Foundation Fieldbus Devices & NAMUR NE 107

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Agenda

- Drivers for NE 107
- Challenges faced by Operators Today
- Foundation Fieldbus & NAMUR
- Benefits of NAMUR NE 107
- Summarized NE 107
Dark Ages

Must be right
Tx says so

Analogue Signal

16mA

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What are you? ????

Communication request using Hand held device
Master Slave

Endress+Hauser Deltabar S
What would you like to know? ??

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Today

The Here and Now

Endress+Hauser
Deltabar S
Your Pump may soon need some maintenance!

Foundation Fieldbus Peer to Peer

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Diagnostic Information from Devices

- Travel Deviation
- Cycle Counter
- Valve Signature
- Step Response
- Dynamic Error Band
- Drive Signal
- Output Signal
- etc...

- Electronics Failure
- Sensor Failure
- Process Condition
- Configuration Warning
- RTD Drift
- RTD Life Estimation
- etc...

- pH Electrode Aging
- Glass Electrode Failure
- Reference Electrode Failure
- Reference Electrode Coating
- Reference Electrode Poisoning
- etc...

- Endress+Hauser

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The Status Today

• Large part of the Production & Quality losses are primarily result of operator error which can be prevented by ensuring that right information is available to the right person at right time.

The global process industry loses $20 billion, or five percent of annual production, due to unscheduled downtime and poor quality.

ARC estimates that almost 80 percent of these losses are preventable and 40 percent are primarily the result of operator error.
Challenges Faced by Operators Today

- Difficult to get **overview status** of the process.
- Operators are bombarded with **Nuisance alarms**
- **Inconsistencies in diagnostics** information from different vendors & product classes.
- Different applications, terminals, interfaces with unsynchronized data
- Operators are integral part of control loops and need to **take decisions** in critical situations.
Foundation Fieldbus and NAMUR

- May 2006 Foundation Fieldbus announced co-operation with NAMUR Working Group 2.6 for development of device diagnostic profiles to further enhance FF technology.
- Sept 2008 Foundation Fieldbus released final Diagnostic Profile specification based on NAMUR Working Group 2.6.
- Adopted NAMUR NE 107 recommendation for “Self Monitoring & Diagnostics of Field Devices”
Fieldbus Foundation Releases Final Diagnostic Profiles Specification

New specification builds upon robust FOUNDATION diagnostic features

AUSTIN, Texas, Sept. 30, 2008 – The Fieldbus Foundation today announced the release of the final FOUNDATION fieldbus Diagnostic Profiles Specification. Based on guidelines established by the NAMUR Working Group 2.6, this specification builds upon the robust diagnostic features already provided by FOUNDATION fieldbus devices. At the same time, it allows end users to harness enhanced Electronic Device Description Language (EDDL) technology to achieve true, actionable diagnostics.

Beginning in May 2006, the Fieldbus Foundation and NAMUR, an international user association for automation technology in the process industries, collaborated on enhancements to FOUNDATION technology, which improved its usability. A key objective of this work was to unify the integration of fieldbus self-monitoring data and ensure the availability of valuable diagnostic information to process plant operators, engineers and technicians.

According to the NAMUR NE107 recommendation, “Self Monitoring and Diagnosis of Field Devices,” fieldbus diagnostic results should be reliable and viewed in the context of a given application. The document recommends categorizing internal diagnostics into four standard status signals. It also stipulates configuration should be free, as reactions to a fault in the device may be very different depending on the user’s requirements. According to NE107, plant operators should only see status signals, with detailed information viewable by device specialists.
What is NAMUR?

• NAMUR is an international association of users of automation in process industries.
  – manufacturers of chemical or pharmaceutical products
  – users of process plants
  – providers of services to chemical/pharmaceutical manufacturers
  – organizations with a technical or scientific purpose, e.g. scientific bodies, associations, universities etc.
NAMUR Organization
What does NAMUR do?

