

Bin Levels & Bearings

What Grain Operations Need to Know

BINMASTER



**LET'S SIMPLIFY
YOUR INVENTORY**



**Leading
Technology**



**Accessible
Anywhere**



**Accurate
Data**



**Technology
Leading**



**Anywhere
Accessible**



**Data
Accurate**



Say hello to BinMaster

- Bin around since the early 1960s
- Lincoln, Nebraska USA
- Division of Garner Industries
- 115,000 sq ft plant on 32 acres
- Manufacture, machine & mold



Put this in the past



No Climbing



No Tape Measures



Solve the problems with grain inventory



Unsafe



Inaccurate



Time Consuming



Expensive



Simplify in the Cloud instead

- Sensors measure bin levels
- IoT devices send data to the Cloud
- Data access from a phone, tablet, or PC
- Connect to a control room or HMI
- Access level data from local device

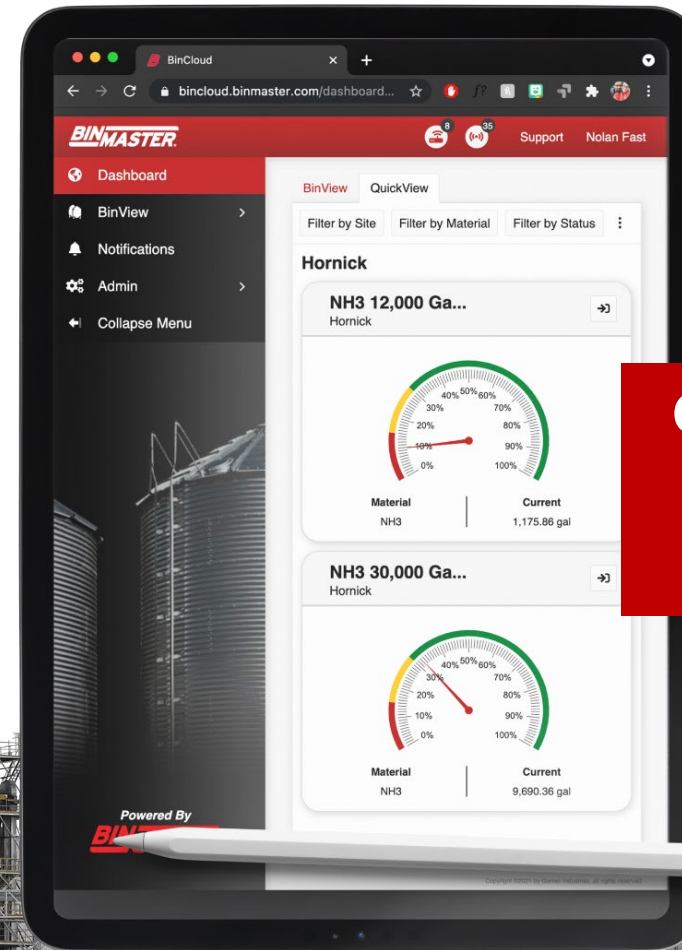
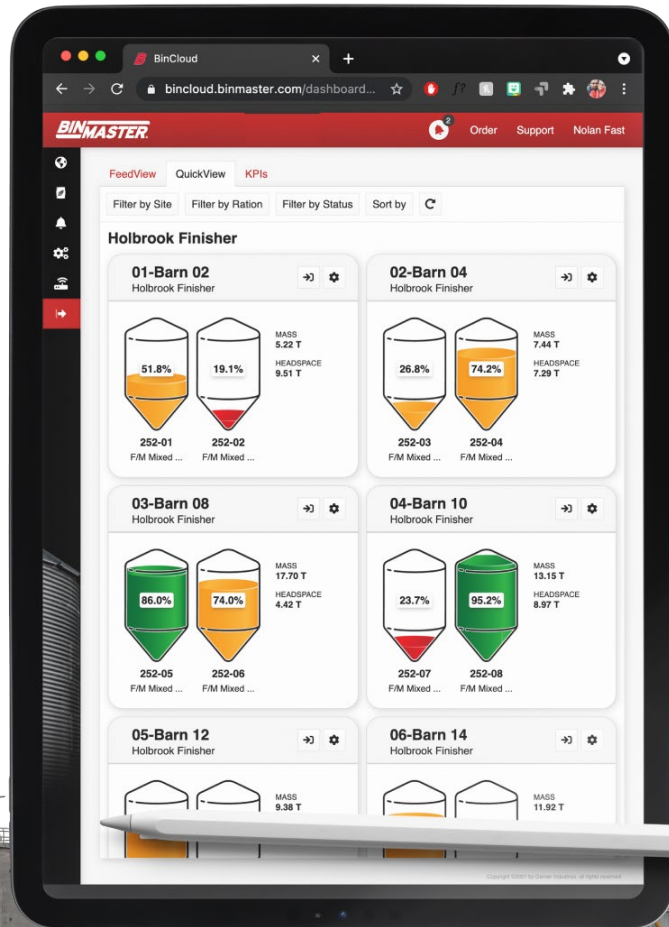


Why simplify?

