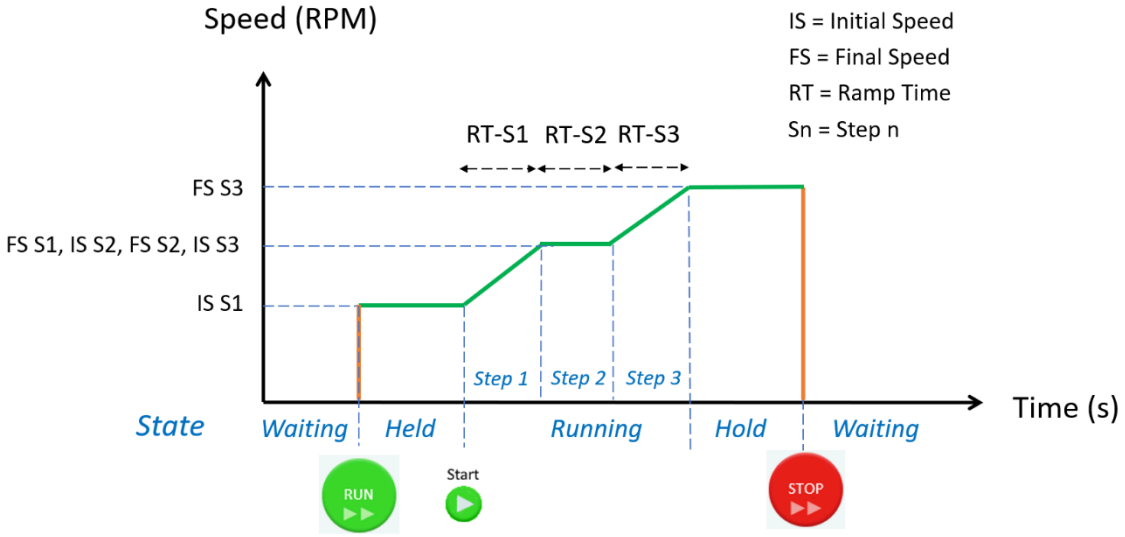
- Up to 10 Steps can be created.
- A new Step be inserted between 2 already existing steps. When doing so, steps within the protocol are renumbered to maintain numerical order.

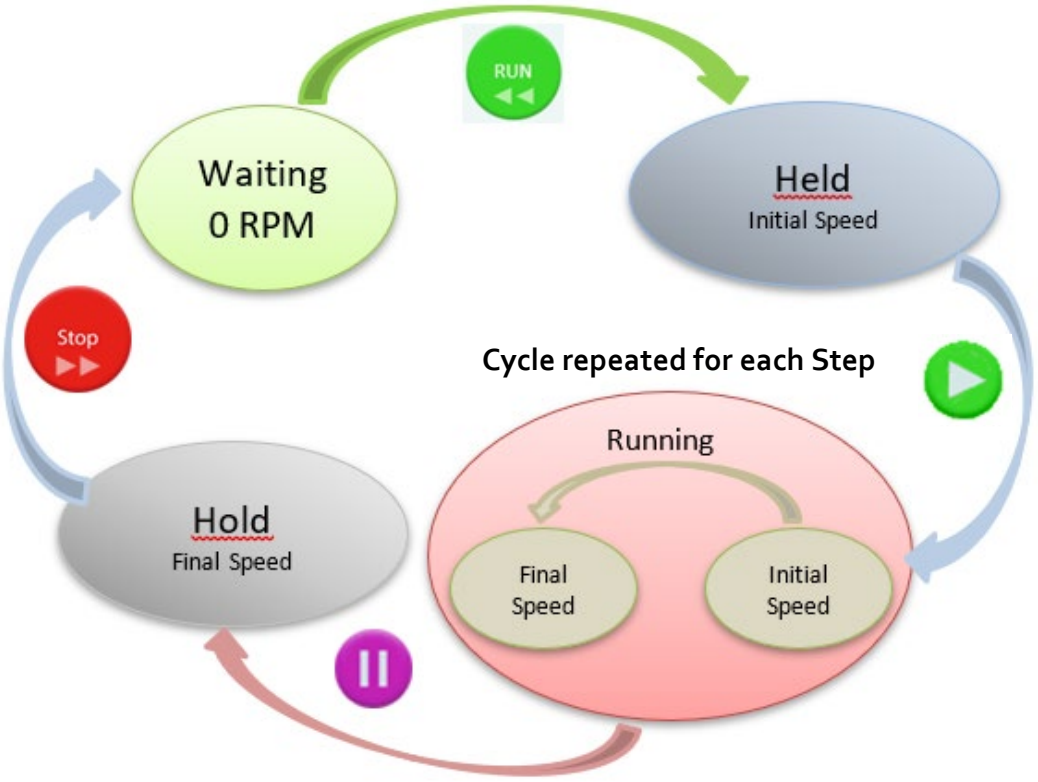
- To move through the different use the **Prev.** and **Next** buttons.

- To Delete a Step, enter in the Step panel and press the **Trash** button. When doing so, steps within the protocol are renumbered to maintain numerical order.

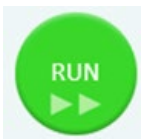
9.5.5. Run an experiment using the STEP mode

The STEP mode has the same 4 operational states as the Ramp mode: **Held**, **Running**, **Hold** and **Waiting**.

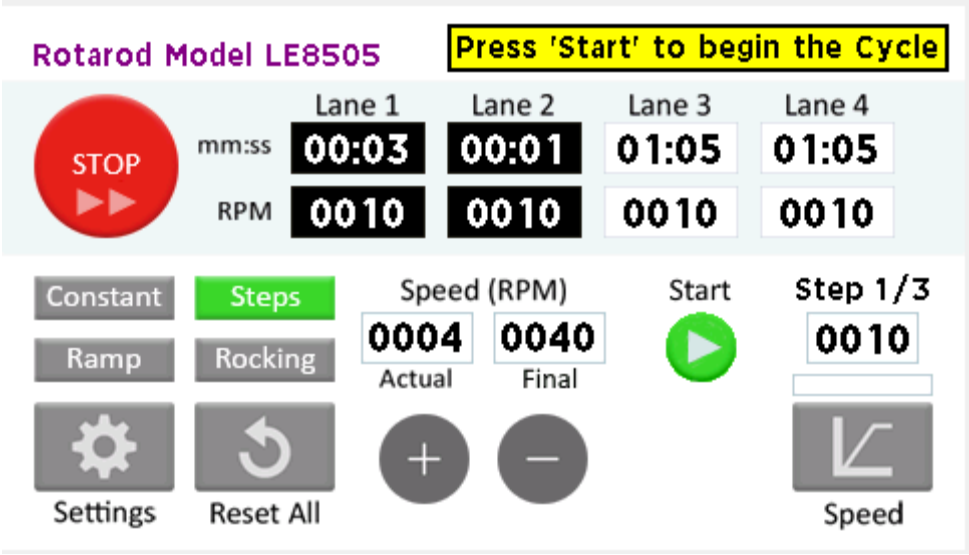




- **Waiting state** – STEP mode protocols begin in the **Waiting** state, with the motor and rod rotation off. When pressing the RUN button, the ROTA ROD enters the **Held** state.

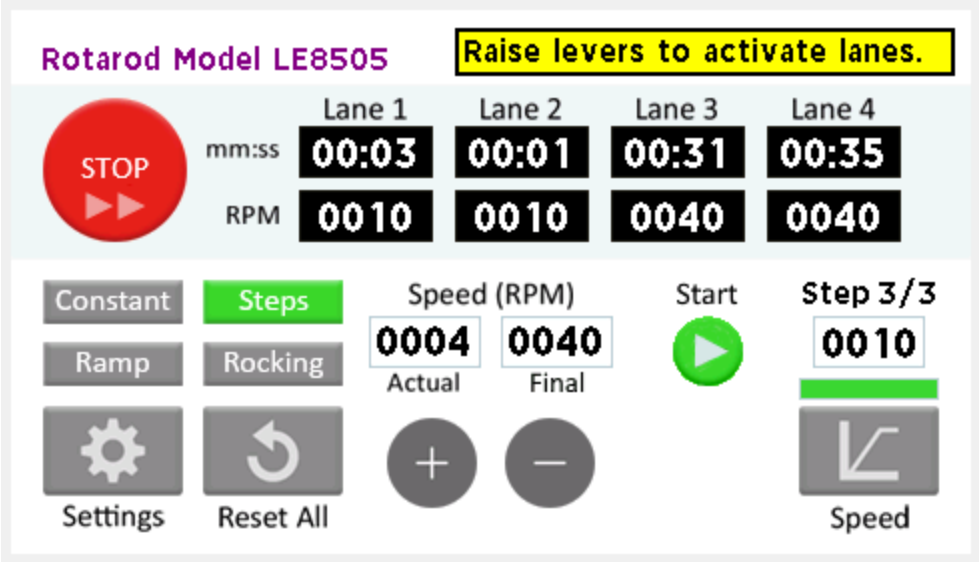
- 

- **Held state** – In this state, the ROTA ROD is rotating at the user-defined Initial Speed.



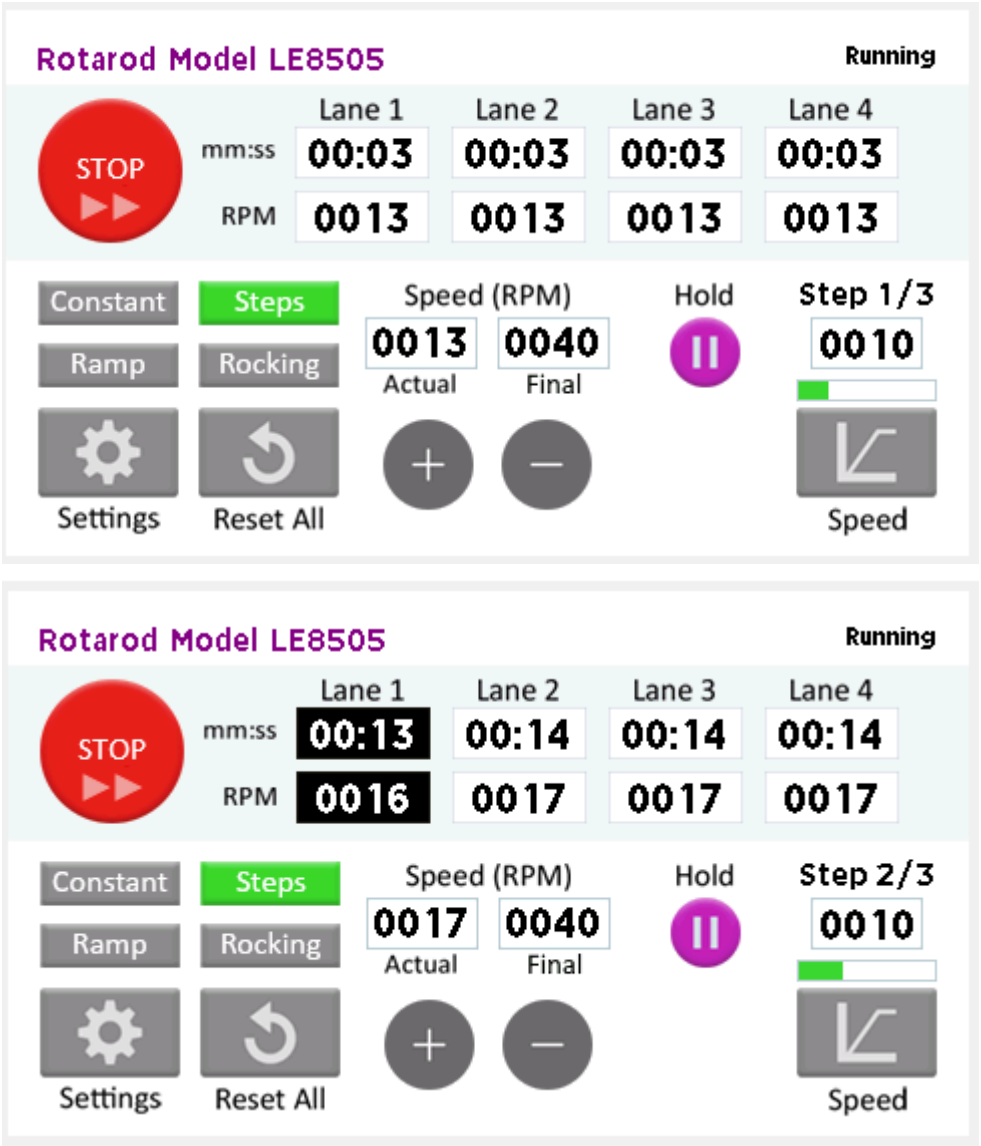
The speed of the rod is constantly maintained at the Initial Speed of the first Step and the message "**Press 'Start' to begin the Cycle**" is displayed.

