

LISTEN.
THINK.
SOLVE. SM

Endress+Hauser Rockwell Automation



AUTOMATION
UNIVERSITY

Collaborating to simplify the
integration of Instrumentation with
Process Automation

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Endress+Hauser A/S, Denmark

THINKING PROCESS

Agenda



1. Introduction

2. Company Alliance

3. Integration Office

4. Integration Documents

5. Case Studies

6. Conclusions



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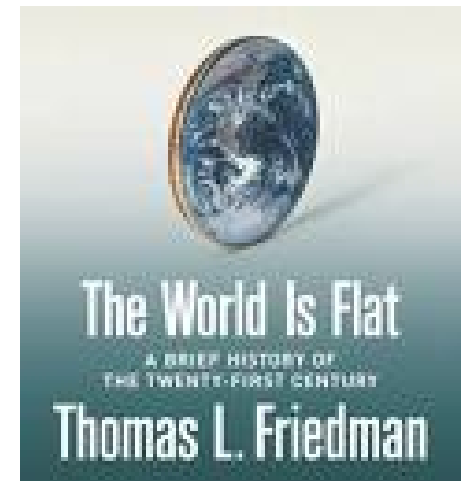
The Value of Collaboration



“The best companies are the best collaborators.

In the flat world, more & more business will be done through **collaborations** within and between companies for very simple reasons: the **next layers of value creation** – whether in **technology, marketing or manufacturing**- are becoming so complex that **no single firm or department** is going to be able to master them alone.”

– Thomas L. Friedman *“The World is Flat”*





- Capital restrictions make purchasing decisions more strict
- End users are focused on operational excellence and continuous improvement
- Automation must:
 - Deliver business value
 - Provide mechanisms for continuous improvements
 - Offer a way for better asset utilization
 - Provide a single and unified view of the complete operation














Endress+Hauser



People for Process Automation

-  Level
-  Pressure
-  Flow
-  Temperature
-  Liquid Analysis
-  Registration
-  Systems Components
-  Services
-  Solutions



Endress+Hauser Strengths



- Leading supplier of field instrumentation for process and solutions for plant asset management
- Strong position in Chemicals, Pharmaceuticals, Food & Beverages, Water Treatment and Biofuels (batch and hybrid industries)
- Committed to bus technologies and management of field information in all its forms (Foundation Fieldbus, Profibus, FDT)
- Focused on delivering value added services with our products



Rockwell Automation's Strengths in Plant Wide Control & Information



- Focus on process industries to deliver total scope of plant control across a range of industries.
- In addition to process control, expertise in the areas of drives, high-speed motion, safety, and discrete automation in process plants.
- Ability to integrate high-speed discrete, drives, and motion control applications with process applications opens up a new realm of plant-wide optimization.



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Value of this Alliance



- Complementary product and solution strengths.
- Convergent industry strengths.
- Both companies increasingly focused on services/solutions.
- Provides a complete field to business level solution that incorporates standard fieldbus technology.
- Joint interoperability testing & certification for fieldbus products, ensures “reduced risk” integration



