

LabRobot

Dilugent® Shaker

User's manual

Version: DSM_2512.6

Software: 1.3.X

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Welcome to the comprehensive guide for the **Dilugent® Shaker**. This innovative instrument, together with **Dilucup® Elegance**, serves as a modern replacement for traditional dilution tubes and vortex mixers, optimizing the serial dilution process.

Key features:

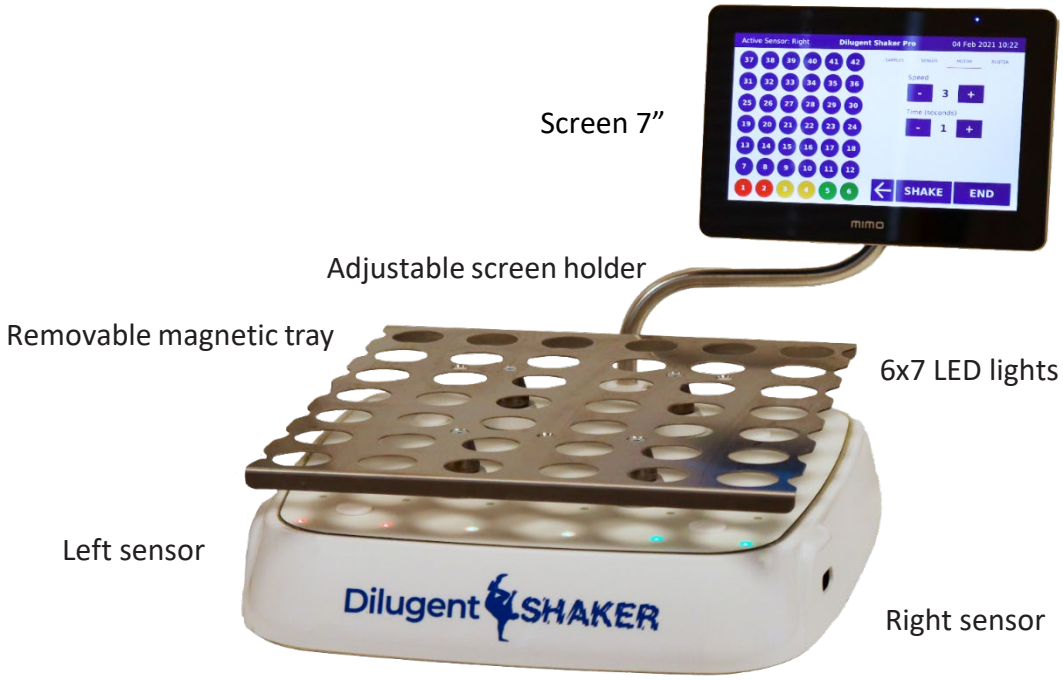
- **Easy-to-use**: designed to be user-friendly and comfortable.
- **Traceability of dilutions:** useful for faster error detection.
- **Ergonomic:** equipped with two side sensors for contactless activation, significantly enhancing user ergonomics and reducing physical strain during operation.
- **LED guidance system**: with 42 LED lights, the Dilugent® Shaker provides clear visual guidance through the dilution process, indicating which cup to be processed.

This manual will provide you with detailed instructions on how to maximize the potential of your Dilugent® Shaker, ensuring that your laboratory operations are both effective and efficient.

Designed and manufactured by **LabRobot Products AB** in **Sweden**.

You can download the latest version of this manual on the website:
https://labrobot.com/dilugent-shaker/

