



SLOVENSKI STANDARD
SIST EN IEC 61918:2019/oprA1:2021

01-marec-2021

Industrijska komunikacijska omrežja - Inštalacija komunikacijskih omrežij v industrijskih okoljih

Industrial communication networks - Installation of communication networks in industrial premises

Industrielle Kommunikationsnetze - Installation von Kommunikationsnetzen in Industrieanlagen

Réseaux de communication industriels - Installation de réseaux de communication dans des locaux industriels

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ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.110	Omreževanje	Networking

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65C/1071/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 61918/AMD1 ED4	
DATE OF CIRCULATION: 2021-01-22	CLOSING DATE FOR VOTING: 2021-04-16
SUPERSEDES DOCUMENTS: 65C/1012/CD, 65C/1042A/CC	

IEC SC 65C : INDUSTRIAL NETWORKS	
SECRETARIAT: France	SECRETARY: Ms Valérie DEMASSIEUX
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 22G, SC 46C, SC 48B, TC 57, SC 121A, ISO/IEC JTC 1/SC 25	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
<p>Attention IEC-CENELEC parallel voting</p> <p>The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

This document is still under study and subject to change. It should not be used for reference purposes.

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TITLE:

Amendment 1 - Industrial communication networks - Installation of communication networks in industrial premises

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

NC comments on this CDV will be resolved during follow up SC65C/JWG10 meetings. Corresponding meeting notice will be provided in due time by the convenor.

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<https://standards.iteh.ai/catalog/standards/sist/7bd028c5-7edf-4125-93f0-094edf942de1/sist-en-iec-61918-2019-opra1-2021>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS –

Installation of communication networks in industrial premises

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 61918:2018 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

Draft	Report on voting
65C/XX/FDIS	65C/XX/FDIS

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 Amendment is English.

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

57 The committee has decided that the contents of this document will remain unchanged until the
58 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
59 specific document. At this date, the document will be

- 60 • reconfirmed,
- 61 • withdrawn,
- 62 • replaced by a revised edition, or
- 63 • amended.

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INTRODUCTION to Amendment 1

69 This Amendment 1 describes the installation in the critical environment of industrial premises
70 of balanced 1-pair networks that use cabling 1000BASE-T1 type A, which allows bidirectional
71 signal transmission at 1000 Mbit/s up to 15 m, 1000BASE-T1 type B for 1000 Mbit/s up to 40
72 m, 100BASE-T1 for 100 Mbit/s up to 15 m, 10BASE-T1S for 10 Mbit/s up to 15 m, 10BASE-
73 T1L for 10 Mbit/s up to 1000 m, where reach is influenced by cabling channel capacity
74 limitations from signal loss and electromagnetic interference.

75 These balanced 1-pair networks are the industrial versions of 1000 Mbit/s ISO/IEC/IEEE
76 8802-3:2017/AMD4, 100 Mbit/s ISO/IEC/IEEE 8802-3:2017/AMD1, and 10 Mbit/s IEEE
77 802.3cg networks.

78

79

INTRODUCTION

80 *In Figure 2, delete the block ISO/IEC 11801-9902.*81 **2 Normative references**82 *Add the following normative references:*83 IEC 61010-2-203:—, *Safety requirements for electrical equipment for measurement, control,*
84 *and laboratory use – Part 3: Particular requirements for industrial communication circuits and*
85 *communication port interconnection*¹86 IEC 61156-11, *MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL*
87 *COMMUNICATIONS – Part 11: Symmetrical single pair cables with transmission*
88 *characteristics up to 600 MHz – Horizontal floor wiring – Sectional specification*89 IEC 61156-12:—, *MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL*
90 *COMMUNICATIONS – Part 12: Symmetrical single pair cables with transmission*
91 *characteristics up to 600 MHz - Work area wiring*²92 IEC 61156-13:—, *MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL*
93 *COMMUNICATIONS – Part 13: Symmetrical single pair cables with transmission*
94 *characteristics up to 20 MHz – Horizontal floor wiring - Sectional specification*³95 IEC 61156-14:—, *MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL*
96 *COMMUNICATIONS – Part 14: Symmetrical single pair cables with transmission*
97 *characteristics up to 20 MHz – Work area cables for 10 Mb/s over one pair – Sectional*
98 *specification*⁴ <https://standards.iteh.ai/catalog/standards/sist/7bd028c5-7edf-4125-93f0-094edf942de1/sist-en-iec-61918-2019-oprA1-2021>99 IEC 63171-6, *Connectors for electrical and electronic components - Product requirements –*
100 *Part 6: Connectors – Detail specification for 2-way and 4-way (data/power), shielded, free and*
101 *fixed connectors for transmission capability and power supply capability with frequencies up*
102 *to 600 MHz*103 ISO/IEC 11801-3/AMD1:—, *Amendment 1: Information technology - Generic cabling for*
104 *customer premises - Part 3: Industrial premises*⁵105 **3 Terms, definitions, and abbreviated terms**106 **3.1 Terms and definitions**107 *Add the following terms and definitions from 3.1.87 to 3.1.92:*

