



Kasper Aero

# 1020A Magnetic Debris Detector (MDD)

KasperAero Technical Data Sheet

Powered by NZMS Technology

## About the 1020 Product Family

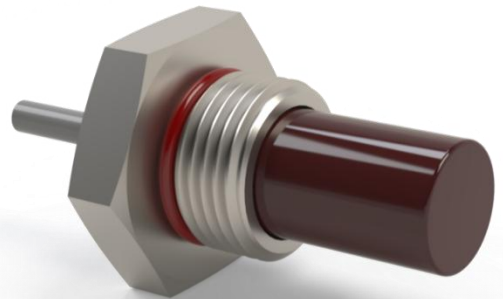
The KasperAero 1020 Series is our flagship line of off the shelf ferrous debris detection sensors, built for demanding industrial environments yet easily adaptable to power generation, marine, and rail applications. Powered by our proprietary NZMS technology, the 1020 Series delivers industry-leading debris monitoring performance with a cost-effective design.

## Key Features

- Real-time, continuous condition monitoring
- Detects both coarse and fine ferrous debris
- Proven to reduce unplanned downtime and maintenance costs
- Compatible with PLC and SCADA systems for seamless integration
- Standard industrial output options
- Robust stainless steel and Polyetherimide (PEI/ Ultem) construction for harsh environments
- Compact form factor for easy installation in existing systems
- Suitable for fuels, oils, coolants, and hydraulics
- Broad range of fittings available

## Advantages

- Low power consumption for battery-driven or embedded systems
- Cost effective high precision measurement sensor
- No external electronics box
- No calibration required



**Entire Sensor**  
(no separate electronics)

## Applications:

- Oil Reservoirs (Tank)
- Oil Return Lines
- Fuel Return Lines
- Hydraulic Reservoirs (Tanks)
- Gearboxes / Final Drives
- Filter housings (Pre or Post)
- Industrial Process Piping
- Pump Discharge Line

## Industries:

- High Uptime Industrial Machinery
- Power Generation
- Railways
- Wind Turbines
- Gear Motors
- Mining
- Transportation
- Machine Tools
- Compressor Sumps & Scavenge



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Focused on the Fundamentals



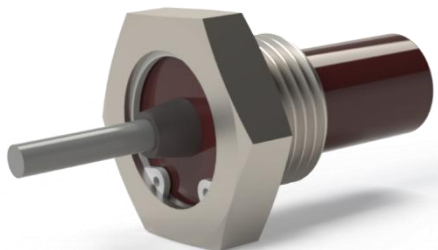
## 1020A

### Electrical Characteristics

These electrical characteristics are specific to Output Type "A". Output Type "A" corresponds to report method of 0.25V – 10V analog output.

Output scale is 1 Volt per 0.020 grams of 10 micron ferrous powder.

The spare pin, pin 4 is used as a digital output to indicate the presence of 0.050 grams of debris. This is not the minimum sensitivity of the 1020A but rather a nominal output value which represents a moderate amount of debris in most applications.



#### Electrical Data

Electrical Interface		4 Wire
Nominal Supply Voltage	[VDC]	24 VDC
Supply Voltage Range	[VDC]	12 - 28 VDC
Power Consumption Debris Indicated	[W]	< 0.105 W
Power Consumption No Debris	[W]	< 0.052 W
Max Report Rate	[Hz]	10 Hz Max

#### Sensor Output

Sensor Output Configuration Code	A
Pin 2, Analog Output	0.25V – 10V
Pin 2, Analog Output - No Debris	0.25V
Pin 2, Analog Output – Maximum Debris	10V
Analog Output Scale	1 Volt per 0.020 grams
Pin 4, Digital Output < 0.050 grams of debris	0.25V
Pin 4, Digital Output > 0.050 grams of debris	10V

#### Circuit Protection

Reverse Polarity Protection	YES
Over Voltage Protection	YES
Short Circuit Protection	YES
Type of Short Circuit Protection	PULSED
Overload Protection	YES

