



IEC 62541-9

Edition 4.0 2026-04

INTERNATIONAL STANDARD

REDLINE VERSION

**OPC unified architecture -
Part 9: Alarms and Conditions**

CONTENTS

FOREWORD	10
1 Scope	13
2 Normative references	13
3 Terms, definitions, abbreviated terms and used data types	14
3.1 Terms and definitions	14
3.2 Abbreviated terms and symbols	17
3.3 Used data types	17
4 Concepts	17
4.1 General	17
4.2 Conditions	18
4.3 Acknowledgeable Conditions	19
4.4 Previous states of Conditions	20
4.5 Condition state synchronization	21
4.6 Severity, quality, and comment	22
4.7 Dialogs	22
4.8 Alarms	22
4.9 Multiple active states	24
4.10 Condition instances in the AddressSpace	25
4.11 Alarm and Condition auditing	26
4.12 Alarms in a system	26
5 Model	26
5.1 General	26
5.2 Two-state state machines	28
5.3 ConditionVariable	30
5.4 ReferenceTypes	31
5.4.1 General	31
5.4.2 HasTrueSubState ReferenceType	31
5.4.3 HasFalseSubState ReferenceType	32
5.4.4 HasAlarmSuppressionGroup ReferenceType	32
5.4.5 AlarmGroupMember ReferenceType	33
5.4.6 AlarmSuppressionGroupMember ReferenceType	33
5.5 Condition Model	34
5.5.1 General	34
5.5.2 ConditionType	35
5.5.3 Condition and branch instances	40
5.5.4 Disable Method	40
5.5.5 Enable Method	41
5.5.6 AddComment Method	42
5.5.7 ConditionRefresh Method	43
5.5.8 ConditionRefresh2 Method	45
5.6 Dialog Model	47
5.6.1 General	47
5.6.2 DialogConditionType	47
5.6.3 Respond Method	49
5.6.4 Respond2 Method	50
5.7 Acknowledgeable Condition Model	51
5.7.1 General	51

5.7.2	AcknowledgeableConditionType	51
5.7.3	Acknowledge Method.....	53
5.7.4	Confirm Method	54
5.8	Alarm model	56
5.8.1	General	56
5.8.2	AlarmConditionType	57
5.8.3	AlarmGroupType	64
5.8.4	AlarmSuppressionGroupType	64
5.8.5	Reset Method	65
5.8.6	Reset2 Method	66
5.8.7	Silence Method.....	67
5.8.8	Suppress Method.....	68
5.8.9	Suppress2 Method.....	69
5.8.10	Unsuppress Method.....	70
5.8.11	Unsuppress2 Method.....	71
5.8.12	RemoveFromService Method.....	71
5.8.13	RemoveFromService2 Method	72
5.8.14	PlaceInService Method	73
5.8.15	PlaceInService2 Method	74
5.8.16	GetGroupMemberships Method	75
5.8.17	ShelvedStateMachineType	76
5.8.18	LimitAlarmType.....	88
5.8.19	Exclusive Limit Types	91
5.8.20	NonExclusiveLimitAlarmType.....	97
5.8.21	Level Alarm	100
5.8.22	Deviation Alarm	101
5.8.23	Rate of change Alarms	103
5.8.24	Discrete Alarms	104
5.8.25	DiscrepancyAlarmType	108
5.9	ConditionClasses	109
5.9.1	Overview	109
5.9.2	BaseConditionClassType	110
5.9.3	ProcessConditionClassType	111
5.9.4	MaintenanceConditionClassType	111
5.9.5	SystemConditionClassType	112
5.9.6	SafetyConditionClassType	112
5.9.7	HighlyManagedAlarmConditionClassType.....	112
5.9.8	TrainingConditionClassType	113
5.9.9	StatisticalConditionClassType	113
5.9.10	TestingConditionSubClassType TestingConditionClassType.....	114
5.10	Audit Events	114
5.10.1	Overview	114
5.10.2	AuditConditionEventType	116
5.10.3	AuditConditionEnableEventType.....	117
5.10.4	AuditConditionCommentEventType.....	117
5.10.5	AuditConditionRespondEventType.....	118
5.10.6	AuditConditionAcknowledgeEventType	118
5.10.7	AuditConditionConfirmEventType	118
5.10.8	AuditConditionShelvingEventType	119

