

Industrial-process measurement, control and automation - Digital factory framework - Part 3:  
Application of Digital Factory for life cycle management of production systems

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62832-3:2020 sisaldab Euroopa standardi EN IEC 62832-3:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62832-3:2020 consists of the English text of the European standard EN IEC 62832-3:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 04.12.2020.	Date of Availability of the European standard is 04.12.2020.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 25.040.40

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

**Industrial-process measurement, control and automation - Digital  
factory framework - Part 3: Application of Digital Factory for life  
cycle management of production systems  
(IEC 62832-3:2020)**

Mesure, commande et automation dans les processus  
industriels - Cadre de l'usine numérique (Digital Factory) -  
Partie 3: Application de l'usine numérique pour la gestion  
du cycle de vie de systèmes de production  
(IEC 62832-3:2020)

Industrielle Leittechnik - Grundstruktur der digitalen Fabrik -  
Teil 3: Anwendung der Digitalen Fabrik für das  
Lebenszyklusmanagement von Produktionssystemen  
(IEC 62832-3:2020)

This European Standard was approved by CENELEC on 2020-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

The text of document 65/831/FDIS, future edition 1 of IEC 62832-3, prepared by IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62832-3:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2021-09-01 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2023-12-01 document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 62832-3:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61987 (series)	NOTE	Harmonized as EN IEC 61987 (series)
IEC 62424	NOTE	Harmonized as EN 62424
IEC 62264-2	NOTE	Harmonized as EN 62264-2
IEC 62541-100	NOTE	Harmonized as EN 62541-100
IEC 62714 (series)	NOTE	Harmonized as EN IEC 62714 (series)
ISO/IEC Guide 2:2004	NOTE	Harmonized as EN 45020:2006 (not modified)

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62832-1	2020	Industrial-process measurement, control and automation - Digital factory framework - Part 1: General principles	EN IEC 62832-1	2020
IEC 62832-2	2020	Industrial-process measurement, control and automation - Digital factory framework - Part 2: Model elements	EN IEC 62832-2	2020
ISO/IEC 6523	series	Information technology -- Structure for the identification of organizations and organization parts -- Part 1: Identification of organization identification schemes		-

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Industrial-process measurement, control and automation – Digital Factory  
framework –**

**Part 3: Application of Digital Factory for life cycle management of production  
systems**

**Mesure, commande et automation dans les processus industriels – Cadre de  
l'usine numérique (Digital Factory) –**

**Partie 3: Application de l'usine numérique pour la gestion du cycle de vie de  
systèmes de production**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC -

[webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Industrial-process measurement, control and automation – Digital Factory  
framework –  
Part 3: Application of Digital Factory for life cycle management of production  
systems**

**Mesure, commande et automation dans les processus industriels – Cadre de  
l'usine numérique (Digital Factory) –  
Partie 3: Application de l'usine numérique pour la gestion du cycle de vie de  
systèmes de production**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 25.040.40

ISBN 978-2-8322-8966-2

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and conventions.....	7
3.1 Terms and definitions.....	7
3.2 Conventions.....	8
4 General rules.....	8
4.1 Information about PS asset types.....	8
4.2 Representation of a production system .....	9
4.3 Rules for CDEs and DataElements.....	9
4.3.1 General .....	9
4.3.2 Constant and variable DataElements .....	10
4.4 Filtering of information for different technical disciplines .....	11
4.4.1 General .....	11
4.4.2 Using ViewElements .....	11
4.4.3 Providing ViewElements .....	11
4.4.4 Filtering information from a Library .....	12
4.4.5 Filtering information from a DigitalFactory.....	12
5 Rules for dictionaries .....	12
5.1 General.....	12
5.2 Rules for consortia dictionaries and standardized dictionaries.....	12
5.3 Rules for supplier dictionaries .....	12
5.4 Rules for DFdictionary .....	13
5.5 Rules for DFassetClassDefinition .....	13
6 Rules for Libraries .....	13
6.1 Rules for SupplierLibraries.....	13
6.2 Rules for DFlibraries .....	14
6.3 Rules for DFassetClasses.....	14
6.4 Rules for composite DFassetClass.....	14
7 Rules for DigitalFactory .....	15
7.1 General.....	15
7.2 Managing a DigitalFactory .....	15
7.3 Creating a DigitalFactory .....	15
7.4 Maintaining a DigitalFactory .....	15
7.5 Managing the access to a DigitalFactory .....	15
7.6 Replicating a DigitalFactory .....	16
8 Representation of PS asset and/or role using DFasset .....	16
8.1 General.....	16
8.2 Creating a DFasset.....	16
8.3 Using the DFassetHeader .....	17
8.3.1 General .....	17
8.3.2 Identification information.....	17
8.3.3 Reference to DFassetClass .....	17
8.4 Role-based equipment information.....	19
8.5 Physical asset information .....	20