Joint Solution Scope



Endress+Hauser competence

Instruments



- Process instruments and applications for all industries

Networks



- Fieldbus
- System integration
- Device configuration

System Platforms



- Integrated Architecture
- Device profiles

Packaged Solutions



- Asset management
- MES/information
- Batch

Engineered Solutions



- Complete process automation projects

Rockwell Automation competence

Collaborating for Customer Value



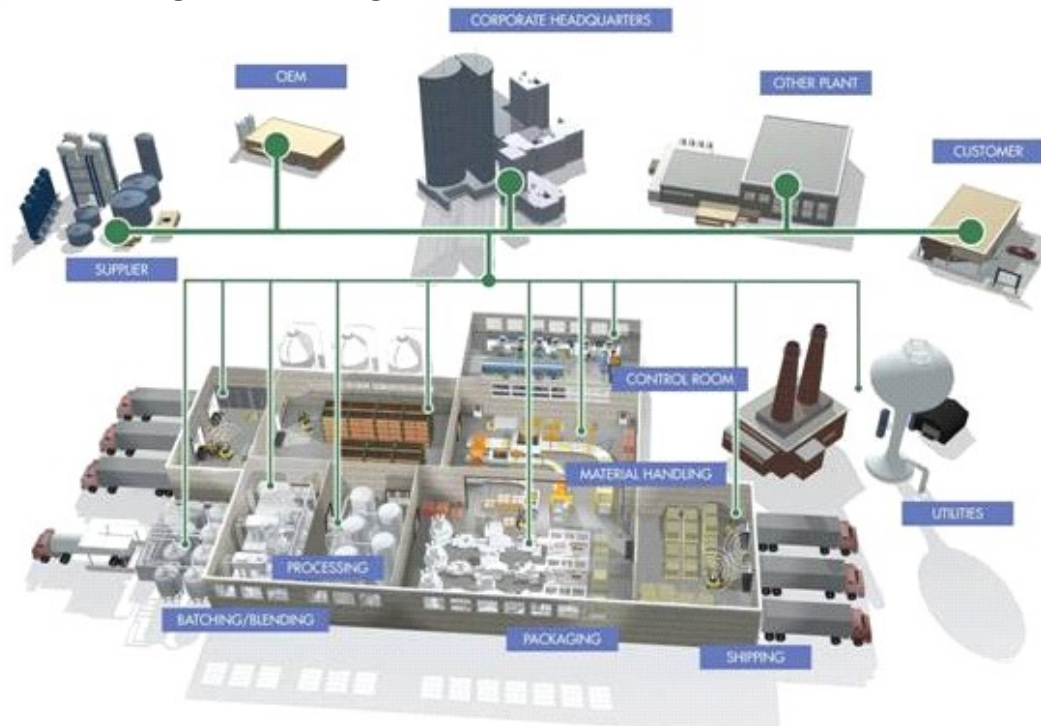
- Covering the space between Process and Discrete applications, essential for next phases in economic plant control
 - Thanks to the combination of PLC and DCS functionality in the Rockwell Automation Integrated Architecture
 - The only system capable of controlling discrete, batch, process, motion, drives and safety applications
- Integration of measurement with automation and information solutions in process / batch applications
 - The alliance Rockwell Automation / Endress + Hauser provides the best scalable, open and cost-balanced solution
- Strategic Partner for Endress + Hauser



Collaborating to provide world class solutions



- Unique alliance draws from the core competencies of both companies to produce something that is greater than the sum of two independent parts



Process automation solutions using best-in-class control systems, instrumentation, software and components

Three strategic cooperation initiatives



- **Technology innovation**
 - Preferred integration between Endress+Hauser process instruments and Rockwell Automation Integrated Architecture
 - **Delivered Value:** Reduce risk, reduce integration costs, protect investment with assured interoperability
- **Integrated asset management**
 - A seamless flow of information between key components of the manufacturing process- from the field instrument through the enterprise business system
 - **Delivered Value:** Improves decision-making and equipment optimization
- **Coordinated engineering services**
 - A wide range of pre-tested, standards-based measurement, automation and information solutions
 - **Delivered Value:** Reduce integration costs, improve operational and maintenance efficiency, optimize plant costs



Interoperability testing



- Performance measures jointly established by both companies
- Verified through completion of common test procedures
 - Assurance Endress+Hauser field instrument meets Integrated Architecture system interoperability performance



Statement attests that the following Endress+Hauser field device:

Model: Prosonic M
Description: HART Level Transmitter
Manufacturing ID: 11
Device Revision: 2
Device ID: Da11
Software Revision: 1.02.00

has been tested with the following Rockwell Automation Integrated Architecture-based host system:

Controller Model: Allen-Bradley ControlLogix
Controller Catalog Number: 1756-LB3
Controller Firmware Version: 15.4
HART Module: Spectrum Controls Analog-HART Input
HART Module Catalog Number: 1756oc-IFB1
HART Module Firmware Version: 2.9

and satisfactorily meets system interoperability measures as jointly established by Rockwell Automation and Endress+Hauser and verified through completion of common test procedures performed by either party.

INTEROPERABILITY STATEMENT


Kevin J. Zaba
Rockwell Automation / Director Process Marketing


Dr. Raimund Sommer
Endress+Hauser Process Solutions AG / Managing Director

Publication PROCES-SIN22A-EN-E - April 2006
50027564/MSA/06
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- 50 Endress+Hauser devices tested

Delivered Value: Ensures a reduced risk solution highlighted by ease of integration and optimum performance

Asset Management



- Turning collective knowledge into enhanced Plant Asset Management offering
 - FactoryTalk AssetCentre
 - FieldCare
- Utilizing Field Device Tool (FDT) for a pluggable & scalable architecture
- Sharing Device Type Manager (DTM) development practices
 - Integration ease
 - Network neutral device configuration and management tools



Delivered Value: Optimizes maintenance & plant operations to improve your resource availability

Commercial & Technical Cooperation



- Joint success is because of local cooperation close to the customer
- Customer technical seminars held worldwide
 - “Process Control Using Smart Instrumentation”



Delivered Value: Seamless support to the customer

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What does Interoperability mean?



The Merriam-Webster dictionary defines INTEROPERABILITY as:

“... the capability of a system to work with or use the parts or equipment of another.”

Why focus on Interoperability?



