# ELECTRO·SENSORS

# WE CAN
# SENSE
## IT

Electro-Sensors has been supplying **MACHINE MONITORING SENSORS** and **HAZARD MONITORING SYSTEMS** to industrial customers worldwide for 50 years and counting. We stand the test of time with rugged products engineered to last in your most demanding and hazardous applications.
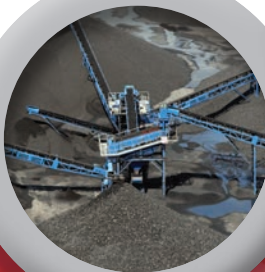
# Introduction

Welcome and thank you for your interest in Electro-Sensors, Inc. We are honored to be your trusted partner for machine monitoring sensors and hazard monitoring systems. When it comes to monitoring your most critical production processes, your business relies on accurate and real-time information to ensure the safety of employees and protection of equipment. We understand that unexpected downtime is stressful and expensive. Preventive and predictive maintenance based on feedback gathered from your production processes can greatly reduce the chance that a catastrophic breakdown will occur. Using Electro-Sensors products provides you the confidence to know that your equipment is running properly and within safe limits, and that any deviation will be quickly identified and neutralized.

Electro-Sensors is ready to help you streamline your processes by offering a wide variety of standard products along with the ability to quickly turnaround highly configurable and specially requested items. Along with this catalog, you can find more information about us and our products by visiting electro-sensors.com. We are here to answer your questions by e-mail sales@electro-sensors.com or by phone 1-800-328-6170. Thank you again for choosing Electro-Sensors.

David Klenk
CEO/CFO

- Rugged, Reliable Industrial-Duty Products

- Improve Processes by:
  - Safeguarding Systems
  - Reducing Downtime
  - Preventing Waste

- Straightforward Product Installation and Calibration

- 5-Year Limited Warranty on Most Products

- World Class Customer Service and Technical Support

- 50 Years of Industry Experience

- Customized Product Solutions to Fit Your Needs

- ISO9001:2015 Quality Certified

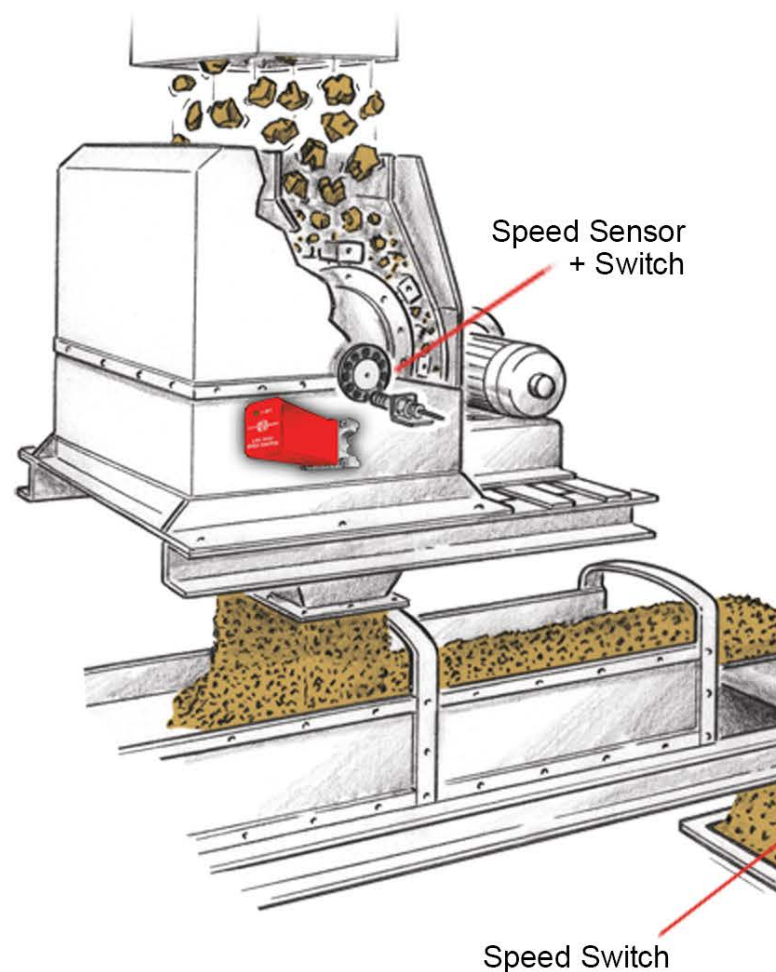- Most Standard Products Ship within 2 Days

## Industries Served

- **Grain, Feed, & Milling**
- **Ethanol Processing**
- **Biofuels Processing**
- **Wastewater Processing**
- **General Manufacturing**
- **Bulk Materials Handling**
- **Mining**
- **Packaging**
- **Water Utilities**
- **Food Processing**
- **Power Generation**
- **Textile Production**

## Applications

- **Belt Conveyors**
- **Screw Conveyors**
- **Vibratory Conveyors**
- **Slide Gates / Valves**
- **Bucket Elevators**
- **Fans / Blowers**
- **Pumps**
- **Hammermills**
- **Turbines**
- **Rotary Airlocks**
- **Dryers**
- **Crushers**



Speed Sensor + Switch

Speed Switch

HazardPR
Temperatu

Electro-S
Hazard M

HazardPRO™ XM
Wireless Hazard Monitoring

**HazardPRO™**
System Manager

Speed Sensor
+ Ratemeter

HazardPRO
Ambient Sensor

HazardPRO
Wireless Node

HazardPRO
Speed Sensor

RO
ure Sensor

HazardPRO
Alignment Sensor

Slide Gate Monitor

Vibration Monitor

Sentry
Monitor
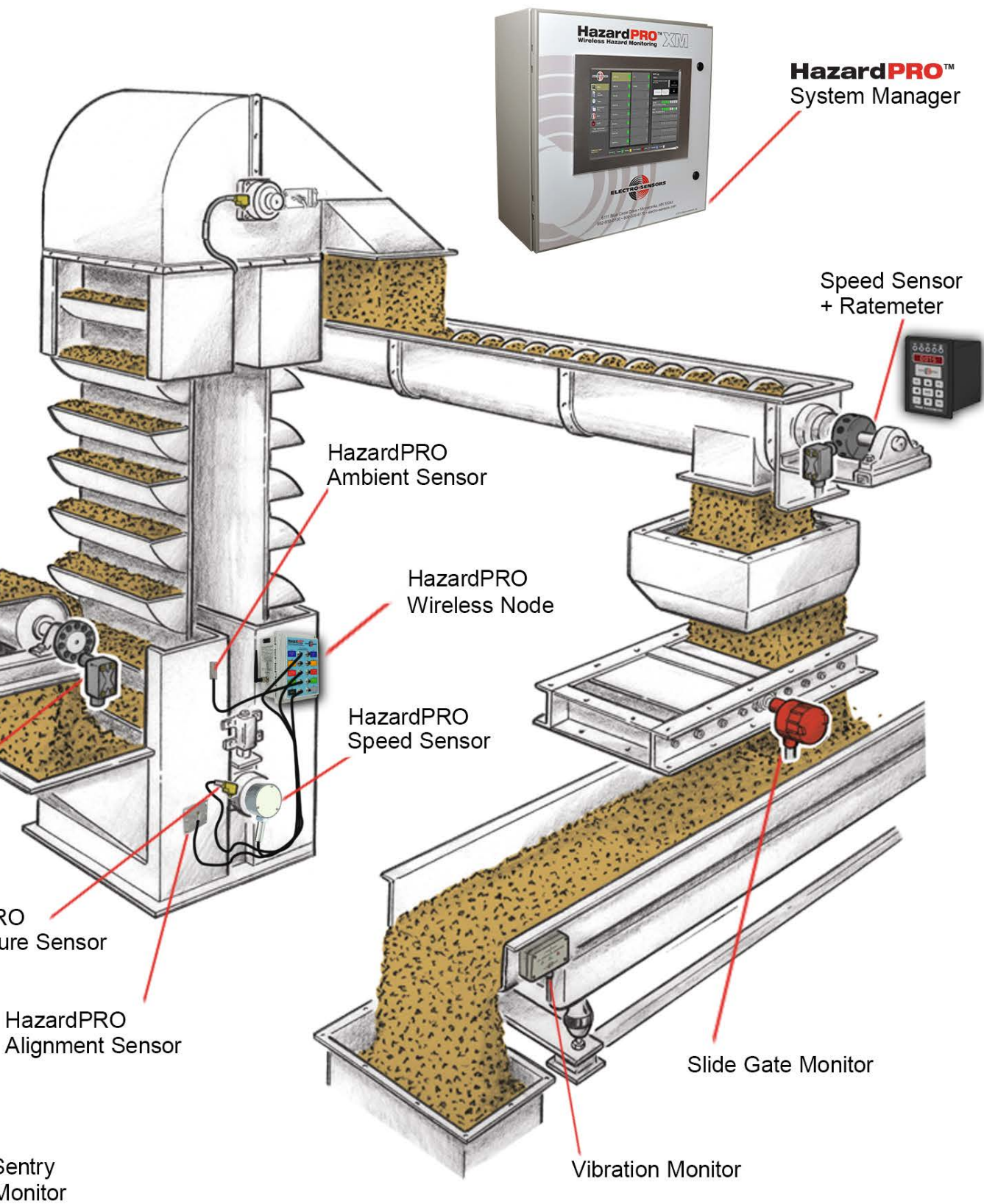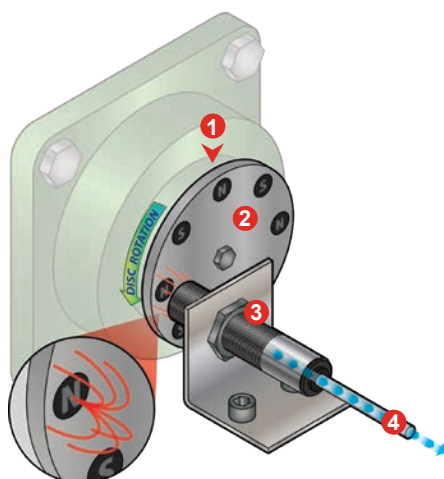
## The Basic Principle of Electro-Sensors Magnetic, Rotating Shaft Speed Sensing

**1** Rotating shaft of machinery (conveyors, bucket elevators, pumps, hammermills, etc.)

**2** Shaft-mounted magnetic pulser (disc shown)

**3** Magnetic shaft speed sensor

**4** Sensor output to PLC, meter, or data acquisition system

## Shaft Speed Sensor Flexibility

Flexibility is one of the reasons plant maintenance professionals choose our speed monitoring sensors and shaft speed switches. With our sensors, you don't need to worry about slight gaps between sensing targets. Compare our senso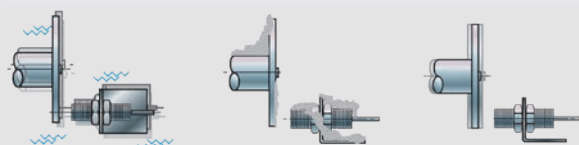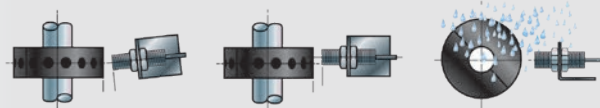r tolerances to the tolerances of our competitors before you purchase and install an inflexible rotational pick-up device.

- Unaffected by plant vibration
- Plows through grease, dust, and dirt
- Forgives up to 1/8" spacing gap

- Forgives misalignment
- Senses up to 1/4" off center
- Water resistant

## Common Installations

### Pulser Disc and Speed Sensor

- End-of-shaft mounted pulser disc
- Wide range of pulses per revolution (PPR) available

### Pulser Wrap and Speed Sensor

- Pulser wrap option ideal for when shaft end is not accessible
- Pulser wraps are custom made (material, number of pulses per revolution, shaft diameter, wrap width) and are compatible with shaft speed sensors

### Embedded Magnet Wheel Housing

- Magnetic (≤ 300 RPM) or shaft tap mounting available
- Easily mount target to shafts with protected disc housing

# Hazard Monitoring Systems



HazardPRO™ Wireless Hazard Monitoring



Electro-Sentry

Electro-Sentry 1

Electro-Sentry 16

Explosive dust & gases can be an unwelcome by-product of processing a wide variety of materials including agricultural, wood, metals, chemicals, and plastics. Explosions occur when concentrations of these dusts/gases exist in a confined space along with sufficient oxygen, and an ignition source. Electro-Sensors hazard monitoring systems can minimize the risk of these explosions by the early detection of conveyor/elevator slowdowns, hot bearing temperatures, or belt misalignment - all of which can create an ignition source.

HazardPRO is the industry leading wireless hazard monitoring system. HazardPRO was designed from the ground up to provide turnkey, reliable, and consistent protection for your most valuable assets, products, facilities, and most importantly, people. As a truly integrated system built expressly for hazard monitoring, HazardPRO captures and displays key information in an intuitive format allowing the user to quickly and comprehensively understand the status of their processes.

