

# INTERNATIONAL STANDARD



**Industrial communication networks – Installation of communication networks in industrial premises**

(<https://standards.iteh.ai>)

Document Preview

[IEC 61918:2018](#)

<https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018>





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

International Standards  
Document Preview

[IEC 61918:2018](https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018)

<https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018>



IEC 61918

Edition 4.2 2024-03  
CONSOLIDATED VERSION

# INTERNATIONAL STANDARD



**Industrial communication networks – Installation of communication networks in industrial premises**

iteh Standards  
(<https://standards.iteh.ai>)  
Document Preview

IEC 61918:2018

<https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 25.040.40; 33.020; 35.240.50

ISBN 978-2-8322-8571-8

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	12
INTRODUCTION.....	14
INTRODUCTION to Amendment 1 .....	18
INTRODUCTION to Amendment 2 .....	18
1 Scope.....	19
2 Normative references .....	19
3 Terms, definitions, and abbreviated terms .....	24
3.1 Terms and definitions.....	24
3.2 Abbreviated terms.....	36
3.3 Conventions for installation profiles .....	38
4 Installation planning.....	38
4.1 General.....	38
4.1.1 Objective .....	38
4.1.2 Cabling in industrial premises.....	38
4.1.3 The planning process .....	41
4.1.4 Specific requirements for CPs.....	42
4.1.5 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3 .....	42
4.2 Planning requirements .....	42
4.2.1 Safety .....	42
4.2.2 Security .....	43
4.2.3 Environmental considerations and EMC.....	44
4.2.4 Specific requirements for generic cabling in accordance with ISO/IEC 11801-3 .....	45
4.3 Network capabilities.....	45
4.3.1 Network topology.....	45
4.3.2 Network characteristics.....	48
4.4 Selection and use of cabling components .....	51
4.4.1 Cable selection.....	51
4.4.2 Connecting hardware selection .....	55
4.4.3 Connections within a channel/permanent link .....	57
4.4.4 Terminators .....	63
4.4.5 Device location and connection .....	63
4.4.6 Coding and labelling .....	63
4.4.7 Earthing and bonding of equipment and devices and shielded cabling .....	64
4.4.8 Storage and transportation of cables .....	75
4.4.9 Routing of cables.....	75
4.4.10 Separation of circuits .....	77
4.4.11 Mechanical protection of cabling components .....	78
4.4.12 Installation in special areas .....	79
4.5 Cabling planning documentation .....	79
4.5.1 Common description .....	79
4.5.2 Cabling planning documentation for CPs .....	79
4.5.3 Network certification documentation .....	80
4.5.4 Cabling planning documentation for generic cabling in accordance with ISO/IEC 11801-3 .....	80
4.6 Verification of cabling planning specification .....	80

5	Installation implementation .....	80
5.1	General requirements .....	80
5.1.1	Common description .....	80
5.1.2	Installation of CPs .....	80
5.1.3	Installation of generic cabling in industrial premises .....	80
5.2	Cable installation .....	80
5.2.1	General requirements for all cabling types .....	80
5.2.2	Installation and routing .....	86
5.2.3	Specific requirements for CPs.....	88
5.2.4	Specific requirements for wireless installation.....	88
5.2.5	Specific requirements for generic cabling in accordance with ISO/IEC 11801-3 .....	88
5.3	Connector installation .....	88
5.3.1	Common description .....	88
5.3.2	Shielded connectors .....	89
5.3.3	Unshielded connectors .....	89
5.3.4	Specific requirements for CPs.....	89
5.3.5	Specific requirements for wireless installation.....	89
5.3.6	Specific requirements for generic cabling in accordance with ISO/IEC 11801-3 .....	89
5.4	Terminator installation .....	90
5.4.1	Common description .....	90
5.4.2	Specific requirements for CPs.....	90
5.5	Device installation.....	90
5.5.1	Common description .....	90
5.5.2	Specific requirements for CPs.....	90
5.6	Coding and labelling .....	90
5.6.1	Common description .....	90
5.6.2	Specific requirements for CPs.....	90
5.7	Earthing and bonding of equipment and devices and shield cabling .....	90
5.7.1	Common description .....	90
5.7.2	Bonding and earthing of enclosures and pathways.....	91
5.7.3	Earthing methods .....	93
5.7.4	Shield earthing methods .....	95
5.7.5	Specific requirements for CPs.....	97
5.7.6	Specific requirements for generic cabling in accordance with ISO/IEC 11801-3 .....	97
5.8	As-implemented cabling documentation .....	98
6	Installation verification and installation acceptance test .....	98
6.1	General.....	98
6.2	Installation verification .....	98
6.2.1	General .....	98
6.2.2	Verification according to cabling planning documentation .....	99
6.2.3	Verification of earthing and bonding.....	100
6.2.4	Verification of shield earthing .....	101
6.2.5	Verification of cabling system .....	102
6.2.6	Cable selection verification .....	102
6.2.7	Connector verification .....	102
6.2.8	Connection verification .....	103