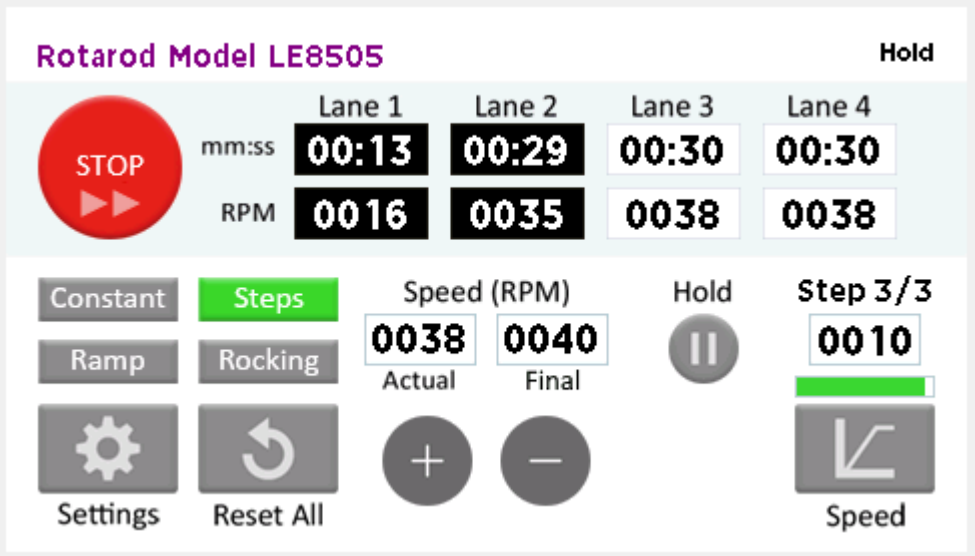
In this state, the subjects are placed on the rod in their respective lane. The levers must be raised as prerequisite before beginning the experiment.



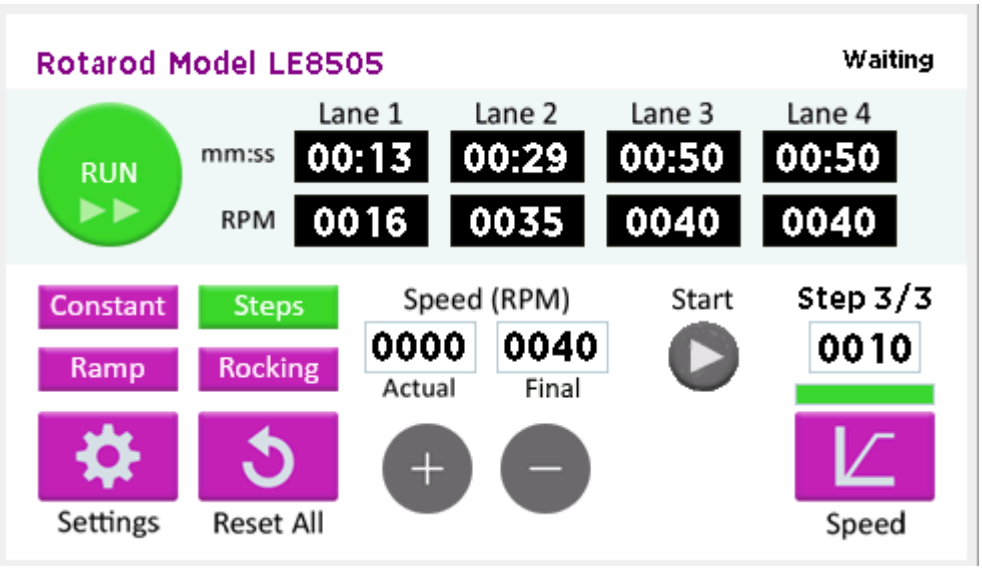
When pressing the **Start** Green button, the ROTA ROD switches to the **Running** state and the speed ramp set for first Step is executed.

- **Running state** – In the **Running** mode, the speed of the ROTA ROD progressively increases from the **Initial Speed** to the **Final Speed** within the defined **Ramp Time** and Step parameters. When starting the **Running** mode, all the lane counters are reset.

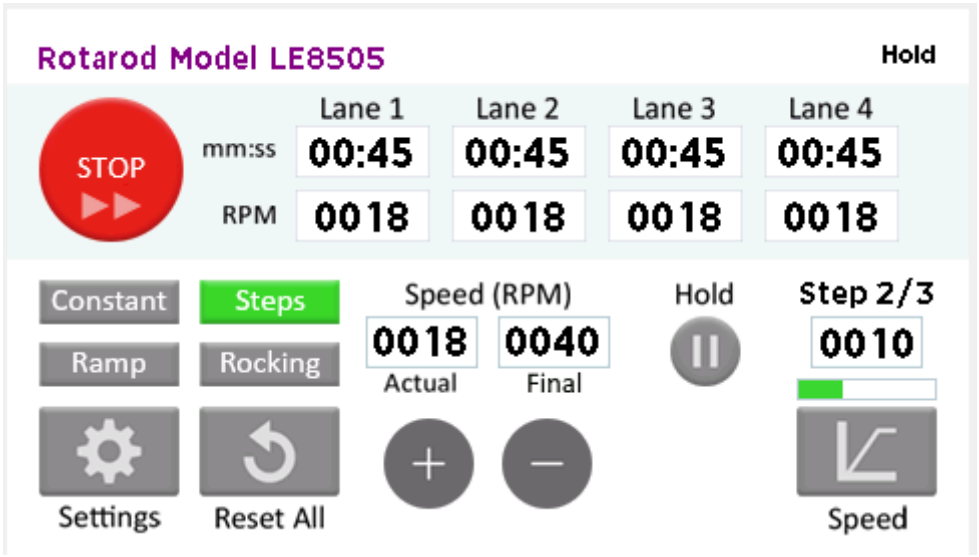




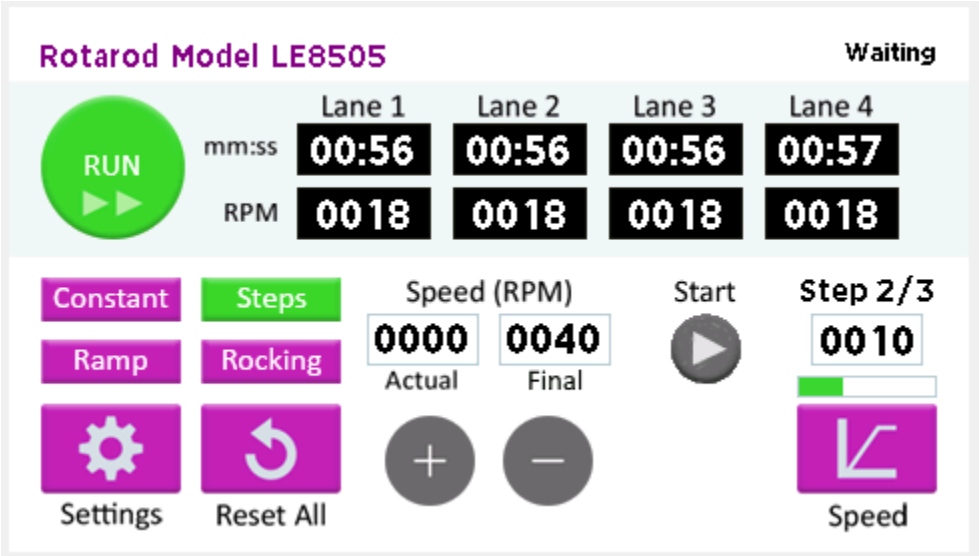
Once the Ramp Time is elapsed in the last step of the protocol, the speed of the ROTA ROD is constantly maintained at the Final Speed and automatically switches to the **Hold** state.



If the **Hold** button is pressed during the ramp/acceleration process, the ramp/acceleration is interrupted, and the rod will continue to rotate at last speed value.



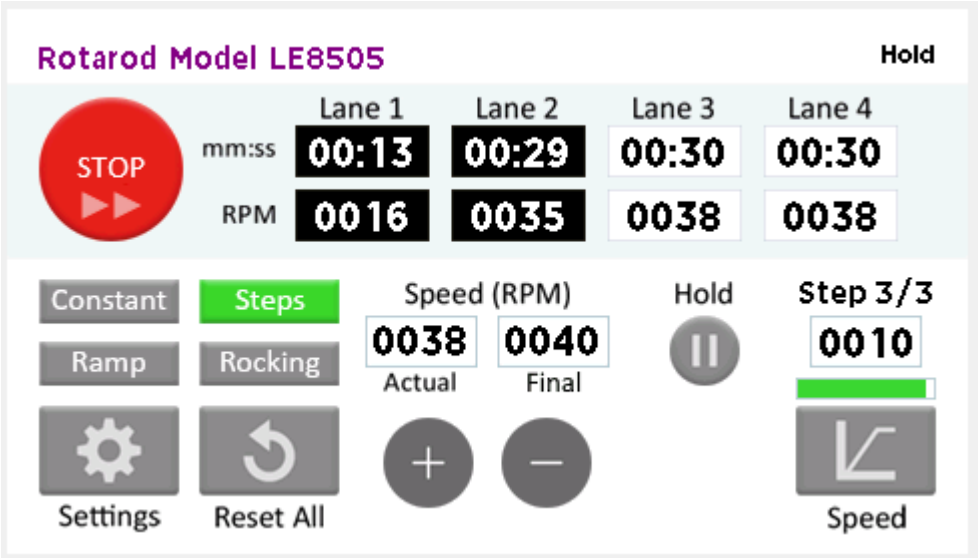
When pressing the **STOP** button, the ROTA ROD switches from the **Hold** to the **Waiting** state and the motor stops rotating.



