Intelligence connects the future!

ISen-H504
Oil Monitoring Sensor

Datasheet

Product Overview

October 17, 2023
CN Rev.v1.0

The ISen-H504 oil condition monitoring sensor adopts the latest patented technology, featuring multiple measurement parameters, high accuracy, and compact size. A single sensor can simultaneously monitor equipment wear conditions and lubrication status, providing both wear particle monitoring and various physicochemical oil property measurements, eliminating the traditional approach of stacking multiple hardware modules for online oil monitoring systems.

The sensor simultaneously monitors wear particles, viscosity, density, oil quality (dielectric constant), water activity (saturation), water content (PPM), and temperature. With optional built-in model algorithms, it can also monitor real-time kinematic viscosity, viscosity index, electrical conductivity, and other parameters. This design enables a multi-functional, compact, multi-parameter integrated online oil condition monitoring sensor, suitable for comprehensive oil monitoring applications.

Main Features

- High accuracy, wide measurement range, compact size, and integrated multi-parameter monitoring sensor;
- Multiple monitoring functions; capable of outputting up to 27 monitoring parameters simultaneously, reducing installation and system integration complexity;
- High performance; wear particle detection ≥30 μm, dynamic viscosity ≥1000 cP, water content ≥100%;

- High flexibility; configurable for high-viscosity, low-viscosity, or other specific monitoring parameters;
- Advanced high-precision signal processing circuit, capable of measuring total ferromagnetic particle count, total non-ferromagnetic particle count, 24-hour ferromagnetic particle accumulation, 24-hour non-ferromagnetic particle accumulation, ferromagnetic particle concentration, non-ferromagnetic particle concentration, and oil flow rate;
- Flexible dimensions with multiple SAE adapter fittings, suitable for different operating conditions;
- No consumables or wear parts, maintenance-free after installation with long service life.

Technical Parameters

Test indicators	Metal wear particles, dynamic viscosity, density, oil quality (dielectric constant), water activity (saturation), water content (PPM), temperature
Metal wear particles	
Particle type	Ferromagnetic particles, non-ferromagnetic particles
Ferromagnetic metal particles	≥30um
Non-ferromagnetic metal particles	≥120um
Number of detection channels	18
Particle channels	Ferromagnetic particles: 30～50um; 50～100um; 100～200um; 200～400um; 400~800um; >800um; total ferromagnetic particles; 24h total ferromagnetic particles Non-ferromagnetic particles: 120～200μm; 200～400μm; 400～800μm; 800～1600μm; >1600μm; total non-ferromagnetic particles; 24h total non-ferromagnetic particles;

	Other indicators Ferromagnetic particle wear concentration, non-ferromagnetic particle wear concentration, flow detection
Detection rate	95% (typical)
Dynamic viscosity	
Test range	200～1000CP
Test accuracy (Typical 23℃)	±3% or ±5CP (whichever is greater)
Resolution	0.01CP
Density	
Test range	600 kg/m²~1500 kg/m²
Test accuracy (Typical 23℃)	±3% or ±10 kg/m² (whichever is greater)
Resolution	0.01 kg/m²
Temperature	
Test range	-30～+120℃
Test accuracy (Typical 23℃)	±0.5℃ or ±3 % (whichever is greater)
Resolution	0.1℃
Oil quality (dielectric constant)	
Test range	1~6
Test accuracy (Typical 23℃)	±3% or ±0.1 (whichever is greater)
Resolution	0.001
Water activity (saturation)	
Test range	0~1 aw
Test accuracy (Typical 23℃)	±0.02 aw(0～0.6)
	±0.03 aw(0.6～0.9)
	±0.04 aw(0.9～1)
Resolution	0.001 aw
Water content (PPM)	