- Accurate, secure, safe and simple to use
- Anywhere, anytime access on-site or remote
- No need for an IT department or servers
- Software upgrades are automatic at no cost
- Under 12¢ per day per bin (\$42 per year)



QuickViews with color-coded bin status

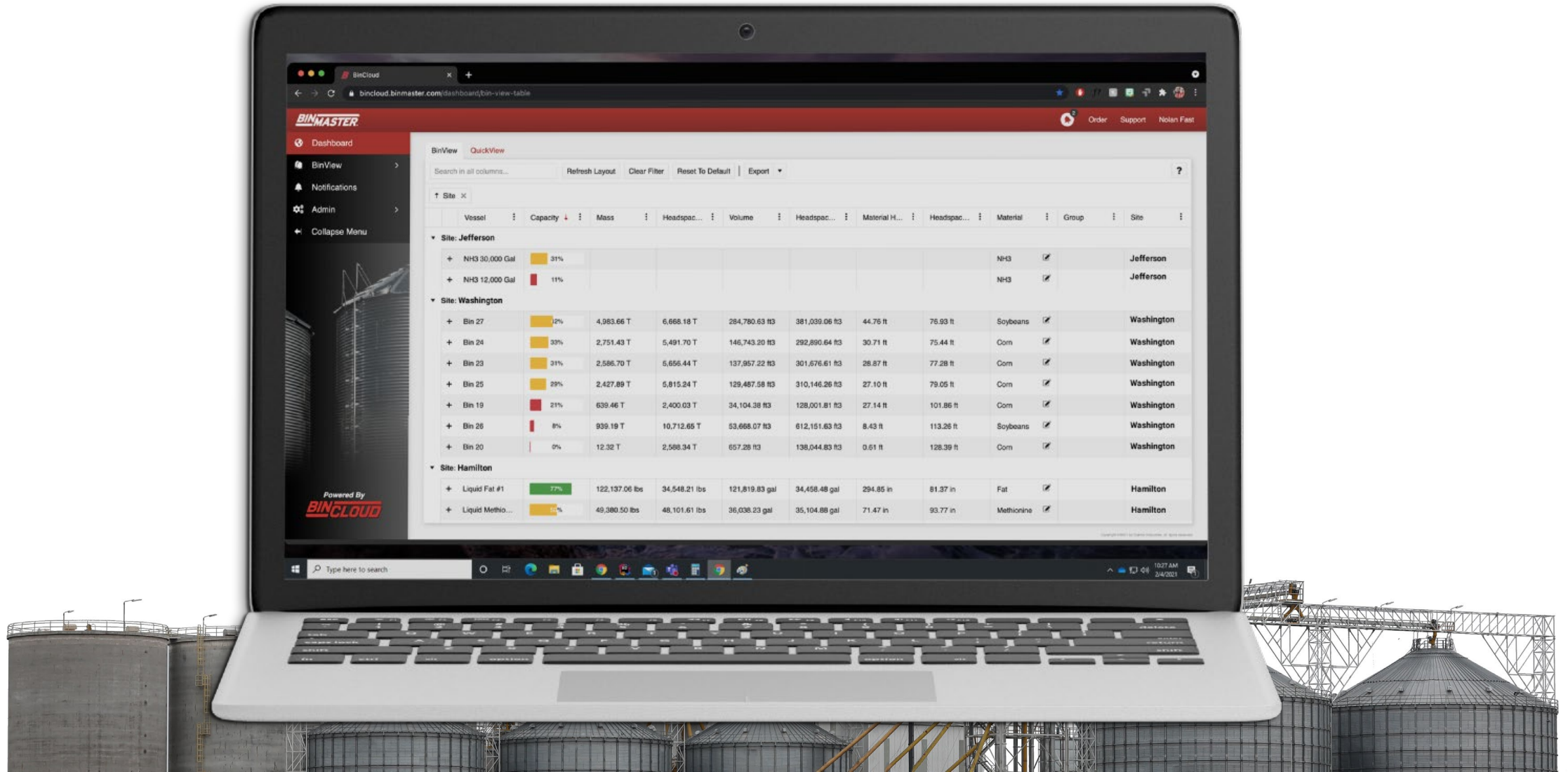


Got propane tanks?
BinCloud measures
them, too.