# Certifications

## HazardPRO Sensors

• Intrinsically Safe (I.S.) in: Class II, Div. 1, Groups E, F, G; Class III

## HazardPRO Nodes

• Intrinsically Safe (I.S.) apparatus located in: Class II, Div. 1, Groups E, F, G; Class III

• Providing Intrinsically Safe (I.S.) circuits for use in: Class II, Div. 1, Groups E, F, G; Class III

# Pioneering Software



• Built-In System Testing

• User-Friendly Touchscreen Interface

• System Maintenance Accountability

• Live Sensor Values & Charts

• Trending & Historical Data

# Flexible System Configuration

HazardPRO boasts 3 fully functional System Managers from which a system can be built. With these system options, your monitoring system can be optimized for the specific size of your facility.
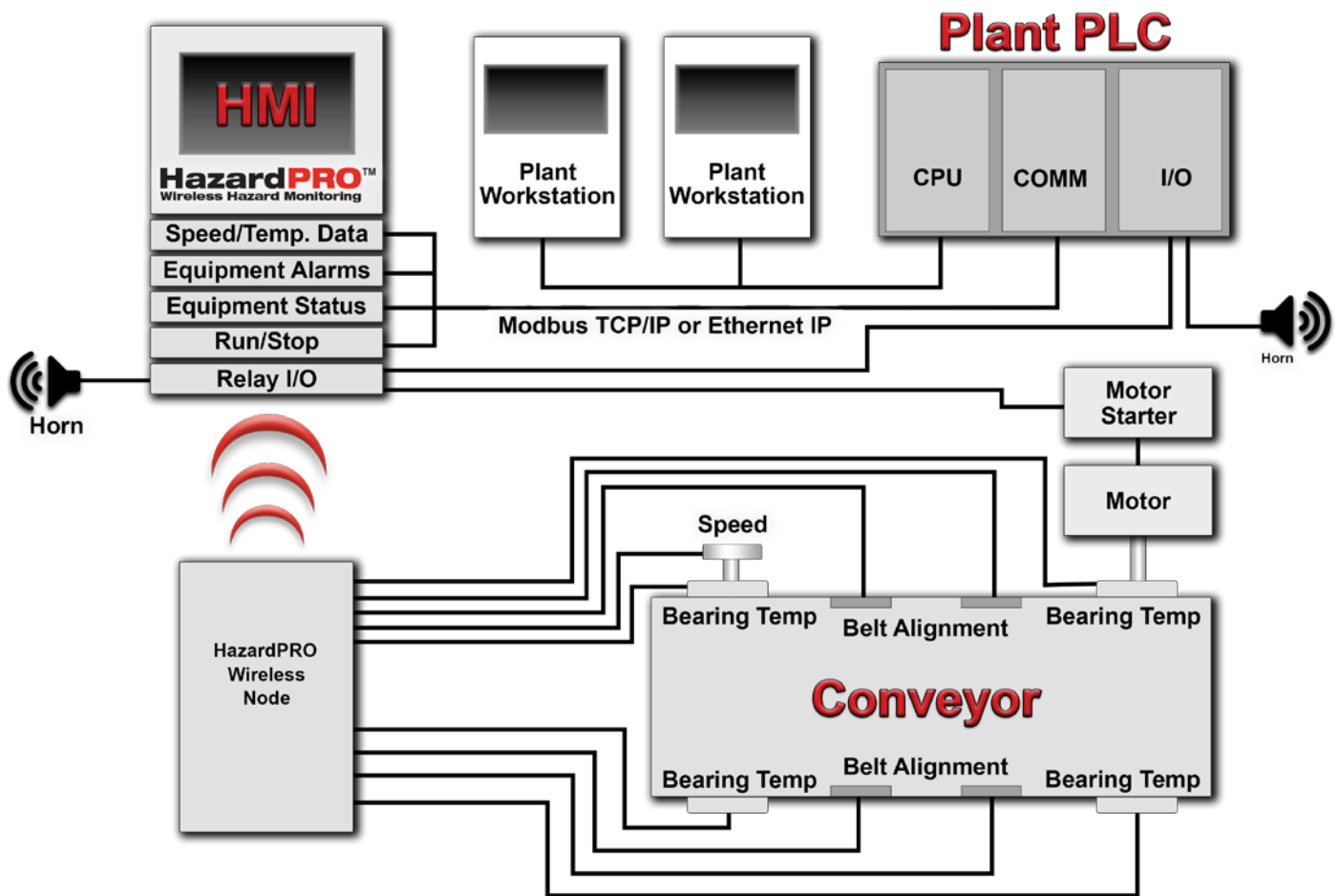


Pieces of Equipment:

**XS:** 1-4          **XM:** 1-16          **XL:** 1-32

## Stand-Alone Monitoring System

HazardPRO systems are design to monitor entire facilites via a network of wireless nodes, sensors, and control relays. The built-in relay system interfaces directly to equipment so that the live sensor data can be used to protect your facility. Every system has the ability to provide shut-down commands to each piece of equipment being monitored.

## Plant Control System Integration

HazardPRO can seamlessly mesh with plant control systems via Modbus TCP/IP or Ethernet IP connection. This allows hazard monitoring to be fully integrated into your plant control system giving you a clearer view into operations and performance of machinery.

## Data Collection & Dedicated Alarm

The wireless nodes are a functional piece of HazardPRO wireless monitoring systems. Each wireless node has a series of sensors used to record machine data and can be used to spot events before machinery reaches a critical failure point. Each system utilizes a dedicated relay to directly interface with your facility alarm system. This ensures that your facility will be aware of failures that could cause harm to your employees, machinery, and vital assets.

## Transmitter Node

*Class II Div. 1 or*
*Class II Div. 2 Models Available*

- Transmit-on-change keeps data current
- Heartbeat transmissions verify reliable communications
- Standard M12 sensor connection for easy installation
- No external power required
- 5+ year battery life
- 10 inputs available for: shaft speed, belt alignment, bearing temperature, ambient temperature, and contact closure

## Shaft Speed Sensor

- Automatic calibration of 10 and 20 percent slowdown
- Multiple mounting configurations
- Optional mounting magnet if shaft is not tapped

## Bearing Temperature Sensor

- No calibration required, setpoints adjusted to ambient sensor
- Stainless steel probe with zerk (grease) fitting
- Probe lengths available 4", 6", 8", 10"
- Replaces existing zerk (grease) fitting

## Ambient Temperature Sensor

- Monitoring local ambient temperature continuously adjusts setpoints on bearing and belt alignment sensors
- Multi-point placement on each side of equipment for highly accurate tracking

## Belt Alignment Sensor

- Brass rub block with easy-install mounting plate
- No calibration required, setpoints adjusted to ambient sensor
- Built-in, wear-detect feature notifies user when the belt alignment sensor needs to be replaced

## Stud Sensor

- Compatible with any standard Electro-Sensors rub block
- Intrinsically safe 3/8-16" temperature probe
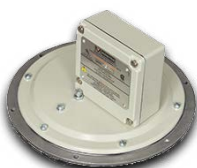
## Diaphragm Switch

- Point level detection in bins and hoppers
- Optimal for plugged chute applications
- Adaptable sensitivity

*\* All Sensors are Offered with Poly-Urethane or Steel Jacket Cable*
*\* Standard Cable Length is 3 Meters.  Extensions are Available.*

## Electro-Sentry 1 Hazard Monitoring System (ES1)

- Hazard monitor for single-legs and conveyors
- Monitors 1 speed and 12 bearing and/or belt alignment sensors
- All sensor values and alarms are displayed on front panel
- Green, yellow, red LED's for each sensor to display alarms
- Direct interface to Electro-Sensors shaft speed and temperature sensors
- One-button test for all sensors, setpoints, and alarm output relays
- 115, 230 VAC (50-60 Hz)

## Electro-Sentry 16 Hazard Monitoring System (ES16)

- Monitors 16 bearing and/or belt alignment sensors
- All sensor values and alarms are displayed on front panel
- Green, yellow, red LED's for each sensor to display alarms
- Direct interface to Electro-Sensors temperature sensors
- One-button test for all sensors, setpoints, and alarm output relays
- 115, 230 VAC (50-60 Hz)

**1** ES1, ES16

### BEARING TEMPERATURE MONITORING

TT420Z-LT (1/2") screws into a 1/8" NPT grease fitting tap and provides a grease fitting for bearing lubrication and a compression fitting for setting probe depth.

**2** ES1, ES16

### BELT ALIGNMENT MONITORING

TT420S-LT features a stud mount adapter for easy attachment to rub block door assembly.

**3** ES1 Only

### SHAFT SPEED MONITORING

• ST420-DI / ST420-LT dust ignition-proof speed sensor (pictured ST420-DI with EZ-18mm mounting bracket) - 2-wire, loop-powered, 4-20 mA output sensor with FM Class II approval.

• FB420 speed sensor with relay (not pictured) - an explosion proof sensor that mounts onto the elevator tail pulley to measure shaft speed. It outputs a 4-20 mA signal and has a programmable setpoint relay function.
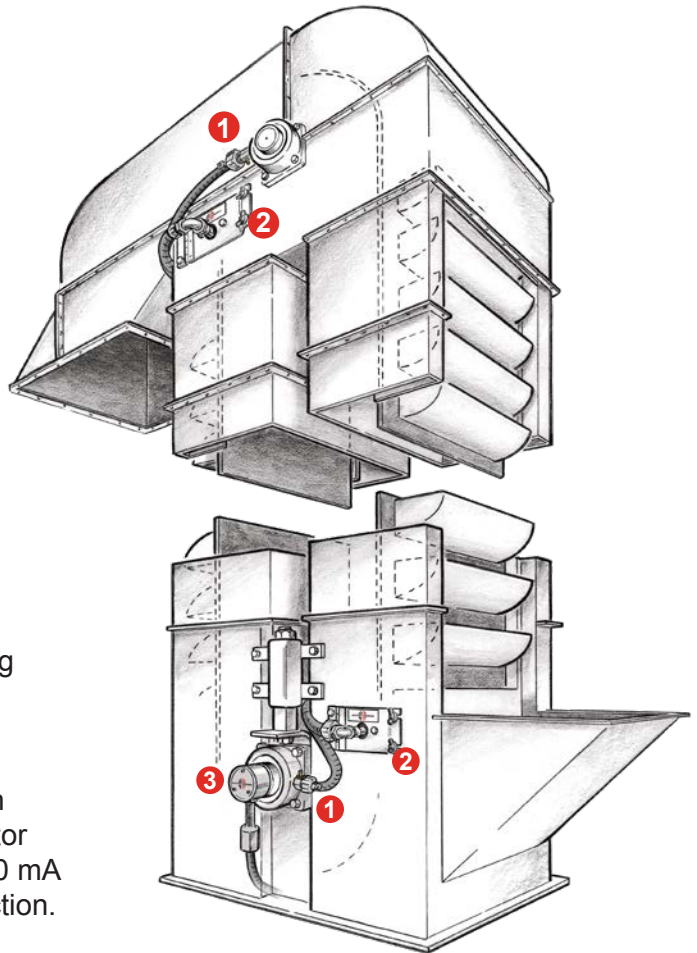
# Speed Switches / Speed Sensors
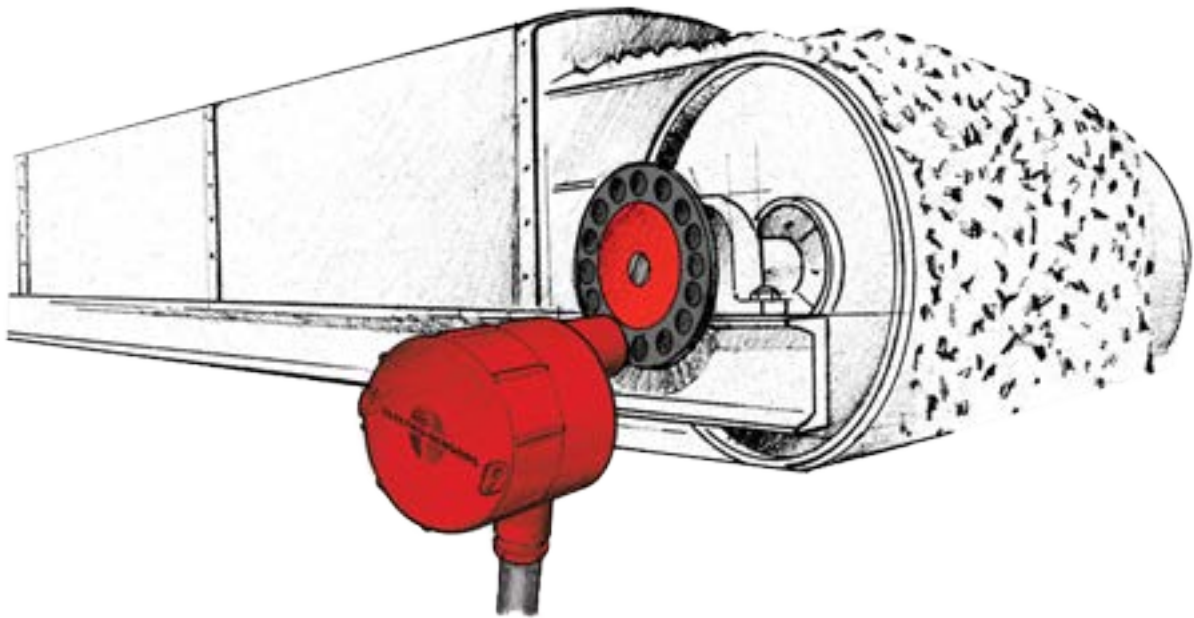


A speed switch senses rotating shaft speed through a speed sensor and shaft-mounted pulser disc/wrap.  It is then compared to one or more settable over/under/zero speed alarm trip-points.  As the shaft rotates, the passing magnets are detected across an air-gap, targets are converted into pulses with a frequency proportional to the shaft RPM. When the alarm threshold is crossed, a corresponding relay de-energizes, indicating the alarm.

