

ecodyst

HYDROGEN MODERN ROTARY EVAPORATOR



OPERATING MANUAL

ECODYST HYDROGEN SUMMARY DESCRIPTION

Rotary evaporators (rotovaps) are ubiquitous devices in chemistry labs and industries performing chemistry, including labs in the chemical, pharmaceutical, environmental, materials, life science, and cannabis industries. A rotovap consists of a heating fluid bath, rotating motor, evaporating flask, condenser, collection flask, and vacuum source. Traditional rotovap condensers require external sources of cooling materials such as dry ice, liquid nitrogen, water or glycol. Glycol requires additional recirculating chiller equipment, which are often bulky, heavy, and inefficient. The traditional rotovap for decades have also been characterized with inefficient vapor condensing, operational cost, unreliability, high energy consumption and material waste.

Using a proprietary and innovative self-cooling technology, Ecodyst has revolutionized the rotovap to be more efficient, to have a smaller footprint, to have greater output, and to be less costly to operate as compared with traditional methods. This disruptive technology has set new standards worldwide for rotary evaporators.

Hydrogen is a powerful, small footprint and intelligent self-cooling rotovap invented for scientists by scientists. Additionally, this modern all-in-one rotovap has superior advantages, has a large cooling survey area condenser and extremely fast rates of evaporation. The hydrogen is a plug-and-play rotovap that allows scientists to focus on more complex tasks.

The only action required is flip the switch.

Superior advantages of the Modern Rotovap

1. Smart self-cooling condenser
2. Fast rates of evaporation
3. Small footprint
4. Always-available condenser
5. No dry ice or external chiller
6. No associated operational cost
7. High levels of productivity
8. Preserves water, no water bills
9. Environmentally friendly
10. Pays for itself within 3 to 5 year



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ABOUT THIS MANUAL

This operating manual provides the technical and operational details for the Hydrogen.

- Please read this manual carefully and obey all safety and warning notices.
- Ensure that every operator reads this manual.
- Ensure that this manual is accessible for every operator.
- Pass on the operating manual to the subsequent owner.
- In addition, please observe the regional regulations



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SAFETY INSTRUCTIONS

General Safety Instructions

The device has been constructed according to state-of-the-art technology and recognized safety regulations. However, risks may still arise during installation, operation and maintenance.

Please ensure the operating manual is available at all times.

The device may only be used under the following circumstances

- Only operate the device, if it is in full working order.
- Ensure all operators of the device possess the necessary safety and risk awareness.
- Operate the device according to the instructions stipulated in this manual only.
- If there is something you do not understand, or certain information is missing, ask your manager or contact the manufacturer.
- Do not do anything on the device without authorization.
- Only use the device according to its intended use.

Intended use

- The device is intended for use by trained and authorized personnel only. The device is suitable for the following
- Economical cooling as alternative to tap water systems use.
- Research application.

Improper use

Any use which deviates from the device's intended use is considered to be improper. The manufacturer does not accept liability for any damages resulting from non-permitted uses. The risk is carried by the operator alone.



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Installation / Electrical Safety

- The device may only be connected when the mains voltage corresponds to the information on the type plate of the unit.
- The mains connection must be accessible at all times.
- Repairs may only be performed by a qualified electrician.
- Never operate the unit with a damaged power cord.
- Always turn the unit OFF and disconnect mains power before performing any maintenance or service.

Personnel Qualification

- The device may only be operated by qualified persons.
- The device may only be operated by individuals who have been instructed in its proper use by qualified persons.
- The device may only be operated and maintained by persons who are of legal age.
- Other personnel may only work with the unit under continuous supervision of an experienced qualified operator.
- This manual must be read and understood by all persons working with the device.
- The personnel must have received special safety instructions in order to guarantee responsible and safe work procedures.

Operating Company's Obligations

A. Installation Site

- The device must be positioned in a suitable location.
- The device must be installed sufficiently stable on a strong and level surface.
- All screw connections must be securely tightened.
- The device should be located as close as possible to the process requiring cooling.