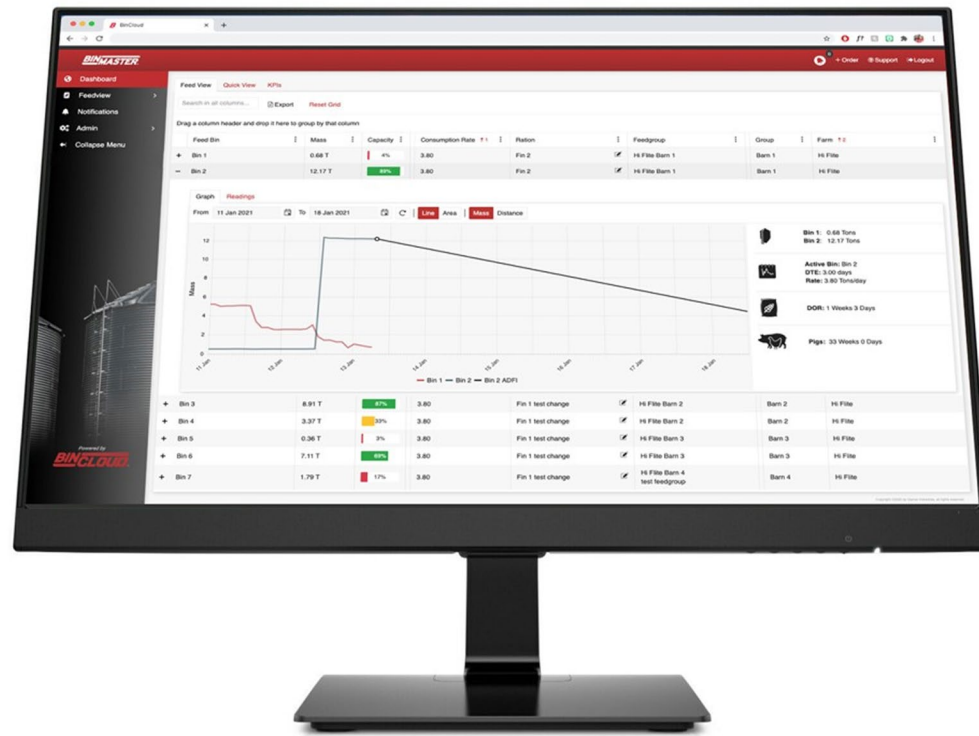
Automated alerts via text or email



Monitor multiple sites



Inventory history and details by bin



Best level sensors for grain



SmartBob

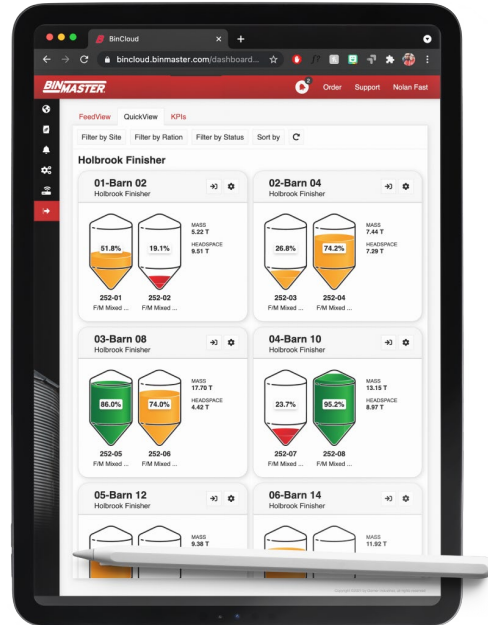
80 GHz Radar



3D Scanners



Data where you need it



Local Display



HMI or Control Room



Phone, Tablet or PC



IoT devices save on installation



Gateway



LoRa Transceiver

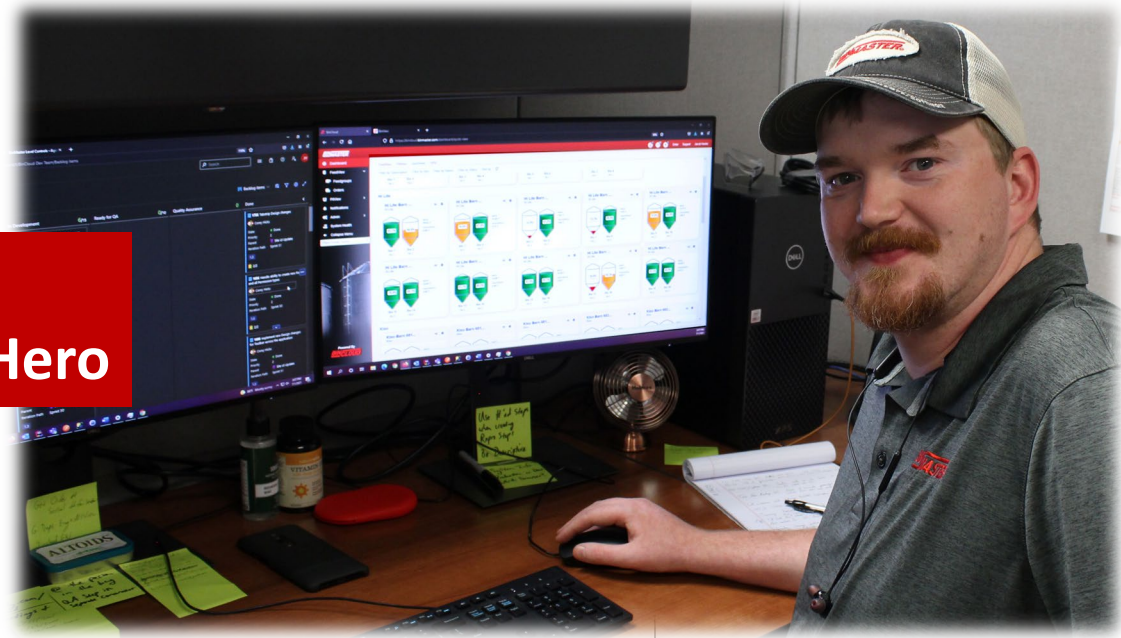


Analog Expansion Hub



Let's transform your inventory system

Jake Harder
BinCloud Support Hero



You don't need ...

