

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Industrial process measurement, control and automation – Digital nameplate

**Mesurage, commande et automatisatisation dans les processus industriels –
Plaque signalétique numérique**

[IEC 63365:2022](https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022)

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 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 Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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

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 It also gives information on projects, replaced and withdrawn publications.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

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

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

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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

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

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

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

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Industrial process measurement, control and automation – Digital nameplate

**Mesurage, commande et automatisation dans les processus industriels –
Plaque signalétique numérique**

[IEC 63365:2022](https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022)

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.080

ISBN 978-2-8322-5894-1

**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.....	8
2 Normative references	8
3 Terms and definitions	9
4 Contents of the digital code	10
4.1 General.....	10
4.2 Data structure of the digital code	10
4.3 Data description with characteristic names	12
5 Digital storage technologies.....	13
5.1 Two-dimensional barcodes (QR Code, Data Matrix).....	13
5.1.1 General	13
5.1.2 Symbol design.....	14
5.1.3 Data volume and module size	14
5.1.4 Error correction	15
5.1.5 Print quality	15
5.1.6 Durability	15
5.2 Transponders (RFID/NFC).....	15
5.2.1 Technical.....	15
5.2.2 Symbol design.....	16
5.2.3 Data format	16
5.2.4 Write protection	16
5.2.5 Durability.....	16
5.2.6 Use in potentially explosive atmospheres	16
5.2.7 Use in modular products	17
5.3 Firmware.....	17
5.3.1 General	17
5.3.2 Use in modular products	17
Annex A (informative) Information on the nameplate required by regulations and standards.....	18
A.1 General.....	18
A.2 Basic information in plain text	18
A.3 Conformity marks and symbols	18
A.4 Information for electrical equipment	18
A.5 Information for explosion-protected equipment.....	19
A.6 Information for pressure equipment.....	19
A.7 Further information	19
Annex B (informative) Semantic data description with standardized data dictionaries	20
B.1 International data dictionaries	20
B.2 The digital nameplate as a subelement of the digital twin.....	20
Bibliography.....	21
Figure 1 – Example of a conventional nameplate converted into a digital nameplate with QR code	11
Figure 2 – Example of a digital nameplate with a general data description	13
Figure 3 – Example of a separate label with the digital code	14

Figure 4 – Symbol design of the QR code of the digital nameplate.....	14
Figure 5 – Marking of a RFID transponder as a digital nameplate	16
Table 1 – Example of a nameplate with a general data description	12

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 63365:2022](https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022)

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL PROCESS MEASUREMENT, CONTROL AND AUTOMATION –
DIGITAL NAMEPLATE**

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 63365 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial Process Measurement, control and automation. It is an International Standard.

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

Draft	Report on voting
65E/880/CDV	65E/931/RVC

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 International Standard 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.

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 63365:2022](https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022)

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022>

INTRODUCTION

The primary purpose of a nameplate is to clearly identify the device and its manufacturer. Legal marks or approval symbols indicate conformity with the regulations for placing the device on the market and for safe use.

The project "Digital Nameplate" was started in response to the needs of manufacturers of explosion-protected equipment and operators of electrical plants in explosion hazardous areas. One objective is to ensure that all of the necessary information can be marked on the equipment, particularly considering the extent of the information required in the field of explosion protection. The requirements for marking products for the global markets have become as extensive that it is often no longer possible to include all of the necessary information on the nameplate, especially of smaller products (e.g. sensors). As an example, in Europe, different EU Directives and harmonized standards can apply to the same product, e.g. for electric safety, explosion safety, safety of machinery, pressure safety or food safety. If the product is to be sold worldwide, additional markings and approval symbols are required, e.g. IEC Ex marking, Ex marking for the North American market, UK CA marking for UK, EAC for the Eurasian Economic Area, RCM for Australia or CCC for China.

Within the context of smart manufacturing, it is also anticipated that products will have to be electronically identifiable in future. Equipment manufacturers can use machine-readable marking in the production process to automatically control the material flow by using a barcode. Operators can easily identify the product at the incoming inspection. Service engineers or the responsible authorities can electronically check all the required data and information for the application and safe use. The data from the machine-readable nameplate can be transmitted directly to an ERP system (Enterprise Resource Planning system) for error-free stocktaking. Operators and users have access to the device data in digital format.