6.2.9	Terminator verification .....	105
6.2.10	Coding and labelling verification .....	105
6.2.11	Verification report .....	105
6.3	Installation acceptance test.....	105
6.3.1	General .....	105
6.3.2	Acceptance test of Ethernet-based cabling .....	107
6.3.3	Acceptance test of non-Ethernet-based cabling .....	110
6.3.4	Specific requirements for wireless installation.....	110
6.3.5	Acceptance test report.....	111
7	Installation administration .....	111
7.1	General.....	111
7.2	Fields covered by the administration .....	111
7.3	Basic principles for the administration system.....	111
7.4	Working procedures .....	112
7.5	Device location labelling .....	112
7.6	Component cabling labelling .....	112
7.7	Documentation.....	113
7.8	Specific requirements for administration .....	114
8	Installation maintenance and installation troubleshooting.....	114
8.1	General.....	114
8.2	Maintenance .....	114
8.2.1	Scheduled maintenance.....	114
8.2.2	Condition-based maintenance.....	116
8.2.3	Corrective maintenance .....	117
8.3	Troubleshooting .....	117
8.3.1	General description .....	117
8.3.2	Evaluation of the problem .....	117
8.3.3	Typical problems .....	118
8.3.4	Troubleshooting procedure .....	120
8.3.5	Simplified troubleshooting procedure .....	121
8.4	Specific requirements for maintenance and troubleshooting.....	122
Annex A (informative)	Overview of generic cabling for industrial premises .....	123
Annex B (informative)	MICE description methodology .....	124
B.1	General.....	124
B.2	Overview of MICE .....	124
B.3	Examples of use of the MICE concept.....	125
B.3.1	Common description .....	125
B.3.2	Examples of mitigation.....	125
B.4	Determining E classification .....	127
B.5	The MICE table.....	130
B.6	Communication devices and cabling considerations .....	131
B.6.1	General .....	131
B.6.2	Device types.....	132
B.6.3	EMI resistance needed for E3 industrial applications .....	133
Annex C (informative)	Network topologies.....	134
C.1	Common description .....	134
C.2	Total cable demand .....	134
C.3	Maximum cable segment length .....	134

