ISA100 WCI Webinar

Webinar date: May 18, 2022
The presentation will begin at 11:00 EST (UTC-5)

24/7 SRV Leak Detection as an Essential Component of Risk Management

Presenter:

Philippe Moock
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Agenda

About the Speaker

Philippe Moock

Global Director Thermal Insight Group

Armstrong International

Philippe started his career in factory automation before joining Armstrong in 2011. He currently leads the "Thermal Insight Group" focused on digital transformation of thermal utilities and providing insights to optimized them.

He hold a master in mechanical engineering from Belgium where he is from as well as an MBA from the US. Citizen of the world, he has lived and worked in Belgium, Florida, India, and China before moving to Michigan in 2017.
He has also frequently traveled for business, optimizing customers' thermal utilities, in Middle East, Asia, and Africa.

His promise is to deliver intelligent system solutions that improve utility performance, lower energy consumption and reduce environmental emissions while providing an enjoyable experience.

Agenda

Introduction to Industrial Wireless

Process Control Network

Ethernet

Field Wireless Management Station

ISA100 Wireless Field Instruments

Wireless sensor mesh network

Field Wireless Access Point

ISA100 Wireless Field Instruments

···· ISA100 Wireless

Applications examples
- Machine health monitoring
- Basic process control
- Monitoring of well heads
- Remote process monitoring
- Leak detection monitoring
- Diagnosis of field devices
- Condition monitoring of equipment
- Environmental monitoring
- Tank level monitoring
- Gas detection
- Fuel tank gauging
- Steam trap monitoring
- Open loop control
- Stranded data capture
- And more
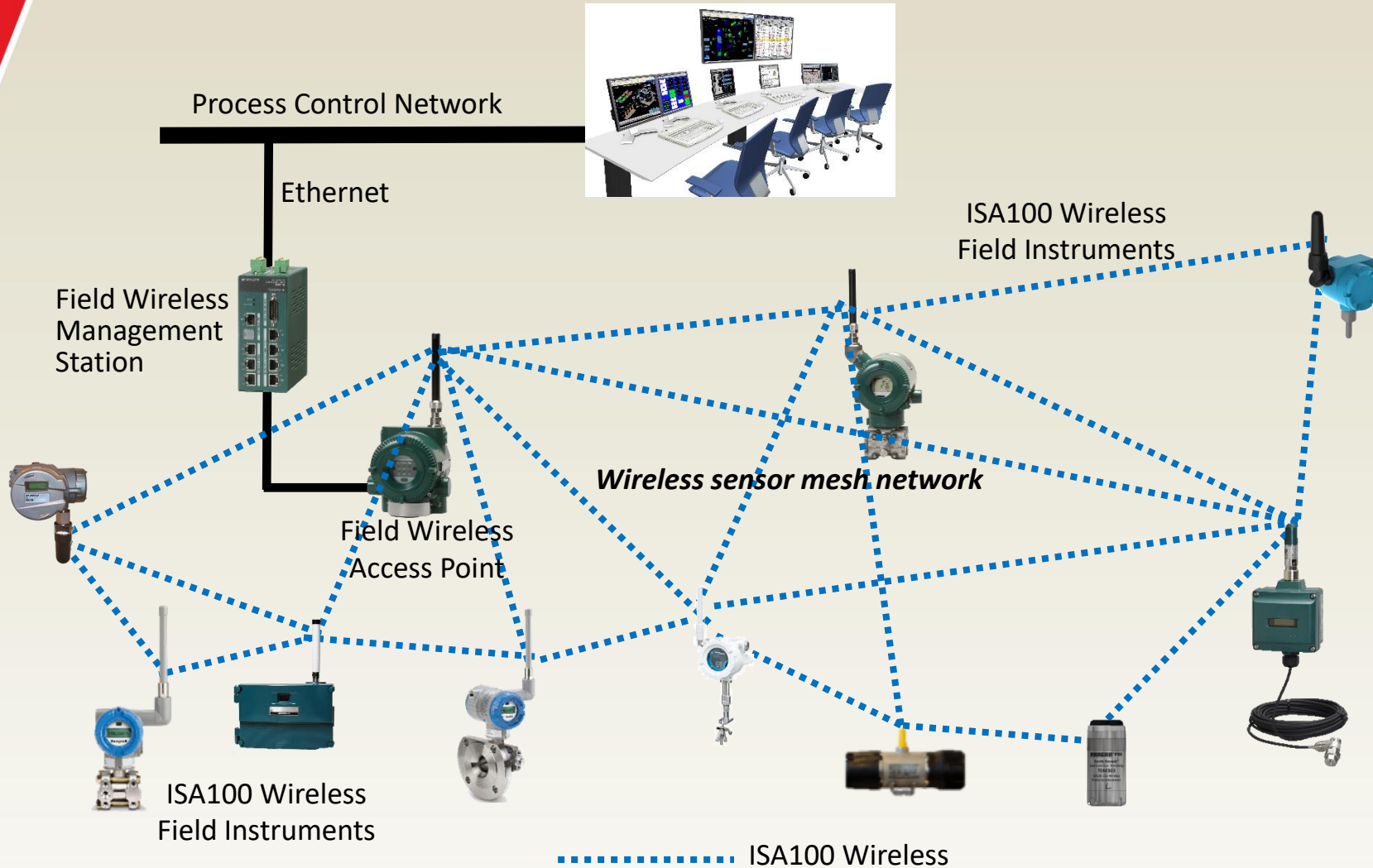
ISA100 WIRELESS COMPLIANCE INSTITUTE™