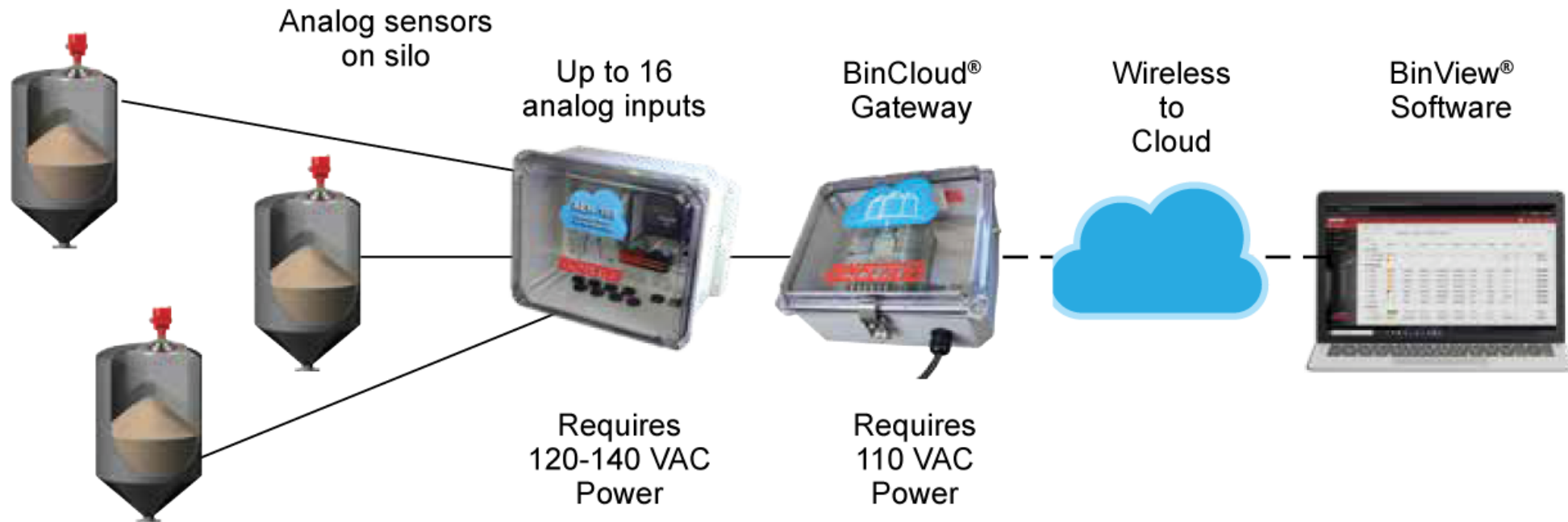
An entirely new system

- Existing sensors are often adaptable to Cloud systems
- Gateways and AEHs can connect 4-20 mA sensors to the Cloud



Connect existing sensors to the Cloud

AEH-100: Analog Expansion Hub



You don't need ...

To buy or install the system all at once

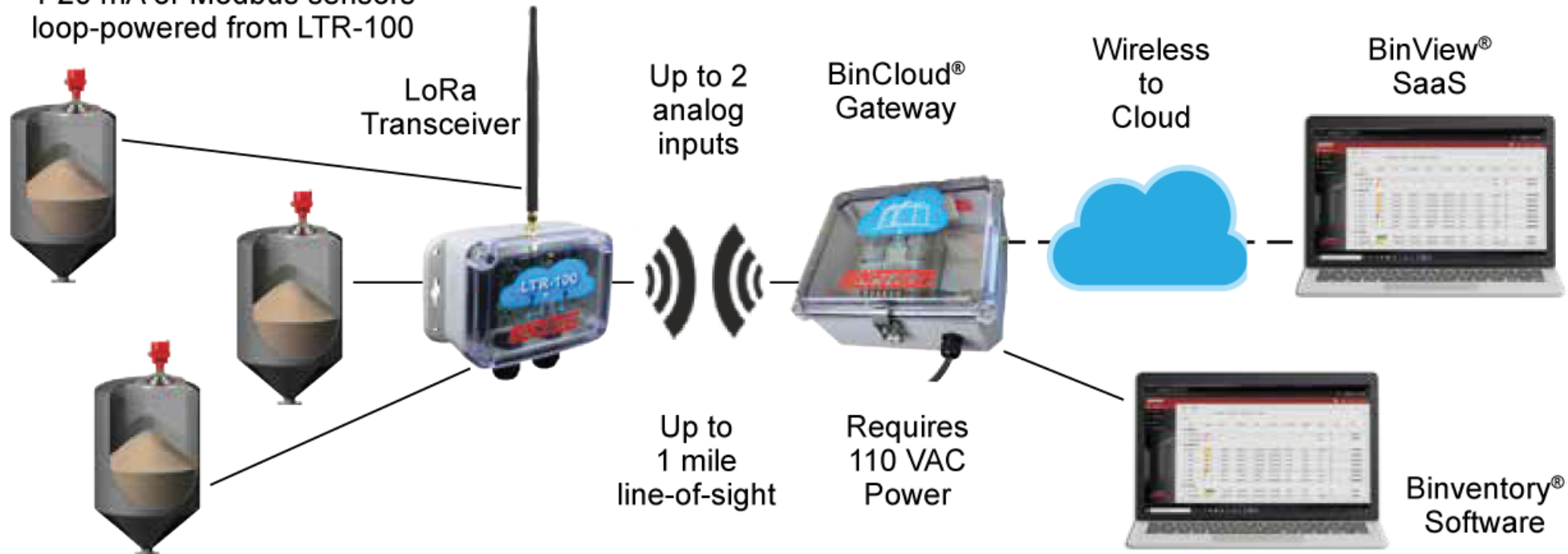
- Systems are scalable
- Start with a bin or two
- Expand number of bins or locations easily



