

TECHNICAL REPORT

**Function blocks (FB) for process control – Electronic device description language (EDDL) –
Part 6: Meeting the requirements for integrating fieldbus devices in engineering tools for field devices**

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FUNCTION BLOCKS (FB) FOR PROCESS CONTROL –
ELECTRONIC DEVICE DESCRIPTION LANGUAGE (EDDL) –****Part 6: Meeting the requirements for integrating
fieldbus devices in engineering tools for field devices**

FOREWORD

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IEC 61804-6, which is a Technical Report, has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
65E/212A/DTR	65E/239/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61804 series, under the general title *Function blocks (FB) for process control – Electronic device description language (EDDL)*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- replaced by a revised edition, or
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INTRODUCTION

The information contained in this part of IEC 61804 is provided for information only and is not part of the IEC 61804-3 requirements.

NOTE 1 ANSI/ISA-61804-3 (104.00.01):2007 is an equivalent to IEC 61804-3:2006.

The need for device integration has grown significantly in recent years. The combination of open systems, growth and mix of bus protocols, more intelligent devices and more sophisticated and complex devices has increased the requirements for integrating these devices in a single tool.

The purpose of this technical report is to investigate if the IEC 61804-3 technology meets the requirements of NAMUR NE 105. NAMUR is an international users association of automation technology in the process industries (www.namur.de). Recommendation NE 105 prepared by working group 2.6: Fieldbus, contains requirements for device integration technologies such as the electronic device description language (EDDL).

From experience, control system manufacturers and plant operations do not permit third-party software to be installed on DCS server, engineering station, or operator consoles – but rather only on separate application stations. One of the objectives of the EDDL standard is to reduce or minimize the need for third-party software to be installed. The question this technical report addresses is if EDDL can meet device integration requirement without the need for software drivers.

iTeh STANDARD PREVIEW

Most NAMUR NE 105 requirements are concerned with the long-term viability of the system and the ease of managing the system. A few requirements are concerned with consistency between different protocols, device types, and manufacturers.

EDDL meets all requirements of NAMUR NE 105. Most requirements are met by virtue of the fact that an EDD file is a compressed text, not a software.

Early EDDL, before enhancements were specified in IEC 61804-3:2006, met most but not all of the NAMUR NE 105 requirements.

NOTE 2 A system combining EDDL with other technologies that do not meet NAMUR NE 105, overall will not meet the requirements of NAMUR NE 105.

EDDL is a language to write the electronic device description (EDD) files. An EDD file describes how an engineering software can integrate a fieldbus device. EDD files provides information which command to send to a field device to read or to write information, how to decode the response, and how to display the information.

The main focus is on investment protection in the face of modern information technology because automation technology users cannot tolerate constant upgrades, updates, and releases – that is, long-term viability for systems and devices without undue maintenance effort. Other major points include ease of keeping systems up to date with new device types and versions, robustness, and uniform display of devices from different manufacturers, for a human interface that is intuitive and easy to learn.

The NE 105 recommendation provided important input for developing the enhancements made to EDDL.

FUNCTION BLOCKS (FB) FOR PROCESS CONTROL – ELECTRONIC DEVICE DESCRIPTION LANGUAGE (EDDL) –

Part 6: Meeting the requirements for integrating fieldbus devices in engineering tools for field devices

1 Scope

This Technical Report (TR) provides an evaluation and assessment of electronic device description language (EDDL) technology. It provides guidance to device and system manufacturers for how EDDL technology can help them meet user requirements. It provides guidance to system integrators, as well as instrumentation and maintenance practitioners at end-user companies, on how EDDL technology can help them integrate systems and incorporate device management in their work processes.

This TR gives examples of requirements from the NAMUR NE 105 recommendation. It is the intent of this TR to illustrate how EDDL technology and products based on EDDL technology meet these requirements.

This TR provides a current assessment of the capability of the EDDL technology and the features and capabilities it enables in devices and tools such as handheld field communicators, distributed control system (DCS) engineering software, DCS operator software, device management software as part of plant asset management solutions, as well as stand-alone software for use in laptop or tablet computers.

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2 Terms, definitions, abbreviated terms and acronyms

2.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1.1

EDD developer

individual or team that develops an EDD

2.1.2

audit trail

log of changes made to and events occurring to devices such as configuration change, calibration, and failures

2.1.3

backwards compatibility

capability of a new version of a product to interoperate with the same products as its earlier version

2.1.4

content and structure

information and how it is organized

Note 1 to entry: That is, what information is displayed and where, and what functions are provided. Note the distinction from look and feel.

2.1.5**distributed control system**

process control system or basic process control system, responsible for control of the process and operator interface

2.1.6**development toolkit**

set of software applications used by device developers to write, test, and tokenize EDD files for their devices

2.1.7**device management**

setup (configuration and calibration) and diagnostics of field instruments

Note 1 to entry: Compare to plant asset management.

2.1.8**device management software**

software used for device management

Note 1 to entry: Often an integral part of plant asset management solution.