PARTS OF DILUGENT® SHAKER

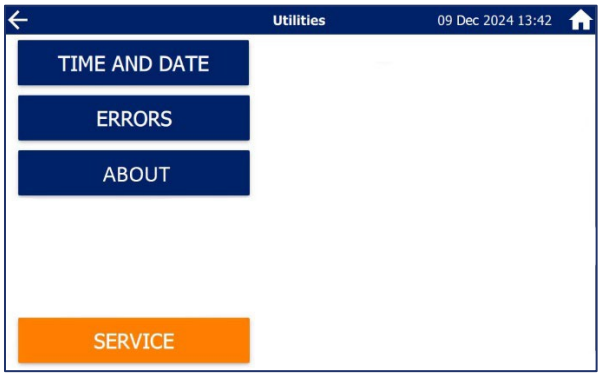


VERSIONS OF DILUGENT® SHAKER

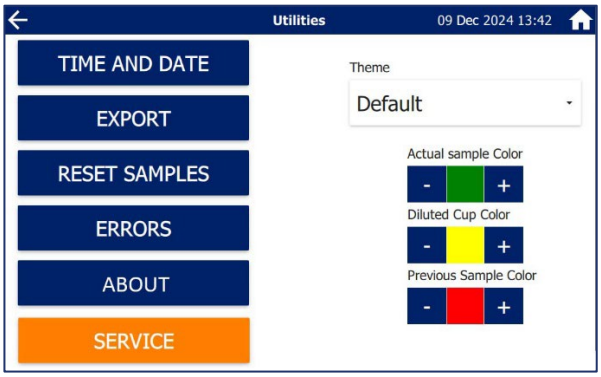
Features	Dilugent® Shaker *Light*	Dilugent® Shaker	Dilugent® Shaker *Pro*
Possible steering with foot switch	•	•	•
Selectable working direction *(from left or right)*	•	•	•
Up to 2 templates can be stored	•		
Up to 10 templates can be stored		•	•
Visual “service required” information	•	•	•
Service menu	•	•	•
Error codes	•	•	•
Bar and QR reading with external scanner		•	•
Visual information of active sensor		•	•
Sample identification		•	•
User identification		•	•
Dilucup® batch identification		•	•
Export of information to USB memory		•	•
Traceability of dilutions		•	•
Advanced programming			•
Step ahead without shaking for doing replicates			•
Customizable interface colours			•
Customizable led colours			•
Full connectivity *(Lims interface not included)*			•
Article number	40DGT84LT	40DGT84SD	40DGT84PO

Example of differences shown on the display:

Light



Pro



INSTALLATION

- **Connect the scanner before** starting the instrument - *otherwise it will not work.*
- Place the Dilucup® blister on the tray making sure that it is well placed.
- The **horizontal position** of Dilugent® Shaker can be adjusted with the **four feet** located underneath the device.
- The position of the screen can be adjusted by moving its support.
- The **brightness of the screen** can be adjusted by two buttons (+ / -) located at the back of the screen.



Power button
| = on
o = off

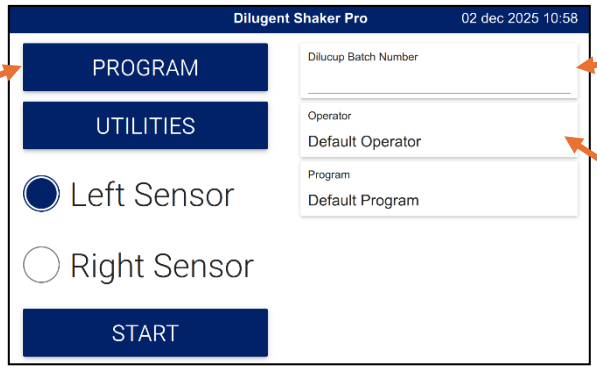
HDMI port for external screen

Screen/ scanner ports

USB ports for export of data

RJ45 port for connection to a computer

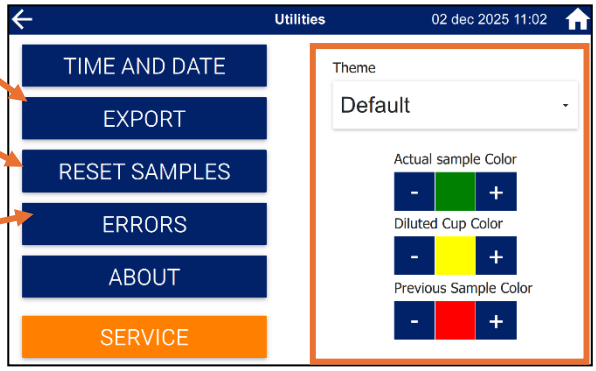
INSTRUCTIONS FOR PROGRAMMING



Create, select, edit and delete a program

Write the batch number or scan the QR code on the Dilucup® blister

Create, select, edit and delete an operator ID



Export the data to USB memory

Reset saved data

If an error occurs, it will be displayed here

Change the colours of the display and the LED lights. *Only on Pro version*

Every Dilucup® blister has a unique QR code that provides relevant information about its production time which may be useful for identification.

