

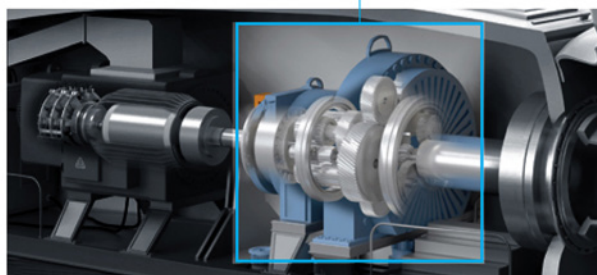


PRODUCT OVERVIEW

MetalSCAN MS3500 ONLINE OIL DEBRIS MONITORING SYSTEM

Proven proactive condition monitoring for rotating equipment.

The MetalSCAN MS3500 Series of products provides the industry with online access to real-time condition monitoring data which enables the earliest reliable detection of component damage available on the market today.



Overview

The MS3500 Series delivers real-time detection of 100% of ferrous and non-ferrous metal particles generated during component damage. The sensors provide continuous monitoring of data to deliver advance warning of abnormal component wear or debris accumulation exceeding defined limits.

This intelligence gives operators the power to plan maintenance in advance, predict the Remaining Useful Life (RUL) of critical equipment, and avoid secondary damage that leads to costly component replacements.

As an equipment operator, managing risk is based upon proper planning of maintenance action. The MS3500 series enables the following:

- Reduction of repair costs – equipment damage and the extent of the repair is much less than if the equipment was operated to failure.
- Reduction of lost revenue – the equipment can be scheduled to be out of service for the shortest possible time, where the replacement parts, equipment, and maintenance crews are on site at the time of shutdown.
- Peace of mind – operators can focus on the problematic assets, trusting the rest of their fleet is well-maintained.
- Reduce mobilization costs – with a clear picture of the entire fleet, maintenance activities at multiple assets can be coordinated concurrently reducing mobilization of expensive equipment.

An additional benefit of effective risk management is the potential for improved coverage from the insurers, which is delivered in terms of reduced premiums, reduced deductibles and/or reduced depreciation.

Reduce operating costs with critical component intelligence.

Description

The new MS3500 Series is Gastops' 5th generation MetalSCAN product line, designed with the same purpose as the MS3000 product line: to monitor the health of rotating equipment.

MetalSCAN is a full-flow, non-obstructive, online debris detection system installed in the lubrication system of critical equipment. It is designed specifically to detect the onset of surface fatigue of bearings and gears and monitor the progression of the damage in real time, providing a continuous measure of equipment condition and a clear understanding of its Remaining Useful Life (RUL).

MS3500 sensors offer more functionality, are lighter, have a lower power consumption and are more affordable than its predecessors. They support multiple communications options and therefore each model is available in two variants: TCP and RTU.

Available in three bore sizes:



MS3505 - 8mm



MS3510 - 25mm



MS3515 - 38mm

Features and Benefits

Features

- 25-year design life with >1,000,000 MTBF (Mean Time Between Failure)
- Maintenance-free with no calibration required
- 100% detection of Fe and NFe metal particles
- Particle size and mass classification
- Onboard condition indicators
- Wide operational temperature range
- Full function continuous Built-in-Test (BIT)
- Industry compliant and certified
- Low power consumption
- Low cost

Benefits

- Prevent unplanned outages
- Prevent equipment secondary damage
- Real-time indication of equipment health and RUL
- Earliest reliable detection of component damage
- Simple and intuitive data interpretation

Whether integrating MetalSCAN into the equipment controller, a Condition Monitoring System, an HMI or requiring a full turnkey solution, MS3500 sensors and their supporting applications allow full flexibility in implementing an optimal solution.

The sensors have built-in digital outputs, support Modbus-TCP and RTU communications, and are supported by various software platforms that unlock even more possibilities.

Option 1 Direct Integration



Controller

OR



Monitoring System

Option 2 Gastops Integration



> MetalSCAN Monitor

> Gastops Connect

Software Introductions

MetalSCAN Manager

MetalSCAN Manager is a Windows-based application capable of interfacing with one or more MetalSCAN sensors. It provides an intuitive interface for users to view and customize configurable parameters to facilitate the set-to-work of sensors.

