D-2 Incorporated

Real-Cond In-Line Fuel Conductivity Product Brochure

Part Number: JF-1A & JF-1A-HP
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Drawing Number: 440-001

In Line Conductivity Measurement is the future of the Oil and Gas Industry. Fully automated, real time measurement allows for precise control and measurement of SDA Additive Injection.

Advantages of the Real-Cond In-Line Sensors

1. ASTM Listed in D2624 “Standard Test Methods for Electrical Conductivity of Aviation and Distillate Fuels”
2. Patented AC Measurement technology allows the only real time, direct measurement of conductivity in the world.
3. True two wire device (4-20 mA), directly interfaces with site DCS, PLC or local readout/ alarm.
4. Durable easy to maintain design. Built with 316 SS for long-term use. Only maintenance required is the annual calibration.
5. Highest precision of any instrument available for test method ASTM D2624. Fully automated direct measurement in the product line every two seconds can’t be matched by any other in line conductivity sensor.
6. ATEX/ FM/ FMc Certified for use in Hazardous Zone Environments.
7. Standard JF-1A ATEX/ FM Certified for use up to 16 Bar.
8. JF-1A-HP High Pressure Sensor is ATEX Certified for use up to 100 Bar.
9. Provides real time conductivity values into Static Dissipative Additive (Conductivity Improver) Injection Systems to control rate of additive in injection and to certify fuel meets conductivity specifications. Eliminating any issues with under or over injection of additive.
10. Eliminates the need for hand sampling fuel for conductivity measurement. Direct in line measurement automates the process. Automation eliminates human interaction thus increasing precision and eliminating operating costs.
11. Sensor’s can be customized to site specifications. Custom length shafts, various measurement ranges, and flange adapters are available.
12. See www.d-2inc.com for Real-Cond In Line Demonstration Video!

D-2 Real-Cond Conductivity Sensors use our Unique AC Measurement technology rather than DC Measurement technology, here is why:

When using a traditional DC sensor you must time your measurement reading due to the build up of polarization impedance, which is depicted in the graph below. The current flow of a traditional meter rise and falls due the polarization effect of the DC applied voltage. As the voltage is first applied there is a steep in-rush current, then, as the electrons form a polarization layer on the electrodes, the current starts to decrease. The user has to "pick" a value from this complex response, at which point they only see one value at a time.

It can be seen from this graph that the actual conductivity measured is a "function" of when the sample is read from the meter. It can be seen that the rapid change in the value on either side of the "read window" results in large variability of reported value.

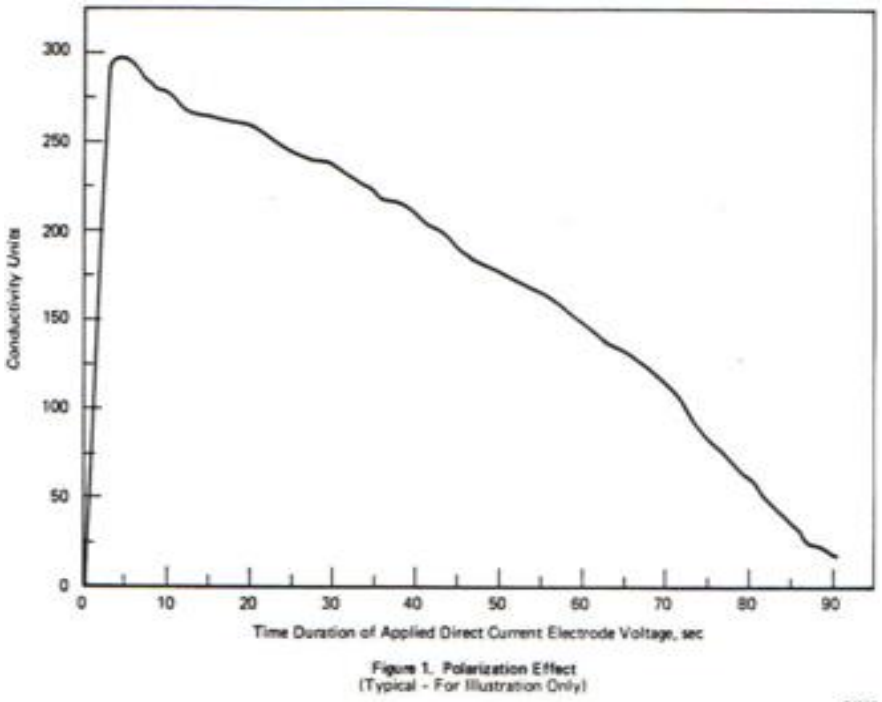


Figure 1. Polarization Effect
(Typical - For Illustration Only)

AC Vs. Dc Measurement Continued…

Secondly, the shape of the above curve actually varies as a function of fluid movement past the electrodes; hence the value read in a DC meter is also a function of the rate of flow. Flow slows the rate at which electrons can collect at the electrodes. Hence DC Measurement of any precision requires the fluid to be absolutely still, no movement. All instruments using DC measurement principles must spot sample in stilled flow and cannot measure in a moving fuel sample. AC measurement, allows for direct rapid readings without the worry of stilling the fuel sample.