- The device should not be installed closer than 1.4 meters (4 feet) to a heat-generating source, such as heating pipes, boilers, etc.
- If possible, the device should be located near a suitable drain to prevent flooding in the event of leaks.
- Do not place the device where corrosive fumes, excessive moisture, excessive dust, or high room temperatures are present.
- The site must have an 80% relative humidity and temperature between 5 - 35 °C
- Adequate clearance should be allowed on the front, sides, top, and rear of the device for access to connections and components.
- The front and side vents of the device must be a minimum of 21 cm (8 inches) away from walls or vertical surfaces, so air flow is not restricted.

B. Changes to the Unit

- No unauthorized changes may be made to the unit.
- No parts may be used which have not been approved by the manufacturer.
- Unauthorized changes result in the EC Declaration of Conformity losing its validity, and the appliance may no longer be operated.
- The manufacturer is not liable for any damage, danger or injuries that result from unauthorized changes or from operating the unit other than described in this manual.

C. Safety for the Personnel

Ensure that only qualified personnel operate the device. Observe the following regulations:

- Laboratory guidelines
- Accident prevention regulation
- Ordinance on Hazardous Substances
- Other generally accepted rules of safety engineering and occupational health
- Local regulations



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Safety During Use

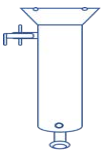







- Wear the appropriate protective clothing when working on the device (clothing, protective glasses and if necessary, safety gloves).
- Do not use the device in potentially explosive areas. The device is not protected against explosion. There is no explosion or ATEX protection available.
- Do not operate or assemble devices in the vicinity which are emission or radiation sources (electromagnetic waves) for the frequency range (3×10^{11} Hz to 3×10^{15} Hz).
- Avoid putting pressure on the display when you do not operate the device. • Eliminate errors immediately.
- Do not use abrasive material to clean the glass surfaces. Only wipe with damp cloths.
- Always switch the device off after use.

Disposal

- Check the device components for hazardous substances and solvents.
- Clean all components before disposal.
- Dispose of the device according to the valid national legal regulations.
- Dispose of the packaging material in accordance with the valid national legal regulations. • Have refrigerant emptied before disposal

ACCESSORIES AND SPARE PARTS

Scope of Delivery

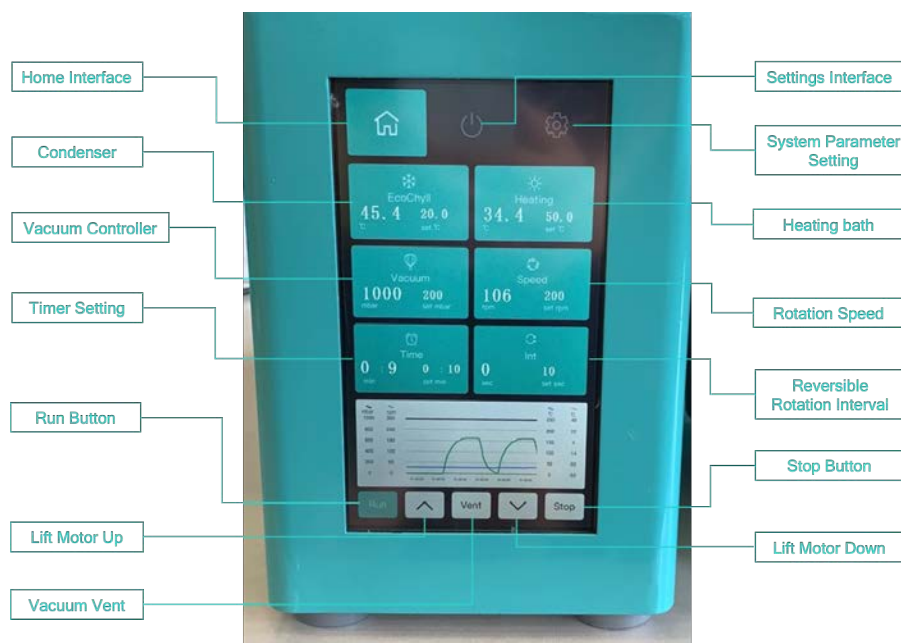
Qty	Part No	Picture	Description
1	ECO-333-1H		hydrogen rotary evaporator, 115V or 230V
1	ECO-777-091		100mm O-ring groove flange condenser glass body with inlet hose connection and vacuum port
1	ECO-777-155		Rotovap adapter to connect rotovap rotary head to condenser
1	ECO-777-166		100mm Quick release clamp to clamp condenser glass body
1	ECO-777-164		100mm Silicone O-ring inserts into condenser glass body groove
1	ECO-777-007		Vapor tubing to connects rotovap adapter to condenser
1	ECO-777-260		1000ml Round bottom evaporator flask, US 24/40 outer joint or Europe 29/32 outer joint
1	ECO-777-268		1000ml Receiving flask, 35/25 ball joint
1	ECO-777-028		#35 Pinch clamp for receiving flask

