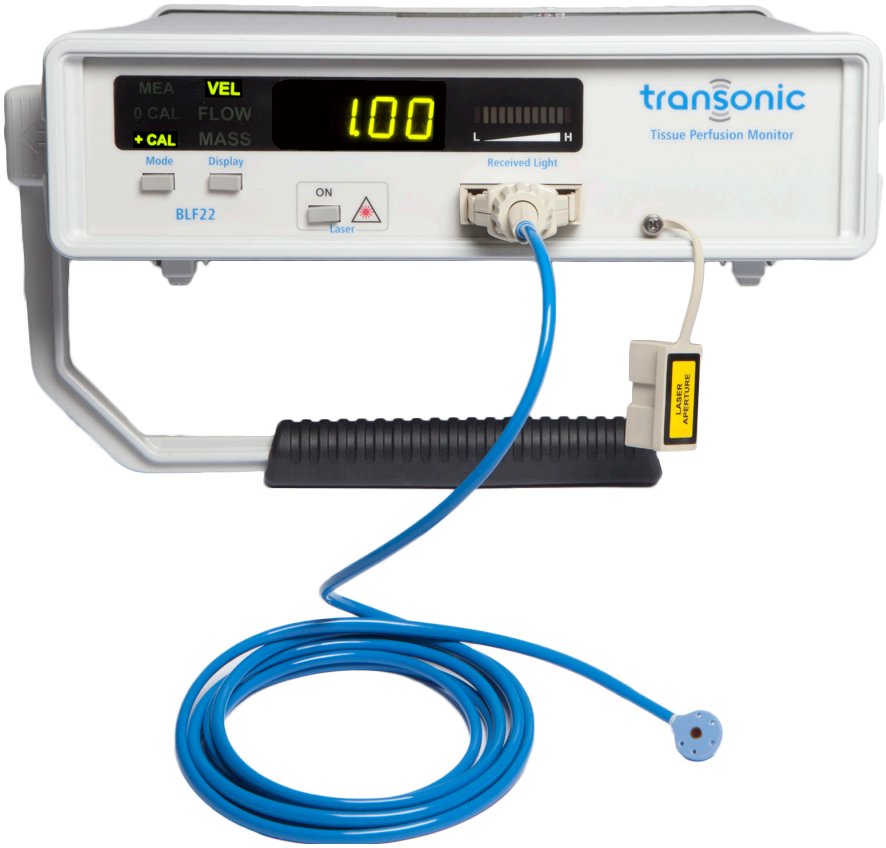
BLF22

Tissue Perfusion Monitor



MEASURE CONTINUOUS MICROVASCULAR PERFUSION, MASS & VELOCITY

- Laser Doppler technology measures blood perfusion in 1 mm³ of tissue.
- Sensitive monitoring of small tissue perfusion changes during an experimental course.
- The recorded waveform shows heart beat synchronous microperfusion pulsatility.
- Monitor effects of exercise, drug treatments, ischemia/reperfusion, manipulations on target microvascular beds.

transonic
THE MEASURE OF BETTER RESULTS.

BLF22 Tissue Perfusion Monitor

GASTRIC MUCOSA SKIN & TISSUE

APPLICATIONS IN EXPERIMENTAL MODELS

KIDNEY

Needle and monofiber Probes measure simultaneous perfusion in the renal cortex and medulla.

LOCAL CEREBRAL PERFUSION

Needle Probes measure sensitive blood flow changes in the cerebral cortex.

SKIN & TISSUE FLAPS

Surface Probes measure local perfusion.

DI Probe on Finger

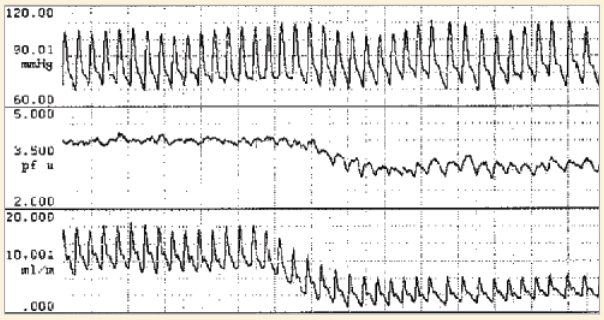
GASTRIC MUCOSA & SEROSA PERFUSION

Surface style or needle Probes may be used in large or small animals.

INTERNAL ORGANS

Surface Probes are used for intraoperative assessment on the liver, pancreas or kidney.

