BS EN 61076-3-117:2009

BSI Standards Publication

Connectors for electronic equipment – Product requirements —

Part 3-117: Rectangular connectors – Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface — Variant 14 related to IEC 61076-3-106 – Push-pull coupling

National foreword

This British Standard is the UK implementation of EN 61076-3-117:2009. It is identical to IEC 61076-3-117:2009.

The UK participation in its preparation was entrusted to Technical Committee EPL/48, Electromechanical components and mechanical structures for electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Connectors for electronic equipment - Product requirements - Part 3-117: Rectangular connectors - Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface - Variant 14 related to IEC 61076-3-106 - Push pull coupling

(IEC 61076-3-117:2009)

Connecteurs
pour équipement électroniques -
Exigences de produits -
Partie 3-117: Connecteurs rectangulaires -
Spécification particulière
pour boîtiers de protection utilisés
avec des connecteurs blindés et non blindés
à 8 voies dans des environnements industriels
incorporant l'interface série CEI 60603-7 -
Variante 14 liée à la CEI 61076-3-106 -
Type d'accouplement pousser-tirer
(CEI 61076-3-117:2009)

Steckverbinder
für elektronische Einrichtungen -
Produktanforderungen -
Teil 3-117: Rechteckige Steckverbinder -
Bauartspezifikation für Schutzgehäuse
für die Anwendung mit 8-poligen geschirmten
und ungeschirmten Steckverbindern
für industrielle Umgebungen zur Aufnahme
der Schnittstelle der Reihe IEC 60603-7 -
Ausführung 14 zu IEC 61076-3-106 -
Push-pull-Kupplung
(IEC 61076-3-117:2009)

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

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CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61076-3-117:2009 E

Foreword

The text of document 48B/1996/FDIS, future edition 1 of IEC 61076-3-117, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61076-3-117 on 2009-07-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2010-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-07-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 61076-3-117:2009 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050-581	2008	International Electrotechnical Vocabulary (IEV) - Part 581: Electromechanical components for electronic equipment	-	-
IEC 60068-1	-[1)]	Environmental testing - Part 1: General and guidance	EN 60068-1	1994[2)]
IEC 60068-2-14	-[1)]	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009[2)]
IEC 60068-2-30	-[1)]	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005[2)]
IEC 60512	Series	Connectors for electronic equipment - Tests and measurements	EN 60512	Series
IEC 60512-1-100	-[1)]	Connectors for electronic equipment - Tests and measurements - Part 1-100: General - Applicable publications	EN 60512-1-100	2006[2)]
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60603-7	Series	Connectors for electronic equipment	EN 60603-7	Series
IEC 60664-1	-[1)]	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007[2)]
IEC 61076-1	2006	Connectors for electronic equipment - Product requirements - Part 1: Generic specification	EN 61076-1	2006
IEC 61156	Series	Multicore and symmetrical pair/quad cables for digital communications	-	-

[1)] Undated reference.
[2)] Valid edition at date of issue.

CONTENTS

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 3-117: Rectangular connectors – Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface – Variant 14 related to IEC 61076-3-106 – Push-pull coupling

1 Scope

This part of IEC 61076 covers rectangular protective housings with push-pull coupling for upgrading existing 8-way shielded and unshielded connectors utilizing the interface described in IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, IEC 60603-7-41, IEC 60603-7-5, IEC 60603-7-51, IEC 60603-7-7 and IEC 60603-7-71 to IP65 and IP67 ratings according to IEC 60529, for use in industrial environments.

Common mating configurations for all variants of the 8-way shielded and unshielded connectors are defined in IEC 60603-7. The mating dimensions for the housings under Clause 3 allow the mating conditions under IEC 60603-7 to be fulfilled.

This standard covers a further variant of IEC 61076-3-106 housing known as variant 14.

The fully assembled variant 14 connectors described in this document incorporate fixed and free connectors which are fully compliant which the relevant part of IEC 60603-7.