One intention of the (offline) digital nameplate is to reduce the required space of the conventional nameplate. In the long term it is expected that the digital nameplate can replace the conventional text on the nameplate saving a lot of space, especially on small products.

This document describes alternative electronically-readable solutions to the current, conventional, plain text marking on the nameplate or packaging. It describes marking technologies that use 2D codes, transponders or the firmware of the products. In the case of a 2D code or transponder, the stored data can be read by commonly available scanning devices, e.g. smartphones. If the marking is stored in the firmware of the product, the nameplate can be shown, for example, on the product display or the data can be read via an electronic interface remotely.

Furthermore, the IEC 61406-1 is in development for a unique product identification via an Identification Link. That standard enables manufacturers to provide all product related data and documents via an Internet address in an electronic format. Product documentation such as technical information, operating instructions and product certificates can be downloaded. That standard defines a specific 2D or RFID code, which contains only the Identification Link string with limited characters. In IEC 63365, the Identification Link string is included as the first property in the digital nameplate, followed by the detailed marking properties. If an Internet connection to the manufacturer's website is available, additional product data (digital twin) and documentation can be accessed.

This document is also intended to increase acceptance of digital nameplates among legislative bodies. A long-term goal is to replace the conventional nameplate with an electronically readable nameplate as far as possible. Regulators require marking to be applied to devices permanently, clearly and legibly. This requirement could be met with digital marking as well. Digital nameplates that are permanently affixed to the product and provide the necessary data without the need for an Internet connection come very close to plain text marking. To ensure greater acceptance, the nameplate shows a minimum amount of marking in plain text. During a transition period, both, the plain text and the digital marking can be applied simultaneously at the product. Today electronic marking is being increasingly implemented and accepted on the international markets.

ISO/IEC 22603-1 was recently published and specifies a digital label representing the product marking. But that standard provides the product marking via a link to a Webserver which contains the relevant information and does not contain the marking directly in the digital code.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 63365:2022](https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022)

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-fd9050ad9296/iec-63365-2022>

INDUSTRIAL PROCESS MEASUREMENT, CONTROL AND AUTOMATION – DIGITAL NAMEPLATE

1 Scope

This International standard applies to products used in the process measurement, control and automation industry. It establishes a concept and requirements for the digital nameplate and provides alternative electronically readable solutions (e.g. 2D codes, RFID or firmware) to current conventional plain text marking on the nameplate or packaging of products.

The digital nameplate information is contained in the electronically readable medium affixed to the product, the packaging or accompanying documents. The digital nameplate information is available offline without Internet connection. After electronic reading, all digital nameplate information is displayed in a human readable text format. The digital nameplate also includes the Identification Link String according to IEC 61406-1 which provides additional online information for the product.

This document does not specify the contents of the conventional nameplate, which are subject to regional or national regulations and standards.

2 Normative references

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.

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 61406-1, *Identification link*

ISO/IEC 15415:2011, *Information technology – Automatic identification and data capture techniques – Bar code symbol print quality test specification – Two-dimensional symbols*

ISO/IEC 16022, *Information technology – Automatic identification and data capture techniques – Data Matrix bar code symbology specification*

ISO/IEC 18004, *Information technology – Automatic identification and data capture techniques – QR Code bar code symbology specification*

ISO/IEC 18092, *Information technology – Telecommunications and information exchange between systems – Near Field Communication – Interface and Protocol (NFCIP-1)*

ISO/IEC 21471, *Information technology – Automatic identification and data capture techniques – Extended rectangular data matrix (DMRE) bar code symbology specification*

ISO/IEC 21481, *Information technology – Telecommunications and information exchange between systems – Near field communication interface and protocol 2 (NFCIP-2)*

ISO/IEC 29158, *Information technology – Automatic identification and data capture techniques – Direct Part Mark (DPM) Quality Guideline*