INSTANTANEOUS MICROCIRCULATORY PERFUSION MEASUREMENTS RECORDED SIMULTANEOUSLY WITH ARTERIAL BLOOD FLOW AND PRESSURE



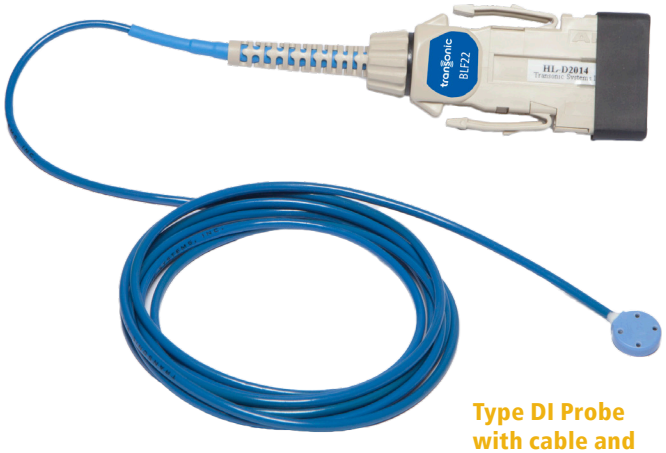
Auricular arterial volume blood flow (bottom), abdominal aorta arterial pressure (top) and microvascular ear perfusion (center) were recorded in a conscious male New Zealand white rabbit. Auricular artery blood flow was measured with a Transonic® 1 mm perivascular Flowprobe previously implanted on the vessel. Arterial pressure was measured via a catheter advanced in the femoral artery. Perfusion in the ear was measured acutely with a Type DI Probe.

Why Measure Mass and Velocity?

Mass and Velocity measurements allow for a more complete picture of changing perfusion conditions and a better understanding of complex physiological responses.

For example: by measuring Flow alone there is no way to determine if an increase in Flow is due to an increase in the Velocity of the RBC or an increase in the amount (Mass) of RBC in the tissue due to increased capillary recruitment.

- BLOOD FLOW: 0-100 tissue perfusion units proportional to mL per min per 100 g of tissue. Uses Doppler light shift from moving RBC to analyze flow by the Bonner algorithm.
- MASS: 0-2000 units proportional to the mass of moving RBC in mg per 100 g of tissue.
- VELOCITY: 0-10.0 units proportional to average flow velocity of moving RBC in m/sec.



Type DI Probe with cable and FDDI connector

Laser Doppler Probes

F L A P S K I D N E Y C E R E B R A L C O R T E X

A Wide Selection of Probe Styles to Meet Application Requirements

SURFACE PROBES

- Type R: Right Angle (ABLPHR) head: epoxy, diameter: 15 mm, height: 7 mm, suture holes
- Type DI: Disk (ABLPHDI) head: epoxy, diameter: 12 mm, height: 3 mm, suture holes
- Type I: Implantable (ABLPHI) head: epoxy with glass window lengths: (approximate) 14 mm, width: 6 mm, height: 3 mm
- Type S: Straight (ABLPHS): titanium tip, diameter: 6 mm, length: 6 mm

CUSTOM PROBES

- MRI/NMR: Type I, R and S probes are non-magnetic. Type N can be made of brass with a 1 mm diameter. Probes can be as long as needed to isolate the instrument from the magnet.
- Curved Needles: A variety of shapes and lengths can be fabricated. Limited to 18 gauge needle Probe.

OPTICAL FIBER OF PROBES

TRANSMIT/RECEIVE FIBER

- Size: 0.0625 mm
- Type: glass, graded index
- Numerical aperture: 0.275 ± 0.15 mm

TRANSMIT/RECEIVE SPACING

- 0.5 mm (standard)
- 0.15, 0.3, 0.7 mm available for special applications

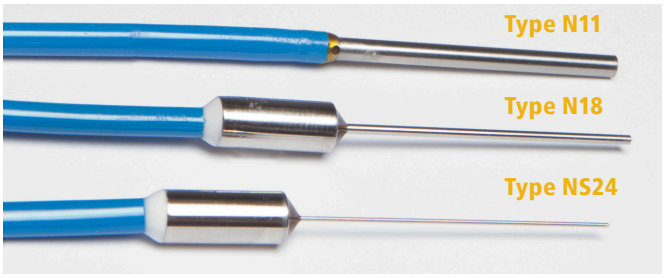
CONNECTOR

FDDI type rated for minimum of 500 connections

NEEDLE PROBES

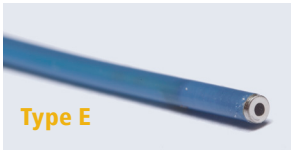
For use with a mircomanipulator

- Type N: Stainless steel shaft; standard length: 40 mm, shorter or longer lengths available on request
  - 11 gauge needle: diameter: 3 mm (ABLPHN11)
  - 18 gauge needle: diameter: 1.2 mm (ABLPHN18)
  - 20 gauge needle: diameter: 0.812 mm (ABLPHN20)
- Type NS: 24 gauge needle (ABLPHNS24) diameter: 0.58 mm, length: 40 mm



