

### Why Steam Trap Monitoring?

If the steam trap **fails open** (Leaking or Blow-Thru):

- Increased back pressure.
  - Reduced flow for surrounding steam traps.
- Steam losses (monetary losses).
- Safety issue.
- Environmental issue...

If the steam trap **fails closed** (Cold):

- Wet steam.
  - Water hammering.
  - Damaged turbine LP saturated steam stage.
  - Piping corrosion.
  - Erosion on valves, reducers.
- “Stalling” or flooded heat exchanger.
  - Decrease in production.
  - Reduced heat transfer.
  - Batch process losses.
  - Thermal stress.
  - Safety issues.

There are **3 challenges** for an effective steam trap monitoring:

- Identifying a failure – What, when, and where?
- Evaluating the scope – How big of an impact?
- Measuring the impact – Value the tangible and intangible losses.

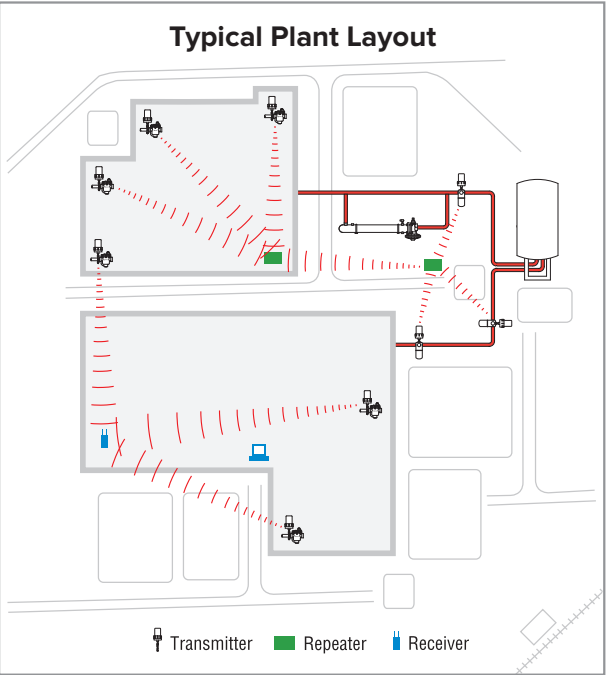
### How It Works

The SteamEye® system is designed to monitor and detect instant failure of steam traps and other steam equipment in real-time. Using a patented Armstrong International technology, SteamEye® transmitters continuously monitor the steam equipment. Once a failure is detected, the transmitter wirelessly sends the current operating condition of the steam trap, or other steam equipment, to a gateway (receiver). SteamEye® can be integrated into your existing Building Automation System (BAS) or Digital Control System (DCS) using Modbus or BACnet™ communication protocols.

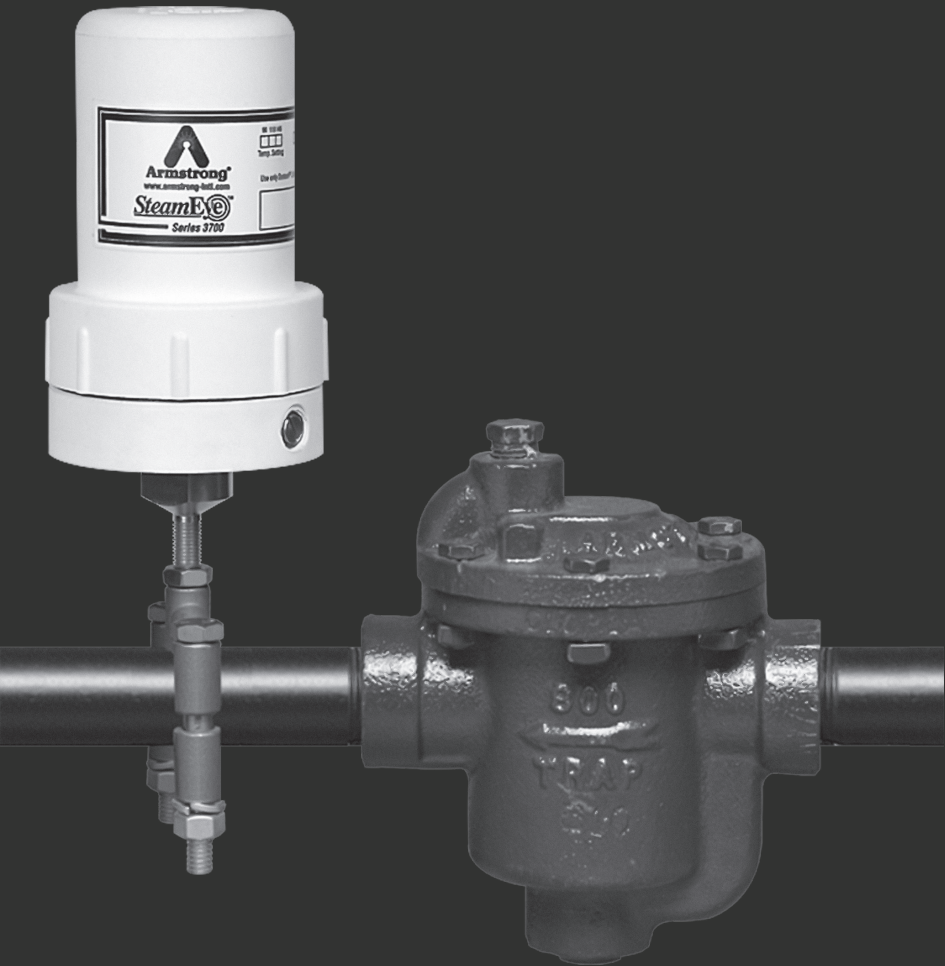
In applications where the transmitter has line of sight to the gateway, the range is approximately 1500 feet. In facilities where the signal must travel through walls, floors and other obstructions the range is 300 to 500 feet. If the receiver is out of the range of a transmitter, repeaters can be placed to “repeat” the signal back to the gateway. The gateway can also be connected to your company’s network where the information can be viewed through any computer on campus.

