

MRI and Medical Research Temperature Monitoring

Rapid-Response, High-Accuracy Temperature Monitoring

Various life sciences applications including patient monitoring, surface skin and core temperature monitoring, and MRI (Magnetic Resonance Imaging) phantom implantable device testing require high-accuracy temperature sensing. Environments such as MRI, MWA (Microwave Ablation) and NMRI (nuclear magnetic resonance imaging) have high magnetic fields combined with pulsed RF (radio frequency) that prohibit the use of metallic sensors.

Other applications require small-diameter, rapid-response and high-accuracy temperature sensors for catheter, RF physiological studies with animals and patient monitoring during electro-surgical procedures.



OSENSA's MRI and Medical Temperature Monitoring Solutions Meet the Challenge



OSENSA's fiber optic temperature sensors provide high accuracy sensing in environments that are not conducive to standard thermometers and RTDs (resistance temperature detectors). OSENSA's fiber optic sensors are constructed from non-metallic materials making them ideally suited for monitoring patient temperature and ensuring the specific absorption rate of tissue does not exceed damaging levels. OSENSA offers high-accuracy fiber optic temperature sensors in a range of sizes and materials that are well suited for MRI and CT (X-ray computed tomography) research. OSENSA's fiber optic probes are constructed out of x-ray transparent materials and with non-magnetic connectors for full compatibility in MRI and CT scanning rooms. In addition, fast-response, ultra-small diameter fiber optic probes are available, specially designed to meet the requirements of many demanding applications.

OSENSA's LUX+ solutions for MRI and medical research applications include the following components:

- Temperature Transmitter - FTX-300/200/100-LUX+, FTX-020-OEM
- Temperature Probes and Extension Cables – PRB-100, PRB-220, PRB-400, EXT-400
- Powered USB Base Station – ACC-USB-BASE

Temperature Transmitters (Signal Conditioners)

The FTX-300/200/100-LUX+ fiber optic signal conditioners offer exceptional value combined with industry-leading response time and accuracy. The temperature transmitters are available in three, two or single channels, and can be connected in series and mounted on a standard 35mm DIN rail. The FTX-LUX+ transmitters can read optical sensors with tip diameters as small as 250 microns over distances up to 50 meters. Longer distances can be supported with custom-tailored solutions. The 4-20mA analog outputs have 16-bit resolution with configurable alarms for easy connection to a PLC, temperature controller, solid state relay, or digital display. Alternatively, the FTX-LUX+ transmitter connects to a computer with a standard USB cable to provide real-time temperature trending and data logging with the optional OSENSAVIEW Pro software.



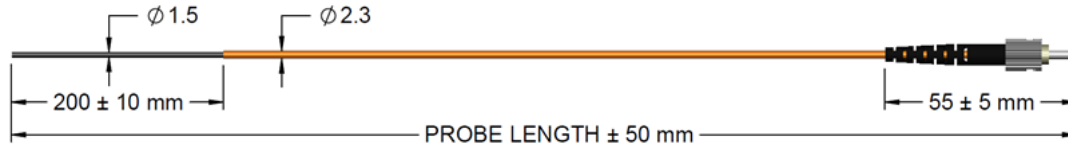
The FTX-020-OEM module is the world's smallest temperature transmitter for OEM applications like MRI and MWA patient monitoring. The FTX-020 temperature transmitter is 75% smaller than competitive solutions and can be soldered directly to printed circuit boards for easy and low-cost integration into OEM systems. The FTX-020 is also ideally suited for measuring gradient coil temperatures in MRI equipment.



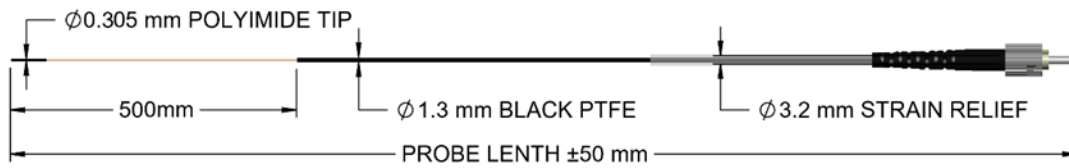
Temperature Probes and Extension Cables

OSENSA's PRB-100/220/400 fiber optic temperature probes are specifically designed for MRI and RF environments. Not only are these probes immune to high intensity magnetic fields, microwaves, and low-concentration X-rays, but they also offer industry leading accuracy, precision, and reliability. The PRB-100 style is a general purpose, ruggedized, all polymer optical fiber temperature sensor that can withstand daily abuse. The PRB-220 combines fast response time with a small-diameter tip for catheter applications. The PRB-400 offers an exceptionally fast response time and is ideally suited for patient monitoring. The PRB-100/220/400 probes deliver an industry leading $\pm 0.1^{\circ}\text{C}$ accuracy (over calibrated temperature from 10°C to 60°C). Furthermore, the probes are compatible with MRI phantoms for implantable device testing in magnetic fields up to 16 Tesla, without a temperature shift as seen with competitive solutions.

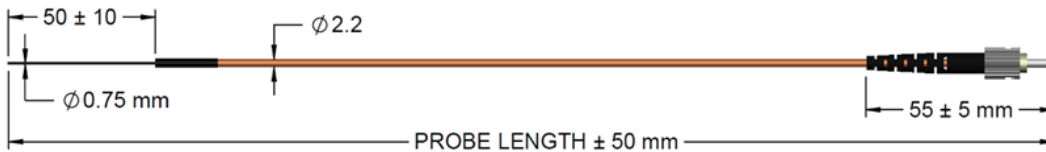
PRB-100



PRB-G20-MRI

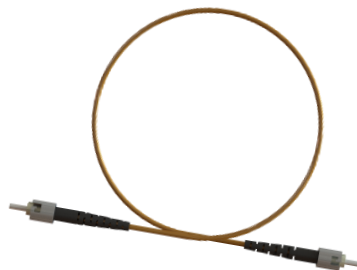


PRB-400



For extended reach applications, OSENSA offers the EXT-400 extension cable. Custom cables are available upon request.

EXT-400-10M-STM-STM



Powered USB Base Station

OSENSA's ACC-USB-BASE offers a simple way to mount FTX-series fiber optic temperature transmitters. The 35mm DIN rail base supplies power and USB communication for up to 10 signal conditioners. The underside has four rubber feet to prevent it from sliding around on your desk, as well as features for wall mounting. The integrated USB to RS-485 cable supports communications speeds up to 115.2kbps.



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