5.10.9	AuditConditionSuppressionEventType	119
5.10.10	AuditConditionSilenceEventType	120
5.10.11	AuditConditionResetEventType	120
5.10.12	AuditConditionOutOfServiceEventType	121
5.11	Condition Refresh related Events	121
5.11.1	Overview	121
5.11.2	RefreshStartEventType	122
5.11.3	RefreshEndEventType	123
5.11.4	RefreshRequiredEventType	123
5.12	HasCondition Reference type	123
5.13	Alarm & Condition status codes	124
5.14	Expected A & C server behaviours	125
5.14.1	General	125
5.14.2	Communication problems	125
5.14.3	Redundant A & C servers	125
6	AddressSpace organisation	126
6.1	General	126
6.2	EventNotifier and source hierarchy	126
6.3	Adding Conditions to the hierarchy	127
6.4	Conditions in InstanceDeclarations	128
6.5	Conditions in a VariableType	129
7	System State & Alarms	129
7.1	Overview	129
7.2	HasEffectDisable	129
7.3	HasEffectEnable	130
7.4	HasEffectSuppressHasEffectSuppressed	130
7.5	HasEffectUnsuppressed	131
8	Alarm Summary and Objects	132
8.1	Overview	132
8.2	AlarmState Variable	133
8.3	AlarmMask	134
9	Alarm Metrics	135
9.1	Overview	135
9.2	AlarmMetricsType	135
9.3	AlarmRateVariableType	137
9.4	Reset Method	137
Annex A (informative)	Recommended localized names	139
A.1	Recommended state names for TwoState Variables	139
A.1.1	LocaleId "en"	139
A.1.2	LocaleId "de"	139
A.1.3	LocaleId "fr"	140
A.2	Recommended dialog response options	141
Annex B (informative)	Examples	142
B.1	Examples for Event sequences from Condition instances	142
B.1.1	Overview	142
B.1.2	Server maintains current state only	142
B.1.3	Server maintains previous states	143
B.1.4	Server current-State Model with Suppression	144

B.1.5	Example for On-Delay, Off Delay and ReAlarmTime	146
B.2	AddressSpace examples	146
Annex C (informative) Mapping to EEMUA		
Annex C (informative)	Mapping from OPC A&E to OPC UA A & C	150
C.1	Overview	150
C.2	Alarms and Events COM UA wrapper	150
C.2.1	Event areas	150
C.2.2	Event sources	151
C.2.3	Event categories	151
C.2.4	Event attributes	152
C.2.5	Event subscriptions	152
C.2.6	Condition instances	155
C.2.7	Condition Refresh	155
C.3	Alarms and Events COM UA proxy	155
C.3.1	General	155
C.3.2	Server status mapping	155
C.3.3	Event Type mapping	156
C.3.4	Event category mapping	156
C.3.5	Event Category attribute mapping	157
C.3.6	Event Condition mapping	160
C.3.7	Browse mapping	160
C.3.8	Qualified names	161
C.3.9	Subscription filters	162
Annex D (informative)	IEC 62682 Mapping	164
D.1	Overview	164
D.2	Terms	164
D.3	Alarm records & State indications	170
Annex E (Informative)	System state	171
E.1	Overview	171
E.2	SystemStateStateMachineType	172
Bibliography	177
Figure 1	– Base Condition state model	18
Figure 2	– AcknowledgeableConditions state model	19
Figure 3	– Acknowledge State Model	20
Figure 4	– Confirmed acknowledge State model	20
Figure 5	– Alarm state machine model	23
Figure 6	– Typical Alarm Timeline example	24
Figure 7	– Multiple active states example	25
Figure 8	– ConditionType hierarchy	28
Figure 9	– TwoStateVariable Illustration	30
Figure 10	– Condition model	35
Figure 11	– SupportsFilteredRetain process	38
Figure 12	– DialogConditionType Overview	47
Figure 13	– AcknowledgeableConditionType overview	51
Figure 14	– AlarmConditionType Hierarchy Model	56

