



SLOVENSKI STANDARD

SIST EN 62439:2008

01-oktober-2008

Mreže za avtomatizacijo z visoko razpoložljivostjo

High availability automation networks

Hochverfügbare Automatisierungsnetze

Réseaux à haute disponibilité

ITEH STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 62439:2008

[SIST EN 62439:2008](https://standards.iteh.ai/catalog/standards/sist/4bc967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008)

<https://standards.iteh.ai/catalog/standards/sist/4bc967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008>

ICS:

25.040.01	Sistemi za avtomatizacijo v industriji na splošno	Industrial automation systems in general
35.040	Nabori znakov in kodiranje informacij	Character sets and information coding
35.110	Omreževanje	Networking

SIST EN 62439:2008

en,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62439:2008

<https://standards.iteh.ai/catalog/standards/sist/4be967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62439

August 2008

ICS 25.040; 35.040

English version

High availability automation networks
(IEC 62439:2008)

Réseaux d'automatismes
à haute disponibilité
(CEI 62439:2008)

Hochverfügbare
Automatisierungsnetze
(IEC 62439:2008)

This European Standard was approved by CENELEC on 2008-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 65C/495/FDIS, future edition 1 of IEC 62439, 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 on 2008-06-01.

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) 2009-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-06-01

The International Electrotechnical Commission (IEC) and CENELEC draw attention to the fact that it is claimed that compliance with this document may involve the use of the following patents:

- Clause 5 (MRP) may involve Patent WO 99/046908 A1 "Local network, especially Ethernet network, with redundancy properties and redundancy manager", owned by Siemens AG A&D, Gleiwitzerstr. 555, Nürnberg 90475 Germany and Hirschmann Automation and Control GmbH, Stuttgarter Strasse 45-51, Neckartenzlingen 72654, Germany;
- Clause 6 (PRP) may involve Patent WO06053459 "Reception of redundant and non-redundant frames", owned by ABB Switzerland Ltd, Corporate Research, Segelhofstr 1K, 5405 Baden, Switzerland;
- Clause 7 (CRP) may involve Patent U.S. 6,826,590 "Block Oriented Control System on High Speed Ethernet", owned by the Fieldbus Foundation, 9005 Mountain Ridge Drive – Bowie Bldg, Suite190, Austin, TX 78759, USA;
- Clause 8 (BRP) may involve Patent Application Serial No. US 11/520,192, "Multiple fault-tolerant Ethernet redundancy", owned by Rockwell Automation Technologies, Inc., 1 Allen-Bradley Drive, Mayfield Heights, Ohio, USA.

The IEC and CENELEC take 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 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 the IEC.

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

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62439:2008 was approved by CENELEC as a European Standard without any modification.

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	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 61158	Series	Industrial communication networks - Fieldbus specifications	EN 61158	Series
IEC 61784-1	- ¹⁾	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	2008 ²⁾
IEC 61784-2	- ¹⁾	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	2008 ²⁾
IEC 61918 (mod)	- ¹⁾	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	2008 ²⁾
IEEE 802	- ¹⁾	IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture	-	-
IEEE 802a	- ¹⁾	IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture - Amendment 1: Ethertypes for Prototypes and Vendor-Specific Protocol Development	-	-
IEEE 802.1D	- ¹⁾	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
IEEE 802.1Q	- ¹⁾	IEEE Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks	-	-
IEEE 802.3	- ¹⁾	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	-	-
IEEE 1588	- ¹⁾	IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

EN 62439:2008

- 4 -

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 791	- ¹⁾	Internet Protocol - DARPA Internet Program Protocol Specification	-	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62439:2008

<https://standards.iteh.ai/catalog/standards/sist/4be967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008>



IEC 62439

Edition 1.0 2008-05

INTERNATIONAL STANDARD

High availability automation networks

STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 62439:2008

<https://standards.iteh.ai/catalog/standards/sist/4be967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