- The use of instrumentation in a control system should be **easy**
- Integration tests **reduce risk** of problems during system development
- Equipment installation documentation and **easy to use** configurations help inexperienced users to succeed
- Predesigned **libraries** of code and graphics can be easily reused
 - Eliminates development time and associated costs
 - Provide a recipe for success
 - Guarantees easy to maintain standards



Interoperability Statements



Statement attests that the following Endress+Hauser field device:

Model: Prosonic M
Description: HART Level Transmitter
Manufacturing ID: 11
Device Revision: 2
Device ID: 0x11
Software Revision: 1.02.00

has been tested with the following Rockwell Automation Integrated Architecture-based host system:

Controller Model: Allen-Bradley ControlLogix
Controller Catalog Number: 1756-L63
Controller Firmware Version: 15.4
HART Module: Spectrum Controls Analog+HART input
HART Module Catalog Number: 1756sc-IF8H
HART Module Firmware Version: 2.9

and satisfactorily meets system interoperability measures as jointly established by Rockwell Automation and Endress+Hauser and verified through completion of common test procedures performed by either party.

INTEROPERABILITY STATEMENT

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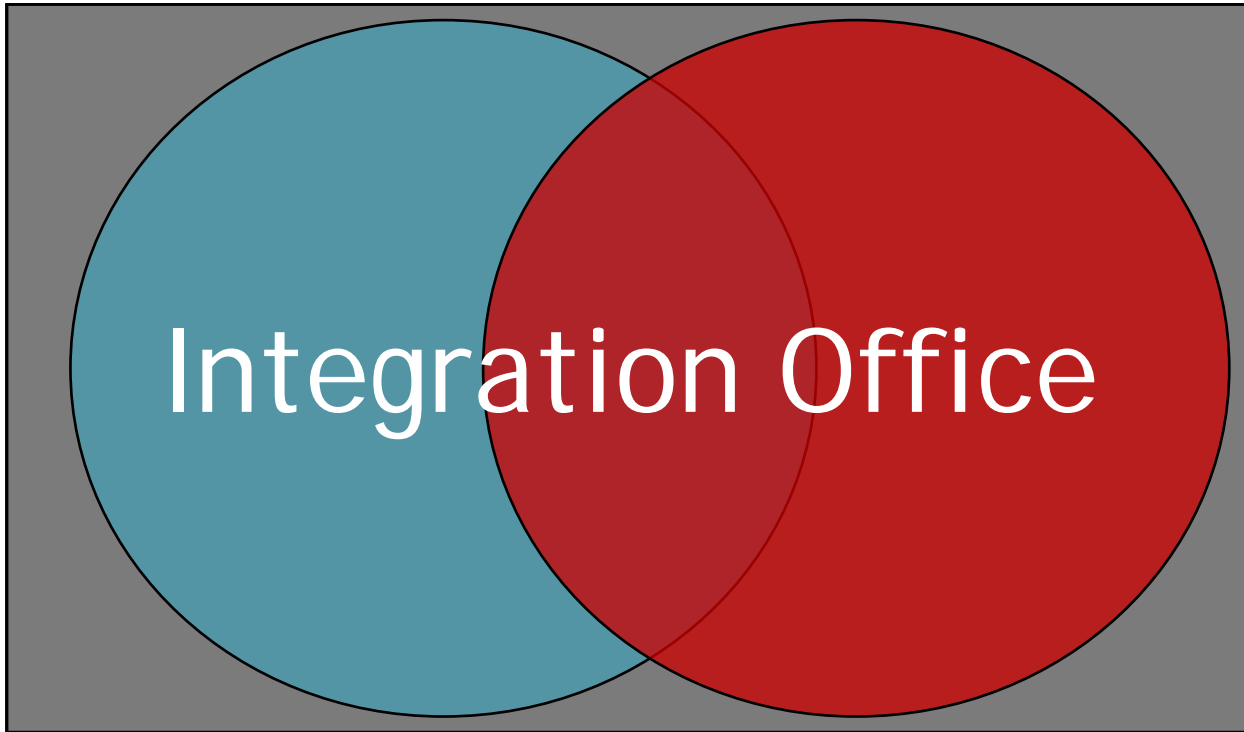
**Rockwell
Automation**