The ROTA ROD automatically applies the **STOP** function and goes back to the **Waiting** mode after all the animals dropped.

9.5.6. Data output

- When a subject drops down on the lever in the Running state, the counters (time and speed) are automatically stopped showing the last displayed value. In STEPS (protocol) mode, the speed at which each animal falls may differ in addition to the latency time.



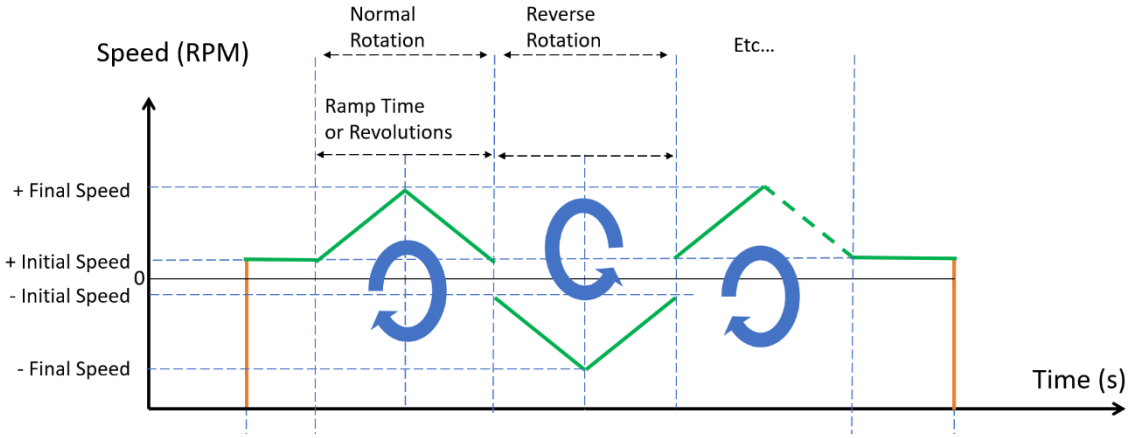
- When the SEDACOM software is used, the fall latency and corresponding speed is recorded in the software each time a lever is activated (pressed down).

9.6. ROCKING MODE (REVERSE RAMP ROTATION & ROCKING PROTOCOLS)

In the ROCKING mode, the user can define a SPEED protocol with alternating changes in the rod rotation direction (forward or reverse). This mode is employed for reverse ramp protocols and rocking protocols.

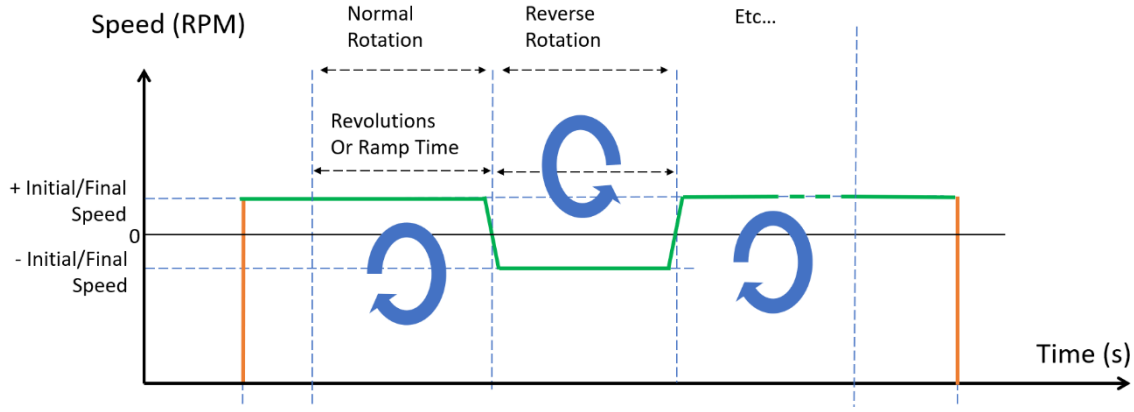
Reverse Ramp Rotation protocol

The reverse ramp rotation is a 4-stage cycle consisting of a normal-rotation phase at increasing speed, followed by a phase at decreasing speed, a change of rotation, hence a reverse-rotation phase at increasing speed, followed by a phase at decreasing speed. The duration of each ramp is determined by the user-defined ramp time or by the user-defined number of revolutions.

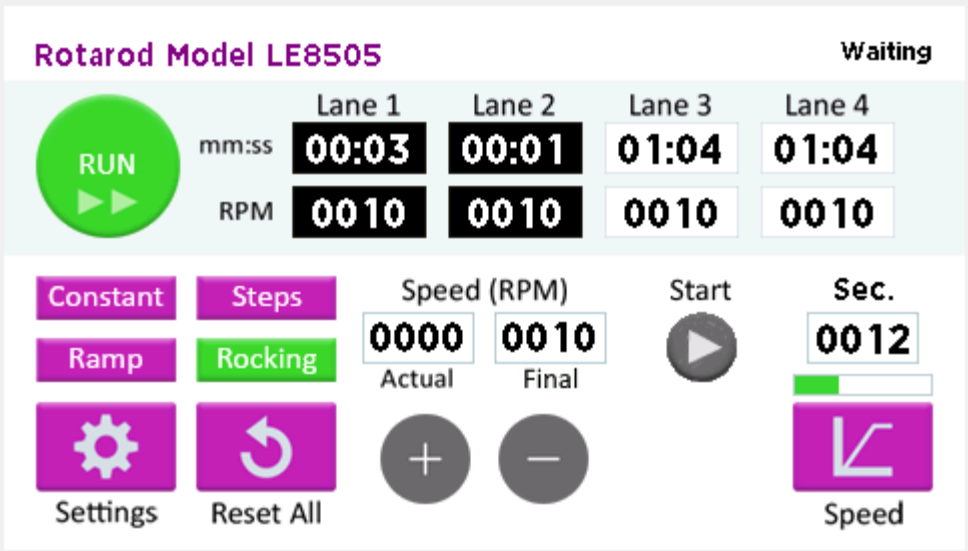


Rocking protocol

During a rocking protocol, a fixed speed is commonly used, and the direction of the rotation changes each time the rod completes a user-defined number of rotation/revolutions (or, accessorily, each time the "ramp time" is elapsed).



9.6.1. Select the ROCKING mode

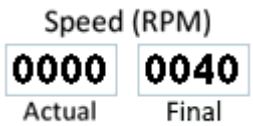


To select the ROCKING working mode, press the **Rocking** button. The button of the selected working mode will highlight in a green color.

ROCKING mode main panel

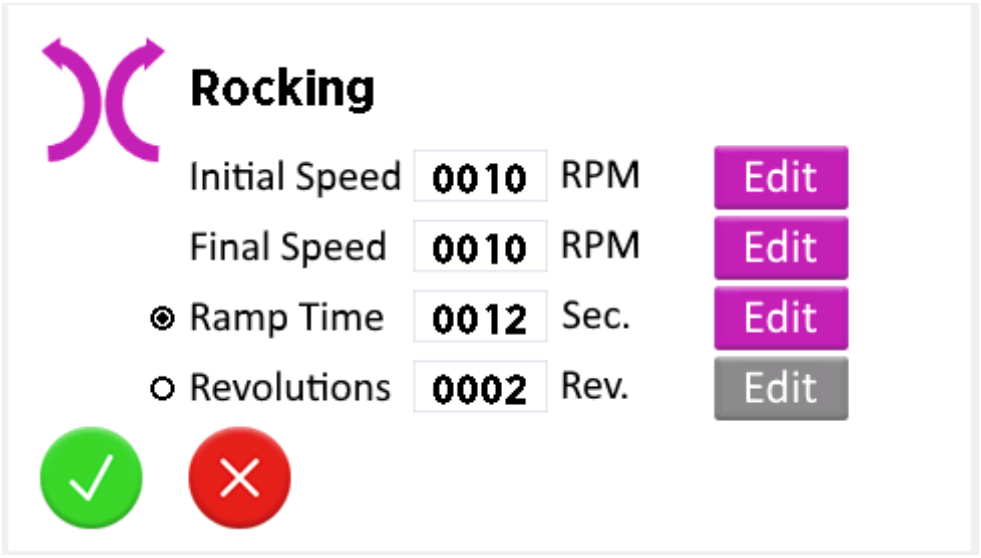
See description below:

Rotarod Model LE8505	**ROTA ROD Model** The top left space on the runtime screen indicates the model of the ROTA ROD.
Waiting Running Press 'Start' to begin the Cycle Raise levers to activate lanes.	**Status and Message/Alerts** The top right of the runtime screen is used to display the status of the experiment (Waiting/Running) and some instructions/alert messages when needed.
RUN	**Run/Stop button** Control button used to start or stop the experiment
Constant Steps Ramp Rocking	**Working mode selector** The selected Steps mode button is shown in green colour.

	**Rod speed indicators** Displays the Actual current rotation speed and final speed set by the user.
	**Lane counters**: The number of counters depends on the ROTA ROD model (2, 4 or 5 lanes). The top row displays the time spent on the rod until the animal is detected to have fallen (TIMER). The bottom row displays the current rotation speed.
	**Settings screen** Go to the main Settings screen.
	**Speed** Go to Speed Setting screen.
	**Start/Hold button** 1. When pressed for the first time, this button starts the selected speed ramp. The lane counters are reset, and the counting process is started. 2. When pressed for the second time, the rod speed is maintained constant at the last current speed value.
	**Speed increase/decrease button** Control buttons to manually increase or decrease the rotation speed (1 RPM increment). This control button only applies to the Constant speed working mode.
	**Runtime Timer** These indicators show the ramp time or revolution number set by the user in Speed Settings, as well as the corresponding time progression bar.

9.6.2. Define the speed steps

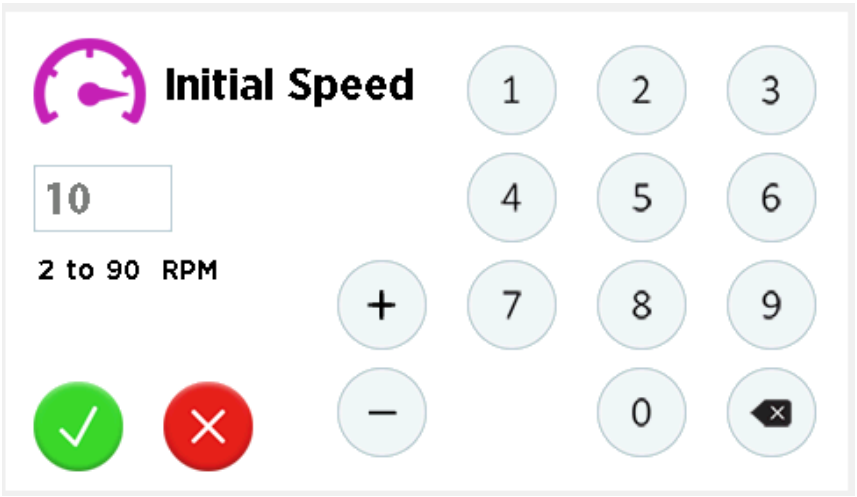
- Press the **Speed** Button to access to the **Step 1** panel.