Steam Loss Thru an Orifice • Drip Application						
	10barg	150psig	17barg	250psig	28barg	400psig
Orifice	[kg/day]	[lb/day]	[kg/day]	[lb/day]	[kg/day]	[lb/day]
#38	495	1 091	796	1 754	1 246	2 747
7/64"	575	1 267	924	2 036	1 447	3 190
1/8"	751	1 655	1 207	2 660	1 890	4 167
5/32"	1 173	2 586	1 885	4 156	2 953	6 511
11/64"	1 419	3 129	2 281	5 029	3 573	7 878
3/16"	1 689	3 724	2 714	5 984	4 253	9 376
7/32"	2 299	5 068	3 695	8 145	5 788	12 761
1/4"	3 003	6 620	4 826	10 639	7 560	16 668
5/16"	4 692	10 343	7 540	16 623	11 813	26 043
3/8"	6 756	14 894	10 858	23 937	17 011	37 502
1/2"	12 011	26 479	19 303	42 556	30 241	66 671
9/16"	15 201	33 512	24 430	53 859	38 274	84 380
11/16"	22 707	50 061	36 495	80 457	57 175	126 050
3/4"	27 024	59 577	43 432	95 750	68 043	150 009

Blow-Thru steam trap, Outlet Pressure < (Inlet Pressure/2)  
Source: AM0017 by UNFCCC



## STEAM SYSTEM MONITORING STEAMEYE®



INTELLIGENT SOLUTIONS IN STEAM, AIR, AND HOT WATER

Armstrong International

North America • Latin America • India • Europe / Middle East / Africa • China • Pacific Rim

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Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.

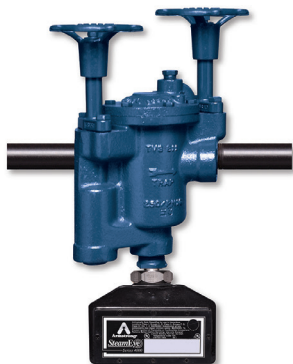
### Steam Trap Monitor

The 4700 Series is designed to detect the condition of the steam trap (cold, ok, and blow thru) for any make or model of steam trap. The 4700 Series utilizes acoustic and temperature readings coupled with Armstrong patented logic to determine the condition of the steam trap. The easy-to-install design provides non-intrusive installation that can be completed in minutes without any special tools. The monitor is battery powered that can be changed easily and quickly without removing the monitor from the mounting hardware. The 4700 series includes a pressure switch option for modulating applications.



The 4700R Series is designed to detect the condition of the steam trap (cold, ok, and blow thru) for any make or model of steam trap. The 4700R Series utilizes acoustic and temperature readings coupled with Armstrong patented logic to determine the state of the trap. This unit includes a simple battery change out design, which can be completed in minutes without shutting down the steam system. The 4700R Series is a remote transmitter that helps monitor steam traps that are difficult to access which are installed in areas such as pits or elevated pipe racks.

The 4300 Series is designed to detect the condition of the steam trap (cold, ok, and blow thru). The 4300 Series utilizes conductivity and temperature readings coupled with Armstrong patented logic to determine the state of the steam trap. The 4300 series also has a pressure switch option for modulating applications. This monitor is typically used for low pressure steam trap applications.

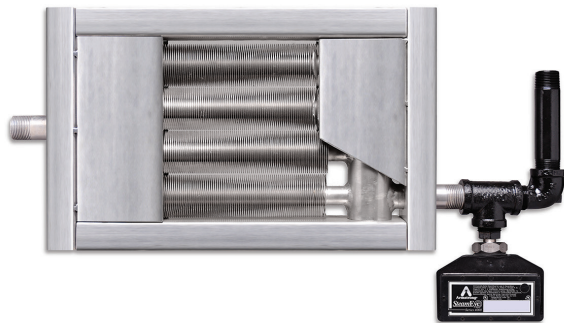


### Vault Monitor

The Vault Monitor is the most robust of all SteamEye® products. It utilizes a robust aluminum epoxy coated housing with potted electrical components to protect the monitor from high temperature and water. The vault monitor utilizes conductivity and temperature readings to determine trap condition (cold, ok, and blow thru). This monitor excels in applications like vaults and tunnels. The transmitter is designed to be installed outside of the vault to help avoid stringent confined space entry regulations and reduce safety concerns of employees. The monitor probe is made of annealed stainless steel and is designed to be installed directly in harsh environments that would destroy lesser robust monitor.

