



gastops

PRODUCT OVERVIEW

FluidSIGHT™
ONLINE
OIL CONDITION
MONITORING
SYSTEM

Keep vessels on course, on time, and on budget: maximize availability & reduce cost.

Gastops' innovative online, oil condition and contamination monitoring system provides real-time detection of critical oil-related failure modes in marine reciprocating engines. Built off the industry leading MetalSCAN technology, FluidSIGHT adds fluorescence spectroscopy to measure the quality of the oil and its additives, the quantity of contaminants such as fuel and water, and the quantity of wear debris in the oil. This provides a holistic view of engine health and enables the shift from preventative maintenance to predictive maintenance.



The Lubrication Risk

Lubricating oils are essential to the reliable operation of marine machinery. They reduce friction, dissipate heat, protect against corrosion, and carry away wear debris - ensuring optimal performance and longevity of critical components.

Over time, however, lubricants degrade due to oxidation and contamination. This deterioration reduces their effectiveness and can ultimately lead to machinery damage if left unaddressed.

Oxidation occurs naturally as lubricants reach the end of their service life or are exposed to excessive thermal and mechanical stress. As degradation progresses, antioxidant additives are gradually depleted, leaving the base oil vulnerable to oxidation. This results in increased viscosity and the formation of insoluble byproducts such as sludge and varnish - factors that can lead to unplanned maintenance and costly downtime.

For this reason, oxidative stability is a key indicator in determining a lubricant's remaining service life. Contamination is another critical concern. It often arises from machinery faults and can serve as an early warning sign of developing issues. For example, fuel dilution may indicate compromised fuel injectors.

In addition to maintaining lubrication quality, oils also transport particles generated by component wear. Under severe operating conditions - such as high loads, speeds, and temperatures - minor wear can quickly escalate into significant damage. Without timely intervention, this can result in catastrophic failure, secondary damage, and expensive repairs or overhauls.

Key Monitoring Capabilities

Oil Quality

Continuously tracks antioxidant depletion, oxidation byproducts and additive health - enabling oil changes based on the actual condition of the oil, not operating hours.

Contamination

Detects fuel dilution and water ingress with high sensitivity, helping crews identify issues early and optimize maintenance.

Wear Debris

Counts and classifies metallic particles to distinguish between normal wear and early signs of critical component damage.