Main capabilities of MetalSCAN Manager software:

- Display sensor and equipment status
- View and update sensor configuration and data
- Import and export sensor configurations
- Export the sensor's diagnostic file
- Clear sensor counts
- Execute all sensor BITs
- Reboot and reset the sensor
- Update the sensor firmware



MetalSCAN Monitor

MetalSCAN Monitor is a Windows-based application which provides the capability to continuously record and display MetalSCAN data, to annunciate warnings and alarms when debris accumulation exceeds user-defined limits, and to interface to external data acquisition or monitoring systems.

Main capabilities of MetalSCAN Monitor software:

- Monitoring and display of equipment status against preset warning and alarm limits
- Display of Fe and NFe particle totals, rates and particle sizes per bin
- Cross-trending of particle counts, mass, bins, rates and temperatures across multiple equipment and sensors.
- Direct integration to Gastops Connect via REST API
- Modbus/TCP and OPC data servers
- SMTP email notifications
- CSV data exports

MetalSCAN technology empowers operators to effectively manage equipment health using oil debris monitoring.



Introduction

Gastops Connect gathers, processes, and analyzes data from MetalSCAN sensors, combines it with equipment controller data and third-party data to create a comprehensive, real-time view of equipment condition, accessible through any web browser device.

Equipment operators, asset managers and maintenance professionals can therefore receive instant notification of changes in equipment condition, gaining visibility into the health of their equipment located anywhere in the world. Connect is available in various service levels, tailored for operators who are self-performers, and for those requiring technical expertise.



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.

SPECIFICATION SHEET

MS3505 ONLINE OIL DEBRIS MONITOR

Performance

Sensor Bore	8mm (3/8 inch)
Minimum Detectable Particle (sphere)	125µm Fe / 450µm NFe
Minimum Detectable Particle (ESD) ¹	70µm Fe / 270µm NFe
Flow Rate	0.5 L/min - 12L/min (0.13 USGPM to 3.2 USGPM)
Flow Direction	Bi-directional
Maximum Particle Detection Rate	Configurable up to 100 particles/sec

¹The Equivalent Spherical Diameter (ESD) of an irregular shaped object is the diameter of a sphere of equivalent volume.

Electrical Interface

Input Power Supply	18 to 30 VDC
Power Consumption	3.7W

Communication

Ethernet 10/100 Mbit/s

Serial RS-485 (Optional)

Particle Type Discrimination
Particle Size Reporting
Particle Mass Reporting
Equipment Condition Indication

Modbus TCP

Modbus RTU

Ferromagnetic (Fe) / Non-Ferromagnetic (NFe)
Configurable Fe / NFe size bins and Fe / NFe Rate
Fe Mass and Fe Mass Rate
Configurable Alarm and Warning Limits
(Fe, NFe & Temperature)

MS3000 Digital Outputs

PULSE
BIT State
Fault
No Fault
Signal Amplitude
Load Impedance Required

Particle Pulse and Built-in-Test (BIT)

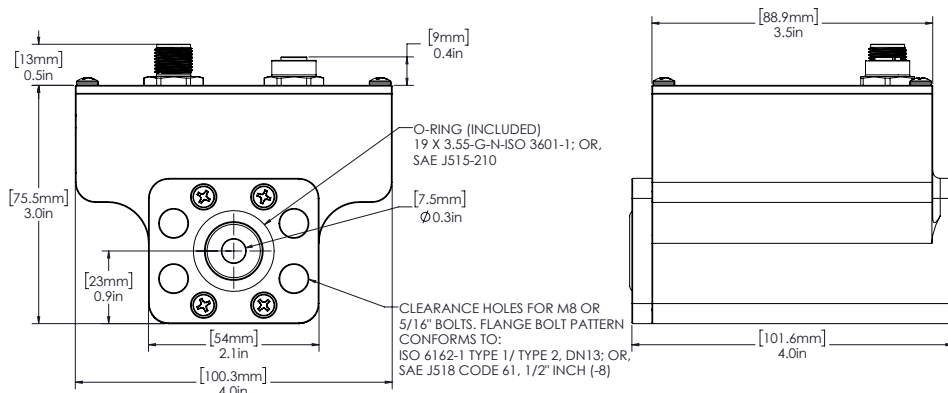
5 ms Square Wave Pulse \pm 2 ms
Hi-LO Logic
Low Logic
High Logic
Power Supply Voltage +0/-2 VDC
High (\geq 1 k Ω)