Agenda

1. About the speaker
2. Introduction Industrial Wireless
3. ISA100 Wireless Industry Standard
4. Armstrong International
5. Introduction
6. Wireless Monitoring
7. Theory of Operation
8. Installation
9. Battery Pack & Approvals
10. Armstrong University
11. Conclusion

ISA100 Wireless Fast Facts

- International standard IEC 62734 since 2014

- Complies with ETSI EN 300 320 v1.8.1 (LBT)

- End-User Driven Standard - meeting all current and future industrial needs

- Sensor routing or field routers for best performance – Freedom of choice

- Broad Multi-Vendor Portfolio of ISA100 Wireless Devices

- ISA100 Wireless enables SIL-2 Certification

- Ensured Interoperability - best-in-class solutions from best-in-class suppliers

- Readily available ISA100 Wireless Modules and Stacks

- Enable fast-track development and go to market

Benefits of ISA100 Wireless Instrumentation

Cost Savings	• Up to 90% of installed cost of conventional measurement technology can be for cable conduit and related construction • Typically: 1/2 the costs, 1/5 of the time • New and scaled applications are now economically feasible
Improved Reliability	• Wired sensors may be prone to failure in difficult environment • Wireless can add redundancy to a wired solution
Improved Visibility	• Condition monitoring of secondary and remote equipment • Process monitoring, fast additional data for trouble shooting
Improved Control	• Add wireless to existing processes for more optimal control
Improved Safety	• Safety related alarms - end to end SIL2 certifiable

ISA100 Wireless Product Portfolio

Infrastructure

Independent Gateway
- Honeywell, Yokogawa

Access Point (AP)
- Honeywell, Yokogawa

Integrated Gateway/AP
- Honeywell, Yokogawa, CDS, Nexcom

GW/AP + Recorder
- Yokogawa

Adapter (HART, etc.)
- Honeywell, Yokogawa

Measurement & Control

Temperature
- Honeywell, Yokogawa

Pressure / Flow
- Honeywell, Yokogawa

Level
- Honeywell, Yokogawa

DI/DO, AI
- Honeywell, Yokogawa

Valve Position
- Eltav, Flowserve, Honeywell

HSE + Life cycle

Corrosion
- RCS , Honeywell

Steam Trap
Armstrong, Bitherm, Spirax Sarco, TLV

Vibration
- GE's Bently Nevada, Divigraph

Gas
- GasSecure, Scott Safety, New Cosmos, Riken Keiki

pH
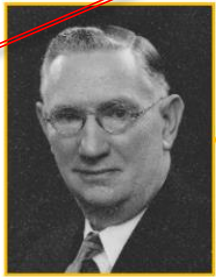- Honeywell, Yokogawa

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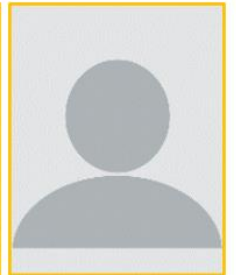9. Battery Pack & Approvals
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Armstrong International

Founded in 1900

Five Generations of Family Ownership
and Leadership

Armstrong International

China since 1995

Belgium since 1969

USA since 1900

India since 2008

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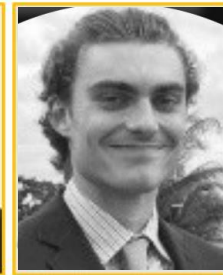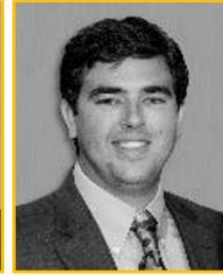9. Battery Pack & Approvals
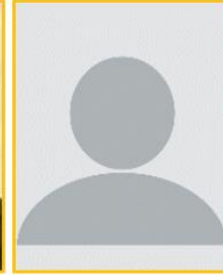10. Armstrong University
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Fugitive Emissions

Fugitive emissions are unintended or irregular releases of gases or vapors from pressurized system, either due to faulty equipment, leakage, or other unforeseen mishaps.