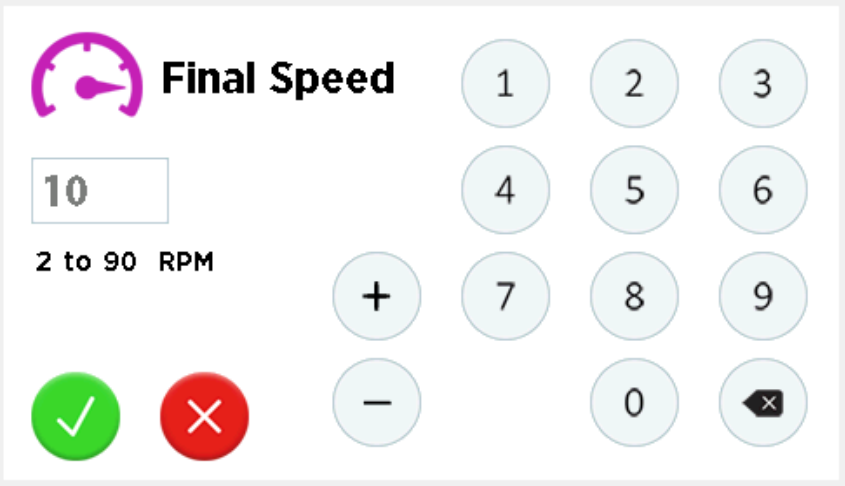


The Steps are defined by 3 parameters:

- Initial Speed
- Final Speed
- Interval of time between each change in the direction of the rotation (ramp time) or numbers of revolution.

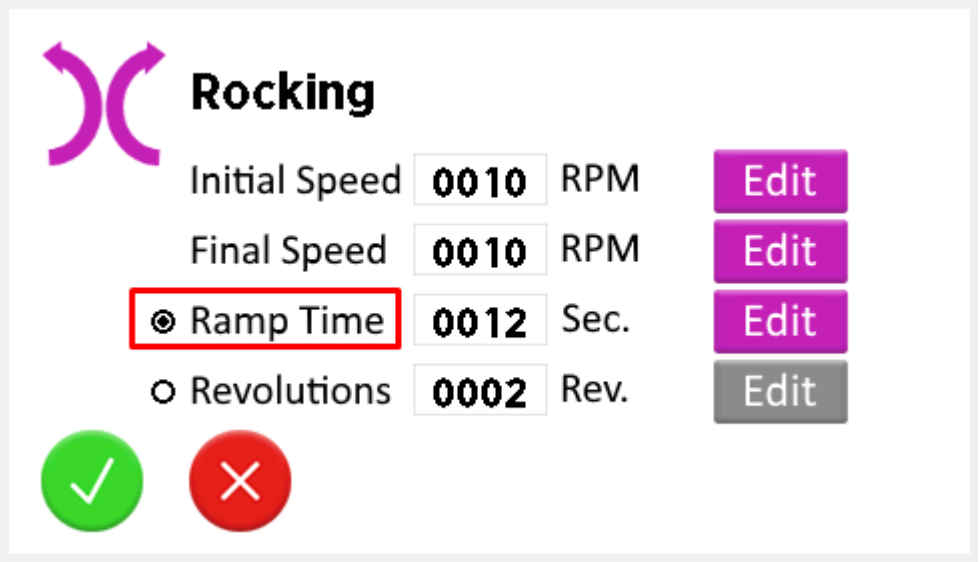
- To select the **Initial and Final speed**, select the corresponding **Edit** button and set the value of the speed.

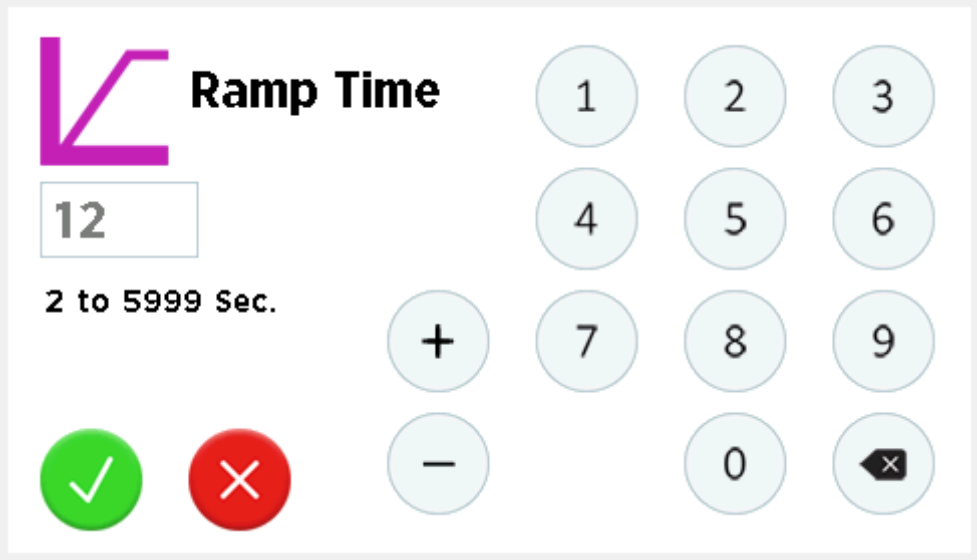




- Use the numeric keyboard for directly entering the value of the speed or used the **+** or **–** button to increment or decrease of the value by steps of 1 unit.
- The range of selectable speed is 2 to 90 RPM.

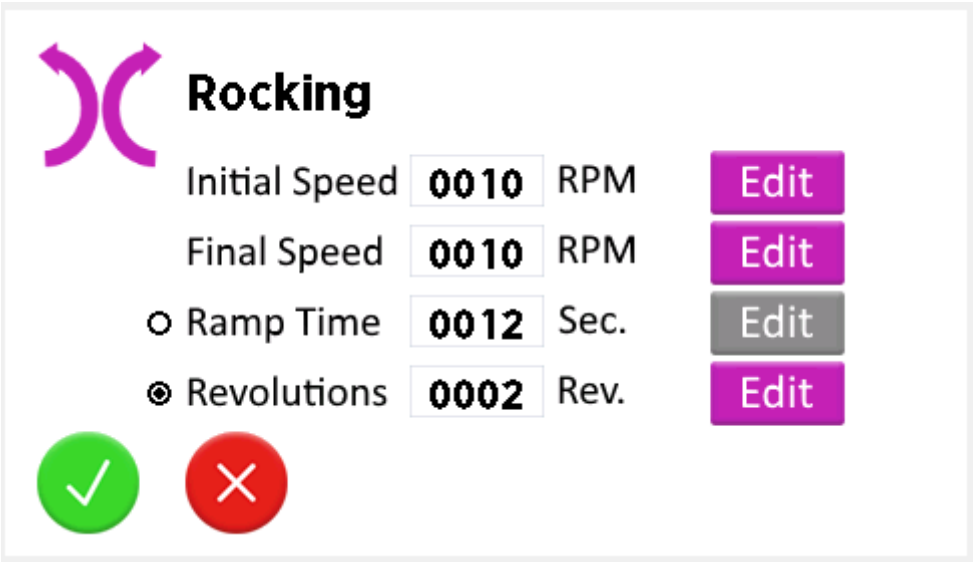
- To select the **Ramp time**, select the corresponding **Edit** button and enter the value of the interval of time the ROTA ROD would need to go from the initial speed to the final speed.

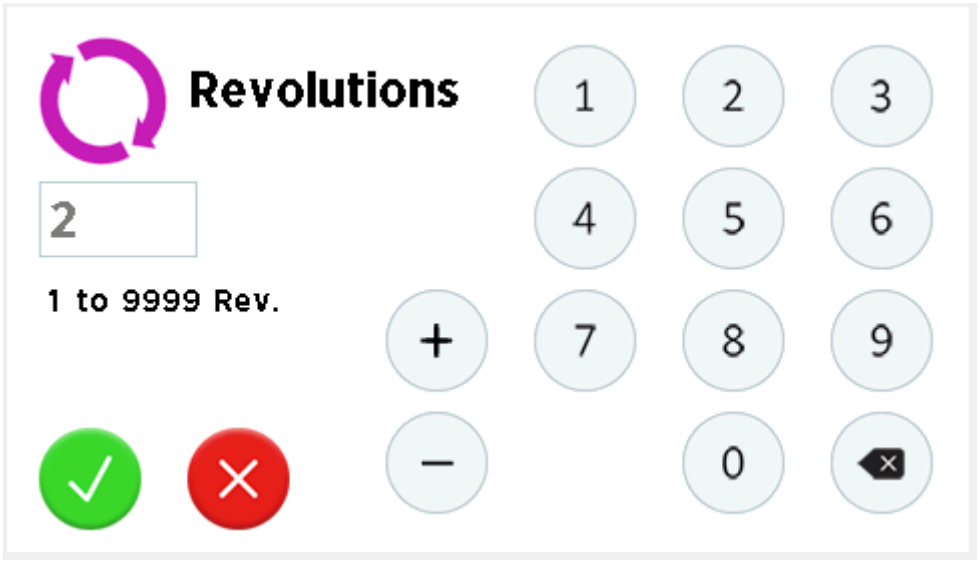




- Use the numeric keyboard for directly entering the value of the time or used the + or – button to increment or decrease of the value by steps of 1 unit.
- The range of selectable time is 2 to 5999 seconds.

