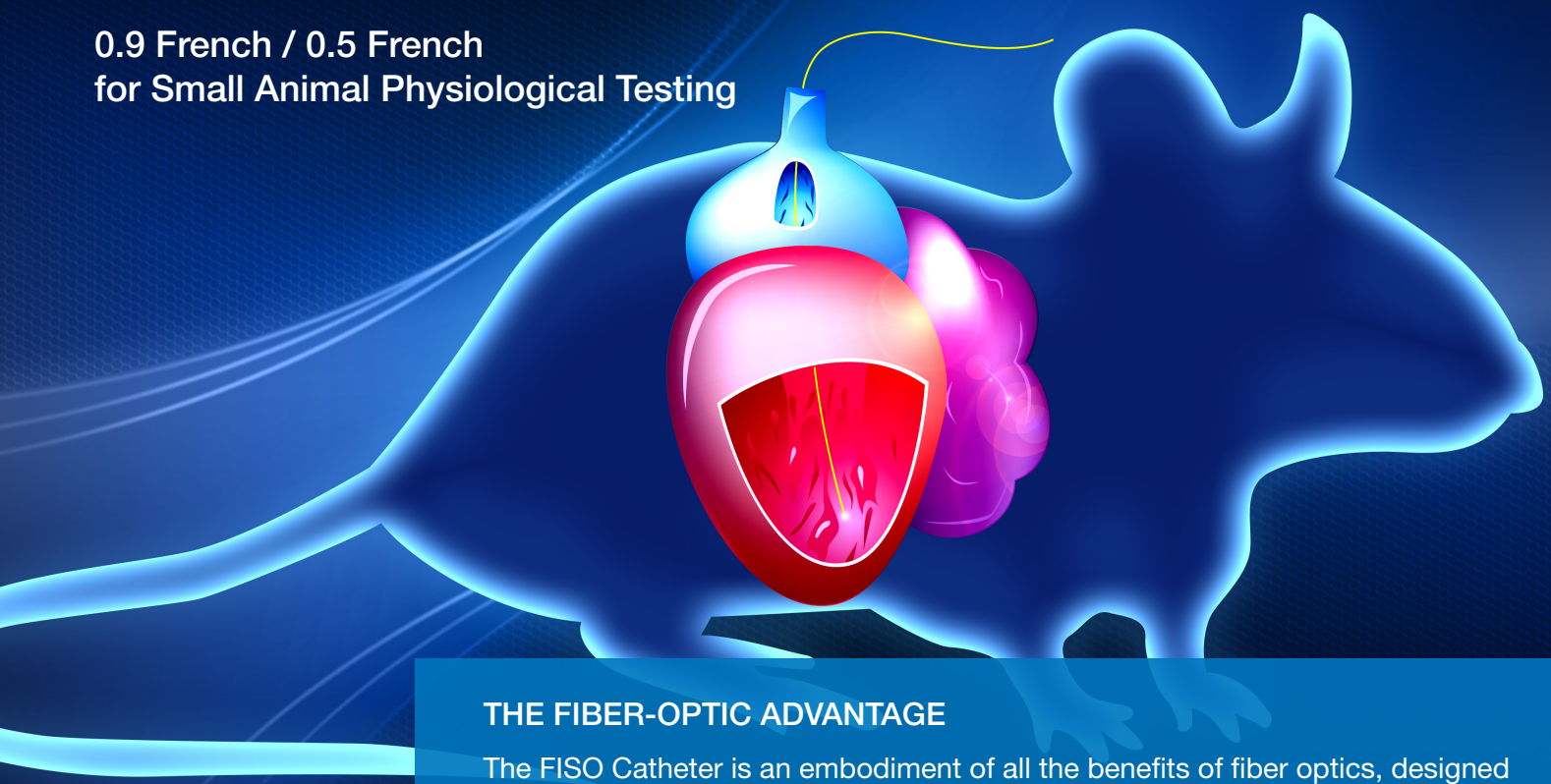
Multiple-use Pre-clinical Pressure Catheter

0.9 French / 0.5 French
for Small Animal Physiological Testing



THE FIBER-OPTIC ADVANTAGE

The FISO Catheter is an embodiment of all the benefits of fiber optics, designed specifically for small-animal research, enabling unique capabilities such as:

- Pressure readings at the exact location of interest due to forward-facing sensing design
- Accurate measurements inside an MRI machine
- Minimized blockage of blood flow in cardiovascular applications due to sheathing dimensions as small as 0.5 Fr

