

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 62439-2:2010 sisaldab Euroopa standardi EN 62439-2:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.04.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 19.03.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 62439-2:2010 consists of the English text of the European standard EN 62439-2:2010.

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**Industrial communication networks -
High availability automation networks -
Part 2: Media Redundancy Protocol (MRP)
(IEC 62439-2:2010)**

Réseaux de communication industrielle –
Réseaux d'automatisme à haute
disponibilité –
Partie 2 : Protocol de redondance
de média (MRP)
(CEI 62439-2:2010)

Industrielle Kommunikationsnetze -
Hochverfügbare Automatisierungsnetze -
Teil 2: Medienredundanz-Protokoll (MRP)
(IEC 62439-2:2010)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 65C/583/FDIS, future edition 1 of IEC 62439-2, prepared by SC 65C, Industrial networks, of IEC TC 65, Industrial-process measurement, control and automation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62439-2 on 2010-03-01.

This EN 62439-2 together with EN 62439-1, EN 62439-3, EN 62439-4, EN 62439-5 and EN 62439-6 supersedes EN 62439:2008.

EN 62439-2:2010 includes the following significant technical changes with respect to EN 62439:2008:

- adding a calculation method for RSTP (rapid spanning tree protocol, IEEE 802.1Q),
- adding two new redundancy protocols: HSR (High-availability Seamless Redundancy) and DRP (Distributed Redundancy Protocol),
- moving former Clauses 1 to 4 (introduction, definitions, general aspects) and the Annexes (taxonomy, availability calculation) to EN 62439-1, which serves now as a base for the other documents,
- moving Clause 5 (MRP) to EN 62439-2 with minor editorial changes,
- moving Clause 6 (PRP) was to EN 62439-3 with minor editorial changes,
- moving Clause 7 (CRP) was to EN 62439-4 with minor editorial changes, and
- moving Clause 8 (BRP) was to EN 62439-5 with minor editorial changes,
- adding a method to calculate the maximum recovery time of RSTP in a restricted configuration (ring) to EN 62439-1 as Clause 8,
- adding specifications of the HSR (High-availability Seamless Redundancy) protocol, which shares the principles of PRP to EN 62439-3 as Clause 5, and
- introducing the DRP protocol as EN 62439-6.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2010-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-03-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62439-2:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61158-2:2007	NOTE	Harmonized as EN 61158-2:2008 (not modified).
IEC 61158-5-10	NOTE	Harmonized as EN 61158-5-10.
IEC 61784-1:2007	NOTE	Harmonized as EN 61784-1:2008 (not modified).
IEC 61784-2:2007	NOTE	Harmonized as EN 61784-2:2008 (not modified).
IEC 62439-3	NOTE	Harmonized as EN 62439-3.
IEC 62439-4	NOTE	Harmonized as EN 62439-4.
IEC 62439-5	NOTE	Harmonized as EN 62439-5.
IEC 62439-6	NOTE	Harmonized as EN 62439-6.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-191	1990	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 61158-6-10	-	Industrial communication networks - Fieldbus specifications - Part 6-10: Application layer protocol specification - Type 10 elements	EN 61158-6-10	-
IEC 62439-1	2010	Industrial communication networks - High availability automation networks - Part 1: General concepts and calculation methods	EN 62439-1	2010
ISO/IEC 8802-3	2000	Information technology - Telecommunications - and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
IEEE 802.1D	2004	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
IEEE 802.1Q	-	IEEE Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks	-	-

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms, definitions, abbreviations, acronyms, and conventions	8
3.1 Terms and definitions	8
3.2 Abbreviations and acronyms.....	8
3.3 Conventions	9
4 MRP Overview.....	9
5 MRP Media redundancy behavior	10
5.1 Ring ports	10
5.2 Media Redundancy Manager (MRM).....	11
5.3 Media Redundancy Client (MRC).....	12
5.4 Redundancy domain.....	12
5.5 Usage with diagnosis and alarms	12
5.6 Ring diagnosis.....	13
5.7 Multiple MRM in a single ring	13
5.8 BLOCKED not supported (option).....	13
6 MRP Class specification	14
6.1 General.....	14
6.2 Template.....	14
6.3 Attributes.....	14
7 MRP service specification.....	17
7.1 Start MRM.....	17
7.2 Stop MRM	18
7.3 State Change	19
7.4 Start MRC	20
7.5 Stop MRC.....	21
7.6 Read MRM	22
7.7 Read MRC	24
8 MRP protocol specification	25
8.1 PDU description	25
8.1.1 Basic data types	25
8.1.2 DLPDU abstract syntax reference.....	25
8.1.3 Coding of the DLPDU field SourceAddress	26
8.1.4 Coding of the DLPDU field DestinationAddress.....	26
8.1.5 Coding of the field TagControlInformation.....	27
8.1.6 Coding of the field LT	27
8.1.7 MRP APDU abstract syntax	27
8.1.8 Coding of the field MRP_TLVHeader	28
8.1.9 Coding of the field MRP_Version	29
8.1.10 Coding of the field MRP_SequenceID	29
8.1.11 Coding of the field MRP_SA	29
8.1.12 Coding of the field MRP_Prio.....	29
8.1.13 Coding of the field MRP_PortRole	29
8.1.14 Coding of the field MRP_RingState.....	29

