

CLOSER TO WHAT MATTERS

EXTRA CORPOREAL LIFE SUPPORT (ECLS)



THE MOBYBOX® AT A GLANCE

PRECISION MEETS SIMPLICITY

Using only pneumatic power as its energy source, the MOBYBOX® is the first ECLS machine to integrate both blood flow control and gas management into a single device. It does not require complex software or an external power source, and it weighs only 2 kg.

Our innovative approach is based on design principles from flow dynamics research and led to the development of our **BIONIQUE FLOW TECHNOLOGY**.

The **PUMP** is a pneumatically powered bi-ventricular displacement pump and as such – like the heart itself – is among the most durable pumping systems there are. Beyond that, they are the gentlest pumps when it comes to blood – which is true for the MOBYBOX® pump as well.^{1,2} This BIONIQUE FLOW pump technology in the MOBYBOX® is unique in the area of ECLS therapy.

While some traditional **GAS EXCHANGERS** have stacked designs with corners that are prone to clotting, our design seals the corner regions of the stacked deck of hollow fiber membranes to create a cylindrical stack. This supports the natural flow behavior of liquids, imitating the conditions observed in natural circulation to eliminate risk of thrombosis in these areas.

The gas exchanger utilizes unique design principles to optimize wash-out, reduce pressure drops, and increase gas exchange efficiency. This results in a very low resistance and comes along with a high normalized CO₂ removal rate and a high oxygen transfer capacity.³



The MOBYBOX® Patient unit integrates the active components: the **PUMP** and the **GAS EXCHANGER**.

THE MOBYBOX® RE-THINKING ECLS

FROM LAST RESORT TO ROUTINE

The use of ECLS therapies has been used increasingly over the past 15 years in the context of postcardiotomy cardiogenic shock in adults and children, as well as acute respiratory distress syndrome (ARDS) in adults.⁴⁻⁹

In cases of partial or complete respiratory failure, VV-ECLS is being applied more and more often to stabilize patients and save lives. This is primarily the case when the use of invasive mechanical ventilation must be viewed as insufficient or problematic (e.g. for severe ARDS).

This buys time for therapeutic measures that have the potential to make a critical difference for patients. In approximately the past 15 years, based on results of the latest studies⁸⁻⁹, and now most recently due to the challenges of the SARS-CoV2 pandemic, the relevance of VV-ECLS in critical care therapy has increased.¹⁰



The MOBYBOX® is now the world's first available fully integrated and portable ECLS system that does not require a battery or motor and uses only pneumatic power from oxygen pressure as its sole energy source.

The lightweight, compact, and shock-resistant housing of the MOBYBOX® Patient unit can be placed directly at the patient's bedside, and the thermal foam insulation reduces heat loss. It is designed with short tubes that connect to the cannulae, reducing foreign surface contact and heat loss while enabling low priming volume.

CLOSE TO THE PATIENT

- Fits in a small backpack and weighs only 2 kg
- Blood-friendly pump^{1,2}
- Independent of an external power source or internal battery

USER-FRIENDLY DESIGN

- Extremely straightforward and intuitive operation
- Ideal for fast, simple transport within the hospital
- Forgo water-based heater technology

MOBYBOX® RUNNER

Thanks to flexible pneumatic lines that connect to gas sources and the MOBYBOX® Patient unit, the MOBYBOX® RUNNER Control unit offers a sufficient radius of movement.



MOBYBOX® RUNNER (Control unit)

MOBYBOX® (Patient unit)

¹ Kau M et al. First Use of a New Extracorporeal Membrane Oxygenation System in COVID19-Associated Adult Respiratory Distress Syndrome: The MobyBox Device. ASAIO J. 2022;68(8):996-1001. DOI:10.1097/MAT.0000000000001685

² Karagiannidis C et al. Ann Thorac Surg. 2020;109(6):1684-1691. DOI:10.1016/j.athoracsur.2020.01.039

³ Karagiannidis C et al. ASAIO J. 2021;67(2):e59-e61. DOI:10.1097/MAT.0000000000001190

⁴ Doll N et al. Ann Thorac Surg. 2004;77(1):151-157. DOI:10.1016/s0003-4975(03)01329-8

⁵ Rogers AJ et al. Ann Thorac Surg. 1989;47(6):903-906. DOI:10.1016/0003-4975(89)90032-5

⁶ Noah MA et al. Referral to an extracorporeal membrane oxygenation center and mortality among patients with severe 2009 influenza A(H1N1). JAMA. 2011;306(15):1659-1668. DOI:10.1001/jama.2011.1471

⁷ Peek GJ et al. Lancet. 2009;374(9698):1351-1363. DOI:10.1016/S0140-6736(09)61069-2

⁸ Combes A et al. N Engl J Med. 2018;378(21):1965-1975. DOI:10.1056/NEJMoa1800385

⁹ Abrams D et al. Ann Cardiothorac Surg. 2019;8(1):44-53. DOI:10.21037/acs.2018.08.03

¹⁰ Bertini P et al. J Cardiothorac Vasc Anesth. 2022;36(8 Pt A):2700-2706. DOI:10.1053/j.jvca.2021.11.006

THE MOBYBOX® - QUICK WHEN IT COUNTS

AREAS OF APPLICATION

In critical situations, every second counts. Thanks to its compact design and its independence from external power sources, the MOBYBOX® is an elegant, safe solution for various applications.

FOR STABILIZATION

In the cath lab for cardiocirculatory failure

VA-ECLS can provide cardiopulmonary support when performing high-risk percutaneous coronary interventions.¹¹ The survival rates for patients with cardiac arrest and refractory ventricular fibrillation is proven to be higher if ECLS is utilized at an early stage during cardiopulmonary resuscitation.¹² The MOBYBOX® can be optimally integrated into procedures thanks to intuitive and simple operation.