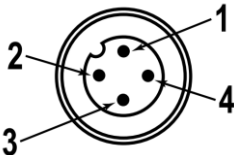
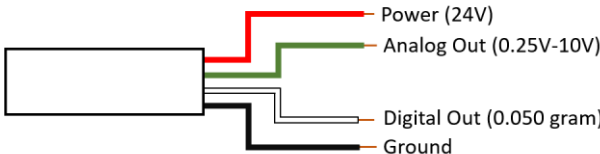
#### Sensor Electrical Connector

Part Number Code:	<b>W</b>	<b>X</b>
Description:	M12 male A-coded 4-pin Default Electrical Connector	No Connector, bare wires 4 Conductors (28 AWG)
Cord Length:	3ft, mPPE Insulated	6ft, mPPE Insulated



# 1020A Magnetic Debris Detector (MDD) Cont.

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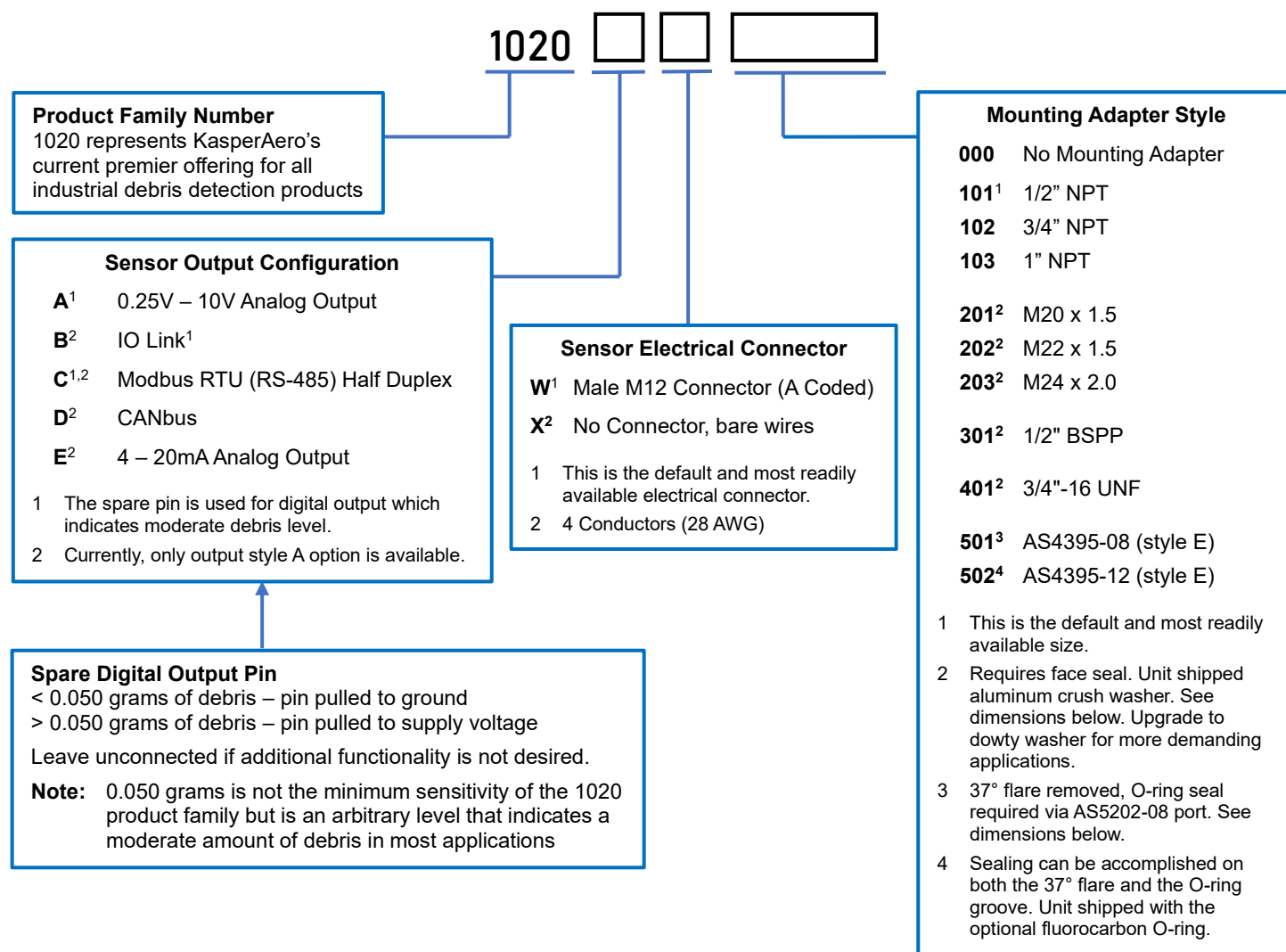
Pinout:		
	<ol style="list-style-type: none"><li>1. Power (24V)</li><li>2. Analog Output (0.25V - 10V)</li><li>3. Ground</li><li>4. Digital Output (0V or 10V)</li></ol>	