Leak detection is an essential component of risk management as it allows the operator to respond to the leaks to prevent further escalation of incidents.
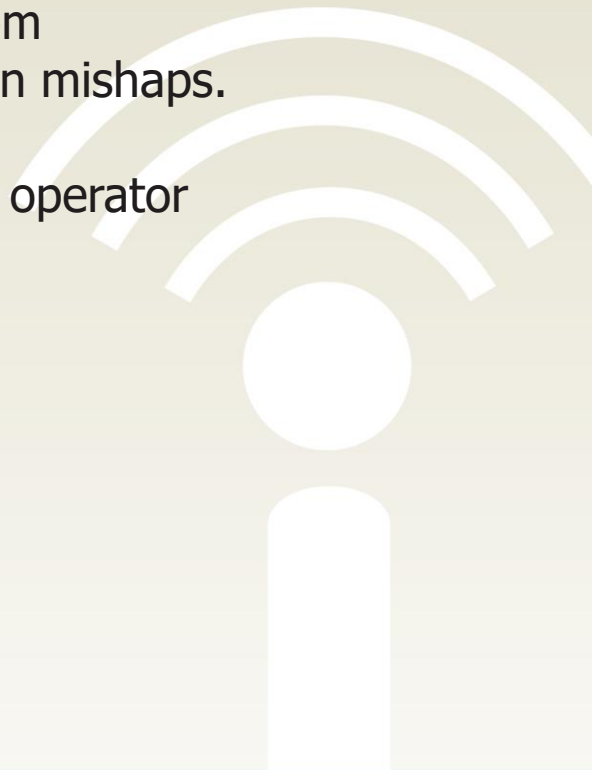
Pressure/Safety Relief Valve

Pressure/Safety Relief Valves are necessary to the protection of many processes but most of these are known to be continuous sources for leakage.

Regardless of whether these gases, hazardous area pollutants or more benign fluids such as steam, are released to an enclosed recovery system or to the environment, it is important **to identify the source, time, and magnitude of the release**.

Four Benefits of Valve Monitoring

Safety
It reduces exposure of employees to potentially harmful emissions and fluids as well as exposure of property to potentially highly corrosive fluids.
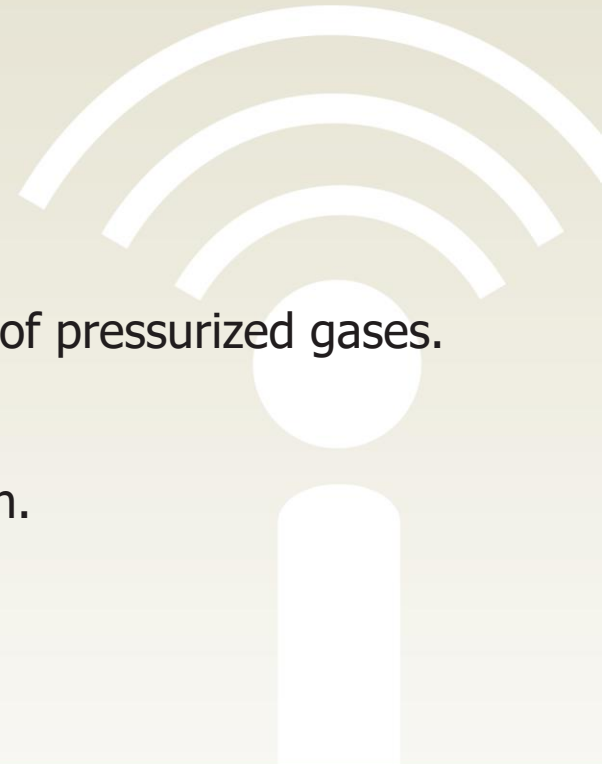
Environmentally
It reduces global warming and greenhouse gases getting to the atmosphere.

Economically
It makes sure the process is efficient by limiting downtime and reducing losses of pressurized gases.

Legally
It helps avoid fines from local and states regulated by complying with legislation.

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Armstrong Intelligent Monitoring (AIM®)

- AD6000 model
- NAMUR NE107 compliant
- 4-year battery life
- Non-intrusive installation
- Class I, Division 1, Zone 0

ISA100 WIRELESS COMPLIANCE INSTITUTE™

# Armstrong Intelligent Monitoring (AIM®)

- **Challenges**
  - The customer wanted to
    - remotely monitor the SRV's continuously.
    - quickly identify a failure (what, when, and where).
    - avoid regulatory compliance issues and fines.
    - monitor SRV's for popping or leaking and track down upsets in the system easily and record the occurrence time and length.

- **Solutions**
  - Wireless acoustic transmitters were installed to continuously monitor the SRV's.
  - By monitoring the SRV's 24/7, the customer can get instant notification when a SRV is opening or leaking to use the maintenance resource more effectively.

