SLOVENSKI STANDARD
oSIST prEN IEC 62439-2:2020

01-maj-2020

Industrijska komunikacijska omrežja - Avtomatizacija omrežja z visoko razpoložljivostjo - 2. del: Protokol z redundanco medijev (MRP)

Industrial communication networks - High availability automation networks - Part 2: Media Redundancy Protocol (MRP)

Industrielle Kommunikationsnetze: Hochverfügbare Automatisierungsnetze - Teil 2: Medienredundanz-Protokoll (MRP)

Réseaux industriels de communication - Réseaux d'automatisme à haute disponibilité - Partie 2: Media Redudancy Protocol (MRP)

Ta slovenski standard je istoveten z: **prEN IEC 62439-2:2020**

ICS:

25.040.01	Sistemi za avtomatizacijo v industriji na splošno	Industrial automation systems in general
35.110	Omreževanje	Networking

oSIST prEN IEC 62439-2:2020 **en,fr,de**

65C/997/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62439-2 ED3**	
DATE OF CIRCULATION: **2020-03-06**	CLOSING DATE FOR VOTING: **2020-05-29**
SUPERSEDES DOCUMENTS: **65C/966/CD,65C/977/CC**	

IEC SC 65C : INDUSTRIAL NETWORKS	
SECRETARIAT: France	SECRETARY: Ms Valérie DEMASSIEUX
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 22G,TC 57	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Industrial communication networks - High availability automation networks - Part 2: Media Redundancy Protocol (MRP)

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

NC comments will be addressed during the SC65C/WG15 meeting scheduled on June 8th-10h, 2020 in Baden (Switzerland). Corresponding meeting notice will be provided in due time by the convenor.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – HIGH AVAILABILITY AUTOMATION NETWORKS –

Part 2: Media Redundancy Protocol (MRP)

FOREWORD

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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.

International Standard IEC 62439-2 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– improvements for the Continuity Check Protocol,

– introduction of further specifiers for the rings, the interconnection links, and the device roles,

– extensions and informations on the use of baudrates smaller than 100 Mbit/s,

– informations on using MRP together with scheduling and shaping mechanisms,

– introduction of an MRP Interconnection profile for 30 ms reconfiguration time.

The text of this standard is based on the following documents:

FDIS	Report on voting
65C/XXX/FDIS	65C/XXX/RVD

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

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

This International Standard is to be read in conjunction with IEC 62439-1.

A list of all parts of the IEC 62439 series, published under the general title *Industrial communication networks – High availability automation networks*, can be found on the IEC website.

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

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

The National Committees are requested to note that for this document the stability date is 2025.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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

The IEC 62439 series specifies relevant principles for high availability networks that meet the requirements for industrial automation networks.

In the fault-free state of the network, the protocols of the IEC 62439 series provide ISO/IEC/IEEE 8802-3 (IEEE 802.3) compatible, reliable data communication, and preserve determinism of real-time data communication. In cases of fault, removal, and insertion of a component, they provide deterministic recovery times.

These protocols retain fully the typical Ethernet communication capabilities as used in the office world, so that the software involved remains applicable.

The market is in need of several network solutions, each with different performance characteristics and functional capabilities, matching diverse application requirements. These solutions support different redundancy topologies and mechanisms which are introduced in IEC 62439-1 and specified in the other Parts of the IEC 62439 series. IEC 62439-1 also distinguishes between the different solutions, giving guidance to the user.

The IEC 62439 series follows the general structure and terms of the IEC 61158 series.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning ring protocol given in Clause 5. Table 1 gives an overview of the relevant patents.

Table 1 – Patent information

No.	Status	Country	Granted Patent Number or Application Number (if pending)	Title
1	granted	US	US 6430151	Local networking with redundancy properties having a redundancy manager
	granted	CA	CA 2323429	
	granted	CN	CN 117195	
	granted	NO	NO 330908	
	granted	EP (AT, BE, CH, DE, DK, ES, FR, GB, IT, NL, SE)	EP 1062787	

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

Siemens Aktiengesellschaft
Otto-Hahn-Ring 6
Munich 81739
Germany

and

Hirschmann Automation and Control GmbH
Stuttgarter Strasse 45-51

341 Neckartenzlingen 72654
342 Germany

343 Attention is drawn to the possibility that some of the elements of this document may be the
344 subject of patent rights other than those identified above. IEC shall not be held responsible for
345 identifying any or all such patent rights.

346 ISO (www.iso.org/patents) and IEC (http://patents.iec.ch/) maintain on-line data bases of
347 patents relevant to their standards. Users are encouraged to consult the data bases for the
348 most up to date information concerning patents.

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INDUSTRIAL COMMUNICATION NETWORKS – HIGH AVAILABILITY AUTOMATION NETWORKS –

Part 2: Media Redundancy Protocol (MRP)

1 Scope

The IEC 62439 series is applicable to high-availability automation networks based on the ISO/IEC/IEEE 8802-3 (IEEE 802.3) (Ethernet) technology.

This part of the IEC 62439 series specifies a recovery protocol based on a ring topology, designed to react deterministically on a single failure of an inter-switch link or switch in the network, under the control of a dedicated media redundancy manager node.

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 60050-191, *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service*

IEC 61158-6-10:2019, *Industrial communication networks – Fieldbus specifications – Part 6-10: Application layer protocol specification – Type 10 elements*

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3*

IEC 62439-1:2010, *Industrial communication networks – High availability automation networks – Part 1: General concepts and calculation methods*
IEC 62439-1:2010/AMD1:2012
IEC 62439-1:2010/AMD2:2016[1]

ISO/IEC 10164-1, *Information technology – Open Systems Interconnection – Systems Management: Object Management Function*

ISO/IEC/IEEE 8802-3 *Standard for Ethernet*

IEEE 802.1D:2004, *IEEE Standard for Local and metropolitan area networks – Media Access Control (MAC) Bridges*

IEEE 802.1Q:2018, *IEEE Standard for Local and metropolitan area networks – Media Access Control (MAC) Bridges and Virtual Bridge Local Area Network*

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[1] A consolidated version of this publication exists, comprising IEC 62439-1:2010, IEC 62439-1:2010/AMD1:2012 and IEC 62439-1:2010/AMD2:2016.

IEEE 802.3:2018, *IEEE Standard for Ethernet.*

3 Terms, definitions, abbreviations, acronyms, and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-191 and in IEC 62439-1, and the following 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
interconnection port
port of a switch that is used to interconnect two ring topologies

3.1.2
interconnection topology
topology in which two ring topologies are connected

3.2 Abbreviations and acronyms

For the purposes of this document, the abbreviations and acronyms given in IEC 62439-1 apply, in addition to the following.

ASE	Application Service Element
CCM	Continuity Check Messages
CFM	Connectivity Fault Management
CFM-MRP	Connectivity Fault Management for MRP
CPU	Central Processing Unit
FDB	Filtering Database
LC-mode	Link Check mode
LSB	Least Significant Bit
MAID	Maintenance Association ID
MD	Maintenance Domain
MD Level	Maintenance Domain Level
MEP	Maintenance End Point
MEPID	Maintenance Association End Point ID
MIB	Management Information Base
MRA	Media Redundancy Automanager
MRC	Media Redundancy Client
MRM	Media Redundancy Manager
MRP	Media Redundancy Protocol
MIC	Media Redundancy Interconnection Client
MIM	Media Redundancy Interconnection Manager
RC-mode	Ring Check mode