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INTERNATIONAL STANDARD

Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces –
Part 24: Type SC-RJ connector family

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC CONNECTOR INTERFACES –

Part 24: Type SC-RJ connector family

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International Standard IEC 61754-24 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

FDIS	Report on voting
86B/2884/FDIS	86B/2919/RVD

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

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

A list of all parts of the IEC 61754 series, published under the general title: *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces,* can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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INTRODUCTION

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC CONNECTOR INTERFACES –

Part 24: Type SC-RJ connector family

1 Scope

This part of IEC 61754 defines the standard interface dimensions for the type SC-RJ family of connectors.

2 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 60603-7-1, *Connectors for electronic equipment – Part 7-1:Detail specification for 8-way, shielded free and fixed connectors with common mating features, with assessed quality*

IEC 61076-3-106, *Connectors for electronic equipment – Product requirements – Part 3-106: 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*

IEC 61754-4, *Fibre optic connector interfaces – Part 4 :Type SC connector family*

3 Description

The parent connector for type SC-RJ connector family is a duplex plug connector set of plug/adaptor configuration which is characterised by 2,5 mm nominal ferrule diameter. The connector includes a push-pull coupling mechanism, which is spring loaded relative to the ferrules in the direction of optical axes. The plug has three male keys. Two of them in each case are used to orient and limit the relative positions between the two ferrules and the components (SC simplex connector) to which they are mated and one key which defines the general orientation of the duplex connector. The optical alignment mechanism of the adaptor is of a resilient sleeve style. For the active device interface, the alignment mechanism can be of both type: rigid bore or resilient sleeve.

4 Interfaces

4.1 General

This standard contains the following standard interfaces for the type SC-RJ connector family as follows:

Table 1 – Title of the standard interfaces

Interface	Title
24-1	Plug connector interface with spherical polished endface (PC)
24-2	Plug connector interface with angled polished endface (APC) 8°
24-3	Plug connector interface for A3c/A3d fibres (HCS)
24-4	Plug connector interface for A4a/A4d fibres (POF)
24-5	Adaptor connector interface
24-6	Active device interface

The following standard interfaces are intermatable:

Table 2 – Interchangeability

SC-RJ connector family	IEC 61754-24	Adaptor	Active device
	Interface	24-5	24-6
Plug	24-1	Mate	Mate
	24-2	Mate	Mate
	24-3	Mate	Mate
	24-4	Mate	Mate

To avoid mating fibre of different sizes (for silica fibres 24-1, 24-2 with the HCS interface 24-3 or with the POF interface 24-4) at least a colour coding system shall be applied not only on the connector but also on the adaptor side. For a higher security level a mechanical coding shall be implemented to eliminate an incorrect fibre type mating, see in detail Annex B, Figure B.1.

In addition to the interfaces defined in this connector family, the SC simplex plug connectors according to IEC 61754-4 (Interfaces 4-1, 4-5, 4-6 and 4-7) can be mated with SC-RJ adaptor connector interface 24-5 and SC-RJ active device interface 24-6.