C.4	Maximum network length .....	134
C.5	Fault tolerance.....	134
C.5.1	General .....	134
C.5.2	Use of redundancy.....	134
C.5.3	Failure analysis for networks with redundancy .....	134
C.6	Network access for diagnosis convenience .....	135
C.7	Maintainability and on-line additions .....	135
Annex D (informative)	Connector tables .....	136
Annex E (informative)	Power networks with respect to electromagnetic interference – TN-C and TN-S approaches .....	157
Annex F (informative)	Conductor sizes in electrical cables .....	159
Annex G (informative)	Installed cabling verification checklists .....	160
G.1	General.....	160
G.2	Copper cabling verification checklist .....	160
G.3	Optical fibre cabling verification checklist.....	163
Annex H (normative)	Cord sets .....	165
H.1	General.....	165
H.2	Constructing cord sets .....	165
H.2.1	Straight through cord sets with M12-4 D-coding connectors .....	165
H.2.2	Crossover cord sets with M12-4 D-coding connectors.....	166
H.2.3	Straight through cord sets with 8-way modular connectors.....	166
H.2.4	Crossover cord sets with 8-way modular connectors.....	167
H.2.5	Straight conversion from one connector family to another .....	168
H.2.6	Crossover conversion from one connector family to another .....	168
H.2.7	Assignment of PMA signal to MDI and MDI-X in outs .....	169
H.2.8	Signal and pin assignment for MDI and TIA568A .....	170
H.2.9	Signal and pin assignment for MDIX and TIA568B .....	170
H.2.10	Signal and pin assignment for MDIX and TIA568A .....	171
H.2.11	Straight through cord set with IEC 63171-6 connectors.....	171
Annex I (informative)	Guidance for terminating cable ends.....	172
I.1	General.....	172
I.2	Guidance for terminating shielded twisted pair cable ends for 8-way modular plugs.....	172
I.3	Guidance for terminating unshielded twisted pair cable ends for 8-way modular plugs .....	174
I.4	Guidance for M12- <del>4 D-coding</del> connector installation .....	175
I.5	Guidance for terminating optical fibre cable ends .....	178
Annex J (informative)	Recommendations for bulkhead connection performance and channel performance with more than 4 connections in <del>the</del> a 4-pair channel .....	179
J.1	General.....	179
J.2	Recommendations .....	179
Annex K (informative)	Fieldbus data transfer testing .....	180
K.1	Background.....	180
K.2	Allowable error rates for control systems .....	180
K.2.1	Bit errors .....	180
K.2.2	Burst errors .....	180
K.3	Testing channel performance .....	181
K.4	Testing cable parameters.....	181
K.4.1	General .....	181

K.4.2	Generic <del>cable</del> cabling testing.....	181
K.4.3	Fieldbus <del>cable</del> cabling testing.....	181
K.5	Testing fieldbus data rate performance .....	182
K.5.1	General .....	182
K.5.2	Fieldbus test.....	182
K.5.3	Planning for fieldbus data rate testing.....	182
K.5.4	Fieldbus data rate test reporting template.....	183
K.5.5	Values for acceptable fieldbus performance.....	183
Annex L (informative)	Communication network installation work responsibility .....	184
L.1	General.....	184
L.2	Installation work responsibility .....	184
L.3	Installation work responsibility table.....	184
Annex M (informative)	Trade names of communication profiles .....	185
Annex N (informative)	Validation measurements .....	188
N.1	General.....	188
N.2	DCR measurements.....	188
N.2.1	Purpose of test .....	188
N.2.2	Assumptions .....	188
N.2.3	Measurements.....	188
N.2.4	Calculations.....	190
N.2.5	Measurement results .....	190
Annex O (informative)	End-to-end link .....	194
O.1	General.....	194
O.2	End-to-end link .....	194
O.3	E2E link normative description .....	195
O.4	E2E link measurement .....	197
Annex P (normative)	Temperature rise of cabling with remote powering.....	198
P.1	General.....	198
P.2	Scope .....	198
P.3	Temperature de-rating calculation.....	198
Annex Q (normative)	Additional requirements for the installation of Ethernet-based balanced 1-pair networks in industrial premises .....	200
Q.1	Overview.....	200
Q.2	Installation planning.....	200
Q.2.1	General .....	200
Q.2.2	Basic balanced 1-pair network characteristics.....	200
Q.2.3	Balanced 1-pair cables .....	201
Q.2.4	Balanced 1-pair connecting hardware .....	201
Q.2.5	Balanced 1-pair cabling channels .....	203
Q.2.6	Remote powering.....	204
Q.2.7	Reuse of legacy cabling.....	205
Q.3	Installation implementation.....	205
Q.3.1	General .....	205
Q.3.2	Additional installation implementation .....	205
Q.4	Installation verification and installation acceptance test .....	205
Q.4.1	General .....	205
Q.4.2	Additional installation verification and acceptance test.....	205
Bibliography	.....	206