Endress+Hauser 
People for Process Automation

Publication PROCES-SR022A-EN-E – April 2006
SD037S/04/en/04.06

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Integration Office



Interoperability Tests

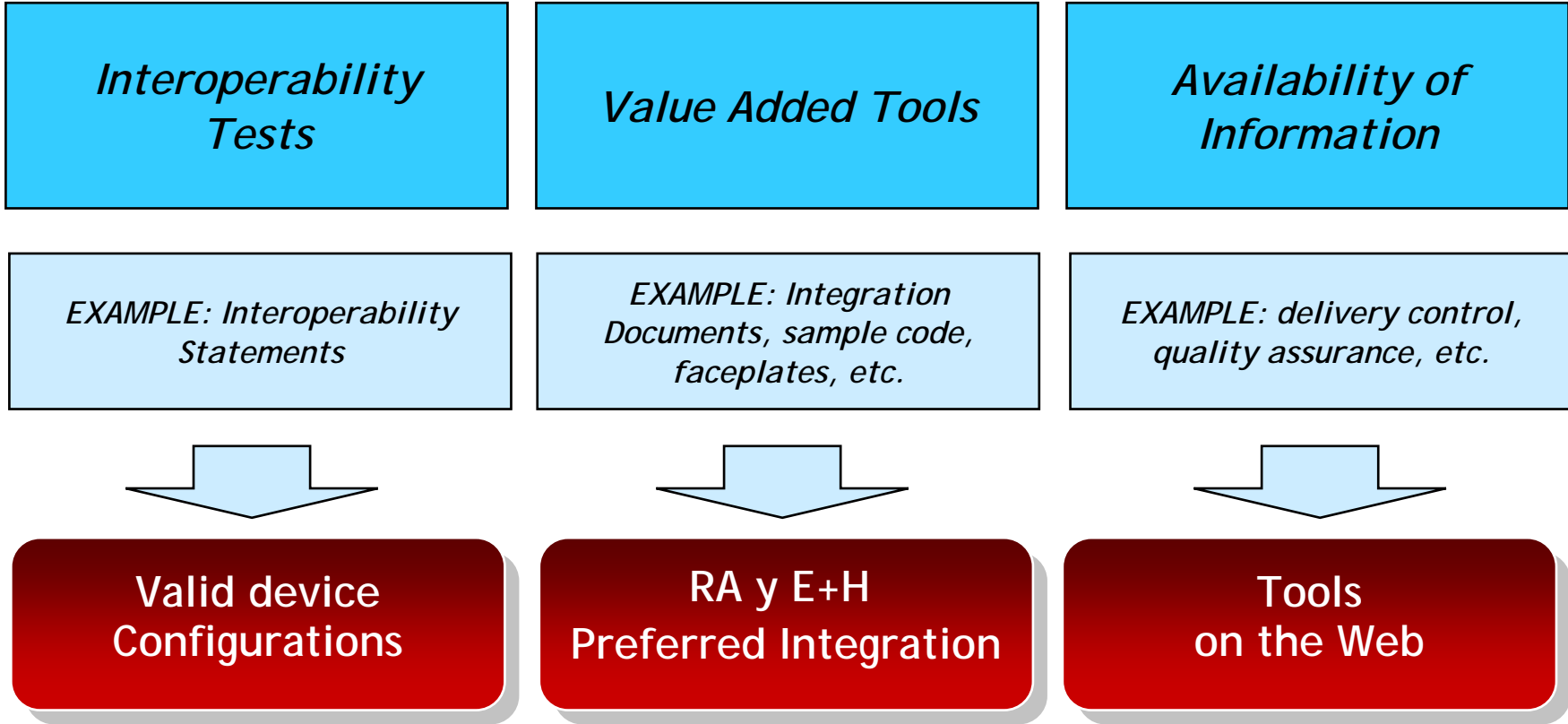
Preferred Integration

Sharing resources to provide solid technical solutions and preferred products and services for customers

Integration Office



Comprehensive and Systematic Focus on Preferred Integration



Integration Office



- Main Objective
 - Simplify integration of E+H instruments with the RA Integrated Architecture
- Priorities
 - ControlLogix HART I/O modules with E+H HART devices
 - HIPROM EN2PA on EtherNet/IP with E+H ProfibusPA devices
 - FF linking device with E+H FF devices
- Resulting Tools
 - Integration Documents
 - Key instrument and control functionality, firmware, software, wiring, configuration, templates, asset management, etc.
 - View Faceplates and Logix Add-on Instructions



Future Integration Plans



- The collaboration with Endress+Hauser creating the Integration Office is a pilot project in Rockwell Automation
- Rockwell Automation will consider future partners to improve and optimize the integration with their devices
- Future specifications of Rockwell Automation products will adjust to meet interoperability standards

