

Transplantation takes flight.  
LifePort™. Here.



## Perfusion in motion



*David Kravitz, CEO  
Organ Recovery Systems*

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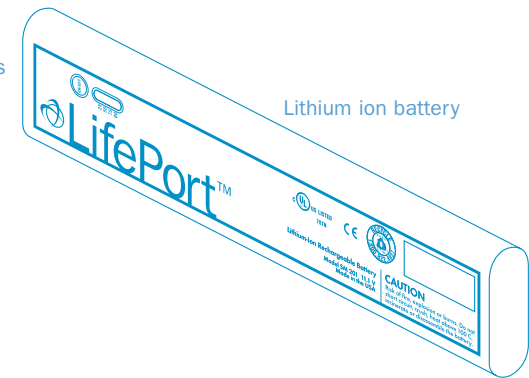
We envision a world where the supply of high-quality organs meets the growing demand for transplantation. With the introduction of the LifePort™ Kidney Transporter we are helping to make this vision a reality. And we will keep perfusion in motion by constantly expanding our proprietary technology platform—an integrated, precision-engineered system supported by organ-specific accessories and solutions.

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## from donation to transplantation

Compact, lightweight, and durably constructed, LifePort™ arrives ready for boarding, then departs on a daylong journey—without replenishment of ice or batteries. First in the next generation of devices. En route to establishing a new continuum of organ care.

Plenty of power for 24 hours



Lithium ion battery

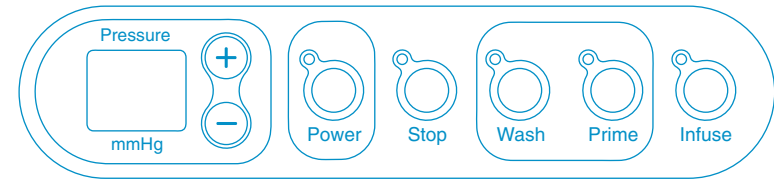


LifePort™ Kidney Transporter



Easy operation

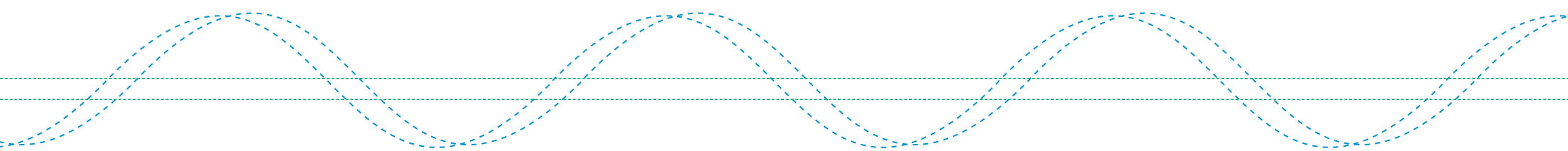
Simple, one-touch keypad control



with state-of-the-art performance

LifePort™ has just two settings: **MODE** and **PRESSURE**.

The microprocessor-controlled pump automatically maintains the pressure you set. Ice and water are all you will need to keep things cool. And a needleless port provides ready access for sampling or injection.