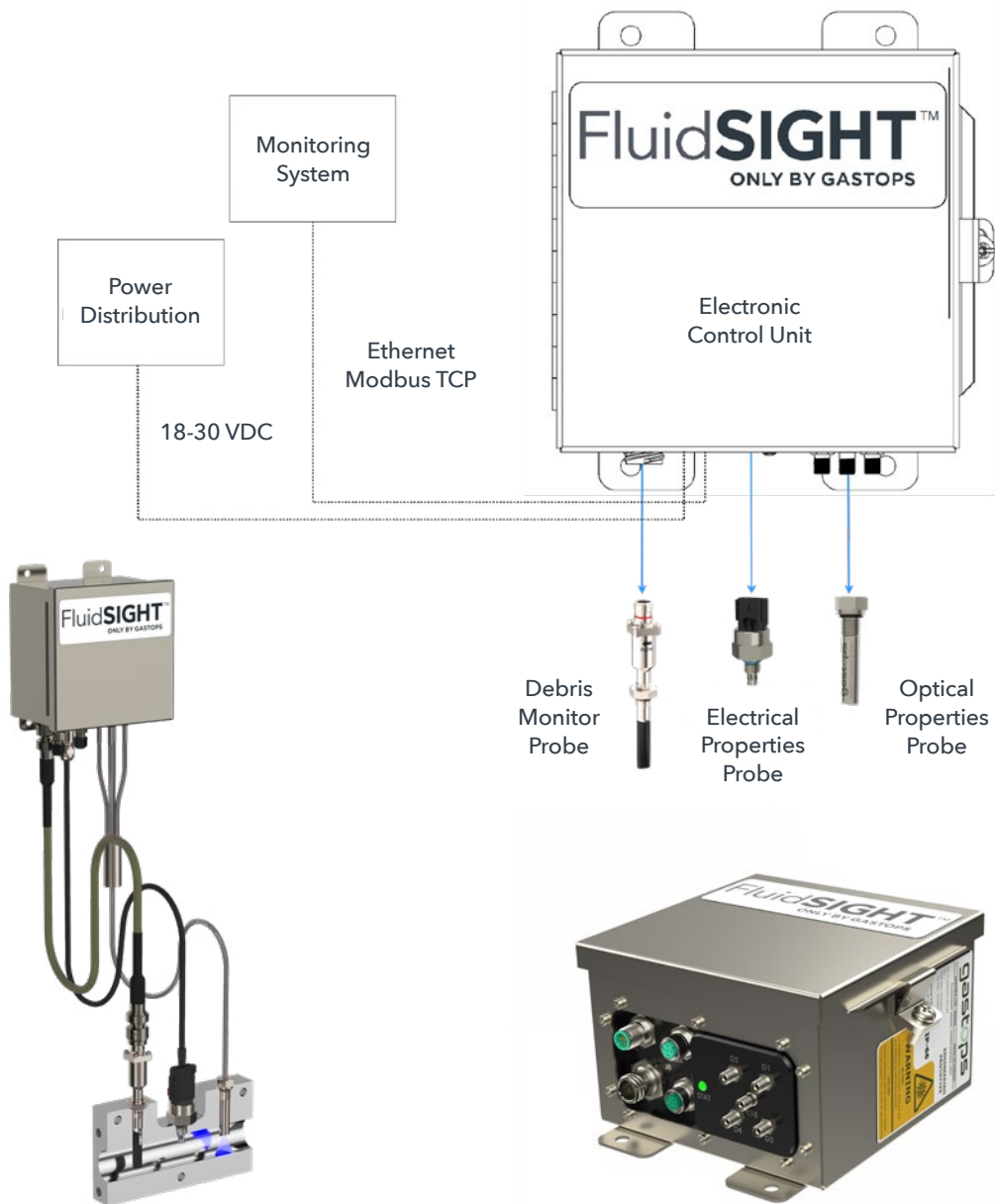


Key Operational Benefits

- ✔ Prevent disruptions and reduce downtime by proactively planning and combining maintenance activities
- ✔ Reduce maintenance-induced issues
- ✔ Prevent failures by ensuring adequate oil quality in varying operating conditions
- ✔ Detect minor faults early to prevent them from escalating into major damage
- ✔ Reduce troubleshooting time and optimize maintenance by pinpointing root cause
- ✔ Prepare for decarbonization and fuel transitions with real-time engine health insights
- ✔ Extend maintenance intervals and oil life—change oil based on condition instead of operating hours
- ✔ Reduce/eliminate routine oil sampling

Specifications

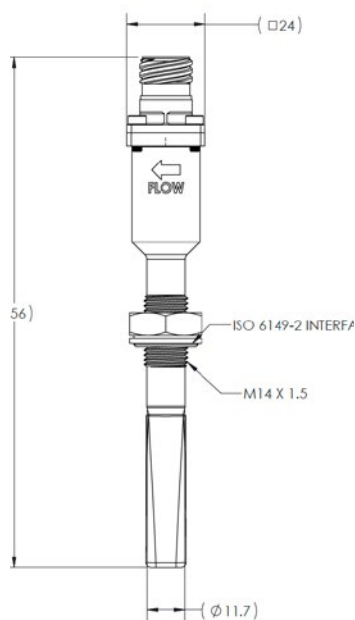
System	Specification
Input Voltage	18 - 30 VDC
Communication Interface	Ethernet-based (Modbus TCP)