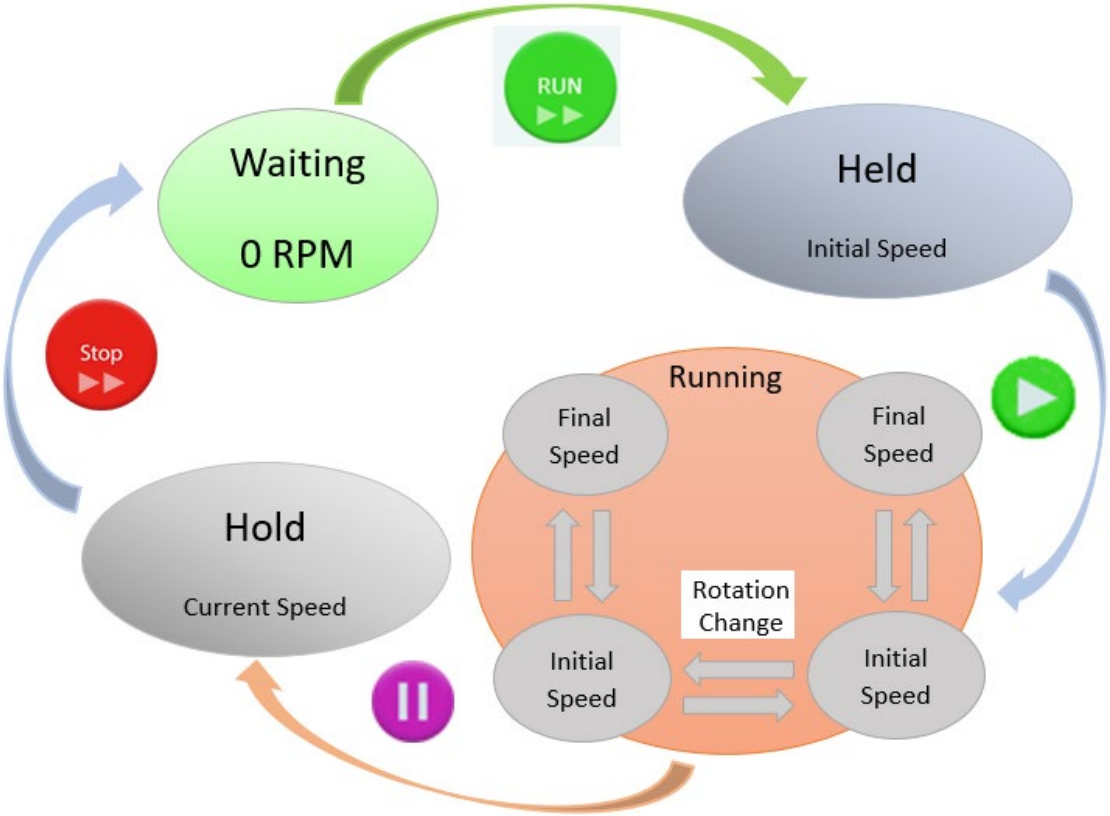
- Choose the Revolutions





9.6.3. Run an experiment using the ROCKING mode

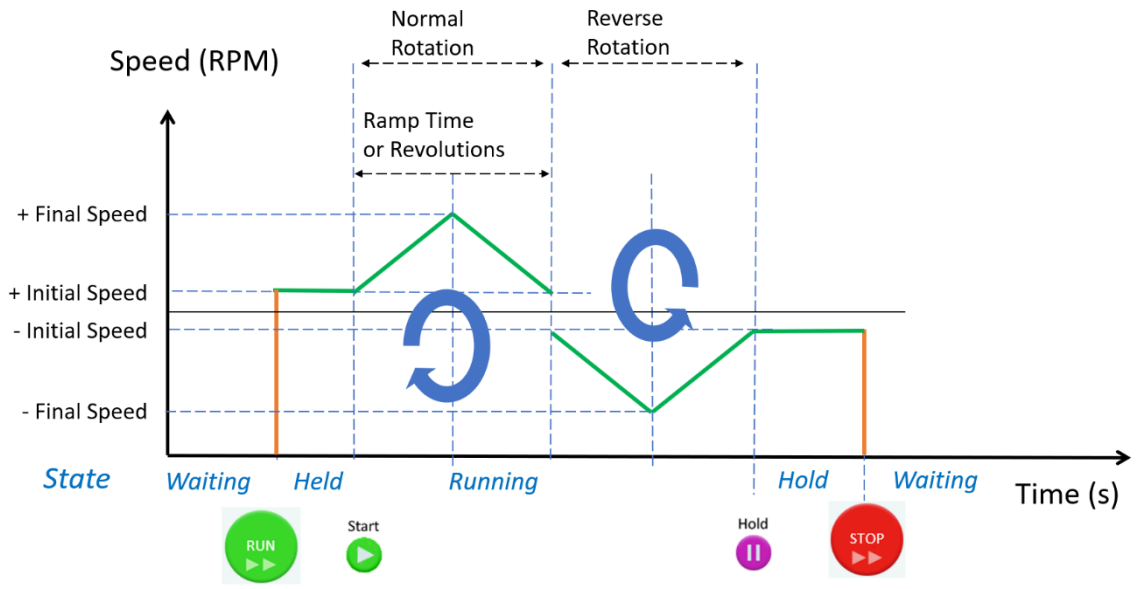
The Step mode has the same 4 operational states as the Ramp mode: **Held**, **Running**, **Hold** and **Waiting**.



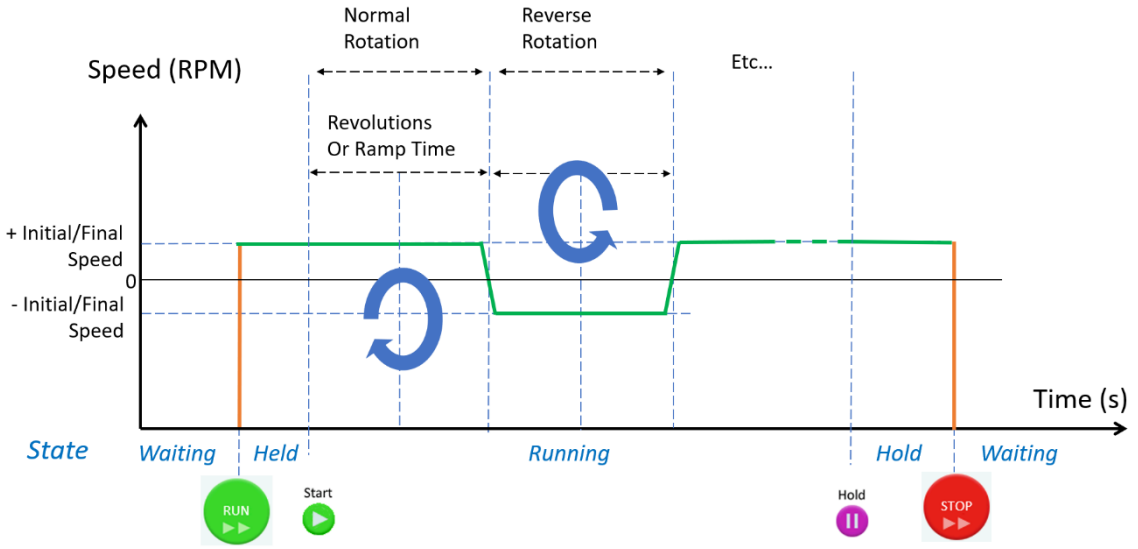
In the **Reverse Ramp Rotation** protocol, the initial speed is different than the final speed.

The **Rocking** protocol, the initial and final speeds have the same value.

Reverse Ramp Rotation protocol

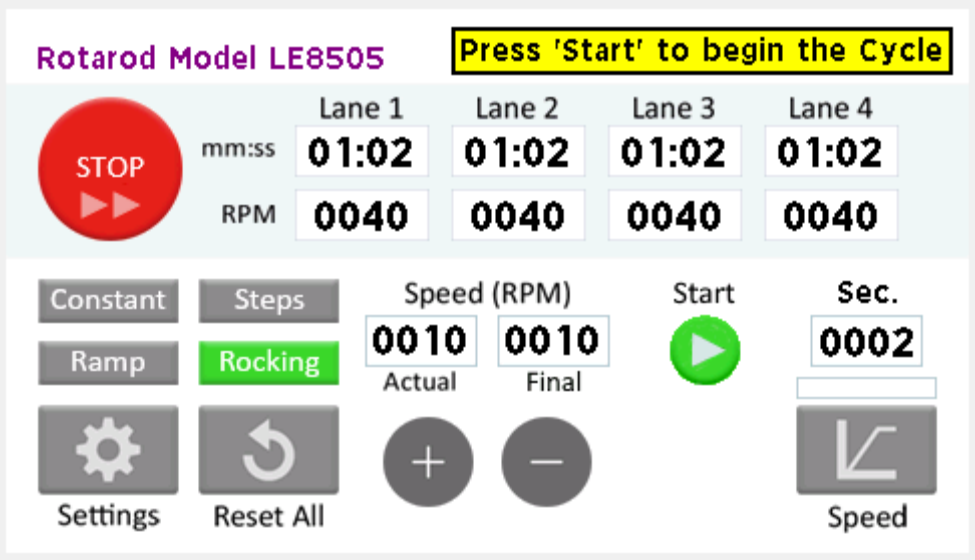


Rocking protocol



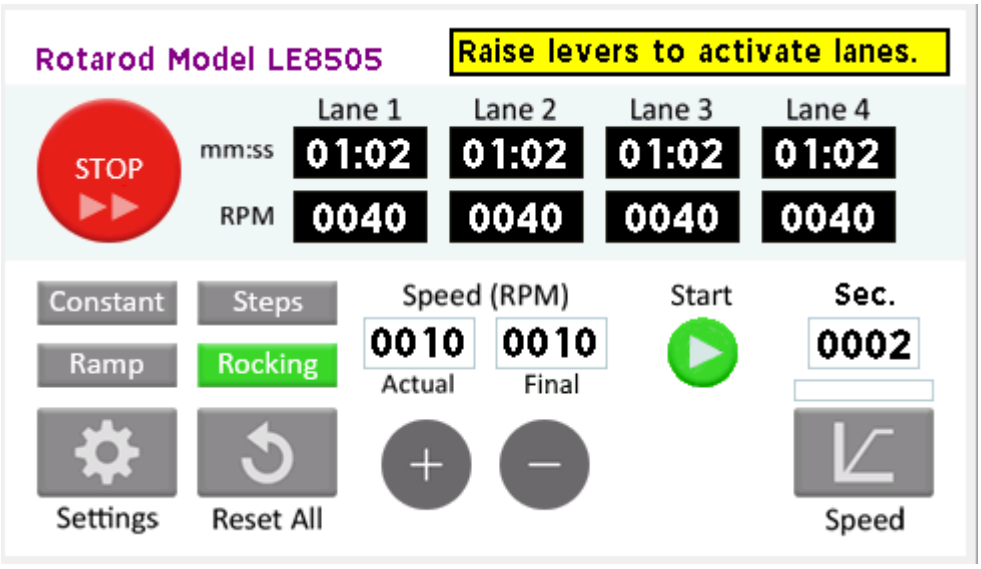
- **Waiting state** – RAMP mode protocols begin in the waiting state, with the motor and rod rotation off. When pressing the RUN button, the ROTA ROD enters the Held state.

- **Held state** – In this state, the ROTA ROD is rotating at the user-defined Initial Speed.



The speed of the rod is constantly maintained at the Initial Speed of the first Step and the message "**Press 'Start' to begin the Cycle**" is displayed, meaning that the unit is waiting for the user to press the **Start** button for initiating the user-defined speed protocol. In the meantime, the speed of the rod is maintained to 4 rpm.

In this **Held** state, the subjects are placed on the rod in their respective lane. The levers must be raised as prerequisite before beginning the experiment.

