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Responsible committee: JPEL/18 Electrical installations of ships and of mobile and fixed offshore units

Interested committees:

Title: BS EN 60092-504 Electrical installations in ships

Part 504: Automation; control and instrumentation

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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 **Documents**
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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



18/1815/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 60092-504 ED5

DATE OF CIRCULATION:

2023-02-10

CLOSING DATE FOR COMMENTS:

2023-05-05

SUPERSEDES DOCUMENTS:

18/1714/RR

IEC TC 18 : ELECTRICAL INSTALLATIONS OF SHIPS AND OF MOBILE AND FIXED OFFSHORE UNITS

SECRETARIAT:

Norway

SECRETARY:

Mr Arild Røed

OF INTEREST TO THE FOLLOWING COMMITTEES:

SC 18A, TC 80

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☒ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

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,
- any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "in some countries" clauses. See AC/22/2007.

TITLE:

Electrical installations in ships - Part 504: Automation, control and instrumentation

NOTE FROM TC/SC OFFICERS:

Please also see the red line version of this document showing the changes (please refer to 18/1814/INF circulated in parallel) compared with the DC document, which was circulated previously.

CONTENTS

1		
2		
3	FOREWORD	7
4	INTRODUCTION	9
5	1 Scope	10
6	2 Normative references	10
7	3 Terms and definitions	12
8	4 General requirements	17
9	4.1 Safety	17
10	4.2 Segregation	17
11	4.3 Performance	17
12	4.4 Usability	17
13	4.5 Integration	17
14	4.6 Development activities	18
15	4.7 Cyber security	18
16	4.7.1 General	18
17	4.7.2 Internet of Things (IoT)	18
18	4.8 Generic requirements for raising and presenting alerts, including both	
19	individual equipment and the (central) alert (management) system	18
20	4.8.1 Introduction	18
21	4.8.2 Characterisation of alerts	19
22	4.8.3 Presentation of alerts	19
23	4.8.4 Circuits	19
24	4.9 General emergency alarm system	19
25	4.9.1 General requirements	19
26	4.9.2 System arrangement	19
27	4.9.3 Sound requirements	21
28	4.9.4 Interface for external devices	22
29	4.9.5 Cabling	22
30	4.9.6 Unauthorized modification of software configuration	22
31	4.9.7 General emergency alarm systems on passenger ships (additional	
32	requirements)	23
33	5 Tests	23
34	6 Design	27
35	6.1 Environmental and supply conditions	27
36	6.2 Circuit design	27
37	6.3 Mutual effects	27
38	6.4 Electrical subdivision	27
39	6.5 Signal level	27
40	6.6 Power supply	28
41	6.6.1 Independent supplies	28
42	6.6.2 Capacity	28
43	6.6.3 Protection	28
44	7 Construction and materials	28
45	7.1 Adjustments	28
46	7.2 Accessibility	28
47	7.3 Replacement	28
48	7.4 Non-interchangeability	28

49	7.5	Cooling	28
50	7.6	Mechanical load on connectors	29
51	7.7	Mechanical features of cabinets	29
52	7.8	Shock and vibration absorbers	29
53	7.9	Internal wiring	29
54	7.10	Cable connections	29
55	8	Installation and ergonomics	29
56	8.1	General.....	29
57	8.1.1	Layout	29
58	8.1.2	Compatibility.....	30
59	8.1.3	Labelling.....	30
60	8.1.4	Labels	30
61	8.1.5	Display colours	30
62	8.1.6	Illumination	30
63	8.1.7	Protection against fluid leakage	30
64	8.1.8	Protection from condensation	30
65	8.1.9	External cables and wiring	30
66	8.2	Sensors	31
67	8.2.1	Location of sensors	31
68	8.2.2	Temperature sensors.....	31
69	8.2.3	Pressure sensors.....	31
70	8.2.4	Water level detectors on bulk carriers	31
71	8.2.5	Enclosure	31
72	8.2.6	Testing and calibration	31
73	8.2.7	Presentation of information	31
74	8.3	Controls	31
75	8.3.1	Remote controls	31
76	8.3.2	Man-machine interface	32
77	9	Specific installations	32
78	9.1	General.....	32
79	9.2	Fire safety systems.....	32
80	9.3	Bilge systems	33
81	9.4	Alert system.....	33
82	9.4.1	Alert requirements	33
83	9.4.2	Display of information	34
84	9.4.3	Supply arrangements.....	34
85	9.4.4	Design	34
86	9.5	Power management system	35
87	9.5.1	General	35
88	9.5.2	Automatic starting and stopping of main power supply equipment.....	36
89	9.5.3	Heavy load request and power reserve calculation	37
90	9.5.4	Black-out recovery	37
91	9.5.5	Load sharing and frequency control	38
92	9.5.6	Shut-down of diesel engine.....	38
93	9.5.7	Automatic disconnection of non-essential consumers	38
94	9.5.8	Design requirements of power management system (PMS).....	38
95	9.6	Energy Management System	39
96	9.6.1	General	39
97	9.6.2	Functional requirements	39