The DC type response curve may also vary due the "temperature" of the fuel. The electro-chemical interaction at the electrode is dependent on ambient temperature. It is common knowledge that all chemical reaction rates vary dependent on the temperature at which they occur. All the above factors lead to significant errors in DC type meters, and absolutely prevent their use in accurately measuring of moving samples. That is why we developed our conductivity meters with AC measurement principles; to ensure the most accurate, usable, reliable measurement of conductivity anywhere in the world.

Why Measure Conductivity of Distillate Fuels and Hydro-Carbon Chemicals?

The conductivity of a fuel or any liquid chemical is a measure of the ability of a fuel to dissipate static electric charge. Conductivity is important because in a low conductivity fuel electrical charges can accumulate and ultimately lead to dissipation in the form of a spark. This in turn results in a potential fire or explosion hazard. Distillate fuels have very low conductivity, ~ 1 million times lower than pure water. Low conductivity fuels have been responsible for several fire incidents in the distribution systems. As a consequence, minimum conductivity specifications have been established for certain petroleum product handling operations.

These conductivity specifications are met by adding Static Dissipative Additive, (SDA), also known as conductivity improver into the fuel. These additives raise the conductivity fuel to safe levels where electric charge can more easily relax from the fuel. This greatly increases safe handling of these low conductivity fuels, and develops as user need in the fuel distribution system to ensure conformity by measurements via in line sensors.

Real-Cond In Line Conductivity Sensors will eliminate any of your Conductivity Specification concerns.

Sensor Specifications:

Standard JF-1A Real-Cond

*Accuracy: +/- 2% of Reading
*Max Pressure: 16 Bar
*Temperature: -20°C to 60°C
*Operational: Up to 85°C
*Retractable Mount Assembly
*Explosion Proof Electronic Housing/ intrinsically safe design
*316 SS Sensor Elements
*4-20 mA conductivity output
*4-20 mA temperature output
*ATEX Zone 1 Certified
*FM/ FMc Class I, Division II Certified
*ASTM D2624 Listed

High Pressure JF-1A-HP

All Specs are the same as JF-1A except the following:

*Max Pressure: 100 Bar
*Custom Flange Mount Assembly
*ATEX Zone 1 Certified

Both the JF-1A and the JF-1A-HP come with our Full operation manual, installation manual, calibration certificate and are covered by a 1 year limited warranty.

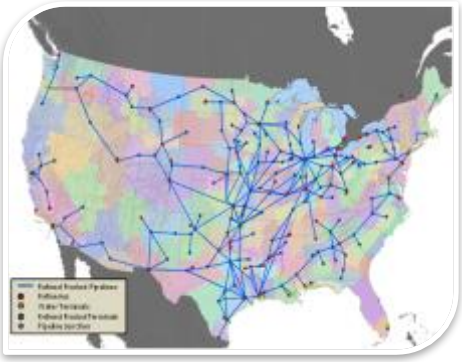
Real-Cond Conductivity In-Line Applications and Support

Refinery Run Down Lines

Installing a JF-1A into your refinery run down line will ensure all the fuel leaving your refinery meets the new conductivity specifications for fuel. As these run down lines have high pressures and flow rates, the JF-1A or JF-1A-HP is the ideal instrument

Marine and Truck Offloading and Loading Terminals

When fuel is transferred from one mode of transport to another it often is required to meet conductivity specifications. With our sensors in line at your terminal, we can fully automate this process. Also as our equipment is ASTM Listed you can certify the fuel and print the average conductivity value for each fuel load on the bill of lading. The Real-Cond Sensors ties into your site DCS or PLC



Pipeline Distribution Terminals

Pipeline Distribution Terminals are an ideal location for use of the Real-Cond sensors. Due to transfer of product these facilities must meet the conductivity specifications when transferring fuel. Real time measurement and control of conductivity can greatly increase transfer rates of product by eliminating the need for relaxation of the fuel.

Fixed Base Operators (Airports)

Real time measurement and control of fuel conductivity is extremely important for airports. As the fuel enters the wing of the aircraft, it must meet conductivity specifications or it puts the entire aircraft at risk due to an electrostatic incident and/ or may interfere with the electrostatic fuel gauges.

D-2 Incorporated Direct Customer Support

Fully Supports all of our equipment with direct technical support. We are an ISO 9001:2008 Quality Certified Manufacturer. All of our equipment and services are covered by our one year limited warranty.

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