8.5.1	Basic DFasset .....	20
8.5.2	Composite DFasset .....	20
9	Representation of PS assets relationships using DFassetLink .....	20
9.1	General.....	20
9.2	DFassetClassAssociation.....	21
9.3	DataElementRelationship.....	21
9.4	Evaluating compatibility between DFassets.....	22
9.4.1	Overview .....	22
9.4.2	Interpretation of compatibility.....	22
9.4.3	Evaluation of compatibility .....	22
Annex A (informative)	Mapping of Digital Factory Framework to other technologies .....	23
A.1	General: implementing DF Framework .....	23
A.2	Mapping to IEC 62714 (AutomationML).....	23
A.3	Mapping to IEC 62541-100 (OPC UA for devices) .....	25
Bibliography	.....	26
Figure 1	– Example for PS asset type description based on multiple dictionaries .....	8
Figure 2	– Representation of a production system .....	9
Figure 3	– Example for use of constant and variable DataElements .....	10
Figure 4	– Example for DFasset created from DFassetClass.....	18
Figure 5	– Example for extending DFasset with additional information .....	18
Figure 6	– Development of physical asset information and role-based equipment information.....	19
Table A.1	– Mapping of DF model elements to concepts of IEC 62714 (all parts) .....	24
Table A.2	– Mapping of DF model elements to concepts of IEC 62541-100 .....	25

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

# INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – DIGITAL FACTORY FRAMEWORK –

## Part 3: Application of Digital Factory for life cycle management of production systems

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62832-3 has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
65/831/FDIS	65/842/RVD

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

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

A list of all parts of the IEC 62832 series, published under the general title, *Industrial-process measurement, control and automation – Digital Factory framework*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

IEC 62832 provides a framework used for establishing and maintaining the digital representations of production systems, including the representation of the elements of the production systems and of the relationships between these elements. The framework is intended also to support the exchange of information about these elements.

The framework aims at reducing the interoperability barriers for exchange of information for the various activities related to production systems. The main advantages of this method are that all information related to a production system is described in a standardized manner, and it can be used and modified through its entire life cycle. The method defined in IEC 62832 is kept as generic as possible in order to enable its use in several industrial sectors.

Manufacturers and suppliers provide information about available PS asset types by using electronic catalogues, which are based on commonly agreed data definitions (for instance IEC CDD, eCI@ss<sup>1</sup> and eOTD<sup>2</sup>). Such data definitions can be provided by standard organizations (like IEC CDD), by consortia (like eCI@ss e.V.) or by companies (like eOTD dictionaries).

The DF Framework provides a standardized approach, by defining the concepts of Libraries (i.e. SupplierLibraries and DFlibraries) and by defining basic rules for such Libraries.

The intention of this document is to provide a common base for implementation of the DF framework using different technologies (for example different engineering data formats). Proposals for such implementations are provided in Annex A.

IEC 62832-1 describes the general principles of the DF reference model together with its most important model elements. IEC 62832-2 specifies detailed requirements for model elements of the DF reference model. This part of IEC 62832 specifies the rules for using the DF framework.

---

<sup>1</sup> eCI@ss® is the registered trademark of a product supplied by the eCI@ss e.V. association. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.

<sup>2</sup> eOTD® is the registered trademark of a product supplied by ECCMA (Electronic Commerce Code Management Association). This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.