98	9.7	Automatic starting installations for electrical motor-driven auxiliaries	41
99	9.7.1	General	41
100	9.7.2	Automatic sequence starting	42
101	9.7.3	Starting installations for stand-by auxiliaries	42
102	9.7.4	Control voltages	42
103	9.7.5	Manual control	42
104	9.7.6	Mechanically driven auxiliaries in low speed range	42
105	9.7.7	Mechanically driven auxiliaries	42
106	9.7.8	Sensors	43
107	9.8	Machinery control installations	43
108	9.8.1	General	43
109	9.8.2	General requirements	43
110	9.8.3	Transfer of control	43
111	9.8.4	Remote control of propulsion machinery from the bridge	43
112	9.8.5	Indicators for remote control of machinery	44
113	9.8.6	Manual override	45
114	9.9	Machinery protection and safety systems	45
115	9.9.1	General	45
116	9.9.2	General requirements	45
117	9.10	Bow, inner, side shell and stern doors	46
118	9.10.1	Application	46
119	9.10.2	Remote control	46
120	9.10.3	Indicator system	46
121	9.10.4	Mode selection	46
122	9.10.5	Failsafe	46
123	9.10.6	Testing	46
124	9.10.7	Independence	46
125	9.10.8	Display	47
126	9.10.9	Sensors	47
127	9.10.10	Television surveillance	47
128	9.10.11	Water leakage detection	47
129	9.10.12	Drainage alert	47
130	9.10.13	Control location	47
131	9.11	Power-operated watertight doors	48
132	9.11.1	General	48
133	9.11.2	Indications	48
134	9.11.3	Emergency alarm	48
135	9.11.4	Closure rate	48
136	9.11.5	Power supply	48
137	9.11.6	Dedicated circuits	48
138	9.11.7	Location of equipment	49
139	9.11.8	Enclosures	49
140	9.11.9	Leakage	49
141	9.11.10	Independent circuits	49
142	9.11.11	Failure of alert circuits	49
143	9.11.12	Failure of control circuits	49
144	9.11.13	Power supply monitoring	49
145	9.11.14	Mode selection	49
146	9.11.15	Indication on navigation bridge	

147	9.11.16	Remote opening	50
148	9.12	Public address systems (PA) ~~on passenger ships~~	50
149	9.12.1	General	50
150	9.12.2	System arrangement	50
151	9.12.3	Emergency broadcast	52
152	9.12.4	Sound requirements	52
153	9.12.5	Interference	53
154	9.12.6	Fault tolerance	53
155	9.12.7	Protection	53
156	9.12.8	Fire zones	53
157	9.12.9	Segregation	53
158	9.12.10	Power supplies	53
159	9.12.11	Cabling	54
160	9.12.12	Ships operating in Polar waters	54
161	9.12.13	Public address system (PA) on passenger ships (additional requirements)	54
163	9.13	Use of public address system (PA) for general emergency alarm (GA) and fire alarm	55
165	9.13.1	General	55
166	9.13.2	Power Supply	55
167	10	Computer based systems	56
168	10.1	General	56
169	10.2	General requirements	56
170	10.3	System categories	56
171	10.4	System configuration	57
172	10.4.1	General	57
173	10.4.2	Power supply	57
174	10.4.3	Hardware	58
175	10.4.4	Software	58
176	10.4.5	Data communication links	58
177	10.4.6	Wireless data communication	58
178	10.4.7	Network/integration of systems	59
179	10.4.8	User interface	59
180	10.4.9	Input devices	60
181	10.4.10	Output devices	60
182	10.4.11	Graphical user interface	60
183	10.5	Protection against modification and loss of data	61
184	10.6	Software maintenance	61
185	10.7	Remote access	61
186	10.7.1	General	61
187	10.7.2	Remote software maintenance	61
188	10.8	Documentation	61
189	10.8.1	General	61
190	10.8.2	Hardware	62
191	10.8.3	System functional description	62
192	10.8.4	Software	62
193	10.8.5	User interface	63
194	10.8.6	Test and evidence	63