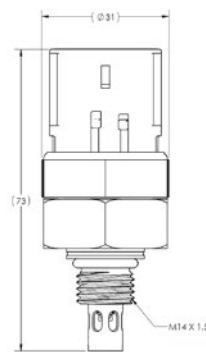
FluidSIGHT Probes

The Optical Properties Probe measures the fluorescence of additives and contaminants in fluids. The probe delivers UV radiation into the fluid under analysis which induces fluorescence of some of the additives and components. The fluorescence is collected by the probe and delivered into the Electronic Control Unit for analysis and interpretation. FluidSIGHT uses an Electrical Properties Probe to measure the fluid temperature, fluid viscosity, and fluid dielectric properties. By fusing these parameters with readings from the Optical Properties Probe, FluidSIGHT can create a comprehensive image of the fluid health and condition. To detect and count metallic particles in the fluid line, FluidSIGHT makes use of an inductive Debris Monitoring Probe. Metallic particles induce a disturbance in the magnetic field generated by the probe. The magnitude of the disturbance which is measured as a voltage defines the size of the particle, and the phase shift of the signal defines whether the metallic particle is ferromagnetic (Fe) or non-ferromagnetic (NFe). All FluidSIGHT probes interface with the fluid line via an M14 x 1.5 mm male thread.

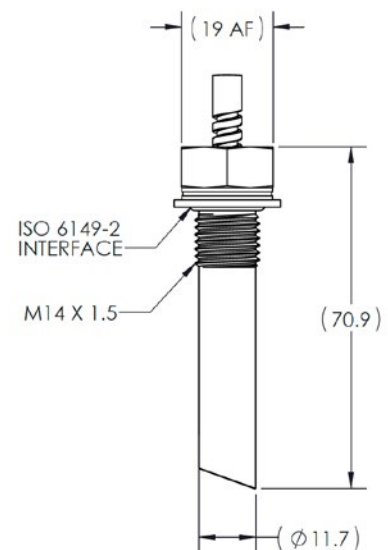
The Optical Properties and Electrical Properties Probe are best installed downstream of the oil filter. Having the two probes installed in proximity is advantageous. The Debris Monitor Probe must be installed upstream of the oil filter and requires active flow to operate properly. Designed for flexible retrofits, the three probes can be installed separately in a single port or combined in a single manifold.



Debris Monitor Probe*



Electrical Properties Probe*



Optical Properties Probe*

*Not to scale

Probe Specifications

Pipe Size Compatibility	1- 5-inch Internal Diameter
Installation Interface	M14 x 1.5 Port
Weight - Optical Probe	685 g
Weight - Particle Probe	148 g
Weight - Electrical Probe	63 g

Fluid Conditions

Operating Temperature	5°C to 100°C
Maximum Pressure	90 psig / 620 kPa
Flow Speed	0.5 - 20 m/s

Detection Capabilities

Antioxidant Depletion	0 to 100% ± 1%*
Viscosity**	2 to 220 cSt ± 0.1 cSt*
Temperature	-20°C to 100°C ± 1°C
Fuel Contamination	≥1 wt% ± 0.1 wt%*
Water Contamination**	≥0.3 wt% ± 0.1 wt%*
Coolant Contamination**	≥0.3 wt% ± 0.1 wt%*
Minimum Detectable Ferrous Particle Size	300 µm***
Minimum Detectable Non-ferrous Particle Size	1000 µm***

Contact Gastops if your application requirements do not fall within the posted specifications

NOTE: * ± Indicates reporting precision

** Viscosity, water, and coolant contamination are reported with accuracy above 40°C

*** Under optimum sensor placement



Debris Monitor Probe*



Electrical Properties Probe*



Optical Properties Probe*

*Not to scale

FluidSIGHT Electronic Control Unit (ECU)

