

# LICOX<sup>®</sup>

## Brain Tissue Oxygen Monitoring System



ENHANCE YOUR PATIENT MANAGEMENT  
IN NEUROCRITICAL CARE\*

LICOX • ENGLISH



- Oxygen is critical for the brain
- Oxygen is an independent variable
- Low values of oxygen in cerebral tissue can correlate with bad clinical outcomes

NEUROCRITICAL  
CARE

 **INTEGRA<sup>™</sup>**

# Quick Set-up

# Simple Operation

# Reliable Performance

## LICOX® CMP Monitor

- Quick, easy calibration using the smart card.
- Cerebral temperature measurement with the use of the LICOX® PMO Combined Oxygen and Temperature Catheter or C8.B probe.
- Easy-to-read digital display.
- Compact, lightweight.
- Easily connects to bedside monitors through the use of LICOX® Monitor Link LML1.



## LICOX® PMO Combined Oxygen and Temperature Catheter

- Highly accurate at relevant PbtO<sub>2</sub> values in brain tissue.
- Oxygen sensitivity averaged over a probe area of 18mm<sup>2</sup>.
- Accurate measurement of brain temperature at the source.
- Excellent long-term stability up to 5 days.
- CMP monitor automatically calibrated with the catheter thanks to the use of smart card. For PMO probes, calibration is included in the connector probe itself.



## THE LICOX® SYSTEM

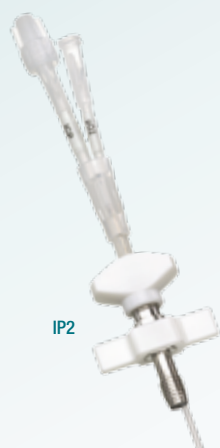
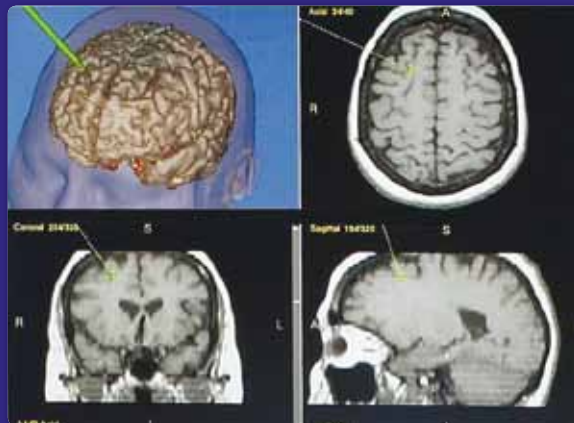
In the last decade, clinical researchers have demonstrated the significance of oxygen partial pressure measurements in the brain.<sup>1,2</sup> A study of Van den Brink, et al (2000), examined brain tissue oxygenation (PbtO<sub>2</sub>) in 101 head trauma patients (Glasgow Coma Scale < 8) using LICOX®.<sup>3</sup> Despite aggressive conventional monitoring and treatment, hypoxic events were observed with the LICOX® system in more than half of these patients. The depth and duration of tissue hypoxia were related to outcome, and proved to be an independent predictor of unfavorable outcome and death.

Monitoring PbtO<sub>2</sub> has been shown to be a reliable and sensitive diagnostic method to monitor cerebral oxygenation, and experience shows the risks of placing intraparenchymal sensors are minimal.<sup>4,5</sup> Clinical research has demonstrated that the prevention of secondary injury following severe head injury is well correlated with better patient outcome.<sup>2,3,5,6</sup>