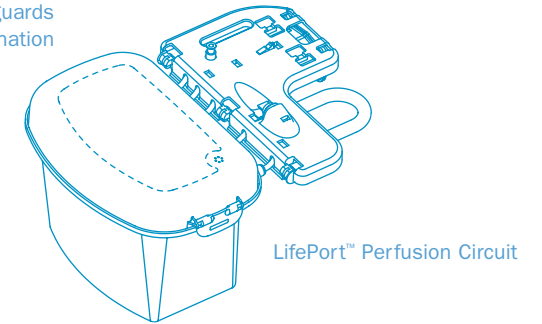


Continuous or pulsatile modes available



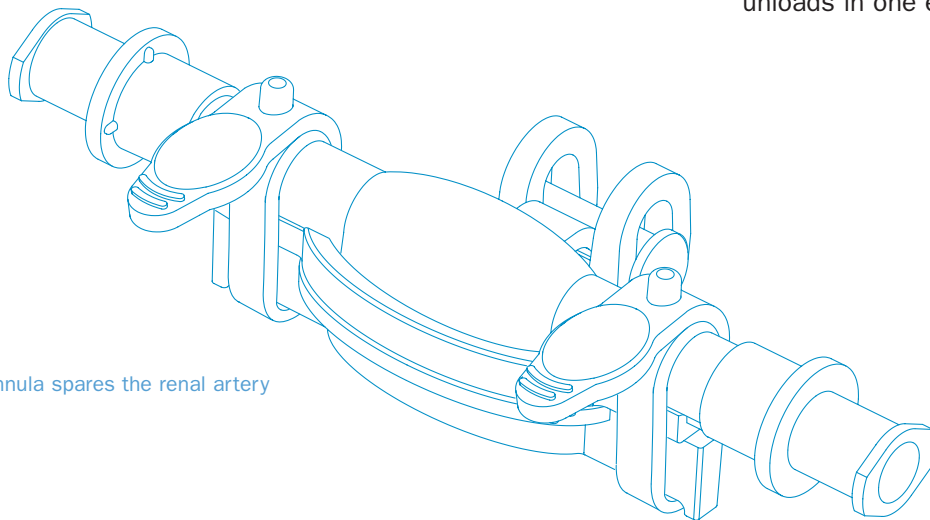
Simple connection

Closed system safeguards  
against environmental contamination



## with ready-to-use disposables

LifePort™ supports a kidney in the style it deserves. The self-contained Perfusion Circuit cradles the organ in a nourishing bath. A custom disposable cannula, situated comfortably on an adjustable mount, swiftly connects LifePort™ to even the most challenging anatomies. And the entire disposable apparatus—complete with organ cassette, preservative solution, tubeset, and pressure sensor—loads and unloads in one easy motion.

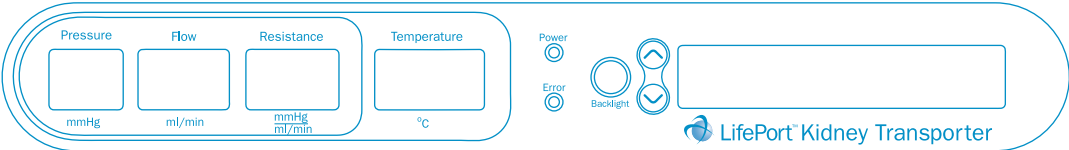


SealRing™ cannula spares the renal artery



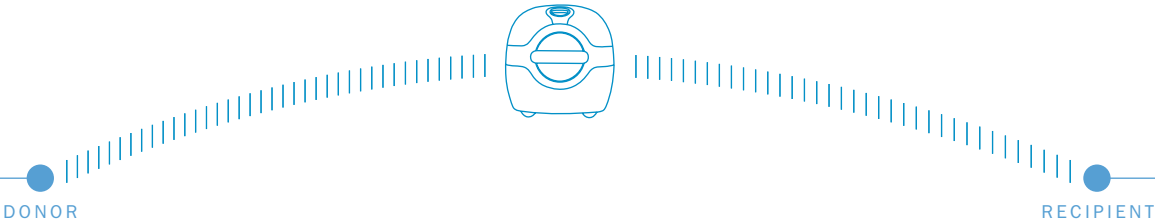
Vital information

Clear data display with electroluminescent backlighting



at your fingertips

LifePort™ captures and displays key performance data in real time. Onboard digital readouts show temperature, pressure, flow, resistance, and perfusion time. PC connection allows remote monitoring, reporting, and analysis.