Figure 15 – Alarm Model	59
Figure 16 – Shelf state transitions	77
Figure 17 – ShelvedStateMachineType model	78
Figure 18 – LimitAlarmType	89
Figure 19 – ExclusiveLimitStateMachineType	92
Figure 20 – ExclusiveLimitAlarmType	96
Figure 21 – NonExclusiveLimitAlarmType	99
Figure 22 – DiscreteAlarmType Hierarchy	105
Figure 23 – ConditionClass type hierarchy	110
Figure 24 – AuditEvent hierarchy	116
Figure 25 – Refresh Related Event Hierarchy	122
Figure 26 – Typical HasNotifier Hierarchy	127
Figure 27 – Use of HasCondition in a HasNotifier hierarchy	128
Figure 28 – Use of HasCondition in an InstanceDeclaration	128
Figure 29 – Use of HasCondition in a VariableType	129
Figure 30 – AlarmSummary equipment example	132
Figure 31 – AlarmSummary Equipment Object Example	133
Figure B.1 – Single state example	142
Figure B.2 – Previous state example	143
Figure B.3 – SuppressedState and OutOfServiceState example	145
Figure B.4 – Alarm example – On Delay, Off Delay, ReAlarmTime	146
Figure B.5 – HasCondition used with Condition instances	147
Figure B.6 – HasCondition reference to a Condition type	148
Figure B.7 – HasCondition used with an instance declaration	148
Figure C.1 – The type model of a wrapped COM AE server	152
Figure C.2 – Mapping UA Event Types to COM A&E Event Types	156
Figure C.3 – Example mapping of UA Event Types to COM A&E categories	157
Figure C.4 – Example mapping of UA Event Types to A&E categories with attributes	160
Figure E.1 – SystemState transitions	171
Figure E.2 – SystemStateStateMachineType model	172
Table 1 – Parameter types defined in IEC 62541-3	17
Table 2 – Parameter types defined in IEC 62541-4	17
Table 3 – TwoStateVariableType definition	29
Table 4 – ConditionVariableType definition	31
Table 5 – HasTrueSubState ReferenceType	32
Table 6 – HasFalseSubState ReferenceType	32
Table 7 – HasAlarmSuppressionGroup ReferenceType	33
Table 8 – AlarmGroupMember ReferenceType	33
Table 9 – AlarmSuppressionGroupMember ReferenceType	34
Table 10 – ConditionType definition	36
Table 11 – ConditionType Additional Subcomponents	36
Table 12 – ConditionId SimpleAttributeOperand Illustration	40

Table 13 – Disable result codes	40
Table 14 – Disable Method AddressSpace definition	41
Table 15 – Enable result codes	41
Table 16 – Enable Method AddressSpace definition	41
Table 17 – AddComment arguments	42
Table 18 – AddComment result codes	42
Table 19 – AddComment Method AddressSpace definition	43
Table 20 – ConditionRefresh parameters	43
Table 21 – ConditionRefresh result codes	43
Table 22 – ConditionRefresh Method AddressSpace definition	45
Table 23 – ConditionRefresh2 parameters	45
Table 24 – ConditionRefresh2 result codes	46
Table 25 – ConditionRefresh2 Method AddressSpace definition	47
Table 26 – DialogConditionType definition	48
Table 27 – DialogConditionType Additional Subcomponents	48
Table 28 – Respond parameters	49
Table 29 – Respond Result Codes	49
Table 30 – Respond Method AddressSpace definition	50
Table 31 – Respond2 parameters	50
Table 32 – Respond2 Result Codes	50
Table 33 – Respond2 Method AddressSpace definition	51
Table 34 – AcknowledgeableConditionType definition	52
Table 35 – AcknowledgeableConditionType Additional Subcomponents	52
Table 36 – Acknowledge parameters	53
Table 37 – Acknowledge result codes	53
Table 38 – Acknowledge Method AddressSpace definition	54
Table 39 – Confirm Method parameters	54
Table 40 – Confirm result codes	55
Table 41 – Confirm Method AddressSpace definition	55
Table 42 – AlarmConditionType definition	60
Table 43 – AlarmConditionType Additional Subcomponents	61
Table 44 – AlarmGroupType definition	64
Table 45 – AlarmSuppressionGroupType definition	65
Table 46 – Silence Reset result codes	65
Table 47 – Reset Method AddressSpace definition	66
Table 48 – Reset2 Method parameters	66
Table 49 – Reset2 result codes	66
Table 50 – Reset2 Method AddressSpace definition	67
Table 51 – Silence result codes	67
Table 52 – Silence Method AddressSpace definition	68
Table 53 – Suppress result codes	68
Table 54 – Suppress Method AddressSpace definition	69
Table 55 – Suppress2 Method parameters	69

