Electro-Sensors, Inc.
Machine Monitoring Sensors & Hazard Monitoring Systems
Who We Are

• An industrial sensing company providing *Machine Monitoring Sensors* & *Hazard Monitoring Systems*

• Founded in 1968

• Products designed & manufactured at our facility located in Minnetonka, MN

• 37 Employees

• Publically held company on NASDAQ (Symbol: ELSE)
Why Choose Electro-Sensors?

• Rugged, Reliable and Proven Industrial Systems
• Improve Production Processes
  – Safeguard Systems, Reduce Downtime, Prevent Waste
• Most Standard Products Ship within Two Days
• 5-Year Limited Warranty on Most Products
• World-class Customer Service & Technical Support
• 50 Years of Industry Experience
• ISO9001:2015 Quality Certified
Major Industries Served

- Grain, Feed & Milling
- Bulk Materials Handling
- Food Processing
- Power Generation
- Ethanol and Bio-Fuels
- Mining & Minerals
- Waste Management
- Packaging
- Pulp & Paper
- Water Utilities
Where We Work – 42 Countries in 2017
Electro-Sensors Products

- Speed Sensors and Switches
- Pulse Generators
- Temperature Sensors
- Slide Gate & Angle Position
- Bearing Sensors & Belt Alignment

- Tachometers, Counters & Displays
- Signal Conditioners & Interface
- Vibration & Tilt Sensors
- Hazard Monitoring Systems
  - Wireless HazardPRO
  - Wired ES1 & ES16
Shaft Speed Switches

• Under-, over-, zero-speed or reverse detection
• Output
  – Relay
  – 4-20 mA
  – DeviceNet
  – AS-Interface
• Number of set points
• Analog or digital electronics & set points
• Approvals
• Input power (DC, AC)
Shaft Speed Sensors

- Hall effect or Magnetoresistive
- Pulse (NPN, PNP) or 4-20 mA output
- Single channel or quadrature
- Generous sensing gap distance
- DC powered
- Explosion proof / housing
- I.S. Approvals
Temperature Sensors

- Flange, stud, probe and lug styles
- 4-20 mA Output factory calibrated -40°C to +120°C
- Compatible with any PLC or data acquisition system
- Simple and quick set-up – no calibration required
- Many custom ranges
- All Stainless Steel and Custom versions available
Alignment Sensors

Conveyor Belt Alignment Rub Block Doors

- Three versions:
- Adjustable rub block for optimal positioning and longer life
- All white epoxy finish minimizes ambient heating
- Unistrut mounts almost anywhere
Positioning Sensors

- 4-20 mA Position feedback for:
  - Slide gates
  - Distributor heads
  - Valves
  - Clam shell bucket
  - Gates
  - Screens
Vibration & Tilt Sensors

- VT420 Vibration Switch
- VS1 Vibration Switch
  - Over- or under-vibration
  - XP available
- Tilt indicator for presence or absence of bulk material
Hazard PRO™ Wireless Hazard Monitoring

Revolutionizing the way the industry monitors critical applications.
HazardPRO Wireless Hazard Monitoring System
HazardPRO™ Features

- Approved for hazardous locations
- Real-time display of key system data
- Intuitive touchscreen interface
- Field-proven reliability
- Continuous system self-check routines
- Remote access and notifications
  - via email, text & web
- Fastest installation & lowest overall cost
HazardPRO Sensors

- Speed
- Bearing Temp
- Ambient/Surface
- Alignment
- Vibration
- Stud Temp
Transmitter Node

- Class II, Div I approved
- Transmit-on-change keeps data current & optimizes battery life
- No external power
- 5+ year battery life
- 10 quick connect sensors for easy installation and equipment maintenance
  - 6 inputs for bearing / alignment / ancillary temperature
  - 2 inputs for ambient temperature
  - 1 input for speed sensing
  - 1 input for contact closure
System Manager

- Ethernet TCP/IP Modbus communication
- Relay outputs
- Controlled levels of authority
- Data & history logging
- Testing reports
- Real-time information & live charting
HazardPRO™ Status Screen

- Customer-specified equipment names
- Explanations in plain English, not code

- Color Coded Status And Status Key

[Image of the status screen with various equipment names and status indicators, including Tank 5 Top Drag highlighted as running with a status message: Equipment is starting. All sections are normal.]
HazardPRO™ Status Screen

- Real time display of data
HazardPRO™ Status Screen

Main Shipping Belt Tail - (Node Id 10)

Status:
Tail Section is normal.

Input 1: Alignment - North
32 °F

Input 2: Bearing - North
32 °F

Input 3: Alignment - South
32 °F

Input 4: Bearing - South
32 °F

Input 5: Not in use

Input 6: Not in use

Input 7: Speed - Shaft
0 RPM

Health: [Green]

Close

Main Shipping Belt

Status:
Equipment is stopped. All sections are normal.

Running Hours: 1191.3

RPM: 0.0

Sections:
A: Tail
Status: Tail Section is normal.

B: Counter Weight
Status: Counter Weight Section is normal.

C: Snub
Status: Snub Section is normal.

E: Head Snub
Status: Head Snub Section is normal.

F: Head
Status: Head Section is normal.

• Real time display of data
HazardPRO™ Status Screen

Main Shipping Belt Tail - (Node Id 10)

Status:
Tail Section is normal.

Input 1: Alignment - North
- Value: 32 °F
- Details

Input 2: Bearing - North
- Value: 32 °F
- Details

Input 3: Alignment - South
- Value: 32 °F
- Details

Input 4: Bearing - South
- Value: 32 °F
- Details

Input Type: Bearing
- Warning Value: 47 °F (Ambient Compensated)
- Shutdown Value: 57 °F (Ambient Compensated)
- Fail-Safe Shutdown Value: 175 °F
- Rate of Rise Warning: Not enabled
- Rate of Rise Shutdown: Not enabled
- Ambient Temperature: 32 °F

Main Shipping Belt

Status:
Equipment is stopped. All sections are normal.

Sections:

A: Tail
- Status: Tail Section is normal.

B: Counter Weight
- Status: Counter Weight Section is normal.

C: Belt Snub
- Status: Belt Snub Section is normal.

D: Drive Main
- Status: Drive Main Section is normal.

E: Head Snub
- Status: Head Snub Section is normal.

F: Head
- Status: Head Section is normal.

Real time display of data
Typical **HazardPRO** Applications
Port Loading Facility – Northwest US
Grain Storage Facility – Midwest US
Aquaculture Processing Facility – Western Canada
Construction Material Fabrication – Southeast US
Consumer Foods Manufacturer – Northeast US