Connect bins up to a mile away

LTR-100: LoRa Transceiver

4-20 mA or Modbus sensors
loop-powered from LTR-100



You don't need ...

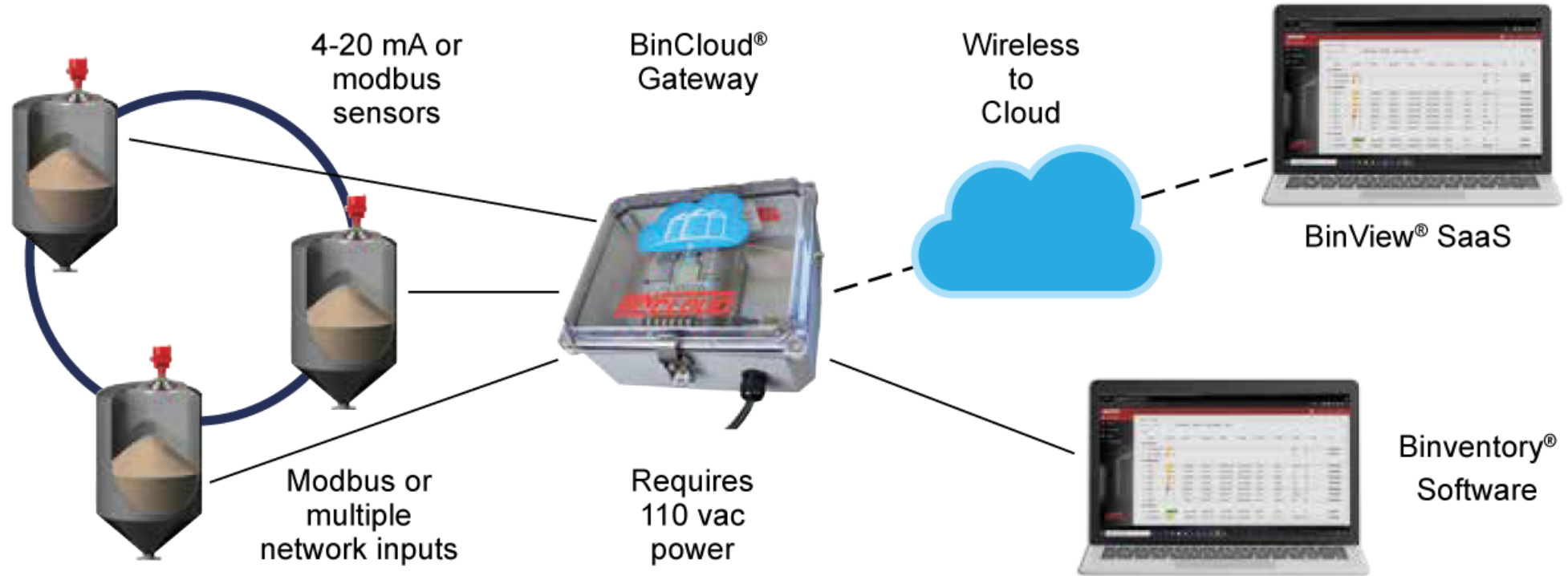
To worry about obsolescence

- Sensors have a long service life of 10+ years
- Software upgrades are automatic with the subscription
- Continuous feature updates by BinMaster programmers



Cloud data for Modbus or 4-20 sensors

BinCloud® Gateway



What it costs

Item	Price	Frequency
SmartBob	~\$2,000	One-time
Non-Contact Radar	~\$3,300	One-time
3D Level Scanner	~\$6,500	One-time
Gateway	\$595	One-time
LoRa Transceiver	\$295	One-time
Analog Expansion Hub	\$795	One-time
Per Gateway Subscription	\$150	Annual
Per Bin Subscription	\$42	Annual



Who is Electro-Sensors?



