

DSO Series

Gear Tooth Speed Sensors

- Hall Effect Technology sensor for gear target detection
- Detects 0-32 pitch gears
- Resolves speed to a Digital Single Output
- Detects Ferrous Targets and Pitch Between Teeth
- Easy to install Flange mount and threaded options available



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Number Example: **M12-18ADSO-5KSA5**

Housing	Sensor Type & Function	Electrical Option	Connection Type
See page 2-4	DSO	See page 5-6	See page 7-8

Modify, update, or enhance any sensor with our modular features and functionality.

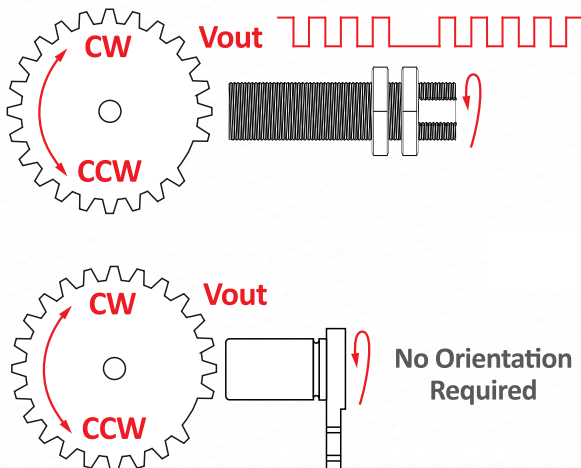
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements

'Target Tracker' No Orientation Required



FEATURES

- Non-contact
- Easy to install
- Temperature stable
- Shock and vibration resistant
- Solid-state (no wearing parts)

APPLICATIONS

- Shaft and gear speed in agricultural equipment
- Measure speed in conveyor systems
- Speed resolution in automation equipment
- Cam and Crank shaft timing

MARKETS

- Aerospace & Defense
- Medical Devices
- Agricultural Machinery
- Marine & Transportation

- Near zero speed operation
- Dynamic, self-calibrating
- Detect non-standard steel targets
- Harsh environment durability
- Large detection gap (custom air gap ranges available)

- Resolving engine RPMs
- Resolve speed of industrial and agricultural attachments
- Provide count feedback of parts in production and testing
- Measure crane / winch feed rate
- Measuring vehicle/wheel speed
- Monitoring gears in transmissions

- Automotive & Heavy Equipment
- Power Generation Systems
- Consumer Electronics
- Manufacturing & Industrial Automation

DSO Series

Gear Tooth Speed Sensors



HOUSING TYPES AND CUSTOMIZATION OPTIONS

The DSO Series offers a wide range of housing styles, mounting types, and material options to cover a variety of application environments. If the housing style you need is not shown, Standex can work with you on your custom housing needs to fulfill your application requirements.

HOUSING MATERIALS

- Aluminum
- Plastic (Glass Filled Nylon)
- Stainless Steel

MOUNTING TYPE

- Threaded Barrel
- Flange Mount
- High Pressure

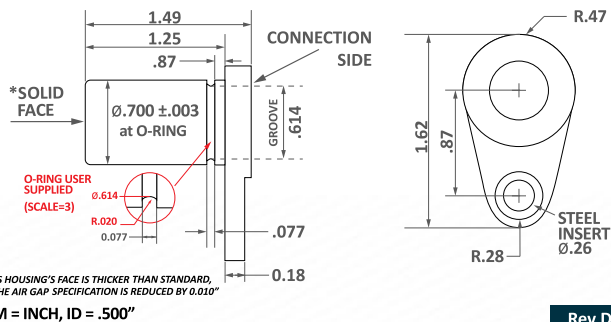
THREAD PITCH

- 1/2-20
- 15/32-32
- 3/4-20
- 5/8-18
- 7/16-20
- M12x1
- M18x1

Plastic Glass Fill Nylon (150°C)

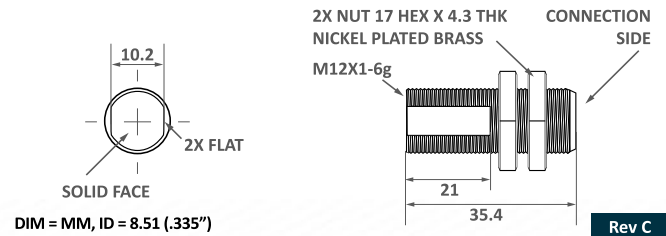
PART NUMBER	M 1 2 - 3 7 A	D S O - 5 K S A 5	CONNECTION
EXAMPLE	HOUSING	ELECTRICAL	

MFM7-37A Flange Mount



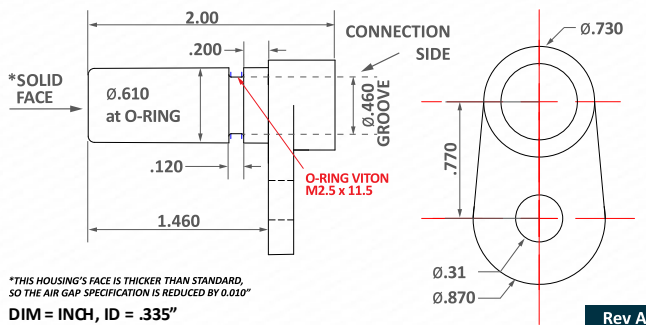
Rev D

M12-18A Thread Mount M12x1mm, 35mm



Rev C

MFM610-18A Flange Mount



Rev A

Molded Housing to Gear Air Gap

		-37A	-18A
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"	.150"
8 (.393") Tooth to Tooth	.000 to .125"	.180"	.110"
12 (.262") Tooth to Tooth	.000 to .070"	.105"	.075"
100% tested before shipping			
16 (.196") Tooth to Tooth	.000 to .050"	.070"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.055"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.040"	.030"
32 (.098") Tooth to Tooth	.000 to .008"	.020"	.020"
Typical Output Duty Cycle	40 to 60%		
Alignment Skew Angle	360 Degrees		

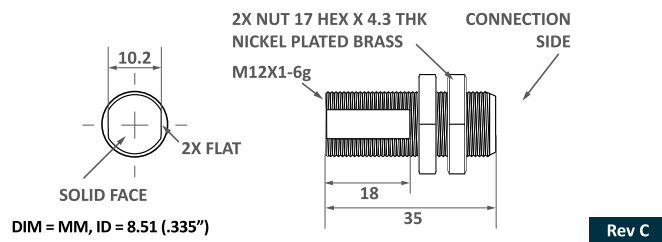
DSO Series Gear Tooth Speed Sensors

303 Stainless Steel

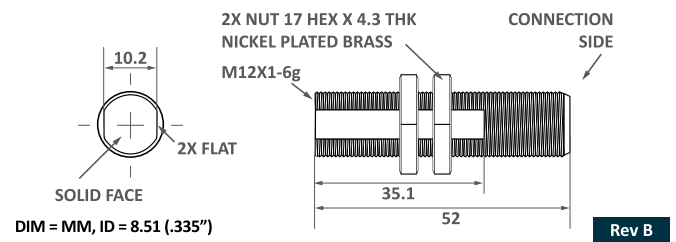
PART NUMBER **EXAMPLE** **M 1 2 - 3 7 A D S O - 5 K S A 5** — CONNECTION

HOUSING ELECTRICAL

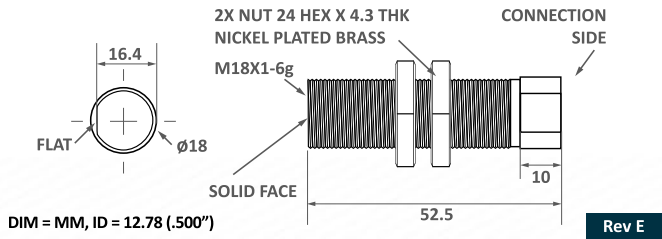
S12-18A Thread Mount M12x1mm, 35mm



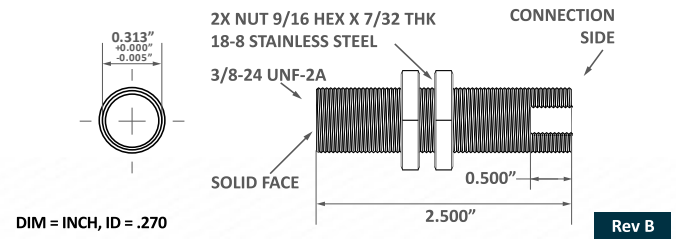
S12H-18A Thread Mount M12x1mm, 52mm



S18-37A Thread Mount M18x1mm, 53mm



S38J-22A Thread Mount 3/8-24, 2.5in



Steel Housing to Gear Air Gap

	-37A		-18A		-22A	
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap	Air Gap Range	Typ. Max Gap	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"	.000 to .120"	.150"	.000 to .100"	.125"
8 (.393") Tooth to Tooth	.000 to .125"	.180"	.000 to .085"	.110"	.000 to .060"	.100"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .070"	.105"	.000 to .055"	.075"	.000 to .045"	.075"
16 (.196") Tooth to Tooth	.000 to .050"	.070"	.000 to .035"	.050"	.000 to .030"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.055"	.000 to .030"	.040"	.000 to .025"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.040"	.000 to .020"	.030"	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .008"	.020"	.000 to .012"	.020"	.000 to .010"	.020"
Typical Output Duty Cycle	40 to 60%					
Alignment Skew Angle	360 Degrees					

DSO Series

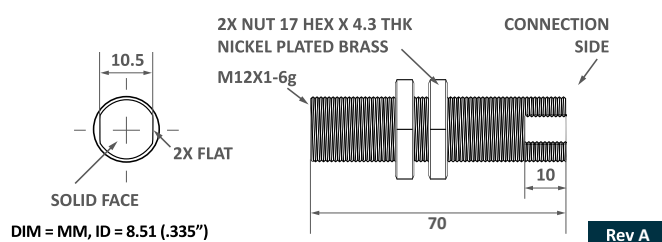
Gear Tooth Speed Sensors

Aluminum Black Anodized

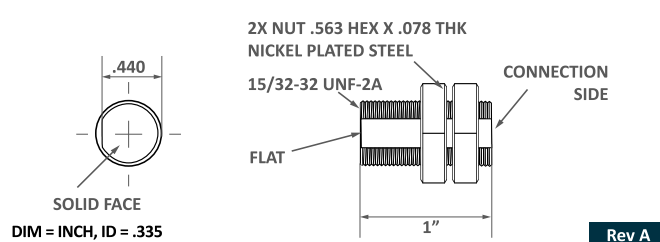
PART NUMBER
EXAMPLE

M 1 2 - 3 7 A D S O - 5 K S A 5 — CONNECTION
HOUSING ELECTRICAL

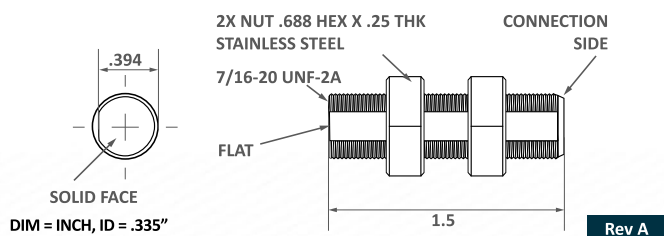
A12F-18A Thread Mount M12x1mm, 70mm



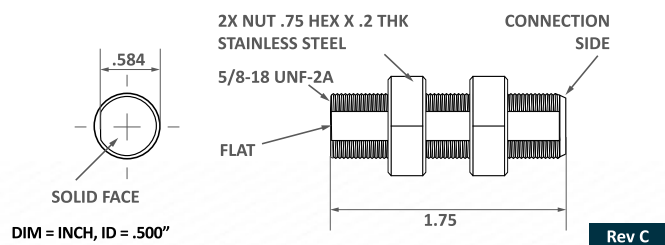
A47-18A Thread Mount 15/32-32, 1in



A44-18A Thread Mount 7/16, 1.5in



A63-37A Thread Mount 5/8



Aluminum Housing to Gear Air Gap

	-37A		-18A		-22A	
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap	Air Gap Range	Typ. Max Gap	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"	.000 to .120"	.150"	.000 to .100"	.125"
8 (.393") Tooth to Tooth	.000 to .125"	.180"	.000 to .085"	.110"	.000 to .060"	.100"
12 (.262") Tooth to Tooth	.000 to .070"	.105"	.000 to .055"	.075"	.000 to .045"	.075"
100% tested before shipping						
16 (.196") Tooth to Tooth	.000 to .050"	.070"	.000 to .035"	.050"	.000 to .030"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.055"	.000 to .030"	.040"	.000 to .025"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.040"	.000 to .020"	.030"	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .008"	.020"	.000 to .012"	.020"	.000 to .010"	.020"
Typical Output Duty Cycle	40 to 60%					
Alignment Skew Angle	360 Degrees					

DSO Series

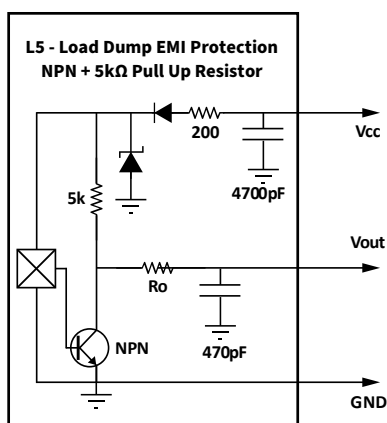
Gear Tooth Speed Sensors

Electrical Output Logic Options

**PART
NUMBER
EXAMPLE**

M 1 2 - 3 7 A D S O - 5 K S A 5 — CONNECTION
HOUSING ELECTRICAL

L5

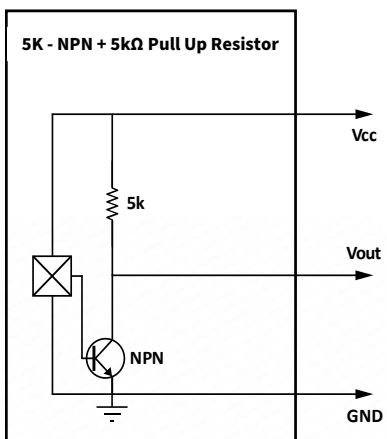


Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.5	+28	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rload > 100k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rload > 100k	0.0	0.4	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Resistance Ro	0.25 watts	290	310	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	μS
Output Fall Time 90-10%	Co < 100pF	-	2.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

Rev B

5K

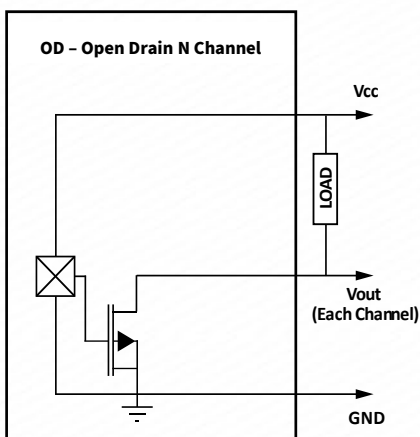


Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink = 20mA	0	0.6	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Rise Time 10-90%	C < 100pF	-	3.0	μS
Output Fall Time 90-10%	C < 100pF	-	1.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

Rev B

OD



Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current	Into Vcc	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink = 20 mA	0	0.6	Volts
Output Leakage Current	Output high	0	10	μA
Output Rise Time 10-90%	Rpu = 1 kΩ, C < 100pF	-	2.0	μS
Output Fall Time 90-10%	Rpu = 1kΩ, C < 100pF	-	1.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory.

** CMOS IC is static sensitive.

Rev E

DSO Series

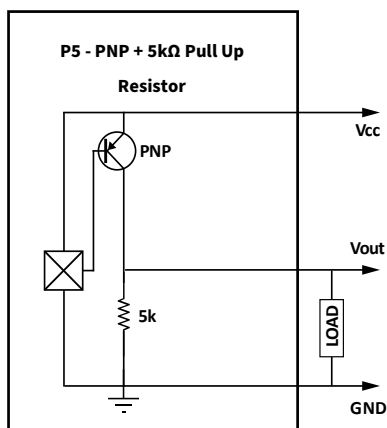
Gear Tooth Speed Sensors

Electrical Output Logic Options

**PART
NUMBER
EXAMPLE**

M 1 2 - 3 7 A D S O - 5 K S A 5 — CONNECTION
HOUSING ELECTRICAL

P5

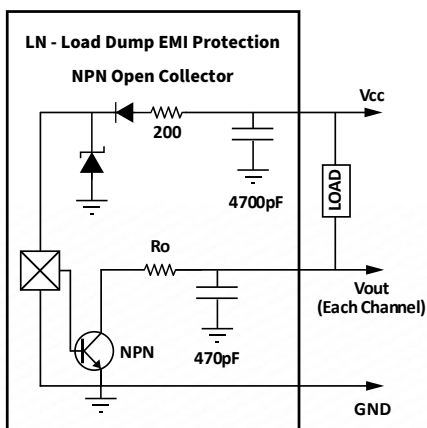


Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+5	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rpu > 10k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rpu > 10k	0.1	0.5	Volts
Internal Pull Up Resistor	Vcc to Vout	none	none	kohms
Output Resistance Ro	0.25 watts	48	52	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	μS
Output Fall Time 90-10%	Co < 100pF	-	2.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

Rev B

LN



Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+5	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rpu > 10k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rpu > 10k	0.1	0.5	Volts
Internal Pull Up Resistor	Vcc to Vout	none	none	kohms
Output Resistance Ro	0.25 watts	48	52	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	μS
Output Fall Time 90-10%	Co < 100pF	-	2.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

Rev B

DSO Series

Gear Tooth Speed Sensors

CONNECTION TYPES AND CUSTOMIZATION OPTIONS

The DSO Series offers a wide range of connection configurations to meet diverse installation and environmental requirements. Whether you need rugged connectors for industrial environments or flexible wiring for compact assemblies, Standex provides tailored solutions:



CONNECTOR OPTIONS

- Deutsch & Amphenol: Industry-standard sealed connectors for harsh environments
- Other Brands Available: Custom connector integration upon request
- Integral Connectors: Built directly into the sensor housing for streamlined installation
- Pigtail Connectors: Short lead wires with pre-installed connectors for plug-and-play use

FREE-END WIRE OPTIONS

- Free-End Jacketed: Durable, protective outer layer for added mechanical strength
- Free-End Ribbon Cable: Flat, flexible cable ideal for tight spaces
- Free-End Shielded: EMI-resistant for electrically noisy environments
- Free-End Wires: Standard stripped leads for direct wiring
- Wire Specifications
- Wire Gauges: 20 AWG and 22 AWG standard
- Lengths: Available in 0–6", 1–4', 5–9', or custom lengths to suit your application

INSULATION MATERIALS

- PVC: Economical and flexible
- Teflon: High-temperature and chemical-resistant
- XLPE: Cross-linked polyethylene for enhanced thermal and abrasion resistance
- High-Temp Options: For extreme operating conditions

Cable Harness & Connector Options

PART NUMBER	EXAMPLE	HOUSING	ELECTRICAL	CONNECTION
	M 1 2 - 3 7 A D S O - 5 K S A 5			

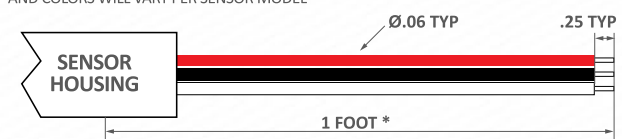
P21, Free End PVC 22 AWG Wires

Connections

Red = Vcc White = Digital Vout Black = Ground

FREE END WIRE LEADS
22 AWG, 7/30, PVC 80°C
3 WIRES SHOWN. THE NUMBER OF WIRES
AND COLORS WILL VARY PER SENSOR MODEL

OTHER STANDARD LENGTHS:
3", 6", 2', 5', 10', AND 20'



