Wireless Valve Position Monitoring, Diagnostics and Predictive Maintenance through ISA100

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The Eltav Company

- Company stage – sales and implementation
- Development, production, sales and support of wireless valve monitoring and diagnostics solutions
- Products with ISA100 and ZigBee Protocols.
- Member of ISA100 standard committee.
- ZigBee in production; ISA100 scheduled release end 2016.
- ISA100 product in collaboration with major System Company.
- Located in Ranana Israel
- Founded in 2006.
- Acquired by Rotork in November 2015.

A Rotork Company
Typical Industrial Application of Valves

Main reason is cost: data suggests $2K to $5K per valve (Wires, Cable Trays, Cabinets, I/Os, Installation…)

*Ratio may vary depending on process and application

*up to 95% of valves are not monitored!
90% of Valves in the process industries are not monitored due to high TCO costs

Process Failure

1. Reduced yield
2. Prone for human errors
3. Health, Safety and Environmental events
4. Inferior or expensive maintenance strategies
5. Compliance with emerging regulations
Wireless monitoring is here!
The Wireless Valve Monitoring Device (VD)

- Autonomous, Power Efficient
- Retains configuration
- LEDs for alive indication
- Installed on a Valve or an Actuator
- Measures Angle, Temperature, Dynamics, Battery, (4 Digitals)
- ISA100, ZigBee, 125KHz Magnetic and IR OOB provisioning
- In future – control of valves.
VD ISA100 Free Space Test
VD ISA Free Space Results

Open Space VD5 to YE GW Link
PER vs Range

PER [%]
Range [m]

Test3
Test4
Test7
Test8
Test9
Valves Monitoring & Diagnostics
VD ISA100 Diagnostics Features

Partial open

Prolonged movement

Reference Graph

Actual movement

Air pressure problem

Sticky valve
Malefunction of Actuated Valve
Jittering Actuated Valve

Click on the left picture to start video & chart
Raising Handle 2.wmv
Paz Refinery in Israel
Field Example - Detect the un completed valve movement
## Valve Status Summary

<table>
<thead>
<tr>
<th>EUI</th>
<th>Valve Tag</th>
<th>Last Seen</th>
<th>Hardware Timestamp</th>
<th>Angle</th>
<th>Open Percentage</th>
<th>Valve State</th>
</tr>
</thead>
<tbody>
<tr>
<td>000D6F0000174D6F</td>
<td>XV-1610171</td>
<td>12:36:03.203,1 mss</td>
<td>12:36:03.147,1 mss</td>
<td>92.3</td>
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<td>XV-1610178</td>
<td>12:37:12.578,1 mss</td>
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<td>XV-1610193</td>
<td>12:35:36.468,1 mss</td>
<td>12:35:36.406,1 mss</td>
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<td>18</td>
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<tr>
<td>000D6F0000174CF2</td>
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<td>12:35:12.700,1 mss</td>
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</tr>
</tbody>
</table>

**Valve Dynamics - CLOSE [Deg]**

- Dynamics Duration: 2540 [msec]
- Set Reference: [Reference taken on 17/07/2012] [2540 msec]

**Position Status**: 19.2°
Field Example: Detect the uncompleted valve movement
Filtration site of National Water Co.

The Challenge:

- Monitoring the process of adding chemicals to drinking water
Sapir – Sea of Galilee Intake
Rotem - Flap Position Measurement
Rotem 20120227_121223.mp4
Kemira – Specialty Chemicals

Chemical Production site

The Challenge
Monitoring critical manual valves in the process following an incident

The Solution
The Eltav wireless solution has been installed on variety of manual ball valves and actuators providing process interlocks and on line monitoring.
Dannon / Strauss Installation
ON OFF Lifting DEMO P1080136.MOV
Dynamics CLOSED > OPEN
# George Fisher Torn Diaphragm Detection

<table>
<thead>
<tr>
<th>Test #</th>
<th>Torn Diaphragm</th>
<th>New Diaphragm VD Calibrated (REF)</th>
<th>Figure of Merit</th>
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<td>1</td>
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<td>5.0</td>
<td>1.4</td>
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<td>21</td>
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</tr>
</tbody>
</table>

**Average** 60.0 1.4
Damaged O-RING

![Graph showing open percent over m NEC for reference and measured data.](image)

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