## Choosing the Right Speed Switch System

**Electro-Sensors offers shaft speed switches that indicate shaft over-speed, under-speed, zero speed, and reverse rotation. 5-year limited warranty on all speed switches and sensors.**

Many applications are better suited with the switch electronics and sensor right at the monitoring point (a 2-piece system) – that way everything is calibrated right there. Other applications require the switch to be remotely mounted from the sensor and disc/wrap (a 3-piece system).

Space limitations, environmental considerations, and personal preference all play a part in determining the speed switch system required. We will help you figure out what you need before installation begins, it will save you time and money in the long run.

### 2-Piece Speed Switch Systems Include

- Shaft speed switch with internal sensor
- Rotating target (typically a pulser disc or a split collar pulser wrap)
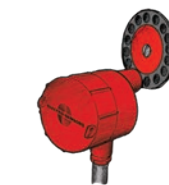
Switch + Pulser Disc
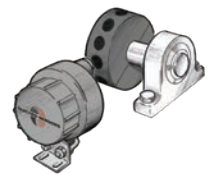
Switch + Pulser Wrap

### 3-Piece Speed Switch Systems Include

- Shaft speed switch
- External sensor with pulse frequency output
- Rotating target (typically a pulser disc or a split collar pulser wrap)
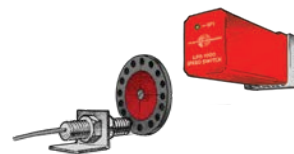
Switch + Sensor
+ Pulser Disc
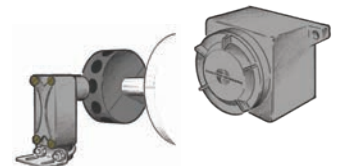
Switch + XP Sensor
+ Pulser Wrap

## Speed Switch EZ Mounting Options and Disc Protection Example

EZ-100 Disc
Guard (upper)

MM-2.00
EZ Mounting
Magnet

EZ-100 Mounting
Bracket

Speed Switch

255-EZ Pulser Disc
(comes with EZ-100)

EZ-100 Disc
Guard (lower)

**Disassembled**

**Assembled**

## 2-Piece System Shaft Speed Switches (Internal Sensor)

### M100T / M5000T Shaft Speed Switch

- Internal sensor
- SPDT relay output
- 5-100 rpm (M100T), 100-5,000 rpm (M5000T) under-speed setting
- Terminal block for easy wiring
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Works with Electro-Sensors magnetic pulser discs / wraps
- Optional EZ-100 mounting bracket and mounting magnet available
- Cast aluminum explosion proof (XP) housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

### FB420 4-20 mA Shaft Speed Sensor with Relay

- Internal sensor
- 4-20 mA analog speed output
- SPDT relay output
- User-configurable operating range within 0-9,999 rpm
- Setpoint can be set for over-speed or under-speed
- Internal LCD for programming and troubleshooting
- 24 VDC powered; terminal blocks for easy wiring
- Works with Electro-Sensors magnetic pulser discs / wraps
- Optional EZ-100 mounting bracket and mounting magnet available
- Cast aluminum explosion proof (XP) housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

### SCP1000 / SCP2000 Shaft Speed Switch

- Internal sensor
- Over-speed or under-speed configuration, 1-990 rpm
- 1 DPDT relay output (SCP1000), 2 SPDT relay outputs (SCP2000)
- Visual setpoint adjustment with digital accuracy
- Built-in start delay
- Dial-in calibration does not require power
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Works with Electro-Sensors magnetic pulser discs / wraps
- Optional EZ-SCP mounting bracket and mounting magnet available
- Cast aluminum explosion proof (XP) housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

## PVC100 / PVC5000 Shaft Speed Switch

- Internal sensor
- SPDT relay output
- Under-speed setpoint adjustable from 10-100 rpm (PVC100) or 100-5,000 rpm (PVC5000)
- 115 VAC (50-60 Hz) only
- Works with Electro-Sensors magnetic pulser discs / wraps
- Corrosion-resistant PVC plastic housing

## M100 / M5000 Shaft Speed Switch (recommended for replacement only. For new applications, see M100T / M5000T)

- Internal sensor
- SPDT relay output
- Under-speed setpoint adjustable from 10-100 rpm (M100) or 100-5,000 rpm (M5000)
- 115 VAC (50-60 Hz) only
- Works with Electro-Sensors magnetic pulser discs / wraps
- Optional EZ-100 mounting bracket and mounting magnet available
- Compact, cast aluminum explosion proof (XP) housing
- UL Listed Class I, Div I (D) Class II, Div I (E, F, G) Class III

## 3-Piece System Shaft Speed Switches

## DR1000 Shaft Speed Switch

- Works with remote / external pulse frequency output sensor (NPN, PNP, or mag pick-up)
- DPDT relay output
- Under-speed setpoint adjustment from 0.5-5,000 rpm (at 8 PPR)
- Terminal blocks for easy wiring
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Rugged explosion proof / NEMA 4X housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

## UDS1000 Reverse Rotation Shaft Speed Switch

- Works with remote / external bidirectional (quadrature) pulse frequency output sensor / incremental encoder (NPN)
- DPDT relay changes state when shaft direction reverses
- Reverse-over-speed setpoint adjustment from 0.5-5,000 rpm
- Relay resets when reverse motion stops
- Terminal blocks for easy wiring
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Rugged explosion proof / NEMA 4X housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

## SS110 Shaft Speed Switch (Slow Speed)

- Works with remote / external pulse frequency output sensor (NPN, PNP)
- Over-speed / under-speed setpoint ranges: 0.01-0.99 and 0.1-9.9 rpm
- SPDT relay output
- Monitors extremely slow speeds; down to 100 minutes per revolution
- Dial-in calibration does not require power
- Built-in start delay
- DIN rail mounting simplifies installation
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Optional explosion proof enclosure
- Optional NEMA 4, NEMA 4X, or NEMA 12 enclosure kit

◄ Optional Explosion Proof Enclosure

## LRB1000 / LRB2000 Shaft Speed Switch

- Works with remote / external pulse frequency output sensor (NPN, PNP)
- Over-speed or under-speed configuration, 1-1,000 rpm
- 1 SPDT relay output (LRB1000) or 2 SPDT relay outputs (LRB2000)
- Visual setpoint adjustment with digital accuracy
- Dial-in calibration does not require power
- Built-in start delay
- DIN rail mounting simplifies installation
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- Optional explosion proof enclosure
- Optional NEMA 4, NEMA 4X, or NEMA 12 enclosure kit

◄ Optional NEMA 4X Enclosure Kit

## DMS100 / DMS5000 Shaft Speed Switch

- Works with remote / external pulse frequency output sensor (NPN, PNP, mag pick-up, and TTL)
- Over-speed or under-speed configuration
- 5-100 rpm (DMS100) with 8 PPR input
- 100-5,000 rpm (DMS5000) with 4 PPR input
- 2 SPDT relay outputs
- DIN rail mounting simplifies installation
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options

| | DMS100/DMS5000 | DR1000 | FB420 | LRB1000/LRB2000 | M100/IM5000 (replace w/IM100T/5000T) | PVC100/PVC5000 | M100T/M5000T | SCP1000/SCP2000 | SS110 | UDS1000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor** | | | | | | | | | | |
| Input Signal (1) | S | S | S | S | S | S | S | S | S | Q |
| Input Signal (2) Termination | N, P | N, P | I | N | I | I | I | I | N | N |
| **Operating** | | | | | | | | | | |
| Setpoints | 2 | 1 | 1 | 1 or 2 | 1 | 1 | 1 | 1 or 2 | 1 | 1 |
| Setpoint Range (rpm) w/Standard 255 Disc | 5-100/ 100-5,000 | 0.5-5,000 | 0.75- 9,999 | 1-99/ 10-990 | 10-100/ 100-5,000 | 10-100/ 100-5,000 | 5-100/ 100-5,000 | 1-99/ 10-990 | 0.01-0.99 0.1-9.9 | 0.5-5,000 |
| Setpoint Calibration | Analog | Analog | Digital | Digital | Analog | Analog | Analog | Digital | Digital | Analog |
| Setpoint Adjustments (3) | 25TP | 1TP 25TP | D | R | 1TP 25TP | 1TP 25TP | 1TP 25TP | R | R | 1TP 25TP |
| Over-speed | ✓ | | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| Under-speed | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Zero Speed | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Reverse Detection | | | | | | | | | | ✓ |
| Failsafe | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Start Delay | | | | ✓ | | | | ✓ | ✓ | |
| Operating Temp. (°C) | 0 to +50 | -40 to +60 | -40 to +60 | -40 to +60 | -40 to +60 | -40 to +60 | -40 to +60 | -40 to +65 | -40 to +60 | -40 to +60 |
| **Output** | | | | | | | | | | |
| 4-20 mA | | | ✓ | | | | | | | |
| DPDT Form C | | 1 | | | | | | 1-SCP1000 | | 1 |
| SPDT Form C | 2 | | 1 | 1 or 2 | 1 | 1 | 1 | 2-SCP2000 | 1 | |
| **Input Power** | | | | | | | | | | |
| 12 VDC | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| 24 VDC | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| 115 VAC | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 230 VAC | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| **Housing** | | | | | | | | | | |
| Mounting (4) | D | E | C | D | C | C | C | C | D | E |
| Material (5) | P | CAL | CAL | P | CAL | PVC | CAL | CAL | P | CAL |
| Explosion Proof | | ✓ | ✓ | | ✓ | | ✓ | ✓ | | ✓ |
| EZ Mount Option | | | ✓ | | ✓ | | ✓ | ✓ | | |

**(1)**
S Single
Q Quadrature

**(2)**
N NPN Open-Collector Output
P PNP Open-Collector Output
I Internal Sensor

**(3)**
D Digital
R Rotary Switches
1TP 1-Turn Potentiometer
25TP 25-Turn Potentiometer

**(4)**
E Enclosure
C Conduit/Bracket
D DIN Rail

**(5)**
CAL Cast Aluminum
P Plastic
PVC PVC

# Shaft Speed Sensors for Virtually any Environment

Electro-Sensors Hall effect and magnetoresistive shaft speed sensors sense magnetic targets and work with our magnetic pulsers (discs, wraps, magnet wheels). Our proximity and gear tooth sensors sense ferrous metal targets, including bolt-heads, screws, gear-teeth, and keyways. Our standard aluminum body sensors will work in most applications, but we also have explosion proof, intrinsically safe, and dust ignition-proof sensors for harsh environments.
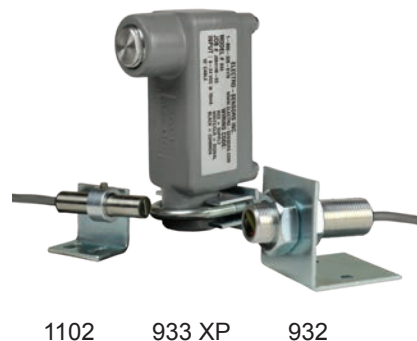
906          907 XP

## 906 / 907 XP Shaft Speed Sensors - Hall Effect

- Square-wave pulse frequency output, NPN open-collector
- Zero speed operation with no signal loss
- 5-24 VDC powered
- 1" NPT conduit port (907 XP)
- Non-contact, large gap distance sensing
- Bidirectional (quadrature) options available (906B, 907B XP)
- Works with Electro-Sensors magnetic pulser discs / wraps
- **906** – Optional EZ-3/4in mounting bracket and mounting magnet available
- **907 XP** – UL Listed Class I, Div I (D) Class II, Div I (E, F, G) Class III
- **907 XP** – Optional EZ-100 mounting bracket and mounting magnet available

1101          931 XP

## 1101 / 931 XP Shaft Speed Sensors - Hall Effect

- Square-wave pulse frequency output, NPN open-collector
- Zero speed operation with no signal loss
- 5-24 VDC powered
- 1/2" NPT conduit port (931 XP)
- Non-contact, large gap distance sensing
- Works with Electro-Sensors magnetic pulser discs / wraps
- **931 XP** – UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G) Class III