XJ

CONTENTS

FOREWORD.....	8
INTRODUCTION.....	10
1 Scope.....	11
2 Normative references.....	11
3 Terms, definitions, abbreviated terms, acronyms, and conventions.....	12
3.1 Terms and definitions.....	12
3.2 Abbreviated terms and acronyms.....	19
3.3 Conventions.....	21
3.3.1 General conventions.....	21
3.3.2 Conventions for state machine definitions.....	21
3.3.3 Conventions for PDU specification.....	21
3.4 Reserved network addresses.....	21
4 Concepts for high availability automation networks.....	22
4.1 Characteristics of application of automation networks.....	22
4.1.1 Resilience in case of failure.....	22
4.1.2 Classes of network redundancy.....	23
4.1.3 Redundancy maintenance.....	23
4.1.4 Comparison and indicators.....	23
4.2 Generic network system.....	25
4.2.1 Network elements.....	25
4.2.2 Topologies.....	26
4.2.3 Redundancy handling.....	32
4.2.4 Network recovery time.....	32
4.2.5 Diagnosis coverage.....	32
4.2.6 Failures.....	32
4.3 Safety.....	34
4.4 Security.....	34
4.5 Conformance.....	34
4.5.1 Conformance to redundancy protocols.....	34
4.5.2 Conformance tests.....	34
5 MRP – Media Redundancy Protocol based on a ring topology.....	37
5.1 MRP Overview.....	37
5.2 MRP Media redundancy behaviour.....	38
5.2.1 Ring ports.....	38
5.2.2 Media Redundancy Manager (MRM).....	39
5.2.3 Media Redundancy Client (MRC).....	40
5.2.4 Redundancy domain.....	40
5.2.5 Usage with diagnosis and alarms.....	40
5.2.6 Ring diagnosis.....	41
5.2.7 Multiple MRM in a single ring.....	41
5.2.8 BLOCKED not supported (option).....	41
5.3 MRP Class specification.....	42
5.3.1 General.....	42
5.3.2 Template.....	42
5.3.3 Attributes.....	42
5.4 MRP Service specification.....	45

5.4.1	Start MRM	45
5.4.2	Stop MRM	46
5.4.3	State Change	47
5.4.4	Start MRC	48
5.4.5	Stop MRC	49
5.4.6	Read MRM	50
5.4.7	Read MRC	52
5.5	MRP Protocol specification	53
5.5.1	PDU description	53
5.5.2	Protocol machines	59
5.6	MRP Installation, configuration and repair	79
5.6.1	Ring port parameters	79
5.6.2	Ring topology parameters	80
5.6.3	MRM and MRC parameters	80
5.6.4	Configuration	81
6	PRP – Parallel Redundancy Protocol	81
6.1	PRP Principle of operation	81
6.1.1	Single points of failure	83
6.1.2	Node structure	83
6.1.3	Compatibility between singly and doubly attached nodes	84
6.1.4	Network management	84
6.1.5	Transition to non-redundant networks	84
6.1.6	Duplicate handling	85
6.1.7	Configuration check	90
6.1.8	Network supervision	90
6.1.9	Redundancy management interface	90
6.2	PRP protocol specifications	91
6.2.1	Installation, configuration and repair guidelines	91
6.2.2	MAC addresses	91
6.2.3	Multicast MAC addresses	91
6.2.4	IP addresses	91
6.2.5	Nodes	92
6.2.6	Duplicate accept mode	92
6.2.7	Duplicate discard mode	92
6.3	PRP service specification	98
6.3.1	Arguments	98
6.3.2	NodesTable	99
6.3.3	PRP Write	100
6.3.4	PRP Read	101
6.4	PRP Management Information Base	102
6.5	PRP Protocol Implementation Conformance Statement (PICS)	103
7	CRP – Cross-network Redundancy Protocol	103
7.1	CRP Overview	103
7.2	CRP Nodes	103
7.3	CRP LAN topology	103
7.4	CRP Key components	105
7.4.1	CRP General protocol operation	105
7.4.2	CRP Statistics	106
7.4.3	CRP Network_Status_Table	107

7.4.4	CRP Recovery time	110
7.4.5	CRP Multicast messages	111
7.4.6	CRP Unicast messages	111
7.4.7	CRP Redundancy information	112
7.4.8	CRP Redundancy statistics	112
7.5	CRP Protocol	112
7.5.1	CRP Singly attached node	112
7.5.2	CRP Doubly attached node	112
7.5.3	CRP Installation, configuration and repair	112
7.5.4	CRP LRE model attributes	112
7.5.5	CRP Encoding of the DiagnosticFrame	118
7.5.6	CRP Encoding of the AnnunciationFrame	119
7.5.7	CRP Common protocol	121
7.5.8	CRP Operational messages	123
7.5.9	CRP services	126
8	BRP – Beacon redundancy protocol	133
8.1	BRP Overview	133
8.2	BRP Principle of operation	133
8.2.1	General	133
8.2.2	Network topology	133
8.2.3	Network components	135
8.2.4	Rapid reconfiguration of network traffic	136
8.3	BRP stack and fault detection features	136
8.4	BRP Protocol specification	138
8.4.1	MAC addresses	138
8.4.2	EtherType	138
8.4.3	Fault detection mechanisms	138
8.4.4	End node state diagram	138
8.4.5	Beacon end node state diagram	145
8.5	BRP Message structure	152
8.5.1	General	152
8.5.2	IEEE 802.3 tagged frame header	152
8.5.3	Beacon message	152
8.5.4	Learning_Update message	153
8.5.5	Failure_Notify message	153
8.5.6	Path_Check_Request message	153
8.5.7	Path_Check_Response message	154
8.6	BRP Fault recovery time	154
8.7	BRP Service definition	155
8.7.1	Supported services	155
8.7.2	Common service parameters	155
8.7.3	Set node parameters service	155
8.7.4	Get node parameters service	157
8.7.5	Add node receive parameters service	159
8.7.6	Remove node receive parameters service	160
8.7.7	Get node status service	161
Annex A	(informative) Classification of networks	163
Annex B	(informative) Availability calculations	165
Annex C	(normative) Network management information base	174