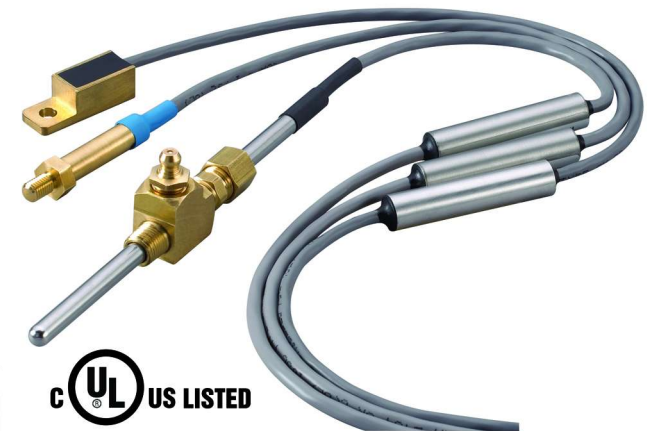
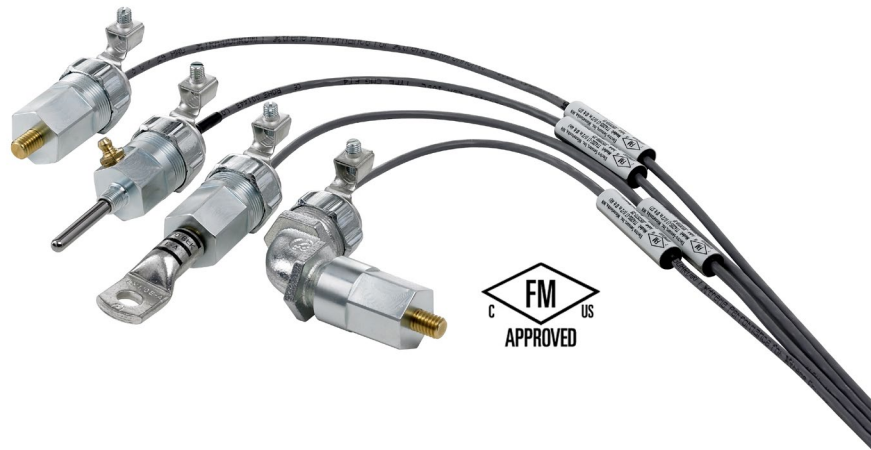
- An industrial sensing company providing machine monitoring sensors and hazard monitoring systems, founded in 1968.
- Products are designed and manufactured at our facility located in Minnetonka, MN.



Agenda

Introduce you to our temperature sensors and the applications for each sensor type.

- TT420 temperature sensors are used to monitor temperature on a wide range of industrial machinery including liquid tanks, piping, conveyors, bucket elevators, motors, gearboxes, pumps, turbines, fans, curing ovens, centrifuges, agitators, hammermills, and more.



Why do you need a temperature sensor?

- Determine bearing failures before they stop production
- Eliminate downtime from failures
- Prolong life of the motor
- Our brass alignment sensor helps detect heat instantly since brass is a great conductor
- Better solution than a diaphragm switch which gets gummed up and makes it useless in detection
- Overheating bearings and the presence of grain dust can result in an explosion causing downtime and added expenses to an operation



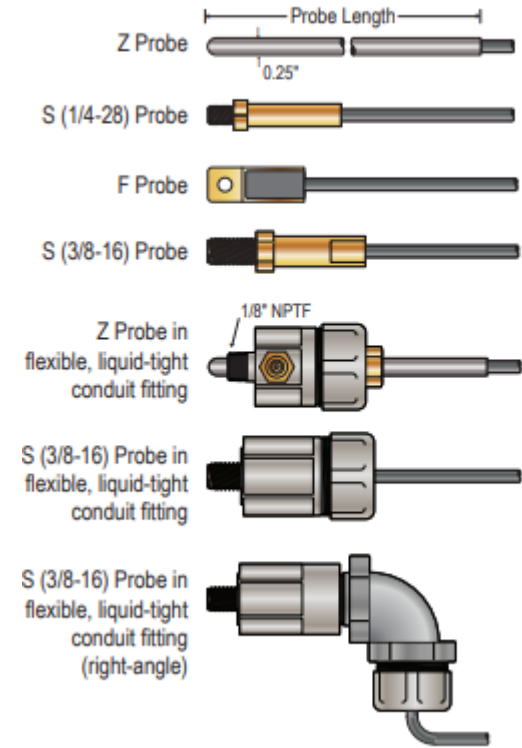
Temperature Sensors

Can be used to monitor temperature and alignment. Electro-Sensors manufactures Intrinsically Safe TT420 and TT420LT which have an integral 1/2" flexible liquid-tight conduit fitting and Dust-Ignition proof ratings.

Sensor Styles:

- **Probe** – The probe is primarily used to monitor pillow block bearings. Can also be used to measure temperature in an enclosed space such as a gearbox.
- **Threaded Stud** – This has a 3/8" thread on the sensor end that allows it to be mounted in many applications. Also, the standard used with Electro-Sensors rubber block doors used to monitor belt misalignment.
- **Surface Mount** – Surface mount temperature sensors are a versatile way to measure the temperature on a motor or other machinery. They can be mounted on most flat surfaces.