Figure 1 – Industrial network installation life cycle .....	15
Figure 2 – Standards relationships .....	17
Figure 3 – Automation island cabling attached to elements of generic cabling .....	39
Figure 4 – Automation islands .....	40
Figure 5 – Automation island network external connections .....	41
Figure 6 – How to meet environmental conditions .....	45
Figure 7 – How enhancement, isolation and separation work together .....	45
Figure 8 – Basic physical topologies for passive networks .....	46
Figure 9 – Basic physical topologies for active networks .....	47
Figure 10 – Example of combination of basic topologies .....	47
Figure 53 – Example of mesh topology .....	47
Figure 11 – Basic reference implementation model .....	58
Figure 12 – Enhanced reference implementation model .....	59
Figure 13 – Equalisation and earthing conductor cross-sectional versus maximum length .....	66
Figure 14 – Selection of the earthing and bonding systems .....	67
Figure 15 – Placement of equalisation conductors .....	69
Figure 16 – Impedance of the earthing conductors and equalisation conductors versus noise frequency .....	70
Figure 17 – Wiring for bonding and earthing in <del>an equipotential</del> a mesh configuration .....	71
Figure 18 – Wiring of the earths in a star earthing configuration .....	72
Figure 19 – Schematic diagram of a field device with direct earthing .....	73
Figure 20 – Schematic diagram of a field device with parallel RC circuit earthing .....	73
Figure 21 – Insert edge protector .....	82
Figure 22 – Use an uncoiling device and avoid forming loop .....	83
Figure 23 – Avoid torsion .....	83
Figure 24 – Maintain minimum bending radius .....	84
Figure 25 – Do not pull by the individual wires .....	84
Figure 26 – Use cable clamps with a large (wide) surface .....	84
Figure 27 – Cable gland with bending protection .....	85
Figure 28 – Spiral tube .....	85
Figure 29 – Separate cable pathways .....	88
Figure 30 – Impedance of the earthing circuit as a function of distance from the metallic pathway .....	91
Figure 31 – Use of flexible bonding straps at movable metallic pathways .....	92
Figure 32 – Surface preparation for earthing and bonding electromechanical connections .....	93
Figure 33 – Example of isolated bus bar .....	94
Figure 34 – Example of isolator for mounting DIN rails .....	95
Figure 35 – Parallel RC shield earthing .....	95
Figure 36 – Direct shield earthing .....	96
Figure 37 – Examples for shielding application .....	96
Figure 38 – Voltage offset mitigation .....	97
Figure 39 – First example of derivatives of shield earthing .....	97

Figure 40 – Second example of derivatives of shield earthing .....	97
Figure 41 – Installation verification process .....	100
Figure 42 – Test of earthing connections .....	101
Figure 43 – Pin and pair grouping assignments for two eight position IEC 60603-7 subparts and four position IEC 60603-7 series to IEC 61076-2-101 connectors.....	104
Figure 44 – Two pair 8-way modular connector .....	104
Figure 45 – Transposed pairs, split pairs and reversed pair .....	104
Figure 46 – Validation process.....	106
Figure 47 – Schematic representation of the channel.....	107
Figure 48 – Schematic representation of the permanent link .....	107
Figure 49 – Schematic representation of an E2E link .....	108
Figure 50 – Communication network maintenance .....	116
Figure 51 – Troubleshooting procedure.....	121
Figure 52 – Fault detection without special tools .....	122
Figure B.1 – MICE classifications.....	124
Figure B.2 – Example MICE classifications within a facility .....	125
Figure B.3 – Enhancement, isolation and separation.....	125
Figure B.4 – Example 1 of mitigation.....	126
Figure B.5 – Example 2 of mitigation.....	127
Figure B.6 – Frequency range of electromagnetic disturbance from common industrial devices .....	127
Figure B.7 – Example of a general guidance for separation versus EFT value.....	129
Figure B.8 – Communication device interface with limited EMI immunity .....	132
Figure B.9 – Communication device interfaces with medium EMI immunity .....	132
Figure B.10 – Communication device interface with the highest EMI immunity (type 2) .....	133
Figure E.1 – Four-wire power network (TN-C) .....	157
Figure E.2 – Five wire power network (TN-S).....	158
Figure H.1 – Straight through cord sets with M12-4 D-coding connectors.....	165
Figure H.2 – Straight through cord sets with 8-way modular connectors, 8 poles .....	166
Figure H.3 – Straight through cord sets with 8-way modular connectors, 4 poles .....	167
Figure H.4 –M12-8 X-coding connector .....	169
Figure I.1 – Stripping the cable jacket.....	172
Figure I.2 – Example of wire preparation for type A cables.....	173
Figure I.3 – 8-way modular plug.....	173
Figure I.4 – Inserting the cable into the connector body .....	174
Figure I.5 – Crimping the connector .....	174
Figure I.6 – Example of a cable preparation for type A wiring.....	175
Figure I.7 – Connector components .....	176
Figure I.8 – Cable preparation .....	176
Figure I.9 – Connector wire gland, nut and shell on the cable .....	176
Figure I.10 – Conductors preparation.....	176
Figure I.11 – Jacket removal.....	177
Figure I.12 – Shield preparation.....	177
Figure I.13 – Conductors preparation.....	177