- **Benefits**
  - Instead of checking all the SRV's annually, they only have to focus on the failing SRV's.
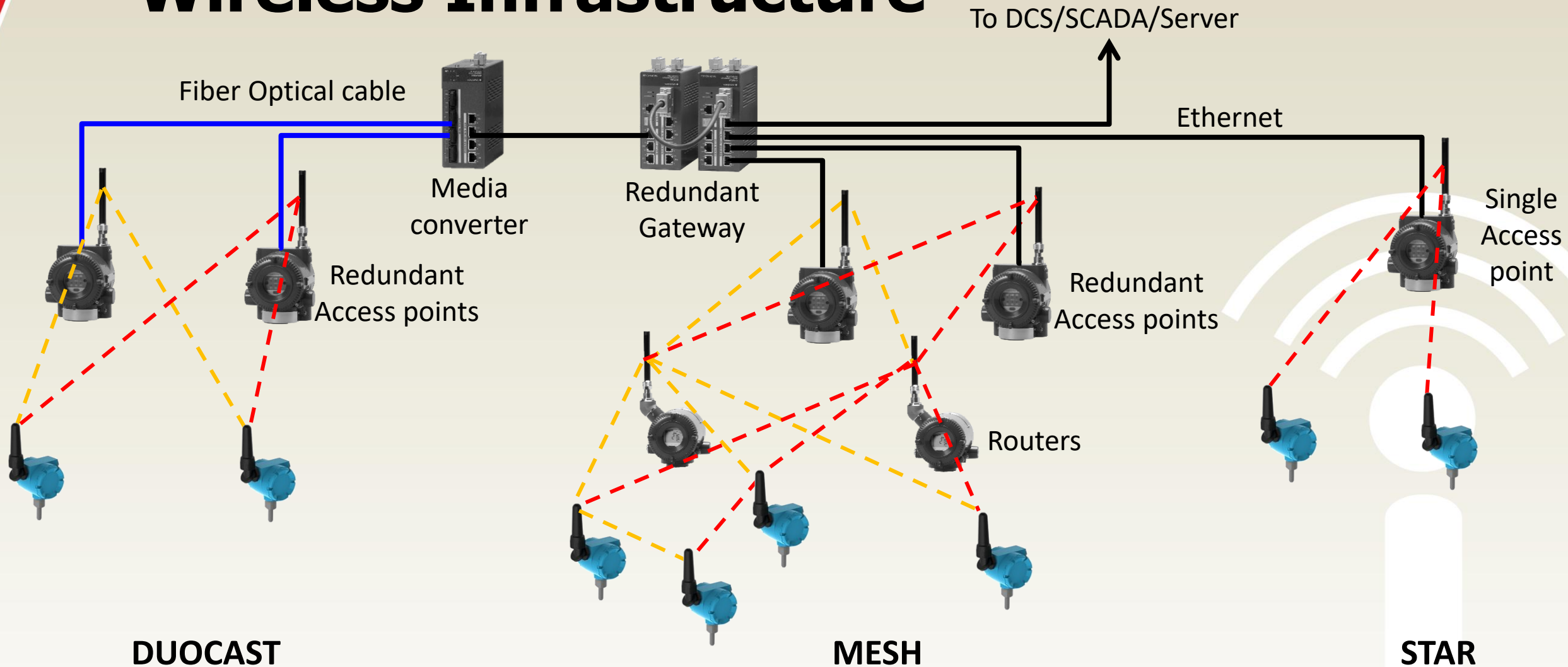 - Increase in process reliability and avoid unplanned downtime with instant notifications.
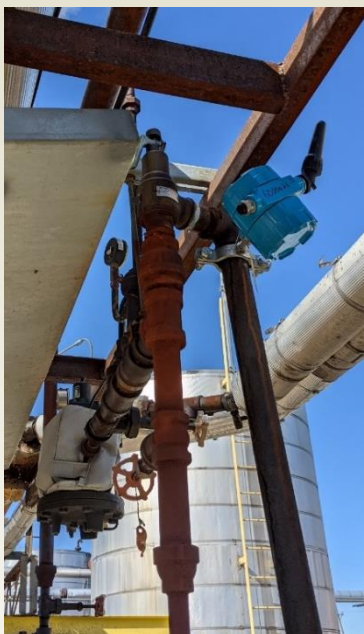
Applications

- Safety Relief Valve
- By-pass valves
- Blowdown valves
- Isolation valves
- …

- Saturated or Superheated Steam
- Liquid Crude
- Natural Gas
- LNG
- Methane
- Nitrogen
- CO_2
- …

Wireless Infrastructure

To DCS/SCADA/Server

Fiber Optical cable

Media converter

Redundant Gateway

Ethernet

Redundant Access points

Redundant Access points

Single Access point

Routers

DUOCAST

MESH

STAR

ISA100 Network

- 24/7 monitoring vs. point of time

- Quickly identify a failure (what, when, and where)

