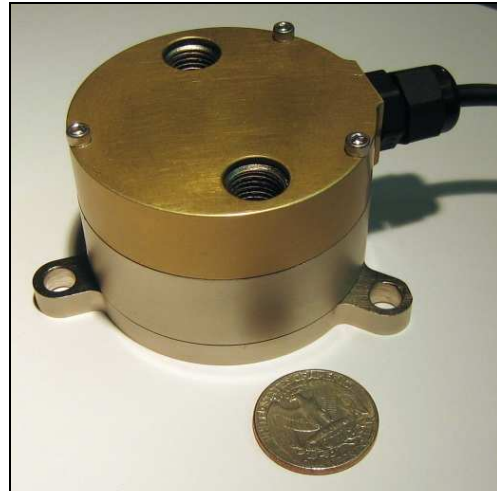


## Micro-ESR™ Lubricating Oil Condition Sensor

The Active Spectrum Micro-ESR™ Oil Condition Sensor provides real-time, embedded electronic detection of lubricant condition.

Lubricating oil wear results from several processes including oxidation, depletion of additives, soot buildup and water contamination. Active Spectrum's lubricant condition sensor uses the principal of **Electron Spin Resonance (ESR)** to measures each of these quantities in real time to predict the optimum oil change interval and alert the operator to impending lubricant failure.

Existing machines can easily be retrofitted to use the Micro-ESR™ sensor.



**Micro-ESR™ Oil Condition Sensor**

### Benefits

- On-board oil condition sensing helps optimize engine lubricant and filter life.
- The interval between oil changes can be extended without compromising machine life.
- Reduced lubricant consumption confers environmental and economic benefits.

### Availability

The Active Spectrum Micro-ESR™ Oil Condition Monitor is currently available for purchase in pre-production quantities for evaluation purposes. Interested parties should contact Dr. James White at +1 650-610-0720 or [jwhite@activespectrum.com](mailto:jwhite@activespectrum.com).

### Specifications

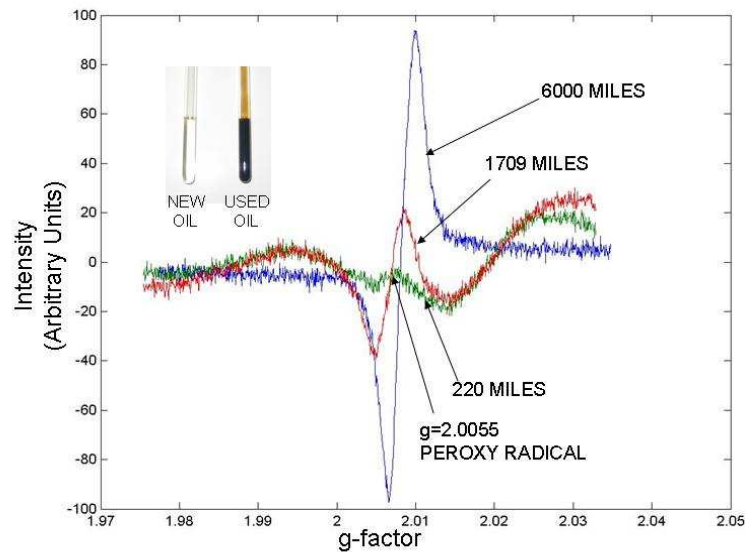
The Active Spectrum Micro-ESR™ Oil Condition Monitor uses a microwave resonance signal to measure the concentration of free radicals in engine oil.

Supply Voltage	<b>+12V DC</b>
Sensor Output Options	<b>Modbus®, RS-232, Ethernet, CAN. Additional communication standards are available according to customer specifications.</b>
Dimensions:	<b>2.25" <math>\phi</math> x 1.5" tall cylindrical metal package with hydraulic and electrical connections.</b>
Fittings	<b>JIC, NPT, others available according to customer specifications.</b>
Quantities Measured	<b>Oxidation and Soot (Peroxy Radical and Carbon Radical), Water Content, fuel dilution (marine applications only), RF dielectric permittivity.</b>
Operating Temperature Range	<b>-30°C to +120°C</b>
Max. Inlet Oil Temperature	<b>160°C+</b>

## Applications

The Active Spectrum Micro-ESR™ Oil Condition Sensor is targeted for use in vehicle fleets including military vehicles, heavy trucking, shipping, rail, heavy equipment, power generation and wind turbines. Any industrial machinery with stringent lubrication requirements could benefit from accurate, embedded condition-based oil maintenance.

## Experimental Results



### Peroxy Radical Concentration\* vs. Mileage

\*The intensity of the measured free-radical resonance is correlated to *both* mileage and driving conditions.