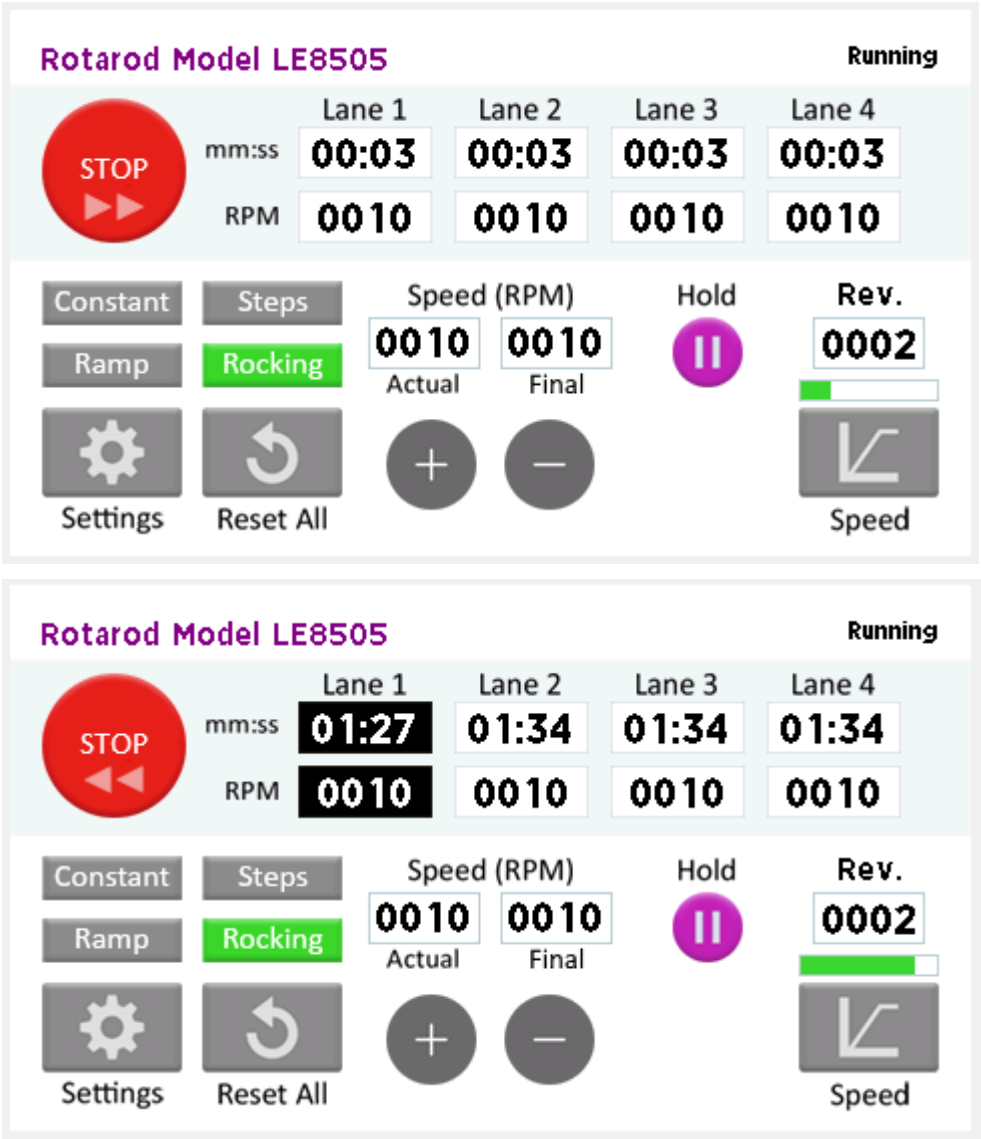


When pressing the Start Green button, the ROTA ROD switches to the Running state and the Rocking protocol is executed.

- **Running state** – In the **Running** mode, the speed of the ROTA ROD is cycled between the initial and final speed, with the direction of rotation is alternating between each cycle. To elaborate, when the running mode starts the rotation speed progressively changes from the Initial Speed to the Final Speed, then

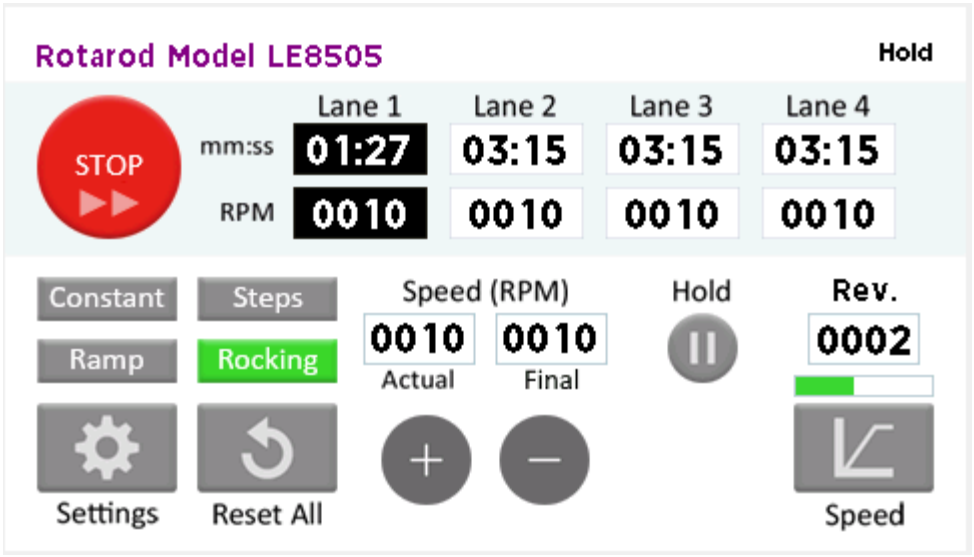
returns to the Initial Speed, which initiates a change of rotation. Now in the reverse direction, the speed changes again from the Initial Speed to the Final Speed, then comes back to the Initial Speed etc… This cycle is repeated until the **Stop** or **Hold** button is pressed.

- When starting the Running mode, all lane counters are reset.

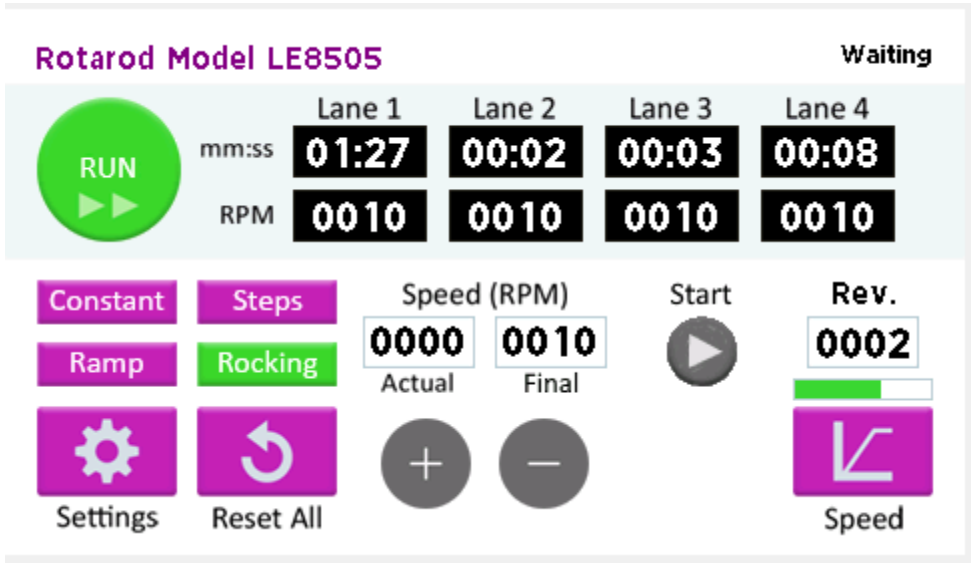


Hold

If the **Hold** button is pressed, the protocol is interrupted, and the rod will continue rotating at the current speed and rotation direction.



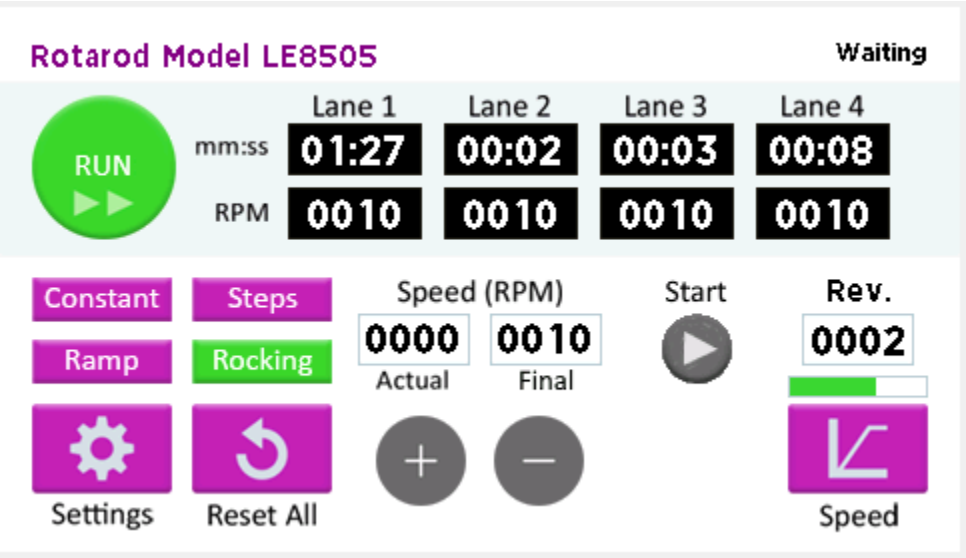
When pressing the **STOP** button, the ROTA ROD switches from the current state to the **Waiting** state and the motor stops rotating.



The ROTA ROD automatically applies the **STOP** function and goes back to the **Waiting** mode after all animals have fallen.

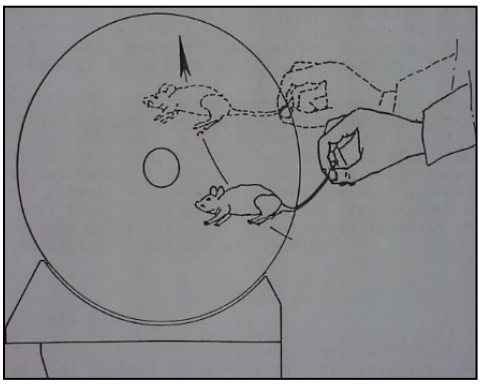
9.6.4. Data output

- When a subject drops down on the lever in the Running state, the counters (time and speed) are automatically stopped showing the last displayed values. In ROCKING mode, the speed at which each animal falls may differ in addition to the latency time.



- When the SEDACOM software is used, the fall latency and corresponding speed is recorded in the software each time a lever is activated (pressed down).

9.7. PLACING A SUBJECT ON THE ROD



- Holding the animal by its tail, gently swing it upward from a position lower than the rod, so that it lands on the rod oriented in a forward direction and begins walking.

- It is advisable to set the cylinder in motion before placing the animals on the rod. Otherwise, by the time the last animal has been seated in position, the first animal may be facing the wrong direction.

- It is also advisable to habituate the animals to the rod by allowing them to walk at the minimum speed for a few moments.

10. TRANSMISION OF DATA TO A PC (SEDACOM)

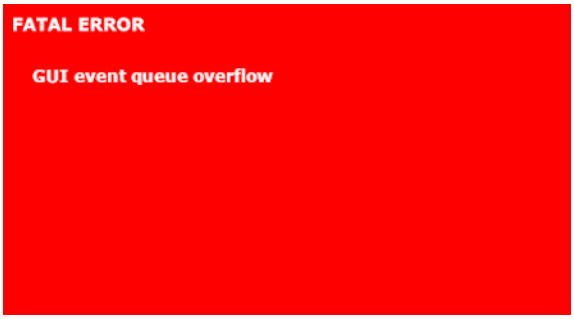
Purchase of the **SEDACOM** software option is needed for transferring the data to a computer (please contact your local provider for more information). The **SEDACOM** software reference is composed of a USB Flash key containing the software installer, license for use and **SEDACOM** User's Manual.