195	11	Additional requirements for periodically unattended machinery spaces or for	
196		reduced attendance	65
197	11.1	General.....	65
198	11.2	Fire precautions	65
199	11.3	Protection against flooding	65
200	11.4	Control of propulsion machinery	65
201	11.5	Alert system and engineers' alert	65
202	11.6	Protection (safety) systems	65
203	11.7	Machinery, boiler and electrical installations	65
204	12	Commissioning and testing	65
205	12.1	Tests of completed installation on board	65
206	12.2	Operational tests	66
207	13	Documentation	66
208	Annex A (informative)	Characterisation of alerts	67
209	Bibliography		68
210			
211	Figure 1 – Typical designs of power management systems		36
212	Figure A.1 – Characterisation of alerts		67
213			
214	Table 1 – Operating conditions of equipment in respect to power demand		15
215	Table 2 – Type tests, test procedures and severities		23
216	Table 3 – Electrical grid control overview		41
217	Table 4 – System categories		56
218	Table 5 – Examples of assignment to system categories		57
219	Table 6 – Tests and evidence according to the system category		64
220			

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 504: Automation, control and instrumentation

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.
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International Standard IEC 60092-504 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This fifth edition cancels and replaces the fourth 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) Aligned bridge and machinery alert references
- b) Transfer of EMC items to IEC 60533
- c) Update power management and energy management

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

FDIS	Report on voting

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

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

274 A list of all parts of the IEC 60092 series, under the general title *Electrical installations in ships*,
275 can be found on the IEC website.

276 The committee has decided that the contents of this publication will remain unchanged until the
277 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
278 the specific publication. At this date, the publication will be

- 279 • reconfirmed,
- 280 • withdrawn,
- 281 • replaced by a revised edition, or
- 282 • amended.

283

INTRODUCTION

284 IEC 60092 forms a series of international standards for electrical installations in sea-going
285 ships, incorporating good practice and coordinating, as far as possible, existing rules.

286 These standards form a code of practical interpretation and amplification of the requirements of the
287 International Convention for the Safety of Life at Sea, a guide for future regulations which may be
288 prepared and a statement of practice for use by ship owners, shipbuilders and appropriate
289 organizations.

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 504: Automation, control and instrumentation

1 Scope

This part of IEC 60092 specifies requirements for electrical, electronic and programmable equipment intended for automation, control, monitoring, alert, and safety and protection systems supporting essential services. These requirements also apply to equipment that could have a detrimental effect on the essential services.

Equipment in the scope of TC 80 is excluded.

NOTE Equipment in the scope of TC80 Maritime navigation and radiocommunication equipment and systems needs to comply with IEC 60945 which already covers the requirements stated in this document.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1, *Environmental testing – Part 2: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2: Tests – Test B: Dry heat*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-30, *Environmental testing – Part 2: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60092-101:1994, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-101:1994/AMD1:1995

IEC 60092-201:1994, *Electrical installations in ships – Part 201: System design – General*

IEC 60092-202, *Electrical installations in ships – Part 202: System design – Protection*

IEC 60092-302-2, *Electrical installations in ships - Part 302-2: Low voltage switchgear and controlgear assemblies - Marine power*

IEC 60092-501, *Electrical installations in ships – Part 501: Special features – Electric propulsion plant*

IEC 60092-502, *Electrical installations in ships – Part 502: Tankers – Special features*