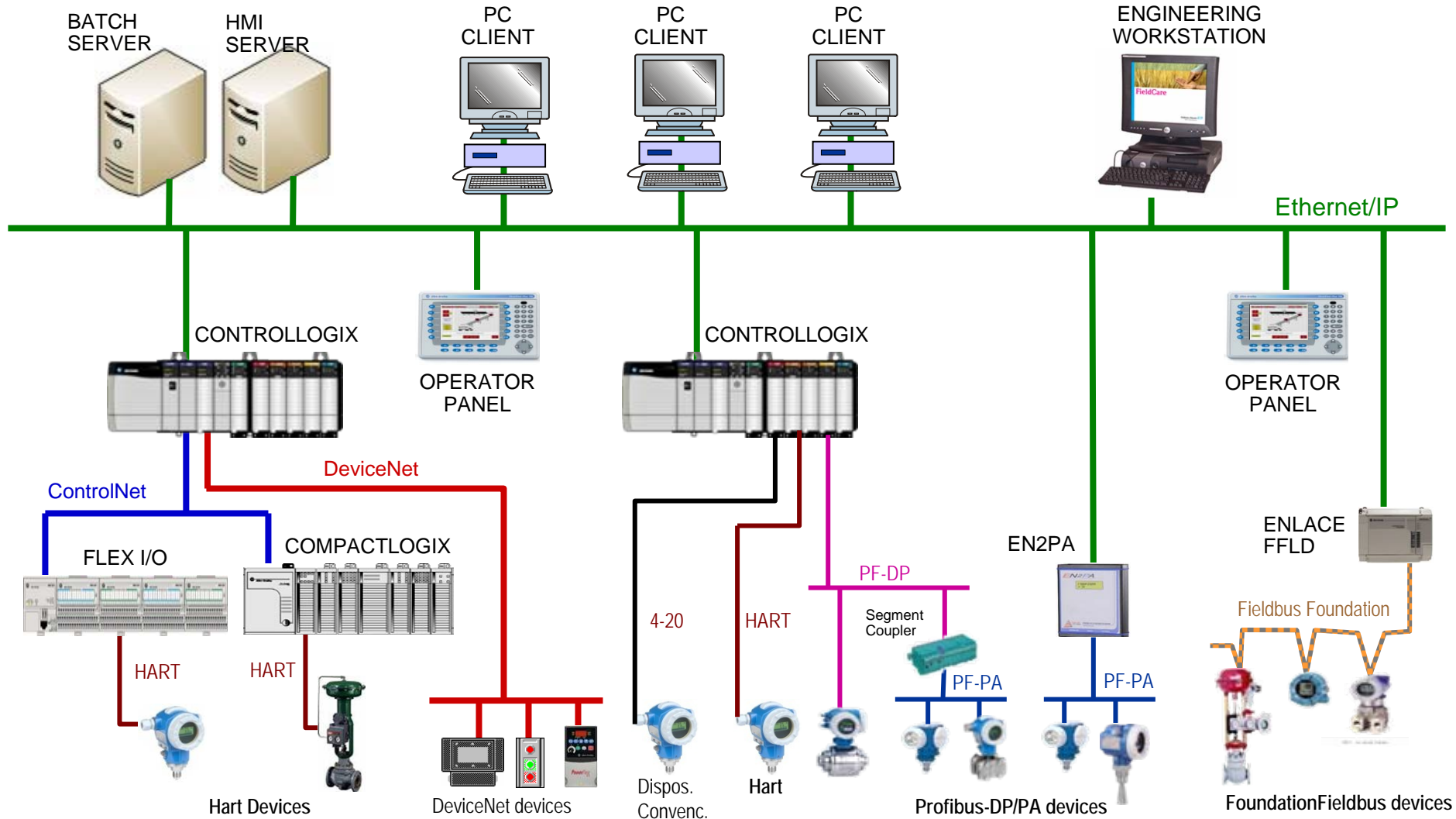


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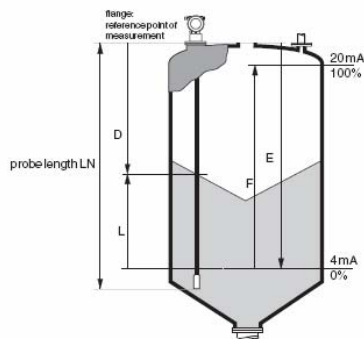
Rockwell Automation and Endress+Hauser



Integration Documents



6 Levelflex M Guided Level-Radar via HART to Integrated Architecture for Process Control



Item	Description
E	Empty distance
F	Span (full distance)
D	Distance from sensor membrane - product surface
L	Level

The dielectric constant (DK) of the medium has a direct impact on the degree of reflection of the high frequency pulses. In the case of large DK values, such as for water or ammonia, there is strong pulse reflection, while with low DK values, such as for hydrocarbons, weak pulse reflection is experienced.

Measured Variables

The measured variable is the distance between a reference point and a reflective surface (i.e. medium surface). The level is calculated based on the tank height entered. The level can be converted into other units (volume, mass) by means of a linearization (32 points).