¹ Under preparation. Stage at the time of publication: IEC/CD 61010-2-203:2020

² Under preparation. Stage at the time of publication: IEC/CDV 61156-12:2020

³ Under preparation. Stage at the time of publication: IEC/CD 61156-13:2019

⁴ Planned. Work to be started when Part 3 is mature enough.

⁵ Under preparation. Stage at the time of publication: ISO/IEC CDV 11801-3/AMD1:2020

108 **3.1.87**109 **balanced 1-pair cable** ^[SEP]

110 cable consisting of a single pair of conductors, optional screen, and overall jacket, primarily
111 intended for use in differential-mode signal transmission and power delivery applications ^[SEP]

112 [SOURCE: ISO/IEC TR 11801-9906:2020, 3.1.2]

113 **3.1.88**114 **balanced 1-pair cabling**

115 cabling composed of balanced 1 pair cable and balanced 1 pair connector ^[SEP]

116 **3.1.89**117 **balanced 1-pair cabling channel**

118 transmission path between equipment constructed from balanced 1-pair cables, balanced 1-
119 pair connectors and balanced 1-pair cable assemblies to facilitate signal and power delivery

120 [SOURCE: ISO/IEC CDV 11801-3/AMD1:—, 3.1.14]

121 **3.1.90**122 **balanced 1-pair connector**

123 connector intended for use with balanced 1-pair cable in differential-mode signal transmission
124 and power delivery applications

125 [SOURCE: ISO/IEC TR 11801-9906:2020, 3.1.3]

126 **3.1.91**127 **balanced 1-pair cord**

128 cable assembly constructed from 1 pair cable and 1 pair connectors

129 [SOURCE: ISO/IEC TR 11801-9906:2020, 3.1.4] ^[SEP]

130 **3.1.92**131 **edge distributor**

132 optional additional distributor to accommodate active equipment to allow transition from
133 balanced 4-pair cabling to balanced 1-pair cabling

134 [SOURCE: ISO/IEC CDV 11801-3/AMD1:—, 3.1.15]

135 **3.2 Abbreviated terms**

136 *Add the following abbreviated terms:*

137 ED Edge distributor

138 PHY Physical Layer

139 **4 Installation planning**140 **4.1.2 Cabling in industrial premises**

141 *Add, at the end of the first bullet, the following text:*

142 this includes the balanced 1-pair cabling 1000BASE-T1 type A used for bidirectional signal
143 transmission at 1000 Mbit/s up to 15 m, 1000BASE-T1 type B used for 1000 Mbit/s up to 40 m,
144 100BASE-T1 used for 100 Mbit/s up to 15 m, 10BASE-T1S up to 15 m, 10BASE-T1L used for
145 10 Mbit/s up to 1000 m, as specified in Annex Q;

146 *Add, after the first sentence of the third paragraph, the following text:*

147 The industrial cabling may include an edge distributor to accommodate active equipment to
148 allow transition from balanced 4-pair cabling to balanced 1-pair cabling.

149 **4.1.3 The planning process**

150 *Replace, in the first bullet, “IEC 60950-1” with “IEC 61010-2-203”.*

151 **4.2.3.2 Use of the described environment to produce a bill of material**

152 *Add, before Figure 8, the following sentence:*

153 The planner should consult the device and cabling manufacturer regarding correct selection of
154 the device and cabling for the environment of the installation under consideration (see B.6).

155 **4.3.2.1 General**

156 *Add, at the end of the subclause, the following text:*

157 Media types consist of optical fibre cabling, balanced cabling (4-pair, 2-pair, 1 pair), wireless,
158 and other CP specific media types. Wireless network installation is not within the scope of this
159 document. Selection of physical media technologies should partner with architectural
160 considerations, taking into account network topology, network characteristics, as well as data
161 propagation and aggregation throughout the network.

162 Optical fibre is generally recommended where high bandwidth is needed or a high data
163 integrity is required. Where powering is required or where reduced bandwidth or length
164 compared to optical fibre, wire cabling is recommended. 4-pair is mostly recommended for
165 connecting control and automation equipment. 1-pair (see Annex Q) is mostly limited to
166 connecting control and automation equipment with field devices.

