



IIoT Valves

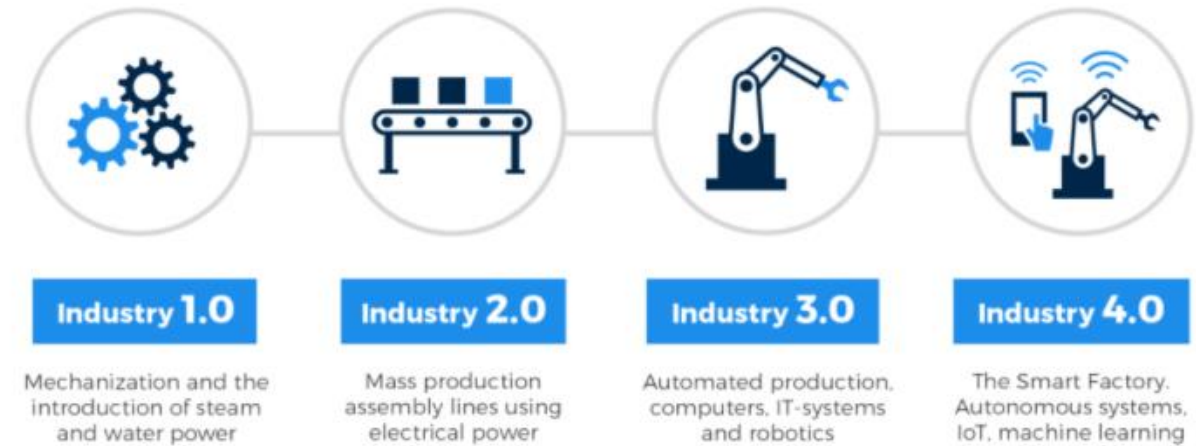
Smart Instrumentation Solutions

INDUSTRY4.

Industry 4.0

- Enhance productivity - decrease waste - improve yield
- Increase sustainability, reduce maintenance costs
- Increase agility of production leading to competitive benefits
- 33% to 77% increase in number of companies identifying themselves as “advanced in digitization” in the next 5 years*
- 24% companies project 30% cost saving in next 5 years by investing into digitization*

The Four Industrial Revolutions



Industry 4.0 is a cultural philosophy about how we can use increased visibility, flexibility and efficiency to be more competitive

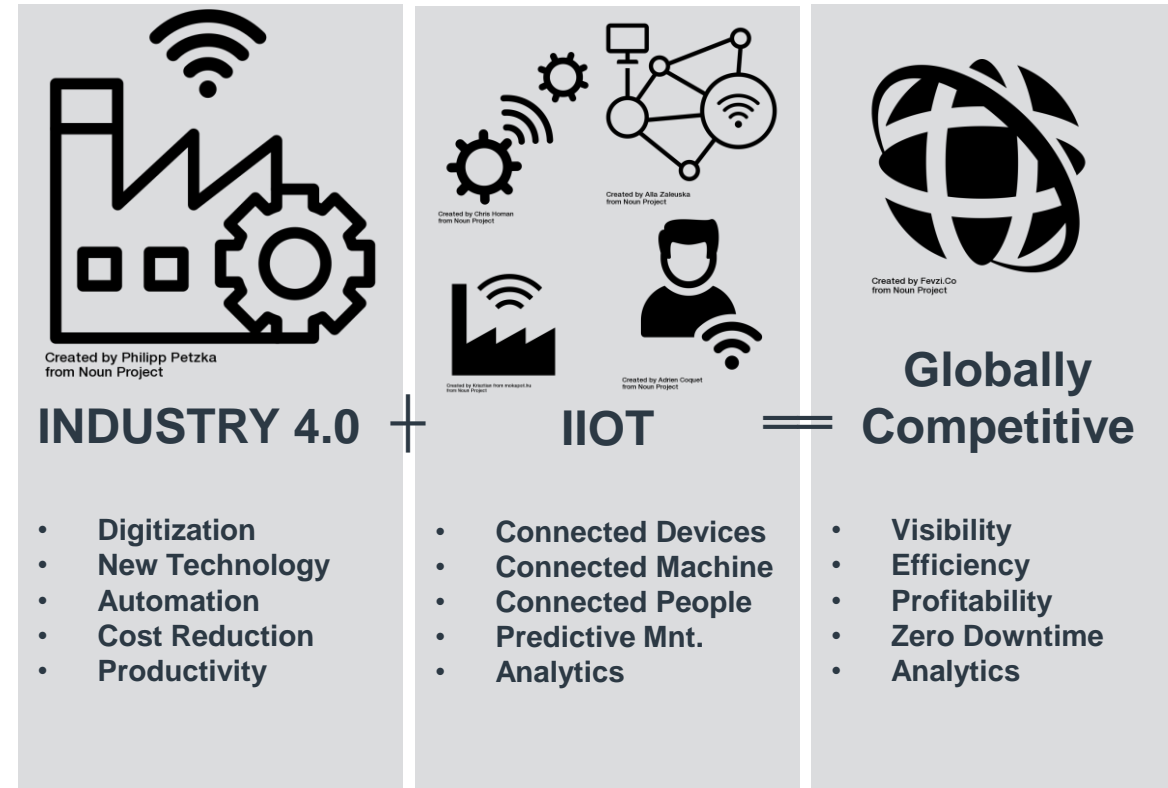
Sources:

<https://www.spectralengines.com/articles/industry-4-0-and-how-smart-sensors-make-the-difference>

<https://www.pwc.fi/fi/julkaisut/tiedostot/industry-4-0-digital-operations-survey-key-findings-finland-2016.pdf>

IIOT

- Connecting devices on the plant floor to a network
- Provide new ways to generate and collect useful data
- Provide visibility down into the machine
- Enabling predictive maintenance and big data analytics
- Improve overall equipment effectiveness
- Provide new insights into our business.




IIoT's connectivity is an enabling force for Industry 4.0

Sources:

<https://automation-insights.blog/2018/11/14/connecting-fluid-power-to-the-industrial-iiot-and-industry-4-0/>

Your IIOT INNOVATIVE TECHNOLOGY PARTNER

2

Innovation awards
in 2019 

IoT

Leading Proven
IOT Technology



Achievements:

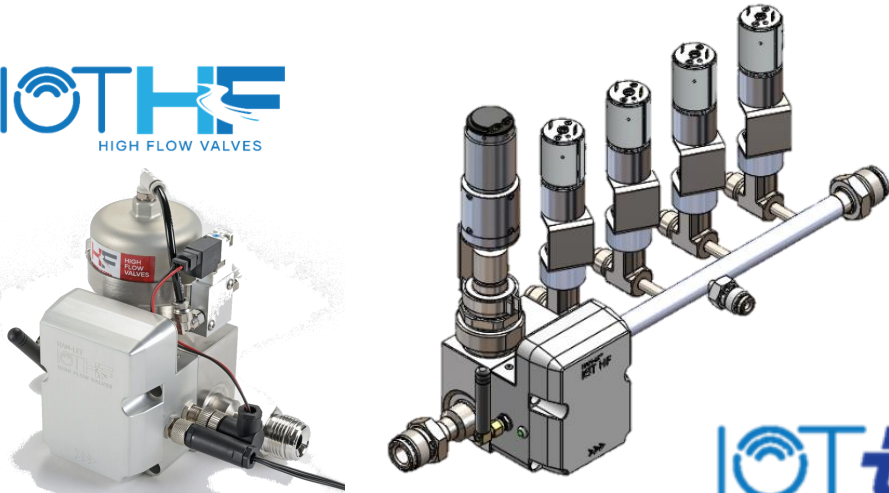
- ✓ IoTH800L-ETH had WON 2019 Innovation Award by Flow Control Magazine
- ✓ IoTH800L-ETH had WON 2nd Place Best IIOT Product in 2019 by Industry of Things
- ✓ Completed successfully multiple Proof of Concept (POC) programs with global companies and installed Ham-Let's IoT valves into customer plants (Refinery, Fabs etc)
- ✓ Developed world 1st ATEX Certified (Zone 0) smart valve.
- ✓ Developed IoT-Let IIoT Platform for Smart Valve Management and AI services