Table 56 – Suppress2 Method AddressSpace definition	69
Table 57 – Unsuppress result codes	70
Table 58 – Unsuppress Method AddressSpace definition	70
Table 59 – Unsuppress2 Method parameters	71
Table 60 – Unsuppress2 Method AddressSpace definition	71
Table 61 – RemoveFromService result codes	72
Table 62 – RemoveFromService Method AddressSpace definition	72
Table 63 – RemoveFromService2 Method parameters	73
Table 64 – RemoveFromService2 result codes	73
Table 65 – RemoveFromService2 Method AddressSpace definition	73
Table 66 – PlaceInService result codes	74
Table 67 – PlaceInService Method AddressSpace definition	74
Table 68 – PlaceInService2 Method parameters	75
Table 69 – PlaceInService2 result codes	75
Table 70 – PlaceInService2 Method AddressSpace definition	75
Table 71 – GetGroupMemberships result codes	76
Table 72 – GetGroupMemberships Method AddressSpace definition	76
Table 73 – ShelvedStateMachineType definition	79
Table 50 – ShelvedStateMachineType transitions	
Table 74 – ShelvedStateMachineType Additional References	81
Table 75 – ShelvedStateMachineType Attribute values for child Nodes	82
Table 76 – Unshelve result codes	82
Table 77 – Unshelve Method AddressSpace definition	83
Table 78 – Unshelve2 Method parameters	83
Table 79 – Unshelve2 result codes	83
Table 80 – Unshelve2 Method AddressSpace definition	84
Table 81 – TimedShelve parameters	84
Table 82 – TimedShelve result codes	84
Table 83 – TimedShelve Method AddressSpace definition	85
Table 84 – TimedShelve2 parameters	85
Table 85 – TimedShelve2 result codes	86
Table 86 – TimedShelve2 Method AddressSpace definition	86
Table 87 – OneShotShelve result codes	87
Table 88 – OneShotShelve Method AddressSpace definition	87
Table 89 – OneShotShelve2 Method parameters	87
Table 90 – OneShotShelve2 result codes	87
Table 91 – OneShotShelve2 Method AddressSpace definition	88
Table 92 – LimitAlarmType definition	90
Table 93 – ExclusiveLimitStateMachineType definition	92
Table 60 – ExclusiveLimitStateMachineType transitions	
Table 94 – ExclusiveLimitStateMachineType Additional References	93
Table 95 – ExclusiveLimitStateMachineType Attribute values for child Nodes	94
Table 96 – ExclusiveLimitAlarmType definition	96