Signals from Instrument to Control System

Signal	Details
Current Output	4...20mA with HART protocol

RA Publication PROCES-AP012A-EN-P - September 2008

E+H Publication SPO05A/04/en/09/08

Integration Documents: Process Solutions Device Integration from Rockwell Automation - Rockwell Automation EMEA

Address: <http://www.rockwellautomation.com/solutions/process/integrationdocs.html>

Rockwell Automation United States + Worldwide

PROCESS SOLUTIONS Device Integration

Integration Documents

These documents provide a step-by-step approach to integrating a field instrument into a Rockwell Automation Integrated Architecture for Process Control system. Features include:

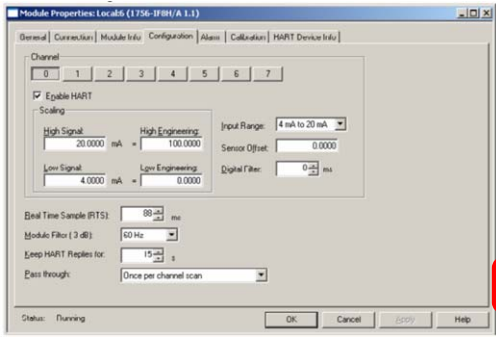
- Application Overview** – Details about the field instrument and control system.
- System Details** – Specifications on the required hardware and software components.
- Installation** – How to connect the measurement instrument to the network interface.
- Configuration**
 - How to configure the network interface.
 - How to configure the measurement instrument and manage parameters.
- Visualization** – How to implement and configure a graphical display of device information.

Documents Available [English: PDF]

- HART Devices via HART I/O**
 - Endress+Hauser – Promass 83 Coriolis Mass Flow
 - Endress+Hauser – Promag 53 Electromagnetic Flow
 - Endress+Hauser – Prowirl 73 Vortex Flow
 - Endress+Hauser – Promotec mass 45 Thermal Flow
 - Endress+Hauser – Levelflex M Guided Radar Level**
 - Endress+Hauser – Micropilot M Radar Level
 - Endress+Hauser – Prosonic M Ultrasonic Level
 - Endress+Hauser – Prosonic S Ultrasonic Level
 - Endress+Hauser – Liquiline M for Liquid Analysis
 - Endress+Hauser – Cerabar S Pressure
 - Endress+Hauser – Deltabar S Differential Pressure
 - Endress+Hauser – ITEM T.M.T 162 Temperature
 - Endress+Hauser – ITEM T.M.T 182 Temperature

<http://www.rockwellautomation.com/solutions/process/integrationdocs.html>

Example: Levelflex M with ControlLogix

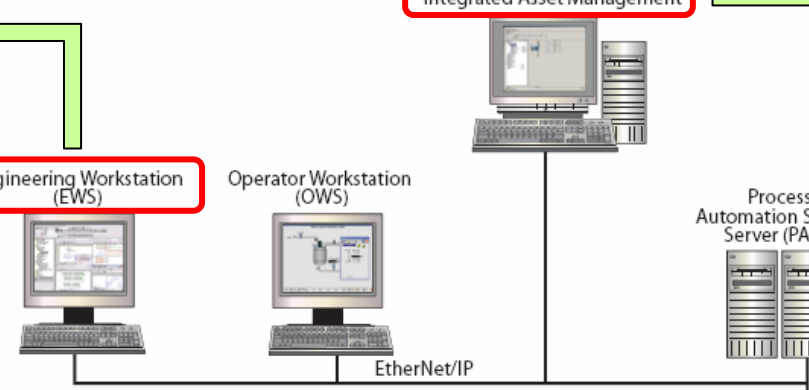
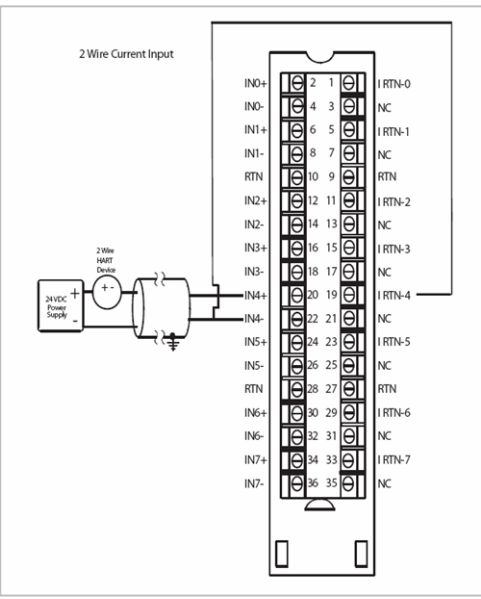
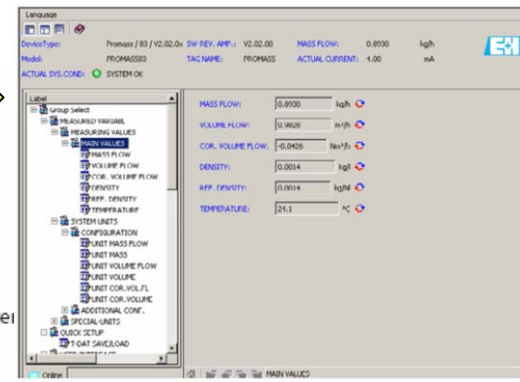