IoT Solution

Smart solutions with broad range of application to lower TCO, enable predictive maintenance and improve operational efficiencies.

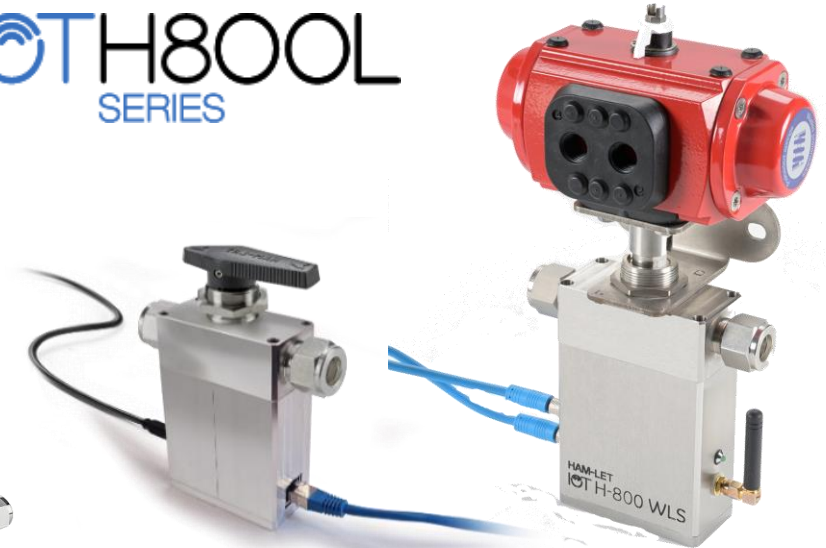
IOTHF
HIGH FLOW VALVES



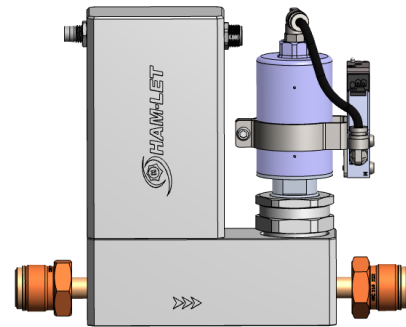
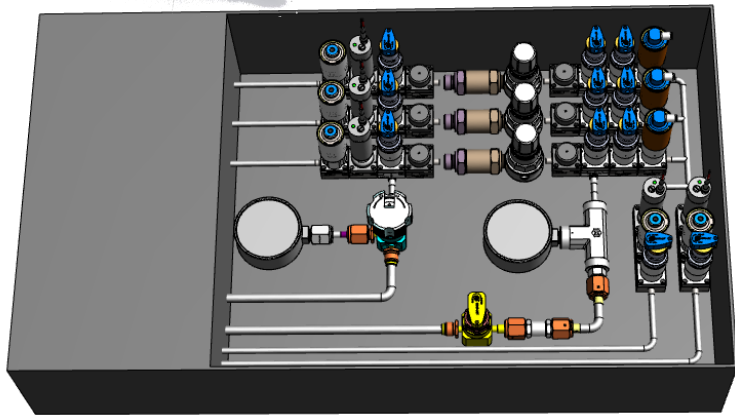
IO-T-LET
SMART VALVE
MANAGEMENT SYSTEM



