Frequently Asked Questions (FAQs)

1020 & 1030 Product Families
Magnetic Debris Detector (MDD)

General Questions

Q1. Do KasperAero debris sensors detect non-ferrous debris?

A1. No. The NZMS debris sensor product family does not collect or detect non-ferrous debris such as aluminum, brass, ceramics, or dirt. Only ferrous metallic particles are detected.

Q2. Are KasperAero debris sensors orientation-specific?

A2. No. All NZMS debris sensors are completely axially symmetric and can operate reliably in any orientation. Performance is unaffected by mounting direction, allowing flexible installation across a wide variety of systems.

Q3. Do KasperAero debris sensors require calibration?

A3. In applications where the sensor is positioned away from nearby ferrous materials, no calibration is required. Non-ferrous metals such as aluminum, annealed stainless steel, magnesium, brass, copper, zinc, and titanium have absolutely no effect on sensor readings and are invisible to the sensor.

In installations with close proximity to ferrous materials, calibration must be handled on the integration side by recording the analog output at baseline and adjusting PLC or SCADA thresholds accordingly. There is no calibration button or on-sensor procedure. See the installation guidelines for your specific product series for more information.

Q4. Can NZMS debris sensors detect both fine and coarse particles?

A4. Yes. All NZMS debris sensors are designed to respond to a wide range of particle sizes, from fine metallic dust indicating early-stage wear to larger chips or fragments that typically signal more severe mechanical damage. The sensor does not differentiate particle size, the output signal reflects the total accumulated ferrous mass on the sensor face, regardless of whether it comes from many small particles or a single larger piece.

Q5. How are debris sensors integrated into a system?

A5. Debris sensors can be connected via analog, digital, IO-Link, Modbus RTU, or CAN bus outputs depending on the sensor order code configuration. On the 1030 series, output styles A (0 to 10 V), B (0 to 5 V) and C (0 to 3.3 V) are available now, each with a spare digital output. The 18D1000 is built with output A (0 to 10 V) only. Styles E (IO-Link), F (Modbus RTU) and G (CANbus) are in development. See the product family data sheet for ordering code information.

Q6. Can the KasperAero debris sensors be integrated into larger systems?

A6. Yes. Both the 1020 and 1030 product families are designed for direct integration into larger systems. Multiple mounting configurations are available, and both series are rated to withstand elevated pressures and temperatures. The 1030 series, with its single-piece 6061-T6 aluminum housing and mil-spec connector, is particularly suited for demanding environments where structural integrity is critical.

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Q7. I checked my debris sensor and there's debris on the face. Should I clean it?

A7. Whether or not to clean the sensor face depends on your specific application. Some systems may allow periodic cleaning, similar to a magnetic drain plug, while others may recommend leaving the sensor untouched. Always follow your maintenance guidelines to determine if and when cleaning is appropriate during the sensor's operational life.

Q8. How long is the expected service life?

A8. NZMS debris sensors are highly reliable due to their lack of moving parts. Service life is influenced by factors such as vibration, thermal cycling, maximum operating temperature, and chemical compatibility with the monitored fluid. Housing durability and seal integrity also play a role.

The 1030 series, machined from a single piece of 6061-T6 aluminum and rated to 125°C, is specifically designed for extended service in harsh or high-temperature environments. The 1020 series, with its Ultem polymer housing rated to 85°C, is well suited for standard industrial applications. When installed and maintained according to specifications, both series are designed for long-term, dependable operation.

Technical Questions

Q9. Why is proximity to ferrous objects important when installing a debris sensor?

A9. NZMS sensing technology works by detecting disturbances in a magnetic field. Nearby ferrous materials, such as steel or cold-worked stainless steel, can alter the ambient field and produce a signal. These effects can be minimized through careful mechanical design and post-installation threshold calibration. Magnetic field strength drops off with the cube of the distance, so even modest separation from ferrous structures significantly reduces interference. A practical rule of thumb is to consider the attraction force between the sensor and any nearby object. The weaker the attraction force feels, the less influence it will have.

Q10. How do transient magnetic fields affect NZMS sensor performance?

A10. Transient magnetic fields generated by high-voltage wiring, motors, pumps, or strong electromagnets can influence sensor readings if the sensor is mounted too close. Where possible, position the sensor away from significant electromagnetic noise sources.

In high-EMI environments, a ferrous guard around the sensor may improve stability and reduce interference. In most cases, the sensor's internal safe guards prevent EMI interference.

Q11. Can NZMS debris sensors detect rust?

A11. Yes, but only to a limited extent. Rust is weakly magnetic, and its detectability depends on the type present. Magnetite (Fe_3O_4) is more magnetic and easier to detect, while hematite (Fe_3O_3) is less magnetic and produces a weaker response. Because rust composition can vary significantly, KasperAero recommends independent testing to confirm performance in rust detection applications.

Q12. What is the maximum sensitivity of the NZMS debris sensors?

A12. The underlying NZMS sensing technology is capable of extremely high sensitivity. Internal electronics take analog measurements of the magnetic field and scale them such that the ADC resolution of the host PLC is never the limiting factor. The practical sensitivity limit is determined by signal noise — setting a debris threshold too low, or failing to apply adequate hysteresis, will cause the sensor to operate unreliably.

For the "A" output configuration (0.25V–10V analog), with a sensitivity of approximately 1V per 0.020 grams, typical PLC threshold values for a large gear train lubrication system might be set as follows:

1V = low level alarm

2V = medium level alarm

3V = high level alarm

See the output specific installation guidelines for more information.

Q13. How quickly does the sensor respond to debris?

A13. NZMS debris sensors are intentionally designed with a slight response delay, typically under three seconds, to reduce false positives and ensure highly reliable data. This filtering helps suppress transient noise and minimizes nuisance trips in real-world operating environments.

Commercial Questions

Q14. How cost effective are KasperAero debris detectors?

A14. KasperAero debris sensors are designed to deliver high performance at a price that supports broad industrial deployment. They should be viewed as affordable insurance against costly downtime, warranty claims, unplanned service visits, and potential contract penalties.

The 1020 series offers the most cost-effective entry point. Costs can be reduced by ordering the default configuration (1020AW101), or reduced further by ordering the base unit without a mounting adapter (1020AW000). The 1030 series carries a higher price point reflecting its single-piece aluminum construction and mil-spec connector, and is intended for applications where ruggedness and high-temperature performance justify the investment.

For volume pricing on either series, please contact our team. For mass-market applications, please review our custom debris sensor options.

Q15. What kind of technical support is available after purchase?

A15. KasperAero provides comprehensive support for all product lines. Our team can assist with installation guidance, system integration, calibration questions, and troubleshooting. We also offer support for interpreting sensor data and optimizing sensor placement. Support is available via email, phone, or virtual consultation, and we aim to respond promptly to all inquiries.