### Safety Relief Valve Monitor

This monitor utilizes acoustic signatures to detect a leaking safety relief valve. The monitor notifies the leaking status and provides the location to quickly solve the issue and avoid process disruption.



### Coil Monitor

This monitor utilizes conductivity technology to immediately notify when condensate is backing up in the coil thus protecting it from corrosion or freezing conditions. The monitor can be installed on any manufacture’s coil.

### Liquid Level Monitor

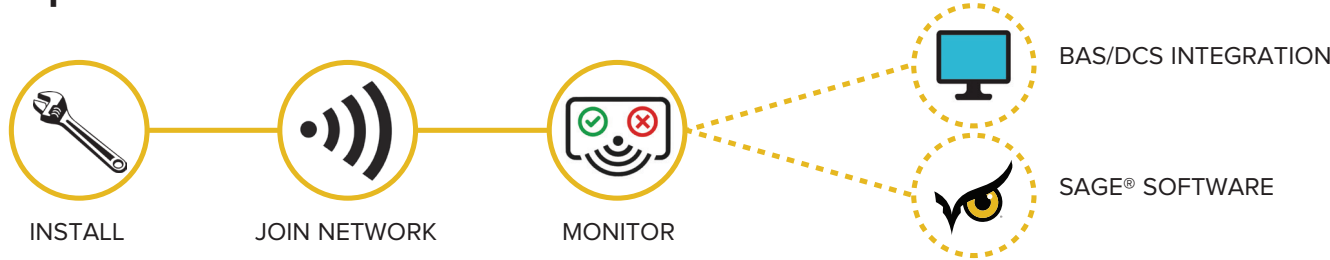
The liquid level monitor can be installed on any piece of equipment to notify flooded conditions. By using conductivity the liquid level transmitter instantly detects and notifies when the liquid’s level is too high.



### Pressure Operated Pump Monitor

The pressure operated pump monitor is designed to detect if a pump has stopped discharging condensate with the available cycle counter. Information collected allows for condensate return calculations and trending of capacities of the pump trap. The pressure operated pump monitor works with any mechanical pump.

### Simple • Smart • Sustainable



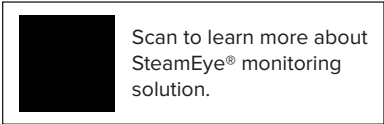
- No integration to external software necessary.
- Transmitted Information to gateway:
  - \* Low battery alert
  - \* Status of equipment
    - Steam Trap: OK, CD (cold), BT (Blow-thru), LOS (Loss of Signal)
    - Safety Relief Valve: OK, RA (Relief Alarm), LOS
    - Coil, Liquid Level: OK, FL (Flooded), LOS
    - Pump: OK, FL, CC (Cycle count), LOS
    - Repeater: OK, LOS
- 24/7 monitoring of the steam.
- Gateway integration connections: Modbus RTU; RS485 (Optional Modbus RS232); BACnet™.

SAGE® keeps you fully informed, 24 hours a day by providing regular updates, precise documentation, custom-filtered reports, and real-time alerts to notify you immediately of any problems that arise.

SAGE® calculates steam loss data and reports it using our proprietary steam system efficiency methodology approved by the United Nations Framework Convention on Climate Change (UNFCCC).

Specifications	Gateway	Repeater	Wireless Monitor
Communications	Proprietary spread spectrum format		
Operating Frequency	902-928 MHz		
Transmission Bandwidth	200 kHz		
Power Requirement	120 VAC	14 VAC	Duracell #DL123A 3 VDC; 2/3 A size; LiMN02
Power Consumption	400 mA	250 mA	N/A
Ambient Temperature	32°F to 140°F (0°C to 60°C)	32°F to 140°F (0°C to 60°C)	-40°F to 140°F (-40°C to 60°C)**
Ethernet	10/100 Mbps	N/A	N/A
Output Power	N/A	250 mW	60 mW
Dimensions	4.5x6.54x3.25 (114x166x83)	6.5x3.5x1 (165x90x25)	See below

\*120 VAC to 14 VAC adapter provided  
\*\*At extreme temperatures, Armstrong recommends optional insulation jacket or heat sink. Consult factory for details.



Wireless Transmitters Dimensions		
	[in]	[mm]
A	3.25	82
B	4.81	20
C	2.00	51
D	Cut to length per trap model	
E	4.57	116
F	5.25	113