DIM = INCH

Rev A

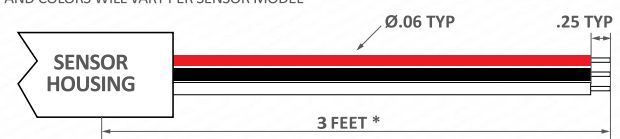
P23, Free End PVC 22 AWG Wires

Connections

Red = Vcc White = Digital Vout Black = Ground

FREE END WIRE LEADS
22 AWG, 7/30, PVC 80°C
3 WIRES SHOWN. THE NUMBER OF WIRES
AND COLORS WILL VARY PER SENSOR MODEL

OTHER STANDARD LENGTHS:
3", 6", 2', 5', 10', AND 20'



DIM = INCH

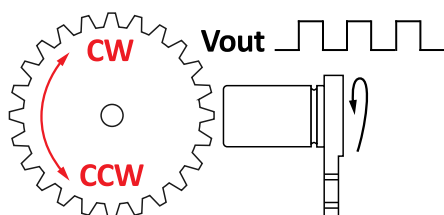
Rev A

DSO Series

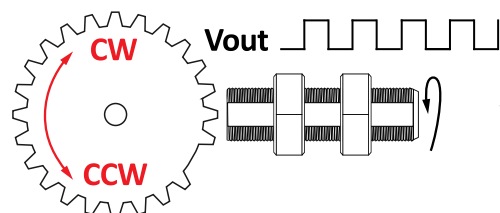
Gear Tooth Speed Sensors

Environmental & Performance Specifications

Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

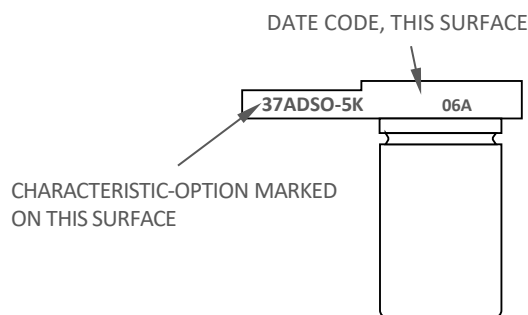
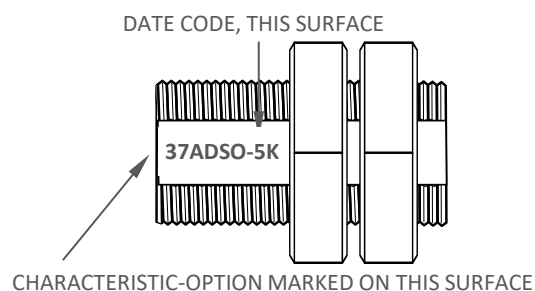


THIS SENSOR WORKS WITH ANY ORIENTATION!

Environmental Specifications

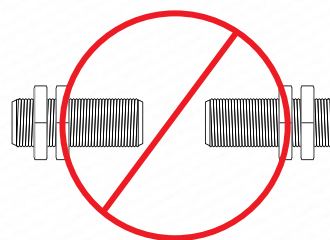
Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	13 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Continuous
Mechanical Shock	100 G's, 11 mS

Marking



Handling Instructions

DO NOT CONTACT FACE TO FACE



CONTACT WITH OTHER MAGNETS MAY REDUCE THE MAXIMUM OPERATING GAP

Please note: All technical specifications on this series datasheet refer to the standard product range. Modifications in the sense of technical progress are reserved. For general information only. For more specific information, please consult the product datasheet, available upon request.

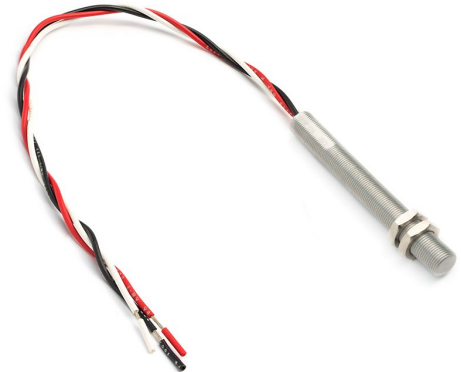
This series datasheet could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein. These change will be incorporated in future revisions.

For deviating values, most current specifications and products please contact your nearest sales office.

A12F-18ADSO-ODP23

Hall Effect Gear Tooth Speed Sensor

- Dynamic Speed Sensor
- No Orientation Required
- N channel open drain output
- Aluminum M12 x 1mm x 70mm housing
- Free end PVC 22 AWG wires (3 foot length)



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **A12F-18ADSO-ODP23**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Aluminum M12 x 1mm 70mm Long	Digital Single Output Gear Tooth Sensor	OD, Open Drain N Ch	P23 = Free End PVC 22AWG Wires

Modify, update, or enhance any sensor with our modular features and functionality.

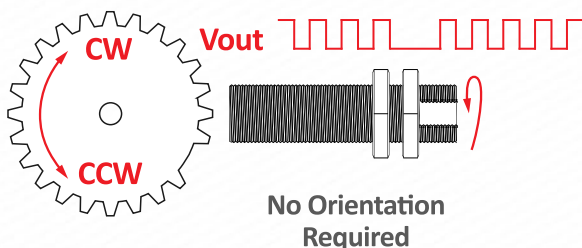
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Target Tracker' No Orientation Required



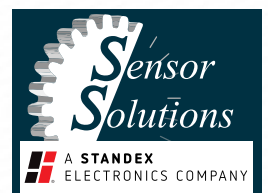
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present, external pull up resistor required.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



A12F-18ADSO-ODP23

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current	Into Vcc	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink = 20 mA	0	0.6	Volts
Output Leakage Current	Output high	0	10	µA
Output Rise Time 10-90%	R pu = 1 k, C < 100pF	-	2.0	µS
Output Fall Time 90-10%	R pu = 1 k, C < 100pF	-	1.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory.
** CMOS IC is static sensitive.

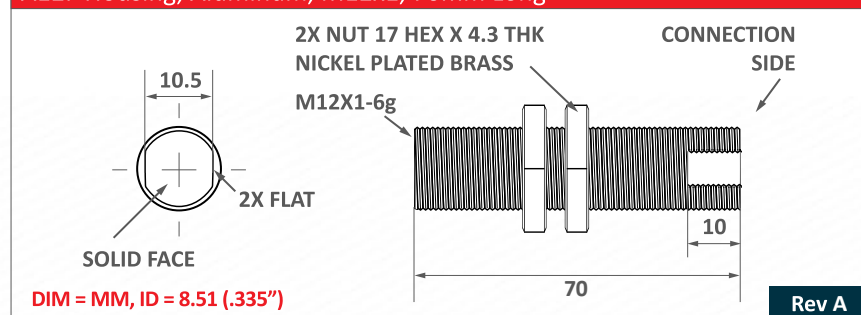
Rev E

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc at 25°C	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Current into Output	-	30	mA
Load Capacitance	-	0.01	µF
Current out of Output	-	n/a	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	13 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Continuous
Mechanical Shock	100 G's, 11 mS

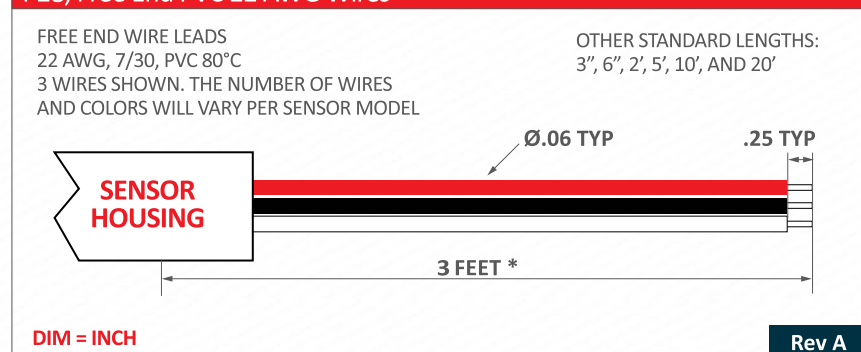
A12F Housing, Aluminum, M12x1, 70mm Long



Rev A

Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .120"	.150"
8 (.393") Tooth to Tooth	.000 to .085"	.110"
12 (.262") Tooth to Tooth	.000 to .055"	.075"
100% tested before shipping		
16 (.196") Tooth to Tooth	.000 to .035"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .012"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

P23, Free End PVC 22 AWG Wires



Rev A

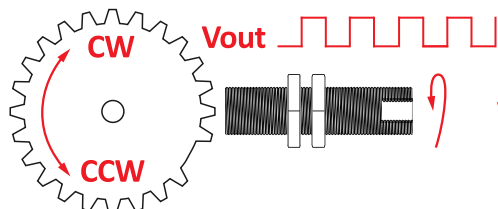
Connections Chart

Red	Vcc	White	Digital Vout
Black	Ground		
P23-18ADSO			

A12F-18ADSO-ODP23

Hall Effect Gear Tooth Speed Sensor

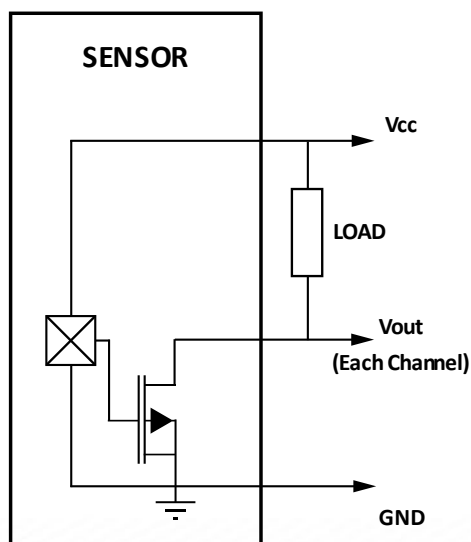
Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

A12F-18ADSO

OD, Open Drain N Channel



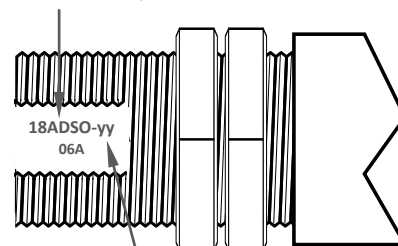
Date Code 'YYM'

YY = YEAR, M = MONTH

A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking

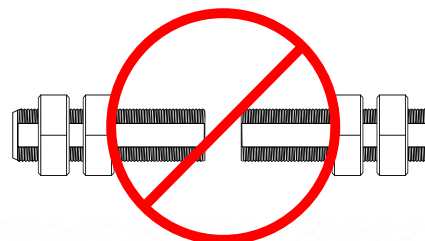
DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION MARKED ON THIS SURFACE YY = OPTION

Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

Please note: All technical specifications on this series datasheet refer to the standard product range. Modifications in the sense of technical progress are reserved. For general information only. For more specific information, please consult the product datasheet, available upon request.

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For deviating values, most current specifications and products please contact your nearest sales office.

A44-18ADSO-P5P21

Single Ch-Target Tracker Gear Tooth Sensor

- Dynamic Speed Sensor
- No Orientation Required
- PNP output with 5k resistor
- Aluminum 7/16-20 x 1.5" housing
- Free end PVC 22 AWG wires (1 foot length)



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **A44-18ADSO-P5P21**

Housing	Sensor Type & Function	Electrical Option	Connection Type
A = Aluminum Black Anodized 7/16-20x1.5"	Digital Single Output Gear Tooth Sensor	PNP, 5k Resistor	P21 = Free End PVC 22AWG Wires

Modify, update, or enhance any sensor with our modular features and functionality.

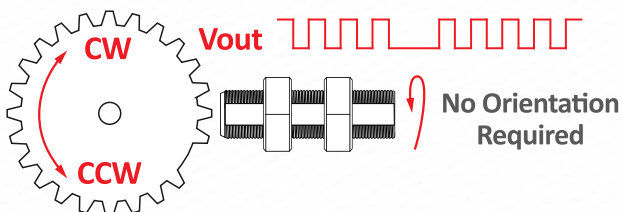
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Target Tracker' No Orientation Required



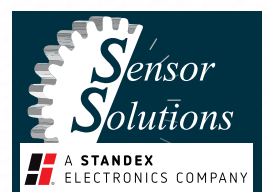
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- PNP goes high with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



A44-18ADSO-P5P21

Single Ch-Target Tracker Gear Tooth Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

These sensors power up with the output transistor OFF (Vout Low). This transistor turns ON (Vout High) for the first time on the approach of a tooth. After the first tooth, they will not miss a target.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current	Into Vcc, Vout Low	+2.5	+8	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Output Voltage Low, Vol	Vcc= 12, Rload=1k	0	0.1	Volts
Output Voltage High, Voh	Vcc= 12, Rload=1k	10.5	12.0	Volts
Pull Down Resistor	Internal Vout to Gnd	4.9	5.1	K Ohms
Output Rise Time 10-90%	Vcc=12, Cload<100pF	-	1.0	µS
Output Fall Time 90-10%	Vcc=12, Cload<100pF	-	7.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory.
** CMOS IC is static sensitive.

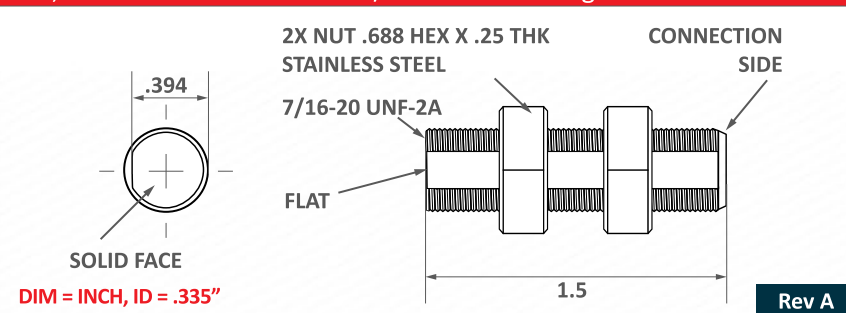
Rev C

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc at 25°C	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Output Clamp (Short Circuit Protection) Current	40	65	mA
Output Short-Gnd, Vcc <28V	-	5	Minutes
Load Dump, 40 mS Rs = 20	-	60	Volts
Output Power, T= 25°C	-	730	mW

Environmental Specifications

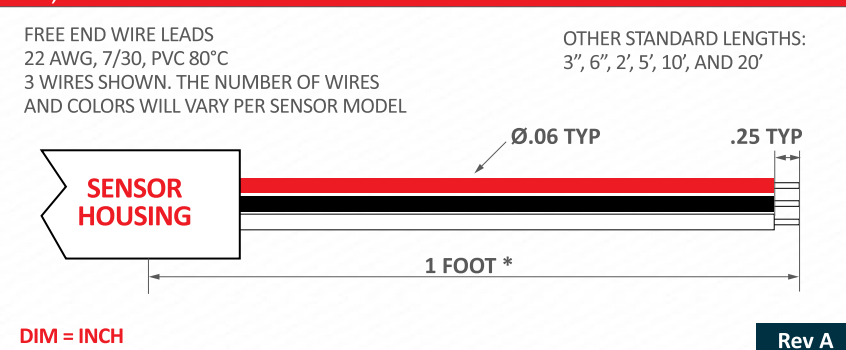
Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	80 Inch-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

A44, Black Anodized Aluminum 7/16" x 1.5" Housing



Rev A

P21, Free End PVC 22 AWG Wires



Rev A

Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .120"	.150"
8 (.393") Tooth to Tooth	.000 to .085"	.110"
12 (.262") Tooth to Tooth	.000 to .055"	.075"
16 (.196") Tooth to Tooth	.000 to .035"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .012"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

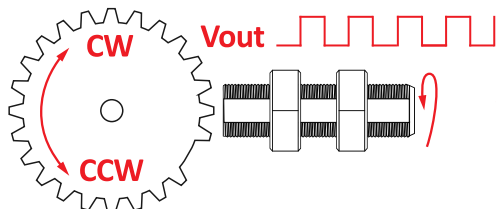
Connections Chart

Red	Vcc	White	Digital Vout
Black	Ground		
P21-18ADSO			

A44-18ADSO-P5P21

Single Ch-Target Tracker Gear Tooth Sensor

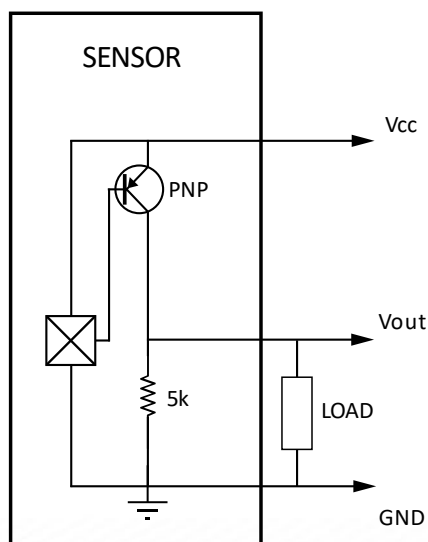
Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

A44-18ADSO

P5, PNP with 5k Resistor



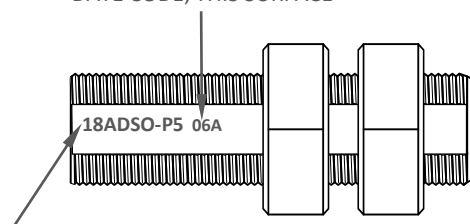
Date Code 'YYM'

YY = YEAR, M = MONTH

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B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking

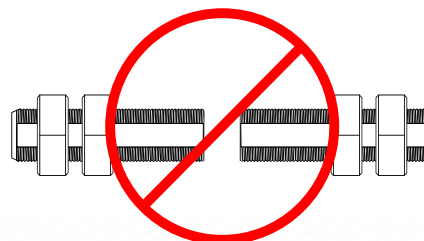
DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION MARKED ON THIS SURFACE

Handling Instructions

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FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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For deviating values, most current specifications and products please contact your nearest sales office.

A47-18ADSO-ODP21

Hall Effect Gear Tooth Speed Sensor

- Dynamic Speed Sensor
- No Orientation Required
- N channel open drain output
- Aluminum 15/32-32 x 1" housing
- Free end PVC 22 AWG wires (1 foot length)



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **A47-18ADSO-ODP21**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Aluminum 15/32-32 x 1" Long	Digital Single Output Gear Tooth Sensor	OD, Open Drain N Ch	P21 = Free End PVC 22AWG Wires

Modify, update, or enhance any sensor with our modular features and functionality.

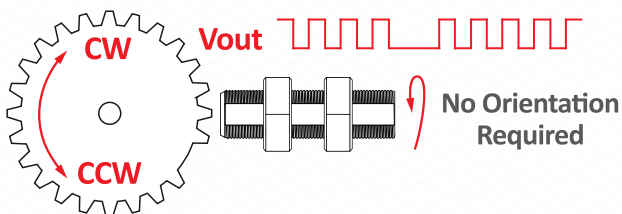
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Target Tracker' No Orientation Required



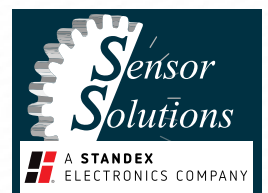
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present, external pull up resistor required.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



A47-18ADSO-ODP21

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current	Into Vcc	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink = 20 mA	0	0.6	Volts
Output Leakage Current	Output high	0	10	µA
Output Rise Time 10-90%	R pu = 1 k, C < 100pF	-	2.0	µS
Output Fall Time 90-10%	R pu = 1 k, C < 100pF	-	1.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory.
** CMOS IC is static sensitive.