DEVICE DESCRIPTION AND FUNCTIONS

Device Overview



Controller Overview



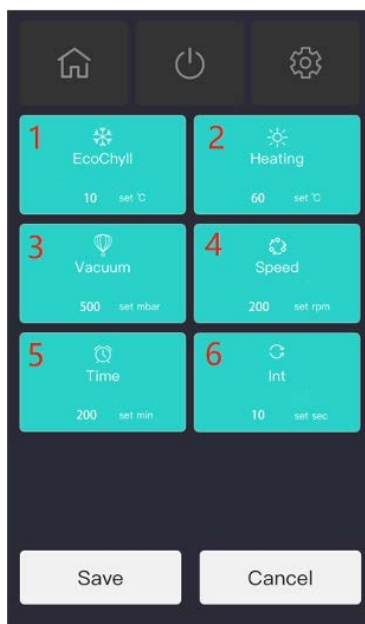
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Multifunctional touchscreen



Touchscreen functions:

1. EcoChyll condenser
2. Heating bath
3. Vacuum controller
4. Rotation speed
5. Lift
6. Timer
7. Reversible speed

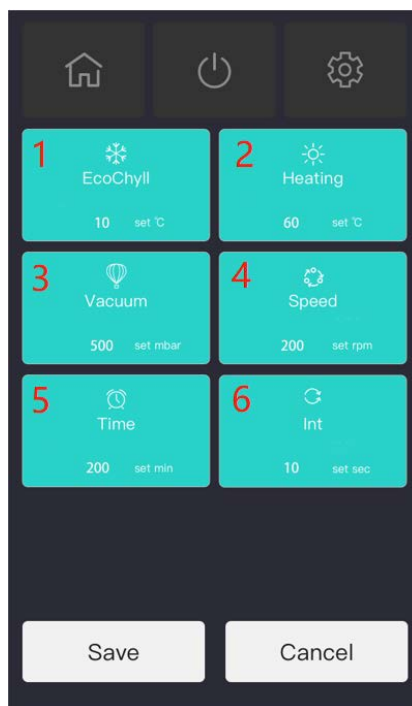


Home Interface



1. **Home interface button:** Press this button to enter the main interface.
2. Long press “ Heating” 5S switches to oil bath mode. And hold for another 5S, switches to water bath model. Only works in standby mode
3. **Set interface button:** Press this button to enter set interface to set parameters for cooling, speed, vacuum value, heating, timer, reversible spin intervals
4. **System parameter setting button :** password:6666. Calibration parameter for temperature, vacuum can be set
5. **Run button**
6. **Stop button**
7. **Lift motor up**
8. **Lift motor down**
9. **Vacuum vent**

Set Interface



1. **EcoChyll** : To set the EcoChyll condenser target temperature, setting range: -40°C - 0°C
2. **Heating** : To set the heating bath target temperature, setting range: 0 °C - 90°C (water), 0°C - 180°C (oil)
3. **Vacuum** : To set the target vacuum value, setting range: 0mbar - 1000mbar (0 mbar the vacuum pump stops running). Note: External vacuum pump required
4. **Speed** : To set the rotation target speed, setting range: 0 - 280 rpm
5. **Time** : To set the timer
6. **Int** : To set clockwise and anti-clockwise rotation directions
7. **button** : The parameter can be saved into EPPROM for next time's turn
8. **button** : The parameter will not be saved, and will return to main interface

Note: To conserve energy, the bath stops heating and goes into standby mode when rotation stops.