IOTH800L
SERIES



IO-T-UF SERIES



IOTH900
RELIEF VALVES SERIES

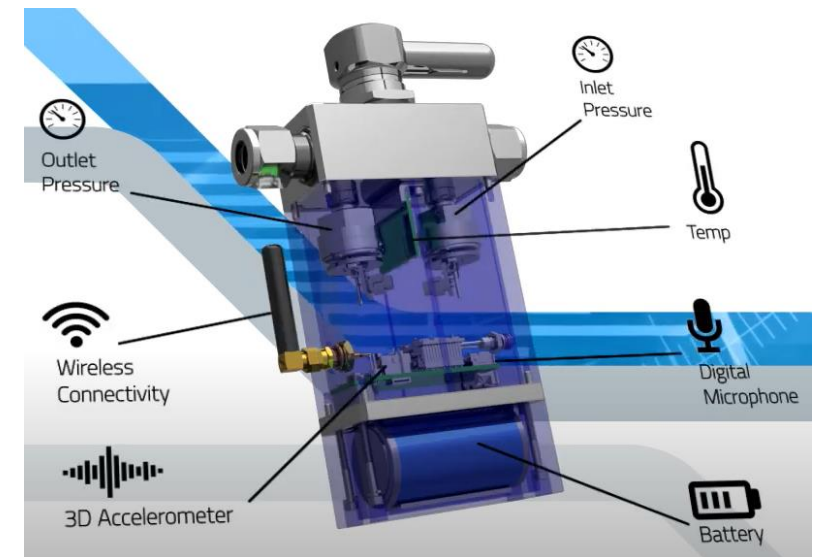


IoT Ball Valve Series

Features and Benefits

- ATEX certified (Zone 0)
- Battery operated (DC powered option available)
- Long operating battery life > 5 years
- Wired uplink connectivity with DC powered version only
 - Ethernet, Modbus RTU and Modbus (TCP)
- Wireless uplink connectivity
 - Supports - LoRaWAN 1.0
- Pressure, Temperature, Humidity, Vibration sensors
- Acoustic Online Measurement
- Max operating pressure at 3000 psi

IoT H800L SERIES



IoT Relief Valve Series

Features and Benefits

- ATEX certified (Zone 0)
- Service pressure up to 225psi
- 24 Vdc Powered
- IFTTT (Rule based Cross Device Triggering)
- ON/OFF status
- Alert triggering
- Flow rate, volume sensing, media temperature and pressure sensing
- Wired uplink connectivity with DC powered version only
- Ethernet, Modbus RTU and Modbus (TCP)
- Wireless uplink connectivity
- Supports - LoRaWAN 1.0
- Also available in High Pressure (HP) model.

IO TH900
RELIEF VALVES SERIES



IoT - High Flow Diaphragm Valve Series

Features and Benefits

- Manual and pneumatic actuated (NC and NO) versions available
- End connection sizes: 3/4" (Cv2.8) and 1/2" (Cv2.5)
- 24 Vdc Powered
- ON/OFF status
- Alert triggering
- Auto-scheduling, remote controlled and monitoring
- Wired uplink connectivity
 - Ethernet, Modbus RTU
- Wireless uplink connectivity
 - Supports - LoRaWAN 1.0



Analytical Oil & Gas Specific Use case



Discrete sampling line monitoring

Used as a parallel sample line (to continuous monitoring), sampled manually by the operators in a frequency determined per process.

[!] Inflection points

Operators do not always track correct timing of the sample, nor pressure; sometimes they don't even actually take the sample; miscalculations may lead to a lower concentration of the oil, causing compensation of the final good with other, more expensive substances to balance the percentage of the final good (Fuel – 95%, 98% etc).



Tailored Solution

Assembling an IOT ball valve next to a sample cylinder, giving sampling time stamp, pressure and temperature, alerting indications of actual sampling to the control system.