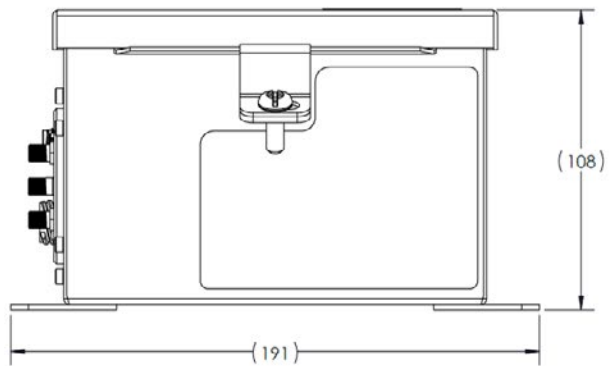
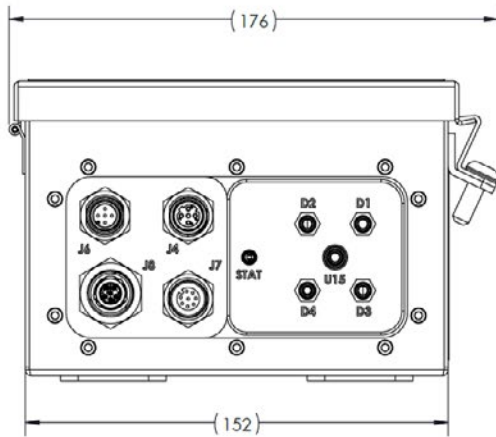
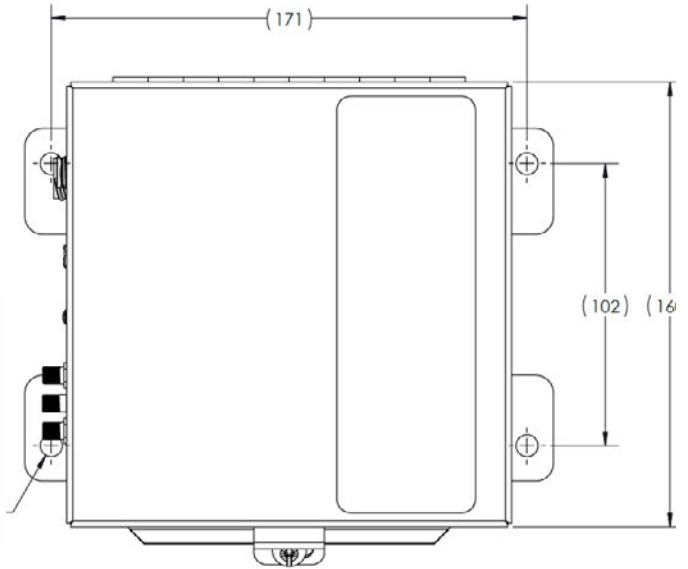
The FluidSIGHT Electronic Control Unit houses the system's electrical and optical components and is designed for back side mounting on a bulkhead or plate.

The FluidSIGHT ECU includes separate interfaces for power input, network and communication, and sensor connections. A status indicator LED on the exterior conveys the unit status to the operator. Communication with the host/monitoring system is achieved via Modbus TCP communication protocol (over ethernet).