INSTRUCTIONS FOR USE

1. Remove the protective film from the first row of Dilucups.
2. Pipet 1 mL of the sample into the flashing green cup and shake it by using the active sensor or the footswitch. *The cup will turn orange.*
3. Pipet 1 mL from that orange cup into the following green cup and shake.
4. Repeat the same process until the number of required dilutions is completed.
5. Once the dilution sample is completed, plate 1 mL from the orange cups.
6. Start with a new dilution series in the flashing green cup. *The orange cups will turn red.*

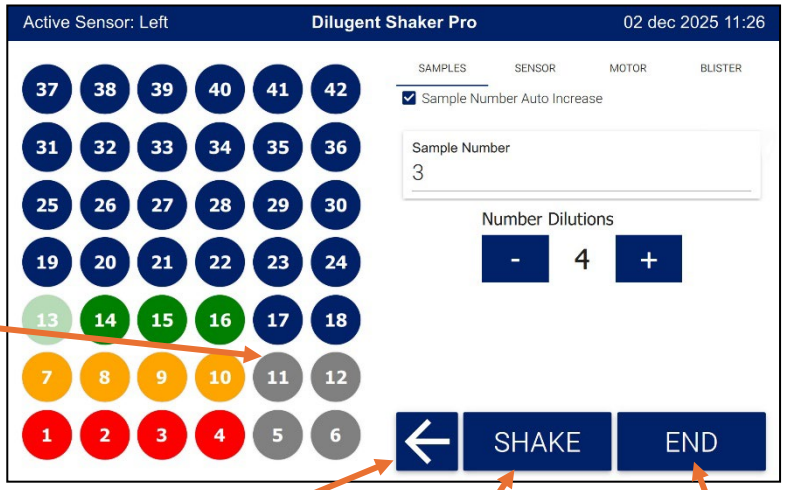
LED lights colours will change to guide the user.

Colour meaning in the default program:

- **Flashing green:** first cup to be used in the dilution series
- **Green**: cup to be used in this series.
- **Orange**: cup already used in the current dilution series. The content can be used for further dilution, collecting or plating.
- **Red**: cup already used in the previous dilution series.
- **Grey**: deactivated cups.



The sensor, sample number, motor speed and the shaking time can be changed between samples



Click on the Dilucups on the screen to deactivate them. They will turn grey on the screen, and the light will turn off on the matrix. Deactivated cups will be ignored.

Undo a step within a sample

Shake without affecting the LED lights

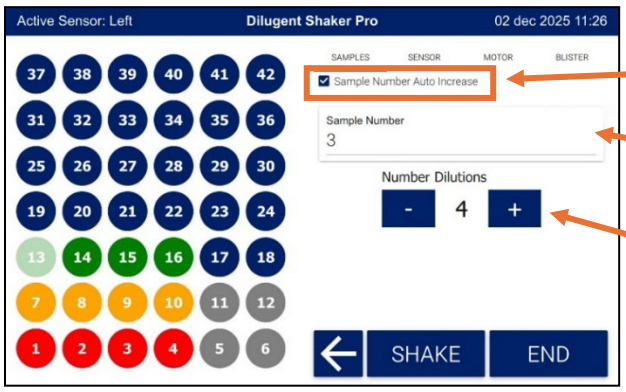
End the program and return to the main menu. *NOTE! The program will restart from the beginning.*

SAMPLES

"Sample Number" is the identification of the sample. Scan the coded label of the sample you are going to use or use the default option where each sample has a different number starting from 1.

If after finishing a sample you try to shake again without changing the name, a warning message will appear saying "Are you sure you want to dilute this sample again?"

- Press "YES" to continue diluting.
- Press "CANCEL" for going back.
- Scan another coded label for changing directly the name of the sample.