## Physical Characteristics

Mechanical	
Maximum Sensitivity	0.015 grams of 10-micron Ferrous Debris
Detectable Debris Media	Ferrous Only Aluminum and Ceramic Debris Immune
Materials (Sensor)	<ul style="list-style-type: none"><li>• Stainless Steel</li><li>• PEI (Ultem)</li><li>• Viton (FKM)</li></ul>
Sensor Size	See individual product datasheets and adapters.
Weight (lbs)	Weight dependent on electrical connection type and adapter type.
Note on Pressure Rating	Pressure rating for sensor face and internal O-ring. Adapter pressure rating varies depending on attachment method and interface materials.
Environmental	
Sensor Protection	IP66 / IP68
Differential Pressure	150 psi (10 bar)
Operating Temperature	YES
Humidity	95% RH @ +135°F
ATEX	Product <u>not</u> designed for ATEX environments. ATEX debris sensors must be custom solution.
Liquids	
Fuels	Gasoline, Diesel, Kerosene, Jet-A, JP-8, Avgas
Oils / Grease	Petroleum Oil, Grease, Mineral Oil, Synthetic Ester, Gear Oil, PAO based Oils, Automatic Transmission Fluid (ATF), Aeroshell Grease, Aero Lubriplate, Bunker Oil, Polyalkylene Glycol, Vegetable Oil
Hydraulics	Hydraulic Oils (HVI and ISO VG), Mineral Oil Based, Water-Glycol
Coolants	Ethylene Glycol, Propylene Glycol, Organic Acid Technology (OAT)
Other	Water, Salt Water, Methanol, Isopropyl Alcohol



## Part Numbering Breakdown



Currently, only output style A has been developed and is available for sale. Please contact our team (Info@KasperAero.com) if output style A does not meet your needs.



### Example Part Numbers

#### Example 1: 1020AW000

**1020** The KasperAero industrial debris sensor product family.  
**A** 0.25V – 10V Output (and spare digital output pin)  
**W** 4 Pin M12 Connector (A Coded)  
**000** No adapter included. Intended for mounting in custom adapter (see required dimensions below).

#### Example 2: 1020AW101

**1020** The KasperAero industrial debris sensor product family.  
**A** 0.25V – 10V Output (and spare digital output pin)  
**W** 4 Pin M12 Connector (A Coded)  
**101** 1/2" NPT Thread Connection

#### Comments:

This is the most common and the base configuration for the 1020 product family. This will have the shortest lead time.

#### Example 3: 1020AW401

**1020** The KasperAero industrial debris sensor product family.  
**A** 0.25V – 10V Output (and spare digital output pin)  
**W** 4 Pin M12 Connector (A Coded)  
**401** 3/4"-16 UNF Threaded Connection. Unit shipped with aluminum crush washer. Recommend customer upgrade to Dowty washer for higher performance sealing if required.

#### Example 4: 1020AX502

**1020** The KasperAero industrial debris sensor product family.  
**A** 0.25V – 10V Output (and spare digital output pin)  
**X** No electrical connector, bare stripped wires (4 conductors, 28 AWG)  
**502** AS4395-12 (style E) connection. Shipped with a -912 fluorocarbon O-ring that is required if sealing on a boss port.

#### Example 5: 1020BW201

IO Link Output not currently available, development in progress. KasperAero recommends using an inline adapter such as the *Banner Engineering S15C Analog Voltage to IO-Link Device Converter* to convert to IO link.