2 General data

2.1 Normative references

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

IEC 60050-581:2008, *International Electrotechnical Vocabulary (IEV) – Part 581: Electro-mechanical components for electronic equipment*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests. Test N: Change of temperature*

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

IEC 60512 (all parts), *Connectors for electronic equipment – Tests and measurements*

IEC 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

IEC 60529:1989, *Degree of protection provided by enclosures (IP Code)*

IEC 60603-7 (all parts), *Connectors for electronic equipment*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61076-1:2006, *Connectors for electronic equipment – Product requirements – Part 1: Generic specification*

IEC 61156 (all parts), *Multicore and symmetrical pair/quad cables for digital communications*

2.2 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581 apply.

3 Dimensional information

3.1 Common features

The industrial connectors referenced in this specification are composed of IEC 60603-7 style fixed and free connectors housed in unique, industrial rated interfaces. The mating information and contact requirements of the 60603-7 interface portion of these industrial connectors shall be compliant with the relevant part of IEC 60603-7.

The following requirements apply to the complete connector comprising of both the free and fixed connectors in the described shells/outer housing.

3.2 General

Dimensions are given in millimetres, drawings are shown in first angle projection. The shape of connectors may deviate from those shapes given in the following figures as long as the specified dimensions are not influenced.

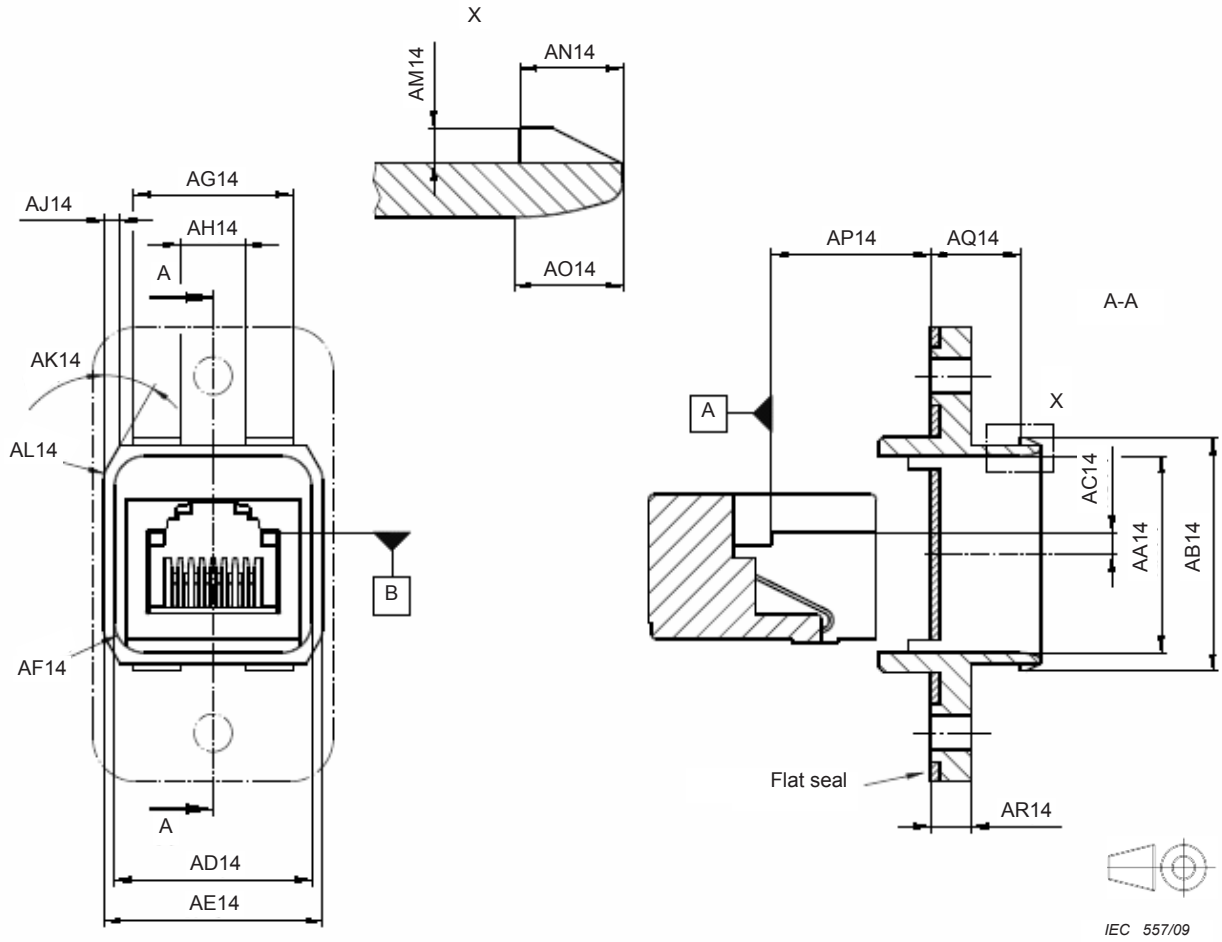
3.3 Contact arrangement of all connector types