167 The planner shall take into account the fact that unshielded cables need more distance from
168 power cable than any shielded cables. In practice more space means more costs because
169 bigger cable pathways or additional pathways dedicated to power or data cables are needed.
170 Worse, these additional requirements could be overlooked or ignored, which would generate
171 areas of high disturbance at critical points in the network.

172 Comparative measurements (unshielded versus shielded) confirm that shielded cables also
173 provide a much higher level of protection against EMI at high frequencies.

174 **4.3.2.3 Network characteristics for balanced 1-pair networks based on Ethernet**

175 *Add, at the end of the subclause, the following text:*

176 For balanced 1-pair networks the requirements specified in Annex Q apply.

177 **4.4.1.2.1 Balanced cables for Ethernet-based CPs**

178 *Add, after the first sentence, the following text:*

179 For balanced 1-pair cables the requirements specified in Annex Q apply.

180 *Replace, in the fourth bullet, “cabling that uses mixed 2 and 4 pair” with “cabling that uses*
181 *different cable elements with varying pair count in the same channel (e.g., 2 and 4 pair or 1*
182 *and 4 pair),”*

183 *Delete the NOTE after the fourth bullet.*

184 **4.4.2.2 Connecting hardware for balanced cabling CPs based on Ethernet**

185 *Add, at the end of subclause, the following text:*

186 For balanced 1-pair connecting hardware the requirements specified in Annex Q apply.

187 **4.4.3.1 Common description**

188 *Add, at the end of the first sentence of paragraph 5, the following text:*

189 for 4-pair cabling. For 1-pair cabling see Annex Q.

190 *Replace, at the end of the second sentence of paragraph 5, “are limited to 4. If the planning*
191 *requires more than 4 connections,” with “have a limited number of connections (e.g., 4 for 4*
192 *pair and 10 for 1 pair). If the planning requires more connections than the corresponding*
193 *reference implementation”*

194 **4.4.3.2.1 Common description**

195 *Change title of bullet a) to: “a) 4-pair basic reference implementation”*

196 *Change title of bullet b) to: “b) 4-pair enhanced reference implementation”*

197 *Add, after bullet c) the following bullet:*

198 d) Balanced 1-pair cabling standards.iteh.ai/catalog/standards/sist/7bd028c5-7edf-4125-93f0-094edf942de1/sist-en-iec-61918-2019-opra1-2021

199 For balanced 1-pair cabling connections the requirements specified in Annex Q apply.

200 **4.4.7.1.4 Selection of the earthing and bonding systems**

201 *Replace, in the first sentence of the last paragraph, “equipotential” with “mesh”.*

202 **4.4.7.3.1 Equipotential**

203 *Replace the title of the subclause with “Mesh”.*

204 *Replace, in the title of Figure 17, “equipotential” with “mesh”.*

205 **5 Installation implementation**

206 **5.1.1 Common description**

207 *Add, at the end of the subclause, the following text:*

208 The requirements specified in this Clause 5 for the CPs also apply for the installation
209 implementation of balanced 1-pair networks specified in Annex Q.

210 **If additional requirements are needed, they will be added in Annex Q and here the**
211 **following text will be added to the above sentence.**

212 Additional requirements are specified in clause Q.3.

213 6 Installation testing

214 6.1 General

215 *Add, at the end of the subclause, the following text:*

216 The requirements specified in this Clause 6 for the CPs also apply for the installation
217 implementation of balanced 1-pair networks specified in Annex Q.

218 Additional requirements for balanced 1-pair network are specified in clause Q.4.

219 6.2.8.3 Wire mapping:

220 *Add, after Figure 42, the following sentence:*

221 For balanced 1-pair applications see Q.4.2.

222 6.3.2.1.2 Transmission performance test parameters:

223 *Replace, in the first paragraph, “IEC 61935-1:2009” with “IEC 61935-1:2019 and IEC 61935-*
224 *1-1:2019”*

225 *Add, after the last bullet l), the following new bullets:*

226 m) Unbalance attenuation, near-end (TCL)

227 n) Unbalance attenuation, far-end (ELTCTL)

228 *Add, at the end of both new bullets m) and n), the following footnote:*

229 where requirements are given in the relevant CP.

230 8 Installation maintenance and installation troubleshooting

231 8.3.3 Typical problems

232 *Add, after the first paragraph, the following text:*

233 When troubleshooting unshielded installations EMC influence can be quantified through field-
234 testing of TCL and ELTCTL transmission parameters. If needed, noise impact reduction may
235 be achieved by identification of at-risk components and selection of replacement components
236 with superior performance.

237 Annex B MICE description methodology

238 B.4 Determining E classification

239 *Replace, in the first column of Table B.3, “High HP motors” with “High power motors”*

240 *Add, after Clause B.5 the following new clause:*