IEC 62439-2

Edition 3.0 2021-12

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

Réseaux de communication industriels – Réseaux de haute disponibilité pour l'automatisation –
Partie 2: Protocole de redondance du support (MRP)

IEC 62439-2:2021-12(en-fr)

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Réseaux de communication industriels – Réseaux de haute disponibilité pour l'automatisation – Partie 2: Protocole de redondance du support (MRP)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – HIGH AVAILABILITY AUTOMATION NETWORKS –

Part 2: Media Redundancy Protocol (MRP)

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

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:

a) improvements for the Continuity Check Protocol,
b) introduction of further specifiers for the rings, the interconnection links, and the device roles,
c) extensions and information on the use of baudrates smaller than 100 Mbit/s,
d) information on using MRP together with scheduling and shaping mechanisms,
e) introduction of an MRP Interconnection profile for a 30 ms reconfiguration time.

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

Draft	Report on voting
65C/1118/FDIS	65C/1137/RVD

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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.

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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 Std 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.

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INDUSTRIAL COMMUNICATION NETWORKS – HIGH AVAILABILITY AUTOMATION NETWORKS –

Part 2: Media Redundancy Protocol (MRP)

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1 Scope

1.1 General

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

1.2 Code component distribution

Each Code Component is a ZIP package containing at least the electronic representation of the Code Component itself and a file describing the content of the package (IECManifest.xml).

The IECManifest contains different sections giving information on:

- the copyright notice;
- the identification of the code component;
- the publication related to the code component;
- the list of the electronic files which compose the code component;
- an optional list of history files to track changes during the evolution process of the code component.

The Code Components included in this IEC standard are a set of SNMP MIBs. The Code Component IEC-62439-2-MIB.mib is a file containing the MIB with the management and monitoring view. It will be available in a full version, which contains the MIB defined in this document with the documentation associated and access is restricted to purchaser of this document.

The Code Component (full version) is freely accessible on the IEC website for download at: https://www.iec.ch/sc65c/supportingdocuments/IEC_62439-2.MIB.{VersionStateInfo}.full.zip but the usage remains under the licensing conditions.

The life cycle of a code component is not restricted to the life cycle of the related publication. The publication life cycle goes through two stages, Version (corresponding to an edition) and Revision (corresponding to an amendment). Consequently, new release(s) of the Code Component(s) may be released, which supersede(s) the previous release, and will be distributed through the IEC website at: https://www.iec.ch/sc65c/supportingdocuments.

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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 60050-192, *International Electrotechnical Vocabulary – Part 192: Dependability* (available at www.electropedia.org)

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

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, *Telecommunications and exchange between information technology systems – Requirements for local and metropolitan area networks – Part 3: Standard for Ethernet*

IEEE Std 802.1Q-2018, *IEEE Standard for Local and Metropolitan Area Networks – Bridges and Bridged Networks*

IEEE Std 802.3-2018, *IEEE Standard for Ethernet*

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-192 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

[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.

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