The new data continuum spans the gap between recovery and transplantation

# LifePort™ Kidney Transporter



**A ICE CONTAINER**  
accepts replenishment  
without interrupting  
perfusion

**B PUMP DECK**  
effortlessly receives  
the Perfusion Circuit

**C BUBBLE DETECTORS**  
ultrasonically protect  
the organ from air  
embolisms

**D CASSETTE WELL**  
maintains a  
consistent hypothermic  
environment

**E CONTROL PANEL**  
sets perfusion  
in motion

**F INFUSION PUMP**  
delivers reliable  
performance with  
instrument-quality  
precision

**G OUTER DISPLAY**  
provides real-time  
data

**H ERGONOMIC HANDLES**  
comfortably fit grips  
of all sizes

**I INSULATING COVER**  
protects during  
transport

**J SAFETY LATCH**  
locks down the  
cover securely

**K ORGAN CASSETTE**  
features vented dual  
lids

**L FILTER**  
removes harmful  
particles

**M CANNULA MOUNT**  
allows proper arterial  
positioning

**N ORGAN CRADLE**  
easy to remove,  
supports and  
secures the kidney

**O TUBEFRAME**  
neatly manages setup  
and connection

**P PRESSURE SENSOR**  
built in to every  
Perfusion Circuit

**Q COUPLER**  
pairs cannulas to  
manage additional  
renal arteries

**R STRAIGHT CANNULA**  
inserts directly into  
the renal artery

**S SEALRING™ CANNULA**  
connects securely to  
calcified aortic patch-  
es and accommodates  
multiple renal arteries

**T AC PLUG**  
powers up LifePort™  
on any voltage

**U DATA PORT**  
guides the flow of  
critical perfusion  
information

**V BATTERIES**  
drop in, hot swap,  
and charge when  
plugged in



# Specifications

## DIMENSIONS

Size	<ul style="list-style-type: none"> <li>61 cm (24") x 35.6 cm (14") x 35.6 cm (14")</li> </ul>
Weight	<ul style="list-style-type: none"> <li>13.6 kg (30 lb) dry</li> <li>20.4 kg (45 lb) fully loaded</li> </ul>

## COOLING AND INSULATION

Cooling mechanism	<ul style="list-style-type: none"> <li>Conduction from organ cassette to ice container</li> </ul>
Insulated cold-zones	<ul style="list-style-type: none"> <li>Ice container, Pump Deck, Perfusion Circuit</li> </ul>
Cold mass	<ul style="list-style-type: none"> <li>5.5 L water-and-ice (50/50) slush</li> </ul>
Ice container	<ul style="list-style-type: none"> <li>Removable, replaceable, and watertight</li> <li>Replenishable without interrupting perfusion</li> <li>Ice is visible through transparent lid</li> </ul>
Electronics cooling	<ul style="list-style-type: none"> <li>Vented air convection</li> <li>Mains-activated fan</li> </ul>

## PUMP DECK

Infuse pump	<ul style="list-style-type: none"> <li>Peristaltic pump</li> <li>Infuse line pressure range user settable from 10 to 65 mm Hg</li> </ul>
Valves	<ul style="list-style-type: none"> <li>Wash valve, normally open</li> <li>Infuse valve, normally closed</li> </ul>
Sensor, flow	<ul style="list-style-type: none"> <li>Sensing range: 0 to 150 mL/min</li> <li>Accuracy: <math>\pm 10\%</math> accuracy above 20 mL/min</li> </ul>
Sensors, temperature (2)	<ul style="list-style-type: none"> <li>Temperature sensor 1: ice container</li> </ul>

Sensors, bubble (2)	<ul style="list-style-type: none"> <li>Temperature sensor 2: fluid in bubble trap</li> <li>Sensing range: <math>-30^{\circ}</math> to <math>60^{\circ}\text{C}</math></li> <li>Accuracy: <math>\pm 0.5^{\circ}\text{C}</math> (<math>-5^{\circ}</math> to <math>10^{\circ}\text{C}</math>)</li> <li>Bubble detector 1: filter output</li> <li>Bubble detector 2: infuse line</li> </ul>
Sensor, cover	<ul style="list-style-type: none"> <li>2 states: cover open/cover closed</li> </ul>
Sensor, Perfusion Circuit	<ul style="list-style-type: none"> <li>2 states: circuit loaded/circuit not present</li> </ul>

