

FPT-850

Fiber-Optic Coupled Transmission Probe

*High performance spectroscopic probes for laboratory and process analysis
... Near-IR, Visible, UV.*



The FPT-850 transmission probe is a good combination of photometric accuracy and robust reliability for a wide range of process applications. It provides extreme robustness for the most demanding process applications. The FPT probe employs a single pass through the sample gap. This has two important advantages compared to double pass “transflectance” probes. First, it eliminates the possibility of stray light offset caused by backscatter from either the sample or the probe windows. Second, it provides twice the window separation for a given optical path length, greatly enhancing sample flow between the windows.

A second distinguishing characteristic of the FPT model probe is the fact that it does not use internal optical fibers¹. This has two significant performance benefits. First, it eliminates performance variations which occur when critical optical components are subjected to varying temperatures. Second, it eliminates the fringing which results from fiber-to-fiber connections. Furthermore, a significant maintenance benefit results from the fact that the probe is not compromised by any damage that might occur to the optical fibers connecting it to the spectrometer.

FPT-850 EXTREME DUTY PROBE

taking the risk out of spectroscopic process analysis.

The FPT-850 was developed to provide maximum long term reliability under the extreme conditions of high temperature, thermal shock, and aggressive chemistries encountered in many on-line process applications².

The key element of this design is a patented sapphire to metal sealing technique employing high nickel alloy seals captured in an electron-beam welded structure^{3, 4, 5}. This approach provides significant advantages over other sealing techniques. A high degree of chemical resistance is assured by the fact that the only materials in contact with the process are the probe body (316L stainless steel or Hastelloy), sapphire, the nickel alloy seals, and a thin flash of either gold or PTFE on the seals (application dependent). The compliance required to withstand extreme temperature cycling is provided by the nickel alloy seal which is precisely compressed prior to welding. This approach eliminates the fatigue and stress failures common with brazed seals. Finally, the elimination of elastomeric seals provides for reliable long term operation at extreme temperatures.

SPECIALIZED CAPABILITIES AND EQUIPMENT:

In addition to the standard transmission probe, we offer specialized capabilities for specific process applications.

- Freedom from stray light and fringing
- Standard pressure ratings to 250 bar
- High photometric accuracy

PROCESS PROBE RETRACTION MECHANISMS:

The PRM heavy duty retraction mechanisms provide a reliable means for retracting a probe from a process line or vessel through an appropriate pressure fitting. With a PRM the probe can be withdrawn for cleaning and referencing without interrupting the process.



LARGE-SCALE PROBES:

We can provide large scale transmission probes (FPT-1850 Series) for process batch reaction vessels involving high temperatures and very high shear forces. Probes have already been provided with lengths to two meters and a wall thickness of approximately 12 mm.

OPTIONS:

OPTION FPP, EXTENDED PATH-LENGTHS:

The FPT-850 probe is available with path lengths of greater than 10 mm. Inquire with Hellma Analytics for price and delivery.

FEATURES:

- Extreme chemical resistance
- Resistant to extreme temperatures and thermal shock
- NEMA-4 classification (FPT-850)

OPTION FPL, CUSTOM PROBE LENGTHS:

The FPT-850 probe can be provided in non-standard lengths. Inquire with Hellma Analytics for price and delivery.

ALTERNATIVE MATERIALS:

Standard FPT-850 probes are fabricated from either 316L stainless steel or Hastelloy C-276. Other materials are available on special order.

VESSEL ATTACHMENT:

FPT Series probes can be provided with a variety of means for attachment to a reaction vessel, including welded-on flanges, pipe fittings, or port connectors. Inquire with us for price and availability.

REFERENCES:

1. U. S. Patent No. 5,418,615
2. Tech. Note AN-918, Process Analysis Without Sample Conditioning
3. U. S. Patent No. 6,586,195 B
4. Tech. Note AN-919, Welded Metal Pressure Seals for Process Spectroscopy
5. Tech. Note AN-921, Qualification of Spectroscopic Probe Designs to Industry Standards for Process Piping and Vessels
6. Tech. Note AN-925, ATEX Considerations



SPECIFICATIONS:

Model Designations:	FPT-850MR-xx
Spectral Ranges:	R = N (800 - 2500 nm) R = V (400 - 2200 nm) R = U (230 - 800 nm, Optimized for 250 nm)
Standard Optical Path-lengths:	xx = 02 (2 mm) xx = 05 (5 mm) xx = 10 (10 mm)
Wetted Material of Construction:	M = S (316 stainless steel) M = H (Hastelloy C-276)
Window Seal Type:	Coated High-Nickel Alloy C-ring in permanent welded structure
Seal Coating:	Gold standard, PTFE
Window Material:	Sapphire or Fused Silica (UV range)
Secondary Containment:	Standard
Conduit Termination Housing:	Standard
Optical Transmission:	> 20%
Maximum Temperature:	400 °C at 200 bar Gold / 200 °C PTFE
Maximum Pressure:	300 bar up to 150 °C, 230 bar at 300 °C
Probe Body Diameter:	27 mm
Max. Immersion Length (to top of gap):	28 cm, std.
Max Flange/Fitting Weld Location, Tip of Probe to Rear Surface of Flange:	X = 02: 296.1 mm (11.67") X = 05: 299.5 mm (11.79") X = 10: 304.5 mm (11.99")
Fiber-Optic Connections:	SMA-905 female, std. FC Optional

Hellma GmbH & Co. KG. – Klosterrunsstraße 5, 79379 Müllheim, Germany
Tel: +49 7631 182 1020 – Fax: +49 7631 182 1011
Web: www.hellma-axiom.com – E-Mail: sales.analytics@hellma.com