1102     933 XP     932

## 1102 / 932 / 933 XP Shaft Speed Sensors - Magnetoresistive

- Square-wave pulse frequency output, NPN open-collector
- Zero speed operation with no signal loss
- 5-24 VDC powered
- 1/2" NPT conduit port (933 XP)
- Non-contact, large gap distance sensing
- Works with Electro-Sensors magnetic pulser discs / wraps
- **1102** – non-threaded stainless steel
- **932** – aluminum with 3/4-16 UNF threads, optional EZ-3/4in mounting bracket and mounting magnet available
- **933 XP** – UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G) Class III

## SpeedTalker-DN(BH) / DN(XP) with DeviceNet

- Measures shaft rpm and alarm states over DeviceNet
- 0-6,550 rpm; up to 4 programmable over / under-speed alarms
- Network powered
- Works with Electro-Sensors magnetic pulser discs / wraps
- ODVA conformance tested
- **DN(BH)** – Rugged NEMA 4X, IP67, stainless steel M18x1 housing with M12 DeviceNet micro-connector
- **DN(BH)** – Optional EZ-18mm mounting bracket and mounting magnet available
- **DN(XP)** – Optional EZ-100 mounting bracket and mounting magnet available
- **DN(XP)** – Cast aluminum explosion proof (XP) housing
- **DN(XP)** – UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)

DN(XP)

DN(BH)

## 916 / 917 XP Analog Shaft Speed Sensors

- 2-wire, sine wave output, clipped at ±20 V level
- 1" NPT conduit port (917 XP)
- Non-contact, large gap distance sensing
- Works with Electro-Sensors magnetic pulser discs / wraps
- **916** – Optional EZ-3/4in mounting bracket and mounting magnet available
- **917 XP** – Optional EZ-100 mounting bracket and mounting magnet available

916        917 XP

## HE950 Gear Tooth Sensor

- Square-wave pulse frequency output, NPN open-collector
- Zero speed operation with no signal loss
- 5-24 VDC powered
- Gap sensing capability up to 3 mm
- Senses broad range of ferrous targets (pulser discs / wraps with steel slugs, keyways, bolt heads, and gear teeth)

## 600 Series Proximity Sensors

- Square-wave pulse frequency output, NPN open-collector
- Zero speed operation with no signal loss
- 10-30 VDC powered
- 8 mm, 12 mm, 18 mm, 30 mm diameter sensors available
- Durable corrosion-resistant metal housings
- LED operation indicator on all models
- Senses broad range of ferrous targets (pulser discs / wraps with steel slugs, keyways, and bolt heads)
- Not recommended for high shaft speeds (Note: for output frequencies above 100 Hz, contact Electro-Sensors.)

## 18mm (M18x1) Stainless Steel Shaft Speed Sensors (Intrinsically Safe (I.S.))

4-20 mA Analog and Pulse Frequency Output both work with magnetic pulsers (disc or wrap) and optional EZ-18mm mounting bracket / magnet.
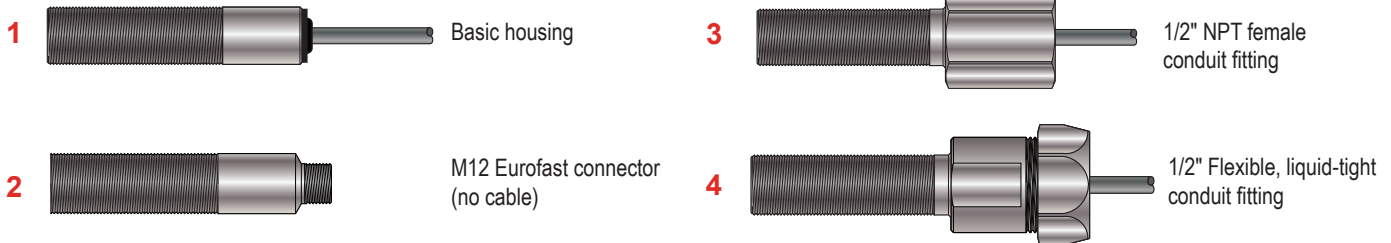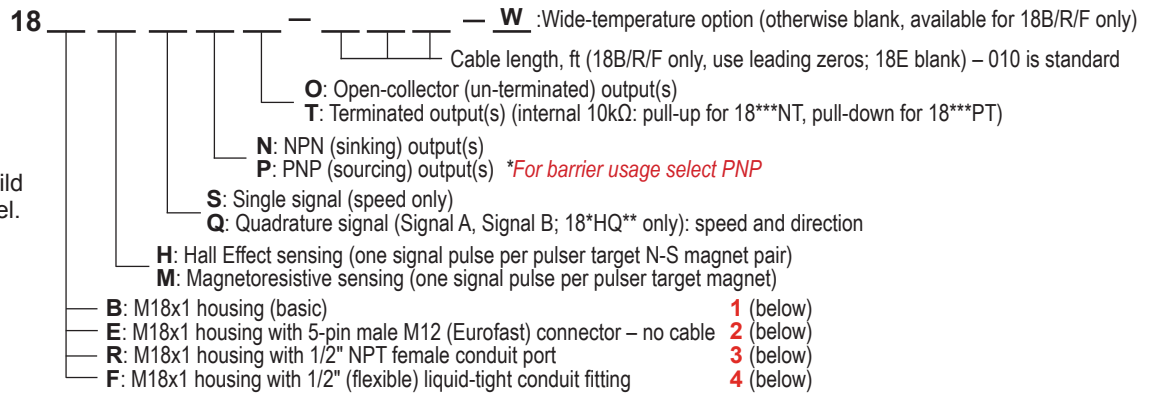
### ST420 / ST420-LT / ST420-DI Shaft Speed Sensors (2-wire 4-20 mA, loop-powered, 8-30 VDC)

- No user calibration – works right out of the box
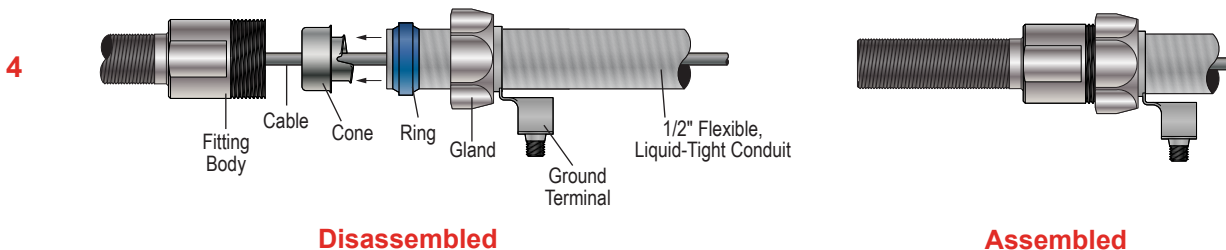- Available in standard and custom-specified measurement ranges

### Series 18 Shaft Speed Sensors (Pulse frequency output down to zero speed, 10-26 VDC)

**18** \_\_ \_\_ \_\_ \_\_ — \_\_ \_\_ \_\_ — **W** : Wide-temperature option (otherwise blank, available for 18B/R/F only)

Cable length, ft (18B/R/F only, use leading zeros; 18E blank) – 010 is standard

**O**: Open-collector (un-terminated) output(s)
**T**: Terminated output(s) (internal 10kΩ: pull-up for 18***NT, pull-down for 18***PT)

**N**: NPN (sinking) output(s)
**P**: PNP (sourcing) output(s)  *For barrier usage select PNP*

**S**: Single signal (speed only)
**Q**: Quadrature signal (Signal A, Signal B; 18*HQ** only): speed and direction

**H**: Hall Effect sensing (one signal pulse per pulser target N-S magnet pair)
**M**: Magnetoresistive sensing (one signal pulse per pulser target magnet)

**B**: M18x1 housing (basic) **1** (below)
**E**: M18x1 housing with 5-pin male M12 (Eurofast) connector – no cable **2** (below)
**R**: M18x1 housing with 1/2" NPT female conduit port **3** (below)
**F**: M18x1 housing with 1/2" (flexible) liquid-tight conduit fitting **4** (below)

**Series 18 Model Configurator** ➤

Fill in the blanks to build a custom sensor model.

**1**  Basic housing

**3**  1/2" NPT female conduit fitting

**2**  M12 Eurofast connector (no cable)

**4**  1/2" Flexible, liquid-tight conduit fitting

| Models | Housing | Hazardous Location Approvals | IP/NEMA Rating | Operating Temperature |
|---|---|---|---|---|
| **ST420** | 1 | I.S. Class I and II (UL) | | -20→80°C (-4→176°F) |
| **ST420-DI** | 3 | Dust Ignition-Proof, Class II (FM) | IP65/4X | -20→80°C (-4→176°F) |
| **ST420-LT** | 4 | Dust Ignition-Proof, Class II (FM) | IP65/4X | -20→80°C (-4→176°F) |
| **18B\_\_\_\_-\_\_\_\_-** | 1 | I.S. Class I and II (FM) | | -20→80°C (-4→176°F) std, -40→100°C (-4→212°F) -W |
| **18E\_\_\_\_-\_\_\_\_-** | 2 | I.S. Class I and II (FM) | | -30→80°C (-22→176°F) |
| **18R\_\_\_\_-\_\_\_\_-** | 3 | I.S. Class I and II (FM) | IP65/4X | -20→80°C (-4→176°F) std, -40→100°C (-4→212°F) -W |
| **18F\_\_\_\_-\_\_\_\_-** | 4 | I.S. Class I and II (FM) | IP65/4X | -20→80°C (-4→176°F) std, -40→100°C (-4→212°F) -W |

**4** 

Fitting Body — Cable — Cone — Ring — Gland — Ground Terminal — 1/2" Flexible, Liquid-Tight Conduit

**Disassembled**



**Assembled**

| Sensor | Shaft Target | Sensing | Speed Signal Output | | Housing | | | NRTL Haz-Loc Approvals |
|---|---|---|---|---|---|---|---|---|
| | | | Speed Signal | Output/ Interface | Type | Conduit Port | Material | |
| ST420 | Magnetic Pulser | n/a | Analog | 2-wire 4-20 mA | M18 x 1 mm | No | SS | IS, Class I, II (UL) |
| ST420-LT, -DI | Magnetic Pulser | n/a | Analog | 2-wire 4-20 mA | M18 x 1 mm | Yes | SS | DIP, Class II (FM) |
| FB420 | Magnetic Pulser | n/a | Analog | 3-wire 4-20 mA | XP | Yes | AL | Class I, II (UL) |
| SpeedTalker(XP) | Magnetic Pulser | n/a | 16-bit digital (network) | DeviceNet | XP | Yes | AL | Class I, II (UL) |
| SpeedTalker(BH) | Magnetic Pulser | n/a | 16-bit digital (network) | DeviceNet | M18 x 1 mm | No | SS | |
| Series 18 | Magnetic Pulser | Hall Effect or Magnetoresistive | Frequency - Single or Quadrature | PNP or NPN | M18 x 1 mm | Yes or No | SS | IS, Class I, II (FM) |
| 906, 906 SS | Magnetic Pulser | Hall Effect | Frequency - Single | NPN | 3/4-16 (2.50 L) | No | AL or SS | |
| 906B, 906B SS | Magnetic Pulser | Hall Effect | Frequency - Quadrature | NPN | 3/4-16 (2.50 L) | No | AL or SS | |
| 907 XP | Magnetic Pulser | Hall Effect | Frequency - Single | NPN | XP | Yes | AL | Class I, II (UL) |
| 907B XP | Magnetic Pulser | Hall Effect | Frequency - Quadrature | NPN | XP | Yes | AL | Class I, II (UL) |
| 916 | Magnetic Pulser | Passive Coil | Frequency - Single | 20 V lim coil | 3/4-16 (2.50 L) | No | AL | |
| 917 XP | Magnetic Pulser | Passive Coil | Frequency - Single | 20 V lim coil | XP | Yes | AL | |
| 931 XP | Magnetic Pulser | Hall Effect | Frequency - Single | NPN | XP | Yes | AL | Class I, II (UL) |
| 932, 932 SS | Magnetic Pulser | Magnetoresistive | Frequency - Single | NPN | 3/4-16 (2.50 L) | No | AL or SS | |
| 933 XP | Magnetic Pulser | Magnetoresistive | Frequency - Single | NPN | XP | Yes | AL | Class I, II (UL) |
| HE950 | Gear Tooth | n/a | Frequency - Single | NPN | 3/4-16 (2.50 L) | No | AL | |
| HE950-18 | Gear Tooth | n/a | Frequency - Single | NPN | M18 x 1 mm | No | SS | |
| 1101 | Magnetic Pulser | Hall Effect | Frequency - Single | NPN | 0.437 smooth (2.00 L) | No | SS | |
| 1101-RK (ring kit) | Magnetic Pulser | Hall Effect | Frequency - Single | NPN | 0.437 smooth (3.75 L) | No | SS | |
| 1102 | Magnetic Pulser | Magnetoresistive | Frequency - Single | NPN | 0.437 smooth (2.00 L) | No | SS | |
| 1102-RK (ring kit) | Magnetic Pulser | Magnetoresistive | Frequency - Single | NPN | 0.437 smooth (3.75 L) | No | SS | |
| 1201 | Magnetic Pulser | Hall Effect | Frequency - Quadrature | NPN | 0.437 smooth (3.75 L) | No | SS | |
| 1202 | Magnetic Pulser | Hall Effect | Frequency - Quadrature | NPN | 0.437 smooth (5.50 L) | No | SS | |
| 608, 608-1 prox | Ferrous Pulser | Prox (-1 shielded) | Frequency - Single | NPN | M8 x 1 mm (30 L) | No | Ni, Plastic | |
| 612, 612-1 prox | Ferrous Pulser | Prox (-1 shielded) | Frequency - Single | NPN | M12 x 1 mm (35 L) | No | Ni, Plastic | |
| 618, 618-1 prox | Ferrous Pulser | Prox (-1 shielded) | Frequency - Single | NPN | M18 x 1 mm (40 L) | No | Ni, Plastic | |
| 630, 630-1 prox | Ferrous Pulser | Prox (-1 shielded) | Frequency - Single | NPN | M30 x 1.5 mm (50 L) | No | Ni, Plastic | |
| 380 Encoder | n/a | n/a | Frequency - Single or Quadrature | NPN | 0.375 shaft | No | AL | |
| 470 Encoder | n/a | n/a | Frequency - Quadrature with Z | NPN | 0.375 shaft (HD) | No | AL | |
| DRK-56C, -143TC | 199SM Magwheel | 1101/2 or 1101/2-RK | Frequency - Single | NPN | NEMA 56C,143TC | Yes | AL | |
| QDK-56C, -143TC | 199SM Magwheel | 1201 | Frequency - Quadrature | NPN | NEMA 56C,143TC | Yes | AL | |
| DRK- _ _ _TC | 199SM Magwheel | 1101/2-RK | Frequency - Single | NPN | NEMA 182,213,254TC | Yes | AL | |
| QDRK- _ _ _TC | 199SM Magwheel | 1202 | Frequency - Quadrature | NPN | NEMA 182,213,254TC | Yes | AL | |