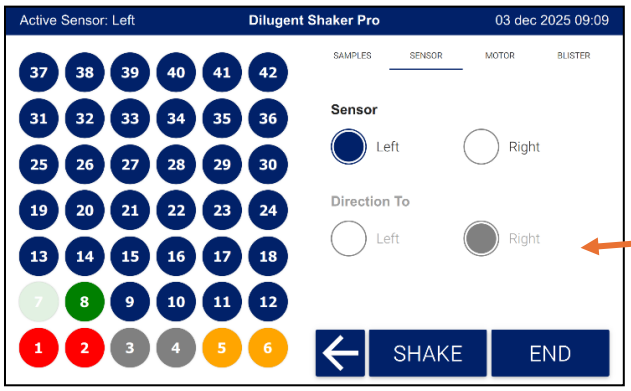


Click here to increase the sample number automatically

Click and scan the sample label

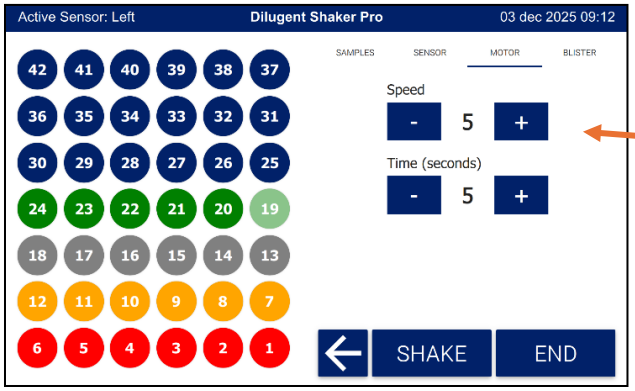
Adjust the number of dilutions (if needed) before performing the 1st dilution of each series

SENSOR



Note: The workflow direction cannot be changed once the dilution series has started

MOTOR



Motor speed	RPM (± 5 %)
1	410 rpm
2	460 rpm
3	510 rpm
4	560 rpm
5	610 rpm
6	660 rpm

Shaking time: 1 - 60s

BLISTER

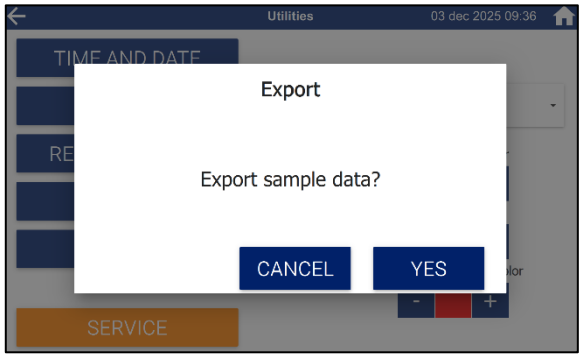


Under “Blister” you can choose whether you want to work with blisters of 3 or 6 cups per row.

If your blisters are 3x7 in size, you can choose which side you prefer to work on: the 3 columns on the left or the 3 on the right.

EXPORT OF DATA *(Not available in Light version)*

1. Insert an USB stick into one of the ports on the back side of Dilugent® Shaker.
2. In the main menu go to “Utilities” and then press “Export”.
3. An Excel® file called “dilugent_data” will be transferred to the USB stick.



Go to “Utilities” and then “Reset Samples” to delete data.
If you export the Excel file again, it will be empty.

Example of data obtained in the Excel® file named “dilugent_data”:

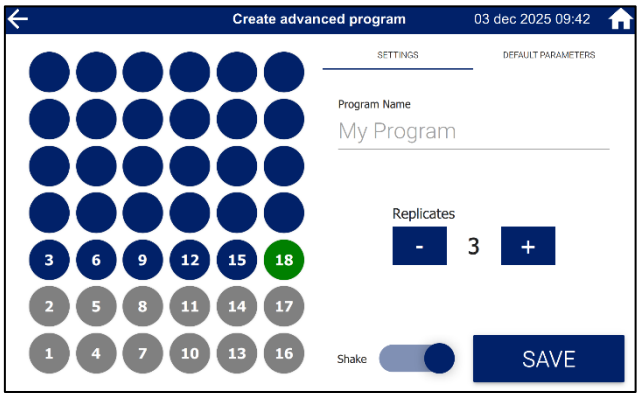
	A	B	C	D	E	F	G	H
1	**id**	**rpm**	**duration**	**dilutions**	**sample_id**	**dilucup_batch_number**	**operator**	**timestamp**
2	1	4	3	3	1	NACL: 1944 EXP 24-JUL-2024 12:37:48	Default Operator	2022-02-23 12:18:20
3	2	4	3	3	2	NACL: 1944 EXP 24-JUL-2024 12:37:48	Default Operator	2022-02-23 12:21:46

id	Identification of the dilution
rpm	1 – 6
duration	Shaking time (1 – 60 s)
dilutions	Number of dilutions of the sample (1 – 12)
sample_id	Identification of the sample
dilucup_batch_number	Information about Dilucup® batch
operator	Identification of the operator
time stamp	Time when the sample was processed

ADVANCED PROGRAMMING *(only for Pro version)*

Advanced programming is useful for working with cups located in different positions than the default or for doing replicates or parallel working.