2.1.9**forward compatibility**

ability of an existing version of a product to interoperate with the same products as the next version

2.1.10**interoperability**

ability of products to work together

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2.1.11**interpreter**

software engine that analyzes script statements in an EDDL method and carries them out without giving direct access to memory, database, underlying file system, and the like

Note 1 to entry: The interpreter is often referred to as "sandbox".

2.1.12**integrated host**

integrated system of DCS and device management software where, for example, device diagnostics can be called up on operator display or device configuration on engineering display

2.1.13**look and feel**

appearance of and interaction with controls such as buttons and parameters

Note 1 to entry: Look includes, for example, background and foreground color, size, shape, font, and icons and how these change depending on status. Feel includes single-click, double-click, selection, typing, expanding from a list, and the like. This is particularly pertinent for functions shared by all devices. Note the distinction from 'content and structure'.

2.1.14**non-interfering**

loading of EDD files on a system in such a way that they do not hamper or inhibit in any way the operation of the system

Note 1 to entry: That is, program files are not overwritten and operating system configuration is not changed.

2.1.15

off-the-shelf

commercially retailed software for business administration and home use as opposed to industrial automation use

2.1.16

plant asset management

system to achieve processing equipment optimization, machinery health monitoring, and device management

Note 1 to entry: Compare to device management.

2.1.17

standard dictionary

electronic dictionary of terms and phrases commonly displayed in interaction with the user where text exists in multiple languages and the selected language is displayed

EXAMPLE: Examples are parameter and menu labels, selection option text, help text, and dialog prompts.

2.1.18

synchronized

mechanism in place to ensure that when a parameter is changed, the change is automatically reflected in all other workstations in a multi-user environment to show the same information

2.1.19

tokenizer

software that, after verification, compresses and encrypts EDDL source text, preventing tampering

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2.1.20

wizard

software-guided work process developed by a device manufacturer, in the form of a script interpreted by the software using the EDD file, to lead users step-by-step through complex tasks

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Note 1 to entry: The wizard is officially known as an EDDL method.

2.2 Abbreviated terms and acronyms

DCS	Distributed control system
EDD	Electronic device description [according to IEC 61804-3]
EDDL	Electronic device description language [according to IEC 61804-3]
FB	Function block
LED	Light emitting diode
TR	Technical Report [according to ISO/IEC Directives, Part 2, 2011]

3 Requirement analysis

3.1 Conventions

This requirement analysis evaluates each clause in NAMUR NE 105 containing a requirement. The clause number in NAMUR NE 105 is indicated within parenthesis for each sub-clause of this Clause 3 and starts with a summary of the requirement in NAMUR NE 105.

NOTE The requirements and recommendations in NAMUR NE 105 expressed by the verbal forms "must" and "should" are cited in this document and do not establish requirement statements in this document.

This TR then proceeds to analyze how EDDL according to IEC 61804-3 meets this requirement.

The summary for each requirement does not take the place of the original NAMUR recommendation. This is an abridged version. In case of questions, users should follow the original NAMUR NE 105 text.

3.2 Investment safety (see 3.1 of NAMUR NE 105:2004)

3.2.1 NAMUR requirement summary

Plants and their automation systems remain operational for 15 years or more. Constant software upgrades would present an undue burden. Therefore, shared components or application programming interfaces between software programs not updated together as one shall be eliminated or minimized to avoid cascading upgrades. Investment shall be protected by stable interoperability. Operating system dependencies shall be minimized because:

- operating system version should not be made obsolete by EDD files for new device versions;
- EDD files should not be made obsolete by operating system patches, service packs, or upgrade;
- EDD files should not be made obsolete by new software versions.

It shall be possible to integrate all present and future devices in any tool.

3.2.2 How EDDL meets this requirement

An EDD file contains only text in a common format; it is a document, not software, and therefore is independent of the operating system. Thus, the files are intrinsically unaffected by changes in off-the-shelf IT products such as operating system and software during the operation of process plants, and therefore do not reduce the lifecycle of the system as a whole. This also makes long-term support easier for the DCS and device manufacturers. That is, EDD files are compatible with old and new versions of operating systems and old and new versions of the software using the EDD files.

From the description written in EDDL, some device manufacturers use the "tokenizer" utility to generate encrypted EDD files for the latest version and prior versions of the EDDL standard, enabling a new device to also be integrated to old software.

By loading the EDD files, it is possible to operate and parameterize field devices from a single tool instead of using device-specific solutions.

3.3 Version conflicts (see 3.2 of NAMUR NE 105:2004)

3.3.1 NAMUR requirement summary

Change of version of software components in modular systems such as operating systems or software programs is a source of substantial risk of interfering with DCS software as a whole.

If the software using the EDD files is integrated with the DCS, the EDD files shall not interfere with the DCS in any way.

Devices shall be supplied together with past and current version EDD files. It shall be possible to write a new version EDD file for an existing device in the future.

Software using the EDD files shall support past and current version EDD files.