# Speed Sensor Targets
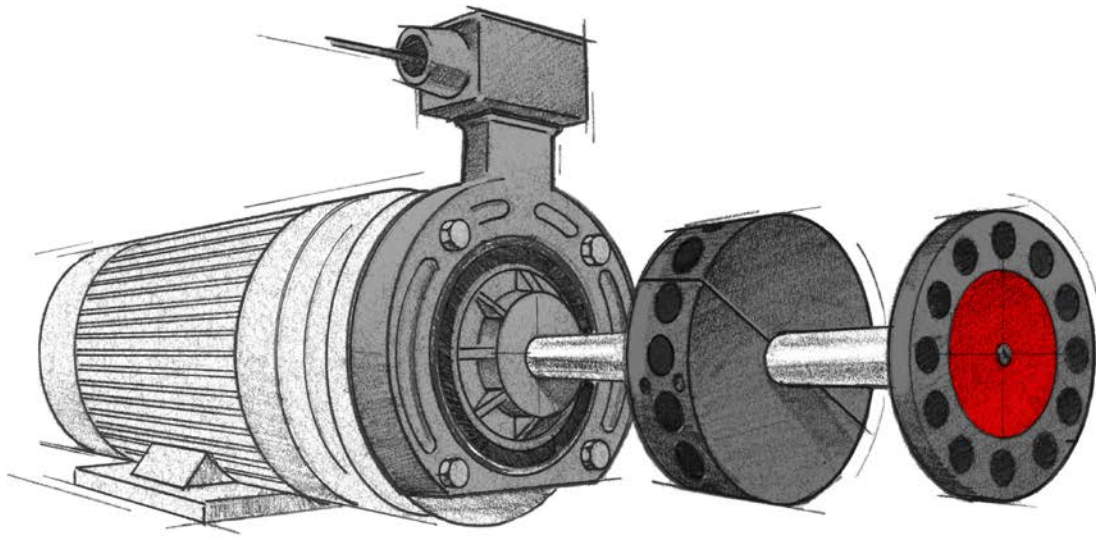


Electro-Sensors shaft speed pulse generators provide the targets needed for shaft speed detection with a sensor or switch. There are many options available for all application needs including customizable split collar pulser wraps.

| EZ-100 + M100T | EZ-SCP + SCP1000 | EZ-18mm + ST420-DI | MM-1.25 + EZ-3/4in + 906 | MM-2.00 + EZ-100 + FB420 | EZ-100 Disc Guards + M100T |

## EZ-100 and EZ-SCP Mounting Brackets*

- EZ-100 and EZ-SCP mounting brackets simplify installation by direct attachment to a tapped shaft end
- EZ-255 pulser disc included with purchase (bore 0.515")
- No additional mounting hardware is required
- EZ-100 for use with the M100, M100T, FB420, 907 XP, 917 XP and SpeedTalker-DN(XP)
- EZ-SCP for use with SCP1000/SCP2000
- Rated for use up to 300 rpm

*\* Patented*

## EZ-3/4in and EZ-18mm Mounting Brackets

- Mount directly to the tapped shaft
- Can use with optional mounting magnet if shaft is not tapped
- Pulser disc is included within housing
- EZ-3/4in is for use with the 906 and 932 sensors**
- EZ-18mm is for use with the Series 18, ST420, ST420-DI, ST420-LT, and SpeedTalker-DN(BH) sensors**

*\*\* Sensors sold separately*

## EZ Mounting Magnets

- MUST be used with EZ mounting brackets
- MM-1.25 mounting magnet: use with EZ-3/4in and EZ-18mm
  Compatible with 906, 932, Series 18, ST420, ST420-DI, ST420-LT, and SpeedTalker-DN(BH)
- MM-2.00 mounting magnet: use with EZ-100 and EZ-SCP
  Compatible with M100, M100T, FB420, 907 XP, 917 XP SCP1000/SCP2000, and SpeedTalker-DN(XP)
- Easy installation, no drilling or tapping required

MM-1.25    MM-2.00

## Stainless Steel Disc Guards

- Protect pulser disc and sensing head
- Models include: standard, 931 XP/933 XP, EZ-100 (upper and lower), EZ-SCP disc guards, and Extended disc guards for added protection
- Protect against excessive dirt, grease, dust, or grime

## Shaft-End Mount Pulser Discs

Mounting a pulser disc to the end of a rotating shaft provides a sensing targer for speed sensors. Mounting requires center drilling and tapping the shaft for a 10-32 UNF machine screw (provided).

- Available with alternating magnetic poles or steel slugs
- Non-contact sensing across up to 0.5" gap
- Sensor must be positioned perpendicular to the disc
- Material options include nylon, PVC, aluminum, or stainless steel
- Custom sizes and number of pulses available
- Impervious to water, grease, dust, oil, dirt, etc.
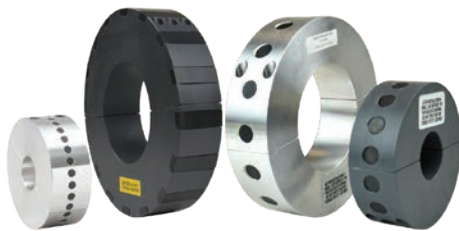
## Split Collar Pulser Wraps

Wraps can be clamped around a rotating shaft, where discs are un usable. Wraps provide an alternate target for speed sensors. The two halves fasten together around the shaft with recessed Allen head socket screws (provided). Custom models accommodate any shaft diameter, tight spaces, and keyways.

- Embedded magnets for standard sensors, or steel slugs for proximity sensors
- Up to .5" gap between sensor & target
- Sensor must be positioned radially to the wrap
- Standard wraps operate to 3,000 rpm (high-speed also available)
- Standard wraps available in PVC, aluminum, or stainless steel
- Impervious to water, grease, dust, oil, dirt, etc.

## Digital Ring Kits for NEMA C Frame Motors

- 60 pulses per revolution, high-speed
- Kits include mounting ring, hardware, sensor, and 199SM magnet wheel (pictured)
- Single-channel and bidirectional (quadrature) output options

## 380 and 470 Rotary Shaft Encoders

The 380 encoder is a standard encoder available with single channel or bidirectional (quadrature) output. The 470 heavy duty encoder provides a bidirectional (quadrature) output with an index pulse.

## Traction Wheel Encoder Assemblies

Complete and ready-to-install system, converts linear travel/speeds to square-wave pulses/frequencies.

# Temperature & Alignment Sensors
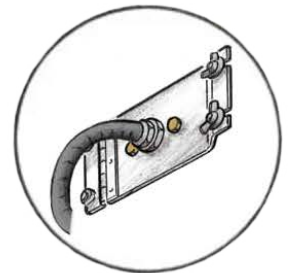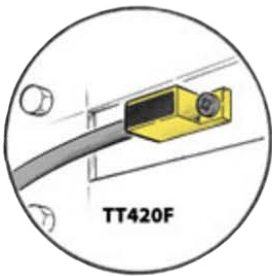


Bearing temperature measurement with the patented TT420 family of temperature sensors offers superior performance, ease of installation, and industry standard 4-20 mA outputs. All temperature sensors are factory calibrated and are available with various probe lengths, conduit adapters, and grease fittings. The integrated grease fitting allows the user to grease bearings without disturbing the temperature sensor installation.

Alignment monitoring is acheived by mounting a temperature sensor to a brass rub block. These rub blocks are mounted adjacent to a conveyor belt. If the belt starts to wander to either side it will start to rub against the block increasing its temperature. The temperature sensor mounted to the rub block then monitors any rising temperatures.

## TT420 Temperature Sensors with 4-20 mA Output
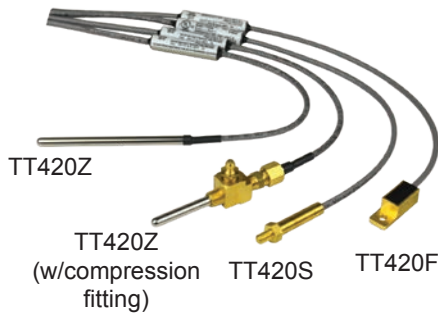


TT420Z

TT420Z
(w/compression
fitting)   TT420S   TT420F

- 2-wire, loop-powered 4-20 mA analog output
- Attachment probe, sensor, and 2-wire 4-20 mA signal conditioner
- Compatible with PLCs, meters, and data acquisition systems
- No user calibration: works right out of the box
- **TT420Z** 1/4" stainless steel probe (often used with compression fitting)
- **TT420S** 1/4-28 threaded stud – screws into any 1/4-28 tap
- **TT420F** mounts onto any flat surface with a #10 machine screw
- UL Listed, Intrinsically Safe (IS)
- Class I, Div I (C, D) Class II, Div I (E, F, G)

## TT420-LT Temperature Sensors with 4-20 mA Output and Liquid-Tight Conduit Fittings



TT420S-LT

TT420Z-LT   TT420S-LT
Right-Angle
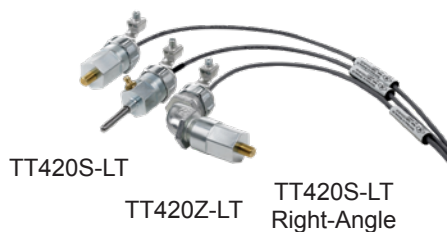
\* Patented design



◄ Optional Magnetic Mount (accepts 3/8-16 UNC threads)



◄ Optional Lug Mount Adapter (for S Models)

- 2-wire, loop-powered 4-20 mA analog output
- Attachment probe, sensor, and 2-wire 4-20 mA signal conditioner
- Compatible with PLCs, meters, data acquisition, and hazard monitoring systems
- No user calibration: works right out of the box
- Integral 1/2" flexible, liquid-tight conduit fittings
- **TT420Z-LT\*** 1/4" stainless steel probe with 1/8" NPT adapter (e.g. grease fitting for bearing temperature)
- **TT420S-LT\*** 3/8-16 threaded stud probe (e.g. belt alignment rub block temperature)
- FM approved, dust ignition-proof
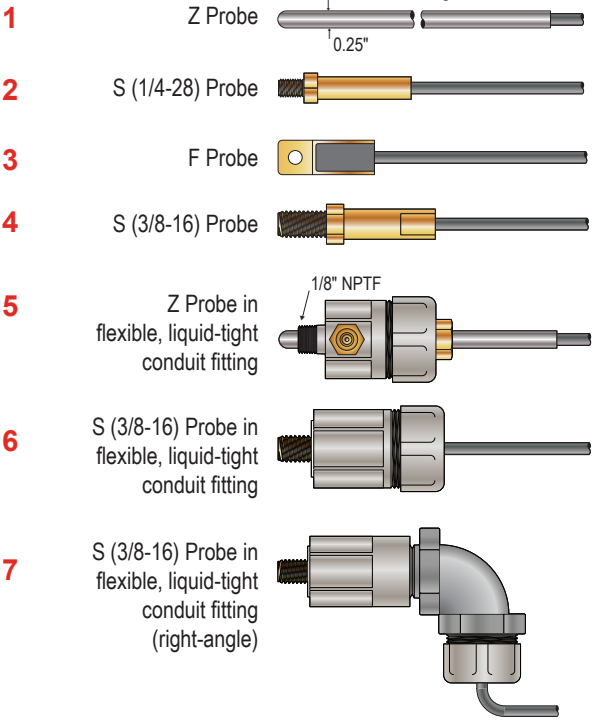- Class II and III, Div I (E, F, G); NEMA 4

