PD IEC TR 63164-2:2020

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Reliability of industrial automation devices and systems

Part 2: System reliability

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National foreword

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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.

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Published by BSI Standards Limited 2020

ISBN 978 0 539 05052 3

ICS 25.040.01

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 July 2020.

Amendments/corrigenda issued since publication

Date	Text affected

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IEC TR 63164-2

Edition 1.0 2020-07

TECHNICAL REPORT

Reliability of industrial automation devices and systems – Part 2: System reliability

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040

ISBN 978-2-8322-8663-0

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RELIABILITY OF INDUSTRIAL AUTOMATION DEVICES AND SYSTEMS –

Part 2: System reliability

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IEC TR 63164-2 has been prepared by 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
65/771/DTR	65/796/RVDTR

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

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A list of all parts in the IEC 63164 series, published under the general title *Reliability of industrial automation devices and systems*, 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

Under the background of Smart Manufacturing, new production modes such as mass customization based on interconnected factories require real-time interconnection, frequent switching and integration across different levels. Therefore, reliability is an important requirement for automation systems in factories. Reliability data of automation systems is the basis for maintenance planning e.g. stock-keeping of spare parts of a production line. An automation system usually consists of several different devices or machines that are used in series, parallel or mixed. This technical report gives guidance for system integrator on how to evaluate the reliability of such entire systems.

This report is the second part of the series. This part concentrates on calculation of failure rates or reliability values for systems based on failure rates or reliability values of single devices depending on the structure of the system. This is necessary for system integrators or designers to be able to calculate the reliability of an entire system from the reliability values of individual devices (see IEC TS 63164-1).

Parts within IEC 63164 series are:

Part 1: Assurance of automation devices reliability data and specification of their source

Part 2: System reliability

Future parts may include following subjects:

- collecting reliability data for automation devices in the field;
- user guide.

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RELIABILITY OF INDUSTRIAL AUTOMATION DEVICES AND SYSTEMS –

Part 2: System reliability

1 Scope

This part of IEC 63164 provides guidance on the calculation of reliability data of automation systems which can be simplified as series, parallel or mixed structure based on reliability data of single devices and/or sub-systems, and on the form to present the data.

NOTE This procedure is only targeted to the reliability of automation systems, but not systems that embed automation systems, e.g. process plant.

Reliability is included in dependability, and this document is mainly focused on random hardware failures that affect reliability. Dependability is used as a collective term for the time-related quality characteristics of an item and additionally includes availability, recoverability, maintainability, maintenance support performance, and, in some cases, other characteristics such as durability, safety and security, which are all not in the scope of this Technical Report.

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.

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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 http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
automation system
DCS- or PLC-based system for the monitoring and controlling of production facilities in the process industry, including control systems based on fieldbus technologies

Note 1 to entry: Whenever “system” is mentioned in this document, it means “automation system”.

[SOURCE: IEC 62381:2012, 3.1.1, modified – Note 1 to entry has been added.]

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