FuelCheck® Probe

The ***FuelCheck®*** Probe is readily installed into the pipeline through a full opening valve. Its installation should ensure constant contact with fluids to ensure instantaneous and positive interface detection.

Probe Construction

The ***FuelCheck®*** Probe is constructed of heavy-wall ½" OD stainless steel tubing. Standard probe length is 24" giving an insertion length of 16" from the top of the valve to the ID of the pipeline. With probe and insertion tool changes, the Probe can be made in virtually any length so as to accommodate almost any installation requirement. The maximum operating pressure and temperature are 1,500 PSI @ 200°F. The materials of construction allow for use in all petroleum fuels with all known additives, including MTBE. The sapphire lens is extremely resistant to both chemicals and abrasion.

FuelCheck® Probe

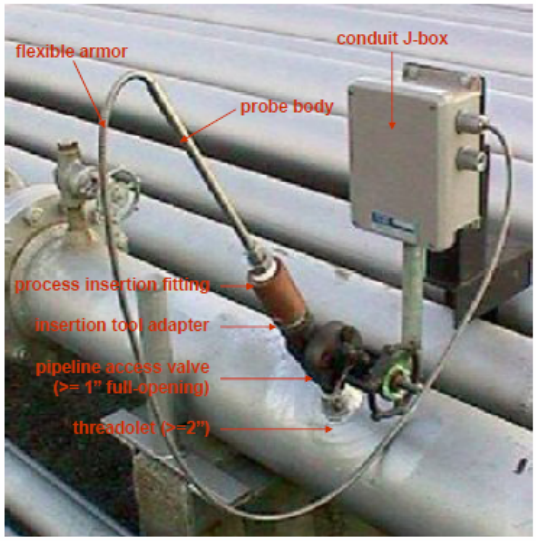

Figure 3
FuelCheck Probe installed in pipeline

The sensor element incorporates an o-ring seal with a Teflon backup seal. The sensor element cannot be replaced therefore replacing the probe will be required if the probe is moved or crimped at the wrong location on the probe body. The probe incorporates a safety stop which is an 11/16" OD upset welded onto the probe body to prevent the probe from passing through the process insertion fitting.

The process insertion fitting is a specially modified bored-through *Swagelok* tubing adapter. An internal o-ring groove incorporating a back-up ring has been machined into the fitting to provide a

pressure seal with the probe body during process insertion and retraction. The process insertion fitting is an integral part of the ***FuelCheck***® probe and cannot be removed in the field.