ISO/IEC 29160, *Information technology – Radio frequency identification for item management – RFID Emblem*

ISO 13849-1, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

ISO/IEC 14443-1, *Cards and security devices for personal identification – Contactless proximity objects – Part 1: Physical characteristics*

ISO/IEC 14443-2, *Cards and security devices for personal identification – Contactless proximity objects – Part 2: Radio frequency power and signal interface*

ISO/IEC 14443-3, *Cards and security devices for personal identification – Contactless proximity objects – Part 3: Initialization and anticollision*

ISO/IEC 14443-4, *Cards and security devices for personal identification – Contactless proximity objects – Part 4: Transmission protocol*

ISO/IEC 15693-1, *Cards and security devices for personal identification – Contactless vicinity objects – Part 1: Physical characteristics*

ISO/IEC 15693-2, *Cards and security devices for personal identification – Contactless vicinity objects – Part 2: Air interface and initialization*

ISO/IEC 15693-3, *Cards and security devices for personal identification – Contactless vicinity objects – Part 3: Anticollision and transmission protocol*

3 Terms and definitions

IEC 63365:2022

<https://standards.iteh.ai/catalog/standards/sist/ed38769d-30f7-4f0c-a2b6-f19050ad9296/iec-63365-2022>
For the purposes of this document, the terms and definitions given in IEC 60050-351 (IEV) and the following apply.

ISO and IEC maintain terminology 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>

3.1

conventional nameplate

nameplate containing all necessary product marking strings in plain text, which is human readable

Note 1 to entry: A conventional nameplate string is composed of text and symbols.

3.2

digital nameplate

electronically readable product marking string encoded in an optically readable medium, a radio frequency transponder or the product firmware

Note 1 to entry: In contrast to a conventional nameplate, a digital nameplate is not human readable.

EXAMPLE 1 2D symbols such as QR Code and DataMatrix are examples of optically readable media.

EXAMPLE 2 Radio frequency identification (RFID) transponders are examples of electronic readable media.

3.3

digital nameplate string

alphanumeric string representing the information encoded in the digital nameplate

Note 1 to entry: A digital nameplate string can be read by a human using the appropriate scanner, reader or engineering software.

3.4

electronic reader

hardware and software means to read electronically readable media

3.5

2D Code

2 dimensional barcode, which can be converted with commonly available readers into plain text

4 Contents of the digital code

4.1 General

The information according to Annex A can be added in a digital code to the nameplate. The digital code

- can store all information required by regional or national regulations and
- can contain additional information provided by the manufacturer.

Marks and symbols cannot be converted into the digital code on the nameplate, but may be provided in the firmware. All information provided in the digital code that is not required specifically in plain text by regional or national regulations can be removed from the human readable text of the nameplate.

For security reasons, a 2D reader that asks the user to activate a link to the URL is recommended. In general, if the link is not activated, the embedded text is shown.

4.2 Data structure of the digital code

The information listed in Annex A can be converted into digital format. The data shall be structured according to the following three categories:

- basic information;
- technical specification;
- certificates.

The first information of the digital nameplate shall be an Identification Link string as per IEC 61406-1. This enables standard scanners to interpret the first line as a URL and, if an Internet connection is available, to link to a product database.

An example of a conventional nameplate is shown in the upper part of Figure 1. This nameplate represents an industrial level meter with several international certificates as an explosion protected device. Due to the amount of information, this nameplate occupies a large area of 80 cm².

In the lower part of Figure 1, the corresponding digital nameplate is shown with the basic information and the conformity symbols still visible in plain text. The complete marking is converted into the digital code. The digital nameplate including QR Code occupies an area of 42,5 cm², which is approximately half of the size of the conventional nameplate above.

The scan of the QR Code using a smartphone with standard scanner software is also shown in Figure 1. The complete text marking including basic information is visible on the screen and can be stored or transferred as a text file.