IEC 60447, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

- 326 IEC 60533, *Electrical and electronic installations in ships – Electromagnetic compatibility (EMC)*
327 *– Ships with a metallic hull*
- 328 IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General*
329 *requirements – Methods of testing and required test results*
- 330 IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measuring*
331 *techniques – Electrostatic discharge immunity test*
- 332 IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement*
333 *techniques – Radiated, radio-frequency, electromagnetic field immunity test*
- 334 IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement*
335 *techniques – Electrical fast transient/burst immunity test*
- 336 IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and*
337 *measurement techniques – Surge immunity test*
- 338 IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement*
339 *techniques – Immunity to conducted disturbances, induced by radio-frequency fields*
- 340 IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement*
341 *techniques – Voltage dips, short interruptions and voltage variations immunity tests*
- 342 IEC 61355-1, *Classification and designation of documents for plants, systems and*
343 *equipment – Part 1: Rules and classification tables*
- 344 IEC 62443 (all parts), *Industrial communication networks – Network and system security*
- 345 IEC 62923-1 *Maritime navigation and radiocommunication equipment and systems – Bridge*
346 *alert management – Part 1: Operational and performance requirements, methods of testing and*
347 *required test results*
- 348 ABS publication, *Guidance notes on the application of ergonomics to marine systems (2014-02)*
- 349 CISPR 16-1-1, *Specification for radio disturbance and immunity measuring apparatus and*
350 *methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring*
351 *apparatus*
- 352 CISPR 16-2-1, *Specification for radio disturbance and immunity measuring apparatus and*
353 *methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted*
354 *disturbance measurements*
- 355 EN 54 (all parts), *Fire detection and fire alarm systems*
- 356 IMO Resolution A.1021(26):2009, *Code on alerts and Indicators*
- 357 IMO Resolution MSC.302(87):2010, *Adoption of performance standards for bridge alert*
358 *management (BAM)*
- 359 IMO Resolution A.813(19):1995, *General Requirements for Electromagnetic Compatibility*
360 *(EMC) for all Electrical and Electronic Ship's Equipment*
- 361 IMO Resolution MSC.98(73):2000, *Adoption of the international code for fire safety systems*
362 *(FSS Code)*

363 SOLAS, *International Convention for the Safety of Life at Sea (SOLAS):1974, consolidated*
364 *edition, 2009*

365 MSC-FAL.1/Circ.3 Guidelines on maritime cyber risk management: 2017

366 **3 Terms and definitions**

367 For the purposes of this document, the terms and definitions given in IEC 60050 as well as the
368 following apply.

369 **3.1**

370 **accuracy**

371 quality which characterizes the closeness of a measured value to the corresponding true value

372 **3.2**

373 **administration**

374 Government of the State whose flag the ship is entitled to fly

375 [SOURCE: SOLAS, Chapter I, Regulation 2, Definition (b)]

376 **3.3**

377 **alarm**

378 **high-priority alert**

379 (MSC.302/A) condition requiring immediate attention and action by the crew, to maintain the
380 safe navigation and safe operation of the ship

381 [SOURCE IEC 62923-1 modified 'bridge team' is replaced by 'crew']

382 **3.4**

383 **alert**

384 (MSC. 302/A) announcement of abnormal situations and conditions requiring attention

385 Note 1 to entry: Alerts are divided in four priorities: emergency alarms, alarms, warnings and cautions. An alert
386 provides information about a defined state change in connection with information about how to announce this event
387 in a defined way to the system and the operator.

388 [SOURCE MSC.302(87) IEC 62923-1]

389 **3.5**

390 **alert systems**

391 automation cluster system for the centralized processing and presentation of the alerts from a
392 group of equipment

393 NOTE to entry 1: refer to SOLAS II-1 Part E, where this is called an alarm system

394 NOTE to entry 2: an alert system encompassing all alerts in the engineering domain of a ship can be regarded as a
395 Central Alert Management (CAM) system for the automation cluster, see MSC.302(87), IEC 62923-1 and IEC 62923-
396 2.

397 Note to entry 3: this was formerly called "machinery alarm systems"

398 **3.6**

399 **automation system**

400 system to monitor and control a process

401 **3.7**

402 **availability**

403 ability of an item to be in a state to perform a required function under given conditions at a given
404 time interval, assuming that the required external resources are provided

3.8**bridge and deck zone**

area from which the ship is steered and navigated and where the antennas are located

3.9**caution****lowest-priority alert**

(MSC.302/A) awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information

[SOURCE: IEC 62923-1]

3.10**centralized control**

control of all operations of a controlled system from one central control position

3.11**computer based system**

system that consists of one or more programmable electronic devices with their connections, peripherals and software necessary to carry out automatically specified functions

Note to entry: The following types of programmable devices could form part of a computer system: main-frame, mini-computer, micro-processor-based computer, programmable logic controller.