## RTD Temperature Sensors with RTD Output, with and without Liquid-Tight Conduit Fittings



RTDZ   RTDS   RTDZ-LT   RTDS-LT
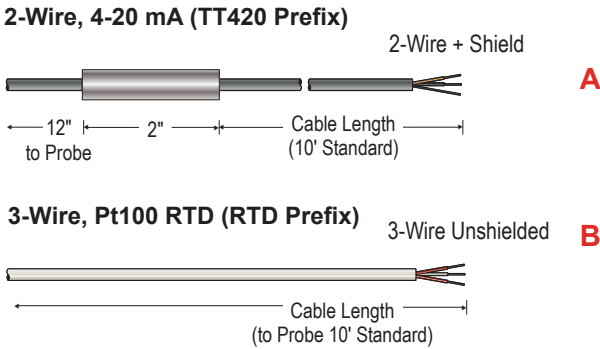(straight &
right-angle)
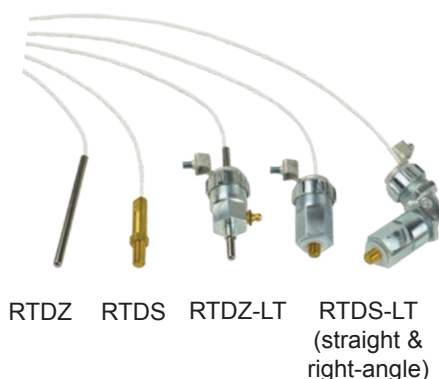
- 3-wire Platinum Pt100 RTD output
- Attachment probe, sensor, and cable
- Compatible with PLCs, meters, data acquisition, and hazard monitoring systems with 3-wire Pt100 RTD inputs
- Integral 1/2" flexible, liquid-tight conduit fittings (RTDZ/S-LT models)
- **RTDZ** – 1/4" stainless steel probe
- **RTDS** – 3/8-16 threaded stud probe
- **RTDZ-LT** – RTDZ with a 1/8 NPT adapter and 1/2" flexible, liquid-tight conduit fitting (e.g. grease fitting for bearing temperature)
- **RTDS-LT** – RTDS with a 1/2" flexible, liquid-tight conduit fitting (e.g. belt alignment rub block temperature)
- Intrinsically Safe (I.S.) Class I, Div I (A, B, C, D), Class II, Div I (E, F, G) I.S. Simple Apparatus
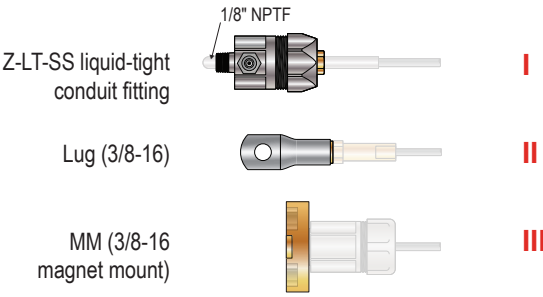
## Probe, Fitting

**1** Z Probe — Probe Length, 0.25"

**2** S (1/4-28) Probe

**3** F Probe

**4** S (3/8-16) Probe

**5** Z Probe in flexible, liquid-tight conduit fitting — 1/8" NPTF

**6** S (3/8-16) Probe in flexible, liquid-tight conduit fitting

**7** S (3/8-16) Probe in flexible, liquid-tight conduit fitting (right-angle)

## Interface / Signal

**2-Wire, 4-20 mA (TT420 Prefix)**

2-Wire + Shield  **A**

12" to Probe — 2" — Cable Length (10' Standard)

**3-Wire, Pt100 RTD (RTD Prefix)**

3-Wire Unshielded  **B**

Cable Length (to Probe 10' Standard)

## Accessories

Z-LT-SS liquid-tight conduit fitting — 1/8" NPTF  **I**

Lug (3/8-16)  **II**

MM (3/8-16 magnet mount)  **III**

| Model | Probe, Fitting | Interface / Signal | Measurement Range | HazLoc Protection & Approvals (NRTL) | Compatible Accessories |
|---|---|---|---|---|---|
| TT420Z | 1 | A | -40→120°C (-40→248°F) | I.S. Class I and II (UL) | I |
| TT420S (1/4-28) | 2 | A | -40→120°C (-40→248°F) | I.S. Class I and II (UL) | |
| TT420F | 3 | A | -40→120°C (-40→248°F) | I.S. Class I and II (UL) | |
| TT420S (3/8-16) | 4 | A | -40→120°C (-40→248°F) | | II, III |
| TT420Z-WT (wide temperature) | 1 | A | -50→150°C (-58→302°F) | | I |
| TT420Z-LT (1/2 in, c, d) | 5 | A | -40→120°C (-40→248°F) | DIP Class II (FM) | |
| TT420S-LT (1/2 in, c, straight) | 6 | A | -40→120°C (-40→248°F) | DIP Class II (FM) | II, III, Rub Block / Door |
| TT420S-LT (1/2 in, c, right-angle) | 7 | A | -40→120°C (-40→248°F) | DIP Class II (FM) | II, III, Rub Block / Door |
| RTDZ (c, d) | 1 | B | -50→200°C (-58→392°F) | I.S. Class I and II (*) | I |
| RTDS (c) | 4 | B | -50→200°C (-58→392°F) | I.S. Class I and II (*) | II, III |
| RTDZ-LT (1/2 in, c, d) | 5 | B | -50→150°C (-58→302°F) | I.S. Class I and II (*) | |
| RTDS-LT (1/2 in, c, straight) | 6 | B | -50→150°C (-58→302°F) | I.S. Class I and II (*) | II, III, Rub Block / Door |
| RTDS-LT (1/2 in, c, right-angle) | 7 | B | -50→150°C (-58→302°F) | I.S. Class I and II (*) | II, III, Rub Block / Door |

\* I.S. simple apparatus (NRTL approval not required)

c is cable length (ft), d is Z probe length (in)

Z probes (1, 5) are stainless steel; S probes (2, 4, 6, 7), F probe (3) and MM (3/8-16) magnet mount (III) are brass
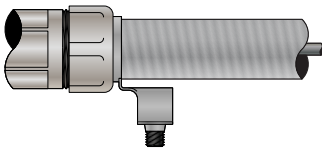
Flexible, liquid-tight conduit fittings (5, 6, 7) are nickel plated steel, Z-LT-SS liquid-tight conduit fitting (I) is stainless steel

Flexible, liquid-tight conduit fittings (5, 6, 7, I) include all hardware for fastening 1/2" flexible, liquid-tight conduit:

**5, 6, 7, I**

Fitting Body — Cable — Cone — Ring — Gland — Ground Terminal — 1/2" Flexible Liquid-tight Conduit
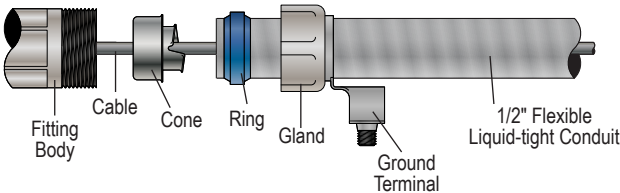
**Disassembled**

**Assembled**

Shown with TT420S-LT
(right-angle)



Shown with TT420S-LT
(right-angle)



Shown with TT420S-LT
(right-angle)

## Rub Block Door Assemblies (3 Models)

- Provides early warning of conveyor or elevator belt misalignment
- Hinged door allows easy installation and access
- Straightforward installation, new or retrofit
- Facilitates regular, proactive maintenance inspections
- 3 unique door assemblies (hinged, adjustable, and Uni-Strut)
- Protects plant machinery, prevents unscheduled downtime, and aids in the safety of employees

### ❶ Standard Hinged Rub Block Door Assembly

Designed for installation on most elevators and conveyors and allows for quick and easy inspection of belts and replacement of worn rub blocks saving time and promoting regular maintenance inspections. Standard rub block door assemblies can be installed on new equipment or as a retrofit upgrade.

### ❷ Adjustable Rub Block Door Assembly*

Designed for installation in difficult to monitor locations such as enclosed conveyors or equipment with frames that interfere with optimum sensor mounting. This assembly has a hinged door with slots for attaching the rub block and sensor. After installation the rub block can be slid approximately one inch into its sensing position so that belt misalignment can be quickly detected at casing joints or inside corners.

### ❸ Uni-Strut Rub Block Door Assembly

Designed for installation on non-enclosed conveyors, the brass rub block is mounted on the side of the door facing the belt and the Uni-Strut can be directly connected to the other side. This assembly allows easy vertical and horizontal adjustment of the rub block for proper belt misalignment monitoring. No need to fabricate expensive and time consuming custom mounting brackets.

## BA100 Belt Alignment Switch for Exposed Belts

- BA100-1 and BA100-1X each have one SPDT limit switch
- BA100-2 and BA100-2X each have two SPDT limit switches
- Roller arm can move up to 90 degrees in either direction and is spring loaded for automatic reset (optional manual reset available)
- Cast aluminum housing standard (BA100-1 and BA100-2)
- Explosion proof cast iron housing optional (BA100-1X and BA100-2X)

# Slide Gate, Valve, and Positioning Sensors
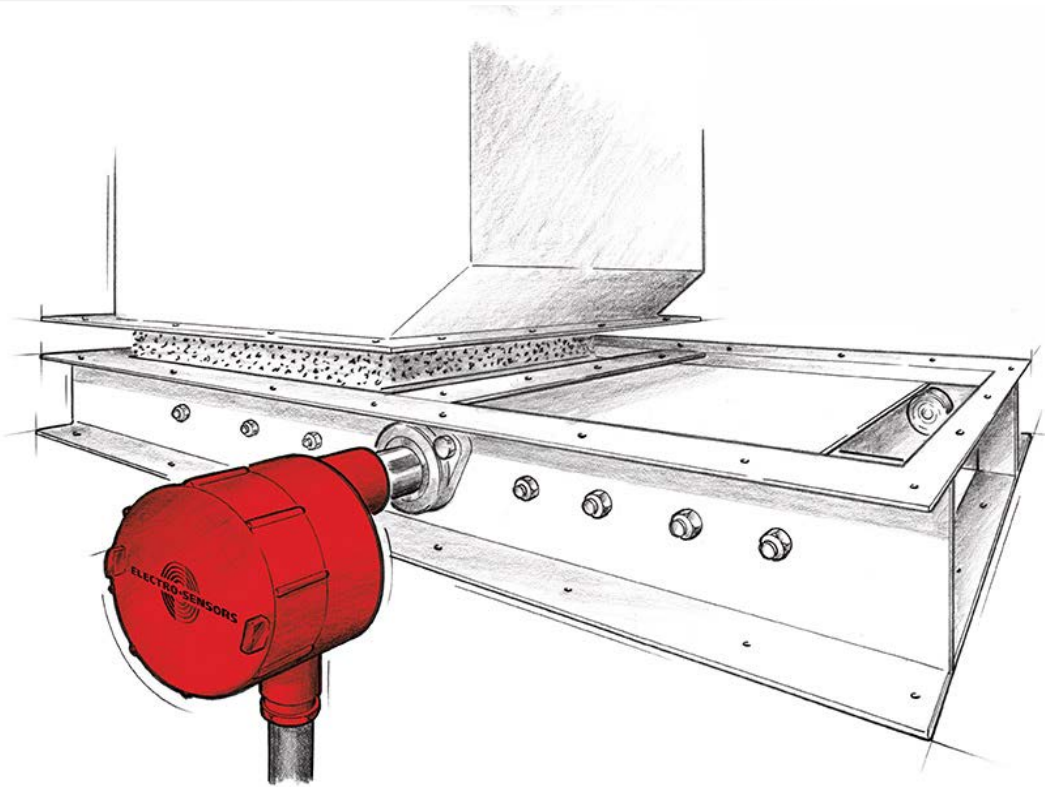
All position feedback monitors in the SG1000 series provide independent and accurate feedback of slide gate or valve position to an external device such as a PLC or optional PM500 Process Meter Display Unit. The SG1000 relay series provides equipment with 2 control relays rather than a 4-20 mA signal.  Models are housed in a rugged, explosion proof cast aluminum enclosure that is dirt, dust, and grease proof, and is water resistant.  In the case of a power failure, all SG1000s are designed to retain accurate positioning.

