NAMUR

This white paper defines NAMUR and explains the DeltaV system's application of its guidelines.
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Introduction

The DeltaV system open architecture encompasses industry standards and guidelines and state-of-the-art technology. Please refer to the *Standards and Technologies* whitepaper for details on the industry standards, various technologies, and industry guidelines together with where they are used in the DeltaV system. Where appropriate, the DeltaV system applies international standards as opposed to industry or trade group recommendations. This approach is consistent with NAMUR, as the published NAMUR recommendations are not intended to be viewed as standards or guidelines. In this paper we will give a brief outline of the areas of the DeltaV system that may be influenced by NAMUR guidelines, followed by a background on NAMUR. The information on NAMUR is obtained from their web site. ([http://www.namur.de/en/organ_d11.html](http://www.namur.de/en/organ_d11.html))

Application of NAMUR Guidelines in the DeltaV System

NAMUR guidelines apply directly in several areas of the DeltaV system. The first is NAMUR NE33 31.03.1993: “Requirements to be met by systems for recipe-based operations.” This guideline is evident in the implementation of Recipe Studio, which also conforms to the ISA SP88 standard. In the DeltaV I/O area NAMUR alarming applies to analog signals (see below) and additionally the I.S. DI card is designed to be compatible with NAMUR sensors (to DIN 19234). In addition, the DeltaV system conforms to many of the standards that are referenced in the NAMUR guidelines. We will examine the example of NAMUR NE 21 below.

NAMUR Limit Detection

You can enable NAMUR limit detection for the analog input value by configuring the I/O channel properties NAMUR_ENA parameter. When this feature is enabled (TRUE) and the IO_IN type is FIELD_VAL_PCT or HART_FIELD_VAL, the status of the input is set to Bad if the signal level is above 21 mA or below 3.6 mA for more than four seconds. The Bad status is cleared when the signal returns within these limits. You can use this feature when the transmitter is designed to flag a device failure by setting its current signal outside the normal 4-20 mA range.

Example NAMUR NE 21

NAMUR NE 21 - Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.

This document is prefaced with the following comment as to scope of application - “NAMUR recommendations and worksheets are working documents and practical reports prepared by NAMUR for their members. Their application is optional. The papers are neither normative standards nor guidelines.” Commentary on this recommendation shall be made with this scope in mind.

NE 21 is a uniform and practical way of determining whether the devices used in process control are immune to interference. It also includes references to national, international and drafts of standards. NE 21 requires testing to a series of standards, some of which are not yet mandatory in Europe. The current EMC standard (EN 61326) covers most of the requirements referenced in NE21.

Currently, the DeltaV system is compliant with EN 61326, but parts of the system do not meet the additional requirements of NAMUR NE21. In addition, the DeltaV system meets the standards with acceptance criteria appropriate for a system under “continuous unmonitored operation.” Namur NE 21 can be interpreted to define the acceptance criteria as would be appropriate for “essential operation (functional safety)” under the EN standard. With the new redundant-capable I/O cards targeted for use in SIS applications, along with new versions of the MD Controller and Dual DC/DC System Supply, the DeltaV system meets the more stringent acceptance criteria.
appropriate for “essential operation(functional safety)” as required by IEC 61326, and thus meets this interpretation of the requirement of NE21.

The goal is to meet the mandatory requirements of applicable EN standards and any other applicable international standards, with NAMUR NE 21 (and others) as a secondary goal due to their stated purpose of being “neither standards or guidelines.”

**Immunity standards for EN 61326:**
- EN 61000-4-2  ESD
- EN 61000-4-3  Electromagnetic Fields
- EN 61000-4-4  EFT
- EN 61000-4-5  Surge
- EN 61000-4-6  Conducted RF
- EN 61000-4-8  Magnetic Fields
- EN 61000-4-11  Voltage Dips & Dropouts

