

# 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.<sup>1,2</sup> 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 CO<sub>2</sub> removal rate and a high oxygen transfer capacity.<sup>3</sup>



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

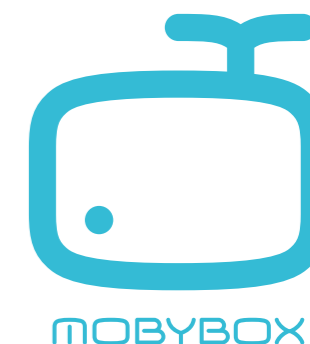
# THE MOBYBOX™ RE-THINKING ECLS

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.<sup>4-10</sup>

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 studies<sup>8-10</sup>, and now most recently due to the challenges of the SARS-CoV2 pandemic, the relevance of VV-ECLS in critical care therapy has increased.<sup>11</sup>



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<sup>1,2</sup>
- 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™ control unit offers a sufficient radius of movement.



MOBYBOX™ RUNNER Control unit

1 Kau D et al. ASAIO J 2022; 68(8):996-1001  
2 Karagiannidis C et al. Ann Thorac Surg 2020; 109(6):1684-1691  
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4 Doll N et al. Ann Thorac Surg 2004;77:151-7  
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6 Moronke AN et al. JAMA. 2011; 306(15):1659-68  
7 Peek G et al. Lancet 2009;374(9698):1351-63

8 Combes A et al. N Engl J Med 2018;378:1965-75  
9 Harrington D and Drazen JM N Engl J Med 2016;375:861-70  
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# 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.<sup>12</sup> 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.<sup>13</sup> 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.<sup>14</sup> 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.



## 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 SRASY-007

**Accessories**  
De-airing set  
Clamp 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

<b>Duration of use</b>	Up to 14 days	<b>Sweep gas flow</b>	0 - 20.0 L/min ±10%
<b>Shelf life</b>	12 months	<b>O<sub>2</sub> transfer rate</b>	100% O <sub>2</sub> saturation at a blood flow of 5L/min, O <sub>2</sub> : ≥ 60 mL O <sub>2</sub> /min per L/min blood flow
<b>Cannula connections</b>	3/8"	<b>CO<sub>2</sub> transfer rate</b>	≥ 50 mL CO <sub>2</sub> /min per L/min blood flow
<b>System filling volume</b>	approx. 500 mL	<b>Δp blood-side gas exchanger</b>	45 mmHg at 5L/min blood flow
<b>Blood flow rate</b>	1 to 5L/min depending on cannula configuration	<b>Δp gas-side gas exchanger</b>	10 mmHg at 20L/min gas flow

### Material

<b>Pump housing</b>	Methyl methacrylate (MABS)	<b>Gas exchanger fibers</b>	Polymethylpentene (PMP)
<b>Pump membrane</b>	Polyurethane (PU)	<b>Gas exchanger grouting</b>	Polyurethane (PU)
<b>Gas exchanger housing</b>	Methyl methacrylate (MABS)	<b>Tubes</b>	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 COASY-003

### Specifications

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

## WATCHA AND WOOMER – TWO COMPANIONS FOR ADDITIONAL SAFETY

### WATCHA O<sub>2</sub> Sensor



hemovent  
WATCHA

The WATCHA is an additional O<sub>2</sub> sensor that monitors oxygen saturation in the extracorporeal blood circuit. It comes with a cuvette installed at the venous cannulae, upstream of the pump.

**WATCHA Set**  
Component number HVEU-305  
Consisting of  
WATCHA Control cuvette  
WATCHA Power supply  
**WATCHA Cuvette set**  
Component number HVEU-302

### Materials in blood contact

**Cuvette** Methyl methacrylate (MABS)

### Specifications

<b>Display</b>	Rotatable OLED color display	<b>Venous Oxygen Saturation</b>	40-100 % (± 5 % at 50-70%)
<b>Displayed parameters</b>	%sO <sub>2</sub> Battery life	<b>Power supply</b>	Battery: 1x1,5 V type AA or Power supply: WAASY-303--A (SV;1400mA)
<b>Battery life</b>	Approx. one week (depending on frequency of use)	<b>Life Cycle WATCHA</b>	2 years

### WOOMER Tube Heater



hemovent  
WOOMER

The WOOMER is a tube heater that reduces heat loss and, in the best case, compensates for it. Optimum application is at the arterial tube because the temperature gradient is most pronounced there. It can also be used additionally on the venous (feed) tube side.

**WOOMER**  
Component number DP-002-0A

### Specifications

<b>Connection</b>	100 – 240 VAC, 50/60 Hz	<b>Operating mode</b>	continuous operation
<b>Power consumption</b>	max. 115 – 139 VA	<b>Dimensions</b>	control unit W x D x H: 90 x 60 x 160mm
<b>Fuse</b>	2.5 A slow-blow	<b>Weight</b>	approx. 1.3 kg
<b>Temperature setting</b>	+42°C	<b>Protection class</b>	I - protective grounding
<b>Control accuracy</b>	± 2,0°C	<b>Degree of protection</b>	BF; defibrillator-proof external and internal application on patients with insulated applied part
<b>Thermal profile overtemperature control</b>	+46°C ± 1,0°C	<b>Medical Device Classification</b>	II a
<b>Warm-up time</b>	from +20°C to +42°C < 10 min.	<b>Moisture protection</b>	IP X2
<b>Air pressure</b>	700 to 1060 hPa	<b>Marking</b>	CE 0123

MOBYBOX™ Patient unit and Runner Control unit are available as MOBYBOX™ Runner Set.

**Clinic and service partner:**

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