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Technical Data

Power Supply

100-120/200-240 V 50/60 Hz

hydrogen Cooling Capacity Specs

Evap. temp		Capacity	Power cons.	Current cons.	EER
°F	o C	BTU/h +/-5%	W +/-5%	A +/-5%	BTU/Wh
-40	-40	122	145	4.21	0.84
-30	-34	482	248	4.64	1.95
-20	-29	909	339	5.10	2.68
-13	-25	1257	398	5.44	3.16
-10	-23	1420	422	5.58	3.36
0	-18	2034	500	6.09	4.07
10	-12	2769	573	6.63	4.83
14	-10	3101	602	6.85	5.15
20	-7	3643	645	7.19	5.64
30	-1	4677	719	7.78	6.51

Hydrogen Dimensions

Dimensions		Hydrogen
W x D x H	Inches	12 x 15 x 29
W x D x H	mm	304.8 x 381 x 736.6
Including condenser	Inches	18.25 x 15 x 29
Including water bath	Inches	17.75 x 16.25 x 29
Overall W x D x H	Inches	17.75 x 16.25 x 29
Overall Footprint	Sq. in.	288.44
Weight	lbs	120

Condenser Cooling Unit Specs

Standard Supply Voltage	115V, 6.3 amps, 60 Hz, or 230V, 3.15 amps 50Hz
Power Consumption	725 W
Default Set Temperature	-40°C
Temp stability of condenser coils	+/- 0.1
Operating Temp. Range (°C)	Ambient -40°C
Cooling time	(-35, 90 secs)
Right Side Vent & Back Fan	Vent & fan must be unblocked for efficient cooling

Rotovap Component Specifications

Specifications	hydrogen Rotovap
Motor Type	Brushless DC motor
Speed Range	20-280rpm
Display	Touchscreen
Clockwise and Anti-clockwise	Yes
Heating Temperature Range	Room temp. to 180°C
Control Accuracy	water: ±1°C oil: ±3°C
Heating Power	1300W
Stroke Displacement	automatic 150mm
Timer	Yes
Time Setting Range	1-999min
Permissible Ambient Temperature	5-40 °C
Permissible Relative Humidity	80% RH
Protection Class	IP20
Protection class	IP21
USB Interface	Yes
Voltage/Frequency	100-120/200-240V 50/60 Hz
Power	1400 W

Key Features

- Touchscreen display of rotation speed, heating and cooling temperatures allows for optimal control of all distillation processes
- Automatic motor lift releases the evaporating flask to a safe position in case of power failure
- 5L heating bath with wide temperature range from room temp. to 180°C. Water/oil heating mode can be changed only through a switch
- Overheating protection temperature at 220°C
- Speed range from 20 to 280 rpm, and interval operation in clockwise and anticlockwise directions for drying process
- Ejection mechanism ensures easy removal of evaporating flask
- Highly chemical resistant double stainless steel spring sealing ring sealed with PTFE provides an excellent sealing performance
- Remote function provides PC control and data transmission

Material for EcoChyll Condensers

EcoChyll® condensers are made of stainless steel 316 metallic alloy and coated with chemical resistant Halar (ECTFE). Halar is virtually unaffected by most corrosive chemicals commonly encountered in industry. Among those substances that Halar fluoropolymer is resistant to are strong mineral and oxidizing acids, alkalis, metal etchants, and most organic solvents except hot amines (e.g. aniline, dimethylamine).¹