**Additional standards for NE 21:**
- EN 61000-4-16  Common Mode Disturbances
- EN 61000-4-17  Ripple on DC Power

**Standards/specification cited**
- DIN V ENV 50140; VDE 0847 Part 3 1995.02
- DIN V ENV 50204; VDE V 0847 Part 204 1996.02
- DIN EN 61000-4-2; VDE 0847 Part 4-2 1996.03
- DIN EN 61000-4-4; VDE 0847 Part 4-4 1996.03
- DIN EN 61000-4-5; VDE 0847 Part 4-5 1996.09
- DIN EN 61000-4-6; VDE 0847 Part 4-6 1997.04
- DIN EN 61000-4-8; VDE 0847 Part 4-8 1994.05
- DIN EN 61000-4-11; VDE 0847 Part 4-11 1995.04
- DIN IEC 77A/156/CD; VDE 0847 Part 4-17 1997.04
- DIN IEC 77A/120/CD; VDE 0847 Part 4-16 1995.05
- DIN IEC 77B/193/CDV; VDE 0847 Part 4-4/A1 1996.10
- DIN IEC 77B/180/CDV; VDE 0847 Part 4-2/A1 1996.10
- DIN VDE 0870-1
- DIN 1319
- DIN 40110

**Industry Standards and Directives used by the DeltaV System**
- 89/336/EEC  EMC Directive
- 94/9/EC  ATEX Directive
- CENELEC EN 50021:1999  Hazardous Area Classification
- CENELEC EN 50014:1997
- CENELEC EN 50020:1994
- CENELEC EN 61010-1
- CENELEC EN 61326 Class A emissions, Annex A immunity
- CENELEC EN 50024
- CENELEC EN 55022 Class A or B emissions
Industry Guidelines used by the DeltaV System

- IEC Publication 255-4 Single Input Energizing
- IEC Publication 546:1976 Controller Performance Evaluation
- IEC Publication 770:1984 High Frequency Disturbances
- IEC 38, Amendment 1 [1994]
- IEEE 518 Installation Guide to Minimize Noise
Background on NAMUR

History

NAMUR was founded at Leverkusen, Germany, on 3 November 1949 as the body to represent the interests of the users of measurement and control technology in the chemical industry by such renowned experts in the field as Dr. Sturm (Bayer), Dr. Hengstenberg (BASF) and Dr. Winkler (Hüls) following the tried and tested traditions of IG-Farbenindustrie (AGEMUR).

At the second meeting in December 1949, the founding members of the working group settled the name: Standardization association for measurement and control in chemical industries—short NAMUR.

Former Activities

After the war, main activities of the process measurement department have been measurement; control loop analysis; standardization, especially interfaces (4-20 mA signal, proximity switch); and exchange of experience of devices.

Activities Today

Activities of NAMUR include:

- measuring
- process-analytics
- open- and closed-loop control automatisation
- communication
- operation technology
- process electrics

throughout the whole lifecycle from planning, assembly and operation to decommissioning.

Objectives

Working Results

Working results are focused on the needs of the member companies and are highly practice-oriented. NAMUR endeavours to achieve economically and technically outstanding working results. In this process, safety and the protection of the environment are indispensable. NAMUR is committed to the idea of "responsible care."

The proposed solutions are formulated on the basis of a holistic approach to process technology processes, taking into consideration the lifecycle costs of devices and systems.

The results of the work of NAMUR are published in a suitable form.
Exchange of Experience

The exchange of experience serves the use of inter-company synergy potentials, the dissemination of knowledge and experience, the communication of user interests, the quick exchange of information on current issues, in-service training, and education.

Requirements

A coordination of requirements takes place in the further technical development of devices and methods with the aim of influencing the manufacturers.

Influencing the manufacturers is necessary because of the feedback of information from application technology practise to the manufacturer, to improve the quality of products and avoid excessive product diversity, to achieve cost advantages for users and manufacturers.

Co-operation

Cooperations exist with other associations to increase efficiency, to avoid duplication of work and to co-ordinate representation of interests. Examples of cooperation with other organizations are:

Measuring and Control Technology

- **GMA**
  VDI/VDE Gesellschaft für Meß- und Automatisierungstechnik
- **ZVEI**
  Zentralverband Elektrotechnik- und Elektroindustrie
- **WIB**
  International Instrument User´s Association
- **INTERKAMA**
  Internationale Fachmesse für industrielle Kommunikations-, Automatisierungs-, Mess- und Analysentechnik

Standardization

NAMUR co-operates in the standardisation bodies for the industry.

Participation in Rule Making is effected by a co-ordinated, appropriate influence being exerted on standardization bodies supervisory bodies and authorities to actively design chemical industry standards, to prevent cost-increasing standards alien to the industry.

