ECLS

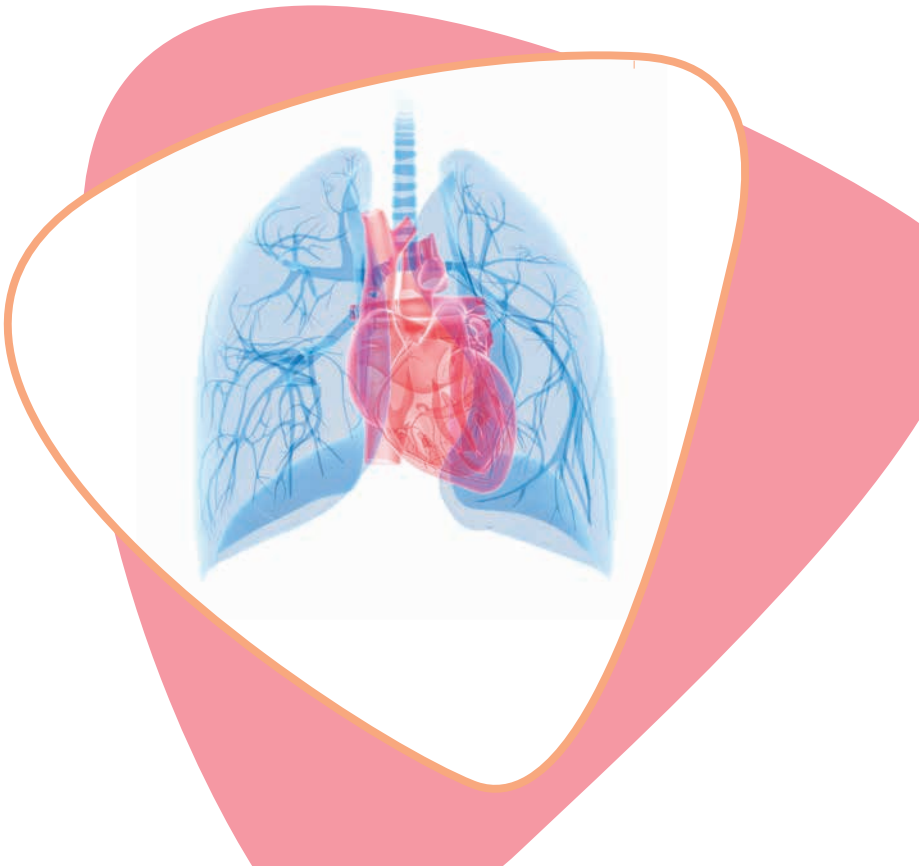
LANDING ECMO: THE SOLUTION TO MONITOR THE COMPLEX INTERACTION BETWEEN MEMBRANE LUNG AND NATIVE LUNG

LANDING

EUROSETS
EVERY LIFE MATTERS

THE SOLUTION TO MONITOR COMPLEX INTERACTIONS

- 18 parameters shown on display.
- Up to 5 parameters represented as graphics in a real time.
- Non invasive spectrophotometric technology to measure blood parameters on the venous and arterial lines.
- Polycarbonate cuvettes assuring accuracy and reliability over time.
- PC (Phosphorylcholine) coated cuvettes, 14 days validated; available in 3/8” or 1/4” sizes.
- Ultrasound blood flow meter for adult and pediatric use.
- Data connection via USB and/or HL7 protocol.
- Dedicated Data Management System with capability to generate pdf files.
- 3 pressure channels to measure Pdrain (negative drainage Pressure), Pin (pre oxy membrane pressure), Pout (post oxy membrane pressure).
- Capnometer to measure the exhausted CO_2 leaving the oxygenator with innovative Thermopiles warming technology designed to prevent condensation formation.
- 10,4” TFT touchscreen user interface.



MONITORING THE TREATMENT OF ACUTE RESPIRATORY AND HEART FAILURE

LANDING ECMO: THE SOLUTION TO MONITOR THE COMPLEX INTERACTION BETWEEN MEMBRANE LUNG AND NATIVE LUNG

In ECMO Procedures, the delivery of O_2 to the patient's metabolism and the removal of CO_2 depend on a complex interaction between the Membrane Lung (ML), the Native Lung (NL) and the metabolic-hemodynamic pattern of the patient. The continuous monitoring of those parameters is critical in the management of the patient.

Monitoring the Membrane Lung is essential to understand the level of performance of gas exchange; while the Native Lung function in both gas exchange and mechanical properties must be assessed to understand the possibility and timing of VV-ECMO weaning.