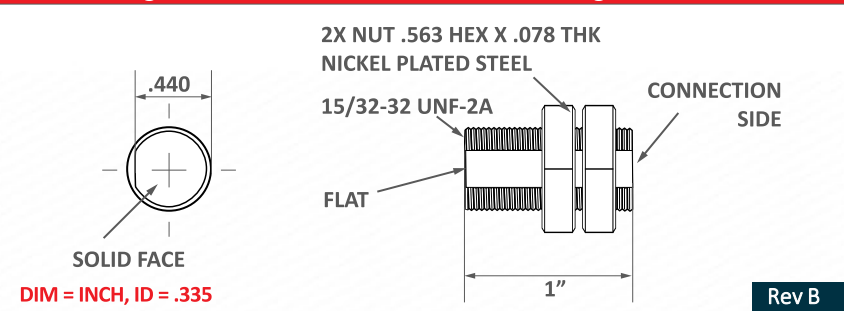
Rev E

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc at 25°C	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Current into Output	-	30	mA
Load Capacitance	-	0.01	µF
Current out of Output	-	n/a	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

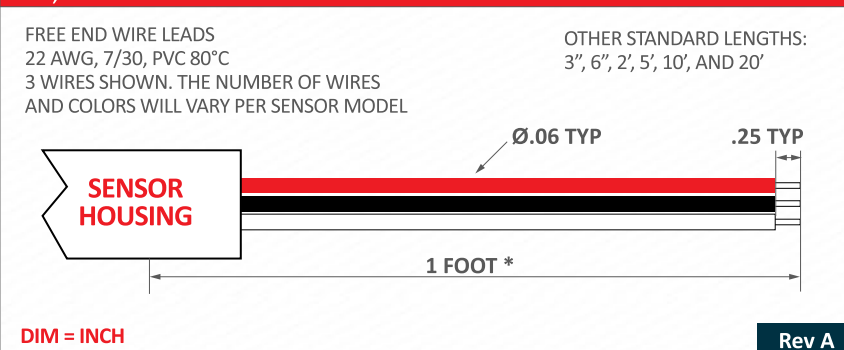
Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	13 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Continuous
Mechanical Shock	100 G's, 11 mS

A47, Housing, Anodized Aluminum, 15/32-32, 1" Long



Rev B

P21, Free End PVC 22 AWG Wires



Rev A

Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .120"	.150"
8 (.393") Tooth to Tooth	.000 to .085"	.110"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .055"	.075"
16 (.196") Tooth to Tooth	.000 to .035"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .012"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

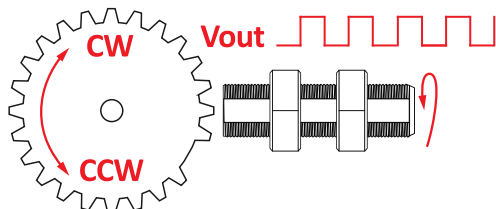
Connections Chart

Red	Vcc	White	Digital Vout
Black	Ground		
P21-18ADSO			

A47-18ADSO-ODP21

Hall Effect Gear Tooth Speed Sensor

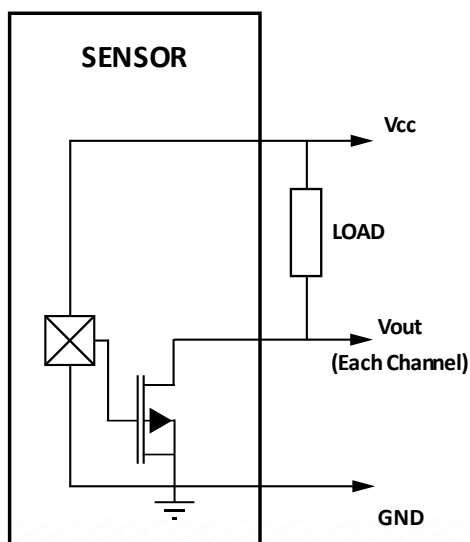
Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

A47-18ADSO

OD, Open Drain N Channel



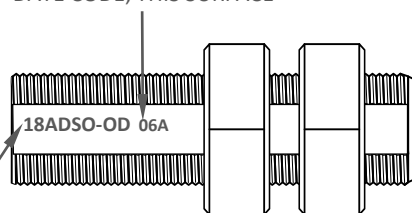
Date Code 'YYM'

YY = YEAR, M = MONTH

A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking

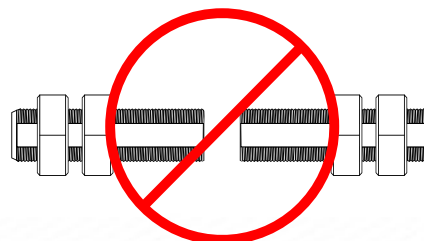
DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION MARKED ON THIS SURFACE

Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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A63-37ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

- Dynamic Speed Sensor
- No Orientation Required
- NPN output with 5k pull up resistor
- Aluminum 5/8-18 x 1.75" housing
- Jacketed 3 wire 22AWG 80C PVC, 5 ft



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **A63-37ADSO-5KJA5**

Housing	Sensor Type & Function	Electrical Option	Connection Type
A = Aluminum Black Anodized 5/8-18 x 1.75"	Digital Single Output Gear Tooth Sensor	NPN, 5k Pull Up Resistor	Jacketed 3 wire 22AWG 80C PVC, 5 ft

Modify, update, or enhance any sensor with our modular features and functionality.

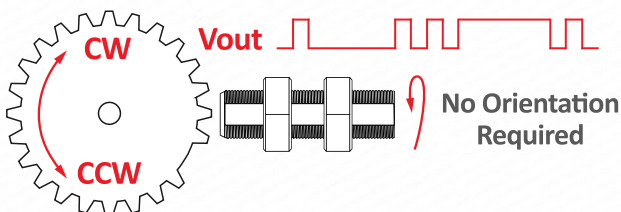
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Target Tracker' No Orientation Required



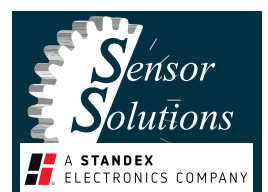
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN goes high with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



A63-37ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink=20mA	0	0.6	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Rise Time 10-90%	C < 100pF	-	3.0	µS
Output Fall Time 90-10%	C < 100pF	-	1.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

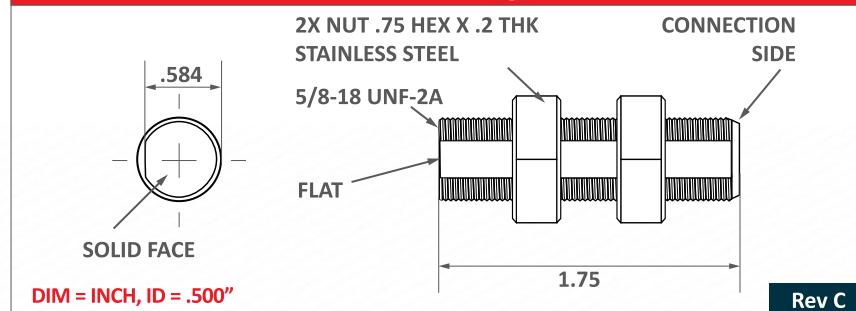
Rev B

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Current into Output, T=25°C	-	30	mA
Load Capacitance	-	0.01	µF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusoidal
Mechanical Shock	50 G's, 11 mS Half-Sine

A63, Black Anodized Aluminum 5/8" Housing



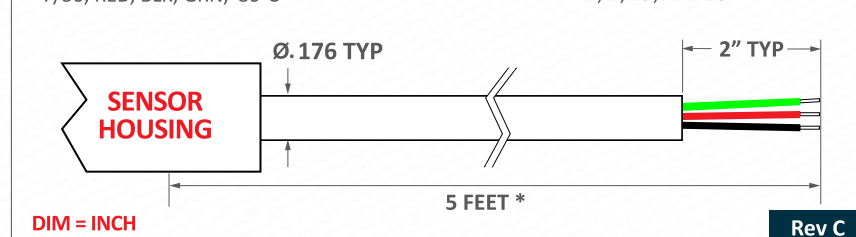
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.160"
12 (.262") Tooth to Tooth	.000 to .070"	.105"
16 (.196") Tooth to Tooth	.000 to .050"	.070"
20 (.157") Tooth to Tooth	.000 to .030"	.055"
24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"

Typical Output Duty Cycle	40 to 60%
Alignment Skew Angle	360 Degrees

JA5, Jacketed 3 Wire 22AWG PVC

FREE END JACKETED 3 WIRE PVC, 22 AWG
7/30, RED, BLK, GRN, 80°C

*OTHER STANDARD LENGTHS:
1', 2', 10', AND 20'



Connections Chart

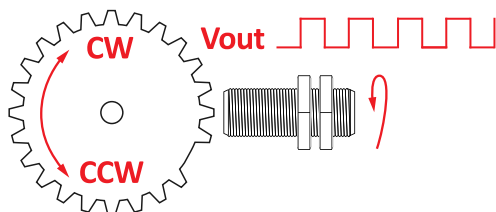
Red	Vcc	Black	Ground
Green	Digital Vout		

JA5-37ADSO

A63-37ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

A63-37ADSO

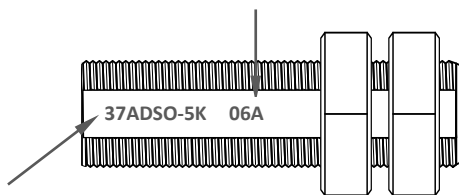
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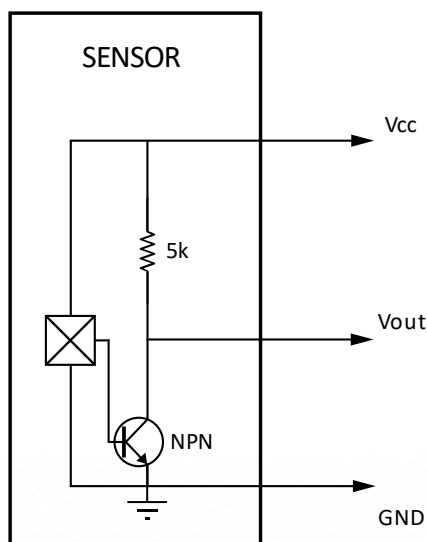
Marking

DATE CODE, THIS SURFACE



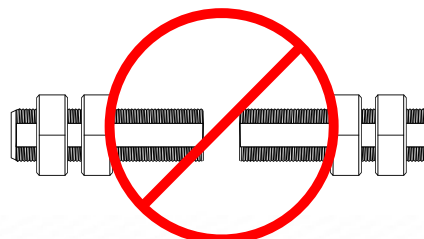
CHARACTERISTIC
MARKED ON THIS SURFACE

5K, 5k Pull-up Resistor



Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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MFM61O-18ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

- Dynamic Speed Sensor
- No Orientation Required
- Load dump and EMI protection w/5k pull up
- Plastic .61" flange mount housing w/o-ring
- Integral 3-way Metri-Pack 150.2 male connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM61O-18ADSO-L5CP13**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount $\varnothing .61$ " x 2" Long	Digital Single Output Gear Tooth Sensor	Surge Protected Input, NPN Output w/ 5k Pull up Resistor	Integral 3-way Metri-Pack 150.2 male

Modify, update, or enhance any sensor with our modular features and functionality.

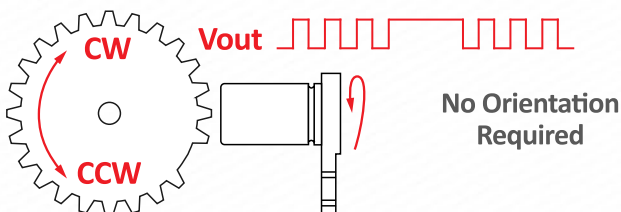
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Target Tracker' No Orientation Required



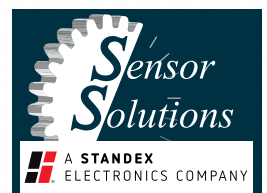
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM61O-18ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

These sensors power up with the output transistor OFF (Vout High). This transistor turns ON (Vout Low) for the first time on the approach of a tooth. After the first tooth, they will not miss a target.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.5	+28	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rload >100k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rload >100k	0.0	0.4	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	K Ohms
Output Resistance Ro	0.25 watts	290	310	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	µS
Output Fall Time 90-10%	Co < 100pF	-	2.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

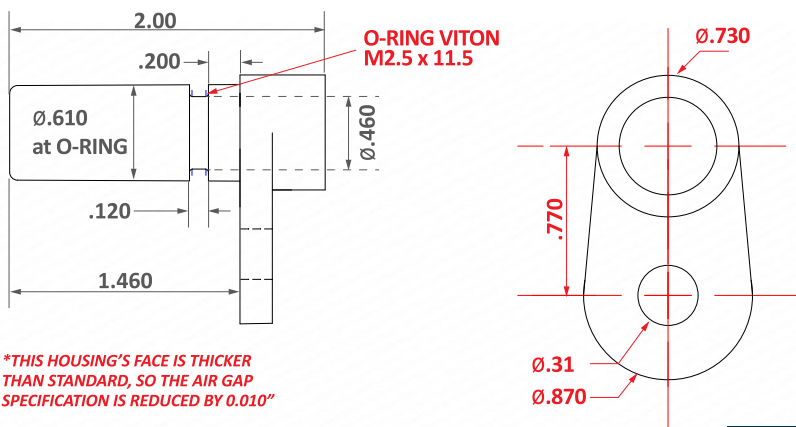
Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-32	+32	Volts DC
Voltage Shorted to Output 1 Minute Max	-20	+32	Volts
Current into Output, T=25°C	-	40	mA
Load Capacitance	-	0.01	µF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 100 mS Rs = 5 per ISO 7637-2 24V Truck Spec	-	200	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusoidal
Mechanical Shock	50 G's, 11 mS Half-Sine

MFM61O, Glass Filled Nylon (150°C) Flanged Housing



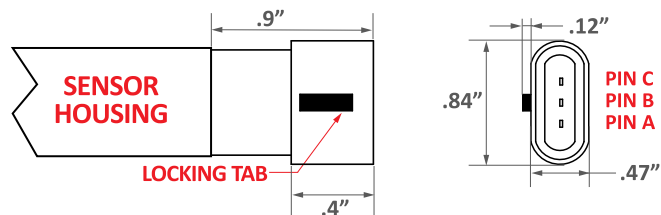
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .120"	.150"
8 (.393") Tooth to Tooth	.000 to .085"	.110"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .055"	.075"
16 (.196") Tooth to Tooth	.000 to .035"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .012"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

MFM61O-18ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

CP13, Integral 3-Way Metri Pack 150.2 Male Connector

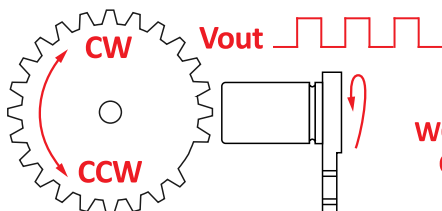
CONNECTOR: METRI-PACK 150.2, 3-WAY MALE
MATES WITH DELPHI-APTIV HOUSING 12162280 AND TERMINAL 12124075



DIM = INCH

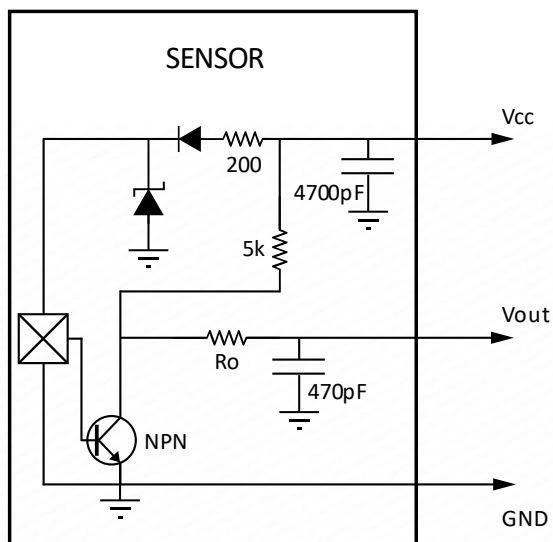
Rev A

Sensor Function



MFM61O-18ADSO

L5, NPN with 5k Pull Up, Protection & EMI Filter



Connections Chart

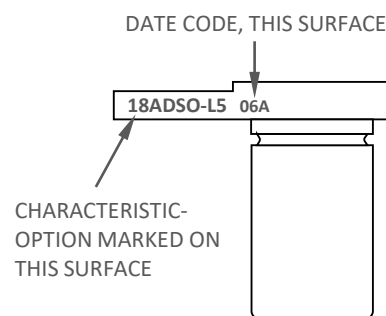
Pin A	Vcc	Pin C	Ground
Pin B	Vout		

CP13-18ADSO

Date Code 'YYM' YY = YEAR, M = MONTH

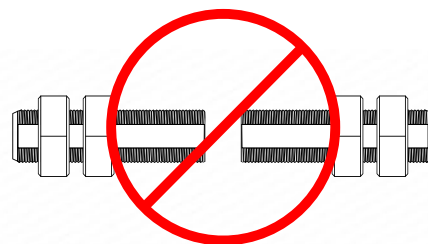
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking



Handling Instructions

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MFM7-37ADSO-L5CD3

Single Ch-Target Tracker Gear Tooth Sensor

- Large Dynamic Speed Sensor
- No Orientation Required
- Load dump and EMI protection w/5k pull up
- Plastic .7" flange mount 1.5" long housing
- Deutsch DT 3 pin with 5" 20 AWG XLPE



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM7-37ADSO-L5CD3**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount $\varnothing .7"$ x 1.5" Long	Digital Single Output Gear Tooth Sensor	Load Dump Protected Input, NPN Output w/ 5k Pull up Resistor	Deutsch DT 3 pin w/5" 20AWG XLPE

Modify, update, or enhance any sensor with our modular features and functionality.