Table 97 – NonExclusiveLimitAlarmType definition	100
Table 98 – NonExclusiveLimitAlarmType Additional Subcomponents	100
Table 99 – NonExclusiveLevelAlarmType definition	101
Table 100 – ExclusiveLevelAlarmType definition.....	101
Table 101 – NonExclusiveDeviationAlarmType definition	102
Table 102 – ExclusiveDeviationAlarmType definition	103
Table 103 – NonExclusiveRateOfChangeAlarmType definition.....	104
Table 104 – ExclusiveRateOfChangeAlarmType definition	104
Table 105 – DiscreteAlarmType definition.....	105
Table 106 – OffNormalAlarmType definition.....	106
Table 107 – SystemOffNormalAlarmType definition	106
Table 108 – TripAlarmType definition.....	107
Table 109 – InstrumentDiagnosticAlarmType definition.....	107
Table 110 – SystemDiagnosticAlarmType definition	107
Table 111 – CertificateExpirationAlarmType definition	108
Table 112 – DiscrepancyAlarmType definition.....	109
Table 113 – BaseConditionClassType definition.....	111
Table 114 – ProcessConditionClassType definition.....	111
Table 115 – MaintenanceConditionClassType definition.....	111
Table 116 – SystemConditionClassType definition	112
Table 117 – SafetyConditionClassType definition	112
Table 118 – HighlyManagedAlarmConditionClassType definition	113
Table 119 – TrainingConditionClassType definition.....	113
Table 120 – StatisticalConditionClassType definition	113
Table 121 – TestingConditionSubClassType TestingConditionClassType definition	114
Table 122 – AuditConditionEventType definition	116
Table 123 – AuditConditionEnableEventType definition	117
Table 124 – AuditConditionCommentEventType definition	117
Table 125 – AuditConditionRespondEventType definition	118
Table 126 – AuditConditionAcknowledgeEventType definition.....	118
Table 127 – AuditConditionConfirmEventType definition	119
Table 128 – AuditConditionShelvingEventType definition.....	119
Table 129 – AuditConditionSuppressionEventType definition	120
Table 130 – AuditConditionSilenceEventType definition.....	120
Table 131 – AuditConditionResetEventType definition	120
Table 132 – AuditConditionOutOfServiceEventType definition	121
Table 133 – RefreshStartEventType definition	122
Table 134 – RefreshEndEventType definition.....	123
Table 135 – RefreshRequiredEventType definition.....	123
Table 136 – HasCondition <i>ReferenceType</i> Definition	124
Table 137 – Alarm & Condition result codes.....	124
Table 138 – HasEffectDisable <i>ReferenceType</i>	130
Table 139 – HasEffectEnable <i>ReferenceType</i>	130

Table 140 – HasEffectSuppress HasEffectSuppressed ReferenceType	131
Table 141 – HasEffectUnsuppress HasEffectUnsuppressed ReferenceType	132
Table 142 – AlarmStateVariableType definition	134
Table 143 – AlarmMask values	134
Table 144 – AlarmMask definition	135
Table 145 – AlarmMetricsType Definition	136
Table 146 – AlarmRateVariableType Definition	137
Table 147 – Suppress result codes	137
Table 148 – Reset Method AddressSpace Definition	138
Table A.1 – Recommended state names for LocaleId "en"	139
Table A.2 – Recommended DisplayNames for LocaleId "en"	139
Table A.3 – Recommended state names for LocaleId "de"	140
Table A.4 – Recommended DisplayNames for LocaleId "de"	140
Table A.5 – Recommended state names for LocaleId "fr"	141
Table A.6 – Recommended DisplayNames for LocaleId "fr"	141
Table A.7 – Recommended dialog response options	141
Table B.1 – Example of a Condition that only keeps the latest state	142
Table B.2 – Example of a <i>Condition</i> that maintains previous states via branches	144
Table B.3 – Example of a Condition that is Suppressed / OutOfService	145
Table C.1 – EEMUA Terms	151
Table C.1 – Mapping from standard Event categories to OPC UA Event types	151
Table C.2 – Mapping from ONEVENTSTRUCT fields to UA BaseEventType Variables	153
Table C.3 – Mapping from ONEVENTSTRUCT fields to UA AuditEventType Variables	153
Table C.4 – Mapping from ONEVENTSTRUCT fields to UA AlarmType Variables	154
Table C.5 – Event category attribute mapping table	157
Table D.1 – IEC 62682 mapping table	164
Table E.1 – SystemStateStateMachineType definition	172
Table E.2 – SystemStateStateMachineType additional references	175
Table E.3 – SystemStateStateMachineType Attribute values for child Nodes	176
Table F.2 – SystemStateStateMachineType transitions	176

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC unified architecture - Part 9: Alarms and Conditions

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62541-9:2020. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62541-9 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2020. This edition constitutes a technical revision.