Environment

Oil Pressure	Maximum 20 bar (300 psi)
Oil Temperature	-40°C to 85°C (-40°F to 185°F)
Ambient Temperature	-40°C to 70°C (-40°F to 158°F)
Vibration	10-50 Hz: 3mm (displacement) 50-300 Hz: 15g (acceleration)
Fluids Compatibility	Hydraulic & lubrication oils; synthetic & mineral based; solvents & cleaning agents

Mechanical Interface

Weight 0.9kg (1.9 lbs)



Compliance

Conforms to ASTM D7917
IP66/67



Ordering Information

Sensors

MetalSCAN 3505 Sensor
(Order: MS3505)

MetalSCAN 3505-RTU Sensor
(Order: MS3505-RTU)

Software

MetalSCAN Manager
(included with sensor)

MetalSCAN Monitor
(Order: MetalSCAN-Monitor)

Gastops Connect
(Contact Gastops)

Accessories

M12, A-Coded, 8-PIN, Straight
Backshell Cable, 10m
(Order: Cable-3500-A-10-00)

M12, A-Coded, 8-PIN, 90deg
Backshell Cable, 10m
(Order: Cable-3500-A-10-90)

M12, D-Coded, 4-PIN to Ethernet
RJ45 Straight Connector Cable, 10m
(Order: Cable-3500-D-10-00)

M12, D-Coded, 4-PIN to Ethernet
RJ45 90deg Connector Cable, 10m
(Order: Cable-3500-D-10-90)

Application Installation Kits
(Contact Gastops)

Head Office

1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia

10-109 Williams Avenue
Dartmouth, NS B3B 2E3
Canada

Newfoundland

146A Glencoe Drive
Mount Pearl, NL A1N 4S9
Canada

Europe

Info.eu@gastops.com

Asia

Info.ch@gastops.com

gastops.com

sales@gastops.com | +1 613 744 3530

C009949_004

SPECIFICATION SHEET

MS3510 ONLINE OIL DEBRIS MONITOR

Performance

Sensor Bore	25mm (1 inch)
Minimum Detectable Particle (sphere)	260µm Fe / 670µm NFe
Minimum Detectable Particle (ESD) ¹	170µm Fe / 435µm NFe
Flow Rate	10 L/min - 300 L/min (2.6 USGPM to 79 USGPM)
Flow Direction	Bi-directional
Maximum Particle Detection Rate	Configurable up to 100 particles/sec

¹The Equivalent Spherical Diameter (ESD) of an irregular shaped object is the diameter of a sphere of equivalent volume.

Electrical Interface

Input Power Supply	18 to 30 VDC
Power Consumption	3.7W

Communication

Ethernet 10/100 Mbit/s

Serial RS-485 (Optional)

Particle Type Discrimination
Particle Size Reporting
Particle Mass Reporting
Equipment Condition Indication

Modbus TCP

Modbus RTU

Ferromagnetic (Fe) / Non-Ferromagnetic (NFe)
Configurable Fe / NFe size bins and Fe / NFe Rate
Fe Mass and Fe Mass Rate
Configurable Alarm and Warning Limits
(Fe, NFe & Temperature)

MS3000 Digital Outputs

PULSE
BIT State
Fault
No Fault
Signal Amplitude
Load Impedance Required

Particle Pulse and Built-in-Test (BIT)