Dimensions in millimetres

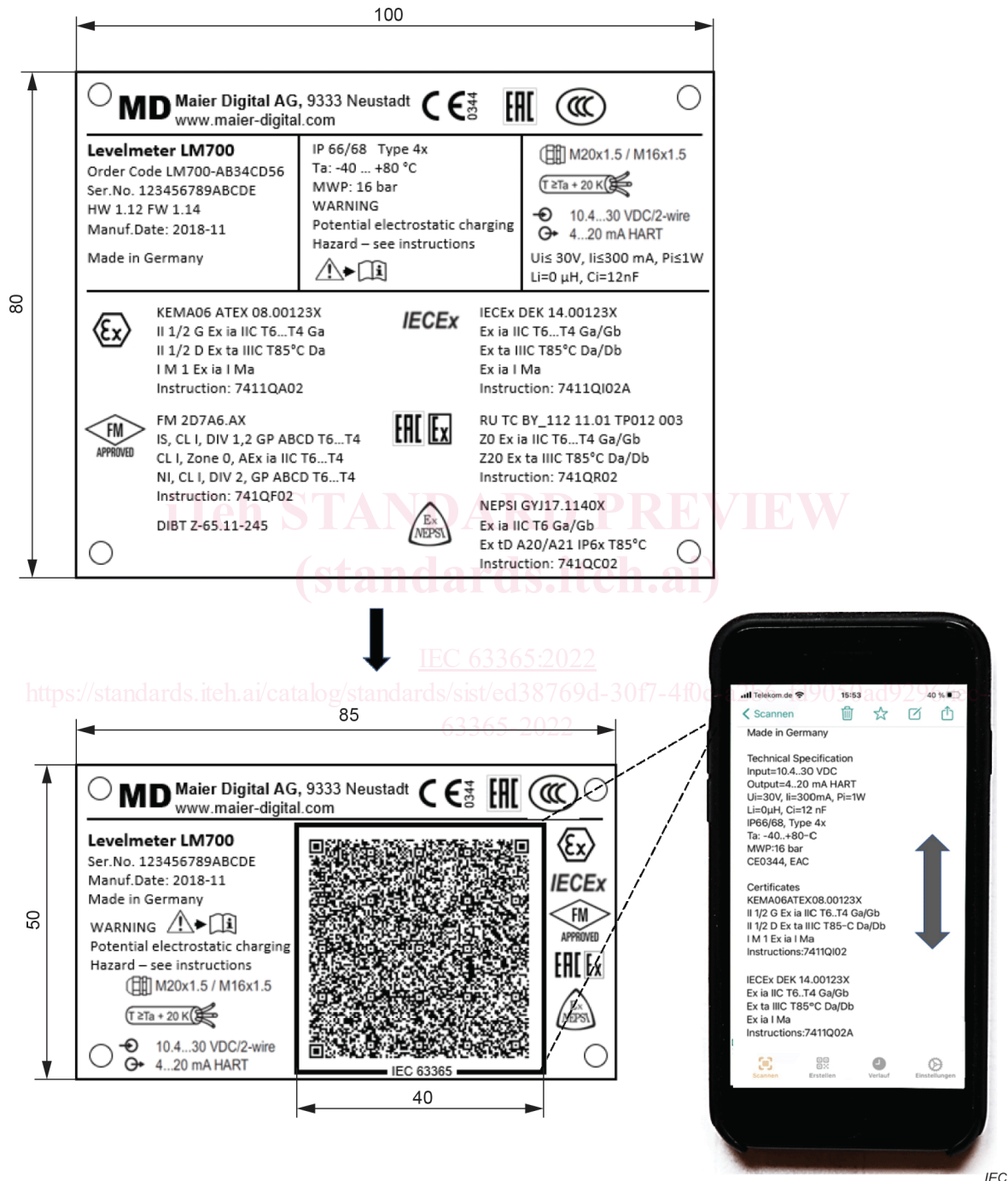


Figure 1 – Example of a conventional nameplate converted into a digital nameplate with QR code

NOTE 1 The example in Figure 1 shows a digital nameplate, which enable scans with human readable data on the display of the smartphone.

NOTE 2 The text file for the QR Code generator contains only the plain text without any control codes as seen in the display of the smart phone. Carriage returns and line feeds are automatically created with the [Enter] key using the text editor.