Test range	0～5000 ppm (according to actual oil properties)
Test accuracy (Typical 23℃)	±10% or ±50ppm (whichever is greater)
Resolution	1ppm
Electrical parameters	
Communication protocol	RS485 MODBUS RTU
Cable interface	M12×15-pin (with shielded wire)
Cable length	10m
Operating voltage	DC 9V～36V
Power consumption	≤5W
Other parameters	
Installation interface	SAE3.0(JB/ZQ 4187-97) (SAE3.5/2.5 etc. can be customized)
Wear particle passage diameter	10mm
Pressure range	0～30bar
Oil flow rate	≤1m/s
Withstand oil temperature	-30～+85°C
Storage temperature	-40～+85°C
IP grade	IP65

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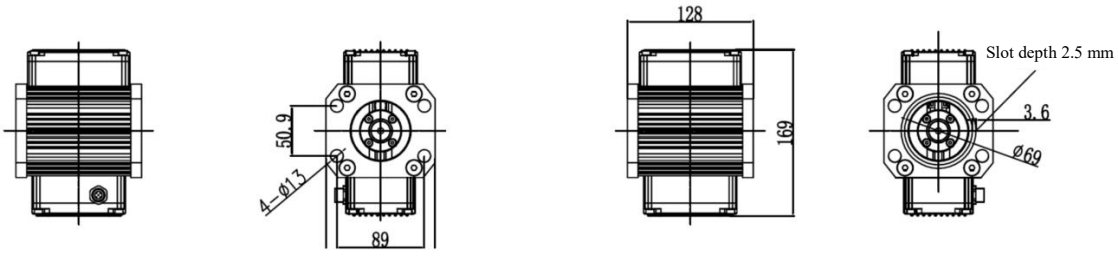
Product Dimension Diagram

Product structure and installation



Unit: mm

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ISen-H505
Oil Monitoring Sensor

Datasheet

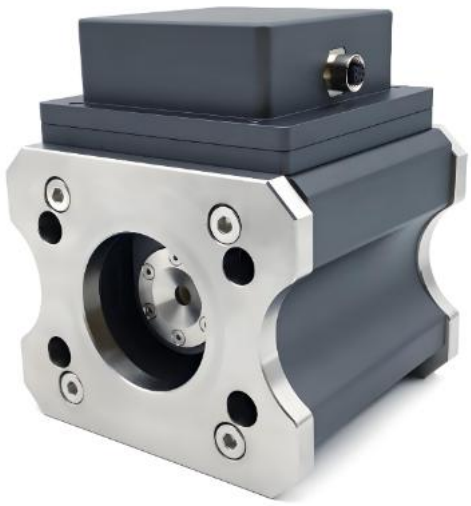
April 14, 2025
CN Rev.v1.0.1

Product Overview

The ISen-H505 oil monitoring sensor integrates industry-leading high-precision and high-stability wear particle detection components. Adopting the advanced multi-coil magnetic field disturbance detection principle and equipped with a high-performance data sampling and processing unit, it enables real-time capture and cumulative output of 40 μm ferromagnetic metal particles and 120 μm non-ferromagnetic metal particles. The sensor is also embedded with internal temperature measurement and oil flow velocity measurement functions, realizing self-inspection of the sensor's operating environment and judgment of oil circuit fluidity. This ensures the sensor always operates in an optimal detection state and that the sampled oil is representative.

Main Features

- Detection capability for 40 μm ferromagnetic & 120 μm non-ferromagnetic wear particles
- Wear particle quantity counting and material analysis
- 2.5 kV isolated RS485 communication
- Measurement immune to external metal and magnetic field interference



- Measurement unaffected by air bubbles and moisture in oil
- Fast response, adjustable data accumulation cycle
- Excellent chemical corrosion resistance and pressure resistance

