

IC Engine Probe Adaptors Models EP-12 and EP-14

Unleash the power of TSI's FSA Signal Processor inside your IC Engine! Obtain time-resolved, in-cylinder velocity and turbulence data—exclusively from TSI!

Features

- Allows acquisition of time-resolved, spatially-resolved, cycle-resolved velocity data
- Model EP-12 designed for 12mm spark plug thread size, EP-14 for 14mm thread
- User-selectable reference angle
- 30-degree increments in probe rotational position, measured from user-selected reference angle
- Continuously variable measurement depth (reach)
- Unique design—no slip-rings, spacers or washers
- Uses the full aperture of the fiberoptic probe
- Anti-reflection coated window
- Any TR110 or TR210 series fiberoptic probe from TSI can be used with the EP-12 and EP-14 IC Engine Probe Adaptors
- Protects the fiberoptic probe

Introduction

Internal combustion (IC) engine development is becoming extremely competitive and knowledge-based. No longer can an engine design effort be considered as a one-dimensional project, because each sub-system requires advanced preparation, modeling, testing, and validation.



The combustion system is one key part of the engine. Emissions regulations demand the cleanest, most complete burning of the fuel. Also, fuel economy standards require the most efficient burning of the fuel. Experimental measurements of in-cylinder flows are often combined with numerical simulations to help the IC engine design team meet all of these objectives.

The best in-cylinder flow measurements are performed when the test-engine geometry is the same as that of a production engine. So while complete mapping of the in-cylinder flow pattern is useful, normally it requires extensive changes to the combustion system. The piston, cylinder wall, and head all need to be modified for optical access. The new EP-12 and EP-14 IC Engine Probe Adaptors allow time-resolved, spatially resolved, even cycle-resolved, velocity and turbulence measurements on unmodified IC engines. No separate optical access is needed, and the in-cylinder flow geometry stays just the way you want it.

The Model EP-12 and EP-14 IC Engine Probe Adaptors are used with TR110 series one-component or TR210 series two-component transceiver probes from TSI. The standard TLN01-60EP lens included with the probe adaptor allows measurements from the window surface to 15mm outward. The optional Model TLN01-50EP “high-SNR” lens offers improved signal-to-noise ratio for the 0 to 5mm region where the spark gap is typically located. The optional Model TLN01-80EP “long stand-off” lens allows measurement over the 19 to 35mm range.

Special Features

The EP-12 and EP-14 IC Engine Probe Adaptors are backed by hours of engine testing and laboratory use. This experience has led to a unique, user-friendly IC engine adaptor that lets the user extract meaningful data from completely unmodified engines. Velocity data are acquired using the coaxial transmitter/receiver approach, the key to obtaining time-resolved, spatially-resolved, cycle-resolved velocity data without costly, unrealistic optical access or single-cylinder engine testing.

Both 12mm and 14mm thread sizes are available, and the special design permits continuous variation of the measurement location, from the window surface outward. Any current TSI 15mm probe can be used in the EP-12 and EP-14 IC Engine Probe Adaptors. An anti-reflection coated window maximizes efficiency and SNR. The reference angle can be set and locked, so the probe can be removed and replaced in the same angular and axial position. The probe can be positioned in 30-degree rotational increments from the reference position, allowing the user to measure any dominant in-cylinder flow direction.

The EP-12 and EP-14 IC Engine Probe Adaptors use no internal slip-rings, spacer rings, or washers that could be dropped or misplaced in the laboratory. A unique internal indexing ring allows the measurement depth to be varied while maintaining the reference position.

Since the TR110 and TR210 series fiberoptic probes are compatible with other TSI transmitter/transceiver probes, existing LDV/PDPA customers need to add only the probe and EP-12 or EP-14 IC Engine Probe Adaptors. The **fiberlight™** Multicolor Beam Separator, PDM Scattered Light Separation and Photodetector System, and FSA Multi-bit Digital Processor can be used in their standard configuration.

Specifications

IC Engine Probe Adaptors Models EP-12 and EP-14

Thread Size	
Model EP-12	12 × 1.25mm
Model EP-14	14 × 1.25mm
Measurement Distance	
Standard TLN01-60EP Lens	0 to 15mm
Optional TLN01-50EP “High-SNR” Lens	0 to 5mm
Optional TLN01-80EP “Long Stand-off” Lens	19 to 35mm
Length*	160mm
Window	AR-Coated Fused Silica
Clear Aperture	6.4mm
Outer Diameter	
Sleeve	19.05mm
End Cap	24.61mm
Inner Diameter	15.49mm
Depth Adjustment Range (max)	17mm
Depth Adjustment Rate	0.794mm/turn
Maximum Operating Temperature	204°C (continuous)
Maximum Operating Pressure	17MPa
Weight	240g
Lenses	TLN01 EP Series

* Add 75mm for the armored monocoil loop

Specifications subject to change without notice.



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