Contact arrangements shall be in accordance with the relevant part of IEC 60603-7.

3.4 IP65 and IP67 sealing

Connectors meant to comply with IP ratings per IEC 60529 require sealing of the components in order to meet the requirements detailed in the test schedules in 6.8.3 through 6.8.8.

3.5 Dimensions, fixed connector



NOTE Fixing hole shall be sufficient for screw M3, see also Figure 3.

Figure 1 – Fixed connector

Table 1 – Dimensions, fixed connector

Letter	Maximum mm	Minimum mm	Nominal mm
AA14	18,23	18,17	18,2
AB14	21,55	21,45	21,5
AC14	2,11	1,99	2,05
AD14	18,23	18,17	18,2
AE14	20,3	20,1	20,2
AF14	2,83	2,77	2,8
AG14	14,85	14,75	14,8
AH14	6,05	5,95	6
AJ14	1,7	1,3	1,5
AK14	31	29	30
AL14	2,1	1,9	2
AM14	0,7	0,6	0,65
AN14	1,95	1,85	1,9
AO14	2,1	1,9	2
AP14	14,85	14,45	14,65
AQ14	8,35	8,25	8,3
AR14	3,9	3,7	3,8

3.6 Dimensions, free connector

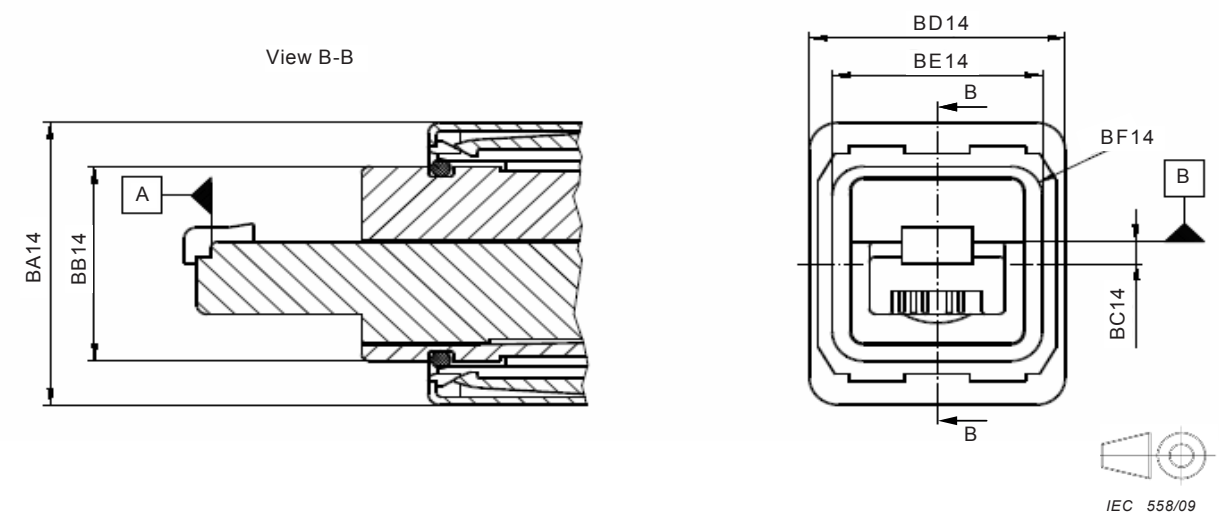


Figure 2 – Free connector

Table 2 – Dimensions, free connector

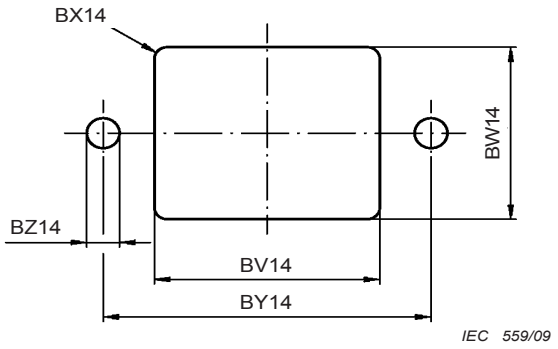
Letter	Maximum mm	Minimum mm	Nominal mm
BA14	29	-	-
BB14	18,09	18,03	18,06
BC14	2,11	1,99	2,05
BD14	22,8	-	-
BE14	18,09	18,03	18,06
BF14	2,73	2,67	2,7

3.7 Termination and mounting information

3.7.1 General

Terminations shall be in accordance with the relevant IEC 60603-7 specification.

3.7.2 Mounting information for fixed connector



NOTE Instead of BZ14 as thread M3, unthreaded holes are also allowed.

Figure 3 – Mounting information – panel cut-out outline

Table 3 – Mounting information

Letter	Maximum mm	Minimum mm	Nominal mm
BV14		21,95	
BW14		18,35	
BX14	R 1,25	-	-
BY14	33,1	32,9	33
BZ14	-	-	M3

4 Gauges

4.1 Connectors, IEC 60603-7 interface

Refer to the relevant part of IEC 60603-7.

5 Characteristics

5.1 Climatic category

The lowest and highest temperatures and the duration of the damp heat, steady state test should be selected from the preferred values stated in 2.3 of IEC 61076-1 and shall not exceed the values defined in the relevant part of IEC 60603-7.