Engineering Workstation (EWS)

Operator Workstation (OWS)

Integrated Asset Management

Process Automation System Server (PASS)

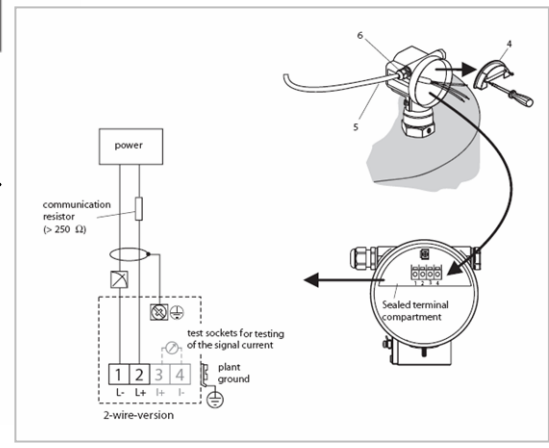


ControlLogix



HART 4-20mA

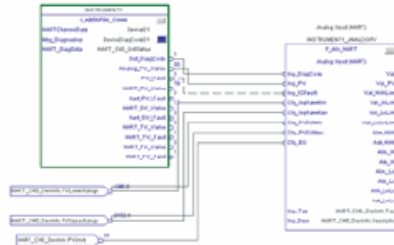
Levelflex M



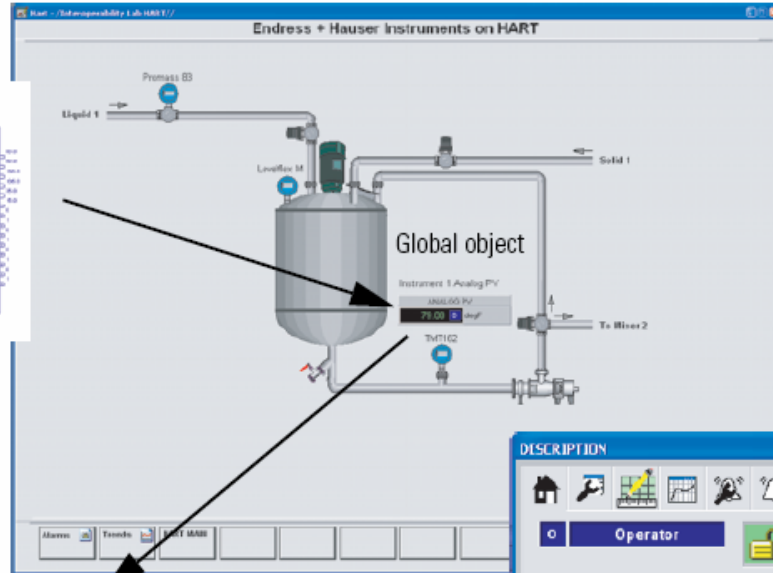
Example: Rapid Customization



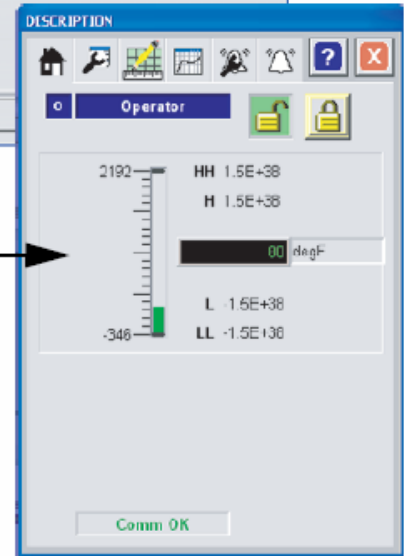
Add-On Instructions in a function block routine.



FactoryTalk View SE Display



Click on global object.



- Predesigned **Add-On Instructions** provide bidirectional data exchange between the faceplates and the ControlLogix PAC controller
- FactoryTalk View SE **Faceplates** provide visualization of the instruments connected to the I/O modules

FactoryTalk View Faceplates



- Provide
 - Typical analog PV
 - Analog I/O fail state
 - PV HART (primary, secondary, etc.)
 - HART channel diagnostics (primary, secondary, etc.)
 - HART extended diagnostics
- Allow configuration of:
 - Tag Name, Description, Mode
 - Operator, Program, etc.
 - PV range (min, max)
 - Alarm level (LL,L,H,HH)
 - Hi-range and Low-range Alarms
 - Alarm delays
 - System Hysteresis