4.2 Plug connector interface PC

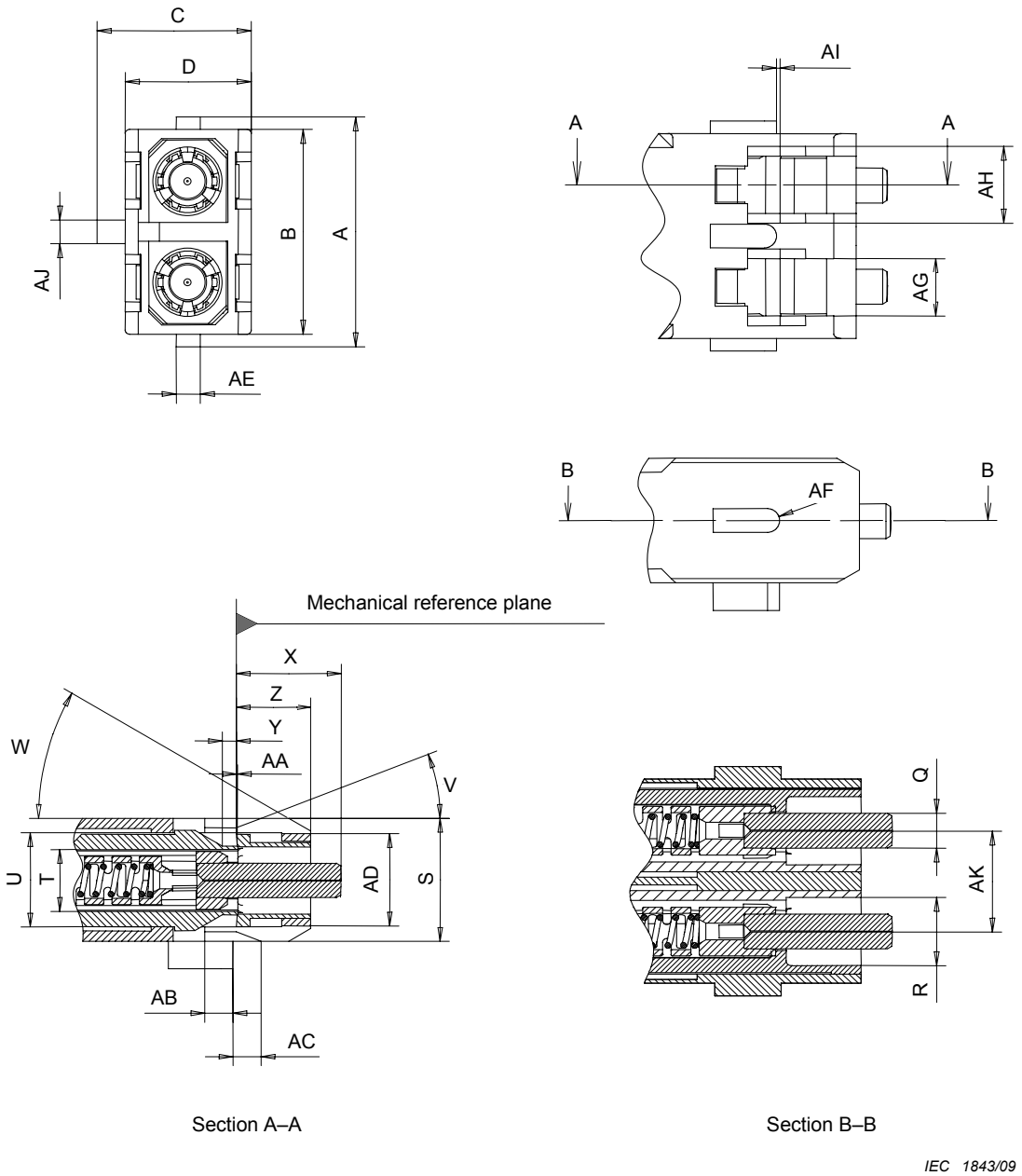

Figure 1 – Plug connector interface PC (SM fibre)

Table 3 – Dimensions of plug connector interface PC (SM fibre)

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	16,2	16,8	See Note 5
B	14,5	14,8	
C	10,8	11,2	
D	8,9	8,99	
Q	2,497	2,499 5	Diameter; see Table 5
R	4,8	4,9	Diameter
S	8,9	8,99	
T	4,9	5,3	
U	6,7	6,8	
V	19	23	Degree
W	25	35	Degree
X	7,15	7,5	See Notes 1, 2
Y	0,8	1,2	
Z	5,3	5,5	
AA	–0,1	0,05	See Note 3
AB	2,11	2,5	
AC	2	2,8	
AD	6,6	6,8	
AE	1,6	1,8	See Note 5
AF	0,8	0,9	Radius, see Note 5
AG	4,05	4,15	
AH	5,4	5,6	
AI	0	0,5	See Note 5
AJ	1,6	1,8	
AK	7,3	7,4	See Note 4

NOTE 1 Ferrule compression force should be from 7,8 N to 11,8 N when the ferrule is compressed to a point where X is 7,00 mm ± 0,10 mm.

NOTE 2 This value shows the dimension after the ferrule is polished and in the unmated condition.

NOTE 3 The negative dimension refers to the position of the inside bottom plane left - direction relative to the mechanical reference plane.

NOTE 4 Plugs should be capable of floating between the AKmin and AKmax, see also Table 13.

NOTE 5 The left and right hand lateral profile is not mandatory. The duplex connector can also be mated without these profiles.

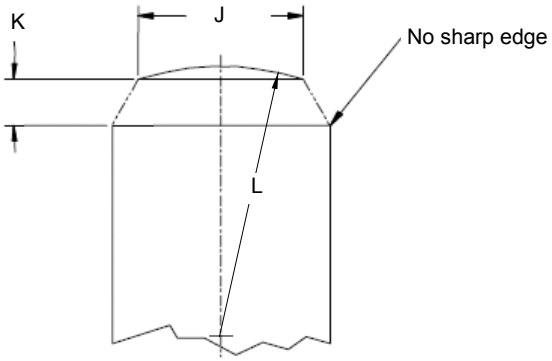

Figure 2 – Detail of spherically polished ferrule PC endface

Table 4 – Dimensions of the spherically polished ferrule PC endface

Reference	Dimensions mm		Notes
	Minimum	Maximum	
J	0,8	NA	Note 1
K	NA	1,8	Note 2
L	5	See OI	Note 3, Note 4
NOTE 1 In IEC 61755-3-1, max. value for J is not defined.			
NOTE 2 In IEC 61755-3-1, min. value for K is not defined.			
NOTE 3 Dome eccentricity of the spherical polished endface should be less than 70 μm.			
NOTE 4 OI; optical interface, IEC 61755-3.			
NA = not applicable.			

Table 5 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Notes
	Minimum	Maximum	
1	2,498 5	2,499 5	
2	2,498 0	2,499 5	
3	2,497 0	2,499 5	