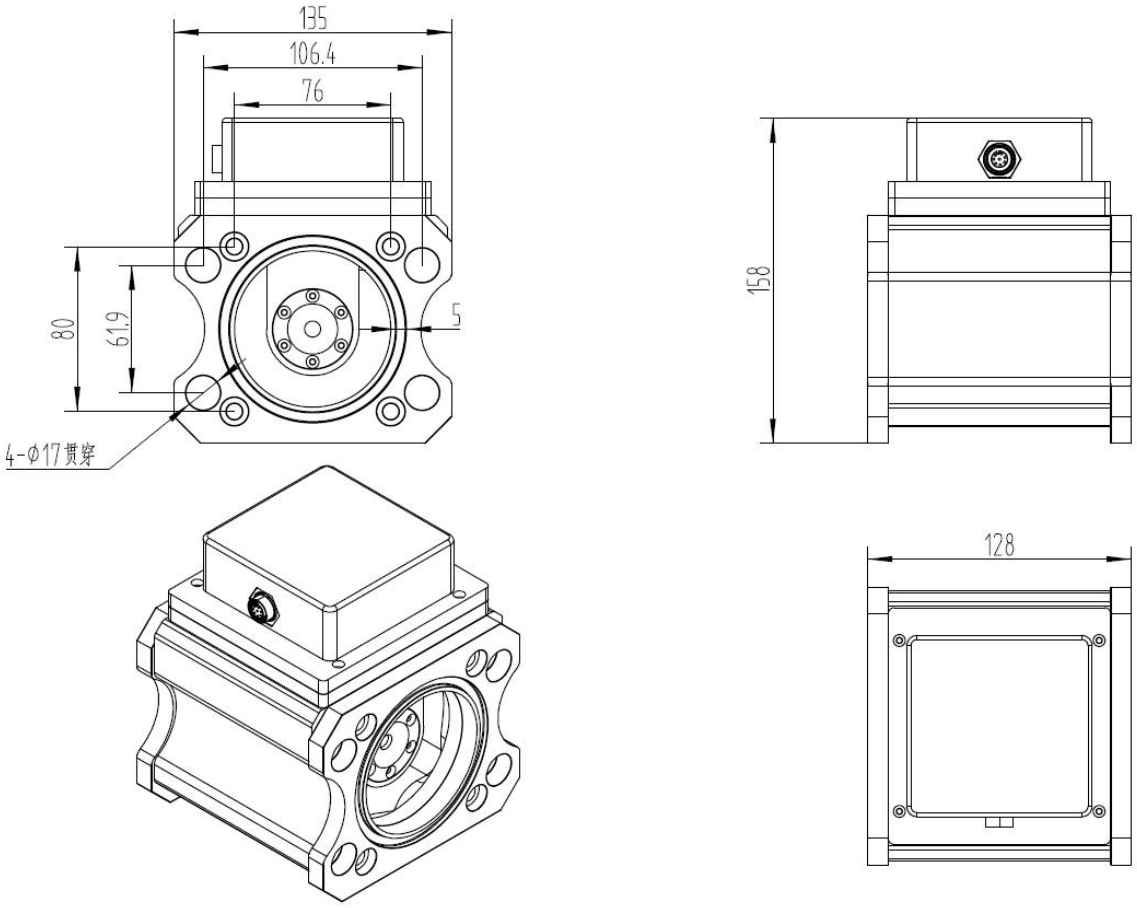
Technical Parameters

Detection capability	Ferrous particles Fe > 40 μm (ESD), 5 grades
	Non-ferrous particles NFe > 120 μm (ESD), 5 grades
Particle detection passage diameter	Φ 8 mm
Detection rate	＞90%
Ferromagnetic statistics	40 ~ 99μm, 100 ~ 199μm, 200 ~ 299μm, 300 ~ 399μm, ≥ 400μm
Non-ferromagnetic statistics	120 ~ 199μm, 200 ~ 299μm, 300 ~ 399μm, 400 ~ 499μm, ≥ 500μm
Statistical cycle	Initial self-test: 30 s, counting interval: adjustable from 300 to 3600s
Particle count	Max 100 particles/sec
Allowable flow rate	0.3 … 9 L/min
Digital output	RS485 MODBUS RTU, isolation voltage 2.5 kV
Operating power	DC 12~28V, 5W Max
Allowable oil pressure	Max 3Mpa
Applicable fluid	Lubricating oil and hydraulic oil (synthetic & mineral-based)
Fluid temperature	-40 … 90 ℃
Ambient temperature	-40 … 80 ℃
Housing material	Stainless steel, anodized aluminum alloy, polycarbonate