## SG1000 Series Position Sensors

There is a "relay only" version available for each sensor

- Models provide a wide range of shaft angle and linear position measurement capabilities
- 4-20 mA position or relay output
- User-configurable measurement range
- 24 VDC powered
- Cast aluminum explosion proof (XP) housing
- UL Listed Class I, Div I (C, D) Class II, Div I (E, F, G)
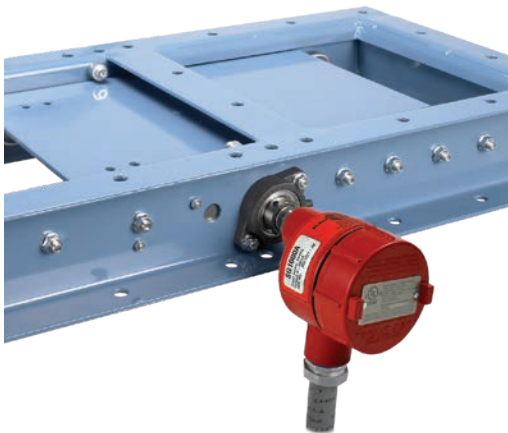
## SG1000A
### Slide Gate Sensor

- Measures multi-turn shaft angle (rotational) position
- Configurable measurement range (0-1/4 turn to 0-6 turns)
- Direct shaft attachment (3/8-16 UNC)
- Applications include electrically / manually-driven rack-and-pinion gates and valves
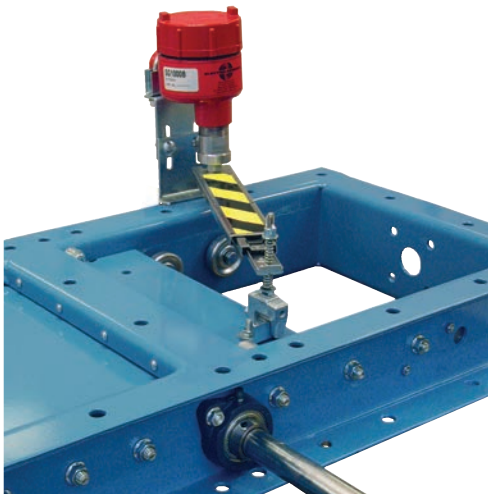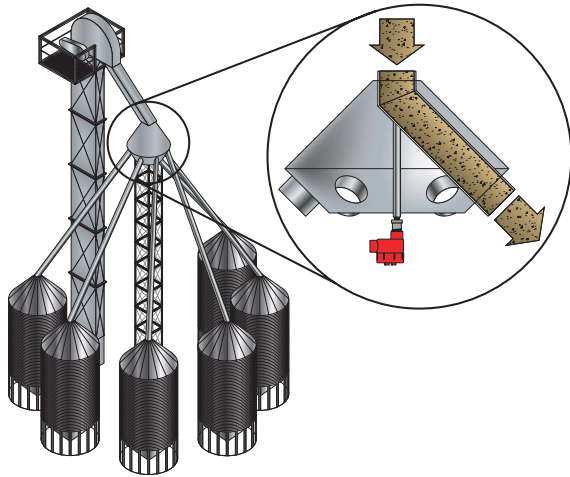
## SG1000B*
### Linear Position Sensor

- Measures linear position
- Configurable measurement range
- Telescopic arm attachment (available in various lengths)
- Mounting position tolerant: mathematically compensates for non-linear position / angle relationship
- Applications include pneumatic / hydraulic-driven gates and rack-and-pinion gates with inaccessible pinion shafts

* Patented (SG1000B and telescopic arm)

Shown on distributor head
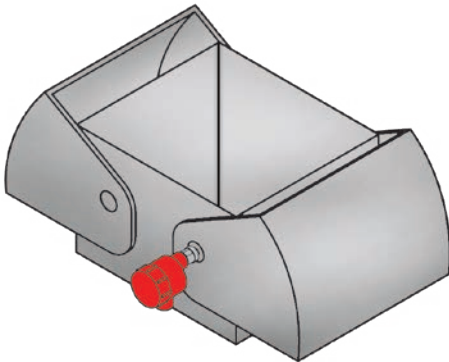
### SG1000C

#### Single-Turn Shaft Position Sensor

- Measures shaft angle (rotational) position
- Single-turn (0°- 359°) measurement range
- Direct shaft attachment (3/8-16 UNC)
- Applications include grain distributors



### SG1000D

#### Valve Position Sensor

- Measures shaft angle (rotational) position
- Configurable sub-turn measurement range
  (0°- 15° to 0°- 359° Note: for applications of 130° measurement or less, SG1000E is recommended for higher resolution)
- Direct shaft attachment (3/8-16 UNC)
- Applications include damper valves



### SG1000E

#### Sub-Turn Shaft Position Sensor

- Measures shaft angle (rotational) position
- Configurable sub-turn measurement range
  (0°- 5.6° to 0°- 130°)
- Direct shaft attachment (3/8-16 UNC)
- Applications include valve shafts and
  clam shell buckets

Shown on clam shell bucket

## Positioning Monitor Selector Guide

| Model | Common Applications | Encoder Range | Power Supply | Signal Output |
|---|---|---|---|---|
| SG1000A | Slide Gates, Valve Position | 0-6 Turns | 24 Vdc ± 10% | 4-20 mA |
| SG1000B | Linear & Rack-and-Pinion Slide Gates | 5.6°-130° Arm Swing | 24 Vdc ± 10% | 4-20 mA |
| SG1000C | Bin Distributor Head | Single Turn 0°-359° | 24 Vdc ± 10% | 4-20 mA |
| SG1000D | Valve Positioning | Single Turn 0°-359° | 24 Vdc ± 10% | 4-20 mA |
| SG1000E | Clam Shell Buckets | 5.6°-130° Arm Swing | 24 Vdc ± 10% | 4-20 mA |
| SG1000F | Slide Gates, Valve Position | 0-2 Turns | 24 Vdc ± 10% | 4-20 mA |
| SG1000RA | Slide Gates, Valve Position | 0-6 Turns | 115 - 230VAC ±10% 50/60Hz | Relay output |
| SG1000RB | Linear & Rack-and-Pinion Slide Gates | 5.6°-130° Arm Swing | 115 - 230VAC ±10% 50/60Hz | Relay output |
| SG1000RC | Bin Distributor Head | Single Turn 0°-359° | 115 - 230VAC ±10% 50/60Hz | Relay output |
| SG1000RD | Valve Positioning | Single Turn 0°-359° | 115 - 230VAC ±10% 50/60Hz | Relay output |
| SG1000RE | Clam Shell Buckets | 5.6°-130° Arm Swing | 115 - 230VAC ±10% 50/60Hz | Relay output |
| SG1000RF | Slide Gates, Valve Position | 0-2 Turns | 115 - 230VAC ±10% 50/60Hz | Relay output |

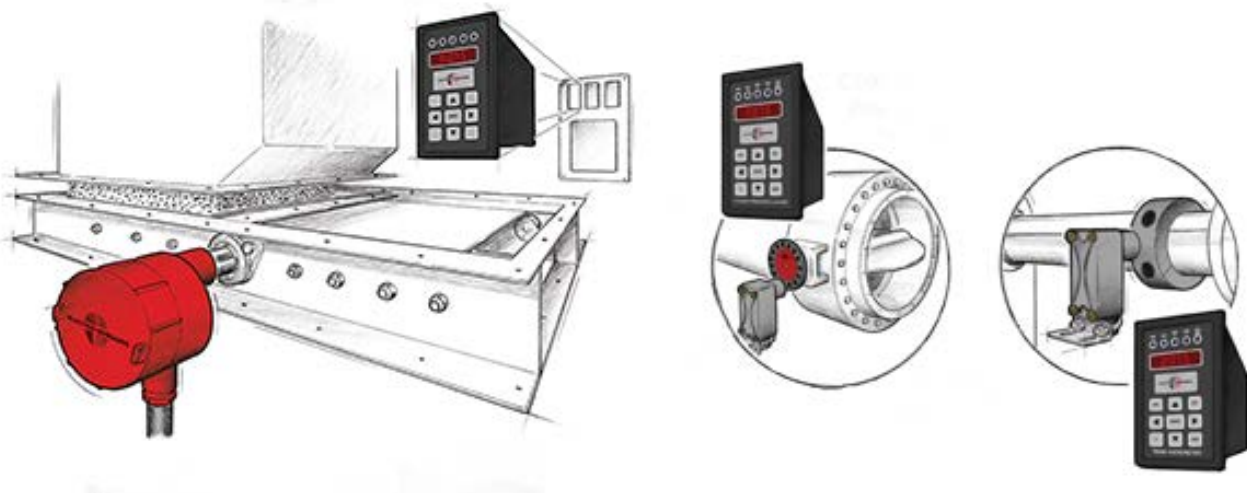## Complementary Products

### PM500

Process Meter

• Quickly and easily display the position of your slidegates, valves, or other machinery.



**(View Page #: 34)**

# Tachometers, Counters Meters, & Displays

Electro-Sensors offers a variety of tachometers, counters, meters, and displays. These inter-facing products allow you to incorporate visual displays of sensor data. User selected outputs can be used to display your prefered output measurement. The full diagnostic features offered will help make your facility run smoother. From ratemeters to tachometers Electro-Sensors has the interfacing option for your facility.

## TR400 Ratemeter

**Full-logic control process ratemeter displays
speed and direction of rotating equipment**

- Displays rate or time-in-process
- Detects and converts 0.01 to 4,000 Hz signal input
- Optional relay outputs: 2 or 6
- Optional analog output: 4-20 mA or 0-10 VDC
- Completely field programmable
- Full diagnostic functions
- Single-channel or bidirectional (quadrature) decoding
- Front panel reverse direction indication
- 3 programmable inputs
- Built-in relay test function
- Optional explosion proof enclosure
- Optional NEMA 4X enclosure kit
- 115, 230 VAC (50-60 Hz) and 10-30 VDC power options

◄ Optional Explosion
Proof Enclosure

## TR5000 Ratemeter

**Full-logic control process ratemeter monitors
up to two shafts and displays their relationship**

- Displays rate, time-in-process, ratio, sum, difference, or draw
- Optional relay outputs and/or 4-20 mA analog output
- Completely field programmable
- Full diagnostic functions
- Setpoint and start delay functions
- 3 programmable inputs
- 3 programmable transistor setpoint outputs
- Keypad lockout
- Optional explosion proof enclosure
- Optional NEMA 4X enclosure kit
- 115, 230 VAC (50-60 Hz) and 10-30 VDC power options

## CT6000 Process Counter

**Full-logic control process counter**

- Displays process, batch, total, and rate
- Optional relay outputs and/or 4-20 mA analog output
- Completely field programmable
- Full diagnostic functions
- 3 programmable transistor setpoint outputs and inputs
- Bidirectional (quadrature) counting
- Optional explosion proof enclosure
- Optional NEMA 4X enclosure kit
- 115, 230 VAC (50-60 Hz) and 10-30 VDC power options

◄ Optional NEMA 4X
Enclosure Kit

## PM500 Process Meter

**Fully Programmable Process Meter**

• 4-digit display, switchable between two inputs
• Completely field programmable
• Modbus RTU communications (RS-485)
• Optional 2 or 4 relay outputs
• Optional analog output card with (2) 4-20 mA outputs
• Sensor failure detection and notification
• Built-in relay test function
• Optional explosion proof enclosure
• Optional NEMA 4X enclosure kit
• 115 VAC (50/60 Hz), with 230 VAC (50/60 Hz) power option

## AP1000 Digital Tachometer

• Displays rate from 0-9,999 or time-in-process
• Field programmable, panel-mount meter
• Easy-to-read, high efficiency LED display
• Optional explosion proof enclosure
• Optional NEMA 4, NEMA 4X, or NEMA 12 enclosure kit
• 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options

◄ Optional NEMA 4X
Enclosure Kit

## HH-100 Hand-Held Tachometer

• Measures speed as low as 1 rpm and as high as 99,999 rpm
• Accuracy ± 0.02% of reading with a resolution of 0.01 rpm
• Easily converts from non-contact to contact operation with a rugged slide-in adapter
• Non-contact sensing from up to 14" with a beam of light
• Measures user-selected units for rate and length
• Built-in memory stores maximum, minimum, and last reading for recall to the display
• 2-year warranty, NIST certification included

## Accu-Tach and Accu-Dial Potentiometers*

**Programmable potentiometers with LCD display and feedback display in user units for motor speed control**

• Replace traditional potentiometers
• Precise process control and feedback
• Reduce costly downtime and product waste
• Easy to install and calibrate
• Tough ABS plastic enclosure - NEMA 4 rated
• Small footprint - only 1.95" x 3.10"

* Patented (both models)

# Signal Conditioners
# &
# Interface
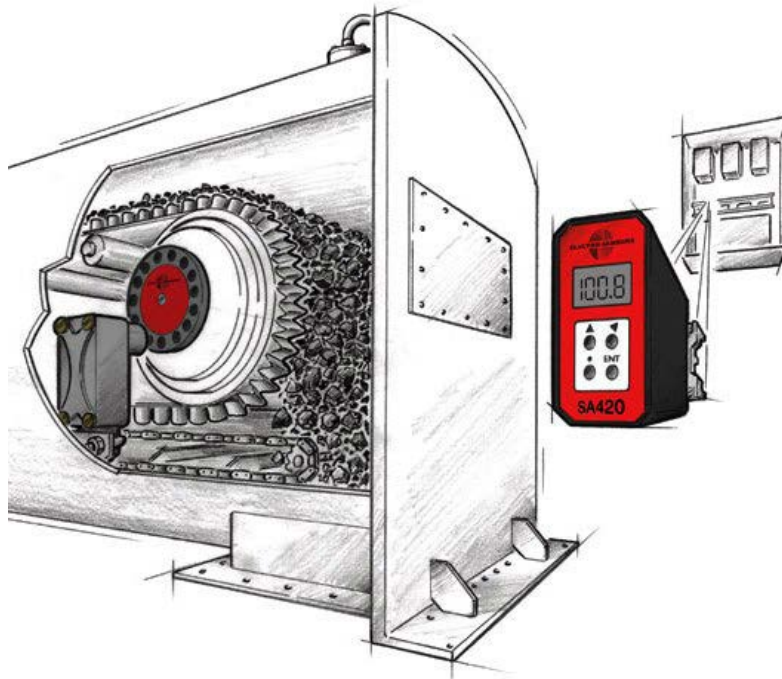


Electro-Sensors signal conditioners provide an analog signal directly proportionate to the speed of a rotating shaft.  The wide voltage range and wave shape flexibility of the signal conditioners' sensor input circuitry enables it to translate input signals from hall effect sensors, proximity switches, magnetic sensors, and a wide variety of other pulse generator devices, into analog outputs.  Electro-Sensors interface units read up to 12 analog sensors such as bearing temperature, belt alignment, and belt or shaft speed.