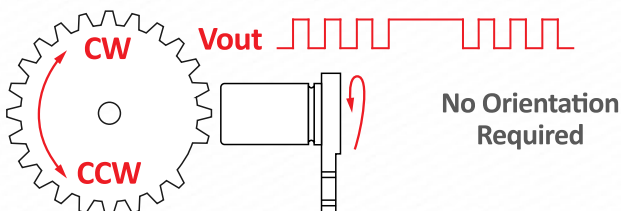
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Target Tracker' No Orientation Required



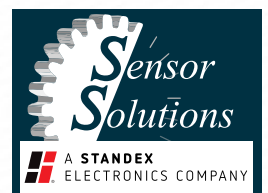
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Greater Air Gap Range
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM7-37ADSO-L5CD3

Single Ch-Target Tracker Gear Tooth Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

These sensors power up with the output transistor OFF. This transistor turns ON for the first time on the approach of a tooth. After the first tooth, they will not miss a target.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.5	+28	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rload >100k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rload >100k	0.0	0.4	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Resistance Ro	0.25 watts	290	310	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	μS
Output Fall Time 90-10%	Co < 100pF	-	2.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

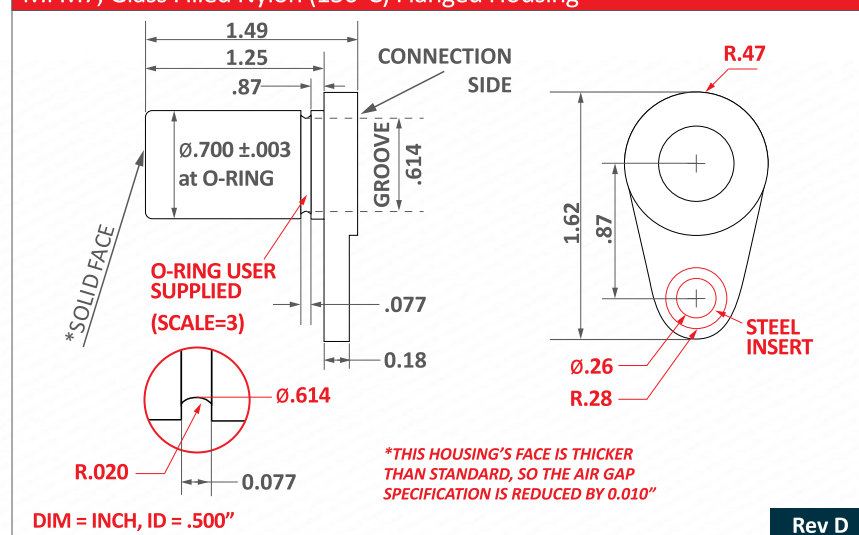
Rev B

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-32	+32	Volts DC
Voltage Shorted to Output 1 Minute Max	-20	+32	Volts
Current into Output, T=25°C	-	40	mA
Load Capacitance	-	0.01	μF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 100 mS Rs = 5 per ISO 7637-2 24V Truck Spec	-	200	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusoidal
Mechanical Shock	50 G's, 11 ms Half-Sine

MFM7, Glass Filled Nylon (150°C) Flanged Housing



Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.160"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .070"	.105"
16 (.196") Tooth to Tooth	.000 to .050"	.070"
20 (.157") Tooth to Tooth	.000 to .030"	.055"
24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

MFM7-37ADSO-L5CD3

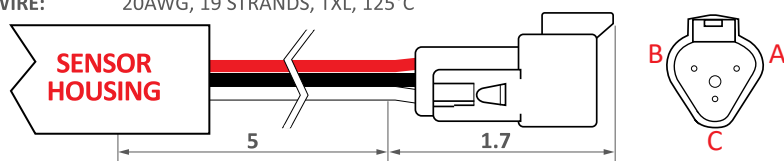
Single Ch-Target Tracker Gear Tooth Sensor

CD3, 3 Pin Deutsch DT03 with 20 AWG TXL

CONNECTOR: AMPHENOL AT04-3P-RD01 BODY OR
DEUTSCH DT04-3P-C015 BODY
DEUTSCH 060-16-0622 TERMINALS
DEUTSCH W3P WEDGELOCK

WIRE: 20AWG, 19 STRANDS, TXL, 125°C

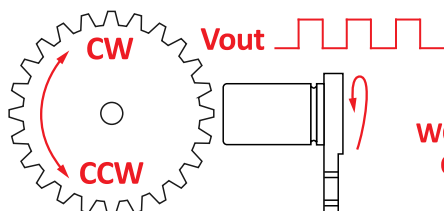
A = WHITE
B = RED
C = BLACK



DIM = INCH

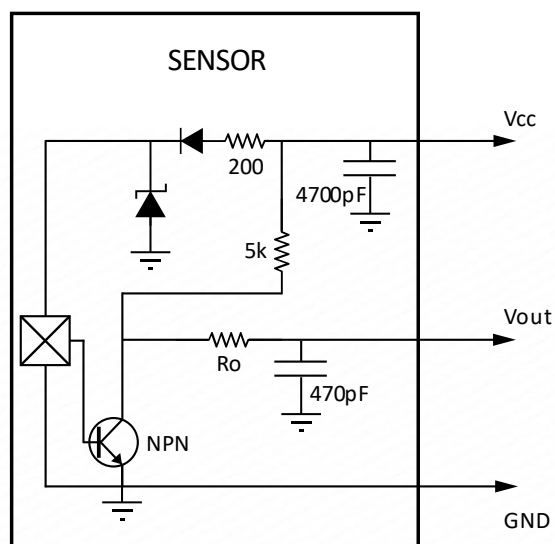
Rev D

Sensor Function



MFM7-37ADSO

L5, NPN with 5k Pull Up, Protection & EMI Filter



Connections Chart

Pin A (White)	Vout	Pin C (Black)	Ground
Pin B (Red)	Vcc		

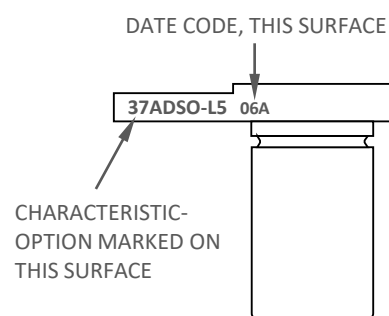
CD3-37ADSO

Date Code 'YYM'

YY = YEAR, M = MONTH

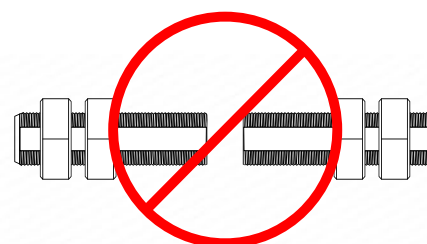
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking



Handling Instructions

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MFM7-37ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

- Dynamic Speed Sensor
- No Orientation Required
- Load dump and EMI protection w/5k pull up
- Plastic .7" flange mount 1.5" long housing
- Integral 3-way Metri-Pack 150.2 male connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM7-37ADSO-L5CP13**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount $\varnothing .7"$ x 1.5" Long	Digital Single Output Gear Tooth Sensor	Load Dump Protected Input, NPN Output w/ 5k Pull up Resistor	Integral 3-way Metri-Pack 150.2 male

Modify, update, or enhance any sensor with our modular features and functionality.

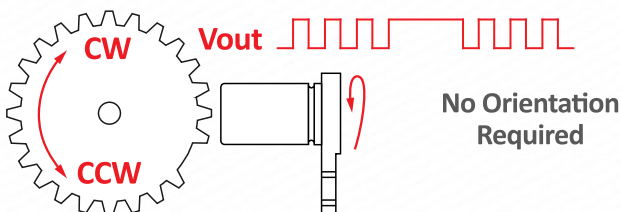
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

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'Target Tracker' No Orientation Required



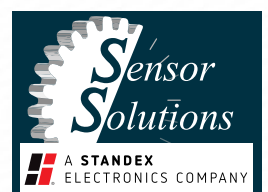
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM7-37ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

These sensors power up with the output transistor OFF (Vout High). This transistor turns ON (Vout Low) for the first time on the approach of a tooth. After the first tooth, they will not miss a target.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
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Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rload >100k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rload >100k	0.0	0.4	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Resistance Ro	0.25 watts	290	310	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	μS
Output Fall Time 90-10%	Co < 100pF	-	2.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

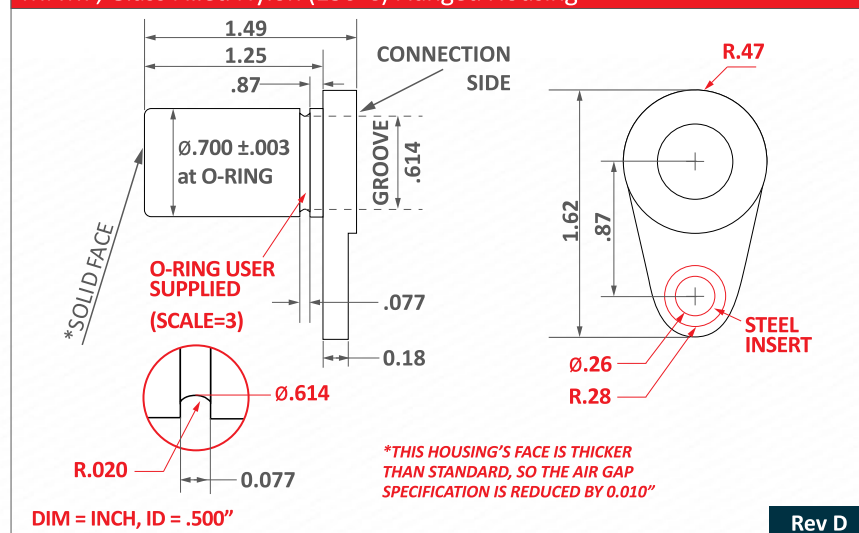
* T max = 150°C is available, contact factory.

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-32	+32	Volts DC
Voltage Shorted to Output 1 Minute Max	-20	+32	Volts
Current into Output, T=25°C	-	40	mA
Load Capacitance	-	0.01	μF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 100 mS Rs = 5 per ISO 7637-2 24V Truck Spec	-	200	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusoidal
Mechanical Shock	50 G's, 11 mS Half-Sine

MFM7, Glass Filled Nylon (150°C) Flanged Housing



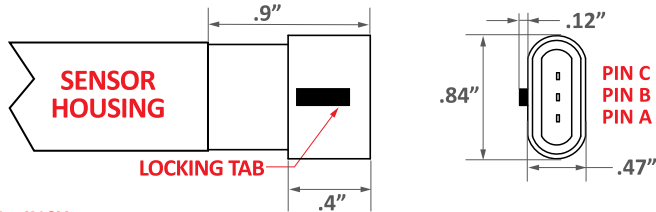
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.180"
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24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

MFM7-37ADSO-L5CP13

Single Ch-Target Tracker Gear Tooth Sensor

CP13, Integral 3-Way Metri Pack 150.2 Male Connector

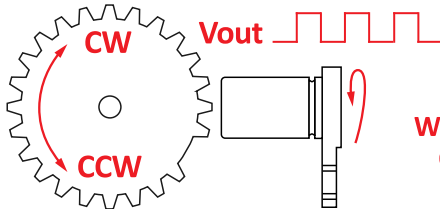
CONNECTOR: METRI-PACK 150.2, 3-WAY MALE
MATES WITH DELPHI-APTIV HOUSING 12162280 AND TERMINAL 12124075



DIM = INCH

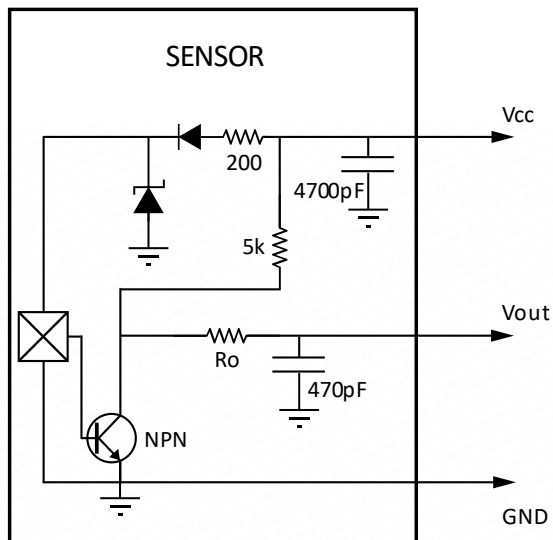
Rev A

Sensor Function



MFM7-37ADSO

L5, NPN with 5k Pull Up, Protection & EMI Filter



Connections Chart

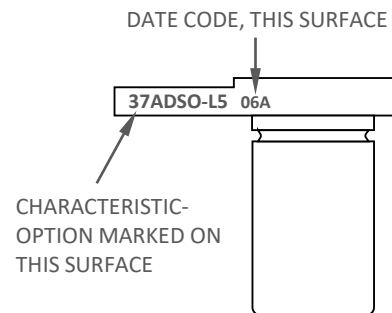
Pin A	Vcc	Pin C	Ground
Pin B	Vout		

CP13-37ADSO

Date Code 'YYM' YY = YEAR, M = MONTH

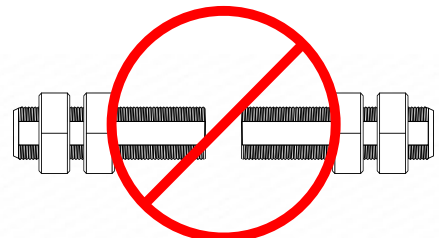
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

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MFM7-37ADSO-LNCP13

Hall Effect Gear Tooth Speed Sensor

- Dynamic Speed Sensor
- No Orientation Required
- Load dump and EMI protection w/NPN open collector
- Plastic .7" flange mount 1.5" long housing
- Integral 3-way Metri-Pack 150.2 male connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM7-37ADSO-LNCP13**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount .7" x 1.5" Long	Digital Single Output Gear Tooth Sensor	Load Dump EMI Protected Input, w/ NPN Open Collector	Integral 3-way Metri-Pack 150.2 male

Modify, update, or enhance any sensor with our modular features and functionality.

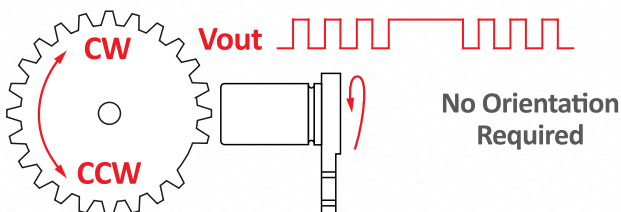
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Target Tracker' No Orientation Required



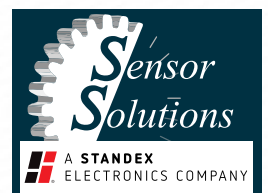
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present, external pull up resistor required.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM7-37ADSO-LNCP13

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+5	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rpu >10k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rpu >10k	0.1	0.5	Volts
Internal Pull Up Resistor	Vcc to Vout	none	none	kohms
Output Resistance Ro	0.25 watts	48	52	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	µS
Output Fall Time 90-10%	Co < 100pF	-	2.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

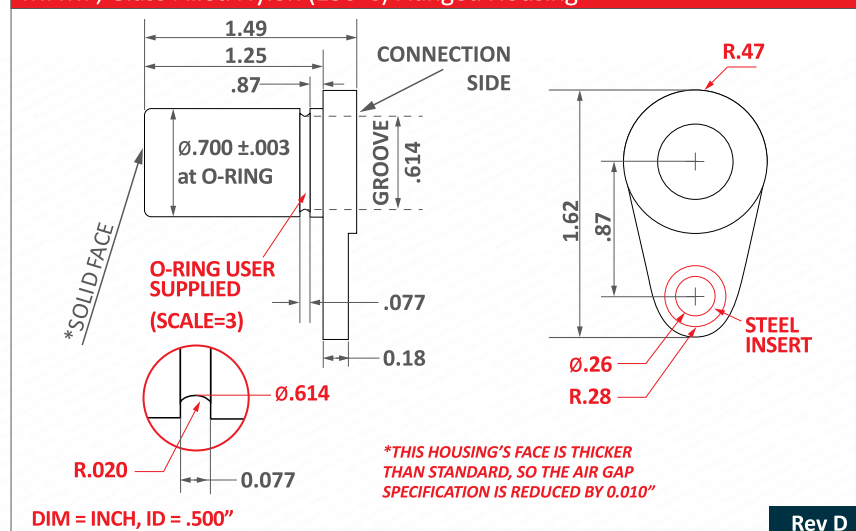
Rev B

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-28	+28	Volts DC
Voltage Shorted to Output 1 Minute Max	-12	+28	Volts
Current into Output, T=25°C	-	40	mA
Load Capacitance	-	0.01	µF
Current Out of Output	-	n/a	mA
Load Dump, 100 mS Rs = 5 per ISO 7637-2 24V Truck Spec	-	200	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusodal
Mechanical Shock	50 G's, 11 mS Half-Sine

MFM7, Glass Filled Nylon (150°C) Flanged Housing



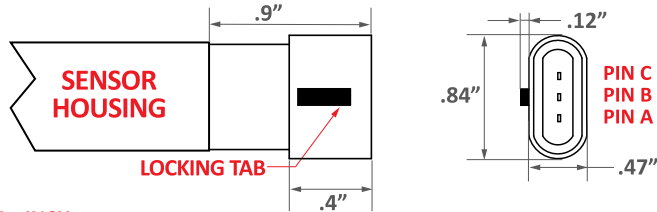
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.180"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .070"	.105"
16 (.196") Tooth to Tooth	.000 to .050"	.070"
20 (.157") Tooth to Tooth	.000 to .030"	.055"
24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

MFM7-37ADSO-LNCP13

Hall Effect Gear Tooth Speed Sensor

CP13, Integral 3-Way Metri Pack 150.2 Male Connector

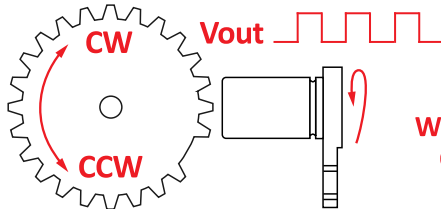
CONNECTOR: METRI-PACK 150.2, 3-WAY MALE
MATES WITH DELPHI-APTIV HOUSING 12162280 AND TERMINAL 12124075



DIM = INCH

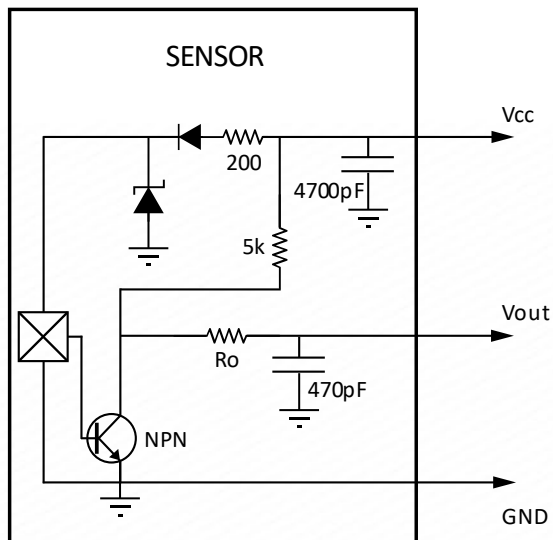
Rev A

Sensor Function



MFM7-37ADSO

LN, NPN Open Collector with Protection & EMI Filter



Connections Chart

Pin A	Vcc	Pin C	Ground
Pin B	Vout		

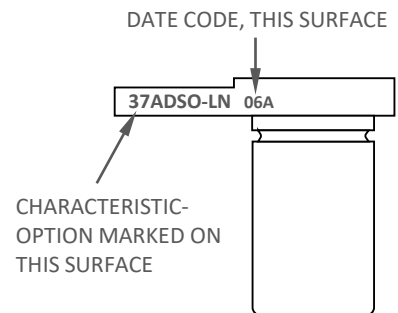
CP13-37ADSO

Date Code 'YYM'

YY = YEAR, M = MONTH

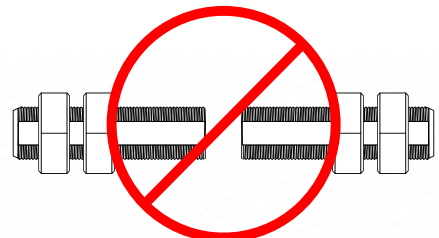
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking



Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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MFM7-37ADSO-ODX0B

Hall Effect Gear Tooth Speed Sensor

- Large Dynamic Speed Sensor
- No Orientation Required
- N channel open drain output
- Plastic .7" flange mount 1.5" long housing
- Free end XLPE 20 AWG wires, 6 inches



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM7-37ADSO-ODX0B**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount 0.7" x 1.5" Long	Digital Single Output Gear Tooth Sensor	N Channel, Open Drain Output	Free End XLPE 20 AWG wires, 6 inches

Modify, update, or enhance any sensor with our modular features and functionality.