## CLINICAL ADVANTAGES

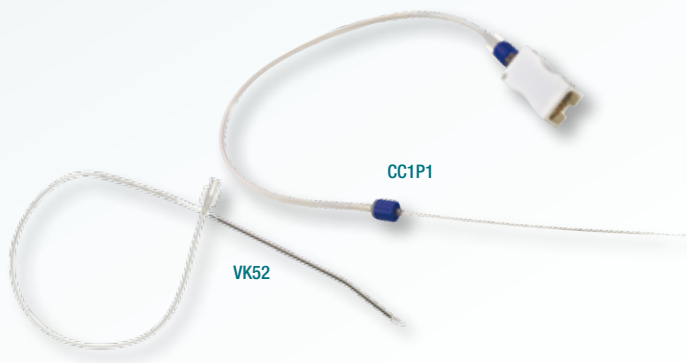
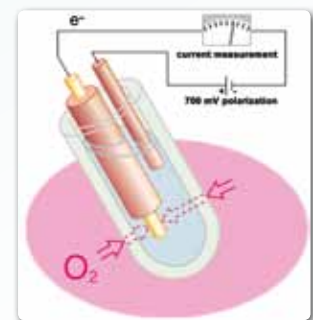
Early warning of differences between brain tissue oxygen supply and demand.

Independent, sensitive measure, allows for more precise neurocare of the patient.



### LICOX® Bolt System

- Single or multi-lumen design allows monitoring of multiple parameters through one burr hole.
- Unique hermetic seal for tight closure and infection control.



### LICOX® Tunneled System

- The oxygen catheter micro-probe CC1G2 and the combined oxygen/temperature micro-probe catheter are capable of being tunneled under the scalp using a Licox probe guide with integral trocar.
- May be introduced during a cranial procedure at the margins of an existing bone flap or through a burr hole.

## References

1. van Santbrink H., Maas A.I.R. et al, *Continuous Monitoring of Cerebral Tissue pO2 After Severe Head Injury*, Neurosurgery 38, 21-31, 1996.
2. Valadka A.B., Robertson C.S. et al, *Relationship of Brain Tissue pO2 to Outcome After Severe Head Injury*, Crit. Care Med. 26, 1576-1581, 1998.
3. van den Brink W.A., Maas A.I.R. et al, *Brain Oxygen Tension in Severe Head Injury*, Neurosurgery 46, No. 4, 868-878, 2000.
4. Kiening K.L., Unterberg A.W. et al, *Monitoring of Cerebral Oxygenation in Patients with Severe Head Injuries: Brain Tissue pO2 Versus Jugular Vein Oxygen Saturation*, J. Neurosurgery 85, 751-757, 1996.
5. Dings J., Meixensberger J. et al, *Clinical Experience with 118 Brain Tissue Oxygen Partial Pressure Catheter Probes*, Neurosurgery 43(5), 1082-1095, 1998.
6. Bardt T.F. et al, *Monitoring of Brain Tissue pO2 in Traumatic Brain Injury: Effect of Cerebral Hypoxia on Outcome*, Acta Neurochir. Suppl. 71, 153-156, 1998.

