

## Wireless Rouge Monitor System



- Real-time, quantitative measurement of rouge development
- Seamless integration to control system
- Cost-savings by optimizing derouging and passivation frequency
- Rouge measurement range is 0.001 – 10  $\mu$  (1 to 10,000 nanometer)

Wireless Gateway  
Model 1410S with 781S (pg. 4-5)



The Wireless Rouge Monitor provides accurate measurement of ultralow corrosion (rouging) rates in high purity biopharmaceutical water systems. Monitoring the rouging rate of typical ions of ferric, chromium, molybdenum and nickel oxides in the water assists the determination of derouging and passivation frequency. The installation and use of a Rouge Monitor provides absolute measurements for rouge rate and rouge accumulation (thickness).

The high sensitivity frontend probe consists of electropolished 316L stainless steel and probe assembly. The probe assembly is connected to a battery operated wireless transmitter providing real-time data and seamless integration.

The WirelessHART protocol uses spread spectrum frequency hopping 2.4GHz radios. These radios communicate directly with the gateway or through other transmitters forming a mesh network. The WirelessHART gateway supports up to 100 units. The typical distance between transmitters is 300-900ft. The gateway is located in a central position, powered by 24 VDC and connected to the DCS (Distributed Control System) system. Using a gateway, the rouging rate in microns/month and rouge accumulation in microns is displayed in the DCS, SCADA (Supervisory Control and Data Acquisition), BMS (Building Management System), data highway, or process control system.

Rouge measurement range is 0.001 – 10  $\mu$  (1 to 10,000 nanometer).

### Operating Specifications

#### Wireless Transmitter - Measurement Ranges:

<b>Corrosion Rate</b>	Rouging rate: 0 to 9.999 $\mu$ /month Rouging rate resolution: 0.001 $\mu$ /month
<b>Potential Measurement</b>	0 to 2 volts
<b>Potential Input Impedance</b>	>20 M $\Omega$
<b>Rouging Rate Resolution</b>	0.001 microns/month
<b>Data Transmit Rate</b>	20 to 60 minutes
<b>Communication</b>	2.4 GHz IEEE 802.15.4. WirelessHART 7 Protocol
<b>Battery Life</b>	3 years at 20 min measurement interval
<b>Ambient Temperature Range</b>	-40°C to +70°C
<b>Antenna</b>	Integrated Omni-directional Antenna Impedance: 50 $\Omega$ Gain: +2dBi Maximum SWR (Standing Wave Ratio):3:1 Maximum radio power output: 10 mW

#### Probe:

<b>Housing Materials</b>	316L stainless steel probe body with electropolished stainless steel (or other alloy) electrodes with Tri-Clover Flange Mounting
<b>Temperature Range</b>	0-200° C
<b>Deposition Rate</b>	0.000-3.000 $\mu$ /month at 1.3 $\mu$ S/cm (0.7 M $\Omega$ -cm) 0.000-0.100 $\mu$ /month at 0.054 $\mu$ S/cm (18 M $\Omega$ -cm)
<b>Operating Range</b>	100-0.025 $\mu$ S/cm conductivity 0.01-40 M $\Omega$ -cm resistivity

### Wireless Transmitter Physical Specifications

#### Enclosure:

<b>Rating</b>	IP66
<b>Housing Materials</b>	6061-T6 Aluminum with Polyester Enamel over Epoxy Primer 316 Stainless Steel