- Avoid unplanned downtime

- Cut labor cost

- Free up maintenance resources

- Increase efficiency

- Reduce energy consumption

- Short payback due to high cost of leaks

- Additional devices will strengthen any existing network
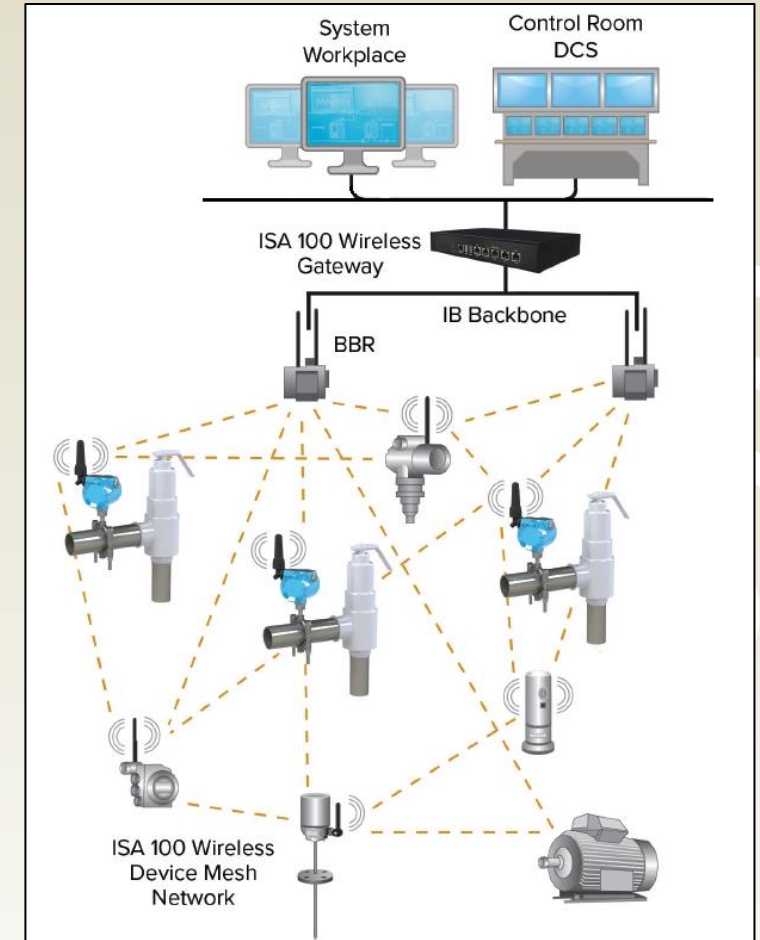
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Theory of Operation

CHANNEL 9

0–255 value of the level of sound detected by the monitor.

0 = no sound, 255 = upper limit of sensing range.

Theory of Operation

CHANNEL 10

The temperature detected at the tip of the stem of the monitor (pipe temperature).

Temperature is a secondary method for detection, trending of temperature data will allow for finding a valve or SRV that is leaking. The temperature trend may increase or decrease depending on the process being monitored. For example, compressed gases like air may decrease the temperature on the discharge side of a leaking valve or SRV, where a gas like steam will cause the temperature to increase on the outlet of the leaking valve or SRV.

Theory of Operation

CHANNEL 11
Number of occurrences where the level exceeds a defined threshold (with reset).

Once the device is installed a baseline reading can be observed and having the physical presence at the equipment know if it is in a good state or failed state at the time of the baseline reading. Adjustments may be made at that time if there is a known background noise level. The set point should be set for any level 1-255, a level of 0 would continuously be in alarm. An advanced site test is not required, but could be performed if the customer requires for a general suggestion of the threshold. Once the individual device is installed it may still require an adjustment.
The reset allows the counter to be set back to zero, "0", after SRV has been serviced or replaced. The reset is a manual request to reset, however if the Totalizer is allowed to exceed one year the device does reset automatically (exceeds allowable timer limits causing reset).

Note: The device is set to a default threshold of 25 counts.

Theory of Operation

CHANNEL 12
Calculate the total time that a lift is detected between resets (in minutes).