The following preferred temperature range and severity of the damp heat steady state test categories have been selected to comply with IEC 61156.

Table 4 – Climatic categories – selected values for environmental performance level A

Climatic category	Lower temperature °C	Upper temperature °C	Damp heat steady state (days)
40/70/21	–40	70	21

5.2 Electrical characteristics

5.2.1 Clearance and creepage distances

The permissible operating voltages depend on the application and on the applicable or specified safety requirements.

Insulation co-ordination is not required for this connector; therefore, the creepage and clearance distances in IEC 60664-1 are reduced and covered by overall performance requirements.

Therefore, the creepage and clearance distances are given as operating characteristics of mated connectors.

In practice, reductions in creepage or clearance distances may occur due to the conductive pattern of the printed board or the wiring used, and shall duly be taken into account.

Table 5 – Clearance and creepage distances

Distance between contacts and shield		Minimum distance between adjacent contacts	
Creepage	**Clearance**	**Creepage**	**Clearance**
mm	mm	mm	mm
1,40	0,51	0,36	0,36

The electrical characteristics are specified in the relevant part of IEC 60603-7.

5.2.2 Voltage proof

Conditions:

IEC 60512, Test 4a, Method A.
Standard atmospheric conditions.
Mated connectors.
All variants: 1 000 V d.c. or a.c. peak, contact-to-contact
1 500 V d.c. or a.c. peak, contact to shield.

5.2.3 Current-carrying capacity

Refer to the relevant part of IEC 60603-7.

5.2.4 Mating cycles with power applied

Any performance requirements as to the number of mating cycles under electric load shall be agreed between the manufacturer and customer.

NOTE For guidance and support when applying un-mating under load, see also IEC 60512-9-3.