The screenshots illustrate the configuration and operation of an analog PV faceplate. Key elements include:

- Vertical Scale:** Shows a scale from 0 to 100 with alarm levels: HH (98), H (95), L (15), and LL (10). The current value is 89.
- Alarm Thresholds Table:**

Alarm Type	Threshold	Deadband
Out-of-Range High	100.00	0.00
High-High Alarm	98.00	1.00
High Alarm	95.00	1.00
Low Alarm	15.00	1.00
Low-Low Alarm	10.00	1.00
Out-of-Range Low	5.00	0.00
- Configuration Form:**
 - Label: ANALOG PV
 - Tag: TAGNAME
 - Raw Input Scaling: Input (Maximum: 100.00, Minimum: 0.00), Scale (1)
 - Units: ENG U
 - Options: Disallow selection of Substitute PV, Clear Program Commands on receipt
- Trend Graph:** Shows a value of 100.00 over time (9:59:49 PM to 10:01:49 PM).
- Alarm Acknowledgment Table:**

Alarm Type	Ack Reqd	Reset Reqd	Minimum Time (secs)
Fail High Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000
High-High Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000
High Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000
Lo Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000
Low-Low Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000
Fail Low Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000

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Teaming to deliver value



Sustained profitability of biodiesel facilities requires management of volatile energy costs, uncertain feedstock and supply costs and increasingly tighter operating margins

- Archer Daniels Midland Company is one of the world's largest agricultural processors, processing food & animal feed ingredients, renewable fuels and naturally derived alternatives to industrial chemicals
- ADM Company – Mid America Biofuels, LLC is Missouri's first biodiesel facility – Mexico, Missouri
- Capacity of 30 million gallons biodiesel production per year, soybean oil as feedstock.
- Endress+Hauser - hundreds of measuring instruments for plant: level, flow, pressure, temperature
- Rockwell Automation – process automation system

Delivered Value: Shared expertise in supporting biodiesel customers. Paramount was our interoperability and risk minimization

Teaming to deliver value



- One of central Indiana's first soy biodiesel fuel production facilities
- Located in Morristown, Indiana,
- Opened doors on August 1, 2006 for a crowd of over 500 dignitaries, farmers and leaders from the agricultural and renewable fuel community.
- Endress+Hauser provided hundreds of measuring instruments for plant: level, flow, pressure, temperature
- Rockwell Automation provided the process automation system

Delivered Value: Provided application knowledge, specific to biodiesel manufacturing processes from concept to plant start-up

Teaming to deliver value



Project has 18 separate networks with more than 300 instruments plus control valves

Key factors were:

Speed of bus, cost and the number of devices on each segment

FDT/DTM technology enabled management of instruments and valves using the same network without adding wiring or hardware

- Fastest growing insulation manufacturer in the world
- Goal to leverage the latest technology in process control in expansion project
- Lanett, AL and Shelbyville, IN facilities
- Joint presentation showed support of multiple bus protocols in one process controller using Integrated Architecture platform, Control Logix
- Provided a “bus neutral” view – an explanation of pros and cons of Profibus, HART and Foundation Fieldbus

Delivered Value: The ability to replace devices without reconfiguring or shutting down network

Teaming to deliver value



Project uses HART cards with more than 100 instruments

- Family-owned business producing 100 tomato products since 1942
- The nation's largest tomato supplier outside of California
- Three state-of-the-art processing facilities, located in Indiana
- Customer wanted assurance the Endress+Hauser FieldCare, FDT-based tool to configure the intelligent field devices, would integrate with the Rockwell Automation process controller

Delivered Value: Superior distribution channel due to local support, collaboration between firms to deliver a better product.

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Summary and Conclusions



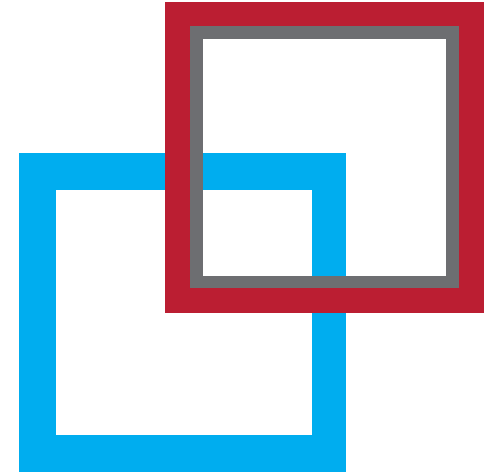
- Endress + Hauser and Rockwell Automation have established a collaboration process to simplify the integration of instrumentation with process control systems
- The joint Integration Office is performing device interoperability tests and creating value adding tools
- The corporate collaboration between Endress+Hauser and Rockwell Automation provides high-value differentiating solutions designed for our customers



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Questions?



THINKING PROCESS