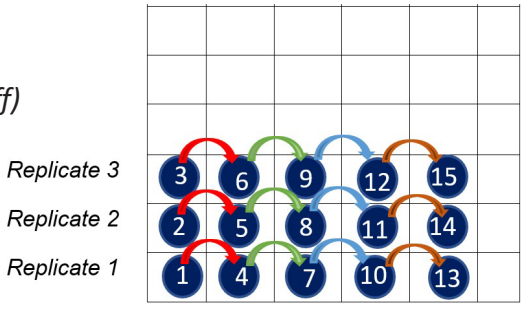
1. Select “Program”, “New program” and then “Advanced”.
2. Write the program name and choose the “time”, “number of dilutions” and “speed of the shaking” in “Default Parameters”.
3. Make sure that the bottom “Shake” is off.
4. Choose the cups that you want to use without shaking and then press “Shake” to shake.
5. Choose the next cup and press “Shake” for turning it off.
6. Repeat steps 3 to 5 as many times as you need.
7. Press “Save” for saving the program.



Example for programming replicates:

If you want to make 3 replicates of 5 dilutions each, you can program the following:

1. Make sure “Shake” is off
2. Press cups 1, 2, 3 and “Shake” *(the shaking will start after cup 3)*
3. Press cup 4 and “Shake” *(the shaking will be off)*
4. Press cups 5, 6 and “Shake” *(it will be on)*
5. Press cup 7 and “Shake” *(it will be off)*
6. Press cups 8, 9 and “Shake” *(it will be on)*
7. Press cup 10 and “Shake” *(it will be off)*
8. Press cups 11, 12 and “Shake” *(it will be on)*
9. Press cup 13 and “Shake” *(it will be off)*
10. Press cups 14, 15 and “Shake” *(it will be on)*



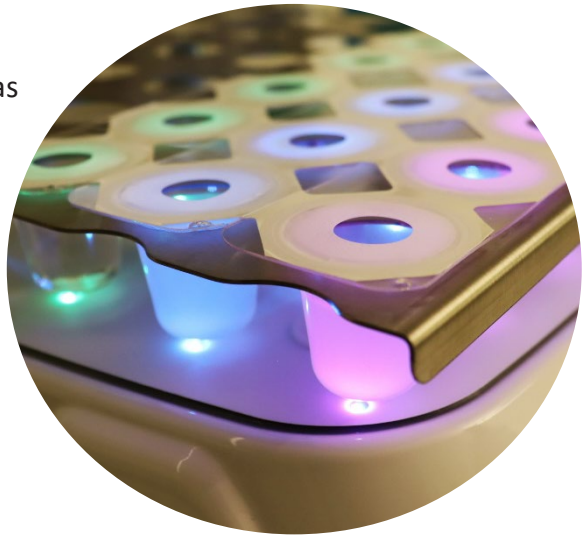
When using the sensor in this program, it will not shake between cups 1 to 3; 4 to 6; 7 to 9; 10 to 12 and 13 to 15, but it will shake between cups 3 and 4; 6 and 7; 9 and 10 and between 12 and 13. The idea is to pipet 1 mL first to cups 1, 2 and 3, to shake the samples for mixing, and then to pipet from 1-3 to 4-6, etc.

CUSTOMIZABLE LED LIGHTS COLOURS AND THEME

(only for Pro version)

Dilugent® Shaker *Pro* has the possibility to personalize the colours of the LED lights as well as the theme of the program. For that, go to "Utilities" and choose the different options.

There are seven different LED light colours; red, dark blue, dark green, orange, white, purple and light blue; and four different themes for the display; "Default", "Dark", "Teal" and "Dark Teal".