KEY FEATURES

- Sheathing as small as 0.5 French
- Catheter tip sizes as small as 0.9 French
- All-optical sensor, no electronics
- Reading instrument supplied with control and data acquisition software
- Tip pressure sensor, not side-looking

RESULTING BENEFITS

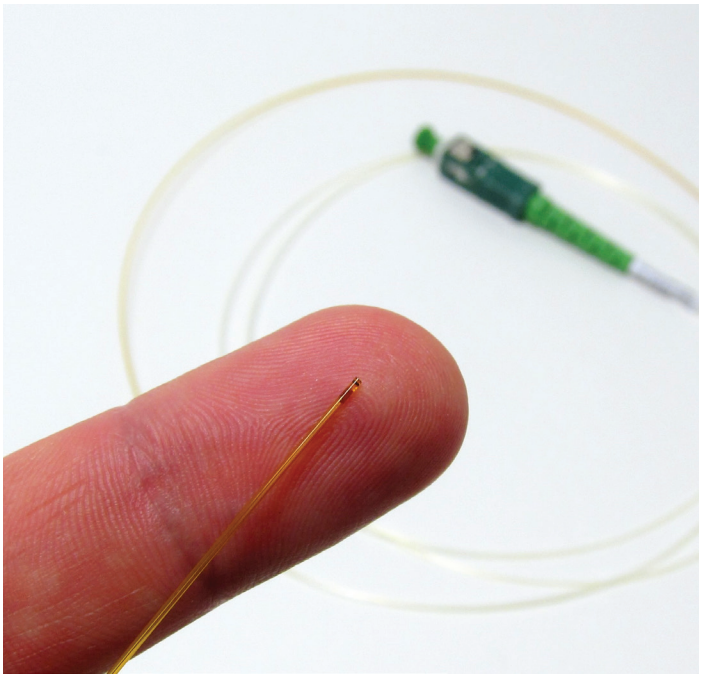
- Femoral insertion, chronic-use now possible
- No side-facing measurement artifacts
- Immune to interference from RF and EMI
- All-in-one preclinical pressure test solution
- Multiple-use catheter

fiso.com

Catheter Specifications

THE NEW STANDARD IN HEMODYNAMIC PRESSURE READINGS IS MRI COMPATIBLE

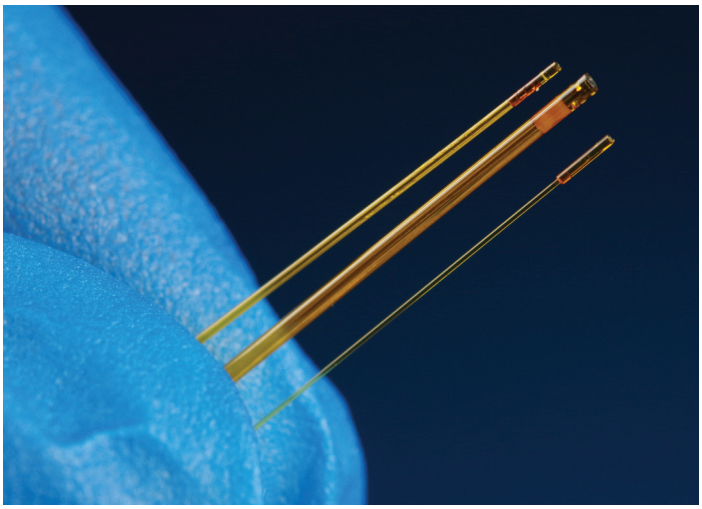
The FISO Catheter offers significant advantages over traditional solid-state catheters, while maintaining excellent performance in signal integrity and frequency response. The other major benefits of the FISO Catheter include: (i) no side-facing sensor measurement artifacts such as is commonly encountered by proximity to vessel walls, and (ii) the ability to function within an MRI machine, or within any noisy EMI or RF-rich environment.



Fiber optic pressure transducers have revolutionized several markets due to their extremely small size, fast speeds, and immunity to RF & EMI.