IN EMERGENCIES

For extracorporeal cardiopulmonary resuscitation

The MOBYBOX® uses only pneumatic power to function and does not require any external power source at all. The compact, space-saving construction enables the MOBYBOX® to save vital time in different medical fields of application when treating patients with acute cardiac or respiratory failure.



THE MOBYBOX® - MOBILE AND FLEXIBLE

WELL EQUIPPED FOR ALL OPERATIONS

DURING MOBILIZATION

For early rehabilitation measures

ECLS patients' prolonged immobility is often associated with neuromuscular weakness and impaired physical functioning.¹³ The MOBYBOX® makes early mobilization and physiotherapy measures noticeably easier. Its lightweight, compact construction makes it possible to position it close to the patient, making it easier for caregivers to perform nursing tasks.



DURING TRANSPORT

For transport within the clinic

The MOBYBOX® is attached to the patient's bed or stretcher. The lightweight, compact, and shock-resistant housing can be placed directly at the patient's bedside, and the thermal foam insulation, in conjunction with short tubes, reduces heat loss and allows users to forgo water-based heater technology.



¹¹ van den Brink FS et al. Prophylactic veno-arterial extracorporeal membrane oxygenation in patients undergoing high-risk percutaneous coronary intervention. *Neth Heart J.* 2020;28(3):139-144. DOI:10.1007/s12471-019-01350-8

¹² Yannopoulos D et al. Advanced reperfusion strategies for patients with out-of-hospital cardiac arrest and refractory ventricular fibrillation (ARREST): a phase 2, single centre, open-label, randomised controlled trial. *Lancet.* 2020;396(10265):1807-1816. DOI:10.1016/S0140-6736(20)32338-2

¹³ Needham DM. *JAMA.* 2008;300(14):1685-1690. DOI:10.1001/jama.300.14.1685

THE MOBYBOX® SYSTEM – TECHNICAL DATA AND DETAILS

MOBYBOX® Patient unit (single use only)



MOBYBOX

The single-use patient unit integrates all active components: the bi-ventricular pump and the helix gas exchanger. The compact housing allows it to be placed directly on the patient bedside. This ensures extremely short connection, reducing foreign surface contact, minimizing sheer stress and maximizing wash-out.

MOBYBOX®
Component number HVEU-007

Marking
CE 0297

Accessories
De-airing set
Clamp and scissors set

Cannulae for use with the MOBYBOX®

The MOBYBOX® can be operated with all common single and double lumen cannulae suited for ECLS applications and which provide a 3/8-inch connector for the tubing. Percutaneous VA- and VV-applications include femoral-femoral, femoral-jugular and double-lumen jugular configurations.

Specifications

Duration of use	Up to 14 days	Sweep gas flow	0 - 20.0 L/min ±10 %
Shelf life	24 months	O₂ transfer rate	100 % O ₂ saturation at a blood flow of 5L/min, O ₂ : ≥ 60 mL O ₂ /min per L/min blood flow
Cannula connections	3/8"	CO₂ transfer rate	≥ 50 mL CO ₂ /min per L/min blood flow
System filling volume	approx. 500 mL	Δp blood-side gas exchanger	45 mmHg at 5L/min blood flow
Blood flow rate	1 to 5L/min depending on cannula configuration	Δp gas-side gas exchanger	10 mmHg at 20L/min gas flow

Material

Pump housing	Methyl methacrylate (MABS)	Gas exchanger fibers	Polymethylpentene (PMP)
Pump membrane	Polyurethane (PU)	Gas exchanger grouting	Polyurethane (PU)
Gas exchanger housing	Methyl methacrylate (MABS)	Tubes	Polyvinyl chloride (PVC), silicone

MOBYBOX® RUNNER Control unit



MOBYBOX
runner

Ultra-small control unit provides both blood and gas flow management in a single unit, which includes a fully integrated gas blender.

The pneumatic drive and ability to place it separately from the patient unit simplifies setup.

MOBYBOX® RUNNER
Component number HVCEU-005

Marking
CE 0297

Specifications

Service interval	1 year
Service life	5 years
Gas connection	3-5 bar, Consumption up to 30 L/min
Acoustic alarm	> 55 dB at 1 meter distance

HEMOVENT WOOMER® – THE COMPANION FOR ADDITIONAL SAFETY

Hemovent WOOMER® Tube Heater



hemovent
WOOMER

The Hemovent WOOMER® is a tube heater that reduces heat loss. It can be used individually, on the arterial and the venous (feed) tube side.

Manufacturer: Barkey

Hemovent WOOMER®
Component number DP-002

Marking
CE 0123

Specifications

Connection	100 – 240 VAC, 50/60 Hz	Operating mode	continuous operation
Power consumption	max. 115 – 139 VA	Dimensions	control unit W x D x H: 90 x 60 x 160 mm
Fuse	2.5 A slow-blow	Weight	approx. 1.3 kg
Temperature setting	+42 °C	Protection class	I - protective grounding
Control accuracy	± 2,0 °C	Degree of protection	BF; defibrillator-proof external and internal application on patients with insulated applied part
Thermal profile overtemperature control	+46 °C ± 1,0 °C	Air pressure	700 to 1060 hPa
Warm-up time	from +20 °C to +42 °C < 10 min.	Moisture protection	IP X2

MOBYBOX® Patient unit and MOBYBOX® RUNNER Control unit are available as MOBYBOX® System.

Manufacturer:

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