5.2.5 Initial contact resistance

Conditions: IEC 60512, Test 2a.

Mated connectors.
Measurement points: as specified in the relevant clause of IEC 60603-7.
Signal contacts: 20 mΩ max.
Shield contact (if any): 20 mΩ max.

5.2.6 Input to output resistance

Conditions: IEC 60512, Test 2a.

Mated connectors.
Signal contacts: 200 mΩ maximum.
Shield (if any): 100 mΩ maximum.

5.2.7 Resistance unbalance

Conditions: IEC 60512, Test 2a.

Mated connectors.
Among all conductor, difference between maximum and minimum:
100 mΩ max.

5.2.8 Initial insulation resistance

Conditions: IEC 60512, Test 3a.

Method A.
Mated connectors.
Test voltage: 100 V d.c.
Each contact and shield (if any) to all others: 500 MΩ min.

5.3 Transmission characteristics

5.3.1 General

Transmission performance is defined by the relevant part of IEC 60603-7.

5.4 Mechanical

5.4.1 Mechanical operation

Conditions: IEC 60512, Test 9a.

Speed: 10 mm/s max.
Rest: 5 s min. (unmated).
PL1: 750 operations.
PL2: 250 operations.

5.4.2 Effectiveness of connector coupling devices transversal

Conditions: IEC 60512, Test 8a.

Force 60 N to be applied at the end of the free housing to load the coupling device with the maximum torque.

5.4.3 Effectiveness of connector coupling devices

Conditions: IEC 60512, Test 15f.

All types: 50 N for 60 s ± 5 s.

5.4.4 Engagement and separation forces

Conditions: IEC 60512, Test 13a.

Speed: 50 mm/s maximum.

All types, insertion and withdrawal: 30 N maximum.

Initial torque test, insertion: 1,0 Nm max. and withdrawal 0,7 Nm max.
After conditioning torque test, insertion: 2,0 Nm max. and withdrawal 1,2 Nm max.

6 Test schedule

6.1 General

This test schedule shows all tests and the order in which they shall be carried out, as well as the requirements to be met.

Reference is made to the relevant IEC 60603-7 part test groups for electrical and environmental test groups.

Tests according this International Standard shall demonstrate the performance of the protective housings in the applicable environment with the relevant IEC 60603-7 connector inserted.

Unless otherwise specified, mated connectors shall be tested. Care shall be taken to keep a particular combination of connectors together during the complete test sequence, i.e. when un-mating is necessary for a particular test, the same connectors shall be mated for the subsequent tests.

Hereinafter, a mated set of connectors is called a "specimen".

6.2 Test procedures and measuring methods

The test methods specified and given in the relevant standards are the preferred methods but not necessarily the only ones that can be used. In case of dispute, however, the specified method shall be used as the reference method.

Unless otherwise specified, all tests shall be carried out under standard atmospheric conditions for testing as specified in IEC 60068-1.

Where approval procedures are involved and alternative methods are employed it is the responsibility of the manufacturer to satisfy the authority granting approval that any alternative methods which he may use give results equivalent to those obtained by the methods specified.

6.3 Preconditioning

Before the tests are performed, the connectors shall be preconditioned under conditions specified in IEC 60068-1 for a period of 24 h, unless otherwise specified by the manufacturer.

6.4 Wiring and mounting of specimens

6.4.1 Wiring

Wiring of these connectors shall take into account wire diameter of the cables defined in the relevant part of IEC 61156 as applicable. Where wiring and/or shielding of test specimens is required, the detail specification of the relevant part of IEC 60603-7 shall be reviewed for information suitable to comply with the selected methods of test.

6.4.2 Mounting

When mounting is required in a test, unless otherwise specified, the connectors shall be rigidly mounted on a metal plate or to specified accessories, whichever is applicable, using the specified connection methods, fixing devices and panel cut-outs as laid down in 3.6.

6.5 Arrangement for contact resistance test

As specified in the relevant part of IEC 60603-7.

