

Capacitance Probe Detects Water Contamination in Oiling Systems

The adverse effects of water in oil are well known. Negative consequences include

- higher viscosity
- reduced load carrying ability
- hydrolysis (the formation of acids, sludge, and varnish)
- foam formation and air entrainment
- additive depletion
- corrosion on metal surfaces
- loss of lubrication film strength leading to increased wear
- cavitations
- filter plugging

Problem

As oil system reliability decreases, maintenance and repair activities increase. Corrective action must be taken before an “out of limits” situation occurs if escalating operational costs are to be avoided.

Solution

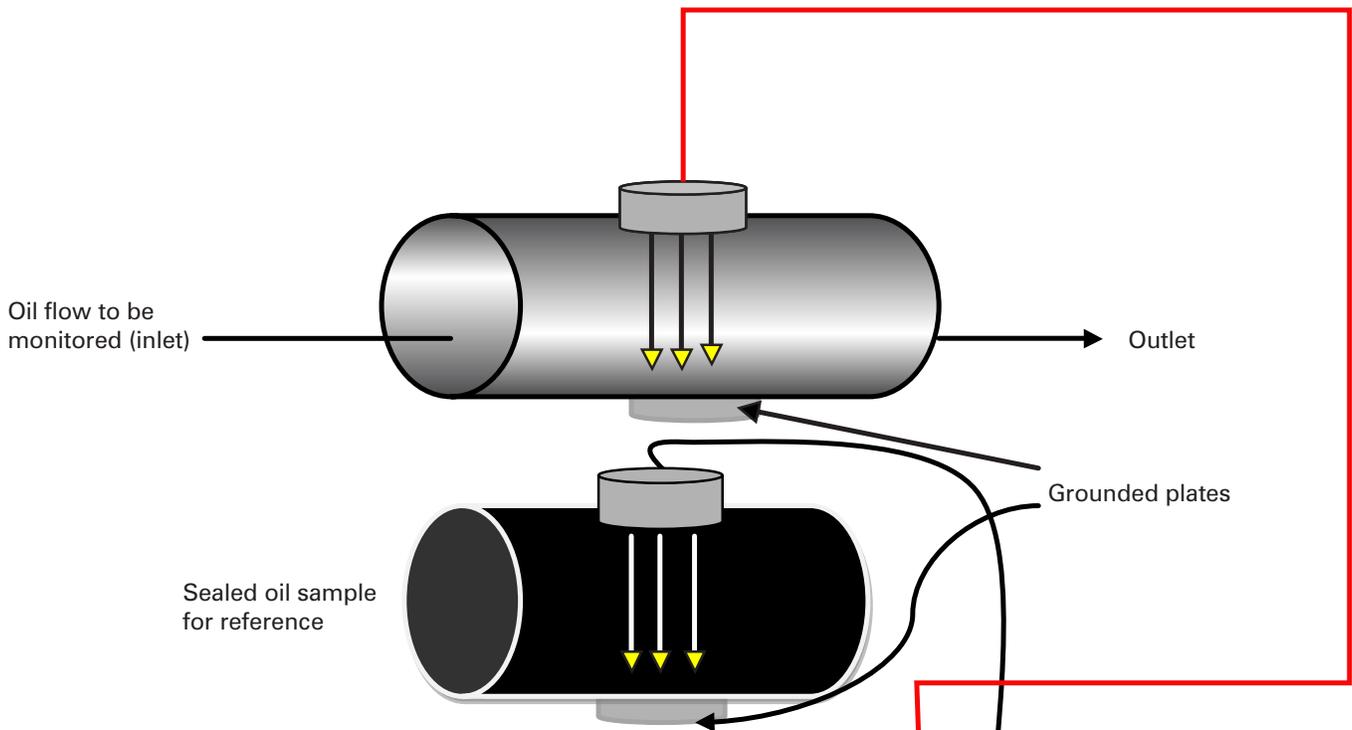
In-line capacitance probes can be used to automatically and continuously monitor water infiltration into lubrication systems. Typically, oil has a dielectric constant in the 2-5 range. Water has a dielectric constant of 80, so even minute amounts of water will significantly alter the water state reading.

To work, place one capacitance probe against a non-conductive section of piping that carries the oil supply to be monitored. A second reference probe is placed against a sealed, non-conductive tube containing a sample of the lubricating oil. Both tubes should be in thermal contact with each other. MTI offers flat flexible capacitance probes that can be easily bonded to the tubes.

Each capacitance probe measures the dielectric field between the face of the probe and the grounded plate on the opposite side of tube. A monitoring CPU triggers an alarm if the dielectric reading for the oil flow channel diverges from the sample reading.

Benefits

By continuously measuring capacitance of the oil or oil water mixture through the tube, moisture level can be minimized, corrosion eliminated, and system reliability enhanced. Maintenance moves from a reactive to a proactive mode.



Probes, pipe diameters, and materials to be kept the same.

MTI's flexible, off-the-shelf probes mold to the shape of a plastic/glass oil tube and continuously monitor the capacitance of the oil or oil water mixture passing through. The company's [D200 digital Accumeasure](#) serves as the monitoring sensor signal conditioner. Immune to thermal drift and easily calibrated to the sensitivity of water in oil, it is available with a digital limit alarm module.



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