#### Weight:

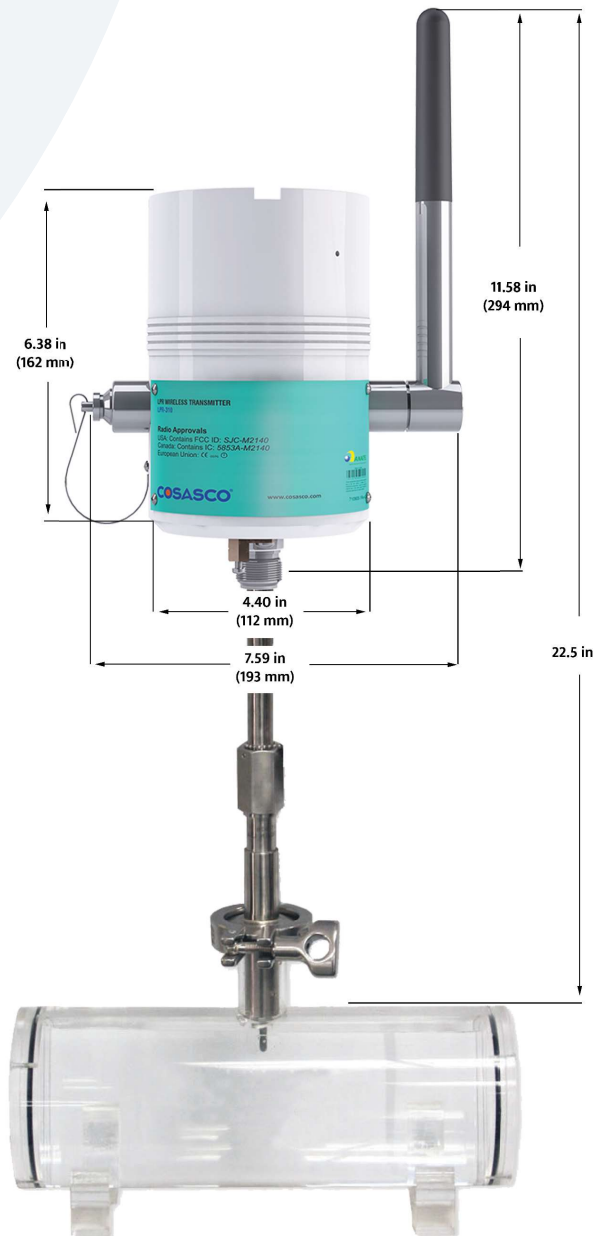
<b>Aluminum Housing</b>	7.5 lbs (3.4 kg) with Lithium Power Module Installed
<b>Stainless Steel Housing</b>	15.3 lbs (6.9 kg) with Lithium Power Module Installed

#### Operational Pole or Wall Mounting

Metal Bracket for direct wall mount and adjustable U-Bolt mounting for 2" pipe size vertical or horizontal pole mounting.

#### Probe Mounting

Directly to probe via Probe Adapter. Probe Adapter Length: Minimum 6.75"



### Self-Organizing Network Specifications

<b>Protocol</b>	IEG62591 (WirelessHART) 2.4 - 2.5 GHz DSSS
<b>Maximum Network Size</b>	200 wireless devices @ 16 sec. 100 wireless devices @ 8 sec. 50 wireless devices @ 4 sec. 25 wireless devices @ 2 sec. 12 wireless devices @ 1 sec.
<b>Supported Device Update Rates</b>	1, 2, 4, 8, 16, 32 seconds or 1-60 minutes
<b>Network Size/Latency</b>	200 Devices: less than 20 sec. 50 Devices: less than 5 sec.
<b>Data Reliability</b>	>99%

### System Security Specifications

<b>Ethernet</b>	Secure Sockets Layer (SSL) - enabled (default) TCP/IP communications
<b>Smart Wireless Gateway Access</b>	Role-based Access Control (RBAC) including Administrator, Maintenance, Operator, and Executive. Administrator has complete control of the gateway and connections to host systems and the self-organizing network.
<b>Self-Organizing Network</b>	AES-128 Encrypted WirelessHART, including individual session keys. Drag and Drop device provisioning, including unique join keys and white listing.
<b>Internal Firewall</b>	User Configurable TCP ports for communications protocols, including Enable/Disable and user specified port numbers. Inspects both incoming and outgoing packets.  Wurldtech: Achilles Level 1 certified for network resiliency.
<b>Third Party Certification</b>	National Institute of Standards and Technology (NIST): Advanced Encryption Standard (AES) Algorithm conforming to Federal Information Processing Standard Publication 197 (FIPS-197)

### Physical Specifications

<b>Material of Construction</b>	Housing: Engineered Polymer Paint: Polyurethane CoverGasket: Silicone Rubber
<b>Antenna</b>	781S Smart Antenna
<b>Weight</b>	10 lb (4.54 kg)
<b>Certifications</b>	Zone 0 Division 1, Class I Division 1 (U.S.) Equivalent Worldwide
<b>Communication Specifications Isolated RS485</b>	2-wire communication link for Modbus RTU multidrop connections. Baud rate: 57600, 38400, 19200, or 9600 Protocol: Modbus RTU Wiring: Single twisted shielded pair, 18 AWG. Wiring distance is approximately 4,000 ft. (1,524 m)
<b>Ethernet</b>	10/100base-TX Ethernet communication port Protocols: Modbus TCP, OPC, HARTIP, https (for Web Interface) Wiring: Cat5E shielded cable. Wiring distance 328 ft. (100 m).
<b>Modbus</b>	Supports Modbus RTU and Modbus TCP with 32-bit floating point values, integers, and scaled integers. Modbus Registers are user specified
<b>OPC</b>	OPC server supports OPC DA, v2, v3