Monitoring the hemodynamic and metabolic parameters of patients (Cardiac Output, $V'O_2$, $V'CO_2$), is paramount to understand and achieve an equilibrium between the metabolic needs and the function of the artificial organ. The ratio between Cardiac Output (CO) and extracorporeal Blood Flow (BF) is fundamental in understanding recirculation in the Membrane Lung and difficulties in obtaining satisfactory Blood Flow.

CONTINUOUS MONITORING OF 18 PARAMETERS

The Landing monitor provides a continuous measurement of the oxygen transfer from the ML (Membrane Lung), combined with hemoglobin level, venous oxygen saturation and arterial oxygen saturation.

Moreover, the Landing ECMO monitor provides hemodynamics data about circulation through the ECMO system, with blood flow, pre-oxygenator pressure and post-oxygenator pressure. Of note, measurements include the drain negative pressure, whose monitoring may be particularly useful to prevent hemolysis.

Thanks to a dedicated CO_2 detection set, LANDING assists Physicians during long term support.

- In a vvECMO Landing displays the interdependency between Native Lung and Membrane Lung.
- In a vaECMO Landing helps to maintain Patient's physiologic parameters.

REFERENCES

1. M.Belliato et al. **A brief clinical case of monitoring of oxygenator performance and patient-machine interdependency during prolonged veno-venous extracorporeal membrane oxygenation.** J Clin Monit Comput. 2017 Oct;31(5):1027-1033. doi: 10.1007/s10877-016-9927-4. Epub 2016 Aug 24.

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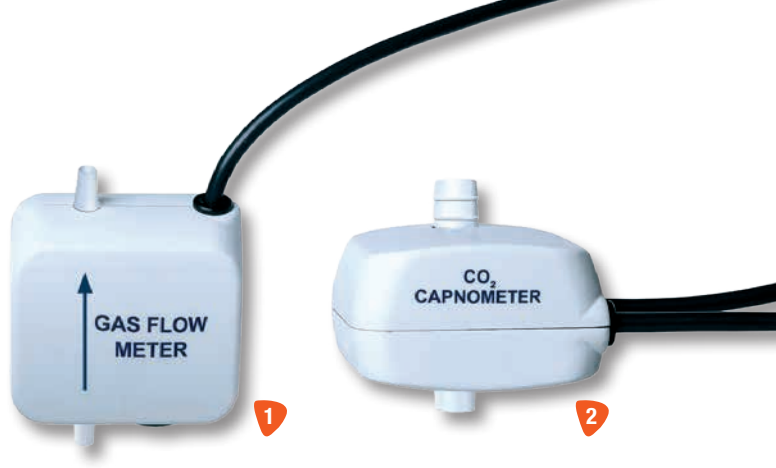
CO_2 DETECTION SET

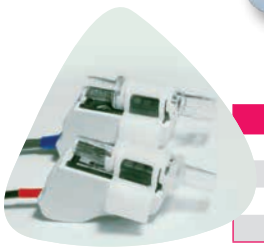
The CO_2 detection device has been specifically designed and developed for long term application and it measures:

1 Sweep gas **2 Exhausted CO_w leaving the oxygenator module.**

The technology involved assures that condense does not alter the reading accuracy over the time.



TECHNICAL DATA	VENOUS PROBE	ARTERIAL PROBE
SO_2 measurement method	Spectrophotometric	
Temperature measurement	Infrared sensor	
Size (H x W x D)	45 x 80 x 28 mm	
Weight	50 g	
Cable lenght	180 cm	
Connectors sizes	1/2"; 3/8"; 1/4"	3/8"; 1/4"



TECHNICAL DATA	GAS FLOW METER	CO_2 METER
Measurement method	Thermopiles	Infrared
Connectors size	1/4" x 1/16"	3/8" x 1/16"
Dimension (H x W x D)	120 x 120 x 60 mm	
Weight (including holder)	250 g	~ 300 g

MEASURED PARAMETER	UNIT	RANGE
SaO_2	%	10 - 100
SvO_2	%	10 - 100
Q Blood	l/min	0,1 - 8,0
Hb	g/dl	5 - 16
Ta	°C (convertible in °F)	4 - 42
Tv	°C (convertible in °F)	4 - 42
P in	mmHg (convertible in kPa)	-100 - 800
P out	mmHg (convertible in kPa)	-100 - 800
P Drain	mmHg (convertible in kPa)	-150 - 200
GF (Gas Flow)	l/min	0,2 - 20
CO_2%	%	0,2 - 8,0
CALCULATED PARAMETER	**UNIT**	**RANGE**
ΔP	mmHg (convertible in kPa)	0 - 800
V'O_2ML	ml/min	0 - 400
V'CO_2ML	ml/min	0 - 500
CO_2RNL	%	10 - 90
V'CO_2Tot	ml/min	0 - 500
EXTERNAL DATA*	**UNIT**	**RANGE**
V'CO_2NL	ml/min	0 - 500
C.O.	l/min	0 - 20