The Occurrence counter and totalizer work together for troubleshooting, a low number of occurrence counts with a high totalizer time would indicate single events lasting a long period of time, the opposite is true as well, high number of occurrences with short duration means "popping" is happening. The combination of occurrence counts and totalizer are monitored by the DCS/BAS and alerts set for notification when events occurs.
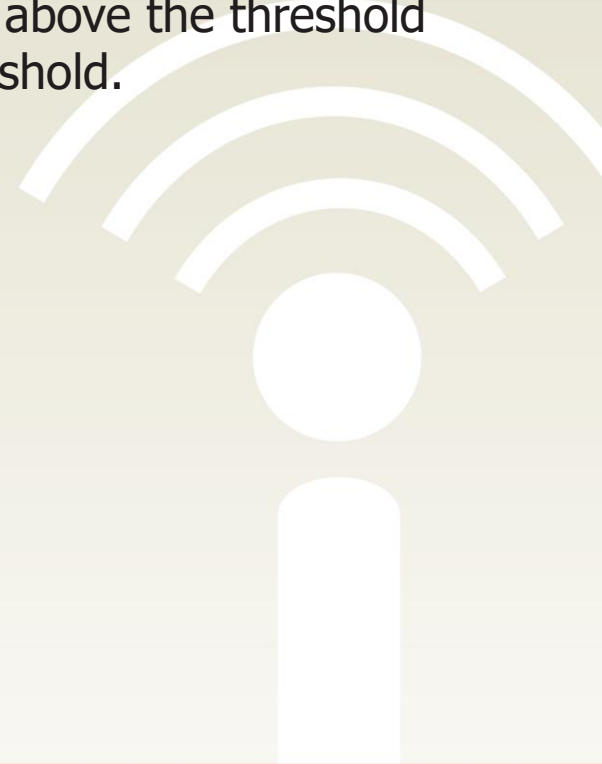
Theory of Operation
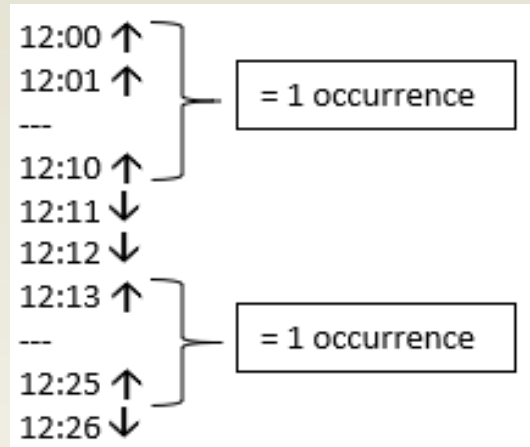
Example: A transmitter is set with a sample rate of 1 minute.
↑   to show that the measurement was above the threshold
↓   to indicate a reading below the threshold.

Occurrence Counter = 2 Occurrences

Occurrence Totalizer = 22 minutes
12:00 to 12:10 = 10 minutes
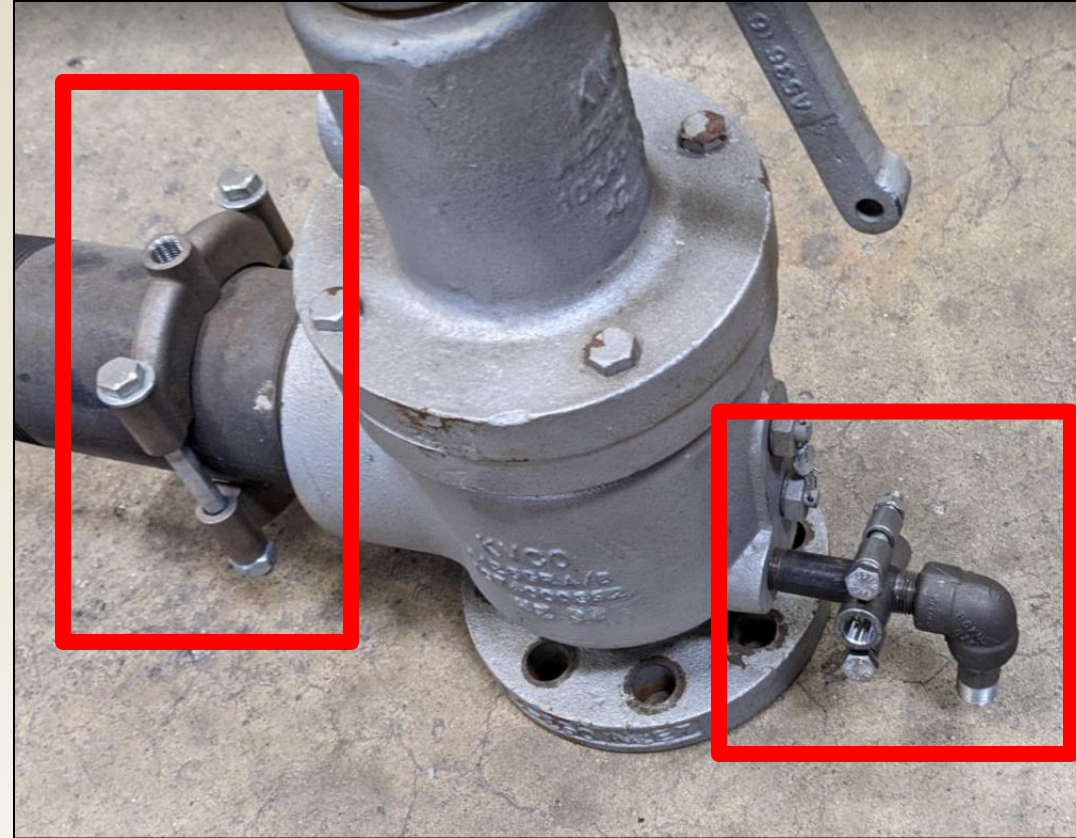12:13 to 12:25 = 12 minutes