Probe, Fitting



Technical Specs

- 2-wire, loop-powered 4-20 mA analog output
- Attachment probe, sensor, 2-wire 4-20 mA signal conditioner
- Sensor with built-in conduit fitting adapter (LT Model)
- No user calibration; works right out of the box
- Compatible with PLCs, meters, data acquisition, and hazard monitoring systems
- Reverse-wiring protected



Approval Ratings

- **TT420LT** - Optimized for Class II area hazard monitor systems (e.g. grain, coal dust) FM approved, Dust-Ignition proof. Class II and III, Div I (E, F, G); NEMA 4.



- **TT420** - UL listed, Intrinsically Safe (IS) Class I, Div I (C, D) and Class II, Div I (E, F, G)



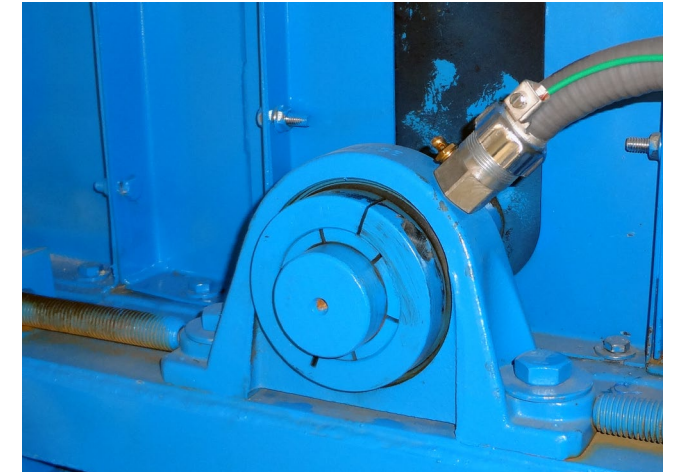
Methods of Monitoring

- **How to monitor:**
- **Rate of rise** – Used by setting a given amount of temperature that increases in a certain period of time. Rate of rise setpoints are used to provide an early warning of belt misalignment or catastrophic bearing failure.
- **Fixed temperature setpoints** – Can be used in areas where the ambient temperature does not fluctuate. In environments where the temperature fluctuates, especially outdoors, fixed setpoints alone are not a good method of providing feedback to a controller or PLC.
- **Ambient temperature compensation** – Used to compare the temperature of a bearing or rub block to the temperature of an ambient temperature sensor that is mounted on a piece of equipment very close to the bearing and rub block.



Temperature Sensor Probes

- Probes come in multiple lengths: 2", 4", 6"
- Monitor temperature of pillow block bearings
- Monitor temperature of gear boxes
- Adaptable Zerk fittings for easy bearing greasing
- Intrinsically Safe Class I, Div I (C, D) Class II, Div I (E, F, G)
- Dust-Ignition proof conduit adapter fitting for Class II and III, Div. I (E, F, G)



TT420Z-LT

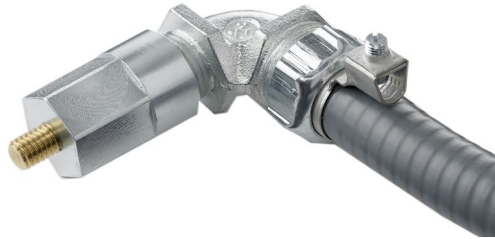


Threaded Temperature Sensor

- TT420 S temperature sensors and fittings are optimized for applications with 3/8-16 or 1/4-28 threaded taps
- Electro-Sensors rubber block assemblies utilize a 3/8-16 threaded tap which directly fits TT420 temperature sensors
- Intrinsically Safe Class 1 Div 1 & Dust-Ignition proof Class II Div 1 approvals



TT420S (3/8-16)



TT420-LT Right Angle



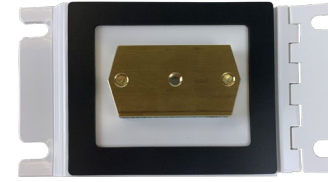
TT420-LT Straight



Rub Block Belt Alignment Assemblies



Adjustable Rub Block Door



Standard Door w/ both brass options



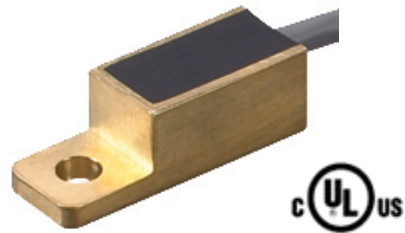
Uni-Strut Tub Block Assembly

- Monitor belt alignment with Electro-Sensors belt alignment assemblies
- Multiple rub block assembly styles for specific application fitment
- Compatible with Electro-Sensors TT420 temperature sensors

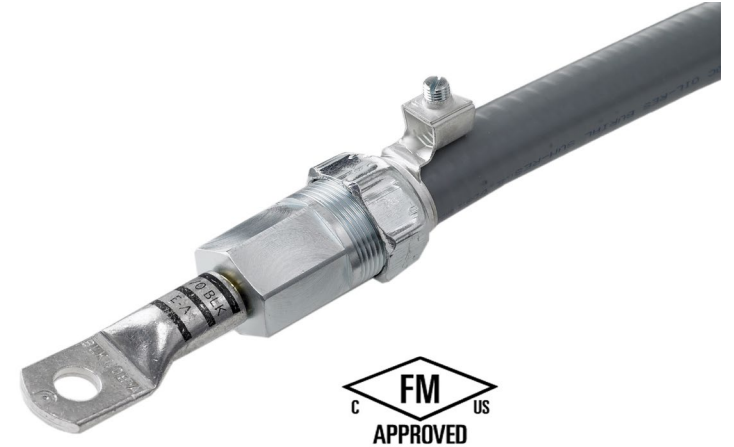


Surface Mount Temperature Sensor

- Versatile mounting capabilities; mount on most flat surfaces
- TT420-F is Intrinsically Safe I.S. Class I and II (UL)
- Surface mount adapter (Lug) available for TT420 S