- **DIN/DKE**
  Deutsches Institut für Normung / Deutsche Elektrotechnische Kommission im DIN und VDE
- **CEN/CENELEC**
  Comité Européen de Normalisation/Comité Européen de Normalisation Electrotechnique
- **ISO/IEC**
  International Organization for Standardization/International Electrotechnical Commission
Division of Labor

Division of labor takes place, for example, in quality inspection and in standardisation work. Practical examples of the division of labor are to be found in market observation, the examination of hardware and software, and the appointment of people to association bodies.

Members

Out of the current number of 66 member companies in the chemical/pharmaceutical industry in the German speaking region two thirds originate from Germany. The rest come from Spain, Austria, Hungary, Switzerland, Belgium and the Netherlands.

NAMUR is an association of users of process control technology.

Manufacturers of process control technology, hardware and software are not eligible as members.

Germany

- Acordis Cellulosic Fibres
- Agfa-Gevaert AG
- Axiva
- BASF AG
- Bayer AG
- Boehringer Ingelheim Pharma KG
- Buna Sow Leuna Olefinverbund GmbH
- BVCT e.V.
- Celanese GmbH
- Centeon Pharma GmbH
- Chiron Behring GmbH
- Clariant GmbH
- Condea Chemie GmbH
- DEA Mineraloel AG
• Dechema e.V.
• Degussa-Hüls AG
• Deutsche BP AG
• Deutsche Shell Raffineriezentrum Köln
• DyStar Textilfarben GmbH & Co.
• Stockhausen GmbH  STOCKHAUSEN
• Trevira GmbH  Trevira
• Th. Goldschmidt AG  TH. GOLDSCHMIDT AG
• VEBA - Oel AG  VEBA OEL
• Wacker Chemie GmbH  WACKER
• Wintershall AG  wintershall

Austria
• Agrolinz Melamin GmbH
• Akronym OMV
• Biochemie GmbH  Biochemie
• Chemserv Industrie Service GmbH  chemserv
• DSM Fine Chemicals GesmbH
• Lenzing AG  Lenzing

Switzerland
• Clariant International AG  Clariant
• Hoffmann - La Roche AG  Roche
• Lonza AG  algroup lonza
• Novartis Services AG  NOVARTIS

Netherlands
• Akzo Nobel Engineering bv  Akzo Nobel
• DSM Service  DSM
• Thermphos International B.V.

Belgium
• BASF Antwerpen N.V.  BASF
• Bayer Antwerpen N.V.

Hungary

• Magyosz - Hungarian Pharmaceutical
Spain

- BASF Espanola S.A.

Publications

The results of the work done by NAMUR are published:

- as publications in atp (Automatisierungstechnische Praxis) or other trade magazines (like at, tm, etz, CIT, process, chemie Technik, Chemie Produktion)
- in NAMUR Status Reports (85, 87, 90, 93, 97)
- in NAMUR Recommendations and Worksheets
- in presentations at the Annual General Meeting (not public)
- in speeches made at workshops and congresses of cooperating associations (GMA, GVC, Dechema, WIB)

NAMUR Recommendations and Worksheets

NAMUR Recommendations and Worksheets are experience reports and working documents prepared by NAMUR for its members among process control users for facultative utilisation.

These papers should not be viewed as standards or guidelines.

Individual copies of NAMUR recommendations may be obtained from the Registered Office free of charge.

The complete edition of NAMUR recommendations and worksheets is available on CD-ROM. There is an update once or twice a year, depending on the number of new documents.

The following English NAMUR Recommendations and Worksheets are currently available:

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<th>Recommendation</th>
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<td>NE 21 engl.</td>
<td>Electromagnetic compatibility(EMC) of industrial process and laboratory control equipment</td>
<td>18.05.99</td>
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<td>NE 31 engl.</td>
<td>Safety of Process Plants Using Measurement and Control Equipment</td>
<td>11.02.95</td>
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<td>NE 33 engl.</td>
<td>Requirements to be met by Systems for Recipe-based Operations</td>
<td>19.05.92</td>
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<td>NE 43 engl.</td>
<td>Standardization of the Signal Level for the Breakdown Information of Digital Transmitters</td>
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<td>Application Example of Batch Control NE 33</td>
<td>14.05.96</td>
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<td>NE 58 engl.</td>
<td>Execution of Process Control Projects Subject to Validation</td>
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<td>Functions of the Operation Management Level in Batch Oriented Production</td>
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<td>Validation of Process Control Systems - Retrospective Validation of Legacy Systems</td>
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