Structural dimensions	128×135×158mm (L×W×H)
Oil circuit interface	SAE 2.0"/2.5"/3.0" (optional)
Weight	<4 kg
IP grade	IP65
Connecting cable	Standard: 10m 5-core cable, M12 5-pin elbow connector; optional: M12 waterproof cable gland

Product Dimension Diagram

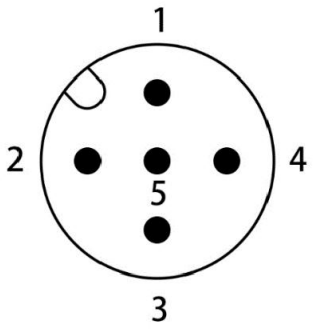
Dimensional drawing:



The above diagram shows the SAE 2.5" flange with a total length of 128 mm

Interface definition (M12 female flange mount)

1) Brown	+24V DC
2) White	RS4858
3) Blue	GND
4) Black	RS485A
5) Grey	Reserved interface



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ISen-H506
Oil Monitoring Sensor

Datasheet

April 14, 2025
CN Rev.v1.0.2

Product Overview

The Isen-H506 oil monitoring sensor is an intelligent sensor for real-time detection of ferrous and non-ferrous wear particles in lubricating oil. Based on the state-of-the-art multi-coil electromagnetic induction principle and equipped with a high-reliability, high-sensitivity data acquisition and processing module, it can comprehensively monitor wear particle type, size, distribution, count, concentration, mass, flow rate and temperature simultaneously, enabling real-time condition monitoring of lubrication and wear for large industrial equipment.

Main Features

- Effective detection of 40 μm Fe and 150 μm NFe
- Outputs wear particle concentration in ppm and particle mass
- Outputs flow rate, temperature and operating hours
- Measurement immune to external metal and magnetic field interference
- Measurement unaffected by air bubbles and moisture in oil

