PD IEC TR 63283-2:2022

BSI Standards Publication

Industrial-process measurement, control and automation — Smart manufacturing

Part 2: Use cases

bsi.

National foreword

This Published Document is the UK implementation of IEC TR 63283-2:2022.

The UK participation in its preparation was entrusted to Technical Committee GEL/65, Measurement and control.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

Published by BSI Standards Limited 2022

ISBN 978 0 539 12623 5

ICS 25.040.40

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2022.

Amendments/corrigenda issued since publication

Date	Text affected

IEC TR 63283-2

Edition 1.0 2022-03

TECHNICAL REPORT

colour inside

Industrial-process measurement, control and automation – Smart manufacturing –
Part 2: Use cases

IEC TR 63283-2:2022-03(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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

IEC TR 63283-2

Edition 1.0 2022-03

TECHNICAL REPORT

colour inside

Industrial-process measurement, control and automation – Smart manufacturing –
Part 2: Use cases

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40

ISBN 978-2-8322-1085-9

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – SMART MANUFACTURING –

Part 2: Use cases

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.

IEC TR 63283-2 has been prepared by Technical Committee 65: Industrial-process measurement, control and automation. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
65/864/DTR	65/905/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63283 series, published under the general title *Industrial-process measurement, control and automation – Smart Manufacturing*, 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 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 document 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

In recent years, one observes that an increasing number of “buzzwords” are in discussion in the manufacturing area. The scope of the various “buzzwords” is not clearly defined, moreover, the scope addressed by the “buzzwords” is not congruent but overlapping. Each stakeholder involved in these discussions has another perspective to the various topics and the discussions address very different levels of detail and consider different contexts. This is illustrated in Figure 1.

“Smart Manufacturing is one of the buzzwords that addresses multiple stakeholders. The overall community is convinced that “Smart Manufacturing” will significantly affect the manufacturing industries and, therefore, standardization will consolidate the vision of “Smart Manufacturing” from different manufacturing industries sectors viewpoints. The discussions within standardization are sufficiently formal or precise in order to later have any claim regarding compliance to standards. Thus, standardization will consolidate the definitions and understanding of the “buzzwords” for its own usage.

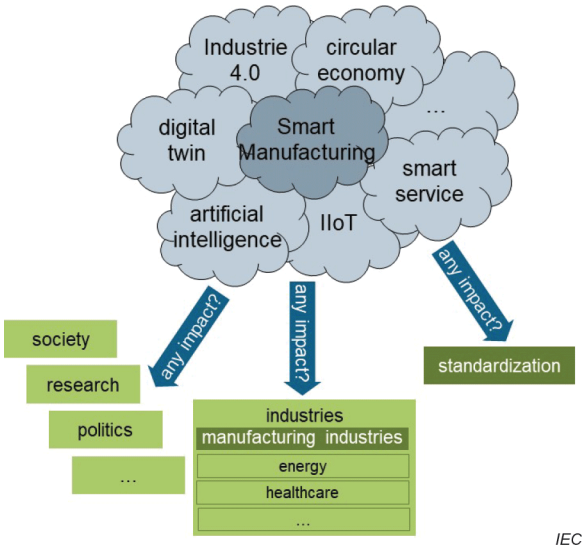

Figure 1 – Related subjects to Smart Manufacturing

In order to analyze the impact of “Smart Manufacturing” on standardization, the approach chosen is the collection and evaluation of use cases to obtain a sufficiently representative description of “Smart Manufacturing”. These use cases are described from the perspective of the manufacturing value chains. They illustrate what could be conceivable in the future in the context of “Smart Manufacturing”. Thus, a use case itself is explainable[1] to a manufacturing company. Experts in standardization will afterwards analyze these use cases to decide whether

- a specific use case provides no (new) input for standardization;
- a specific use case provides needs to maintain existing standards (this can be related to the content or the application areas);
- a specific use case provides input for additional measures to be elaborated in by standardization projects.

[1] A typical employee of a manufacturing company is not familiar with formal methods used to describe use cases as accurately as possible or even uses different terms, for example plant versus factory versus production system. Thus an explanation of the use cases is necessary.

Based on this approach the use cases will contribute to the following topics:

- Consolidation of the vision “Smart Manufacturing”: The use cases will describe the basic principles of traditional and future manufacturing value chains and will work out the additional, new opportunities enabled by digitalization.
- Consolidation of terms and concepts: The use cases will facilitate to come to agreements on basic terms and concepts. The description of terms and concepts will be in an application context and not here in a terms and definitions section.
- Justification of a general need for standardization: Based on the use cases, the fundamental gaps will be identified. It is intended to close the gaps that have not yet been filled up. Possibly, however, it is effective to first suitably upgrade the installed base based on already established standards.
- Elaboration of recommendations for standardization on an abstract level: Based on the use cases, the requirements – and not solution concepts – for standardization will be extracted to achieve a consensus for maintenance or new development of standards. It is intended to derive the recommendations from the use cases and ensure backward traceability to the use cases.

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – SMART MANUFACTURING –

Part 2: Use cases

1 Scope

This Technical Report has the goal of analyzing the impact of “Smart Manufacturing” on the daily operation of an industrial facility. It focusses on the perspective of automation and control of the production system, but also on the supporting processes of ordering, supply chain management, design, engineering and commissioning, operational technology, life cycle management, and resource management.

These recommendations are accomplished on the basis of several carefully selected use cases that are familiar to manufacturing industry. Therefore, each use case is described, followed by an analysis of the possible influence of “Smart Manufacturing” and the assessment of the impact on existing and future standardization.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 General

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

NOTE In 3.2, all conceptual constituents of uses cases including their context are defined in a way that the document is self-explanatory. The definitions are fully aligned with IEC TR 63283-1 (65/683/DTR).

From these conceptual constituents the examples introduced in the various use cases are distinguished. These concrete roles are consolidated in 3.3, 3.4, 3.5 and 3.6 to provide a consistent cross reference of all concrete roles involved in the individual use cases of this document. For the sake of clarity, a distinction is made between business, human and technical roles. A technical role can be represented by a subject or an object, where a subject is an entity doing something, and an object is having something done to it. Thus, subjects have capabilities in the sense of having the ability to perform actions.

3.2 General terms and definitions

3.2.1
actor
entity that communicates and interacts

Note 1 to entry: These actors can include people, software applications, systems, databases, and even the power system itself.

[SOURCE: IEC 62559-2: 2015, 3.2]