## CONTROL/DISPLAY

Control panel	<ul style="list-style-type: none"> <li>Set pressure display</li> <li>Set pressure increment/decrement buttons (1 mm Hg steps)</li> <li>Power, Wash, Prime, Infuse, and Stop buttons</li> <li>Power, Wash, Infuse, Prime, and Stop LEDs</li> </ul>
Outer display	<ul style="list-style-type: none"> <li>Alphanumeric display scroll buttons</li> <li>Backlight toggle button</li> <li>Power and Error LEDs</li> <li>Pressure display</li> <li>Flow rate display</li> <li>Resistance display</li> <li>Ice container temperature display</li> <li>Alphanumeric display indicating: avg pressure, perfusate temperature, infusion time, pulsatile parameters (diastolic pressure and bpm), temperature max/min, battery charge status, state, and messages</li> </ul>

## LIFEPORT™ PERFUSION CIRCUIT

Organ capacity	<ul style="list-style-type: none"> <li>One human kidney <math>\leq 7.5</math> cm x 17 cm x 4 cm</li> </ul>
Organ support	<ul style="list-style-type: none"> <li>Cradle support, mesh organ restraints</li> </ul>
Perfusate per use	<ul style="list-style-type: none"> <li>1 L</li> </ul>
Perfusate compatibility	<ul style="list-style-type: none"> <li>KPS-1® or other approved machine perfusion solution</li> </ul>
Circuit compatibility	<ul style="list-style-type: none"> <li>Use only with the LifePort™ Kidney Transporter</li> </ul>
Sterility considerations	<ul style="list-style-type: none"> <li>Single-use, ETO sterilized</li> </ul>
Sealing and venting	<ul style="list-style-type: none"> <li>Pressure-compensating and liquid-tight</li> <li>No perfusate wetting outside disposable set</li> </ul>
Bubble trap	<ul style="list-style-type: none"> <li>Disposable, integral to Perfusion Circuit</li> </ul>
Sensors, pressure	<ul style="list-style-type: none"> <li>Disposable, integral to Perfusion Circuit</li> <li>Sensing range: 0 to 150 mm Hg</li> <li>Accuracy: <math>\pm 10\%</math> above 10 mm Hg</li> </ul>
Solids filtration	<ul style="list-style-type: none"> <li>20-micron nominal, cartridge filter</li> </ul>
Cannula mount	<ul style="list-style-type: none"> <li>For positioning and securing LifePort™ Disposable Cannula</li> </ul>

## LIFEPORT™ DISPOSABLE CANNULAS

SealRing™ cannula	<ul style="list-style-type: none"> <li>7 x 20 mm and 10 x 35 mm</li> </ul>
Straight cannula	<ul style="list-style-type: none"> <li>3 mm, 5 mm, and 8 mm</li> </ul>
Cannula coupler	<ul style="list-style-type: none"> <li>Flexible, trimmable tubing with detachable Luer locks</li> </ul>

## ELECTRONICS MODULE

CPU board	<ul style="list-style-type: none"> <li>Analog circuits and I.O. for sensors, valves, and pumps</li> <li>Control panel interface</li> <li>Microcontroller circuits</li> <li>Embedded firmware</li> <li>Real-time clock</li> <li>RS232 I.O.</li> </ul>
Battery board	<ul style="list-style-type: none"> <li>Power management</li> <li>Battery management and recharge</li> </ul>
Perfusion mode	<ul style="list-style-type: none"> <li>Continuous or pulsatile</li> </ul>