4.3 Plug connector interface APC 8°

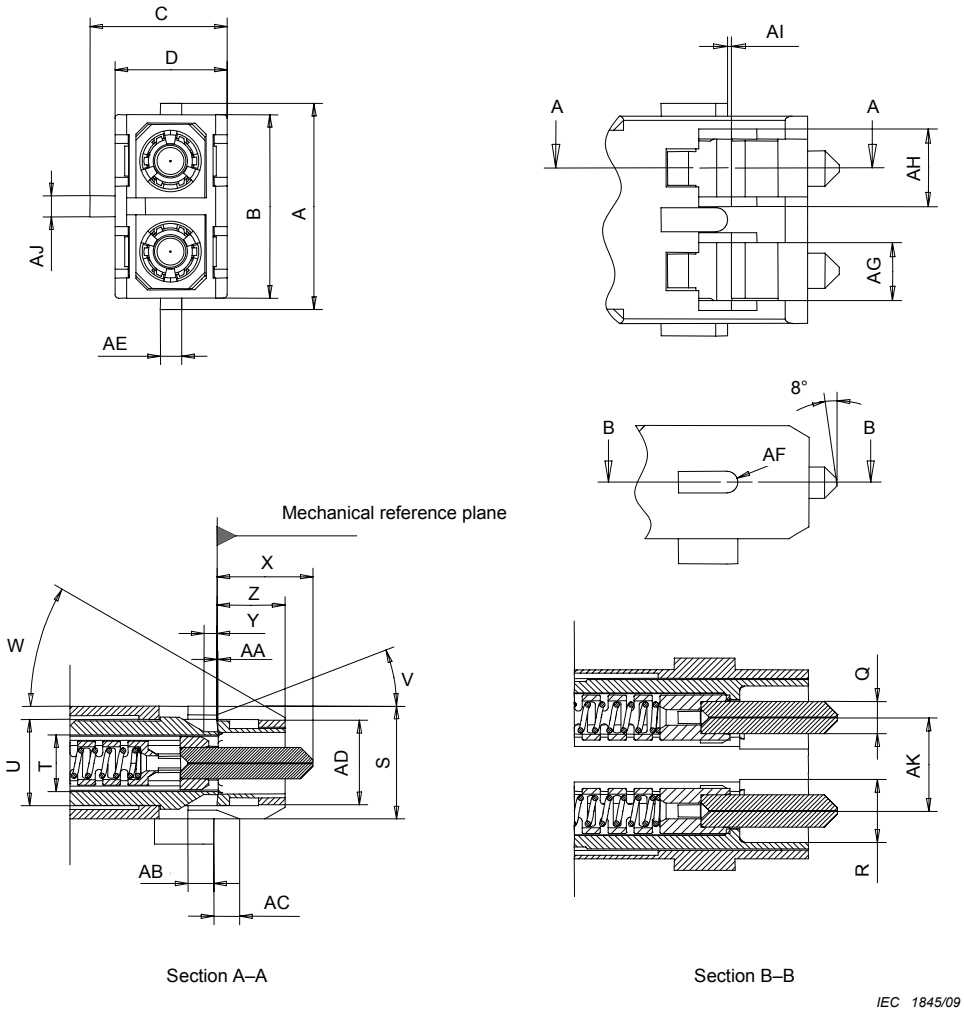

Figure 3 – Plug connector interface APC 8° (SM fibre)

Table 6 – Dimensions of plug connector interface APC 8° (SM fibre)

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	16,2	16,8	See Note 5
B	14,5	14,8	
C	10,8	11,2	
D	8,9	8,99	
Q	2,497	2,499 5	Diameter; see Table 8
R	4,8	4,9	Diameter
S	8,9	8,99	
T	4,9	5,3	
U	6,7	6,8	
V	19	23	Degree
W	25	35	Degree
X	7,15	7,5	See Notes 1, 2
Y	0,8	1,2	
Z	5,3	5,5	
AA	–0,1	0,05	See Note 3
AB	2,11	2,5	
AC	2	2,8	
AD	6,6	6,8	
AE	1,6	1,8	See Note 5
AF	0,8	0,9	Radius, see Note 5
AG	4,05	4,15	
AH	5,4	5,6	
AI	0	0,5	See Note 5
AJ	1,6	1,8	Same values for all guiding keys (= AE)
AK	7,3	7,4	See Note 4

NOTE 1 Ferrule compression force should be from 7,8 N to 11,8 N when the ferrule is compressed to a point where X is 7,00 mm ± 0,10 mm.

NOTE 2 This value shows the dimension after the ferrule is polished and in the unmated condition.

NOTE 3 The negative dimension refers to the position of the inside bottom plane left - direction relative to the mechanical reference plane.

NOTE 4 Plugs should be capable of floating between the AKmin and AKmax, see also Table 13.

NOTE 5 The left and right hand profile is not mandatory. The duplex connector can also be mated without these profiles.

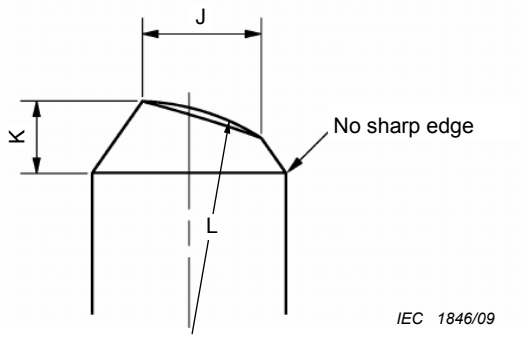

Figure 4 – Detail of angled polished ferrule endface (APC)

Table 7 – Dimensions of the angled polished ferrule endface (APC)

Reference	Dimensions mm		Notes
	Minimum	Maximum	
J	0,8	1,7	
K	NA	1,8	
L	5	See OI	Radius; see Note 1 and Note 2
NOTE 1 Dome eccentricity of the spherical polished end face should be less than 70 μm.			
NOTE 2 OI; optical interface IEC 61755-3.			
NA = not applicable.			

Table 8 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Notes
	Minimum	Maximum	
1	2,498 5	2,499 5	
2	2,498 0	2,499 5	
3	2,497 0	2,499 5	