## SA420 Digital Signal Conditioner

- Works with a remote / external pulse frequency output sensor (NPN, PNP, or mag pick-up)
- Accepts a wide range of input frequencies 0.01 Hz to 10 kHz
- 4-20 mA and 0-10 VDC outputs proportional to shaft speed
- Field adjustable calibration
- 115, 230 VAC (50-60 Hz) and 12, 24 VDC power options
- DIN rail mount
- Optional explosion proof enclosure
- Optional NEMA 4, NEMA 4X, or NEMA 12 enclosure kit

## ION Remote I/O (3 models)

- **Analog-In** (12 inputs) - Measure up to 12 analog current signals (e.g. 0-20 mA, 4-20 mA) with 1µA resolution.
- **Discrete I/O** (6 inputs, 6 relay outputs) - Read up to 6 binary sensor/switch states (on/off, closed/open, 1/0), write up to 6 FORM A relay output states (open/closed). Inputs are compatible with NPN (sinking) signal sources and mechanical switches.
- **Frequency/Discrete-In** (12 dual-purpose inputs) - Measure up to 12 shaft speeds and/or signal frequencies from pulse-frequency-output sensors with 16 or 32-bit precision, read up to 12 binary sensor/switch states (on/off, closed/open, 1/0) or do any combination of the three. Inputs are individually configurable for NPN (sinking), PNP (sourcing), or push-pull line-driver signal outputs.
- Modbus RTU slave over isolated RS485 network interface, up to 115.2k baud
- Low response message latency (≤ 1 mS) for high Modbus data throughput
- Protected 24 VDC sensor power output on each signal-in terminal block makes sensor wiring easy
- Pluggable terminal blocks
- DIN rail mount
- 24 VDC powered

## SpeedTalker-DN(UI) with DeviceNet

- Works with 1 or 2 remote / external pulse frequency output sensor(s) (shaft speed sensors, proximity sensors or incremental encoders; NPN, PNP, or line driver)
- Provides real-time shaft rotation speed / direction and up to 8 programmable over / under-speed alarms over DeviceNet
- Network powered
- Provides isolated DC sensor power
- 2 dual-purpose inputs may be used to measure 2 speed-only sensors or 1 speed+direction (quadrature output) sensor
- Easily integrates into any DeviceNet network
- ODVA conformance tested
- DIN rail mount

# Vibration Monitors, Tilt Switches, & Motor Drive Controls
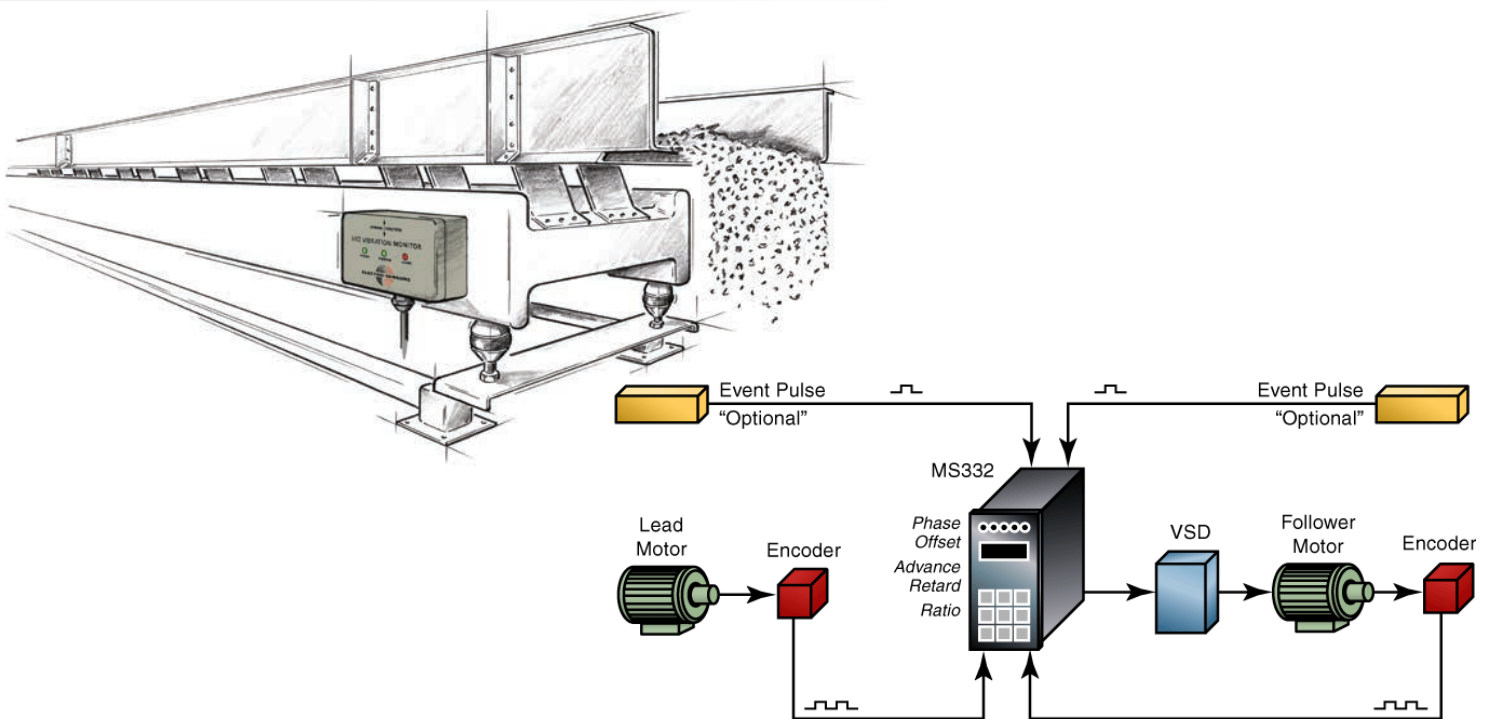


Electro-Sensors designs and manufactures sensors to monitor machinery for either the presence or absence of vibration outside of an adjustable setpoint. Vibration levels outside of the setpoint will trigger the internal relay and provide a warning or shut down the equipment, before damage can occur.

Electro-Sensors tilt switches are designed to detect the presence or absence of bulk materials. The output of the internal switch can be wired into your existing system or, utilize the SCU-200 to provide control to your equipment.

Electro-Sensors motor speed drive controllers provide precise regulation of motor speed by controlling the speed reference signal to the variable speed drive. This allows for accurate control and monitoring of the speed drive.

## VS1 / VS2 Vibration Monitors

NEMA 4X Model

Explosion Proof Model

- **VS1** protects against excessive vibration levels
- **VS2** is ideal for use on deliberately vibrating machinery
- Adjustable setpoint
- Adjustable setpoint delay prevents false shutdowns
- Settable RMS vibration velocity alarm trip-point and delay time
- LED's provide an instant view of machine status
- Isolated SPDT relay output or transistor output
- 24 VDC (18-30 VDC) powered

## MTS Tilt Switch and SCU-200 Control Unit

- Detects the presence or absence of bulk material
- Standard enclosure is NEMA 12 with indicator lights
- NEMA 4 and intrinsically safe enclosures available
- Rugged heliarc-welded steel probes
- Use with SCU-200 for complete monitoring system
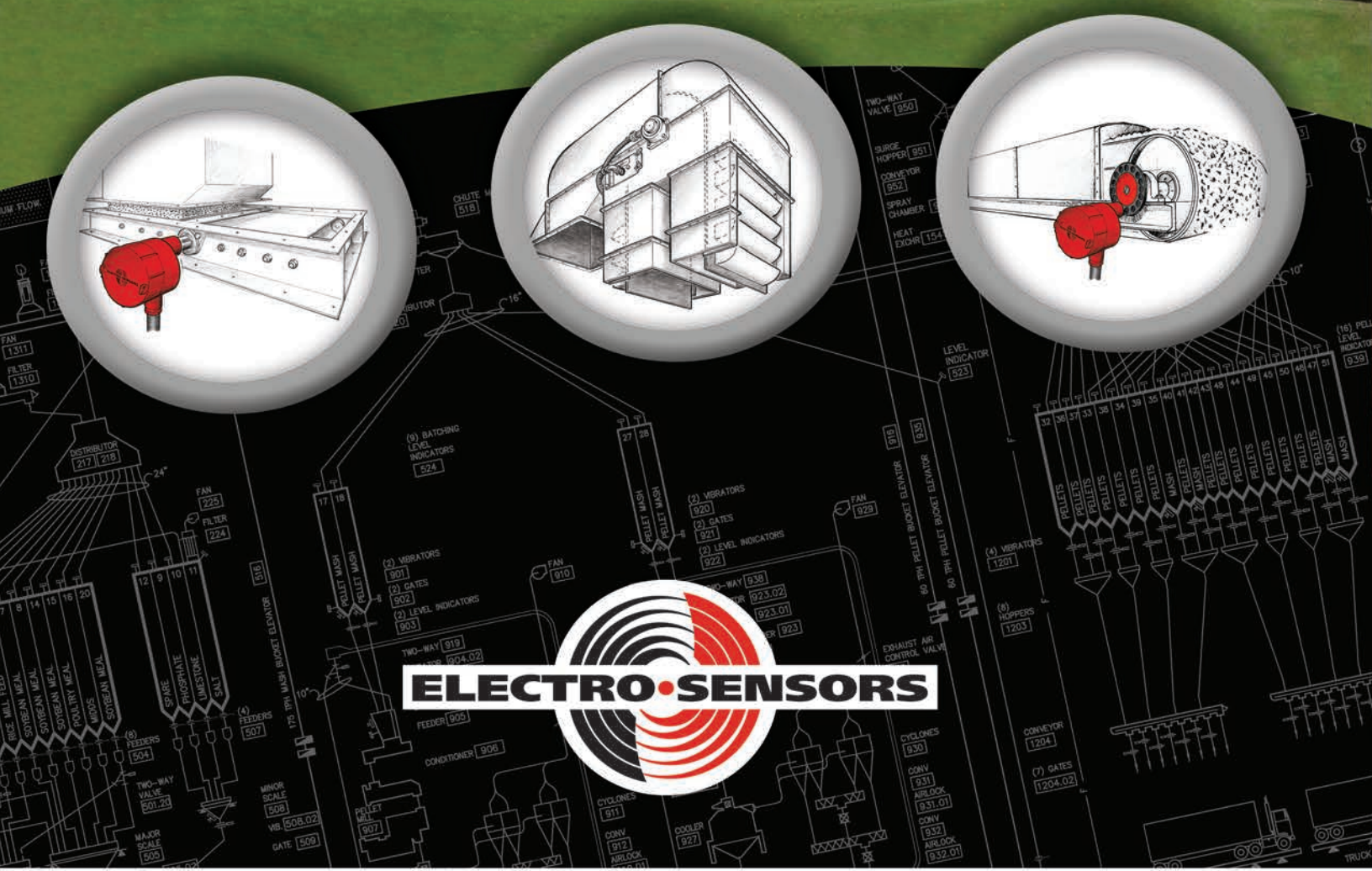
SCU-200          MTS Tilt Switch

## MS320 Closed-Loop Motor Drive Speed Controller

Modes and functionality include: master and ratio-follower modes and programmable input functions. Optional analog speed feedback input, analog setpoint inputs, and relay outputs. Works with incremental shaft encoders and pulse-frequency output shaft speed sensors. Optional explosion proof enclosure or NEMA 4X enclosure kit.

## MS332 Closed-Loop Motor Drive Speed Controller

Modes include zero-cumulative-error ratio-follower (electronic gearing) and zero-cumulative-error index-follower (mechanical event/phase synchronization). Features include forward-only and forward/reverse settings for uni/bidirectional control, multiple setpoints and many programmable contact-closure input and NPN output functions. Builds numerous machine synchronizing/follower processes. Works with quadrature incremental shaft encoders (all modes) and proximity, photo-eye, and other presence/event sensors (index-follower mode). Optional explosion proof enclosure or NEMA 4X enclosure kit.

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