6.6 Arrangement for dynamic stress tests (test phase AP2)

Contact resistance measurement as specified in the relevant part of IEC 60603-7.

6.7 Basic (minimum) test schedule

Not applicable.

6.8 Full test schedule

6.8.1 General

For the full test schedule, 18 specimens are needed (3 groups of 6). Within each group, only 2 of the 6 specimens shall be subjected to the IPX5 and IPX7 tests. The same specimens are used for both tests against ingress of water, water jets, IPX5, and temporary immersion, IPX7. Two additional specimens shall be used for the dust-tight test, IP6X.

6.8.2 Test group P – Preliminary

The specimens shall consist of the variant shell and an IEC 60603-7-X interface connector assembled together.

All specimens shall be subjected to the test group P – preliminary tests in the sequence detailed below.

The specimens shall then be divided into the appropriate number of groups. All connectors in each group shall undergo the following tests as described in this detail specification and in the sequence given, unless the detail specification of the relevant part of IEC 60603-7 requires alteration of the sequence of tests or adds new tests to verify additional connector characteristics.

The test parameters required shall not be less than those listed. The following tests specify the characteristics to be checked and the requirements to be fulfilled.

6.8.3 Test group P

Table 6 – Test group P

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	Requirement All connector styles
P1	General exam-ination		Unmated connectors	Visual examination	1a	There shall be no defect that would impair normal operation
				Dimensional examination	1b	The dimensions shall comply with those specified in the relevant figure of Clause 3.
P2	Polarizing method	13e	Not applicable			
P3			Test voltage 100 V ± 15 V d.c. Method A 8 contacts/specimen	Insulation resistance	3a	500 MΩ min.
P4			Contact/contact: Method A mated connectors	Voltage proof	4a	1 000 V d.c. or a.c. peak
			All contacts to test panel: Method A mated connectors			1 500 V d.c. or a.c. peak

6.8.4 Test group AP

Table 7 – Test group AP – Dynamic/climatic

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
AP1	Engagement and separation forces	13a	Rate: 50 mm/min max		13a	Measure forces and torque as required Insertion torque: 1,0 Nm max. Withdrawal torque: 0,7 Nm max. Insertion and withdrawal force: 30 N max.
AP2	Rapid change of temperature	11d (IEC 60068-2-14)	–40° C to 70° C Mated connectors 25 cycles, t_1: 30 min recovery time 2 h			
AP3			Test voltage 100 V ± 15 V d.c. Method A 8 contacts/specimen	Insulation resistance	3a	500 MΩ min.
AP4			Contact/contact: Method A mated connectors	Voltage proof	4a	1 000 V d.c. or a.c. peak
			All contacts to test panel: Method A mated connectors			1 500 V d.c. or a.c. peak
AP5			Unmated connectors	Visual examination	1a	No damage likely to impair normal operation
AP6	Damp heat	11c (IEC 60068-2-30)	21 cycles Low temperature 25 °C High temperature 55 °C Cold, humidity 93 % All samples in mated state			
AP7	Engagement and separation forces	13a			13a	Measure forces and torque as required Insertion torque: 2,0 Nm max. Withdrawal torque: 1,2 Nm max. Insertion and withdrawal force: 30 N max.
AP8	Effectiveness of coupling device	15f	Rate of load application 44,5 N/s max.		4a	50 N for 60 s ±5 s

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
AP9	Degree of protection (IP Code) - Second characteristic numeral		Water jets (test IPX5) – 6,3 mm nozzle Temporary immersion (test IPX7) – 1 m, 30 min Test conditions as per Table 8, 14.2.5 (IPX5) and 14.2.7 (IPX7) of IEC 60529			No leakage on contacts. Test 2 of the 6 BP test group specimens. Test same 2 specimens for IPX5 and IPX7 test
AP10	Degree of protection (IP Code) - First characteristic numeral		Test on 2 new specimens other than those subject to AP9 and AP10. Dust-proof test IP6X: dust chamber (Figure 2 of IEC 60529) with underpressure, test conditions as per 13.6.1 of IEC 60529	Test 6		No deposit of dust observable inside the enclosure at the end of the test (13.6.2 of IEC 60529)
AP11			Test voltage 100 V ± 15 V d.c. Method A 8 contacts/specimen	Insulation resistance	3a	500 MΩ min.
AP12			Contact/contact: Method A mated connectors	Voltage proof	4a	1 000 V d.c. or a.c. peak
			All contacts to test panel: Method A mated connectors			1 500 V d.c. or a.c. peak
AP13			Unmated connectors	Visual examination	1a	No damage likely to impair normal operation