Figure I.14 – Installing conductors in connector .....	177
Figure I.15 – Assembling the body of the connector .....	178
Figure I.16 – Final assembling .....	178
Figure N.1 – Loop resistance measurement wire to wire .....	189
Figure N.2 – Loop resistance measurement wire 1 to shield .....	189
Figure N.3 – Loop resistance measurement wire 2 to shield .....	189
Figure N.4 – Resistance measurement for detecting wire shorts .....	189
Figure N.5 – Resistance measurement between wire 1 and wire 2 .....	190
Figure N.6 – Validation of the cable DCR .....	191
Figure N.7 – Conclusions for cable open or shorts .....	192
Figure N.8 – Determination of proper cable terminator value .....	193
Figure O.1 – Channel according to ISO/IEC 11801 .....	194
Figure O.2 – End-to-end link .....	195
Figure O.3 – One segment, two Connection E2E link .....	195
Figure O.4 – Two Segment, three Connection E2E link .....	196
Figure O.5 – Three Segment, one Connection bulkheads, four Connection E2E link .....	196
Figure O.6 – Three Segment, two Connection, six Connection E2E link .....	196
Figure O.7 – Three Segment, four Connection E2E link .....	196
Figure O.8 – Four Segment, five Connection E2E link .....	196
Figure O.9 – Five Segment, six Connection E2E link .....	197
Figure Q.1 – Balanced 1-pair network .....	200
Figure Q.2 – IP65/IP67 IEC 63171-6 connectors .....	202
Figure Q.3 – Mating parts of the IEC 63171-6 connectors .....	202
Figure Q.4 – Balanced 1-pair channel model with 40 m max length .....	203
Figure Q.5 – Balanced 1-pair channel model with 1 000 m max length .....	203
Figure Q.6 – Additional mitigation for remote powering over balanced 1-pair network .....	204
Figure Q.7 – Balanced 1-pair wire mapping .....	205
Table 1 – Basic network characteristics for balanced cabling not based on Ethernet .....	49
Table 2 – Network characteristics for balanced cabling based on Ethernet .....	49
Table 3 – Network characteristics for optical fibre cabling .....	50
Table 4 – Information relevant to copper cable: fixed cables .....	52
Table 5 – Information relevant to copper cable: cords .....	52
Table 6 – Information relevant to optical fibre cables .....	53
Table 7 – Connectors for balanced cabling CPs based on Ethernet .....	55
Table 8 – Connectors for copper cabling CPs not based on Ethernet .....	56
Table 9 – Optical fibre connecting hardware .....	56
Table 10 – Relationship between FOC and fibre types (CP x/y) .....	56
Table 11 – Basic reference implementation formulas .....	58
Table 12 – Enhanced reference implementation formulas .....	60
Table 13 – Correction factor Z for operating temperature above 20 °C .....	60
Table 14 – Equalisation and earthing conductor sizing and length .....	68
Table 15 – Bonding straps cross-section .....	68