8.1.15	Coding of the field MRP_Interval	30
8.1.16	Coding of the field MRP_Transition	30
8.1.17	Coding of the field MRP_TimeStamp	30
8.1.18	Coding of the field MRP_Blocked	30
8.1.19	Coding of the field MRP_ManufacturerOUI	31
8.1.20	Coding of the field MRP_ManufacturerData	31
8.1.21	Coding of the field MRP_DomainUUID	31
8.2	Protocol machines	31
8.2.1	MRM protocol machine	31
8.2.2	MRC protocol machine	41
8.2.3	MRM and MRC functions	48
8.2.4	FDB clear timer	51
8.2.5	Topology change timer	51
9	MRP installation, configuration and repair	51
9.1	Ring port parameters	51
9.2	Ring topology parameters	52
9.3	MRM parameters	52
9.4	MRC parameters and constraints	52
9.5	Calculation of MRP ring recovery time	53
9.5.1	Overview	53
9.5.2	Deduction of formula	53
9.5.3	Worst case calculation for recovery time of 10 ms	55
9.5.4	Worst case calculation for 50 devices	56
10	MRP Management Information Base (MIB)	56
10.1	General	56
10.2	MRP MIB with a monitoring view	56
10.3	MRP MIB with a management and monitoring view	64
	Bibliography	73
	Figure 1 – MRP stack	10
	Figure 2 – MRP ring topology with one manager and clients	11
	Figure 3 – MRP open ring with MRM	11
	Figure 4 – MRP ring with more than one MRM	13
	Figure 5 – MRP protocol machine for MRM	32
	Figure 6 – MRP protocol machine for MRC	42
	Table 1 – MRP Start MRM	17
	Table 2 – MRP Stop MRM	18
	Table 3 – MRP Change State	19
	Table 4 – MRP Start MRC	20
	Table 5 – MRP Stop MRC	21
	Table 6 – MRP Read MRM	22
	Table 7 – MRP Read MRC	24
	Table 8 – MRP DLPDU syntax for ISO/IEC 8802-3 (IEEE 802.3)	26
	Table 9 – MRP OUI	26
	Table 10 – MRP MulticastMACAddress	27

Table 11 – MRP TagControlInformation.Priority field	27
Table 12 – MRP LT field	27
Table 13 – MRP APDU syntax	28
Table 14 – MRP Substitutions	28
Table 15 – MRP_TLVHeader.Type	28
Table 16 – MRP_Version	29
Table 17 – MRP_Prio	29
Table 18 – MRP_PortRole	29
Table 19 – MRP_RingState	30
Table 20 – MRP_Interval	30
Table 21 – MRP_Transition	30
Table 22 – MRP_TimeStamp	30
Table 23 – MRP_Blocked	31
Table 24 – MRP_DomainUUID	31
Table 25 – MRP Local variables of MRM protocol machine	33
Table 26 – MRM State machine	34
Table 27 – MRP Local variables of MRC protocol machine	43
Table 28 – MRC state machine	43
Table 29 – MRP functions	49
Table 30 – MRP FDB clear timer	51
Table 31 – MRP topology change timer	51
Table 32 – MRP Network/Connection parameters	52
Table 33 – MRP MRM parameters	52
Table 34 – MRP MRC parameters	53

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 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 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.

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:

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

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 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 referenced documents are indispensable for the application 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 60050-191:1990, *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service*

IEC 61158-6-10, *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*

ISO/IEC 8802-3:2000, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*

IEEE 802.1Q, *IEEE standards for local and metropolitan area networks. Virtual bridged local area networks*

IEEE 802.1D:2004, *IEEE standard for local and metropolitan area networks Media Access Control (MAC) Bridges*

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, as well as in IEC 62439-1, apply.

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.

MRC Media Redundancy Client