Annex D (informative) PRP algorithm as pseudo-code	197
Bibliography.....	200
Figure 1 – General network elements (tree topology)	25
Figure 2 – Example of tree topology.....	27
Figure 3 – Example of linear topology	28
Figure 4 – Example of ring topology.....	28
Figure 5 – Example of a partially meshed topology	29
Figure 6 – Example of fully meshed topology.....	30
Figure 7 – Single LAN structure without redundant leaf links.....	30
Figure 8 – Single LAN structure with redundant leaf links.....	31
Figure 9 – Redundant LAN structure without redundant leaf links	31
Figure 10 – Redundant LAN structure with redundant leaf links	31
Figure 11 – Conformance test overview	35
Figure 12 – MRP Stack	38
Figure 13 – MRP Ring topology with one manager and clients	39
Figure 14 – MRP MRM in an open ring	39
Figure 15 – MRP Ring with more than one MRM.....	41
Figure 16 – MRP Protocol machine for MRM.....	60
Figure 17 – MRP Protocol machine for MRM.....	70
Figure 18 – PRP General redundant network example	81
Figure 19 – PRP Redundant network example as two LANs (bus topology).....	82
Figure 20 – PRP Redundant ring example with SANs and DANPs.	82
Figure 21 – PRP Single Ring with DANPs in SRP mode.....	83
Figure 22 – PRP Two DANPs communicating	83
Figure 23 – PRP Redundancy Box, transition from single to double LAN.	85
Figure 24 – PRP Frame extended by an RCT.....	86
Figure 25 – PRP Tagged frame extended by an RCT	87
Figure 26 – PRP Constructed, padded frame closed by an RCT.....	87
Figure 27 – PRP Drop window on LAN_A.....	88
Figure 28 – PRP Drop window reduction after a discard.....	89
Figure 29 – PRP Frame from LAN_B was not discarded.	89
Figure 30 – PRP Synchronized LANs.....	89
Figure 31 – CRP Stack architecture	103
Figure 32 – CRP Single LAN topography	104
Figure 33 – CRP Double LAN topology	104
Figure 34 – CRP DiagnosticFrame pair approach.....	105
Figure 35 – CRP Example system.....	106
Figure 36 – BRP Star network example.....	133
Figure 37 – BRP Linear network example	134
Figure 38 – BRP Ring network example.....	135
Figure 39 – BRP Stack architecture	136
Figure 40 – BRP State diagram of end node	139

Figure 41 – BRP State diagram for beacon end node.....	146
Figure B.1 – General symmetrical fault model.....	166
Figure B.2 – Simplified fault model	167
Figure B.3 – Asymmetric fault model.....	168
Figure B.4 – Network with no redundancy	169
Figure B.5 – Network with no single point of failure.....	170
Figure B.6 – Network with resiliency to second failure.....	172
Table 1 – Examples of application grace time	22
Table 2 – Examples of redundancy protocols.....	24
Table 3 – MRP Start MRM	45
Table 4 – MRP Stop MRM.....	47
Table 5 – MRP Change State.....	47
Table 6 – MRP Start MRC.....	48
Table 7 – MRP Stop MRC	49
Table 8 – MRP Read MRM	50
Table 9 – MRP Read MRC	52
Table 10 – MRP IEEE 802.3 DLPDU syntax.....	54
Table 11 – MRP OUI.....	54
Table 12 – MRP MulticastMACAddress.....	55
Table 13 – MRP TagControlInformation.Priority field.....	55
Table 14 – MRP LT field.....	55
Table 15 – MRP APDU syntax	56
Table 16 – MRP Substitutions.....	56
Table 17 – MRP_TLVHeader.Type.....	56
Table 18 – MRP_Version	57
Table 19 – MRP_Prio.....	57
Table 20 – MRP_PortRole	57
Table 21 – MRP_RingState.....	58
Table 22 – MRP_Interval	58
Table 23 – MRP_Transition.....	58
Table 24 – MRP_TimeStamp	58
Table 25 – MRP_Blocked.....	59
Table 26 – MRP_DomainUUID.....	59
Table 27 – MRP Local variables of MRM protocol machine	61
Table 28 – MRM State machine	62
Table 29 – MRP Local variables of MRC protocol machine	71
Table 30 – MRC State machine	71
Table 31 – MRP Functions.....	76
Table 32 – MRP FDB Clear Timer.....	79
Table 33 – MRP Topology Change Timer.....	79
Table 34 – MRP Network/Connection parameters	80
Table 35 – MRP MRM parameters	80