TT420-F



TT420-S with Lug



Wireless Hazard Monitoring

HazardPRO™
Wireless Hazard Monitoring

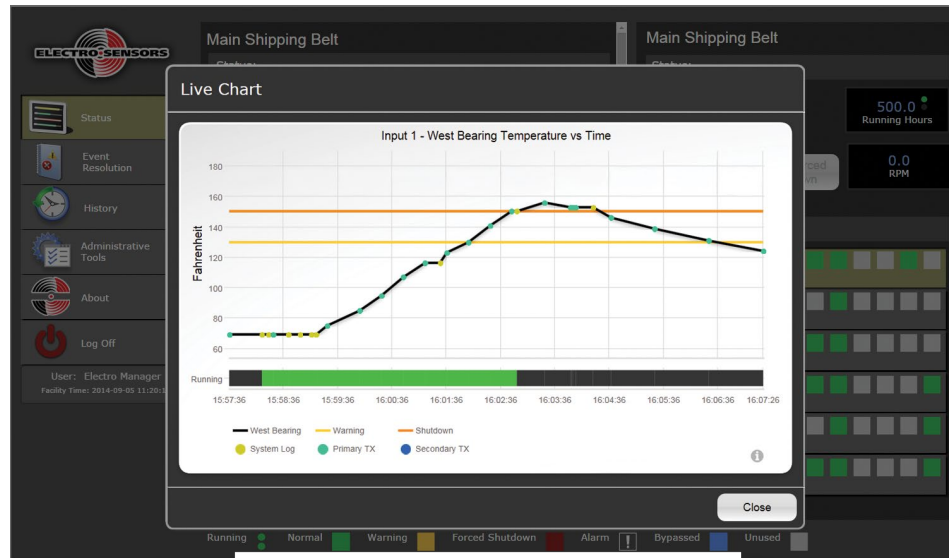


HazardPRO™ System

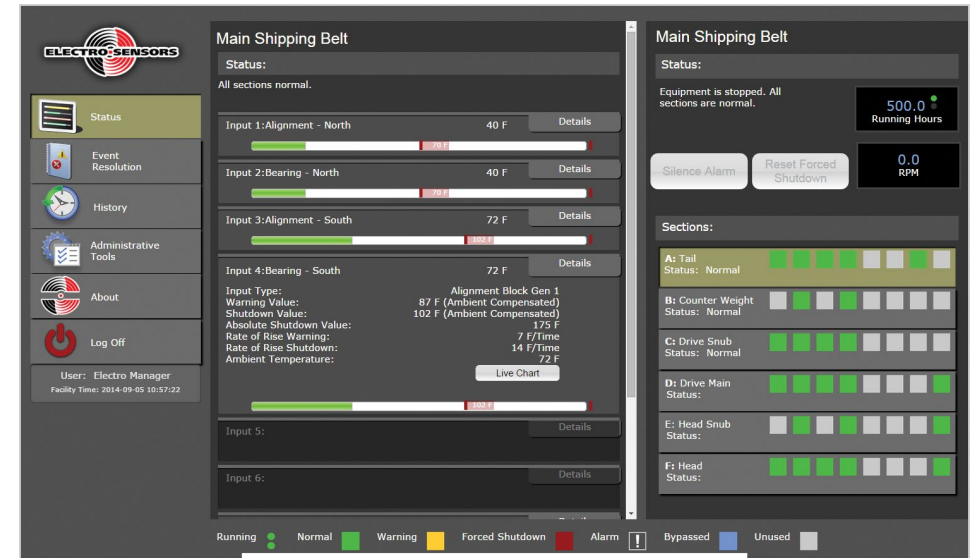
- Wirelessly monitor machinery for: temperature, speed, vibration, and alignment
- Quickly view monitored processes and their condition from the System Manager status screen
- Class II Div. 1 Groups E, F, G; Class III for sensors & nodes
- Ambient temperature sensors provide accurate setpoints
- Wear-detection belt alignment sensors notify you when rub blocks need to be replaced
- Built-in system testing
- Full integration with existing plant controls



HazardPRO System Manager



Sensor Charts



Node Overview



Access Your Data Anywhere

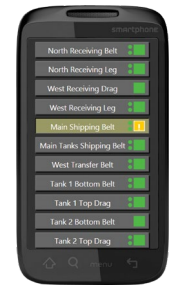
HazardPRO™ XL
Wireless Hazard Monitoring







HazardPRO System Manager



Personal/Mobile Devices



Thank you!

Bin Levels & Bearings

BINMASTER