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

- a) addition of "Comment" parameter to Alarm shelving methods;
- b) addition of method that allows a client to get the members of a group, since it is possible that the AddressSpace does not expose instances of alarms;
- c) addition of deadband properties for all limits in the limit AlarmType (from which all other types described in this issue are derived);
- d) addition of text explaining the disabling of alarms is no longer supported in ISA 18.2 and that it is maintained in this document for backward compatibility, but that it is recommended that Alarm not be disabled;
- e) addition of optional severities for limit alarms;
- f) addition of new AlarmState variable type that can be used to collect alarm information for displays on graphics;
- g) addition of SupportsFilterRetain property to improve Client filtering;
- h) removal of ConditionSubClassId and ConditionSubClassNames from the conditiontype definition since they are now defined in BaseEventType.

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

Draft	Report on voting
65E/1056/CDV	65E/1109/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

Throughout this document and the other parts of the IEC 62541 series, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in the "Terms and definitions" clause in one of the parts of the IEC 62541 series.

Italics are also used to denote the name of a service input or output parameter or the name of a structure or element of a structure that are usually defined in tables.

The *italicized terms* and *names* are, with a few exceptions, written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element's initial letter capitalized within the compound). For example, the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

A list of all parts in the IEC 62541 series, published under the general title *OPC Unified Architecture*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

1 Scope

This part of IEC 62541 specifies the representation of *Alarms* and *Conditions* in the OPC Unified Architecture. Included is the *Information Model* representation of *Alarms* and *Conditions* in the OPC UA address space. Other aspects of alarm systems like alarm philosophy, life cycle, alarm response times, alarm types and many other details are captured in standards such as IEC 62682 and ISA 18.2. The *Alarms* and *Conditions Information Model* in this document, is designed in accordance with IEC 62682 and ISA 18.2. Annex C specifies a recommended mapping between OPC Classic Alarm & Events (A&E) servers to the model described in this document.

Annex A describes recommended localized names for *Alarm* states.

Annex B describes examples (e.g. *Event* sequences, *Alarm* areas in *AddressSpace*).

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 ~~TR~~ 62541-1, *OPC Unified Architecture - Part 1: ~~Overview and~~ Concepts*

IEC 62541-3, *OPC Unified Architecture - Part 3: Address Space Model*

IEC 62541-4, *OPC Unified Architecture - Part 4: Services*

IEC 62541-5, *OPC Unified Architecture - Part 5: Information Model*

IEC 62541-6, *OPC Unified Architecture - Part 6: Mappings*

IEC 62541-7, *OPC Unified Architecture - Part 7: Profiles*

IEC 62541-8, *OPC Unified Architecture - Part 8: Data Access*

IEC 62541-11, *OPC Unified Architecture - Part 11: Historical Access*

IEC 62541-16, *OPC Unified Architecture - Part 16: State Machines*

IEC 62682, *Management of alarm systems for the process industries*

~~EEMUA: 2nd Edition EEMUA 191 — Alarm System — A guide to design, management and procurement (Appendixes 6, 7, 8, 9), available at <https://www.eemua.org/Products/Publications/Print/EEMUA-Publication-191.aspx>~~

ISA 18.2, *Management of Alarm Systems for the Process Industries*

Bibliography

~~ISA 18.2, Management of Alarm Systems for the Process Industries -
<https://www.isa.org/store/ansi/isa-182-2016-management-of-alarm-systems-for-the-process-industries/46962105>~~

EEMUA Publication 191, *Alarm System – A guide to design, management and procurement, second edition*

IETF RFC 2045, N. Freed, N. Borenstein, *Multipurpose Internet Mail Extensions (MIME) - Part One: Format of Internet Message Bodies*, November 1996, available at <https://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2046, N. Freed, N. Borenstein, *Multipurpose Internet Mail Extensions (MIME) - Part Two: Media Types*, November 1996, available at <https://www.ietf.org/rfc/rfc2046.txt>

IETF RFC 2047, K. Moore, *Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII Text*, November 1996, available at <https://www.ietf.org/rfc/rfc2047.txt>