#### Example 6: 1020CX202

Modbus Output not currently available, development in progress. KasperAero recommends using an interface adapter such as the *DatExel Voltage to Modbus converter RTU DAT3015V* or the *Banner Engineering S15C-U-MQ Analog Voltage to Modbus Converter*.

#### Example 7: 1020DX301

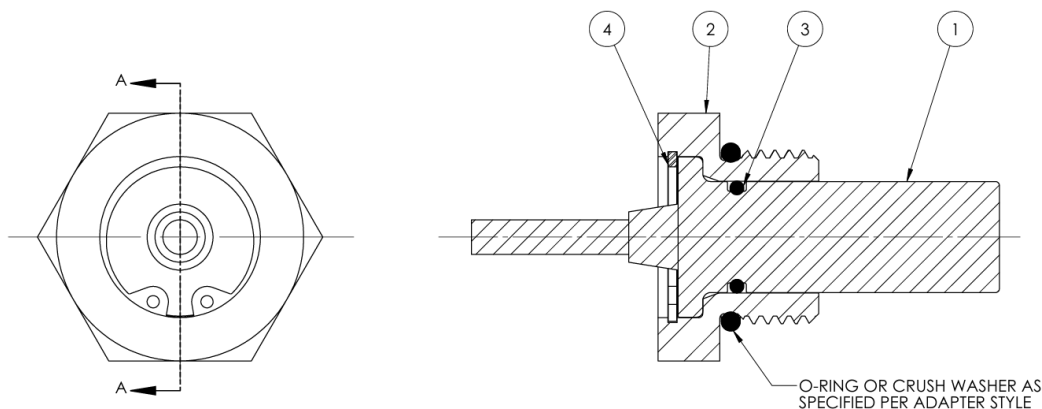
CANbus Output not currently available, development in progress. KasperAero recommends either the *CSS Electronics CANmod.input: 8 x Analog/Digital/Pulse to CAN Bus Converter* or converting to IO Link then converting to CAN Bus.

#### Example 8: 1020EX302

4-20mA Output not currently available, development in progress. KasperAero recommends using a signal converter such as the *Masibus 9000-dop Signal Isolated Converter 0-10V, 4-20Ma, 230/110V Ac* or converting to Modbus then converting to 4-20mA.



### Assembly



#### Bill of Materials (BOM)

Item Number	Part Number	Description	Materials	QTY
1	1020A000	Base Unit, Ferrous Debris Sensor	PEI (Ultem)	1
2	Adapters 101 through 502	Adapter, Hex Flange	304 Cres (Stainless Steel)	1
3	M83485/1-013	Packing, Preformed, O-Ring	Fluorocarbon (Viton)	1
4	MS16625-4081	Ring, Retaining, Internal	Cres (Stainless Steel)	1

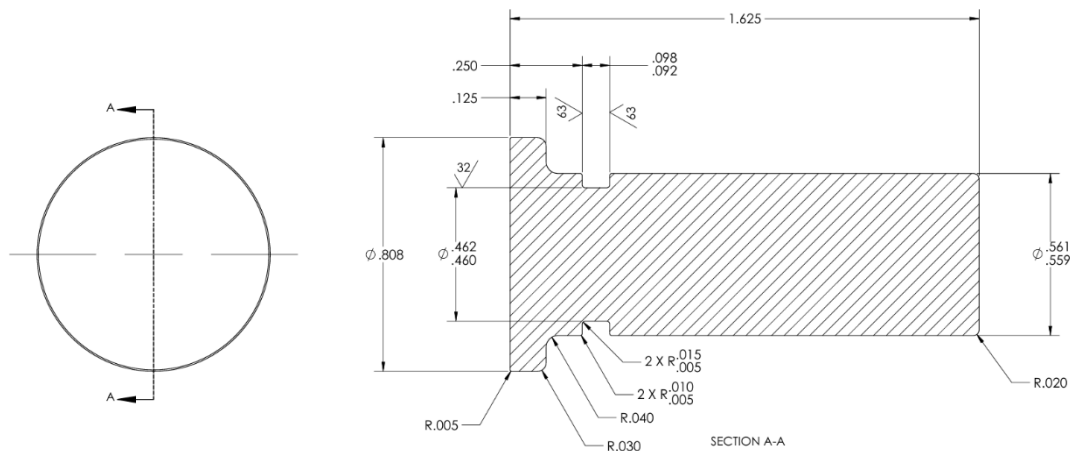
**NOTE:** See notes throughout about which styles require O-rings or crush washers.