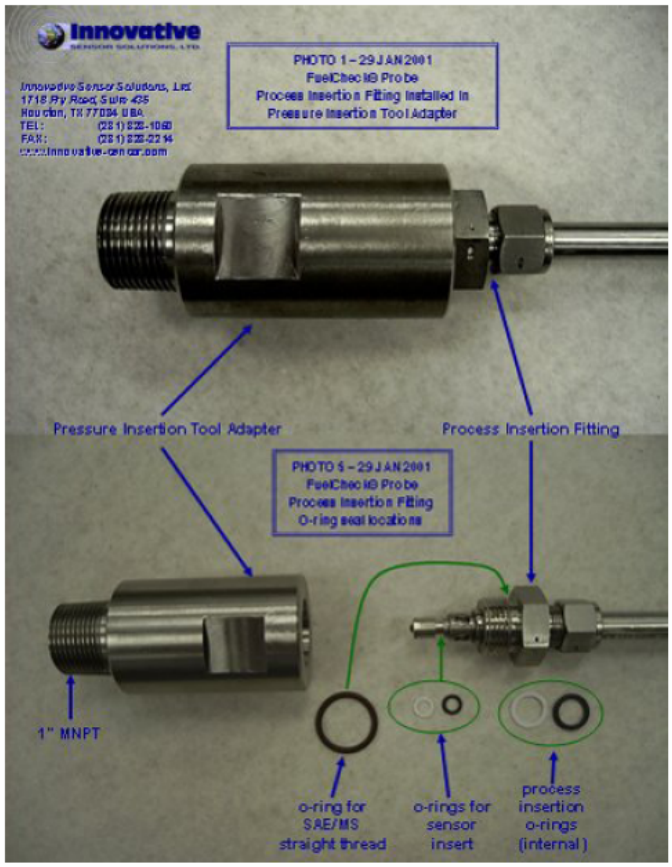

Figure 4
Process Insertion O-Rings

The Insertion Tool adapter enables the use of the high pressure probe Insertion Tool in the event that the probe must be inserted or removed from the process at pressures exceeding 300 PSI. Even if the process pressure is never expected to exceed 300 PSI, it is recommended that this adapter be used as a safety feature so that the probe could be removed in the event of an emergency.

The top end of the probe is attached to a length of 3/8" OD stainless steel flexible conduit ("armor") providing protection for the fiberoptic probe lead. Standard length is 120". This armor is terminated in a ½" MNPT conduit fitting which is attached to the probe junction box. The fiberoptic leads are terminated with ST type fiberoptic connectors which attach to the fiberoptic interconnect cable leading to the ***FuelCheck***® Controller.

A fiberglass junction box (J-Box) is provided to protect the fiberoptic connection between the probe and the fiberoptic interconnect cable. This J-box is normally the terminus of a rigid or EMT conduit installed to protect the fiberoptic interconnect cable.

Probe Location Considerations

FuelCheck® probes can be installed through any full-opening valve with an inside diameter (ID) of 1" or larger; however, several considerations should be observed in order to provide optimum performance. It is strongly recommended that the probe be installed such that its tip not protrude past the inside wall of the pipeline. If the probe extends into the pipeline, damage to the pipeline and probe can result by pigging the line without removal of the probe. If the probe location is not to be pigged, the probe can be installed into the pipeline to the desired length but fluid velocity and fluid density should be considered to insure any type of harmful harmonics are produced **(Call ISSLtd for harmonic calculation if required)**.

When the probe is to be installed flush with the ID of the pipeline so as to accommodate pigging, several factors must be considered. First, it is recommended that the fixture (i.e., weldolet) in which the tip of the probe (i.e., the sensor element) will reside be of sufficient diameter and suitable location such that fluid turbulence will provide adequate sampling. If this fixture is too small, fluid stagnation could occur resulting in a failure of the system to detect the interface. It is therefore recommended that the probe insertion weldolet be at least 1" in diameter so that adequate mixing takes place thus allowing for very rapid interface detection. It is also important that the weldolet bit size be as large as possible. Too often, it has been observed that a large weldolet was installed but that the hole bored through the pipeline was very small.

The location and orientation of the probe insertion weldolet is also important. Placing the probe near an elbow in the line will provide greater turbulence and more rapid interface detection. Insertion of the probe in the top of the pipeline should be avoided since a vapor pocket could develop in the weldolet. Insertion from 45° from vertical to the side is preferable, though care must be taken to provide sufficient clearance for convenient installation and removal. Vertical installations have been made and with the lines under pressure have not presented any problems.

Probe Insertion and retraction

The ***FuelCheck***® Probe has been designed to be safely inserted into and retracted from the process. These instructions must be followed to prevent injury and damage to the equipment. Appropriate safety equipment should always be used (i.e., safety glasses, and fire-retardant clothing).

The probe should always be installed in close proximity to a reliable pressure gauge or the pressure must be known when performing these operations. When installing a ***FuelCheck***® Probe for the first time, the following procedures must be followed. It is imperative that all client safety procedures be followed explicitly, and that engineering specifications (i.e., threaded connection compounds, sealants, tightening torque, etc.) be strictly adhered to. Probe installation, removal, insertion, retraction, etc. should only be undertaken by qualified and authorized personnel. These procedures require 2 people to perform the operation.