APPLICATIONS INCLUDE

- **Neuroscience** - Intracranial pressure
- **Cardiovascular** - LV pressure, arterial BP
- **Intraocular pressure**
- **Urology** – Bladder/Ureter pressure
- **Spine** – Intradiscal pressure
- **Bone** – Intermedullary pressure
- **MRI Gating** – Arterial blood pressure or LV pressure for image gating
- **Respiratory**
- **Gastro Intestinal**

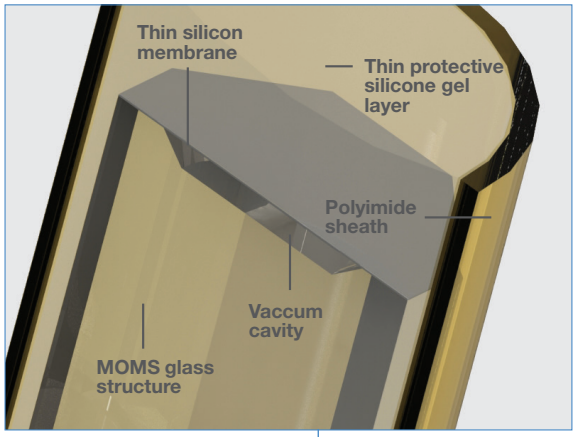


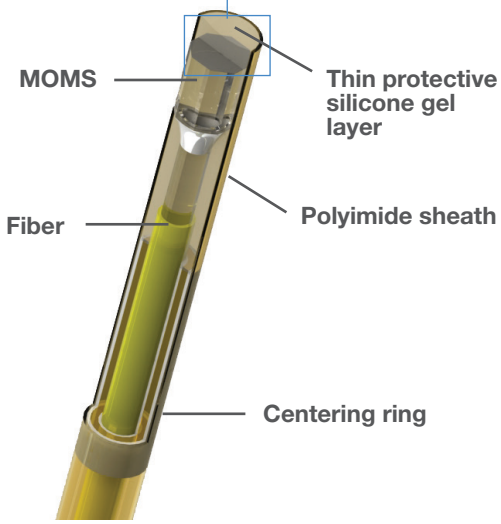
Some of the Life Science series, top to bottom: (FOP-LS-PT9-10; FOP-LS-2FR-10; FOP-LS-PT9-11)

Configurations Available

Ordering code	Tip diameter	Tip length	Sheating diameter	Sheating length	Total length	Pressure range
FOP-LS-PT9-10	0.9Fr	N/A	0.9Fr	20cm	1.7 meters	± 300mmHg
FOP-LS-PT9-11	0.9Fr	1.25mm	0.5Fr	20cm	1.7 meters	± 300mmHg
FOP-LS-PT9-20	0.9Fr	N/A	0.9Fr	20cm	10 meters	± 300mmHg
FOP-LS-2FR-10	2 Fr	N/A	2 Fr	70cm	1.7 meters	± 300mmHg
FOP-LS-2FR-20	2 Fr	N/A	2 Fr	70cm	10 meters	± 300mmHg
FOP-LS-2FR-30	2 Fr	N/A	2 Fr	70cm	1.7 meters	0-10 bars

The Technology

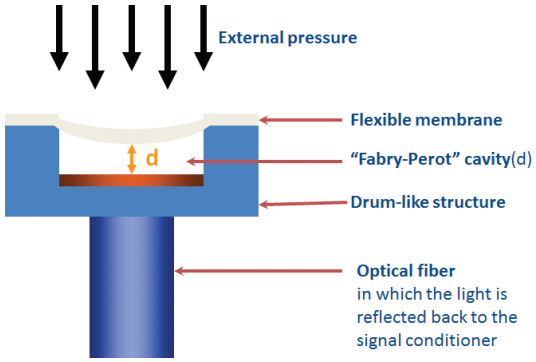




The optical pressure transducer at the heart of the FISO Catheter is a Fabry-Pérot (F-P) etalon which comprises two parallel reflecting mirrors on either side of a transparent medium, where the distance between the mirrors is known as the etalon cavity length. The reflection spectrum of the F-P etalon has distinct peaks in wavelength as a function of the cavity length, physically corresponding to resonances of the etalon. Named after the two French physicists who mathematically modeled this optical structure well over 120 years ago, the term etalon comes from the French word, étalon, meaning “measuring gauge” or “standard”.

FISO’s pressure transducers are a flexible embodiment of the F-P etalon. As illustrated below, a deformable membrane is assembled over a vacuumed cavity, forming a small drum-like structure. The bottom of the drum and the inner surface of the flexible membrane form the sensing F-P cavity. When pressure is applied, the membrane is deflected towards the bottom of the drum, thus reducing the cavity length. After the NIST-traceable factory sensor calibration, the etalon cavity length will correspond to a very precise pressure value. The signal conditioner is designed to be able to accurately determine the cavity length with sub-nanometer precision.

In this way, the pressure transducer and signal conditioner form an extremely precise and repeatable pressure measurement system.



EASY-TO-USE

The FISO Catheter has unrivaled ease-of-use, as the catheter comes pre-calibrated, with the calibration data stored in a smart-chip in the fiber-optic connector for the signal conditioner to read automatically. There is no need to benchmark to an external pressure reference as the sensing technology provides precise pressure readings after nulling to the ambient pressure.