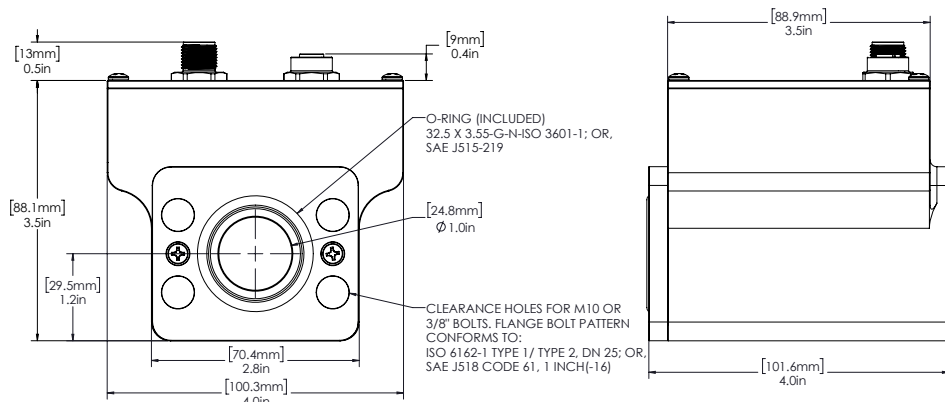
5 ms Square Wave Pulse ± 2 ms
Hi-LO Logic
Low Logic
High Logic
Power Supply Voltage +0/-2 VDC
High (≥ 1 k Ω)

Environment

Oil Pressure	Maximum 20 bar (300 psi)
Oil Temperature	-40°C to 85°C (-40°F to 185°F)
Ambient Temperature	-40°C to 70°C (-40°F to 158°F)
Vibration	10-50 Hz: 3mm (displacement) 50-300 Hz: 15g (acceleration)
Fluids Compatibility	Hydraulic & lubrication oils; synthetic & mineral based; solvents & cleaning agents

Mechanical Interface

Weight 1.1 kg (2.4 lbs)



Compliance

Conforms to ASTM D7917
IP66/67



Ordering Information

Sensors

MetalSCAN 3510 Sensor
(Order: MS3510)

MetalSCAN 3510-RTU Sensor
(Order: MS3510-RTU)

Software

MetalSCAN Manager
(included with sensor)

MetalSCAN Monitor
(Order: MetalSCAN-Monitor)

Gastops Connect
(Contact Gastops)

Accessories

M12, A-Coded, 8-PIN, Straight
Backshell Cable, 10m
(Order: Cable-3500-A-10-00)

M12, A-Coded, 8-PIN, 90deg
Backshell Cable, 10m
(Order: Cable-3500-A-10-90)

M12, D-Coded, 4-PIN to Ethernet
RJ45 Straight Connector Cable, 10m
(Order: Cable-3500-D-10-00)

M12, D-Coded, 4-PIN to Ethernet
RJ45 90deg Connector Cable, 10m
(Order: Cable-3500-D-10-90)

Application Installation Kits
(Contact Gastops)

Head Office

1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia

10-109 Williams Avenue
Dartmouth, NS B3B 2E3
Canada

Newfoundland

146A Glencoe Drive
Mount Pearl, NL A1N 4S9
Canada

Europe

Info.eu@gastops.com

Asia

Info.ch@gastops.com

gastops.com

sales@gastops.com | +1 613 744 3530

C009950_003

SPECIFICATION SHEET

MS3515 ONLINE OIL DEBRIS MONITOR

Performance

Sensor Bore	38mm (1-1/2 inch)
Minimum Detectable Particle (sphere)	350µm Fe / 1,000µm NFe
Minimum Detectable Particle (ESD) ¹	230µm Fe / 600µm NFe
Flow Rate	38 L/min - 1000 L/min (10 USGPM to 260 USGPM)
Flow Direction	Bi-directional
Maximum Particle Detection Rate	Configurable up to 100 particles/sec

¹The Equivalent Spherical Diameter (ESD) of an irregular shaped object is the diameter of a sphere of equivalent volume.