TECHNICAL DATA	FLOW SENSOR EM-TEC
Blood Flow measurement method	Ultrasound
Size (H x W x D)	25 x 33 x 45 mm
Weight	100 g
Cable lenght	290 cm
Connectors sizes	3/8" x 3/32"; 1/4" x 3/32"; 1/4" x 1/16"

TECHNICAL DATA	LANDING
Dimension (H x W x D)	220 x 290 x 85 mm
Weight (including holder)	approx. 3,7 kg
Power supply	100 - 243 VAC, 47/63 Hz
Battery runtime	approx. 30 min
Display module	10,4" TFT touchscreen
Resolution	800 x 600 pixel
Update frequency	arterial and venous every 5 sec
Interface	1 LAN 1 USB port for data export 1 USB port for software update

EXPLANATION OF PARAMETERS

ML (Membrane Lung) Performance

V'O_2ML [ml/min]	**Contribution of MEMBRANE LUNG**	range 0 - 400	↑ increase ML contribution related to Q delivered to Patient ↓ decrease ML contribution related to Q delivered to Patient	AUTO
V'CO_2ML [ml/min]	**Power of ECMO vs CO_2 Total**	range 0 - 500	↑ ML removes more CO_2 and the NL work, to remove CO_2, is reduced ↓ ML removes less CO_2 and the NL work, to remove CO_2, is augmented	AUTO

NL Condition

V'CO_2NL [ml/min]	**Power of Native Lung to remove CO_2**	range 0 - 500	↑ higher NL performance to eliminate CO_2 ↓ lower NL performance to eliminate CO_2	MANUAL
CO_2 R NL [%]	**NL behaviour vs CO_2 Total**	range 10 - 90	↑ NL extracts More CO_2 *(without changing ventilator parameters)* ↓ NL extracts Less CO_2 *(without changing ventilator parameters)*	AUTO if V'CO_2NL is inserted

Patient's Condition

C.O. [L/min]	**Cardiac Output**	range 0 - 20	↑ higher CO ↓ lower CO	MANUAL
V'CO_2TOT [ml/min]	**Total V'CO_2** (V'CO_2ML + V'CO_2NL)	range 0 - 500	↑ increased CO_2 produced by the Patient ↓ reduced CO_2 produced by the Patient	AUTO if V'CO_2NL is inserted

ORDERING GUIDE

CODE	DESCRIPTION		N./PACK
EU5052	**LANDING MONITOR**		**1**
	EU1872	ARTERIAL PROBE	1
	EU1873	VENOUS PROBE	1
	EU1900	CLAMP ON TRANSDUC. SCT 3/8” x 3/32” (FLOW METER EM-TEC)	1
	EU1869	POWER SUPPLY	1
	MX960P1	REUSABLE PRESSURE TRANSDUCER	2
	MX260	HOLDER FOR REUSABLE PRESSURE TRANSDUCER	2
	EU6593	CONNECTING CABLE MEDEX-LANDING	2
	TRUCLIP	HOLDER FOR EDWARDS PRESSURE TRANSDUCER	1
	EU6592	CONNECTING CABLE EDWARDS-LANDING	1
EU5075	**CO_2 DETECTION SET**		
	EU10431	POWER AND COMMUNICATION CAPNOMETER	
	EU10388	CAPNOMETER-GAS FLOW METER	
	EU10411	POWER SUPPLY (for LANDING ECMO)	
	EU3964	SET GAS ESCAPE/CAPNOMETER	
	OPTIONALS		
EU1517	TEMPERATURE PROBE YSI (for oxygenator and cardioplegia heat exchanger)		1
EU1901	CLAMP ON TRANSDUC. SCT 1/4” x 3/32” (FLOW METER EM-TEC)		1
EU10409	CLAMP ON TRANSDUC. SCT 1/4” x 1/16” (FLOW METER EM-TEC)		1
	SINGLE USE		
EU3863	VENOUS CUVETTE 1/2” - 1/2” (3 boxes - 15 pcs/box)		45
AG3863	VENOUS CUVETTE 1/2” - 1/2” COATED (3 boxes - 15 pcs/box)		45
EU3864	ARTERIAL AND VENOUS CUVETTE 3/8” - 3/8” (3 boxes - 15 pcs/box)		45
AG3864	ARTERIAL AND VENOUS CUVETTE 3/8” - 3/8” COATED (3 boxes - 15 pcs/box)		45
EU3874	ARTERIAL AND VENOUS CUVETTE 1/4” - 1/4” (3 boxes - 15 pcs/box)		45
AG3874	ARTERIAL AND VENOUS CUVETTE 1/4” - 1/4” COATED (3 boxes - 15 pcs/box)		45

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