ENABLES LOWER RUNNING COSTS

No need for solid-state pressure catheters when mass produced optical sensors and fibers are inexpensive and small. Also, being less than 1Fr in size, the catheter can be inserted into the femoral artery, thereby extending the use of the valuable transgenic animals.

PROVEN SENSING TECHNOLOGY

The pressure transducer has been used in numerous applications in medical pressure sensing for over 15 years.

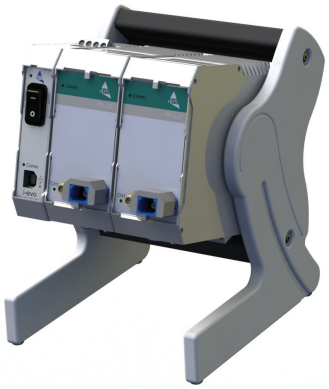
Module and Chassis Specifications

FPI-LS MODULE

This “signal conditioning” module is both the light source and receiver of the fiber optic measurement system. The FPI-LS converts the optical signal to a pressure reading and requires no external amplification box. The researcher may plug the catheter’s optical connector directly into the FPI-LS or may use an (optional) extension cable with accompanying connection box.

EVO CHASSIS

The bench-top chassis is provided with Evolution data acquisition and instrument control software. Modular in design, researchers can add FPI modules, and thus more channels, as time and budgets permit.



PARAMETER	FPI-LS and the FISO Catheter
Pressure range	-300 mmHg to +300 mmHg
Precision	+/- 1% of Full Scale
Resolution	+/- 0.3 mmHg, dependent on filtering used
Temperature range	10°C to 50°C
Sampling rate	Analog Output: 15,000 Hz Digital Output: Up to 5000 Hz. settable via Evolution Software
Data output	Digital USB 2.0 / Analog 0-5V 16 bit

Evolution Software and Solution Summary

CONFIGURE AND CONTROL THE READING INSTRUMENT

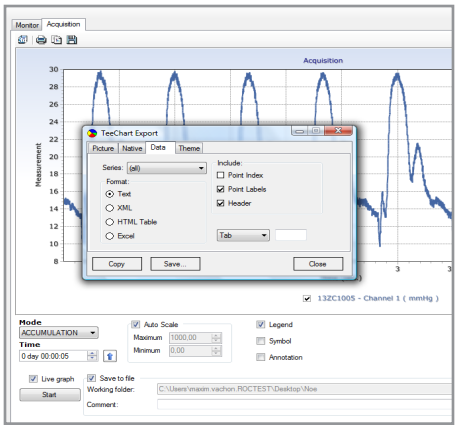
The most common set-up for users will be to configure the 0-5V analog output level to the pressure range of interest, but the end-user will also enjoy the ability to visually confirm proper communication between catheters and the instrument.

SIMPLE MONITORING AND REAL-TIME GRAPHING

Users may easily choose between reading the actual measurement, or plot (both in real-time) with user specified screen refresh rates and graphing options.

EXPORT DATA

While users may generally prefer to use the 15kHz analog output on the FPI-LS, data may also be recorded and saved in multiple file formats.



Module and Chassis Specifications

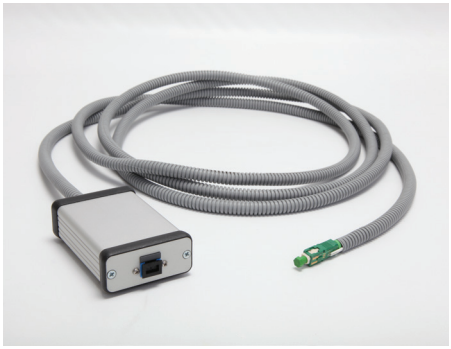
ALL-IN-ONE PRECLINICAL PRESSURE TEST SOLUTION

The entire solution comprises: an animal-use catheter, the signal conditioner in power supply housing (FPI-LS with EVO Chassis), control & acquisition software, and optional extension cables and data acquisition system. Computer interface and data analysis software is supplied by the researcher.

Other Accessories

EXTENSION CABLE

Be sure to purchase this 3 meter extension cable when a longer working distance is required, but also can be removed when working close to the subject



BNC CABLE

For connection to standard data acquisition systems, a SMA-BNC cable is provided with every FPI-LS module purchased

CLEANING KIT

The catheter distal end cleaning guide is provided, along with several packs of the required disinfectant, with each catheter purchased

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