Analytical Oil & Gas Use cases- Economical value

Economical Value of Accurate sampling and reduced compensation*:

- Avg of 5 US \$ over the last year gross refining margin per final gasoline barrel ; 15 US \$ per Diesel
- **Higher octane gasolines are more difficult**, more time-intensive to produce, and also require more energy to be expended than compared to lower octane gasolines
- In case of **wrongful sampling and data**, the final good sample will show **lower octane percentage** causing the refinery to **apply compensation** of reformat (high octane product) to naphtha (low octane product) in higher rate than planes, causing the cost of the gasoline production to rise
- Small-Medium size American refinery yields 25K Barrels a day ; 5 US \$ margin per barrel results in total of 125K USD margin a day
- In case our valve will cause higher accuracy sampling (in the rate of 0.1%), and time stamps, we are looking at a minimum of 0.01% of daily margin improvement, resulted in 12.5K US \$ per day of actual margin.

*Sources:

Refining business economical overview: <https://www.canadianfuels.ca/website/media/PDF/Publications/Economics-fundamentals-of-Refining-December-2013-Final-English.pdf>

Margin per barrel: <https://www.neste.com/corporate-info/investors/market-data/oil-product-margins>

Price spread of Premium and regular gasoline: <https://www.eia.gov/todayinenergy/detail.php?id=11131>

PRMS Pressure Relief Specific Use case



Gas relief control and monitoring

PRMS stations suffers from uncontrolled gas relives due to pressure peaks and uncontrolled incidents at the station

[!] **Inflection points**

The customer isn't tracking the amount of gas lost and unaware to the relief incidents and it's duration



Tailored Solution

Smart IOT relief valve can monitor the duration of gas relief, pressure, temperature and estimate the amount of gas lost. Present data about the actual relief threshold design, so the actual cracking pressure will be adjusted in case of excessive relief

PRMS Pressure Relief Specific Use case – Economical Value

Economical Value of Gas relief management*:

- Avg. global price of 1 liter of natural gas is ~0.5 US \$
- In a small country such as Israel, about 9 Billions liters supplied annually to customers
- Professionals estimate that the minimum gas reliefs accounts for about 15K-30K liters annual loss per station; Which worth of 7.5K-15K US \$ annually per station
- North America estimations of **Lost And Unaccounted For** (LAUF) (that's takes into account all losses of gas, including relieves) are estimated in ~100M US \$, our valve can minimize it.
- Considering each station will need 1-3 smart Relief valves, ROI will be in less then a year

*Sources:

Lost and unaccounted gas: <https://pubs.naruc.org/pub/FA86BB52-AE3F-D8AC-B295-801BD6DC6435>

Amount of yearly gas supply in Israel: <https://www.inql.co.il/%d7%a0%d7%aa%d7%95%d7%a0%d7%99-%d7%94%d7%9e%d7%a2%d7%a8%d7%9b%d7%aa/%d7%9e%d7%a2%d7%a8%d7%9b%d7%aa-%d7%94%d7%94%d7%95%d7%9c%d7%9b%d7%94/>

Emerson smart grid solution for natural gas grids: <https://www.emerson.com/documents/automation/brochure-natural-gas-smart-grid-management-fisher-en-1257656.pdf>

Use case – Process sampling system

- **Application:** Sampling System Timing Accuracy
- **Inflection point:**
 - Inaccurate sampling timing
 - Wrong control parameters impacting production yield and system's operation/safety.
- **Tailored Solution:**
 - IoTH800L-WLS valve enable sample readings timing accuracy
 - Reporting exact timing when operators actuate it to collect the sample
 - Ensuring accurate sample collection timestamp shown at IoT-Let cloud dashboard
 - Providing precise correlation to the data collected from the analyzer system.
- **Benefits**
 - Improve Operation efficiencies and quality
 - Reduce manpower cost to access to remote sample points
 - Reduce error, Improve production yield due to more accurate sampling data.