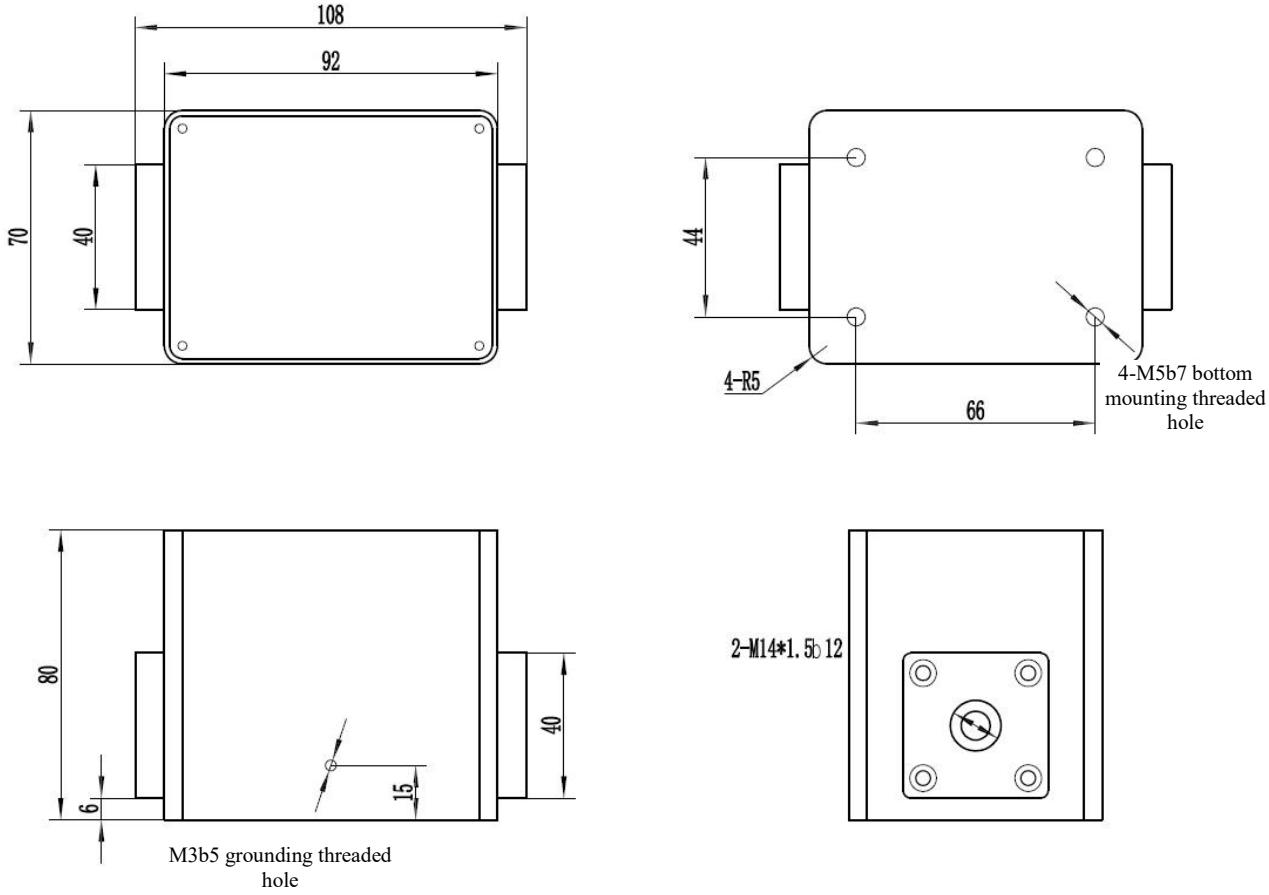
- Excellent chemical corrosion resistance and pressure resistance
- No moving parts or consumables; 10-year design life
- 2.5 kV isolated RS485 communication

Technical Parameters

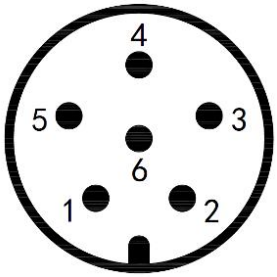
Detection capability	Ferrous particles Fe > 40 μm (ESD), 5–8 grades
	Non-ferrous particles NFe > 150 μm (ESD), 5–8 grades
Statistical cycle	Initial self-test: 30 s; continuous data accumulation
Particle count	Max 100 particles/sec
Allowable flow rate	0.2 … 8.9 L/min (0.15 … 2.9m/s)
Tube size	Φ8mm
Digital output	RS485 MODBUS RTU, isolation voltage 2.5 kV
Operating power	DC 12~30V±10%, < 200mA
Probe pressure rating	20bar Max
Applicable fluid	Lubricating oil and hydraulic oil (synthetic & mineral-based)
Fluid temperature	-20 … 80 ℃
Ambient temperature	-20 … 85 ℃
Housing material	316 stainless steel, T6061 anodized aluminum
Structural dimensions	108×70×80 mm (L×W×H)
Threaded interface	M14*1.5 (customizable)
Weight	<1.0 kg
IP grade	IP65
Connecting cable	2 m, M8 6-pin straight connector
Explosion-proof certification	Ex ib IIC T4 Gb

Product Dimension Diagram

Dimensional drawing:



Interface definition (M8-6 core male)



2)	+24V DC	Red
4)	GND	Black
1)	RS485+/A	White
3)	RS485-/B	Green