<https://www.solvay.com/en/brands/halar-ectfe>

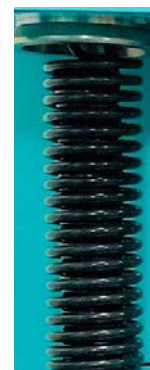
Table 2. Halar Chemical Resistance Examples

	Test Temp (°F)	Halar ECTFE
Organic Solvents		+
ACIDS		
98% Sulfuric Acid	220	+
37% Hydrochloric Acid	220	+
BASES		
50% Sodium Hydroxide	220	+
50% Sodium Hydrosulfide	220	+
OXIDERS		
50% Sodium Chlorate	200	+
100 Chlorine (anhydrous)	200	S

+: Unaffected condenser

S: Slightly Affected

¹Solvay Solexis, Inc.



Halar coated stainless steel

ASSEMBLY

Installation

1. Remove hydrogen from packaging and save or dispose of packaging material
2. Place O-ring in the condenser glass body o-ring groove
3. Open quick release clamp and put over condenser flange
4. Slide condenser over hydrogen condenser, may need to tilt hydrogen
5. Secure quick release clamp and tighten with flat head screwdriver
6. Remove screw cup and spring from rotovap rotary head
7. Put screw cup and spring on rotovap adapter and secure to the rotary drive head. Make sure vapor seal is inside the drive head
8. Attach supplied tubing to rotovap adapter and condenser body hose connector
9. Attach receiving flask to condenser body with pinch clamp
10. Attach tubing to condenser glass vacuum port and vacuum pump.
11. Plug in hydrogen and turn the switch to one located on the lower left side
12. Hydrogen display will light with 8.8.8.8 for startup period
13. Hydrogen is factor preset to max coldest -40°C but can be adjusted as need.
14. Check all ports for vacuum leaks, tighten clamps and adapters as needed
15. Place sample solvent like ethanol or acetone in evaporator flask and secure it to the vapor tube with keck clip.
16. Set water bath temperature to desired temperature or 45°C
17. Set rotation speed to desired speed or 100 rpm and start spinning flask
18. Turn on vacuum pump and open vacuum port to vacuum. Use vacuum pump controller to set and control vacuum.



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POST OPERATIONS

Cleaning

Recommended to clean condenser glass after use and replace tubing as needed.

Maintenance

The unit is maintenance-free. Any necessary repair must be performed by an authorized Ecodyst distributor. Please contact Ecodyst or your local Ecodyst distributor.

Troubleshooting

Loss of Vacuum	Assess and tighten clamps on various components Check vacuum seal on rotary evaporator.
Ice Build Up on Condenser	Ensure EcoChyll is not left on for long periods without Condensing.

Transportation and Storage

- Store and transport the unit and its components only if they were emptied and cleaned in the original packing material.
- Alternatively store and transport the unit in a container which prevents damages during transportation.



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SUPPORT

Warranty

Ecodyst provides a 2-year warranty for the products described here (excluding glass and wearing parts) if you register using the warranty card enclosed. The warranty is valid from the point of registration. The serial number is also valid without registering. The warranty covers part and manufacturing defects.

(Serial number on back of hydrogen)

Questions / Repair work

If any aspect of installation, operation or maintenance remains unanswered in the present manual, please contact Ecodyst directly or our Distributor in your country.



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SERVICE

Confirmation of Condition of Unit

In the case of repair, copy and complete the Confirmation of condition of unit and send it to Ecodyst.

Product number

Serial number

Reason for repair

Has the device been cleaned, decontaminated/sterilized?

Yes No

Is the unit in a condition which does not represent any health threats for the staff of our service department?

Yes No

If not, which substances has the unit come into contact with?

Legally binding declaration

The customer is aware of being legally liable to Ecodyst for any damages arising from incomplete and incorrect information.

Signature:

Date:

Please note: The shipper is responsible for the return of the goods in well packed condition, suitable for the mode of transport.

Last name, first name

Company

Address

E-mail



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Invented for scientists by scientist