4.4 Plug connector interface for A3c/A3d fibre

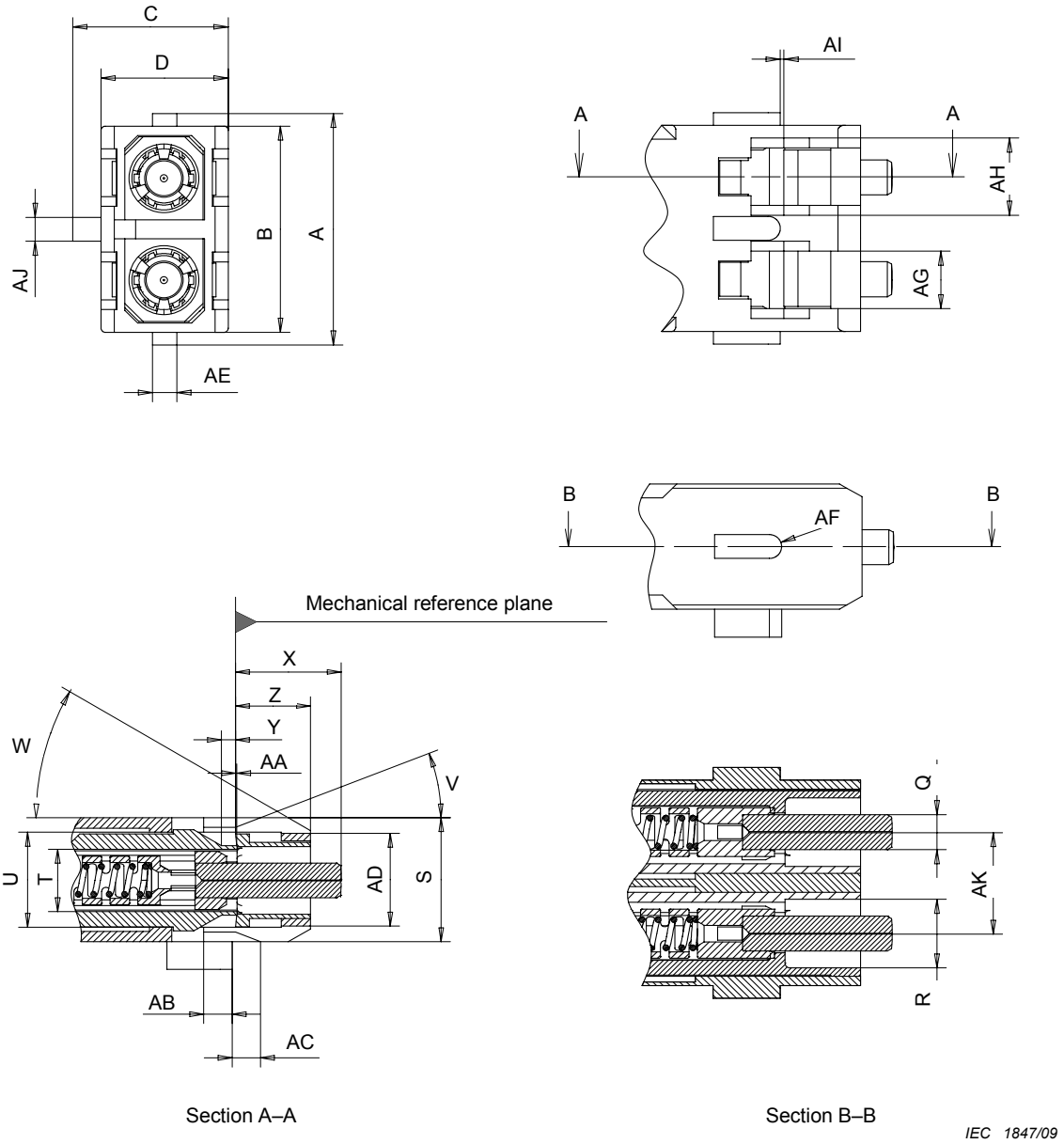

Figure 5 – Plug connector interface for A3c/A3d fibre (HCS fibre type)

Table 9 – Dimensions of plug connector interface for A3c/A3d fibres

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	16,2	16,8	See Note 4
B	14,5	14,8	
C	10,8	11,2	
D	8,9	8,99	
Q	2,494 0	2,499 5	Diameter, see Table 10
R	4,8	4,9	Diameter
S	8,9	8,99	
T	4,9	5,3	
U	6,7	6,8	
V	19	23	Degree
W	25	35	Degree
X	7,2	7,7	See Note 1
Y	0,8	1,2	
Z	5,3	5,5	
AA	–0,1	0,05	See Note 2
AB	2,11	2,5	
AC	2	2,8	
AD	6,6	6,8	
AE	1,6	1,8	See Note 4
AF	0,8	0,9	Radius, see Note 4
AG	4,05	4,15	
AH	5,4	5,6	
AI	0	0,5	See Note 4
AJ	1,6	1,8	Same values for all keys (= AE)
AK	7,3	7,4	See Note 3

NOTE 1 This value shows the dimension after the ferrule is polished and in the unmated condition.

NOTE 2 The negative dimension refers to the position of the inside bottom plane left - direction relative to the mechanical reference plane.

NOTE 3 Plugs should be capable of floating between the AKmin and AKmax, see also Table 13.

NOTE 4 The left and right hand side profile is not mandatory. The duplex connector can also be mated without using these profiles.

Table 10 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Notes
	Minimum	Maximum	
2	2,498 0	2,499 5	
3	2,497 0	2,499 5	
4	2,494 0	2,499 5	