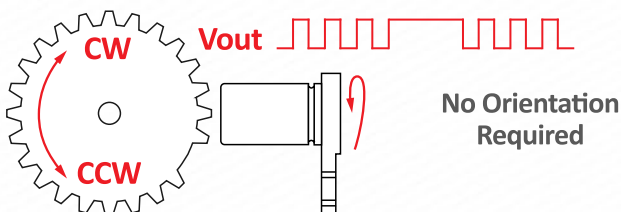
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Target Tracker' No Orientation Required



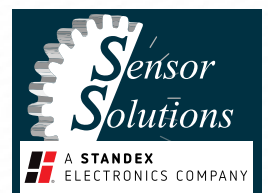
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present, external pull up resistor required.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM7-37ADSO-ODX0B

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink = 20 mA	0	0.6	Volts
Output Leakage Current	Output high	0	10	μA
Output Rise Time 10-90%	R pu = 1k, C < 100pF	-	2.0	μS
Output Fall Time 90-10%	R pu = 1k, C < 100pF	-	1.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory. **CMOS IC is static sensitive
***Non contacting

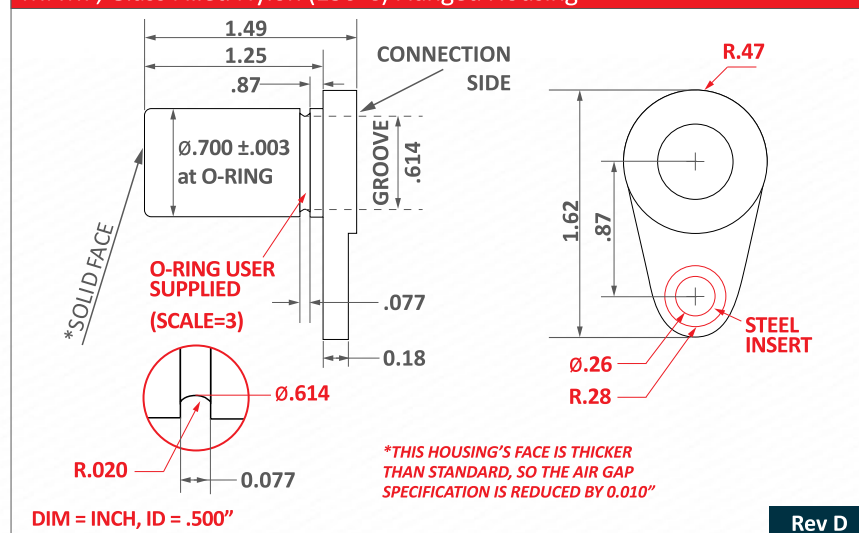
Rev D

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-30	+30	Volts DC
Voltage Shorted to Output 1 Minute Max	-0.3	+30	Volts
Current into Output, T=25°C	-	30	mA
Load Capacitance	-	0.01	μF
Current Out of Output	-	n/a	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusoidal
Mechanical Shock	50 G's, 11 mS Half-Sine

MFM7, Glass Filled Nylon (150°C) Flanged Housing



Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.160"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .070"	.105"
16 (.196") Tooth to Tooth	.000 to .050"	.070"
20 (.157") Tooth to Tooth	.000 to .030"	.055"
24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

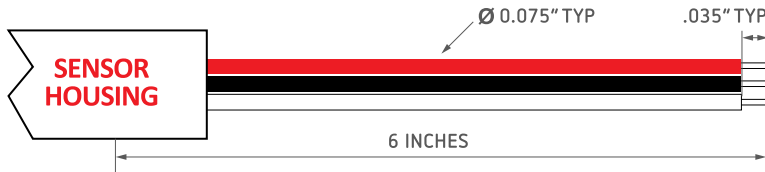
MFM7-37ADSO-ODX0B

Hall Effect Gear Tooth Speed Sensor

X0B, Free End XLPE 20 AWG Wires

FREE END WIRE LEADS
20 AWG, XLPE, 125°C, 19/32
3 WIRES SHOWN. THE NUMBER OF WIRES
AND COLORS WILL VARY PER SENSOR MODEL

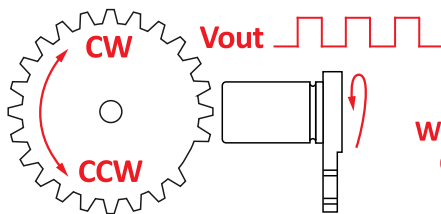
OTHER STANDARD LENGTHS:
3', 1', 2', 5', 10' AND 20'



DIM = INCH

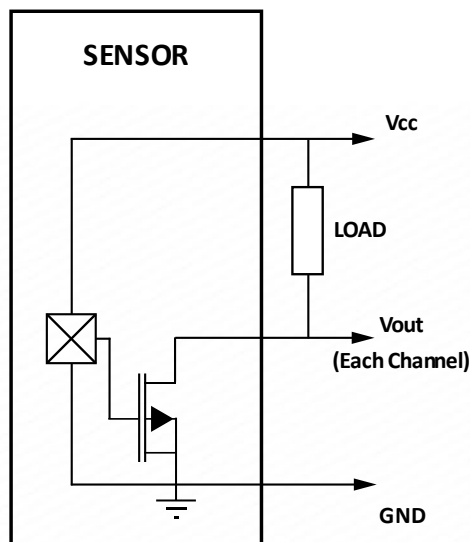
Rev A

Sensor Function



MFM7-37ADSO

OD, Open Drain N Channel



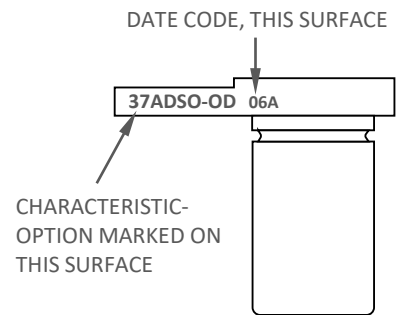
Connections Chart

Red	Vcc	Black	Ground
White	Vout		
X0B-37ADSO			

Date Code 'YYM' YY = YEAR, M = MONTH

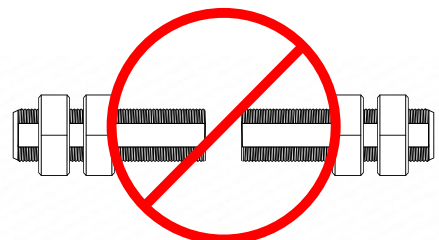
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking



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MFM7-37ADSO-P5P21

Hall Effect Gear Tooth Speed Sensor

- Dynamic Speed Sensor
- No Orientation Required
- PNP output with 5k resistor
- Plastic .7" flange mount 1.5" long housing
- Free end PVC 22 AWG wires (1 foot length)



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **MFM7-37ADSO-P5P21**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Glass Filled Nylon Flange Mount $\varnothing .7"$ x 1.5" Long	Digital Single Output Gear Tooth Sensor	PNP, 5k Resistor	P21 = Free End PVC 22AWG Wires

Modify, update, or enhance any sensor with our modular features and functionality.

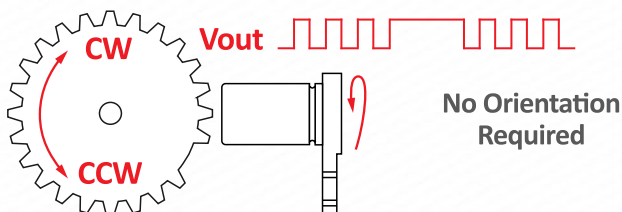
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

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'Target Tracker' No Orientation Required



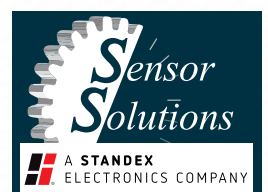
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- PNP goes high with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- Easy install Flange mount design sets gap relative to target face

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



MFM7-37ADSO-P5P21

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+5	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage High	Vcc = 24V, Rpu >10k	23.5	24	Volts
Saturation Voltage Low	Vcc = 24V, Rpu >10k	0.1	0.5	Volts
Internal Pull Up Resistor	Vcc to Vout	none	none	kohms
Output Resistance Ro	0.25 watts	48	52	Ohms
Output Rise Time 10-90%	Co < 100pF	-	8.0	µS
Output Fall Time 90-10%	Co < 100pF	-	2.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

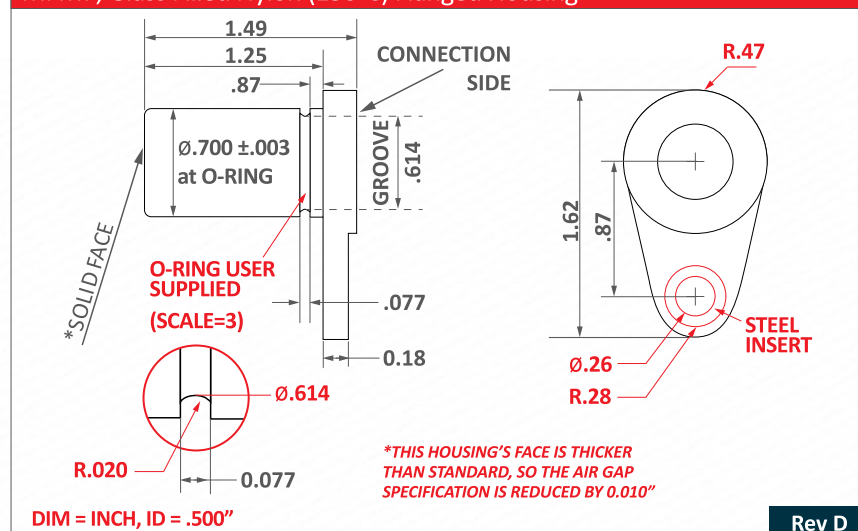
Rev B

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-28	+28	Volts DC
Voltage Shorted to Output 1 Minute Max	-12	+28	Volts
Current into Output, T=25°C	-	40	mA
Load Capacitance	-	0.01	µF
Current Out of Output	-	n/a	mA
Load Dump, 100 mS Rs = 5 per ISO 7637-2 24V Truck Spec	-	200	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	15 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 10 to 2000 Hz Sinusodal
Mechanical Shock	50 G's, 11 mS Half-Sine

MFM7, Glass Filled Nylon (150°C) Flanged Housing



Rev D

Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .180"	.240"
8 (.393") Tooth to Tooth	.000 to .125"	.180"
12 (.262") Tooth to Tooth 100% tested before shipping	.000 to .070"	.105"
16 (.196") Tooth to Tooth	.000 to .050"	.070"
20 (.157") Tooth to Tooth	.000 to .030"	.055"
24 (.131") Tooth to Tooth	.000 to .020"	.040"
32 (.098") Tooth to Tooth	.000 to .008"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

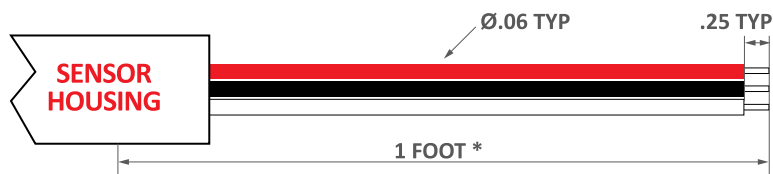
MFM7-37ADSO-P5P21

Hall Effect Gear Tooth Speed Sensor

P21, Free End PVC 22 AWG Wires

FREE END WIRE LEADS
22 AWG, 7/30, PVC 80°C
3 WIRES SHOWN. THE NUMBER OF WIRES
AND COLORS WILL VARY PER SENSOR MODEL

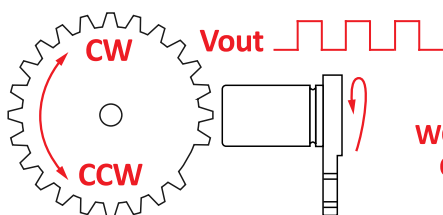
OTHER STANDARD LENGTHS:
3", 6", 2', 5', 10', AND 20'



DIM = INCH

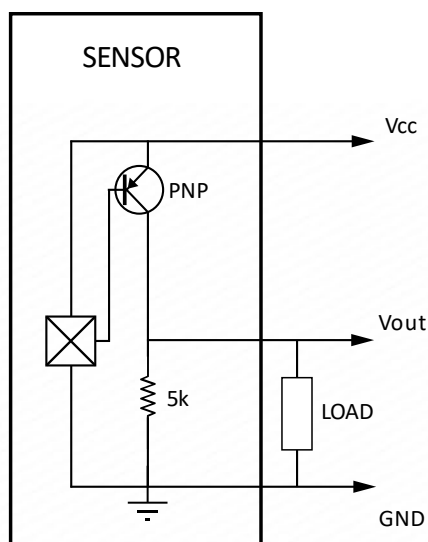
Rev A

Sensor Function



MFM7-37ADSO

P5, PNP with 5k Resistor



Connections Chart

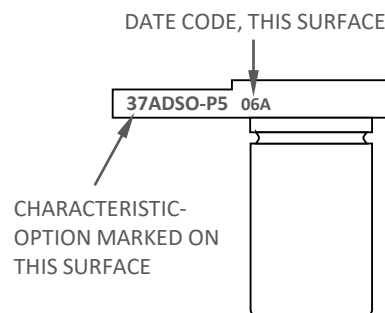
Pin A	Vcc	Pin C	Ground
Pin B	Vout		

P21-37ADSO

Date Code 'YYM' YY = YEAR, M = MONTH

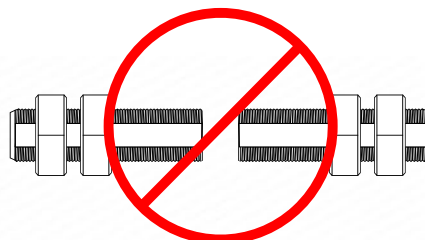
A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Marking



Handling Instructions

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S12-18ADSO-5KCB2

Single Ch-Target Tracker Gear Tooth Sensor

- Dynamic Speed Sensor
- No Orientation Required
- NPN output with 5k pull up resistor
- Stainless 12x1mm x 35mm housing
- Integral 4 pin male 12mm micro connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12-18ADSO-5KCB2**

Housing	Sensor Type & Function	Electrical Option	Connection Type
S = Stainless Steel, Thread Pitch M12x1, 35mm Long	Digital Single Output Gear Tooth Sensor	NPN, 5k Pull Up Resistor	CB2 = Integral 4 Pin Male 12mm Micro Connector

Modify, update, or enhance any sensor with our modular features and functionality.

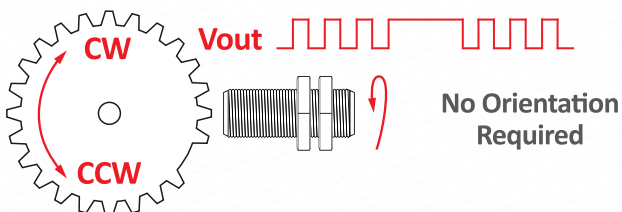
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Target Tracker' No Orientation Required



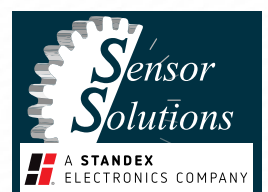
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN output goes low with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



S12-18ADSO-5KCB2

Single Ch-Target Tracker Gear Tooth Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

These sensors power up with the output transistor OFF (Vout High). This transistor turns ON (Vout Low) for the first time on the approach of a tooth. After the first tooth, they will not miss a target.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current, Output Off	Into Vcc	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low, Vol	I sink = 20 mA	0	0.6	Volts
Output Voltage High, Voh	Vcc = 12, Rload > 100Ω	105	120	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	K Ohms
Output Rise Time 10-90%	C < 100pF	-	3.0	μS
Output Fall Time 90-10%	C < 100pF	-	1.0	μS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	20	V / M

* T max = 150°C is available, contact factory.
** CMOS IC is static sensitive.

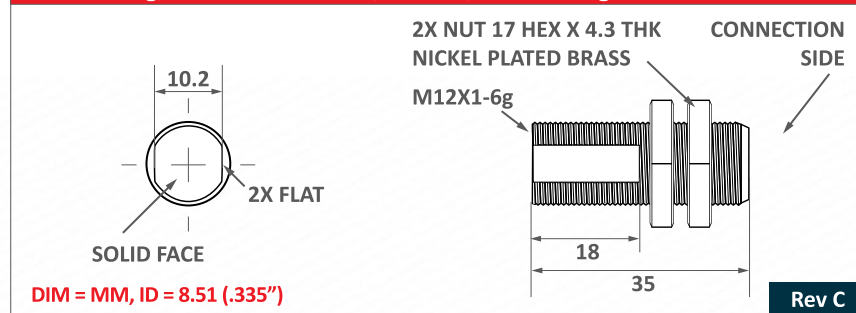
Rev B

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc at 25°C	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Current into Output	-	30	mA
Load Capacitance	-	0.01	uF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

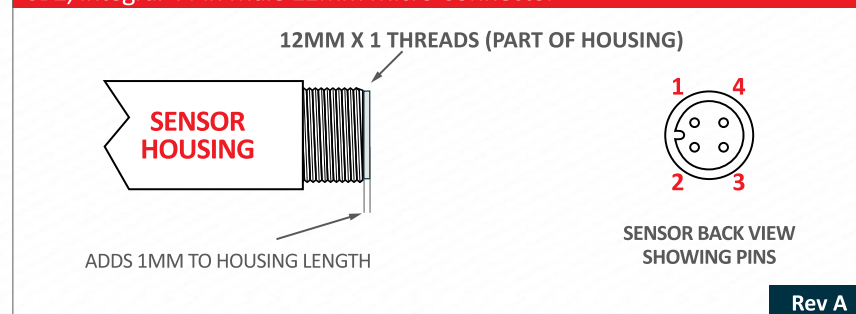
Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

S12 Housing, 303 Stainless Steel, M12X1, 35mm Long



Rev C

CB2, Integral 4 Pin Male 12mm Micro Connector



Rev A

Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .120"	.150"
8 (.393") Tooth to Tooth	.000 to .085"	.110"
12 (.262") Tooth to Tooth	.000 to .055"	.075"
100% tested before shipping		
16 (.196") Tooth to Tooth	.000 to .035"	.050"
20 (.157") Tooth to Tooth	.000 to .030"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .012"	.020"
Typical Output Duty Cycle	40 to 60%	
Alignment Skew Angle	360 Degrees	

Connections Chart

Pin 1	Vcc	Pin 3	Ground
Pin 2	n/c	Pin 4	Digital Vout

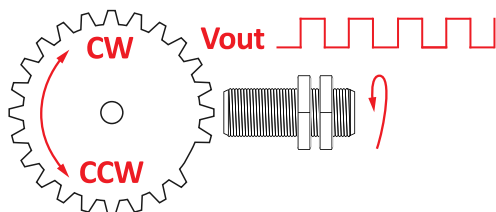
CB2-18ADSO

OTHER MATING CONNECTORS AND CABLE SETS AVAILABLE

S12-18ADSO-5KCB2

Single Ch-Target Tracker Gear Tooth Sensor

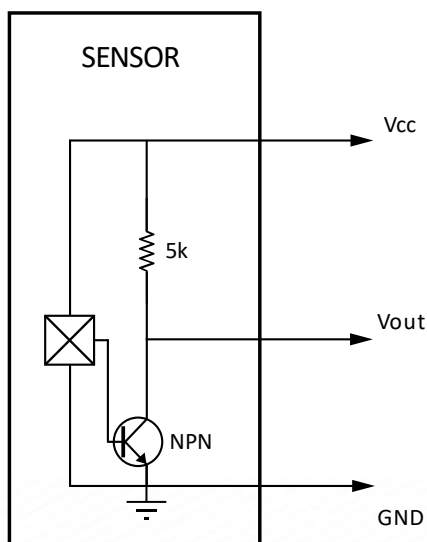
Sensor Function



**THIS SENSOR
WORKS WITH ANY
ORIENTATION!**

S12-18ADSO

5K, 5k Pull-up Resistor



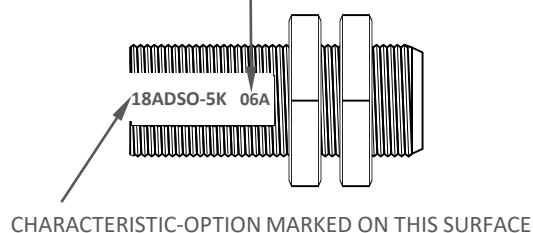
Date Code 'YYM'

YY = YEAR, M = MONTH

A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

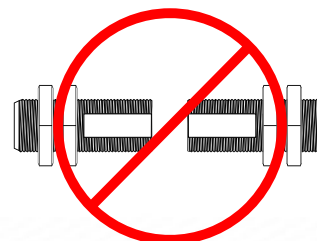
Marking

DATE CODE, THIS SURFACE



Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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S12H-SSTDSO-R5CB2-001

Gear Tooth Speed Switch

- Speed Switch
- Transistor output-ferrous target activated
- Regulated input, NPN with 5k pull-up
- Stainless 12x1mm x 52mm housing
- Integral 4 pin male 12mm micro connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12H-SSTDSO-R5CB2-001**

Housing	Sensor Type & Function	Electrical Option	Connection Type	User Defined Frequency
S = Stainless Steel, Thread Pitch M12x1, 52mm Long	Speed Switch Gear Tooth & Ferrous Targets	Regulated Input NPN w/5k Pull up	CB2 = Integral 4 Pin Male 12mm Micro Connector	Switch Frequency <u>xxx</u> in Hz

Modify, update, or enhance any sensor with our modular features and functionality.

HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

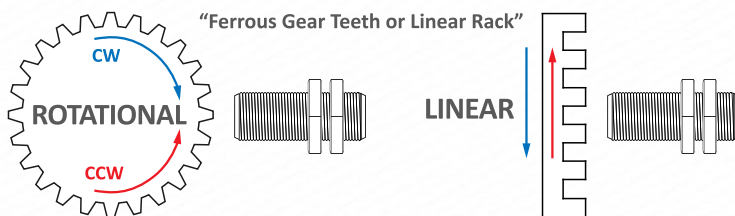
ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

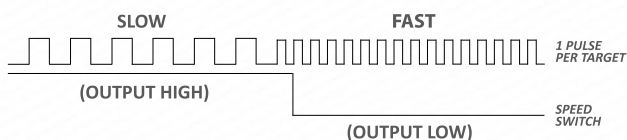
Need a Custom Sensor Solution?... Send us your application specific requirements at sensorso.com

'Steel Gears & Ferrous Target Actuated Speed Switch with Transistor Output'

Overspeed, Underspeed, Zero-Speed



OUTPUTS



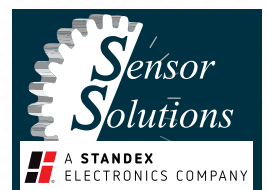
Type - SSG

DESCRIPTION

- Speed switch output turns on/off dependent on factory programmed frequency.
- 001 Hz switch point functions as "0 speed" indicator. For other switch speeds contact Sensor Solutions.
- Single channel digital square wave output for resolving actual speed.
- Detects gears and other ferrous targets using Hall Effect Technology
- Capable of detecting 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Ferrous Target Speed Switch
- No Orientation Required
- Add -xxx in Hz to End of PN – contact factory for custom switch point models



S12H-SSTD50-R5CB2-001

Gear Tooth Speed Switch

OTHER OPTIONS

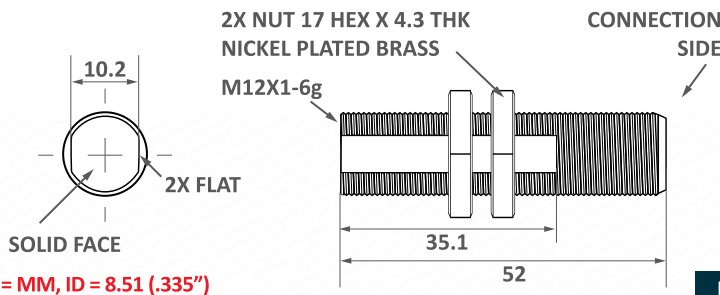
As well as these Ferrous Target Speed Switches, we offer Magnet / Magnet Tape activated Speed Switches, and Gear Tooth Speed Switches designed to work with standard gears. We have options for relay outputs, NPN outputs, and TTL outputs.

Note: Check our website or contact us to discuss any of our magnetic speed, count, and position detection sensors.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range	Operating	-40	+110	Deg C
Supply Voltage, Vcc	Over temperature	+8	+30	Volts DC
Supply Current	Into Vcc, Vcc=12V	5	16	mA
Internal Pull up Resistor	Vcc to Vout	4.9	5.1	kOhms
Vol, Low Level Vout	Vcc = 12V, Rload >100k	0.0	0.7	Volts
Voh, High Level Vout	Vcc = 12V, Rload >100k	11.75	12	Volts
Overspeed TRIP Frequency	Output goes low above	0.98	1.01	Hz
Underspeed Release Freq.	Output goes high below	0.94	0.97	Hz
ESD (like product qualified)	Nondestructive	-	2000	Volts
EMI (like product qualified)	20k to 1 G Hz	-	20	V / M

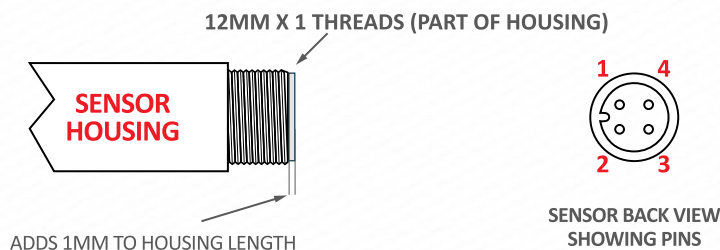
Rev D

S12H Housing, 303 Stainless Steel, M12X1, 52mm Long



Rev B

CB2, Integral 4 Pin Male 12mm Micro Connector



Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc-Gnd	-32	+32	Volts
Voltage at Output	-.3	30	Volts
Sink Current into Output	-	50	mA
Short Circuit Prot. Vout-Gnd	-	Indef.	Minutes
Short Circuit Prot. Vout+Vcc	-	None	Minutes

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 ms Half-Sine

Sensor Characteristics

Output State at 0 Speed: High (Transistor Off)

Air Gap Range, Targets	Min	Typ	Max
.22" wide, .65" apart, .30" deep:	.000"	.070"	.140"*
.12" wide, .29" apart, .25" deep:	.000"	.045"	.090"*
.10" wide, .17" apart, .17" deep:	.000"	.028"	.055"*
.06" wide, .10" apart, .10" deep:	.000"	.015"	.030"*
TRIP Frequency Accuracy, Output LOW	.98%	1.0%	1.01%*
RELEASE Frequency Accuracy, Output HIGH	.99%***	1.0%	1.02%

STOP DETECT TIME, Output returns high after sudden stop 10ms (Typical)

* Gap the sensor less than MAX GAP.

** Output is LOW if teeth are passing by faster than 1.02 * Trip Frequency.

*** Output is HIGH if teeth are passing by slower than 0.99 * Release Frequency

Convert RPM to Hz

Over/Under Speed Trip Points are in Hz, pulses per second.

To convert RPM (Revolutions per Minute) to Hz, you need to know the target's pulses per revolution, "N". A 20-tooth target produces 20 pulses, so N=20.

$$\text{Hz} = \text{RPM} * (N / 60). \text{ Or } \text{RPM} = \text{Hz} * (60 / N).$$

Example: For a 20-tooth target and 500 Hz trip point, RPM = 500 * (60 / 20) so the output switches low at 1500 RPM.

Connections Chart

Pin 1	Vcc	Pin 3	Ground
Pin 2	1 Pulse per Target	Pin 4	Speed Switch Output

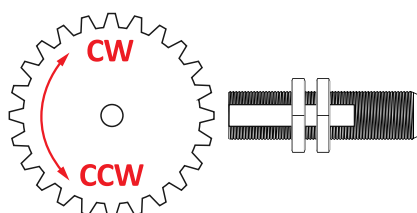
CB2-SSTD50

OTHER MATING CONNECTORS AND CABLES AVAILABLE

S12H-SSTDSO-R5CB2-001

Gear Tooth Speed Switch

Sensor Function

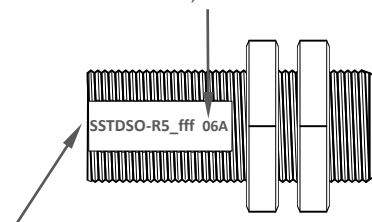


THIS SENSOR WORKS WITH ANY ORIENTATION!

S12H-SSTDSO

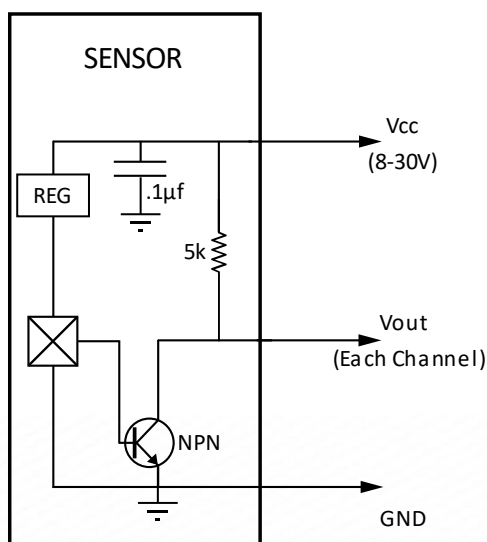
Marking

DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION_TRIP SPEED
MARKED ON THIS SURFACE
fff = SWITCH FREQUENCY IN Hz #

R5, Regulated, 5k Resistor



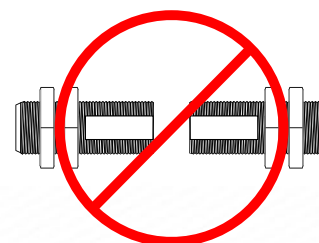
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C MAR	G JUN	K SEP	N DEC

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S12H-SSTDSO-R5CB2-500

Gear Tooth Speed Switch

- Speed Switch
- Transistor output-ferrous target activated
- Regulated input, NPN with 5k pull-up
- Stainless 12x1mm x 52mm housing
- Integral 4 pin male 12mm micro connector



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12H-SSTDSO-R5CB2-500**

Housing	Sensor Type & Function	Electrical Option	Connection Type	User Defined Frequency
S = Stainless Steel, Thread Pitch M12x1, 52mm Long	Speed Switch Gear Tooth & Ferrous Targets	Regulated Input NPN w/5k Pull up	CB2 = Integral 4 Pin Male 12mm Micro Connector	Switch Frequency <u>xxx</u> in Hz

Modify, update, or enhance any sensor with our modular features and functionality.

HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

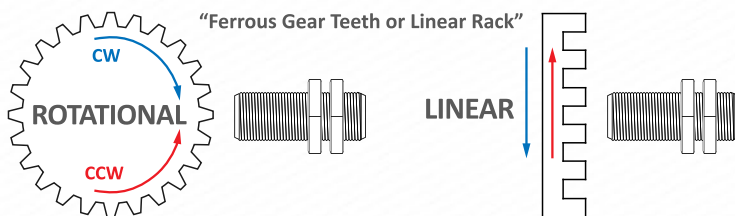
ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

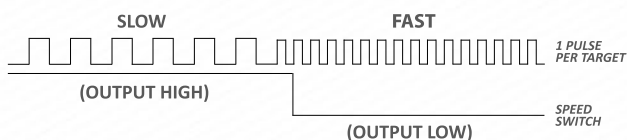
Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Steel Gears & Ferrous Target Actuated Speed Switch with Transistor Output'

Overspeed, Underspeed, Zero-Speed



OUTPUTS



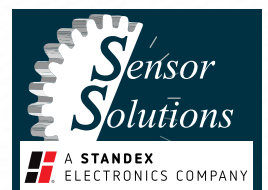
Type - SSG

DESCRIPTION

- Speed switch output turns on/off dependent on factory programmed frequency.
- 500 Hz switch point indicates if sensor is seeing more or less than 500 "teeth" per second.
- Single channel digital square wave output for resolving actual speed.
- Detects gears and other ferrous targets using Hall Effect Technology
- Capable of detecting 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Ferrous Target Speed Switch
- No Orientation Required
- Add -xxx in Hz to End of PN – contact factory for custom switch point models



S12H-SSTD50-R5CB2-500

Gear Tooth Speed Switch

OTHER OPTIONS

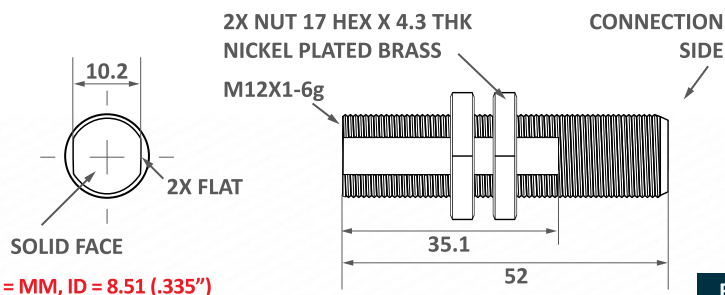
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Note: Check our website or contact us to discuss any of our magnetic speed, count, and position detection sensors.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range	Operating	-40	+110	Deg C
Supply Voltage, Vcc	Over temperature	+8	+30	Volts DC
Supply Current	Into Vcc, Vcc=12V	5	16	mA
Internal Pull up Resistor	Vcc to Vout	4.9	5.1	kOhms
Vol, Low Level Vout	Vcc = 12V, Rload >100k	0.0	0.7	Volts
Voh, High Level Vout	Vcc = 12V, Rload >100k	11.75	12	Volts
Overspeed TRIP Frequency	Output goes low above	490	505	Hz
Underspeed Release Freq.	Output goes high below	470	485	Hz
ESD (like product qualified)	Nondestructive	-	2000	Volts
EMI (like product qualified)	20k to 1 G Hz	-	20	V / M

Rev D

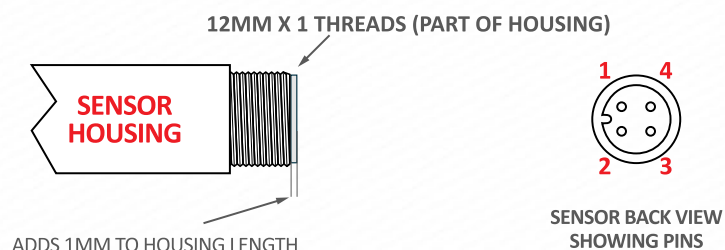
S12H Housing, 303 Stainless Steel, M12X1, 52mm Long



DIM = MM, ID = 8.51 (.335")

Rev B

CB2, Integral 4 Pin Male 12mm Micro Connector



ADDS 1MM TO HOUSING LENGTH

SENSOR BACK VIEW
SHOWING PINS

Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc-Gnd	-32	+32	Volts
Voltage at Output	-.3	30	Volts
Sink Current into Output	-	50	mA
Short Circuit Prot. Vout-Gnd	-	Indef.	Minutes
Short Circuit Prot. Vout+Vcc	-	None	Minutes

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 ms Half-Sine

Sensor Characteristics

Output State at 0 Speed: High (Transistor Off)

Air Gap Range, Targets	Min	Typ	Max
.22" wide, .65" apart, .30" deep:	.000"	.070"	.140"*
.12" wide, .29" apart, .25" deep:	.000"	.045"	.090"*
.10" wide, .17" apart, .17" deep:	.000"	.028"	.055"*
.06" wide, .10" apart, .10" deep:	.000"	.015"	.030"*
TRIP Frequency Accuracy, Output LOW	.98%	1.0%	1.01%*
RELEASE Frequency Accuracy, Output HIGH	.99%***	1.0%	1.02%

STOP DETECT TIME, Output returns high after sudden stop 10ms (Typical)

* Gap the sensor less than MAX GAP.

** Output is LOW if teeth are passing by faster than 1.02 * Trip Frequency.

*** Output is HIGH if teeth are passing by slower than 0.99 * Release Frequency

Convert RPM to Hz

Over/Under Speed Trip Points are in Hz, pulses per second.

To convert RPM (Revolutions per Minute) to Hz, you need to know the target's pulses per revolution, "N". A 20-tooth target produces 20 pulses, so N=20.

$$\text{Hz} = \text{RPM} * (N / 60). \text{ Or } \text{RPM} = \text{Hz} * (60 / N).$$

Example: For a 20-tooth target and 500 Hz trip point, RPM = 500 * (60 / 20) so the output switches low at 1500 RPM.

Connections Chart

Pin 1	Vcc	Pin 3	Ground
Pin 2	1 Pulse per Target	Pin 4	Speed Switch Output

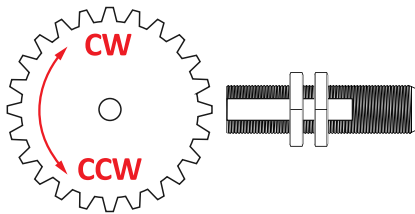
CB2-SSTD50

OTHER MATING CONNECTORS AND CABLES AVAILABLE

S12H-SSTDSO-R5CB2-500

Gear Tooth Speed Switch

Sensor Function

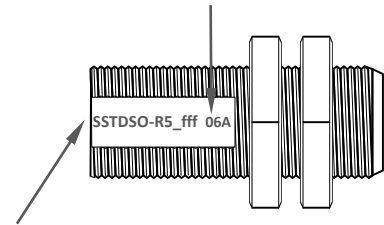


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ORIENTATION!**

S12H-SSTDSO

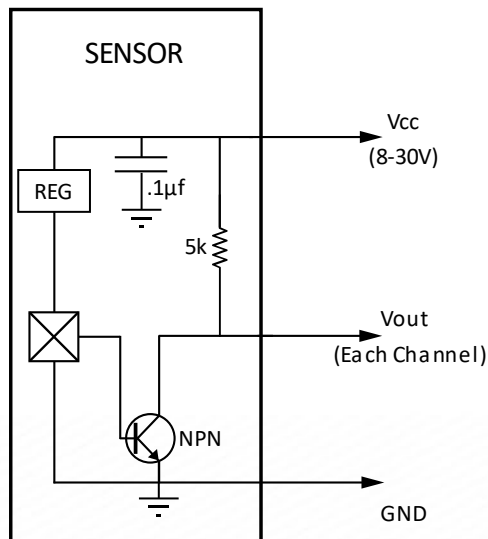
Marking

DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION_TRIP SPEED
MARKED ON THIS SURFACE
fff = SWITCH FREQUENCY IN Hz #

R5, Regulated, 5k Resistor



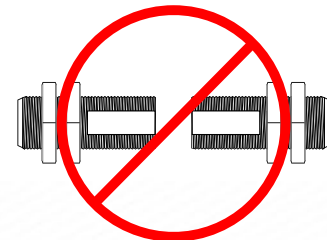
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A JAN	D APR	H JUL	L OCT
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S12R-SSRDSO-NCSL5-001

Gear Tooth Speed Switch

- Ferrous target activated Speed Switch
- 8 to 32V DC Powered
- 150 VAC Normally Closed Form B Relay
- Stainless 12x1mm x 45mm housing
- Shielded 2 pair 22 AWG 105°C PVC, 5 foot



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12R-SSRDSO-NCSL5-001**

Housing	Sensor Type & Function	Electrical Option	Connection Type	User Defined Frequency
S = Stainless Steel, Thread Pitch M12x1, 45mm Long	Speed Switch Gear Tooth & Ferrous Targets	Relay Output Normally Closed	SL5 = Ind. Shielded 2 Pair 22AWG -20 to 105°C PVC	Switch Frequency <u>xxx</u> in Hz

Modify, update, or enhance any sensor with our modular features and functionality.