Table 16 – Bonding plates surface protection.....	68
Table 17 – Cable circuit types and minimum distances .....	78
Table 18 – Parameters for balanced cables .....	81
Table 19 – Parameters for silica optical fibre cables .....	81
Table 20 – Parameters for POF optical fibre cables .....	81
Table 21 – Parameters for hard clad silica optical fibre cables .....	82
Table 22 – Typical problems in a network with balanced cabling .....	119
Table 23 – Typical problems in a network with optical fibre cabling .....	119
Table B.1 – Example 1 of targeted MICE area .....	126
Table B.2 – Example 2 of targeted MICE area .....	126
Table B.3 – Relationship between electromagnetic disturbance-generating devices and “E” classification .....	128
Table B.4 – Coupling mechanism for some interfering devices .....	129
Table B.5 – MICE definition .....	130
Table B.6 – EMI resistance of industrial applications .....	133
Table D.1 – Conventions for colour code used in the connector table .....	136
Table D.2 – Pin/pair assignment and colour scheme .....	138
Table D.3 – 8-way modular connector .....	138
Table D.4 – M12-4 A-coding connector .....	140
Table D.5 – M12-4 D-coding connector .....	142
Table D.6 – M12-5 A-coding connector .....	144
Table D.7 – M12-5 B-coding connector .....	146
Table D.8 – SubD connector .....	147
Table D.9 – 7/8-16 UN-2B THD / M18 connector .....	149
Table D.10 – Open style connector .....	150
Table D.11 – M12-8 X-coding connector and A-coding connector .....	152
Table D.12 – BNC connector .....	153
Table D.13 – TNC connector .....	154
Table D.14 – Rectangular 8-way/10-way modular connectors .....	155
Table D.15 – M8-4 A-coding, D-coding, P-coding, X-coding connectors .....	156
Table F.1 – American wire gauge system and kcmil .....	159
Table G.1 – Copper cabling verification checklist .....	161
Table G.2 – Earthing and bonding measurements checklist .....	162
Table G.3 – Signatures for Table G.1 and Table G.2 checklists .....	162
Table G.4 – Checklist for special checks for non-Ethernet base CPs .....	163
Table G.5 – Signatures for Table G.4 checklist .....	163
Table G.6 – Optical fibre cabling verification checklist .....	164
Table G.7 – Signatures for Table G.6 checklist .....	164
Table H.1 – M12-4 D-coding pin/pair assignment .....	166
Table H.2 – M12-4 D-coding to M12-4 D-coding crossover pin/pair assignment .....	166
Table H.3 – 8-way modular pin/pair assignment .....	167
Table H.4 – 8-way modular crossover pin/pair assignment .....	168
Table H.5 – Connectivity pin assignment .....	168

Table H.6 – M12-4 to 8-way modular crossover pin pair assignment .....	169
Table H.7 – Assignment of PMA signal to MDI and MDI-X pin outs .....	169
Table H.8 – Signal and pin/pair assignment for MDI and TIA 568B.....	170
Table H.9 – Signal and pin/pair assignment for MDI and T568A.....	170
Table H.10 – Signal and pin/pair assignment for MDIX and T568B.....	171
Table H.11 – Signal and pin/pair assignment for MDIX and T568A.....	171
Table J.1 – Transmission requirements for more than 4 connections in a channel.....	179
Table M.1 – Trade names of CPFs and CPs .....	185
Table P.1 – Parameters used to calculate the temperature derating.....	199
Table Q.1 – Basic balanced 1-pair network characteristics.....	201
Table Q.2 – IEC 63171-6 colour code and signal assignment.....	202

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[IEC 61918:2018](https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018)

<https://standards.iteh.ai/catalog/standards/iec/3e71d9dd-503b-4555-a266-5163c3c0aa8d/iec-61918-2018>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

INDUSTRIAL COMMUNICATION NETWORKS –

## Installation of communication networks in industrial premises

## 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 consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.**

**IEC 61918 edition 4.2 contains the fourth edition (2018-09) [documents 65C/928/FDIS and 65C/933/RVD], its amendment 1 (2022-03) [documents 65C/1141/FDIS and 65C/1162/RVD] and its amendment 2 (2024-03) [documents 65C/1282/FDIS and 65C/1290/RVD].**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**