4.5 Plug connector interface for A4a*/A4d fibres

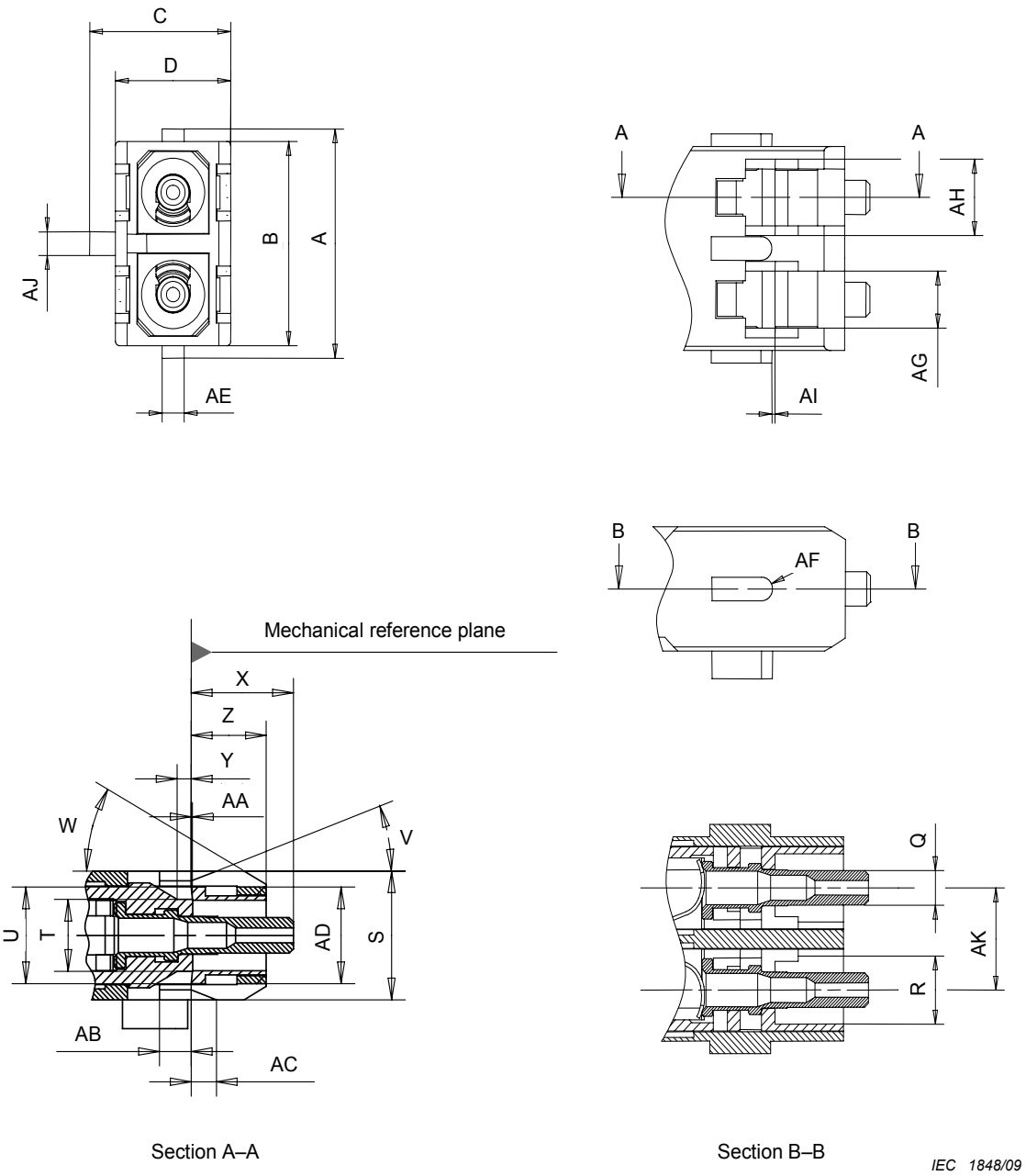

Figure 6 – Plug connector interface for A4a*/A4d fibres (POF)

* Improved performances of fiber A4a: A4a1

Table 11 – Dimensions of plug connector interface for A4a*/A4d fibres (POF)

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	16,2	16,8	See Note 4
B	14,5	14,8	
C	10,8	11,2	
D	8,9	8,99	
Q	2,47	2,499 5	Diameter, see Table 12
R	4,8	4,9	Diameter
S	8,9	8,99	
T	4,9	5,3	
U	6,7	6,8	
V	19	23	Degree
W	25	35	Degree
X	7,2	7,7	See Note 1
Y	0,8	1,2	
Z	5,3	5,5	
AA	–0,1	0,05	See Note 2
AB	2,11	2,5	
AC	2	2,8	
AD	6,6	6,8	
AE	1,6	1,8	See Note 4
AF	0,8	0,9	Radius, see Note 4
AG	4,05	4,15	
AH	5,4	5,6	
AI	0	0,5	See Note 4
AJ	1,6	1,8	Same value for all guiding keys (= AE)
AK	7,3	7,4	See Note 3

NOTE 1 This value shows the dimension after the ferrule is polished and in the unmated condition.

NOTE 2 The negative dimension refers to the position of the inside bottom plane left - direction relative to the mechanical reference plane.

NOTE 3 Plugs should be capable of floating between the AKmin and AKmax, see also Table 13.

NOTE 4 The left and right hand side profile is not mandatory. The duplex connector can also be mated without using these profiles.

Table 12 – Ferrule grade

	Dimensions outer diameter mm		Notes
	Minimum	Maximum	
Typical range	2,470 0	2,499 5	