Accurate Sampling capture

Use case – Gas delivery system to laboratory/plant

Application: Monitoring of Gas delivery systems

- **Inflection point:**

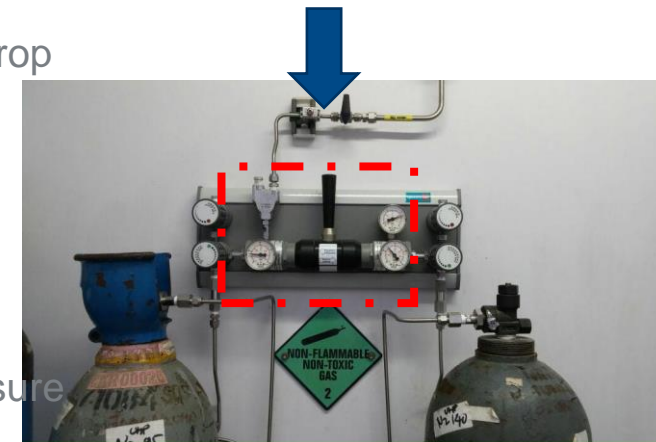
- No real-time monitoring and control of hydrogen and CO bundles (explosive gases).

- **Tailored Solution:**

- IoTH800L-WLS-EX is deployed at the bundle gate to provide real-time detection of pressure drop
- Collected data sent twice daily to cloud based portal
- The operator can provide real time monitoring of progressive pressure drops,
- In case of reaching the pre-defined threshold an alert is presented on the operator dashboard.

- **Benefits**

- **Safety** - Real time alarm/warning sent to operators during any abnormalities like sudden pressure drop, temperature spikes, humidity change etc
- **Preventive Maintenance** and Insights – Real time alarm/warning sent to operators for pre-set alarms.
- **Proactive intervention** (manual or automatic) replace gas bundle.
- Eliminate any **system downtime** due to gas supply disruption.



Use case - IoT High Flow manifold application

Application: Argon welding manifold application for Semiconductor fabs

- **Inflection point:**

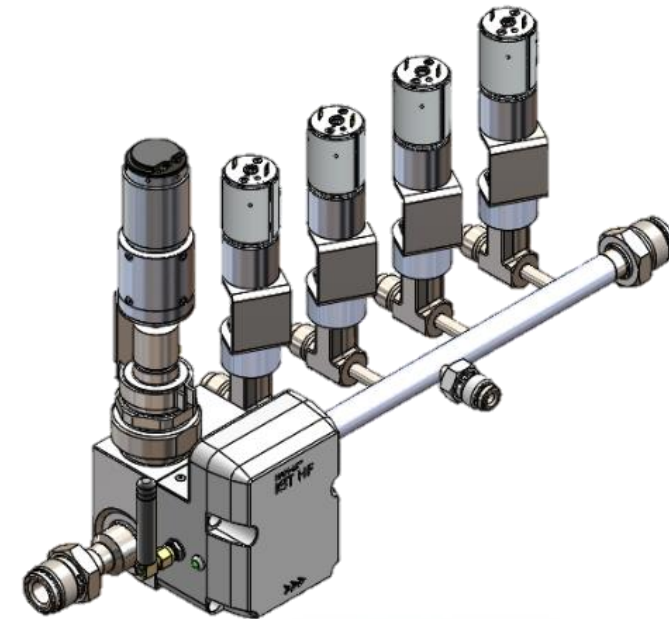
- No automated control of gas purge / shutdown – no Realtime monitoring of system

- **Tailored Solution:**

- IoT HF valve provide manual/Automatic Open/Close functionality with user defined schedule of events.
- Allows automatic purge shutdown and restart events programmed via calendar user interface.
- Control of purge output using remote control of metering valves.