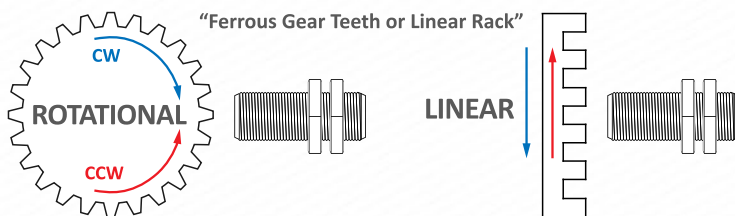
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

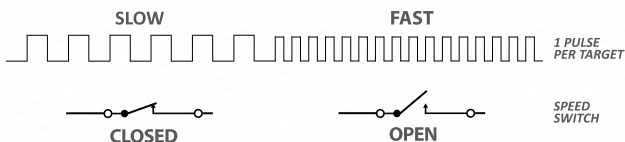
CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Steel Gears & Ferrous Target Actuated Speed Switch with Relay Output' Overspeed, Underspeed, Zero-Speed



OUTPUTS



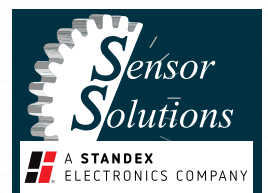
Type - SSG

DESCRIPTION

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- 001 Hz switch point functions as "0 speed" indicator. For other switch speeds contact Sensor Solutions.
- Single channel digital square wave output for resolving actual speed.
- Detects gears and other ferrous targets using Hall Effect Technology
- Capable of detecting 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Ferrous Target Speed Switch
- No Orientation Required
- Add -xxx in Hz to End of PN – contact factory for custom switch point models



S12R-SSRDSO-NCSL5-001

Gear Tooth Speed Switch

OTHER OPTIONS

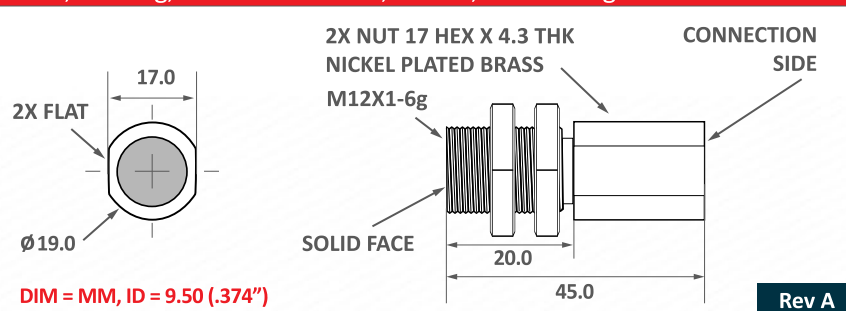
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Note: Check our website or contact us to discuss any of our magnetic speed, count, and position detection sensors.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range	Operating	-40	+110	Deg C
Supply Voltage, Vcc	Over temperature	+8	+32	Volts DC
Supply Current	Into Vcc	6	24	mA
Contact Resistance	Initial	-	0.10	Ohms
Overspeed TRIP Frequency	Relay opens	0.98	1.01	Hz
100% Final Tested at factory				
Underspeed Release Freq.	Relay closes	0.94	0.97	Hz
100% Final Tested at factory				
Relay Closing Bounce Time	T=25C	-	3	mS
ESD (like product qualified)	Nondestructive	-	2000	Volts
EMI (like product qualified)	20k to 1 G Hz	-	20	V / M

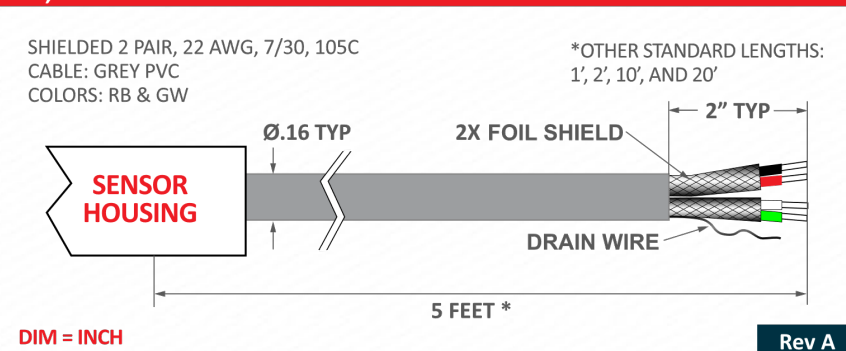
Rev C

S12R, Housing, 303 Stainless Steel, M12x1, 45mm Long



Rev A

SL5, Ind. Shielded 2 Pair 22 AWG -20 to 105°C PVC



Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc-Gnd	-16	+32	Volts
Voltage at Relay	-	150	Volts AC
Voltage at Relay	-	120	Volts DC
Switching Current, T = 25C	-	1	Amp
Switching Current, T = 70C	-	.46	Amp
Switching Power, T = 25C	-	30	Watts
Isolation, Surge Voltage Between Supply and Relay	-	1.5	k Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

Sensor Characteristics

Output State at 0 Speed: Relay Closed

Air Gap Range, Targets	Min	Typ	Max
Large >1/4" wide and >1/4" apart	.000"	.070"	.140"*
Med. >1/8" wide and >1/8" apart	.000"	.045"	.080"*
Small >1/16" wide and >1/8" apart	.000"	.028"	.030"*
8 Pitch Gear (.393" tooth to tooth)	.000"	.015"	.085"*
TRIP Frequency Accuracy, Relay OPEN	.98%	1.0%	1.01%*
RELEASE Frequency Accuracy, Relay CLOSED	.99%***	1.0%	1.02%
STOP DETECT TIME, Relay closes after sudden stop	1 second (Typ.)		

* Gap the sensor less than MAX GAP.

** Relay is guaranteed OPEN if teeth are passing by faster than 1.02 * Trip Frequency.

***Relay is guaranteed CLOSED if teeth are passing by slower than 0.99 * Release Frequency

Convert RPM to Hz

Over/Under Speed Trip Points are in Hz, pulses per second.

To convert RPM (Revolutions per Minute) to Hz, you need to know the target's pulses per revolution, "N". A 20-tooth target produces 20 pulses, so N=20.

$$\text{Hz} = \text{RPM} * (N / 60). \text{ Or } \text{RPM} = \text{Hz} * (60 / N).$$

Example: For a 20-tooth target and 500 Hz trip point, RPM = 500 * (60 / 20) so the output switches low at 1500 RPM.

Connections Chart

Red	Vcc	Black	Ground
White	Relay Output	Green	Relay Common

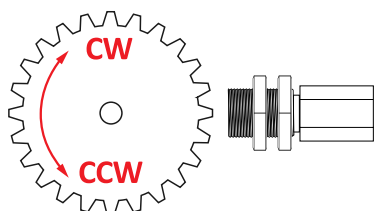
SL5-SSRDSO

OTHER MATING CONNECTORS AND CABLES AVAILABLE

S12R-SSRDSO-NC SL5-001

Gear Tooth Speed Switch

Sensor Function

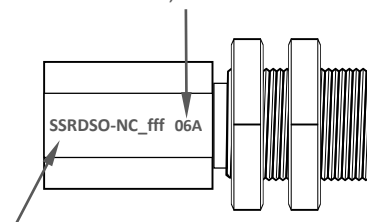


**THIS SENSOR
WORKS WITH ANY
ORIENTATION!**

S12R-SSRDSO

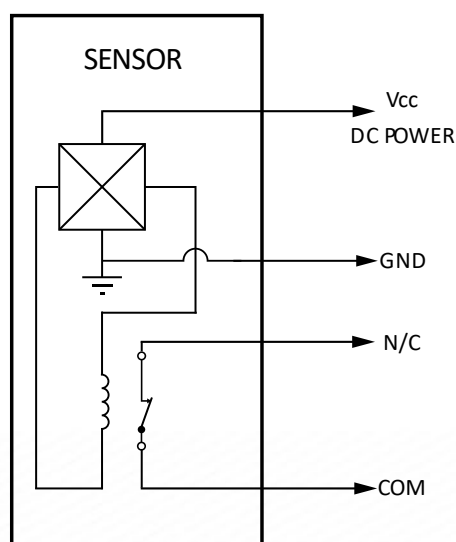
Marking

DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION_NC Relay Output
MARKED ON THIS SURFACE
fff = SWITCH FREQUENCY IN Hz #

NC, Relay Output



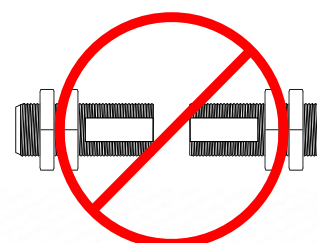
Date Code 'YYM'

YY = YEAR, M = MONTH

A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

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For deviating values, most current specifications and products please contact your nearest sales office.

S12R-SSRDSO-NOSL5-001

Hall Effect Gear Tooth Speed Switch

- Ferrous target activated Speed Switch
- 8 to 32V DC Powered
- 150 VAC Normally Open Form A Relay output
- Stainless 12x1mm x 45mm housing
- Shielded 2 pair 22 AWG 105°C PVC, 5 foot



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12R-SSRDSO-NOSL5-001**

Housing	Sensor Type & Function	Electrical Option	Connection Type	User Defined Frequency
S = Stainless Steel, Thread Pitch M12x1, 45mm Long	Speed Switch Gear Tooth & Ferrous Targets	Relay Output Normally Open	SL5 = Ind. Shielded 2 Pair 22AWG -20 to 105°C PVC	Switch Frequency <u>xxx</u> in Hz

Modify, update, or enhance any sensor with our modular features and functionality.

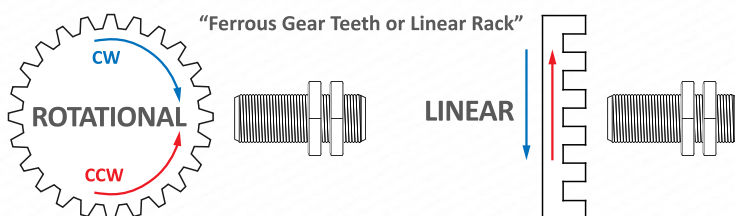
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

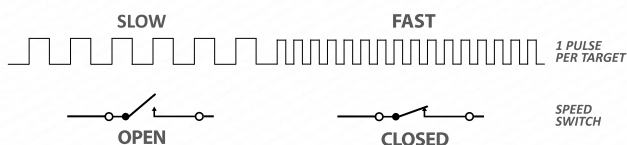
CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at sensors@standexelectronics.com

'Steel Gears & Ferrous Target Actuated Speed Switch with Relay Output' Overspeed, Underspeed, Zero-Speed



OUTPUTS



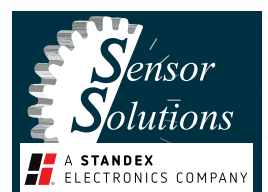
Type - SSG

DESCRIPTION

- Speed switch output turns on/off dependent on factory programmed frequency.
- 001 Hz switch point functions as "0 speed" indicator. For other switch speeds contact Sensor Solutions.
- Single channel digital square wave output for resolving actual speed.
- Detects gears and other ferrous targets using Hall Effect Technology
- Capable of detecting 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Ferrous Target Speed Switch
- No Orientation Required
- Add -xxx in Hz to End of PN – contact factory for custom switch point models



S12R-SSRDSO-NOSL5-001

Hall Effect Gear Tooth Speed Switch

OTHER OPTIONS

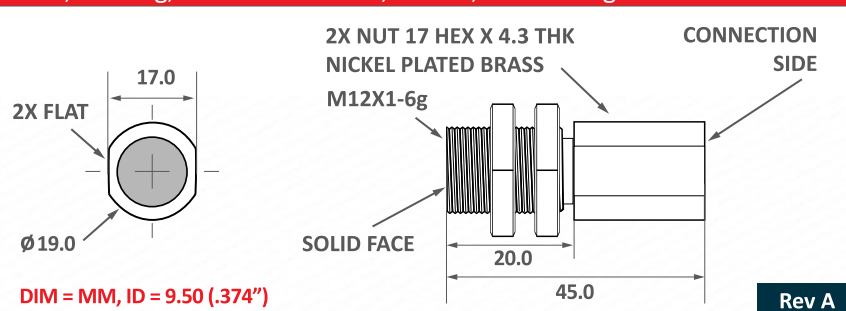
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Note: Check our website or contact us to discuss any of our magnetic speed, count, and position detection sensors.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range	Operating	-40	+110	Deg C
Supply Voltage, Vcc	Over temperature	+8	+32	Volts DC
Supply Current	Into Vcc	6	24	mA
Contact Resistance	Initial	-	0.10	Ohms
Overspeed TRIP Frequency 100% Final Tested at factory	Relay closes	0.98	1.01	Hz
Underspeed Release Freq. 100% Final Tested at factory	Relay opens	0.94	0.97	Hz
Relay Closing Bounce Time	T=25C	-	3	mS
ESD (like product qualified)	Nondestructive	-	2000	Volts
EMI (like product qualified)	20k to 1 G Hz	-	20	V / M

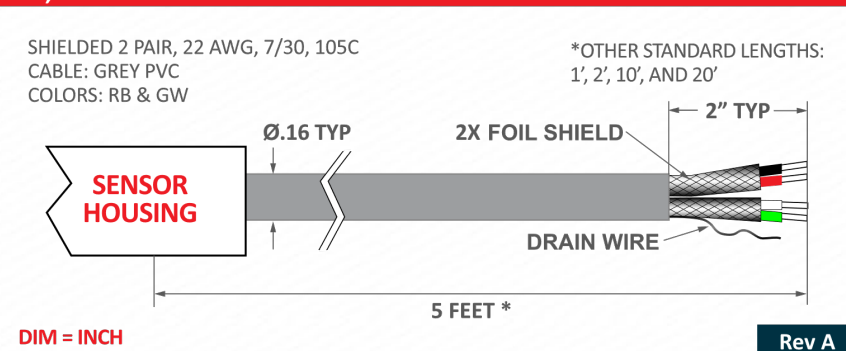
Rev C

S12R, Housing, 303 Stainless Steel, M12x1, 45mm Long



Rev A

SL5, Ind. Shielded 2 Pair 22 AWG -20 to 105°C PVC



Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc-Gnd	-16	+32	Volts
Voltage at Relay	-	150	Volts AC
Voltage at Relay	-	120	Volts DC
Switching Current, T = 25C	-	1	Amp
Switching Current, T = 70C	-	.45	Amp
Switching Power, T = 25C	-	30	Watts
Isolation, Surge Voltage Between Supply and Relay	-	1.5	k Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

Sensor Characteristics

Output State at 0 Speed: Relay Open

Air Gap Range, Targets	Min	Typ	Max
Large >1/4" wide and >1/4" apart	.000"	.070"	.140"*
Med. >1/8" wide and >1/8" apart	.000"	.045"	.080"*
Small >1/16" wide and >1/8" apart	.000"	.028"	.030"*
8 Pitch Gear (.393" tooth to tooth)	.000"	.015"	.085"*
TRIP Frequency Accuracy, Relay CLOSED	.98%	1.0%	1.01%*
RELEASE Frequency Accuracy, Relay OPEN	.99%***	1.0%	1.02%
STOP DETECT TIME, Output returns high after sudden stop	1 second (Typ.)		

* Gap the sensor less than MAX GAP.

** Relay is guaranteed CLOSED if teeth are passing by faster than 1.02 * Trip Frequency.

***Relay is guaranteed OPEN if teeth are passing by slower than 0.99 * Release Frequency

Convert RPM to Hz

Over/Under Speed Trip Points are in Hz, pulses per second.

To convert RPM (Revolutions per Minute) to Hz, you need to know the target's pulses per revolution, "N". A 20-tooth target produces 20 pulses, so N=20.

$$\text{Hz} = \text{RPM} * (N / 60). \text{ Or } \text{RPM} = \text{Hz} * (60 / N).$$

Example: For a 20-tooth target and 500 Hz trip point, RPM = 500 * (60 / 20) so the output switches low at 1500 RPM.

Connections Chart

Red	Vcc	Black	Ground
White	Relay Output	Green	Relay Common

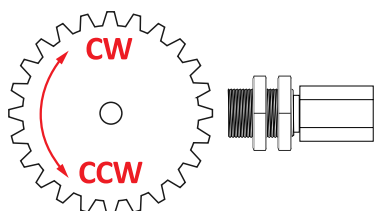
SL5-SSRDSO

OTHER MATING CONNECTORS AND CABLES AVAILABLE

S12R-SSRDSO-NOSL5-001

Hall Effect Gear Tooth Speed Switch

Sensor Function

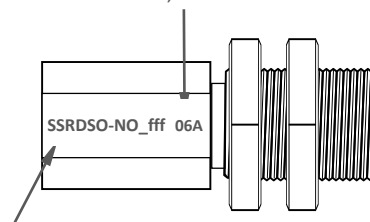


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S12R-SSRDSO

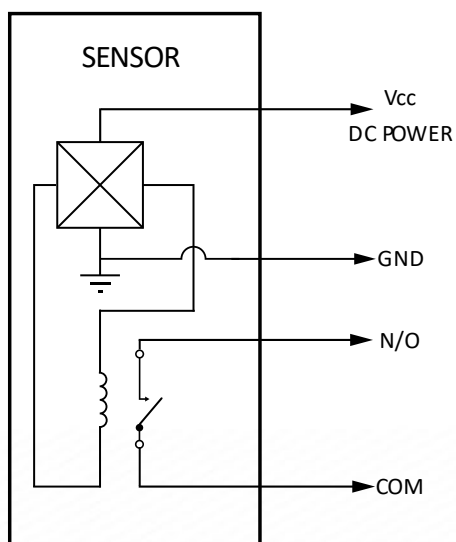
Marking

DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION_NO Relay Output
MARKED ON THIS SURFACE
fff = SWITCH FREQUENCY IN Hz #

NO, Relay Output



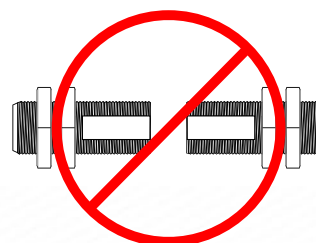
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A JAN	D APR	H JUL	L OCT
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S12R-SSRDSO-NOSL5-500

Gear Tooth Speed Switch

- Ferrous target activated Speed Switch
- 8 to 32V DC Powered
- 150 VAC Normally Open Form A Relay
- Stainless 12x1mm x 45mm housing
- Shielded 2 pair 22 AWG 105°C PVC, 5 foot



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S12R-SSRDSO-NOSL5-500**

Housing	Sensor Type & Function	Electrical Option	Connection Type	User Defined Frequency
S = Stainless Steel, Thread Pitch M12x1, 45mm Long	Speed Switch Gear Tooth & Ferrous Targets	Relay Output Normally Open	SL5 = Ind. Shielded 2 Pair 22AWG -20 to 105°C PVC	Switch Frequency <u>xxx</u> in Hz

Modify, update, or enhance any sensor with our modular features and functionality.