Catalog Number	Description
<b>AC3.1_EU</b>	LICOX® CMP OXYGEN AND TEMPERATURE MONITOR
<b>CC1SB</b>	LICOX® OXYGEN CATHETER MICRO PROBE, OXYGEN SENSITIVE AREA OF 13 MM2, LENGTH 150MM, TO BE USED WITH LICOX® BOLT KITS
<b>CC1G2</b>	LICOX® OXYGEN CATHETER MICRO PROBE, OXYGEN SENSITIVE AREA OF 18 MM2, LENGTH 460MM, TO BE TUNNELED
<b>C8B</b>	LICOX® TEMPERATURE MICRO PROBE CATHETER, LENGTH 126MM, TO BE USED WITH LICOX® BOLT KITS
<b>IM1</b>	LICOX® BOLT KIT ONLY, SINGLE LUMEN, WITHOUT CATHETER
<b>IM2_EU</b>	LICOX® BOLT KIT ONLY, DOUBLE LUMEN, WITHOUT CATHETER
<b>IM3_EU</b>	LICOX® BOLT KIT ONLY, TRIPLE LUMEN, WITHOUT CATHETER
<b>IM1S</b>	COMPLETE LICOX® OXYGEN CATHETER MICRO PROBE, SINGLE LUMEN CONTAINS CC1SB OXYGEN PROBE AND IM1 SINGLE LUMEN BOLT KIT
<b>IM2S_EU</b>	COMPLETE LICOX® OXYGEN CATHETER MICRO PROBE, DOUBLE LUMEN CONTAINS CC1SB OXYGEN PROBE AND IM2_EU DOUBLE LUMEN BOLT KIT
<b>IM3S_EU</b>	COMPLETE LICOX® OXYGEN CATHETER MICRO PROBE, TRIPLE LUMEN CONTAINS CC1SB OXYGEN PROBE AND IM3_EU TRIPLE LUMEN BOLT KIT
<b>IM3ST_EU</b>	COMPLETE LICOX® OXYGEN CATHETER MICRO PROBE WITH TEMPERATURE CATHETER MICRO-PROBE CONTAINS IM3_EU TRIPLE LUMEN BOLT KIT, CC1SB OXYGEN PROBE, C8B TEMPERATURE CATHETER MICRO PROBE
<b>VK51</b>	LICOX® PARENTERAL PROBE GUIDE FOR TUNNELING
<b>IT1</b>	COMPLETE LICOX® TUNNELING PROBE KIT CONTAINS CC1G2 OXYGEN TUNNELING CATHETER PROBE AND VK51 PARENTERAL PROBE GUIDE
<b>CC1P1</b>	LICOX® PMO COMBINED OXYGEN AND TEMPERATURE CATHETER MICRO PROBE, OXYGEN SENSITIVE AREA OF 18 MM2, TO BE BOLTED OR TUNNELED
<b>IP1</b>	LICOX® PMO BOLT KIT WITH SINGLE LUMEN INTRODUCER
<b>IP2</b>	LICOX® PMO BOLT KIT WITH DOUBLE LUMEN INTRODUCER
<b>VK52</b>	LICOX® PMO TUNNELING NEEDLE
<b>IP1P</b>	COMPLETE LICOX® PMO KIT CONTAINS IP1 SINGLE LUMEN BOLT KIT AND CC1P1 COMBINED OXYGEN AND TEMPERATURE CATHETER MICRO PROBE
<b>IP2P</b>	COMPLETE LICOX® PMO KIT CONTAINS IP2 DOUBLE LUMEN BOLT KIT AND CC1P1 COMBINED OXYGEN AND TEMPERATURE CATHETER MICRO PROBE
<b>IT2_EU</b>	COMPLETE LICOX® PMO KIT CONTAINS VK52 TUNNELING NEEDLE AND CC1P1 COMBINED OXYGEN AND TEMPERATURE CATHETER MICRO PROBE

## To measure Intracranial Pressure with LICOX® Oxygen Monitoring:

<b>110-4L</b>	CAMINO® INTRACRANIAL PRESSURE MONITORING KIT USED WITH ALL CAMINO MONITORS: CAM-01, MPM-1
<b>NL950-SD</b>	VENTRIX™ INTRACRANIAL PRESSURE MONITORING KIT USED WITH VENTRIX MONITOR NL950-100
<b>LML1</b>	LICOX® MONITOR LINK TO CONNECT TO AC3.1_EU
<b>NL950-MC-XX</b>	INTERFACE CABLE TO CONNECT LML1 TO BEDSIDE MONITOR
<b>PMOBOX</b>	LICOX® INTERFACE DEVICE BETWEEN CC1P1 COMBINED OXYGEN AND TEMPERATURE CATHETER MICRO PROBE AND BEDSIDE MONITOR

Oxygen catheter micro probes must be stored between 2°C & 10°C.

\* *Brain tissue oxygen monitoring in traumatic brain injury and major trauma: outcome analysis of a brain tissue oxygen-directed therapy*  
Pradeep K. Narotam, M.D., M.M.E.D., 1-3 John F. Morrison, M.S., M.D., 2,3 and Narendra Nathoo, M.D., Ph.D. 2-4  
J. Neurosurg. / May 22, 2009

\* *Monitoring of brain tissue oxygenation during aneurysm surgery: prediction of procedure-related ischemic events*  
Andreas Jödicke, M.D., Felix Hübner, M.D., and Dieter-Karsten Böker, M.D.  
J Neurosurg 98:515-523, 2003



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