- Please refer to the **SEDACOM** User's Manual for instructions on how to install and use the software with the ROTA ROD.
- A USB communication cable (provided with the ROTA ROD) is needed to connect the ROTA ROD to the computer running the **SEDACOM** software. Please refer to the present User's Manual chapter 7 for instructions on how to connect this cable to the device.

10.1. FATAL ERROR

The following FATAL ERROR screen message will appear in any of these cases:

- If the ROTA ROD is connected to the computer with the USB cable while the SEDACOM program is closed.
- If the ROTA ROD is connected to the computer with the USB cable before the SEDACOM program has been configured for use with the device (i.e. ROTA ROD has not been selected from the New Device menu, or wrong communication port is selected).



11. UPGRADING FIRMWARE

Once ordered, the upgrade process is digital: the user will receive an email with the upgrade process instructions together with a link to download the upgrade files.

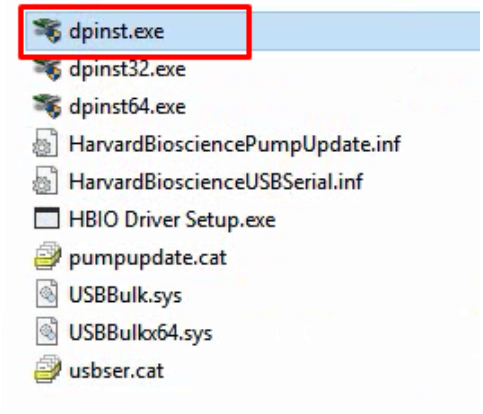
The upgrade process requires connection of the ROTA ROD control unit to a computer.

The upgrade files include:

- **Device Updater folder**: the folder contains the application used to upgrade de firmware.
- **Harvard Apparatus Drivers folder**: the folder contains the drivers for the recognition of the control unit by the computer. These drivers are already installed if using the ROTA ROD touchscreen with the **SEDACOM** software (V2.0.02 or superior).
- Update file (**App Rota Rod Release vx.srec**): this file contains all the upgrade information. The "x" will display the number of the version to upgrade.

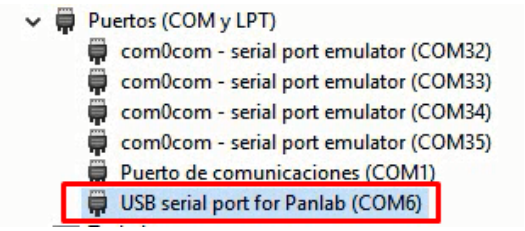
1. Upload the upgrade folders and files to the desktop of your computer.

2. If the SEDACOM software (V2.0.02 or superior) has not been installed to the computer, follow the next steps:
   a. Ensure that the control unit is not connected to the computer.
   b. Open the Harvard Apparatus Drivers folder.
   c. Execute the dpinst.exe file:

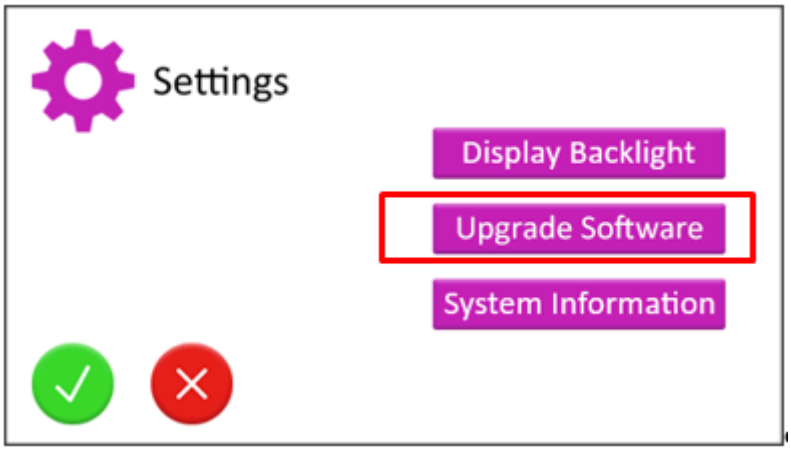


   d. Press NEXT until the end of the driver installation process.

3. Connect the control unit to PC using a USB cable, switch on the control unit and check its recognition by the computer by using the following steps:
   e. Go to Control panel/System/Device manager.
   f. In the Ports (COM and LP) section the "USB serial port for Panlab (COM6)" port should be shown:

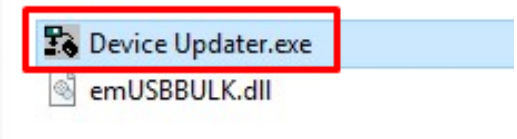


4. On the control unit, go to the ROTA ROD Settings and press the Upgrade Software button twice to enter "Boot Loader Mode".

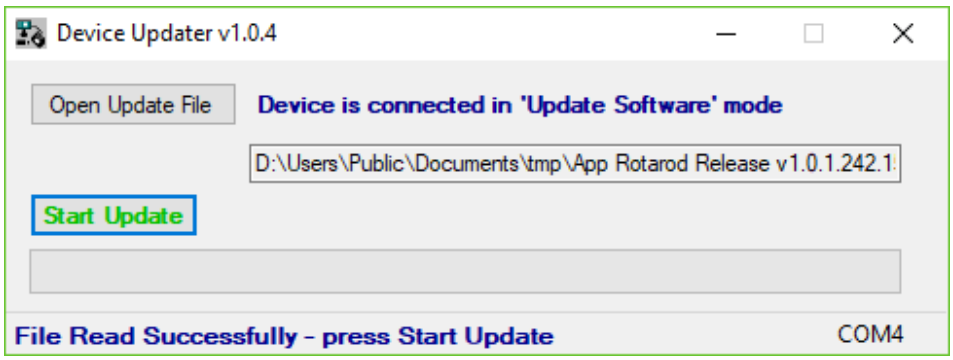


NOTE: To exit boot loader mode without upgrading the software, power cycle (restart) the control unit.

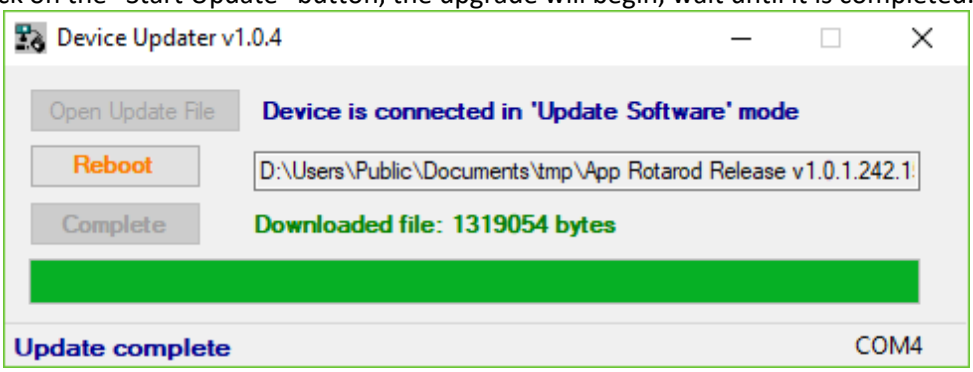
5. Open the folder and run the “Device Updater.exe” application.



6. Click on the “Open Update File” button and browse to the upgrade *.srec file previously saved on your desktop and click Open.

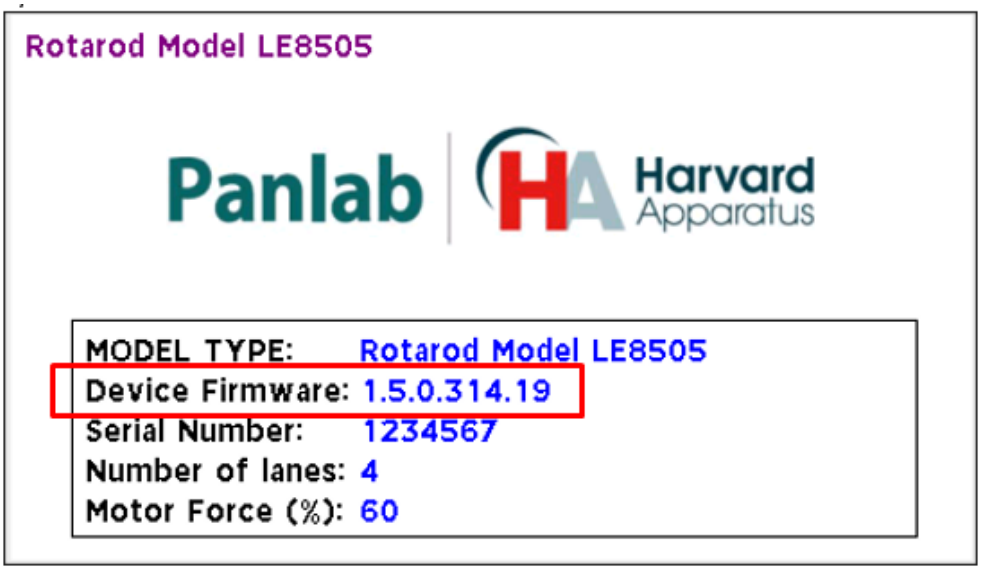


7. Click on the “Start Update” button, the upgrade will begin, wait until it is completed.



8. After the update is completed, press Reboot to power cycle (restart) the control unit.

9. Go the Control unit System Information panel and check that the “Device Firmware” number of the firmware is the same than the one shown on the upgrade file received by email.



12. TROUBLESHOOTING

This table provides instruction to solve the most frequent problems.

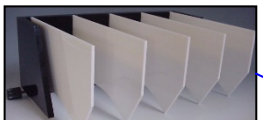
PROBLEM	SOLUTION
The display shows the message "Place all levers down."	• Check that all levers are down. • Contact technical service if problem persists.
The rod does not turn.	• Check that the rod is properly positioned with the groove aligned with the fulcrum bar. • Contact with technical service if problem persists.
In Acceleration mode when pressing the "Hold Ramp" button the display shows the message "Raise levers to activate lanes."	• Lift one or more levers and press "Hold Ramp" button again. • Check that levers are correctly placed. • Contact with technical service if problem persists.
A red coloured screen with the message **FATAL ERROR GUI event queue overflow**, appears in the display.	• Check if USB cable is connected to the computer and **SEDACOM** program is closed. • Check if USB cable is connected to the computer, but **SEDACOM** program is not correctly setup (correct port and device must be selected).

13. MAINTENANCE

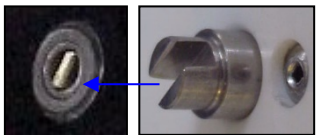
13.1. REMOVING PARTS

The ROTA ROD has 3 removable parts.