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Installation

Maximum 6 in. (15 cm)

Installation

Pipe Temperature	0-160°C / 32-320°F
Corresponding Saturated Steam Pressure	0.0061-6.2 bar(a) / 0.089-89.6 PSIA

HORIZON

PIPE

360°

YES
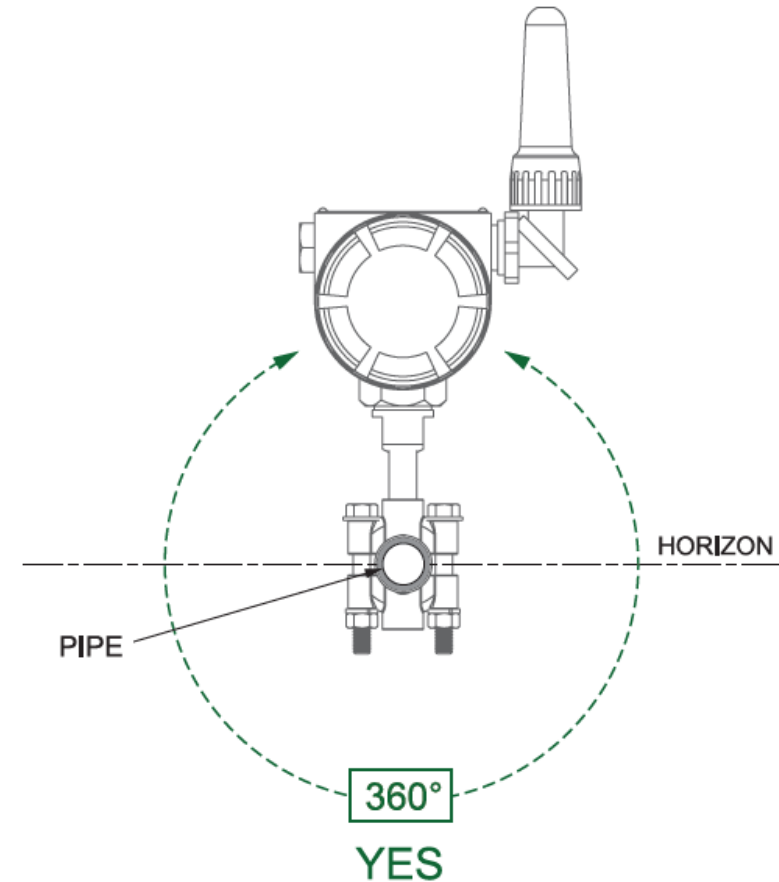
Installation

Pipe Temperature	255-440°C / 491-824°F
Corresponding Saturated Steam Pressure	43.2 bar(a) - * / 612 PSIA - *

*Steam is superheated at this temperature.