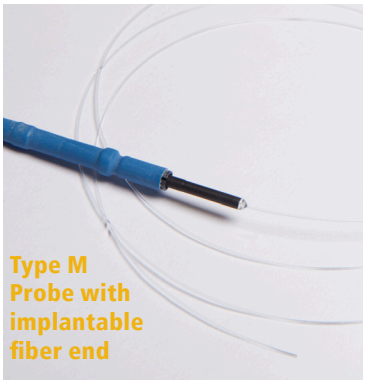
ENDOSCOPIC PROBE

- Type E: Teflon coated cable with 1 mm titanium disc at tip of endoscopy segment (ABLPHE): length: 2 m, diameter: 1.8 mm; flexible cable length: 2 m; total length: 4 m



MONOFIBER PROBE

- Type M: Two fiber cables (ABLPLM) with implantable single fiber ends; 0.5 mm diameter (AFAL1026).



References available at: **www.transonic.com**

BLF22 Tissue Perfusion Monitor Specifications

WEIGHT

2.95 Kg (6.5 lbs)

CASE DIMENSIONS (w x d x h)

25.6x32.4x6.9 cm (10.1x12.8x2.7")

ENVIRONMENTAL CONDITIONS

- Storage & Transport Temperature: -40°C to +70°C
- Operation Temperature: 0°C to +40°C
- Relative Humidity: 20% to 90%
- Atmospheric Pressure: 500-1060 hPa
- IPX Rating: IP31

INFRARED LASER DIODE

- Class 3R laser product per IEC60825-1-2007
- Optical power output: <3 mw
- Wavelength: 785 nm

LASER POWER (at tip of Probe)

< 2 mW

DOPPLER SIGNAL BAND

24 Hz - 24 KHz

FIELD OF MEASUREMENT

Approximately 1 mm^3 at 1 mm depth into the tissue (for Probes with 0.5 mm optical fiber spacing)

OUTPUT RANGE

- **Flow:** 0-100 tissue perfusion units proportional to mL per min per 100 g of tissue
- **Mass:** 0-2000 units proportional to the mass of the moving red blood cells, in milligrams per 100 g of tissue
- **Velocity:** 0-10.0 units proportional to the average flow velocity (m/sec) of the moving red blood cells

DIGITAL (USB) SIGNALS

1st order RC time; Digital 7.5 Hz 3rd Butterworth

OUTPUT TIME CONSTANTS

0.1, 1.0 and 3.0 sec (1st order low pass filter) Individually switch-selectable for each of flow, mass and velocity analog outputs

FRONT PANEL DISPLAY

1st order low-pass filtered at 1.5 Hz

SUBJECT ISOLATION

No electrical connection between instrument's line ground & Probe.

LINE TO MONITOR ISOLATION

Metal components of the Monitor case (back panel, ground to the analog outputs enclosure) are connected to the line ground.

WARM-UP TIME

10 minutes

EQUIPMENT RATINGS

100-240 VAC; 50-60 Hz, single phase; 20 VA

POWER LINE FUSE

1.5 A All models

REGULATORY COMPLIANCE

Transonic® Monitors and Laser Doppler Probes comply with acceptable standards for medical equipment. Transonic® is an ISO13485-certified facility.

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Transonic Systems Inc. is a global manufacturer of innovative biomedical measurement equipment. Founded in 1983, Transonic sells "gold standard" transit-time ultrasound flowmeters and monitors for surgical, hemodialysis, pediatric critical care, perfusion, interventional radiology and research applications. In addition, Transonic provides pressure and pressure volume systems, laser Doppler flowmeters and telemetry systems.

AMERICAS
Transonic Systems Inc.
Tel: +1 607-257-5300
Fax: +1 607-257-7256
support@transonic.com

EUROPE
Transonic Europe B.V.
Tel: +31 43-407-7200
Fax: +31 43-407-7201
europe@transonic.com

ASIA/PACIFIC
Transonic Asia Inc.
Tel: +886 3399-5806
Fax: +886 3399-5805
support@transonicasia.com

JAPAN
Nipro-Transonic Japan Inc.
Tel: +81 04-2946-8541
Fax: +81 04-2946-8542
japan@transonic.com