6.8.5 Test group BP

Table 8 – Test group BP – Mechanical

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	Requirements All connector styles
BP1	Mechanical operation (half of the specified number of operations)	9a	N operations – see mechanical operations. Speed 10 mm/s max. Rest 5 s (unmated). Fully assembled connectors tested and the locking device of shell is actuated.			PL1 N = 750 operations PL2 N = 250 operations

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	Requirements
						All connector styles
BP2	Degree of protection (IP Code) - Second characteristic numeral		Water jets (test IPX5) – 6,3 mm nozzle Temporary immersion (test IPX7) – 1 m, 30 min Test conditions as per Table 8, 14.2.5 (IPX5) and 14.2.7 (IPX7) of IEC 60529			No leakage on contacts. Test 2 of the 6 BP test group specimens. Test same 2 specimens for IPX5 and IPX7 test
BP3	Degree of protection (IP Code) - First characteristic numeral		Test on 2 new specimens other than those subject to AP9 and AP10. Dust-proof test IP6X: dust chamber (Figure 2 of IEC 60529) with underpressure, test conditions as per 13.6.1 of IEC 60529	Test 6		No deposit of dust observable inside the enclosure at the end of the test (13.6.2 of IEC 60529)
BP4			Test voltage 100 V ± 15 V d.c. Method A 8 contacts/specimen	Insulation resistance	3a	500 MΩ min.
BP5			Contact/contact Method A, mated connectors	Voltage proof	4a	1 000 V d..c or a.c. peak
			All contacts to test panel Method A, mated connectors			1 500 V d.c or a.c.
BP6			Unmated connectors	Visual examination	1a	No damage likely to impair normal operation

6.8.6 Test group CP

Table 9 – Test group CP – Continuity

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	
CP1	Vibration	6d	f = 10 – 500 Hz, Amplitude = 0,35 mm Acceleration = 50 m/s^2 10 sweeps / axis	Contact disturbance	2e	10 µs max.

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	
CP2	Shock	IEC 60512-6-3	50 g, 11 ms duration of impact, 500 m/s^2 half sine	Contact disturbance	2e	10 μs max.
CP3			Test voltage 100 V d.c. Method A Mated connectors	Insulation resistance	3a	500 MΩ min.
CP4	Degree of protection (IP Code) - Second characteristic numeral		Water jets (test IPX5) – 6,3 mm nozzle Temporary immersion (test IPX7) – 1 m, 30 min Test conditions as per Table 8, 14.2.5 (IPX5) and 14.2.7 (IPX7) of IEC 60529			No leakage on contacts. Test 2 of the 6 BP test group specimens. Test same 2 specimens for IPX5 and IPX7 test
CP5	Degree of protection (IP Code) - First characteristic numeral		Test on 2 new specimens other than those subject to AP9 and AP10. Dust-proof test IP6X: dust chamber (Figure 2 of IEC 60529) with underpressure, test conditions as per 13.6.1 of IEC 60529	Test 6		No deposit of dust observable inside the enclosure at the end of the test (13.6.2 of IEC 60529)
CP6			Unmated connectors	Visual examination	1a	There shall be no defects that would impair normal operation

6.8.7 Test group DP – Electrical load and temperature

This testing is covered by the use of pre-qualified IEC 60603-7 series on fixed and free connectors.

6.8.8 Test group EP – Signal integrity

The electrical transmission requirements (signal integrity) are defined in the relevant part of IEC 60603-7.

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