Changing the LED light colours is especially beneficial for colorblind users

MAINTENANCE AND CLEANING

- Dilugent® Shaker **can remain in a laminar flow cabinet** *(with the power off)* even when the **ultraviolet light is** turned **on**.
- The **metal tray** is fastened with magnets and can be **removed by lifting one of the corners.**
- It is recommended **not** to apply alcoholic solutions directly onto the instrument. You may disinfect moderately with a paper towel dipped in an alcoholic solution.
- Avoid using Dilugent® Shaker when wearing clothes with reflective elements as these may interfere with optical sensors.

TECHNICAL INFORMATION

Power supply	AC input: 100-240 V, 50/60 Hz DC output: 12 V – 5 A, 60W max
Size of the tray (l x w x h)	30 x 26 x 2,2 cm
Size of the base (l x w x h)	38 x 30,5 x 5,5 cm
Size of the screen (h x w x d)	12,7 x 18,4 x 1,1 cm / (7")
Weight	5,1 kg

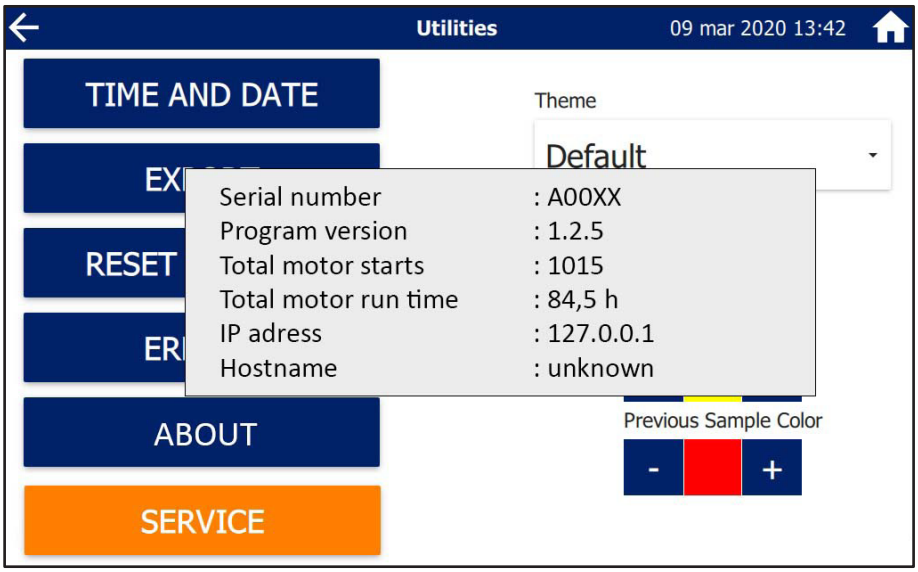
SERVICE INTERVAL AND WARRANTY

Dilugent® Shaker has a 2-year warranty from the purchase date.

If “SERVICE REQUIRED” appears in the main menu contact the technical service.

LabRobot recommends that Dilugent® Shaker is always **serviced after 75,000 starts or 100 hours** operating time **after the 2-year warranty** period to ensure trouble-free use of the instrument.

You can find this information in “About” under “Utilities”.



CONTACT INFORMATION

Contact us if you have any further questions. We will be happy to answer.

Visit our website for updated information. You can also download the latest version of this manual at: https://labrobot.com/dilugent-shaker/

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Follow us on LinkedIn and learn more about the Dilucup® System!

DECLARATION OF CONFORMITY

CE

LabRobot Products AB
Munkerödsvägen 4
SE-444 32 Stenungsund

Declares responsibility that the product, Dilugent® Shaker to which this declaration relates, is in conformity with the following European product standard and directives:

EMC, Electromagnetic compatibility

SS-EN 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

RoHS

Directive 2011/65/EU	Restriction of the use of certain hazardous substances

By conformance with the above referenced standard and directive, this product follows the provisions of the directive below:

2014/30/EU Electromagnetic compatibility directive

Date of issue: 2020-03-11, Stenungsund, Sweden



_____
CEO, Hervé Laisis



_____
Technical Manager, Nicklas Larsson

Updated: 2025-01-02
Approved by: Berit Bergström/2025-01-02