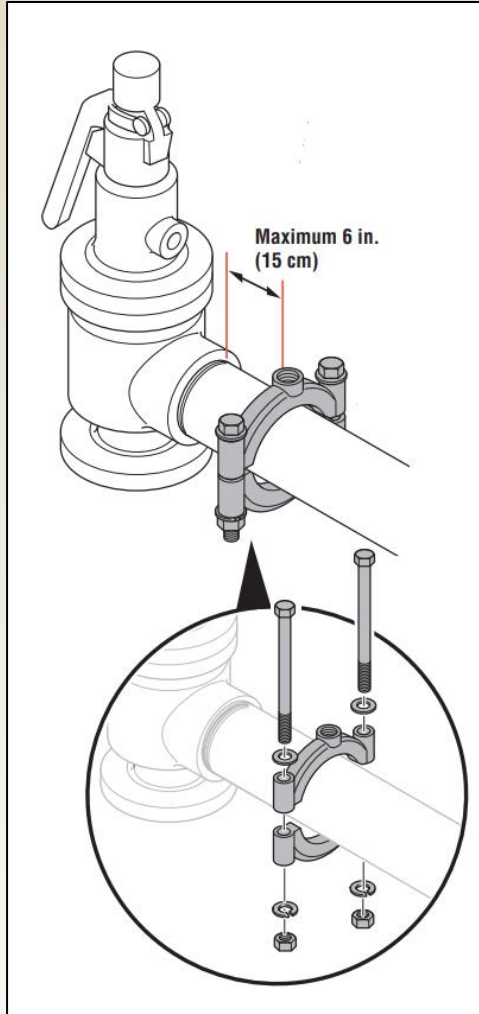**Note:** Dual heat sinks and a stem extension are required.
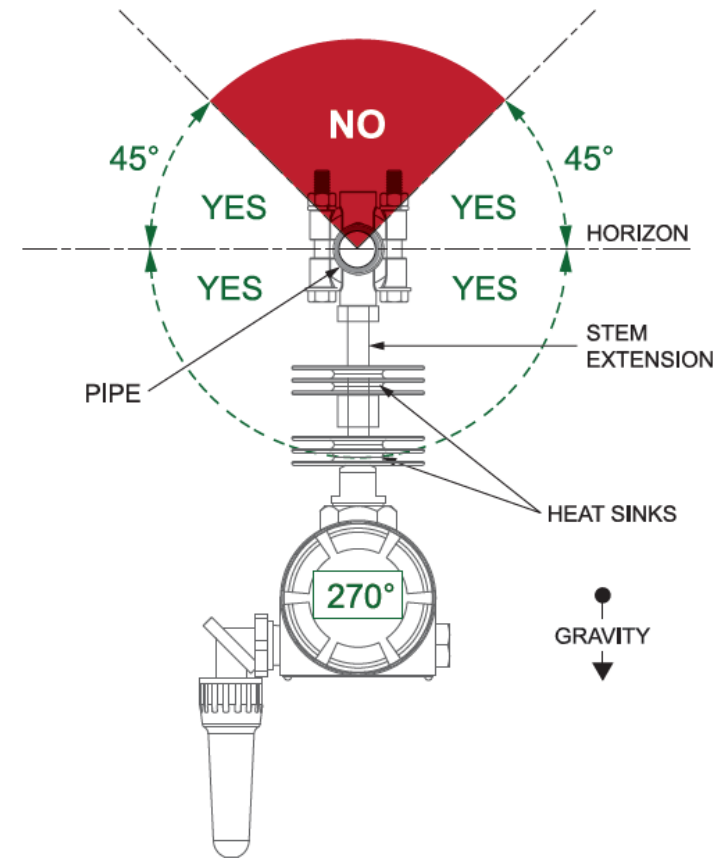
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Battery Pack

Functional Specifications

Humidity limits: 0–100% relative humidity non-condensing
Rated voltage: The battery pack, rated output voltage is 7.2 VDC

Nominal life (under typical, operating conditions): 4 years

Approvals

UL LLC Approval	
United States	Intrinsic Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G Zone 0, for Class I, Group IIC Temperature Code: T4 [275ºF (135ºC)] Ambient Temperature Range: T_{amb} -40ºC to 70ºC (-40ºF to 158ºF) For use with Armstrong model D64519 lithium metal battery only Standards used for Compliance: UL 913, Ed. 8; UL 60079-0, Ed. 7; UL 60079-11, Ed. 6

Ingress Protection Rating	IP66
Output Signal	ISA100.11a protocol over 2.45-GHz, ISM radio band
Temperature Operating Range	-40ºC to 70ºC (-40ºF to 158ºF)
Materials of Construction	Housing – Low Cu, Al alloy Paint – Powder Coat O-ring – EPDM Stem – 304 SS Antenna – Nylon 6,6 Nameplate – 316 SS
Battery Type	Encapsulated, Lithium Metal Cells
Weight	4.1 lbs (1.9 Kg)

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Armstrong University Online

ARMSTRONG UNIVERSITY®

Knowledge Not Shared is Energy Wasted.®

Armstrong University Onsite

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ISA100 Wireless Adoption Development Eco-system

WCI ISA100 Wireless Rapid Development Kit

- Everything you need to develop an ISA100 Wireless (IEC 62734) connected field instrument
- Develop ISA100 Wireless (IEC 62734) compliant and certifiable field instruments with minimal effort using application layer code provided
- Includes reference hardware design for ISA100 Wireless (IEC 62734) field instrument implementation
- Certified WISA modules run ISA100 Wireless communication stack
- User friendly SPiN development board includes OLED display and a large variety of sensors

https://centerotech.com/product/wci-isa100-rapid-development-kit/

Online Resources

www.isa100wci.org

- Learning Center with White Papers
- Articles, End-user stories, Forum
- Receiving over 20,000 web views per month
- Full list of certified/registered ISA100 Wireless devices
- And more useful content for you and your business

ISA100 Wireless Interest Group

- Latest news, end-user and expert discussions, insights
- 1100 members and growing; please join and invite your peers to join as well !
- Receiving over 5,000 web views per month
- Limited Time Offer: Join the group and you will be entered in a prize draw to win a new iPad

ISA100 Wireless Linked in Interest Group

Limited Time Promotion

Scan the QR code and join the ISA100 Wireless Linkedin group. **If you join during our limited time offer**, you will be entered in a prize draw to win a new iPad!

SCAN ME

Questions?

www.isa100wci.org **ISA 100 WIRELESS**

ISA100 Wireless Interest Group **Linked in**

1100+ members and growing; please join and invite your peers to join as well !

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