3.12**control functions**

functions intended to regulate the behaviour of equipment or systems

3.13**control position****control station**

group of control devices by which an operator can control the performance of a machine, apparatus, process or assembly of machines and apparatus

NOTE to entry: A control position will generally enable an operator to verify the achievement of the desired conditions by means of an appropriate monitoring system

3.14**emergency alarm****highest-priority alert**

(MSC.302/A) alarm which indicates immediate danger to human life or to the ship and its

machinery exists and requires immediate action

[SOURCE IEC 62923-1]

3.15**EMS energy management system**

automatic control system for the generation, distribution, storage and loads of electrical energy, including system demand control and management forecast of the electrical energy system, in order to continuously search for an optimum with respect to an operational goal.

Note 1 to entry: The definition of the energy management system definition is derived from “(Microgrid) Energy management system [IEV 617-04-25] System operating and controlling energy resources and loads of the microgrid”.

Note 2 to entry: Examples for such goals can be: fuel consumption, emissions, wear and tear, performance and/or reliability.

Note 3 to entry: The EMS is considered to be a tertiary loop. The power management of the power source is the first control loop and the PMS the secondary control loop.

3.16**essential services**

services essential for the navigation, propulsion, steering or manoeuvring of the ship, or for the safety of human life, or for special characteristics of the ship (for example special services).

[SOURCE IEC 60092-101]

3.17**failsafe**

design property of an item which prevents its failures from resulting in critical faults

Note to entry: The safe state, according to the application, will be predetermined in terms of priority for the safety of the ship and may generally be taken as the least critical one for the main components and auxiliaries of, for example, the propulsion/manoeuvring plant.

[SOURCE IEC 60050-821: 1998, 821-01-10, modified – a note has been added.]

3.18**function**

elementary operation performed by the system which, in conjunction with other elementary operations (system functions), enables the system to perform a task

3.19**instrumentation**

instruments and their application for monitoring, measurement and control

3.20**(important) indication**

(MSC191/A) marking of an operational status of displayed information which needs special attention, for example, information with low integrity or invalid information

Note 1 to entry: The important indication is not part of alert classification.

3.21**inhibition**

preventing announcement of an alert for which the alert conditions exist

3.22**integrity**

capability of a system to satisfactorily perform the required functions under all the stated conditions within a stated period of time

3.23**machinery control room**

room or spaces where centralized controls and measuring and monitoring equipment for main equipment and essential auxiliary machinery are located together with the appropriate means of communication

3.24**machinery space**

spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion

Note to entry: In case of unusual arrangements, the administration may define the limits of the machinery spaces.

[SOURCE: SOLAS Chapter II-1, Regulation 2, Definition 15]

3.25**management forecast of a system**

the preparation and checking of the programmes for the generation of electricity, means of storage and release, including network diagram analysis for providing the most economic supply of expected loads with the necessary security within a given period of time, in a given system, all present and foreseeable circumstances being taken into account.

[SOURCE: IEC 603-06-01]

3.26**monitoring functions**

functions intended to collect data from equipment and systems for the purpose of display and recording

3.27**power management**

automatic control mechanism that achieves the smallest input power consistent with a pre-determined level of functionality.

[SOURCE: IEC 904-03-01]

Note 1 to entry: Table 1 provides a structured overview as an aid to understanding this and other concepts relating to energy efficiency and power consumption applicable in electrotechnical products. Additional terms to fulfil the particular needs of particular product sectors should be defined within the structure of the concepts shown in Table 1.

Table 1 – Operating conditions of equipment in respect to power demand

Distinction by Power	<table><tr><td>0 Watt</td><td>≥ 0 Watt</td><td>> 0 Watt</td></tr></table>			0 Watt	≥ 0 Watt	> 0 Watt		
0 Watt	≥ 0 Watt	> 0 Watt						
Mode	<table><tr><td>Disconnected</td><td>Off Mode</td><td>Partial On Mode</td><td>On Mode</td></tr></table>				Disconnected	Off Mode	Partial On Mode	On Mode
Disconnected	Off Mode	Partial On Mode	On Mode					
Sub-Mode				<table><tr><td>Idle Mode</td><td>Operation Mode</td></tr></table>	Idle Mode	Operation Mode		
Idle Mode	Operation Mode							
Function Type	Function characterized by mode			<table><tr><td>Primary</td></tr><tr><td>Secondary</td></tr><tr><td>Tertiary</td></tr></table>	Primary	Secondary	Tertiary	
Primary								
Secondary								
Tertiary								
Function	User describes mode of function			<table><tr><td>Protective Function</td></tr><tr><td>Reactivation Function</td></tr><tr><td>Status Information Function</td></tr><tr><td>Network Integrity Function</td></tr></table>	Protective Function	Reactivation Function	Status Information Function	Network Integrity Function
Protective Function								
Reactivation Function								
Status Information Function								
Network Integrity Function								
				<table><tr><td>Optional</td></tr><tr><td>Mandatory</td></tr></table>	Optional	Mandatory		
Optional								
Mandatory								