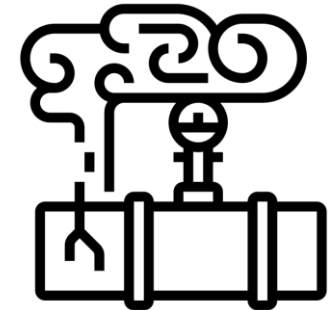
- **Benefits**

- Reduce wastage and save cost
- Improve operational efficiencies and reduce manpower cost
- Provide real time status and control of the purge lines
- Remote control anytime/anywhere via Mobile application or cloud based portal

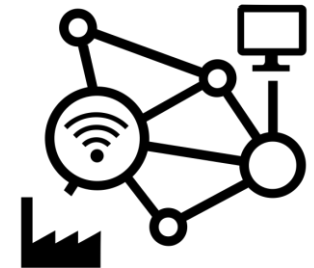


Preventing costly leaks

- Pressure and temperature expose equipment to wear and tear
- When excessive pressure opens up the valve – no way to close them completely
- Leaks not sealed off quickly and effectively can lead to a hundreds of \$ in loss and worse
- Can become a safety hazard that can eventually cause a unplanned shutdown



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from Noun Project



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from Noun Project

Real time Remote Access / Data Sharing

- Eliminate the need to access the main control panel to switch on/off
- Enables plant supervisors/engineers to shut down or open or change parameters remotely
- Data can be shared in real time – processing and analyzing – based on needs
- Example, if there are irregularities detected in the temperature-humidity sensor reading, the valve can be shut down via smart phone application or a laptop
- Increased Productivity



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IoT Delivery Platform – Proof of Concept



Powered by IoT-Let Portal on AWS/Azure



IoT Gateway

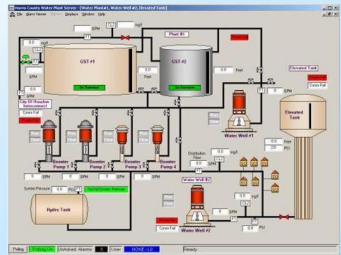
Modbus (RTU) wired Path
Valve's sensors data to be polled over Modbus network

Wired or Wireless uplink to IOT portal
(Optional concurrent path to provide full IoT Functions and historical data correlations/analysis)

Existing PLC Controllers*



SCADA interface* (GUI)



IoTH800KL-WLS-DC smart valve with optional actuator control. Based upon IP66 and ATEX Zone 0/1 design.



- Humidity
- Temperature
- Pressure
- 3D Accelerometer

*For illustration purpose only

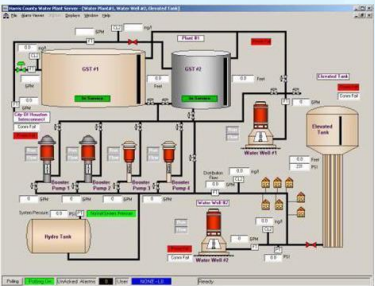
Horizontal Design

Smart Valves ensure interoperability and are customizable to different delivery platforms and hardware. True Horizontal design enable ease of deployment.

iOT-LET
HAM-LET SMART VALVE
MANAGEMENT SYSTEM



Localized Control
Systems



WAN

Industrial Grade
Gateways/Controller



LAN



Multiple Uplink
Options



LoRaWAN™



Modbus

Ham-Let's Smart
devices



IoT Portfolio Summary (Process)



Main Features

Real time sensing			
Remote control - Safety Shut down	✓	✓	
Position/State Indication	✓	✓	✓
IP66 Protection	✓	✓	✓
Wireless (LoraWan – EU, US, AS and AU)	✓		✓
EX Certified (Zone 0/1)	✓		✓
Battery operation option	✓		

Legend

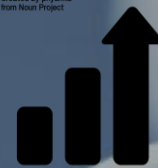
- Microphone
- Humidity
- Temperature
- Pressure
- 3D Accelerometer
- Flow Rate/Volume

* All IoT valves support Modbus RTU as default for ease of configuration and integration

What are your
business
priorities ?



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Thank you