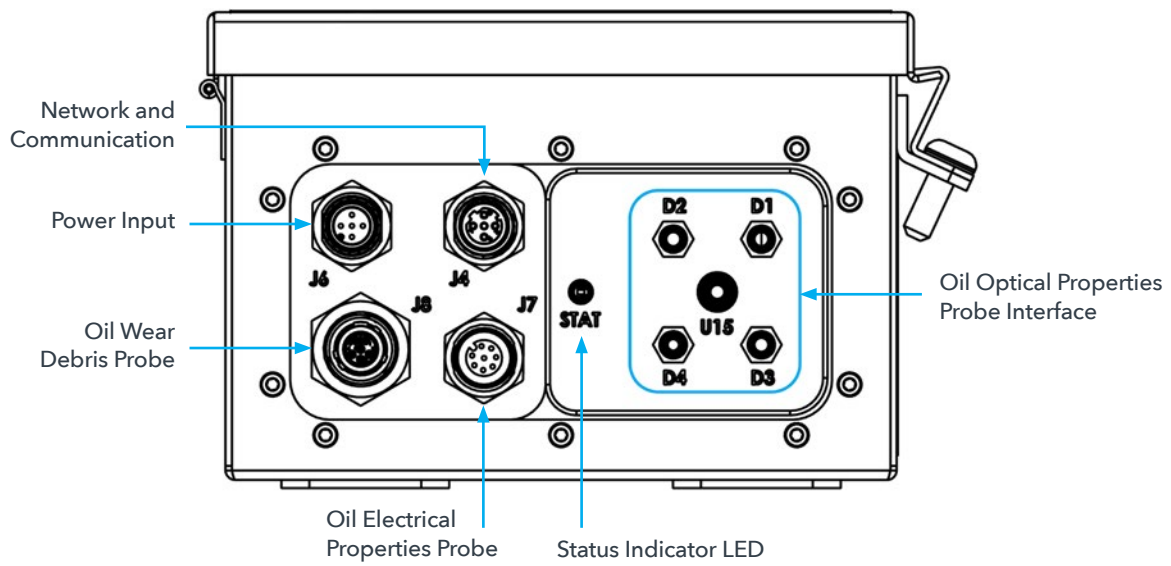
ECU Specifications

Material	304 Stainless Steel
Enclosure Size	176 (W) x 191 (H) x 108 (D) mm
Weight	2.5 kg
Operating Temperature	5°C to 50°C
Storage & Transit Temperature	-20°C to 70°C
Environmental Protection	IP66 Rating

FluidSIGHT Electronic Control Units



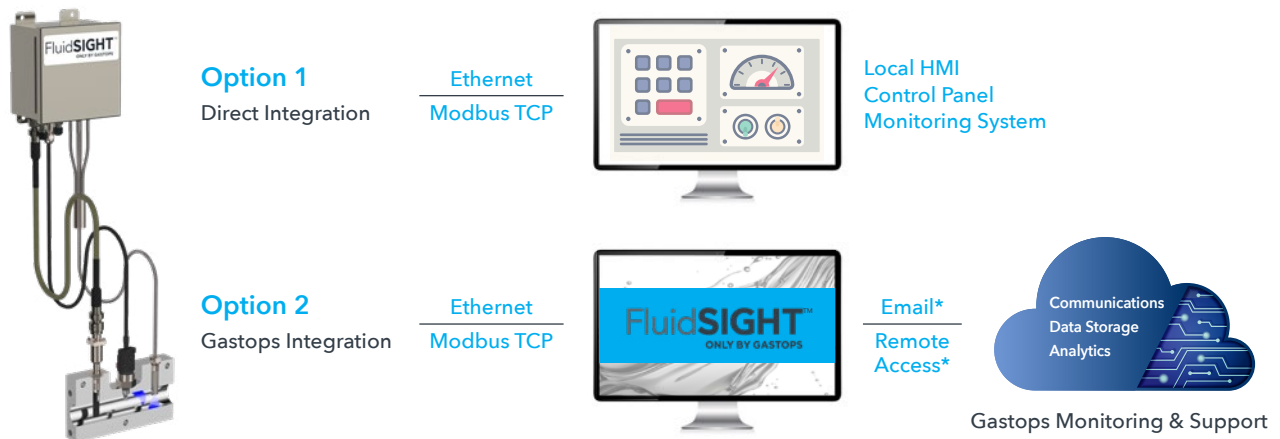
FluidSIGHT Electrical Integration



Vessel Integration

FluidSIGHT can be integrated directly with a central control system that supports data polling via Modbus TCP, allowing full integration with existing essential data acquisition systems.

Alternatively, integration can be performed with a PC running Gastops' proprietary software enabling further cloud-based services including monitoring and fleet level analytics.



*Internet access required

FluidSIGHT offers a PC software that runs under Microsoft Windows designed to interface with one or more systems and provides a graphical user interface for tracking the health of the equipment(s) being monitored. The software provides the capability to continuously display data, to annunciate warnings and alarms when any of the conditions being monitored exceeds user-defined limits. The displayed data are synthesized results achieved by combining readings from multiple sensors/probes using Gastops developed models. The software can be executed by the customer's existing host monitoring system or by a dedicated PC available from Gastops.

About Gastops

Gastops is the world's leading provider of intelligent condition monitoring solutions used in Aerospace, Defence, Energy, and Industrial applications to optimize the availability, performance, and safety of critical assets. We offer peace of mind to our customers with innovative online monitoring sensors, at-line analysis, complex modeling and simulation, world-class laboratory testing, engineering, design, and MRO services that predict performance to enable proactive operating decisions. Gastops has been providing powerful insights into the condition of critical equipment since 1979.



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