NOTE As the number of functions increases from left to right in Table 1, the relevant modes will generally have higher energy consumption. The existence of a mode in Table 1 does not imply that a particular piece of equipment will offer that mode.

3.28**PMS****power management system**

automatic control system for the generation and distribution of electrical energy in order to ensure the availability of power under all conditions without management forecast of the electrical energy system but includes power system management.

NOTE 1 to entry: The PMS is considered to be a secondary control loop. The power management of the power source is the first control loop and the EMS the tertiary control loop.

3.29**power system management**

the effective operation of generation, transmission and distribution facilities so as to assure adequate security of supply at minimum cost

[SOURCE: IEC 603-04-01]

3.30**process**

systematic series of actions that lead to a particular result of an executing instance of a computer program

3.31**protection functions**

functions intended to prevent damage to equipment or systems in the event of a fault

3.32**protection and safety functions**

functions intended to prevent harm or danger to personnel and protect equipment/systems

3.33**remote control**

control of an operation at a point distant from the controlled switching device

[SOURCE IEC 60050-441:2000, 441-16-07]

3.34**reliability (performance)**

ability of an item to perform a required function under given conditions for a given time interval

Note 1 to entry: It is generally assumed that the item is in a state to perform this required function at the beginning of the time interval.

Note 2 to entry: Generally, reliability performance is quantified using appropriate measures. In some applications, these measures include an expression of reliability performance as a probability, which is also called reliability.

[SOURCE: IEC 60050-312:2001, 312-07-06, modified – notes 1 and 2 have been added.]

3.35**significant modification**

modification of the system functionality and/or safety of the system

3.36**software**

computer programs, procedures, rules and associated documentation of a digital information processing system pertaining to the operation and including application (user) program, middleware and operating system (firmware) program

3.37**system**

collection of components organised to accomplish a specific function or set of functions

3.38**system demand control**

The control of the power demand of the consumers on a power system.

[SOURCE: IEC 603-04-03]

3.39**usability**

extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

3.40**warning**

(MSC.302/A) condition requiring immediate attention, but no immediate action by the crew

Note to entry 1: Warnings are presented for precautionary reasons to make the crew aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.

[SOURCE: IEC 62923-1 modified 'bridge team' is replaced by 'crew']

4 General requirements**4.1 Safety**

Systems shall be designed such that risk of harm to persons or the environment is reduced to a level acceptable to the administration, both in normal operation and under failure conditions. Functions shall be designed on the failsafe principle.

4.2 Segregation

Systems shall be designed such that failure of one component part or sub-system will not unduly affect any other system, sub-system or component and, as far as is practicable, shall be detectable.

Failure in an automation system shall not influence the protection and safety functions.

Protection and safety functions shall be independent of control functions. As far as is practicable, control and monitoring (alert) functions shall also be independent.

Standby systems, or other redundancy arrangements, are to be functionally independent.

4.3 Performance

Systems shall maintain specified levels of performance in operation, and where necessary, under fault conditions.

Repeatability and accuracy shall be adequate for the proposed use and shall be maintained at their specified value during their expected lifetime and normal use.

Systems shall be stable throughout their operational range.

4.4 Usability

Systems shall be readily usable under all intended operating conditions and shall support effective and efficient operation.

Adequate safeguards against incorrect operation shall be provided.

4.5 Integration

Where safety of personnel may directly depend on correct system operation or failure, such systems shall not be integrated with, or be mutually dependent upon, any other system, except those providing complementary functions.

607 Where safety may indirectly depend on system operation or failure, the integrity of the
608 integrated system shall be to the satisfaction of the administration.