4.6 Adaptor connector interface

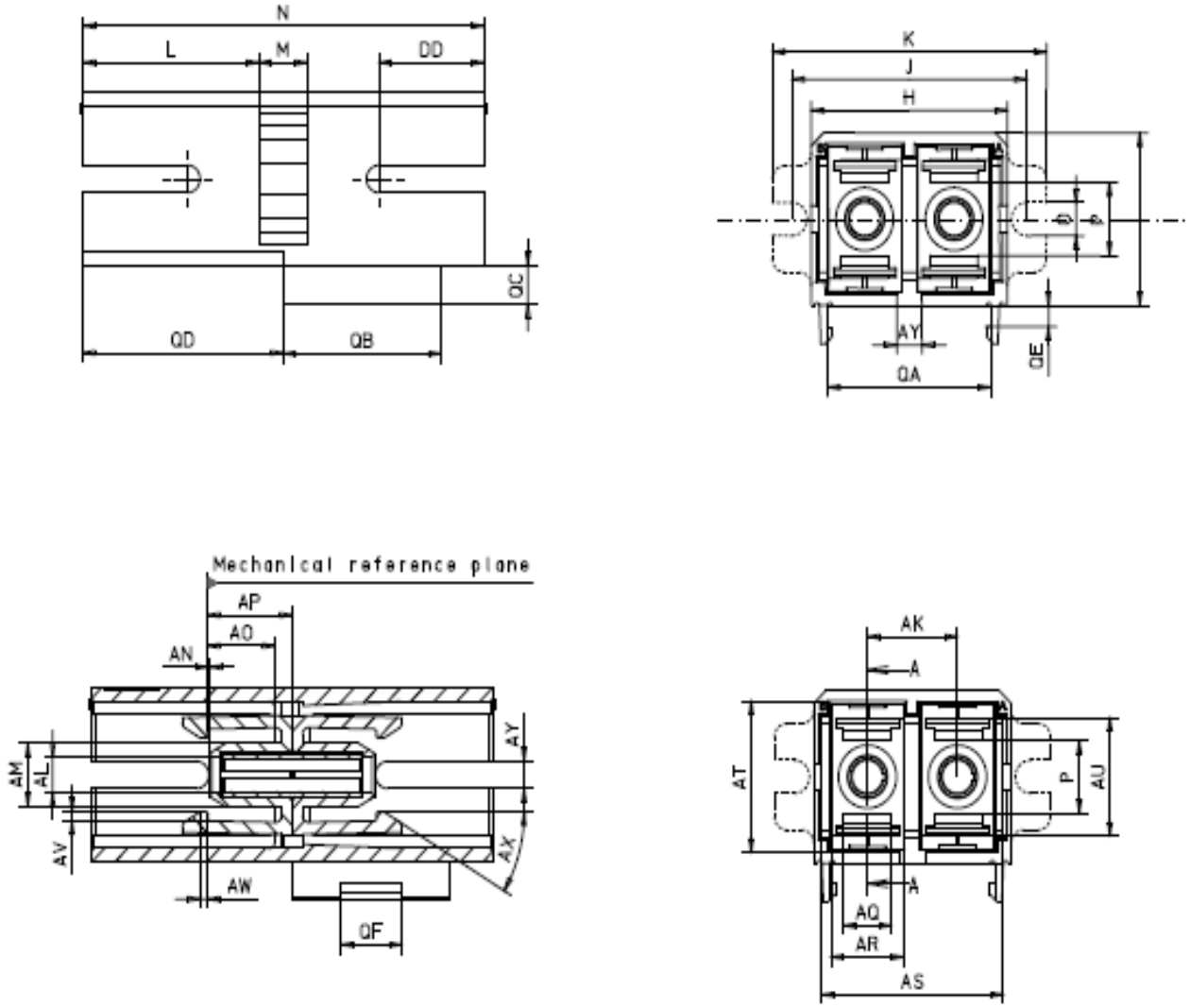

Figure 7 – Adaptor connector interface

Table 13 – Dimensions of adaptor connector interface

Reference	Dimensions mm		Notes
	Minimum	Maximum	
H		16,1	
I		13,1	
J	19,3	19,4	See Note 3
K		22,6	See Note 3
L		14,6	See Note 3
M		4,2	See Note 3
N		33	
O	2,4	2,6	See Note 3
P	4,9	5,8	
AK	7,3	7,4	For adapter, see Note 1
AL	2,7	2,8	Diameter, see note 2
AM	4,69	4,79	Diameter
AN	0,06	1,0	
AO	5,51	5,9	
AP	6,9	7,1	
AQ	3,8	4,04	
AR	5,0	5,3	
AS	14,7	15,2	
AT	10,8	11,2	
AU	9,0	9,1	
AV	0,65	0,75	
AW	0,4	0,8	
AX	27	33	Degree
AY	2,0	2,2	Slit for guiding pin (on connector side)
DD	8,5	8,7	See Note 4
QA	13,4	13,5	
QB	12,9	13,0	
QC	2,8	3,0	
QD		16,5	
QE	1,6	1,7	
QF	4,9	5,1	

NOTE 1 In case of resilient sleeve, the sleeve can move, the tolerances must be higher than for connectors; typically AK for adaptors (sleeves) is: AKmax: 7,65 mm, AKmin: 7,05 mm.

NOTE 2 The connector alignment feature is a resilient sleeve. The sleeve is free to rotate in the adaptor and a typical position of the split is shown. The feature must accept a pin gauge to the centre of the adaptor with a force of 2,0 N to 5,9 N under the condition that another pin gauge is inserted into the feature from the other side. The centre of the adaptor is defined by the dimension AP.

NOTE 3 Flange dimension for mounting is not mandatory (see drawing).

NOTE 4 DD is for manufacturing reason not referenced to reference plane.