Electrical Interface

Input Power Supply	18 to 30 VDC
Power Consumption	3.7W

Communication

Ethernet 10/100 Mbit/s Serial RS-485 (Optional)

Particle Type Discrimination
Particle Size Reporting
Particle Mass Reporting
Equipment Condition Indication

Modbus TCP

Modbus RTU

Ferromagnetic (Fe) / Non-Ferromagnetic (NFe)
Configurable Fe / NFe size bins and Fe / NFe Rate
Fe Mass and Fe Mass Rate
Configurable Alarm and Warning Limits
(Fe, NFe & Temperature)

MS3000 Digital Outputs

PULSE
BIT State
Fault
No Fault
Signal Amplitude
Load Impedance Required

Particle Pulse and Built-in-Test (BIT)

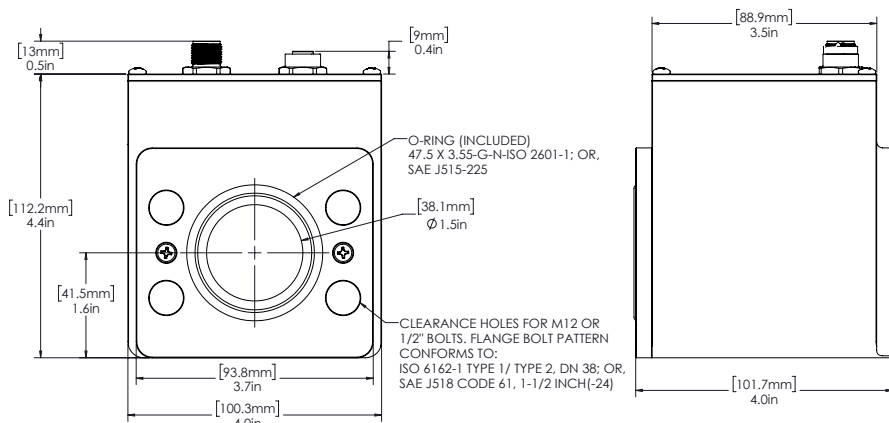
5 ms Square Wave Pulse \pm 2 ms
Hi-LO Logic
Low Logic
High Logic
Power Supply Voltage +0/-2 VDC
High (\geq 1 kΩ)

Environment

Oil Pressure	Maximum 20 bar (300 psi)
Oil Temperature	-40°C to 85°C (-40°F to 185°F)
Ambient Temperature	-40°C to 70°C (-40°F to 158°F)
Vibration	10-50 Hz: 3mm (displacement) 50-300 Hz: 15g (acceleration)
Fluids Compatibility	Hydraulic & lubrication oils; synthetic & mineral based; solvents & cleaning agents

Mechanical Interface

Weight	1.9 kg (4.1 lbs)
--------	------------------



Compliance

Conforms to ASTM D7917
IP66/67



Ordering Information

Sensors

MetalSCAN 3515 Sensor
(Order: MS3515)

MetalSCAN 3515-RTU Sensor
(Order: MS3515-RTU)

Software

MetalSCAN Manager
(included with sensor)

MetalSCAN Monitor
(Order: MetalSCAN-Monitor)

Gastops Connect
(Contact Gastops)

Accessories

M12, A-Coded, 8-PIN, Straight
Backshell Cable, 10m
(Order: Cable-3500-A-10-00)

M12, A-Coded, 8-PIN, 90deg
Backshell Cable, 10m
(Order: Cable-3500-A-10-90)

M12, D-Coded, 4-PIN to Ethernet
RJ45 Straight Connector Cable, 10m
(Order: Cable-3500-D-10-00)

M12, D-Coded, 4-PIN to Ethernet
RJ45 90deg Connector Cable, 10m
(Order: Cable-3500-D-10-90)

Application Installation Kits
(Contact Gastops)

Head Office

1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia

10-109 Williams Avenue
Dartmouth, NS B3B 2E3
Canada

Newfoundland

146A Glencoe Drive
Mount Pearl, NL A1N 4S9
Canada

Europe

Info.eu@gastops.com

Asia

Info.ch@gastops.com

gastops.com

sales@gastops.com | +1 613 744 3530