609 **4.6 Development activities**

610 Activities undertaken in the development process, from initial design through to eventual
611 realisation, shall be planned and structured in a systematic manner, and are to be properly
612 managed. Persons responsible for carrying out these activities shall be competent to do so.

613 Activities, scopes, responsibilities and competencies shall be documented.

614 **4.7 Cyber security**

615 **4.7.1 General**

616 Operational systems shall only be remotely accessible if remote control, remote maintenance
617 or software updates are a necessity. When operational systems need to be connected to
618 internet they shall comply with IMO requirement: MSC-FAL.1/Circ.3.

619 NOTE To comply with this IMO requirement it is recommended to follow IEC 63154. Additional guidance can be found
620 in IEC 62443.

621

622 **4.7.2 Internet of Things (IoT)**

623 The basic behaviour of electric protection devices, see IEC 60092-202, shall not depend on its
624 network communication connection.

625 **4.8 Generic requirements for raising and presenting alerts, including both individual** 626 **equipment and the (central) alert (management) system**

627 **4.8.1 Introduction**

628 In general, the requirements, as stated in this clause, apply to the presentation of alert
629 notifications. However, in some cases deviations from these general requirements are
630 necessary. These cases only apply for specific installations as described in Clause 9. For the
631 installations in Clause 9 each of the requirements of this clause applies unless stated differently.

632 An alert shall indicate the operational consequences of the situation and indicate any possible
633 mitigation measure for the operational situation.

634 Alerts provided by machinery installations and/or the alert system shall have the following
635 objectives:

- 636 – to direct the attention of personnel to an abnormal condition in a ship's machinery system
637 with appropriate disturbance level (alert priority);
- 638 – to help establish the operational impact of the abnormal condition;
- 639 – to enable effective mitigation and, where possible, precautionary action to be taken.

640 Alerts shall be defined such that they are only raised when relevant in the operational context.

- 641 – Example 1: a pressure alert in the debit flow from a pump is only relevant when the pump
642 is in operation.
- 643 – Example 2: a high-level alert for a tank is only relevant when the tank can be/is being filled
644 (to prevent alerts due to ship's roll).
- 645 – Example 3: low oil pressure in an engine is only relevant when the engine is/should be
646 running in normal operational condition.

4.8.2 Characterisation of alerts

NOTE Reference is made to IMO Resolution A.1021(26), MSC.302(87) and IEC 62923-1 and IEC 62923-2.

There are four different types of alerts: Emergency alarms; Alarms; Warnings; and Cautions. To which category an alert belongs depends on the urgency. Alerts that have no mandatory priority according, e.g. A.1021(26) or based on this document, shall be assigned an appropriate priority according to MSC.302(87) and IEC 62923-1. For guidance, see Figure A.1.

The audible and visual signals and indications used for alerts shall comply with the relevant requirements.

NOTE Reference is made to IMO Resolution A.1021(26), MSC.302(87) and IEC 62923-1 and IEC 62923-2.

4.8.3 Presentation of alerts

Alert indications shall be done according IMO Resolution MSC.302(87) and IEC 62923-1 2018.

The presentation of alerts shall comply with the requirements given in IEC 60945 2002:

- chapter 4.2.1, except for paragraph 4.2.1.8, and
- chapter 6.1 except for paragraph 6.1.8

Note requirements with respect to night vision are only applicable to equipment placed in spaces where these requirements are relevant

4.8.4 Circuits

Alert signals should be based on normally closed loops, giving alert upon signal failure.

Shut-down circuits of essential machinery should be based on normally open circuits with loop monitoring.

4.8.4.1 Alert independence

For systems using lamp indications (with lamp test) to locally indicate alerts the following shall apply: A fault in the visual indication of an alert shall not affect the operation of the audible indication and vice versa.

4.9 General emergency alarm system

4.9.1 General requirements

The general emergency alarm system shall be used for notifying crew and passengers throughout all the accommodation and normal crew working spaces.

A general emergency alarm is a system comprising user interface, power supplies, cabling, electrically operated bells or klaxons (other equivalent warning system), interface to external devices and other related equipment required to distribute the general emergency alarm.

The general emergency alarm shall continue to function once triggered until it is manually turned off or is temporarily overridden by an emergency broadcast on the public address system.

4.9.2 System arrangement

4.9.2.1 General

The general emergency alarm system architecture and configuration shall allow for multiple control units.