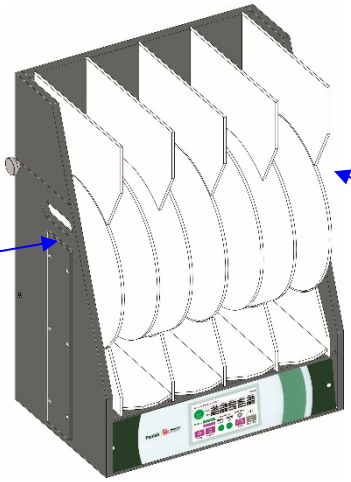
- The top hood rat extension (only used with rat configurations)
- The rotating drum (can be changed from rat to mice – or inversely) in the rat/mice combined 4 lanes ROTA ROD model
- The transparent back panel

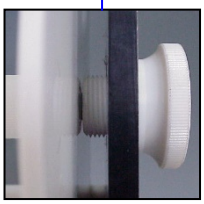


Use the screws on both top sides to remove it.

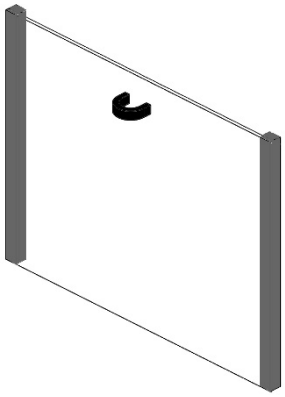


1. The cleft on the roll must fit with the one on the box.





2. Use the white screw to fix the roll. It must fit with the hole in the box.



3. The transparent back panel Is kept in place by magnets located in the 4 corners of the lid.

13.2. CLEANING THE UNIT

WARNING: NEVER USE ABRASIVE PRODUCTS, ALCOHOL OR SOLVENTS to clean the unit, as they may damage the Perspex sheets or crack the acrylic front panel of the liquid crystal display.

- The ROTA ROD needs to be cleaned for removing urine, feces and odour. To do so, we recommend using a damp cloth or paper with water or unscented soap (which has no strong odour). Then a dry cloth should be used to dry it.

- NEVER pour water or liquids on the equipment.

- Once you have finished using the equipment turn it off with the main power switch. Clean and check the equipment so that it is in optimal condition for its next use.

13.3. LEVERS FORCE ADJUSTMENT

On the back of the levers there is a screw that is used for adjusting the strength of the levers. If screwed (clockwise), the separation between the lever and the magnet that holds the lever will increase. This will decrease the attraction and the lever will be more sensitive to detection of fall. If on the contrary, it is unscrewed, the distance to the magnet that holds it will decrease, which will result in an increase of the strength of the lever and less sensitivity to detect a fall from the rod.

15. PREVENTIVE MAINTENANCE

	EXPERIMENT	4 MONTHS
LEVERS CLEANING	☑	
ROD CLEANING	☑	
PLATFORM CLEANING	☑	
TRANSPARENT BOTTOM LID CLEANING	☑	
LEVERS STRENGTH ADJUSTMENT[1]		☑

[1]If levers fall with same force adjustment is not necessary.

16. SPECIFICATIONS

POWER SUPPLY	
Input voltage:	100-240V~
Frequency:	50-60 Hz
Output voltage:	30V=
Max. output current:	1,666A
Polarity:	
ENVIRONMENTAL CONDITIONS	
Operating temperature:	10°C to +40°C
Operating relative humidity:	0% to 85% RH, non-condensing
Storage temperature:	0°C to +50°C, non-condensing
COMUNICATIONS OUTPUT	
Standard Interface:	USB
Connector:	USB-B type
SPEED	
Range	2 to 90 RPM, 1RPM increment
TIME SETTINGS	2 to 5999 sec., 1 sec. increment
SPEED MODES	
Constant	Constant speed
Acceleration	Constant acceleration
Steps	Custom Speed Protocol
Rocking	Reverse Ramp Rotation and Rocking

DIMENTIONS/WEIGHT

Model	**Total size** (mm)	**Fall height** (mm)	**Lane Width** (mm)	**Drum ∅** (mm)	**Rod ∅** (mm)	**Hood Height** (mm)	**Weight** (Kg)
LE8205 - mice	390 x 250 x 400	200	50	250	30	NA	10
LE8305 – rat, with hood	390 x 250 x 505	215	75	250	60	130	12.5
LE8505 – mice	390 x 250 x 400	200	50	250	30	NA	10
LE8505 – rat, with hood	390 x 250 x 505	215	75	250	60	130	12.5
LE8355 - rat, with hood	390 x 250 x 754	470	153	250	80	130	13.8

Panlab
a division of Harvard Bioscience, Inc.

DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITÉ

Nombre del fabricante:	**Panlab s.l.u.**
Manufacturer's name:	www.panlab.com
Nom du fabricant:	info@panlab.com
Dirección del fabricante:	Energía, 112
Manufacturer's address:	08940 Cornellà de Llobregat
Adresse du fabricant:	Barcelona SPAIN
Declara bajo su responsabilidad que el producto: Declares under his responsibility that the product: Déclare sous sa responsabilité que le produit:	**ROTAROD**
Marca / Brand / Marque:	**PANLAB**
Modelo / Model / Modèle:	**LE8205 (76-0770), (LE8305) 76-0771, LE8505 (76-0772)**

Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes:
Fulfils the essential requirements established by The European Union in the following directives:
Remplit les exigences essentielles établies pour l'Union Européenne selon les directives suivantes:

2006/95/EC	Directiva de baja tensión / Low Voltage / Basse tensión
2004/108/EC	Directiva EMC / EMC Directive / Directive CEM
2012/19/EU	La Directiva de Residuos de Aparatos Eléctricos y Electrónicos (WEEE) / The Waste Electrical and Electronic Equipment Directive (WEEE) / Les déchets d'équipements électriques et électroniques (WEEE)
2011/65/EU	Restricción de ciertas Sustancias Peligrosas en aparatos eléctricos y electrónicos (ROHS) / Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (ROHS) / Restriction de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (ROHS)
2006/42/EC	Directiva mecánica / Machinery directive / Directive mécanique

Para su evaluación se han aplicado las normas armonizadas siguientes:
For its evaluation, the following harmonized standards were applied:
Pour son évaluation, nous avons appliqué les normes harmonisées suivantes:

Seguridad / Safety / Sécurité:	**EN61010-1:2010 Ed.3**
EMC:	**EN61326-1:2012 Class B**
FCC:	**FCC47CFR 15B Class A[1]**
Safety of machinery:	**EN ISO 12100:2010**

[1]This equipment complies with the limits for class B equipment in accordance with CISPR 11 definition and is classed as a Class A digital device, pursuant to CFR Title 47 part 15 of the FCC Rules and is intended to be used in an industrial environment.

En consecuencia, este producto puede incorporar el marcado CE:
Consequently, this product can incorporate the CE marking:
En conséquence, ce produit peut incorporer le marquage CE:

CE

En representación del fabricante:
Manufacturer's representative:
En représentation du fabricant:

Carme Canalís
General Manager
Panlab s.l.u., a division of Harvard BioScience

Cornellà de Llobregat, Spain
20/02/2015

GB Note on environmental protection:

After the implementation of the European Directive 2002/96/EU in the national legal system, the following applies:
Electrical and electronic devices may not be disposed of with domestic waste.Consumers are obliged by law to return electrical and electronic devices at the end of their service lives to the public collecting points set up for this purpose or point of sale. Details to this are defined by the national law of the respective country. This symbol on the product, the instruction manual or the package indicates that a product is subject to these regulations. By recycling, reusing the materials or other forms of utilising old devices, you are making an important contribution to protecting our environment.

E Nota sobre la protección medioambiental:

Después de la puesta en marcha de la directiva Europea 2002/96/EU en el sistema legislativo nacional, Se aplicara lo siguiente:
Los aparatos eléctricos y electrónicos, así como pilas y baterías, no se deben tirar a la basura doméstica. El usuario está legalmente obligado a llevar los aparatos eléctricos y electrónicos, así como pilas y baterías, al final de su vida útil a los puntos de recogida municipales o devolverlos al lugar donde los adquirió. Los detalles quedaran definidos por la ley de cada país. El símbolo en el producto, en las instrucciones de uso o en el embalaje hace referencia a ello. Gracias al reciclaje, a la reutilización de materiales i a otras formas de reciclaje de aparatos usados, usted contribuirá de forma importante a la protección de nuestro medio ambiente.

F Remarques concernant la protection de l'environnement :

Conformément à la directive européenne 2002/96/CE, et afin d'atteindre un certain nombre d'objectifs en matière de protection de l'environnement, les règles suivantes doivent être appliquées.
Elles concernent les déchets d'équipement électriques et électroniques. Le pictogramme "picto" présent sur le produit, son manuel d'utilisation ou son emballage indique que le produit est soumis à cette réglementation. Le consommateur doit retourner le produit usager aux points de collecte prévus à cet effet. Il peut aussi le remettre à un revendeur.En permettant enfin le recyclage des produits, le consommateur contribuera à la protection de notre environnement. C'est un acte écologique.

D Hinweis zum Umweltschutz:

Ab dem Zeitpunkt der Umsetzung der europäischen Richtlinie 2002/96/EU in nationales Recht gilt folgendes:
Elektrische und elektronische Geräte dürfen nicht mit dem Hausmüll entsorgt werden. Der Verbraucher ist gesetzlich verpflichtet, elektrische und elektronische Geräte am Ende ihrer Lebensdauer an den dafür eingerichteten, öffentlichen Sammelstellen oder an die Verkaufstelle zurückzugeben. Einzelheiten dazu regelt das jeweilige Landesrecht. Das Symbol auf dem Produkt, der Gebrauchsanleitung oder der Verpackung weist auf diese Bestimmungen hin. Mit der Wiederverwertung, der stofflichen Verwertung oder anderer Formen der Verwertung von Altgeräten leisten Sie einen wichtigen Beitrag zum Schutz unserer Umwelt.

I Informazioni per protezione ambientale:

Dopo l'implementazione della Direttiva Europea 2002/96/EU nel sistema legale nazionale, ci sono le seguenti applicazioni:
I dispositivi elettrici ed elettronici non devono essere considerati rifiuti domestici. I consumatori sono obbligati dalla legge a restituire I dispositivi elettrici ed elettronici alla fine della loro vita utile ai punti di raccolta collerici preposti per questo scopo o nei punti vendita. Dettagli di quanto riportato sono definiti dalle leggi nazionali di ogni stato. Questo simbolo sul prodotto, sul manuale d'istruzioni o sull'imballo indicano che questo prodotto è soggetto a queste regole. Dal riciclo, e re-utilizzo del material o altre forme di utilizzo di dispositivi obsoleti, voi renderete un importante contributo alla protezione dell'ambiente.

P Nota em Protecção Ambiental:

Após a implementação da directiva comunitária 2002/96/EU no sistema legal nacional, o seguinte aplica-se:
Todos os aparelhos eléctricos e electrónicos não podem ser despejados juntamente com o lixo doméstico Consumidores estão obrigados por lei a colocar os aparelhos eléctricos e electrónicos sem uso em locais públicos especficos para este efeito ou no ponto de venda. Os detalhes para este processo são definidos por lei pelos respectivos países. Este símbolo no produto, o manual de instruções ou a embalagem indicam que o produto está sujeito a estes regulamentos. Reciclando, reutilizando os materiais dos seus velhos aparelhos, esta a fazer uma enorme contribuição para a protecção do ambiente.

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