- **NAMUR promotes the interests** of the process industry (users) in the field of automation e.g.
  - instrumentation with **sensors and actuators**,
  - electrical engineering
  - **communication** between process control equipment,
  - batch control, advanced process control, plant and process monitoring,
  - DCS, MES
  - process management, plant asset management
  - Logistic systems and Supply Chain Management
Objective of NAMUR NE 107

- It is **Standardization of diagnostics information** form field devices integrated via e.g. Foundation Fieldbus
- Improved **Operator Efficiency**
- Improve **Productivity**
- Reduce **cost**
- Make maintenance more **efficient**.
What are NAMUR 107 Benefits

• What does NAMUR 107 implementation do?
  • Bring Reliable & Viewable status diagnostics from field devices

  • Status will be forwarded to the right person at right time (fewer spurious alarms)

• Actionable Diagnostics

• Allocation of status signals in field devices. Independent of DCS!
Summarized NAMUR - NE 107

- NE107: “Self-Monitoring and Diagnosis of Field Devices”
  - Diagnosis results must be reliable
  - Internal diagnosis categorized into 5 standard status signals
  - Configuration should be flexible depending on the user's requirements
  - The plant operator should only see these status signals
  - The diagnosis results must always be viewed in the context of the application
  - Detailed information available for device specialist
NAMUR Recommendation NE 107

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NAMUR Recommendation NE 107

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### 5 Categories of Status signals

<table>
<thead>
<tr>
<th>Status signal</th>
<th>Color</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal</strong>: valid output signal</td>
<td><img src="green.png" alt="Green" /></td>
<td><img src="green.png" alt="Green" /></td>
</tr>
<tr>
<td><strong>Maintenance required</strong>: still valid output signal</td>
<td><img src="blue.png" alt="Blue" /></td>
<td><img src="syringe.png" alt="Syringe" /></td>
</tr>
<tr>
<td><strong>Out of specification</strong>: signal out of the specified range</td>
<td><img src="yellow.png" alt="Yellow" /></td>
<td><img src="question_mark.png" alt="Question Mark" /></td>
</tr>
<tr>
<td><strong>Function check</strong>: temporary non-valid output signal</td>
<td><img src="orange.png" alt="Orange" /></td>
<td><img src="wrench.png" alt="Wrench" /></td>
</tr>
<tr>
<td><strong>Failure</strong>: non-valid output signal</td>
<td><img src="red.png" alt="Red" /></td>
<td><img src="x.png" alt="X" /></td>
</tr>
</tbody>
</table>

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NAMUR Recommendation NE 107

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Maintenance Required. Leakage??

Status to Operators
NAMUR Recommendation NE 107

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Context of Application

Operator's Console

Maintenance Console

SD_MAINT_ALM
Active

SD_MAINT_ACTIVE
Clogged Pressure Sensor

SD_RECOMMENDED_ACTION
Clean Sensor

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NAMUR Recommendation NE 107

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FF 912 Specification

- FF 912 - Field Diagnostic Profile
  - The technical specification which describes the implementation of the NE 107 into Foundation Fieldbus → Endress+Hauser was part of the specialist team which defined the FF 912
FF 912 Explanation

Must be implemented in the Resource Block since ITK 6.0

→ The same parameters are available for all manufacturer. The parameterization for the FMCS categorization is similar for all vendors.

Can be implemented if additional diagnostic bit are needed

→ Manufacturer specific
Endress+Hauser Committed to NE107

- Hardware
- Software
- Testing
- Logistic

E+H Group
Wide
Standard for

Advanced
Diagnostic

Products Platform With NE 107
- FMP 5x – GWR*
- TMT 82*
- E 200 – Coriolis *

* Presently Released with HART Only, Ff expected

DCS / PLC
Integration

DTMs

Endress+Hauser
People for Process Automation

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Example E200 Coriolis

1. Measurement page with warning
   - An event occurred. Depending on event status the status symbol for the event level is shown

2. Event page
   - Icon/text according NE 107 (F,M,C,S)

3. Info page
   - Event occurred.
   - Maintenance instructions

Diagostic event page.
Challenges

• Time by which device & host vendors will become compliant.
• Vendors having products manufactured at different production centers (acquired companies)
Summary

• Clear Harmonized information Independent of source of data

• Good overview of Process & Status

• All relevant information available in easy to use environment.