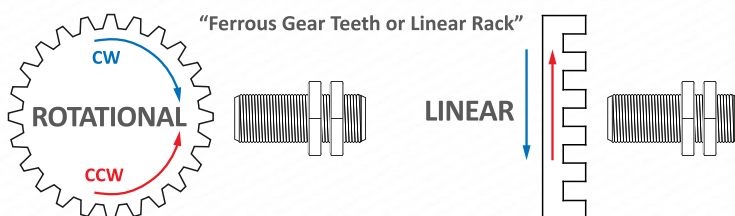
HOUSING -Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL -Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

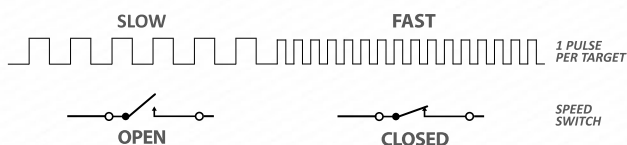
CONNECTION -Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Steel Gears & Ferrous Target Actuated Speed Switch with Relay Output' Overspeed, Underspeed, Zero-Speed



OUTPUTS



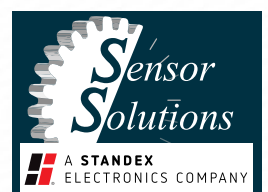
Type - SSG

DESCRIPTION

- Speed switch output turns on/off dependent on factory programmed frequency.
- 500 Hz switch point functions as "0 speed" indicator. For other switch speeds contact Sensor Solutions.
- Single channel digital square wave output for resolving actual speed.
- Detects gears and other ferrous targets using Hall Effect Technology
- Capable of detecting 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- No orientation required. Use lock nuts to set air gap within range of target

FEATURES

- Ferrous Target Speed Switch
- No Orientation Required
- Add -xxx in Hz to End of PN – contact factory for custom switch point models



S12R-SSRDSO-NOSL5-500

Gear Tooth Speed Switch

OTHER OPTIONS

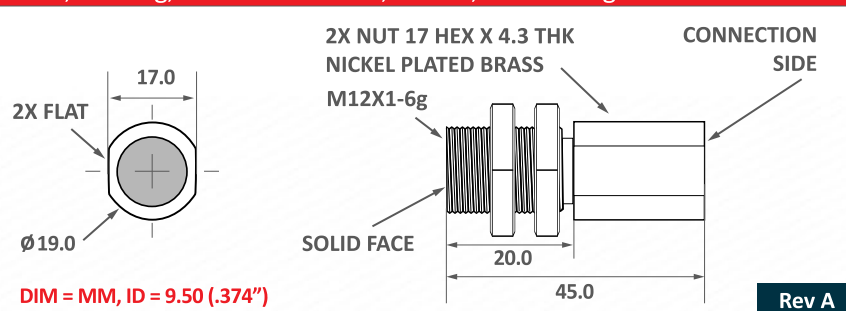
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Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range	Operating	-40	+110	Deg C
Supply Voltage, Vcc	Over temperature	+8	+32	Volts DC
Supply Current	Into Vcc	6	24	mA
Contact Resistance	Initial	-	0.10	Ohms
Overspeed TRIP Frequency 100% Final Tested at factory	Relay closes	490	505	Hz
Underspeed Release Freq. 100% Final Tested at factory	Relay opens	470	485	Hz
Relay Closing Bounce Time	T=25C	-	3	mS
ESD (like product qualified)	Nondestructive	-	2000	Volts
EMI (like product qualified)	20k to 1 G Hz	-	20	V / M

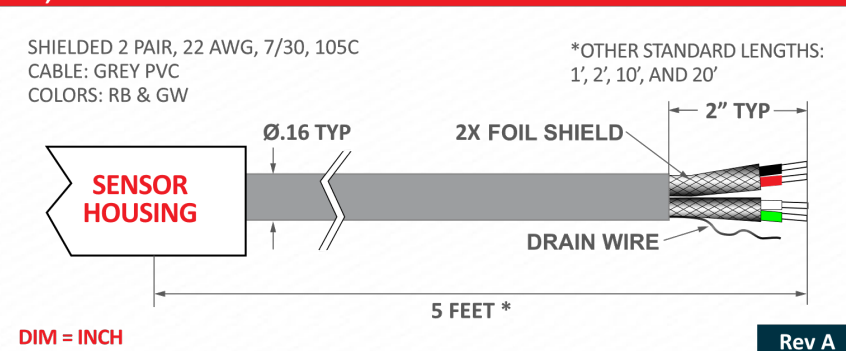
Rev C

S12R, Housing, 303 Stainless Steel, M12x1, 45mm Long



Rev A

SL5, Ind. Shielded 2 Pair 22 AWG -20 to 105°C PVC



Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc-Gnd	-16	+32	Volts
Voltage at Relay	-	150	Volts AC
Voltage at Relay	-	120	Volts DC
Switching Current, T = 25C	-	1	Amp
Switching Current, T = 70C	-	.45	Amp
Switching Power, T = 25C	-	30	Watts
Isolation, Surge Voltage Between Supply and Relay	-	1.5	k Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	23 Foot-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

Sensor Characteristics

Output State at 0 Speed: Relay Open

Air Gap Range, Targets	Min	Typ	Max
Large >1/4" wide and >1/4" apart	.000"	.070"	.140"*
Med. >1/8" wide and >1/8" apart	.000"	.045"	.080"*
Small >1/16" wide and >1/8" apart	.000"	.028"	.030"*
8 Pitch Gear (.393" tooth to tooth)	.000"	.015"	.085"*
TRIP Frequency Accuracy, Relay CLOSED	.98%	1.0%	1.01%*
RELEASE Frequency Accuracy, Relay OPEN	.99%***	1.0%	1.02%
STOP DETECT TIME, Output returns high after sudden stop	1 second (Typ.)		

* Gap the sensor less than MAX GAP.

** Relay is guaranteed CLOSED if teeth are passing by faster than 1.02 * Trip Frequency.

***Relay is guaranteed OPEN if teeth are passing by slower than 0.99 * Release Frequency

Convert RPM to Hz

Over/Under Speed Trip Points are in Hz, pulses per second.

To convert RPM (Revolutions per Minute) to Hz, you need to know the target's pulses per revolution, "N". A 20-tooth target produces 20 pulses, so N=20.

$$\text{Hz} = \text{RPM} * (N / 60). \text{ Or } \text{RPM} = \text{Hz} * (60 / N).$$

Example: For a 20-tooth target and 500 Hz trip point, RPM = 500 * (60 / 20) so the output switches low at 1500 RPM.

Connections Chart

Red	Vcc	Black	Ground
White	Relay Output	Green	Relay Common

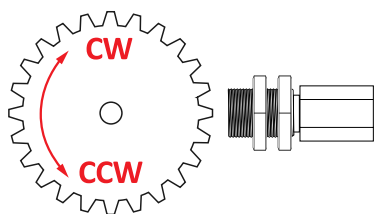
SL5-SSRDSO

OTHER MATING CONNECTORS AND CABLES AVAILABLE

S12R-SSRDSO-NOSL5-500

Gear Tooth Speed Switch

Sensor Function

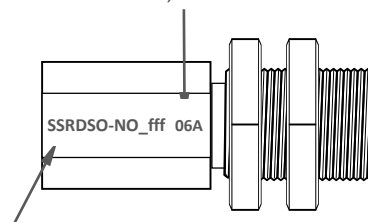


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S12R-SSRDSO

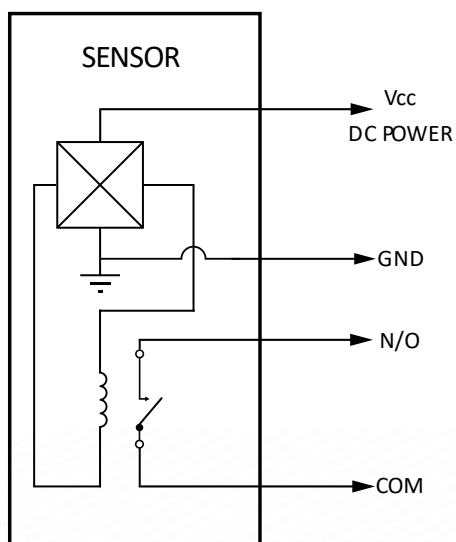
Marking

DATE CODE, THIS SURFACE



CHARACTERISTIC-OPTION_NO Relay Output
MARKED ON THIS SURFACE
fff = SWITCH FREQUENCY IN Hz #

NO, Relay Output



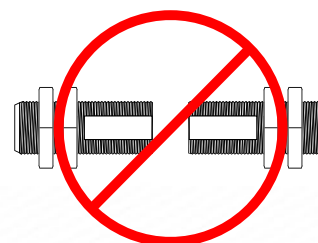
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A JAN	D APR	H JUL	L OCT
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Handling Instructions

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S38J-22ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

- Tiny Dynamic Speed Sensor
- No Orientation Required
- NPN output with 5k pull up resistor
- Stainless Steel 3/8-24 x 2.5" housing
- Jacketed 3 wire 22AWG 80C PVC, 5 ft



CUSTOMER FOCUSED ENGINEERING + MODULAR DESIGN

Part Description: **S38J-22ADSO-5KJA5**

Housing	Sensor Type & Function	Electrical Option	Connection Type
Stainless Steel 3/8-24 x 2.5" Long	Digital Single Output Gear Tooth Sensor	NPN, 5k Pull Up Resistor	Jacketed 3 wire 22AWG 80C PVC, 5 ft

Modify, update, or enhance any sensor with our modular features and functionality.

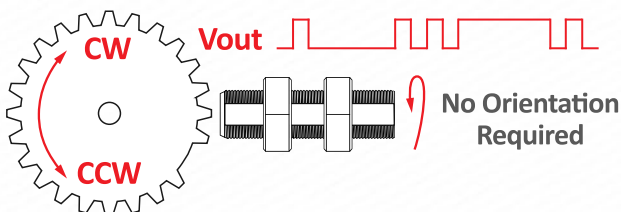
HOUSING - Aluminum, stainless steel, plastic, threaded, flange mount, customer specific

ELECTRICAL - Every sensor function available in various electrical options (NPN, PNP, TTL, etc.)

CONNECTION - Deutsch, Amphenol, many other brands, free end wires, pigtails, any length

Need a Custom Sensor Solution?... Send us your application specific requirements at [sensorso.com](https://www.sensorso.com)

'Target Tracker' No Orientation Required



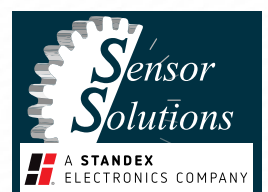
Type - DSO

DESCRIPTION

- Hall Effect Technology sensor for gear/ferrous target detection
- Detects 0-32 pitch gears, bolt heads, holes in steel plates, and other ferrous targets
- Single channel digital square wave output can resolve speed or count. For directional speed sensors, contact us.
- NPN goes low with ferrous metal present.
- Self-calibrating output reacts to both the leading and falling edge of any ferrous metal target

FEATURES

- Internal Hysteresis, Bounce Free
- Solid State (Nothing to wear out!)
- Temperature Stable
- Near 0 Speed Operation
- Dynamic, Self-Adjusting



S38J-22ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

TARGET SPECIFICATIONS NOTICE

Target Specifications are for detecting an end-sensed, 14.5 pressure angle, steel spur gear. The presence of ferrous metals or strong magnetic fields near the sensor's internal magnet may invalidate the specifications. Engineers are available to assist in target design and applications with non-standard targets. Custom target specifications can only be guaranteed when the customer supplies a target along with any additional components that may affect sensor output, and the customer has validated function in the finished application.

Note: for NPN sensors, off is a high signal, while PNP sensors off is a low signal. Additional gear tooth sensors are available. Check our website or contact us to compare all our gear tooth and single channel speed sensor options.

Electrical Specifications	Conditions	Min	Max	Unit
Temperature Range*	Operating	-40	+110*	Deg C
Supply Voltage, Vcc	Over temperature	+4.2	+24	Volts DC
Supply Current, Output Off	Into Vcc, Vcc = 24V	+1.5	+5	mA
Frequency Range	Near zero speed	0.1	15k	Hz
Saturation Voltage Low	I sink=20mA	0	0.6	Volts
Internal Pull Up Resistor	Vcc to Vout	4.9	5.1	kohms
Output Rise Time 10-90%	C < 100pF	-	3.0	µS
Output Fall Time 90-10%	C < 100pF	-	1.0	µS
ESD **	Nondestructive	-	2000	Volts
EMI **	20k to 1 G Hz	-	100	V / M

* T max = 150°C is available, contact factory.

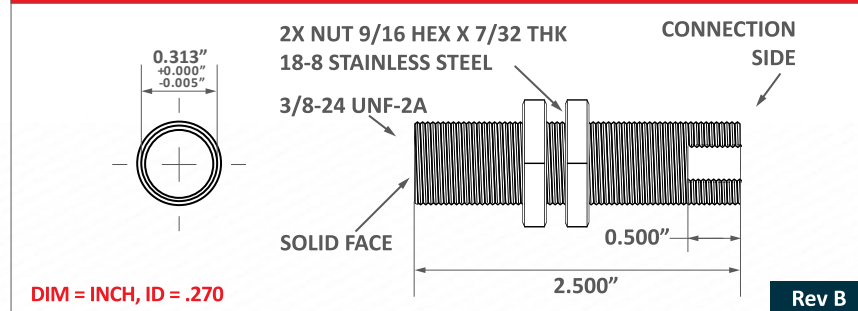
Rev A

Absolute Max Limits	Min	Max	Unit
Supply Voltage, Vcc	-30	+30	Volts DC
Voltage Applied to Output	-0.3	+30	Volts
Current into Output, T=25°C	-	30	mA
Load Capacitance	-	0.01	µF
Current Out of Output	-	Vcc/5k	mA
Load Dump, 40 mS Rs = 20	-	60	Volts

Environmental Specifications

Corrosion Resistance	500 hours salt spray ASTM B-117
Installation Torque	100 Inch-Pounds Maximum
Enclosure	Nema 1,3,4,6,13 & IEC IP67
Vibration	10 G's 2 to 2000 Hz Sinusoidal
Mechanical Shock	100 G's, 11 mS Half-Sine

S38J, Housing, 303 Stainless Steel, 3/8-24, 2.5" Long



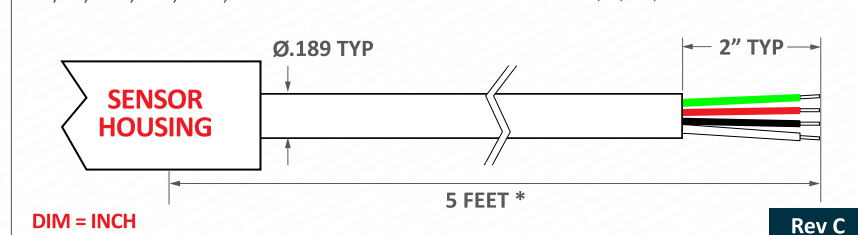
Target Performance Gear Pitch ~ (#Teeth / Dia. in Inches)	Air Gap Range	Typ. Max Gap
4 (.785") Tooth to Tooth	.000 to .100"	.125"
8 (.393") Tooth to Tooth	.000 to .060"	.100"
12 (.262") Tooth to Tooth	.000 to .045"	.075"
100% Tested before shipping		
16 (.196") Tooth to Tooth	.000 to .030"	.050"
20 (.157") Tooth to Tooth	.000 to .025"	.040"
24 (.131") Tooth to Tooth	.000 to .020"	.030"
32 (.098") Tooth to Tooth	.000 to .010"	.020"

Typical Output Duty Cycle	40 to 60%
Alignment Skew Angle	360 Degrees

JA5, Jacketed 3 Wire 22AWG PVC

FREE END JACKETED 3 WIRE PVC, 22 AWG
7/30, RED, BLK, GRN, 80°C

*OTHER STANDARD LENGTHS:
1', 2', 10', AND 20'



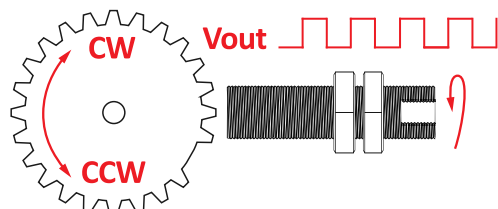
Connections Chart

Red Vcc	Black Ground
Green Digital Vout	
JA5-37ADSO	

S38J-22ADSO-5KJA5

Hall Effect Gear Tooth Speed Sensor

Sensor Function



THIS SENSOR WORKS WITH ANY ORIENTATION!

S38J-22ADSO

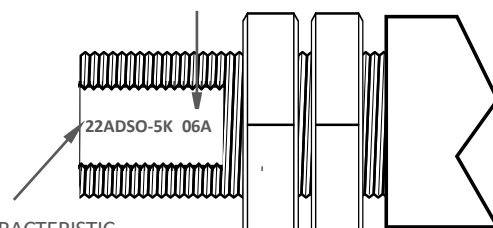
Date Code 'YYM'

YY = YEAR, M = MONTH

A JAN	D APR	H JUL	L OCT
B FEB	E MAY	J AUG	M NOV
C MAR	G JUN	K SEP	N DEC

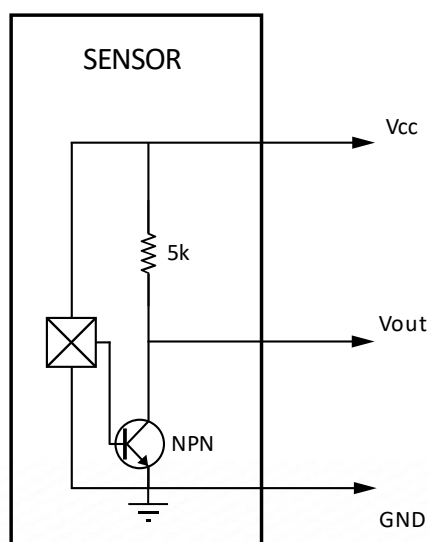
Marking

DATE CODE, THIS SURFACE



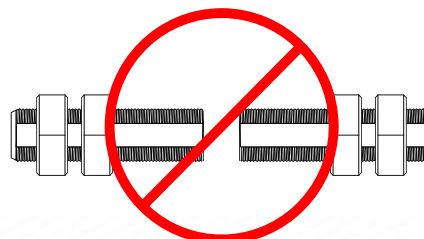
CHARACTERISTIC MARKED ON THIS SURFACE

5K, 5k Pull-up Resistor



Handling Instructions

**DO NOT CONTACT
FACE TO FACE**



**CONTACT WITH OTHER MAGNETS MAY
REDUCE THE MAXIMUM OPERATING GAP**

Please note: All technical specifications on this series datasheet refer to the standard product range. Modifications in the sense of technical progress are reserved. For general information only. For more specific information, please consult the product datasheet, available upon request.

This series datasheet could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein. These change will be incorporated in future revisions.

For deviating values, most current specifications and products please contact your nearest sales office.