### Dimensions

#### Base Unit:

Adapter Style 000

PEI Plastic (Ultem)



See CAD models on [KasperAero.com](http://KasperAero.com)



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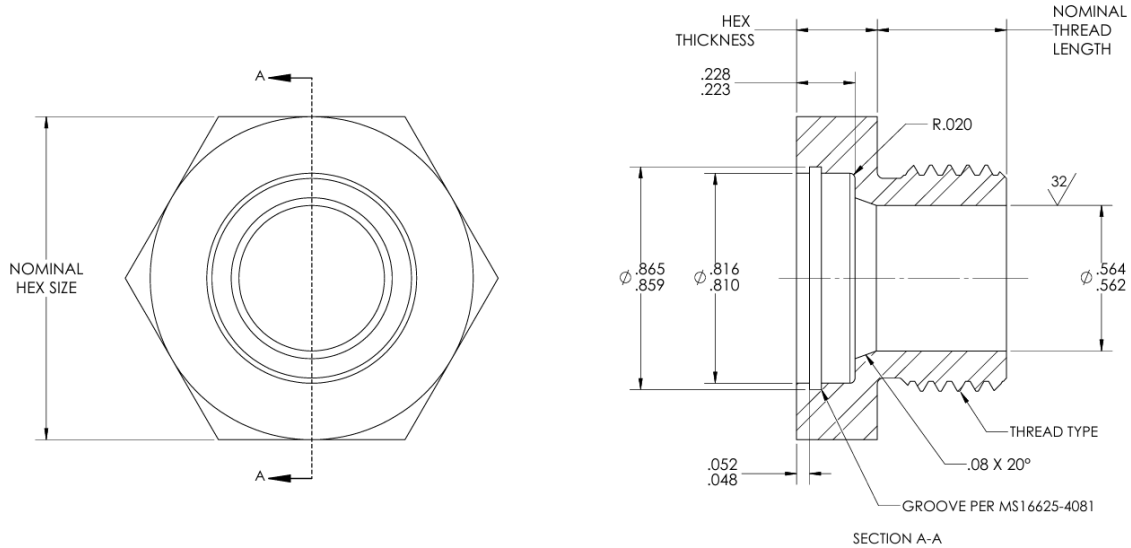
## KasperAero Technical Data Sheet

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### Adapters:

Adapter Styles 101-502

304 CRES (Stainless Steel)



See CAD models on [KasperAero.com](http://KasperAero.com)

### Adapter Dimensions

Adapter Style	Thread Type	Nominal Thread Length (inches)	Nominal Hex Size (inches)	Nominal Hex Thickness (inches)
101 <sup>1</sup>	1/2" NPT	0.782	1.000	0.313
102	3/4" NPT	0.794	1.250	0.438
103	1" NPT	0.985	1.500	0.625
201 <sup>2</sup>	M20 x 1.5	0.394	1.000	0.313
202 <sup>2</sup>	M22 x 1.5	0.447	1.125	0.438
203 <sup>2</sup>	M24 x 2.0	0.447	1.250	0.438
301 <sup>2</sup>	1/2" BSPP	0.394	1.125	0.438
401 <sup>2</sup>	3/4"-16 UNF	0.551	1.125	0.438
501 <sup>3</sup>	AS4395-08 (style E)	0.624	1.000	0.313
502 <sup>4</sup>	AS4395-12 (style E)	0.859	1.375	0.500
NOTES:	<ol style="list-style-type: none"><li>1 This is the default and most readily available size.</li><li>2 Requires face seal. Unit shipped aluminum crush washer. See dimensions below. Upgrade to dowty washer for more demanding applications.</li><li>3 37° flare removed, O-ring seal required via AS5202-08 port. See dimensions below.</li><li>4 Sealing can be accomplished on both the 37° flare and the O-ring groove. Unit shipped with the optional fluorocarbon O-ring.</li></ol>			