

TSI MINI-FIBER PROBES SERIES TR110/TR210

THE LATEST IN FIBEROPTIC PROBE
TECHNOLOGY IN THE SMALLEST
PACKAGE SIZE AVAILABLE FROM TSI

TSI's Mini-Fiber Probe Series TR 110/TR210 are the next generation of fiberoptic miniprobes from TSI, the pioneer in fiber probe-based Laser Doppler Velocimetry (LDV) measurements. The new probes integrate advances in fiber technology, optics miniaturization, and performance, enabling measurements never-before-possible. They provide the ideal combination of ruggedness and flexibility needed for accurate flow diagnostics in confined spaces using fiberoptic probes immersed in the flow.



Applications

- + Underwater LDV
- + Turbulence characterization
- + Velocity measurement
- + IC engine measurements
- + Boundary layer flows
- + Back scatter LDV measurements

Operation

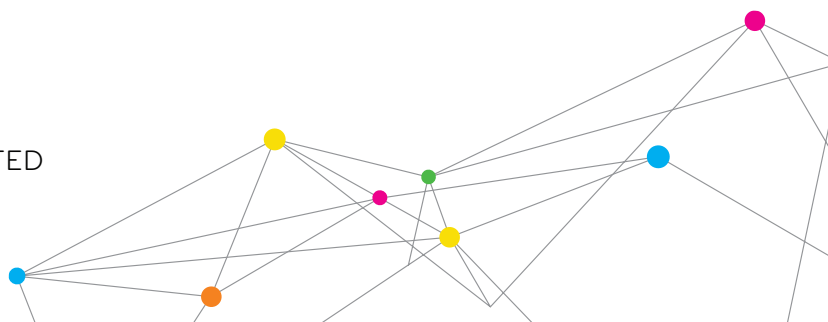
The TR110 and TR210 series probes incorporate the latest advances in fiberoptic technology, miniature optics, specialty metals, and precision machining to enable trouble-free measurements. A new lens design offers a choice of three interchangeable lenses, all able to operate in air or underwater.

Features and Benefits

- + Super-compact size
- + Sealed construction
- + Stainless steel construction
- + Selection of three multi-purpose lenses
- + Transmits as well as receives the scattered light
- + Can be immersed in the flow with minimum disturbance



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SPECIFICATIONS

TSI® MINI-FIBER PROBES SERIES TR110/TR210

Diameter

15.2 mm

Length

159 mm

Weight

200g

Fringe Spacing

4.1 μm standard; 5.5 μm and 8.2 μm optional

Measurement Region

Diameter 79 μm standard; 105 μm and 157 μm optional

Number of Fringes

19

Construction

Multi-alloy stainless steel and ceramic

Underwater Operation

Water-tight to 1 Atm

Temperature Range

0 to 50°C (storage, shipping);
0 to 25°C (operating)

Lens Focal Length

60 mm supplied with the probe; 80 mm and 120 mm optional

Lens Usage

All lenses can be used in air or underwater

Fiber Cable Length

8 m standard; 15 m and 20 m optional

Interchangeability

Interchangeable with all other TSI fiberoptic probes

Output Fiber Connection

SMA

Lens Model Numbers

TLN01-60, TLN01-80, TLN01-120

Specifications are subject to change without notice.

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Operation

The probes use single-mode transmitting fibers and a SNR-optimized multimode fiber-based receiving system. Miniature optics components produce a smaller measurement volume, higher spatial resolution, and a more stable beam crossing. The fibers and optics work together to provide cleaner, stronger signals and higher data rates.

Specialty stainless alloys and ceramics, combined with appropriate stabilization processes, reduce internal stress buildup, and improve long-term stability, even with changes in environmental conditions. This ensures more years of trouble-free performance before the probe will require servicing.

Special CNC and EDM machining techniques are used to manufacture the miniature high-precision parts used only in the new TR110 and TR210 series. A sealed and purged design makes them the choice for underwater and in-flow measurement situations. They also are ideal for measurements in restricted or confined spaces. The lightweight probe body can be placed inside ducts or flow channels or in test enclosures and the like.

The TR110 and TR210 series probes are particularly suited for use in TSI's IC engine probes, which can be used in either 12mm or 14mm spark plug ports. Thanks to a wide operating temperature range, they also can be used inside furnaces and boilers, provided a suitable cooling jacket is used.

The three multipurpose interchangeable lenses combine to offer a 2:1 range in fringe spacing and waist size. All can be used in air or in submerged flow applications. Only high accuracy, coated, chromically- and spherically-corrected optics are used, as in all TSI LDV and PDPA optics.

A single TR110 probe measures one component of velocity and a TR210 probe two velocity components. Combining TR110 and TR210 probes allows all three velocity components to be measured.



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