## BATTERIES

Batteries	<ul style="list-style-type: none"> <li>1–4 lithium ion batteries</li> </ul>
Replacement	<ul style="list-style-type: none"> <li>Drop-in, hot swappable</li> </ul>
Status indicator	<ul style="list-style-type: none"> <li>Remaining time readout on outer display</li> <li>LED charge status indicator on each battery</li> </ul>
Charging	<ul style="list-style-type: none"> <li>Rapid recharge (5 hr) via mains</li> </ul>
Battery conditioning	<ul style="list-style-type: none"> <li>Available with accessory charger</li> </ul>

## MAINS POWER

Mains power	<ul style="list-style-type: none"> <li>100–240V AC; 50–60Hz</li> </ul>
Power cord	<ul style="list-style-type: none"> <li>2.5 m detachable, medical-grade (US)</li> </ul>

## POWER AND DATA PANEL

Contents	<ul style="list-style-type: none"> <li>Mains power connection</li> <li>RS232 serial connection</li> <li>Circuit breakers</li> </ul>
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## DATA COLLECTION

Interface	<ul style="list-style-type: none"> <li>RS232 serial connection</li> </ul>
Data	<ul style="list-style-type: none"> <li>Setpoints, calculated and displayed values, sensor readings, and events stored every 10 sec</li> </ul>
Data files	<ul style="list-style-type: none"> <li>Five 48-hr data files</li> </ul>
Data modes	<ul style="list-style-type: none"> <li>Query</li> <li>Streaming</li> <li>Upload</li> </ul>
External control	<ul style="list-style-type: none"> <li>LifePort™ cannot be controlled via RS232 port</li> </ul>

## ALARMS

Automatic alarms	<ul style="list-style-type: none"> <li>Check Tubing</li> <li>Occlusion</li> <li>Too Much Pressure</li> <li>Can't Reach Pressure</li> <li>Sensor Error</li> <li>Check Ice</li> <li>Near Freezing</li> <li>Purge Bubbles</li> </ul>
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<ul style="list-style-type: none"> <li>Bubbles</li> <li>Load Perfusion Circuit</li> <li>Pump Error</li> <li>Check Filter</li> <li>Low Battery</li> </ul>
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## PERFORMANCE

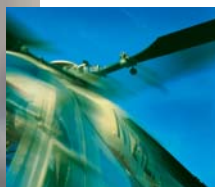
Closed loop control	<ul style="list-style-type: none"> <li>Constant pressure monitoring to maintain user-set pressure</li> </ul>
Temperature	<ul style="list-style-type: none"> <li>Maintains ice container temperature at <math>1^{\circ}</math> to <math>8^{\circ}</math> C over ice life</li> </ul>
Ice life	<ul style="list-style-type: none"> <li>24 hr with cover closed</li> </ul>
Battery life	<ul style="list-style-type: none"> <li>24-hr uninterrupted perfusion</li> </ul>
Hardwire safety circuits	<ul style="list-style-type: none"> <li>Maximum temperature</li> <li>Maximum pressure</li> <li>Motor current</li> <li>Watchdog</li> </ul>
Continuous flow	<ul style="list-style-type: none"> <li>Pressure regulated at user setting <math>\pm 20\%</math> above 10 mm Hg</li> </ul>
Pulsatile flow (optional configuration)	<ul style="list-style-type: none"> <li>Systolic pressure regulated to user setting <math>\pm 20\%</math> above 10 mm Hg</li> <li>Fixed pulse repetition rate</li> <li>Alphanumeric display of diastolic and average pressures</li> </ul>

CE 0050

This is only the beginning.

We are actively developing a LifePort™ Workstation and Perfusion Transporters that will accommodate the heart, liver, and pancreas—creating the first and only comprehensive system for preserving, transporting, treating, and assessing organs.

LifePort.™ Here.



Perfusion in motion

technologies | human | global

Innovating transplantation **technologies** that extend the **human** capacity for healing across a **global** stage



**Organ Recovery**  
systems

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