4.7 Active device interface

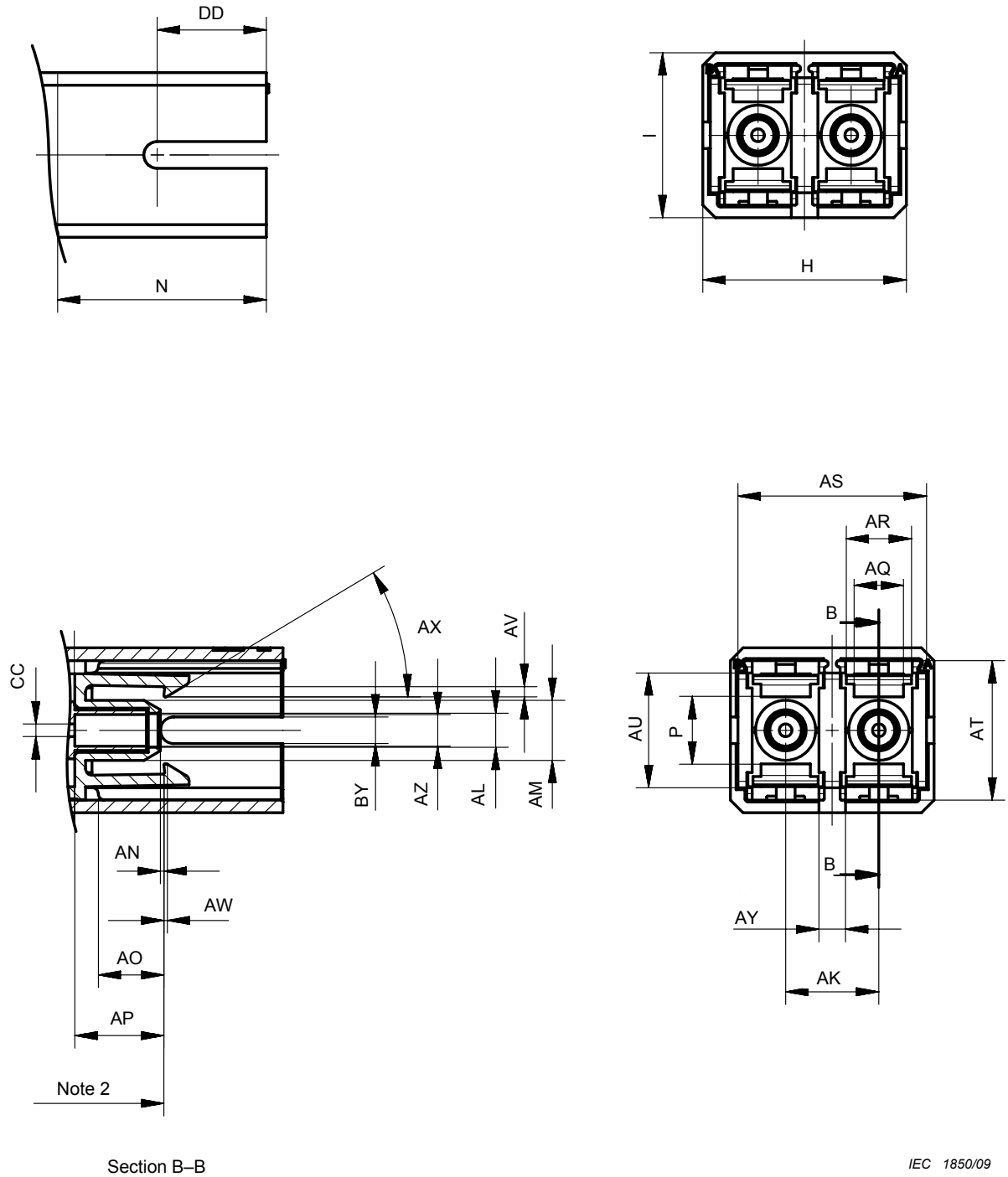

Figure 8 – Active device interface

Table 14 – Dimensions of active device interface

Reference	Dimensions mm		Notes
	Minimum	Maximum	
H		16,1	
I		13,1	
N		16,5	
P	4,9	5,8	
AK	7,3	7,4	See Note 1
AL	2,7	2,8	Diameter
AM	4,69	4,79	Diameter
AN	0,06	1,0	
AO	5,51	5,9	
AP	6,9	7,4	
AQ	3,8	4,04	
AR	5,0	5,3	
AS	14,7	15,2	
AT	10,8	11,2	
AU	9,0	9,1	
AV	0,65	0,75	
AW	0,4	0,8	
AX	27	33	Degree
AY	2,0	2,2	Slit for guiding pin (on connector side)
AZ	2,50	2,52	Diameter, see Note 2
BY	2,0	2,2	Slit for guiding pin (on connector side)
CC	0,3	2,5	
DD	8,5	8,7	Note 3

NOTE 1 Active device has fixed dimensions.

NOTE 2 The connector alignment feature for an interface could either be a rigid bore sleeve or a resilient sleeve. In the case of a rigid bore sleeve, the diameter should be within the values given for AZ. In the case of a resilient sleeve, the feature should accept a pin gauge (see Figures 2 and 9 and Tables 4 and 15) to the centre of the active device with a force of 2 N to 5,9 N under the condition that another pin gauge is inserted into the feature from the other side. The centre of the adaptor is defined by the dimension AP.

NOTE 3 DD is for manufacturing reason not referenced to reference plane.

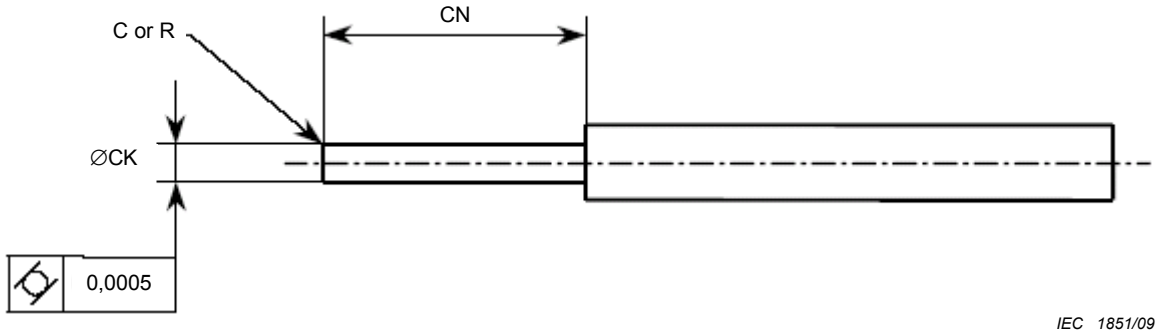

Figure 9 – Pin gauge for resilient alignment sleeve

Table 15 – Dimensions of pin gauge

Reference	Dimensions mm		Notes
	Minimum	Maximum	
CK	2,498 5	2,499 5	See Notes 1 and 2
CN	7	15	
NOTE 1 Surface roughness grade N4 < 0,2 µm Ra.			
NOTE 2 Chamfer or radius at gauge endface.			

Annex A
(normative)

Colour / mechanical coding system

Basically the media type is related to the colours of the housings:

Table A.1 – Basic colours of the housing

Media type, interface	Colour of the housing
SM, APC, 8°	Green, RAL 6018
SM, PC, 0°	Blue, RAL 5015
MM	Beige, RAL 1014 (or Black, RAL 9005)
Large core fibres, of type A3c/A3d (HCS)	Black, RAL 9005
Large core fibres, of type A4a*/A4d (POF)	Black, RAL 9005

For mechanical coding, adaptor and connector are upgradeable with pin and clip. The mechanical coding is applied as follows, see Table A.2 and Figure A.1.

Table A.2 – Coloured code of mechanical pin (key; adaptor) and clip (frame; connector)

Mechanical Code	Colour code for the pin (adaptor) and clip (connector)	Remarks
0	Green, RAL 6018	Not coded, Note
1	Red, RAL 3020	
2	Brown, RAL 8004	
3	Yellow, RAL 1016	
4	Violet, RAL 4008	
5	White, RAL 9010	
6	Black, RAL 9005	
NOTE Universal, intermatable to all mechanical and colour coded clips, also in case if no pin is mounted in the adaptor.		

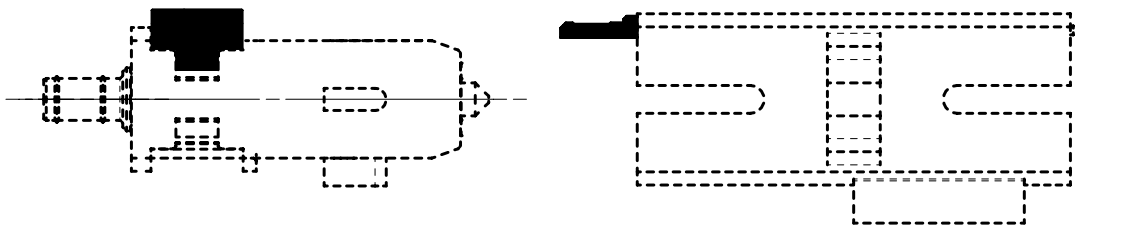

Figure A.1 – Mechanical coding location with pin and clip

On Figure A.2, the mechanical coding system is seen in more details, from key number 1 to 6.