Table 36 – MRP MRC parameters.....	80
Table 37 – PRP_Supervision frame with VLAN tagging.....	96
Table 38 – PRP Constants.....	98
Table 39 – PRP Arguments.....	99
Table 40 – PRP Arguments.....	100
Table 41 – PRP Write	101
Table 42 – PRP Read	102
Table 43 – CRP Example Network_Status_Table for node 3.....	106
Table 44 – CRP Network_Status_Table for singly connected nodes.....	108
Table 45 – CRP Network_Status_Table for DANC	109
Table 46 – CRP Path_Status_Sets	116
Table 47 – CRP Example of a Path_Status_Set.....	116
Table 48 – CRP Configuration attributes impact on LAN operation.....	117
Table 49 – CRP DiagnosticFrame format	118
Table 50 – CRP AnnunciationFrame	119
Table 51 – CRP Unicast destination address handling	124
Table 52 – CRP Configuration Parameters.....	125
Table 53 – CRP Set assignment info service parameters.....	126
Table 54 – CRP Get redundancy info service.....	128
Table 55 – CRP Put redundancy info service.....	130
Table 56 – CRP Get statistics service	131
Table 57 – BRP End node flags.....	140
Table 58 – BRP End node state transition table.....	141
Table 59 – BRP Beacon end node flags.....	147
Table 60 – BRP Beacon end node state transition table.....	148
Table 61 – BRP Common Header with IEEE 802.3 tagged frame format	152
Table 62 – BRP Beacon message format.....	153
Table 63 – BRP Learning_Update message format.....	153
Table 64 – BRP Failure_Notify message format.....	153
Table 65 – BRP Path_Check_Request message format	153
Table 66 – BRP Path_Check_Response message format	154
Table 67 – BRP Set Node Parameters service parameters.....	156
Table 68 – BRP Get Node Parameters service parameters	157
Table 69 – BRP Add Node Receive Parameters service parameters	159
Table 70 – BRP Remove Node Receive Parameters service parameters.....	160
Table 71 – BRP Get Node Status service parameters	161
Table A.1 – Code assignment for the <TYPE> field.....	163
Table A.2 – Code assignment for the <PLCYleaf> field	163
Table A.3 – Code assignment for the <TPLGY> field	163
Table A.4 – Code assignment for the <ITYPE> field.....	164

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH AVAILABILITY AUTOMATION NETWORKS

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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) The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of the following patents:
 - a) Clause 5 (MRP) may involve Patent WO 99/046908 A1 "Local network, especially Ethernet network, with redundancy properties and redundancy manager", owned by Siemens AG A&D, Gleiwitzerstr. 555, Nürnberg 90475 Germany and Hirschmann Automation and Control GmbH, Stuttgarter Strasse 45-51, Neckartenzlingen 72654, Germany
 - b) Clause 6 (PRP) may involve Patent WO06053459 "Reception of redundant and non-redundant frames", owned by ABB Switzerland Ltd, Corporate Research, Segelhofstr 1K, 5405 Baden, Switzerland.
 - c) Clause 7 (CRP) may involve Patent U.S. 6,826,590 „Block Oriented Control System on High Speed Ethernet“, owned by the Fieldbus Foundation, 9005 Mountain Ridge Drive – Bowie Bldg, Suite190, Austin, TX 78759
 - d) Clause 8 (BRP) may involve Patent Application Serial No. US 11/520,192, "Multiple fault-tolerant Ethernet redundancy", owned by Rockwell Automation Technologies, Inc., 1 Allen-Bradley Drive, Mayfield Heights, Ohio, USA

IEC takes no position concerning the evidence, validity and scope of these patent rights.

The holders of these patents have assured the IEC that they are willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holders of these patent rights is registered with IEC.

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

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

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

FDIS	Report on voting
65C/495/FDIS	65C/498/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

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

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[SIST EN 62439:2008](#)

<https://standards.iteh.ai/catalog/standards/sist/4be967a8-31f3-4bc5-baf0-2fdd4d4001d8/sist-en-62439-2008>