Pilot™ Probe Datasheet

Cryogenic liquid Raman probe

Key Features

- *In-situ* measurement – no sample transport required
- Compatibility with the Kaiser Raman Analyzer
- Measures LNG as a cryogenic liquid – eliminates the vaporizer
- Reduces BTU uncertainty by up to 10 times
- Industry standard installation options
- Available with retraction interface

Pilot LNG probe installed at an LNG truck loading facility.

A cryogenic version of Kaiser Pilot Raman probe has been developed for optimal Raman performance in cryogenic liquid application when coupled to a Kaiser Raman analyzer. The combination of the Pilot Raman probe and the Kaiser Raman analyzers provide a powerful tool for the in-situ analysis of cryogenic liquids, such as liquefied natural gas (LNG), without the need to vaporize the sample.

The modular design of the Pilot allows the sampling point to be customized for each customer's facility, allowing for flexible integration via direct flange mounting onto transfer pipes or integration into a slip-stream or fast loop for easier maintenance. This versatility may reduce maintenance cost, eliminate a potential failure mechanism, improve process safety, and reduce initial installation cost.

All Pilot probes utilize a single fiber for excitation and another for collection. This provides a robust interface, sampling versatility, and reduced cost for long runs of fiber when compared to multi-fiber collection designs. Single collection fibers also permit simultaneous multi-channel operation on a single analyzer. Standard telecommunication fiber diameters (<100 microns) are used to increase mechanical stability and minimize the cost per meter for deployment over long-cable runs.

The Pilot probe has been designed and is manufactured to meet Category I pressure equipment safety standards as defined by the Pressure Equipment Directive (PED). Pilot probes can be supplied in two geometries, a probe with a gold-colored protective aluminum cylinder for ATEX/CSA installations, and an all stainless steel right angle connector design for installations where marine compatibility is required. Pilot probe flanges and insertion length are constructed to match customer pipe interface and isolation valve formats.

CSA/IECEx/ATEX*

ATEX*/IECEx

Pilot™ Probe for cryogenic liquids.
*See specifications for details.

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Advantages

- Compact, easy to install
- Permanent alignment probe, reproducible sampling
- Direct process measurement no stream conditioning required
- Can be immersed into cryogenic liquids, down to -196 °C – no vaporizing needed
- Compatible with installation in classified environments
- ATEX and North American Hazard Area marking available as options

Versatile

- Compatible with installation in various process environments, including top insertion, side insertion, and sample loop
- Flange installation – Flange specified at purchase to match customer mating process flange
- Compatible with Kaiser Raman analyzers
- Probe can be installed up to 500** meters from the analyzer
- Optional Retraction interface probe can be retracted from and inserted into LNG without stopping flow

** up to 500 meters for the 785 nm Raman Rxn4™ analyzer.

Specifications

Materials	SS 316L (standard); C276 (optional) Materials of construction certification (for wetted components)
Laser Wavelength	532 nm, 785 nm
Spectral Coverage	150-3425 cm^{-1} (532 nm, 785 nm)
Laser Power	
Maximum Laser Power	Up to 499 mW into probe head
Sample Interface	
Pressure	SS 316L: up to 370 psi; Alloy C276: up to 650 psi
Temperature (probe head)	-196 to + 70°C
Temperature (fiber cable)	-40 to +80 °C; Temperature ramp: ≤ 6°C/min
Mount	Direct Flange or retraction interface mount
Probe Outer Diameter	1 in (2.54 cm)
Fiber Optic Cable	
Design	PVC jacketed, proprietary construction, conduit and tray rated
Connections	Industrial hybrid (optical/electrical) integrated connector (IP67)
Length	5 m standard, up to 250 m; custom lengths available upon request
Minimum Bend Radius	6 in (15.2 cm)
Certification*	
ATEX	CE Ex II 2/1 G Ex ia op is IIA or IIB; or IIB+H2; or IIC T3; or T4; or T6 Ga
CSA	Ex ia IIC T4 Class I Zone 0 AEx ia IIC T4 Class I Division 1 Groups A, B, C and D T4
IECEx	Ex ia op is IIA or IIB or IIB + H2 or IIC T3 or T4 or T6 Ga IECEX ITS 14.0015X

*Gold cylinder Pilot-E design only. Contact Kaiser regarding certifications for the right angle probe design.

For more information, please go to
www.optograf.com

Contact

www.spectrasensors.com/contact

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