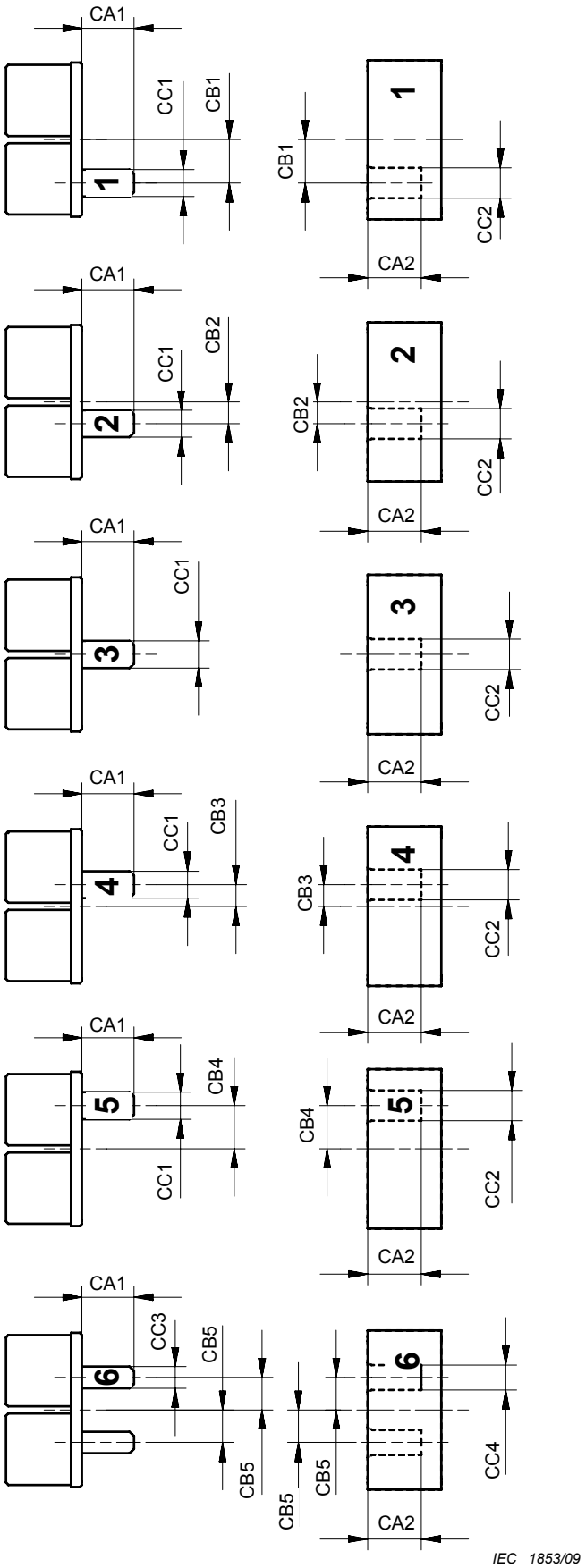

Figure A.2 – Mechanical disposition of the keys (pin and clip)

Table A.3 – Mechanical disposition of the keys (pin and clip)

Reference	Minimum	Nominal	Maximum
CA1	Note	4,8	Note
CA2	4,91	4,94	4,97
CB1	3,9	4,0	4,1
CB2	1,9	2,0	2,0
CB3	1,9	2,0	2,1
CB4	3,9	4,0	4,1
CB5	2,9	3,0	3,1
CC1	Note	2,5	Note
CC2	Note	2,8	Note
CC3	Note	2,0	Note
CC4	Note	2,3	Note
NOTE If not otherwise indicated, see for tolerances DIN EN 16901.			

Annex B
(normative)

Cut out information

The outer dimensions of the housing of the SC-RJ connector family is chosen such that the geometry complies with the RJ45 cut out (RJ45 referenced in IEC 60603-7-1) and can be mounted in different protective housings (see IEC 61076-3-106). In Figure B.1, the mechanical cut out is shown in detail.

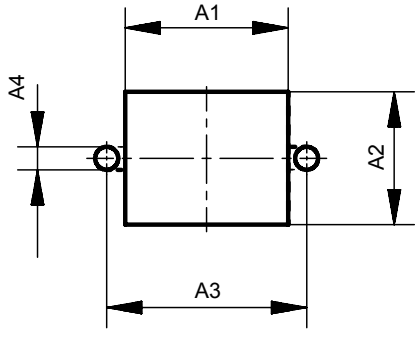

Figure B.1 – Panel cut out information; mounting hole Ø 2,3, or groove for M2

Table B.1 – Dimensions for mounting the fixed adaptor

Reference	Minimum mm	Nominal mm	Maximum mm
A1	16,2	16,3	16,4
A2	13,2	13,3	13,4
A3	19,9	20,0	20,1
A4	Note	2,3	Note
NOTE If not otherwise indicated, see for tolerances DIN EN 16901.			

Bibliography

IEC 60793-2-30, *Optical fibres – Part 2-30: Product specifications – Sectional specification for category A3 multimode fibres*

IEC 60793-2-40, *Optical fibres – Part 2-40: Product specifications – Sectional specification for category A4 multimode fibres*

IEC 61753 (all parts), *Fibre optic interconnecting devices and passive components performance standard*

IEC 61754-1, *Fibre optic connector interfaces – Part 1:General and guidance*

IEC 61755-1, *Fibre optic connector optical interfaces – Part 1: Optical interfaces for single mode non-dispersion shifted fibres – General and guidance*

ISO 5456-2: *Technical drawings – Projection methods – Part 2: Orthographic representations*

DIN EN 16901: *Plastics mouldings; Tolerances and acceptance condition for linear dimensions, (Tolerance group -130).*

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