BS EN 61754-27:2013

BSI Standards Publication

Fibre optic interconnecting devices and passive components — Fibre optic connector interfaces

Part 27: Type M12-FO connector family

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This British Standard is the UK implementation of EN 61754-27:2013. It is identical to IEC 61754-27:2013.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/2, Fibre optic interconnecting devices and passive components.

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

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Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 27: Type M12-FO connector family

(IEC 61754-27:2013)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Interfaces de connecteurs pour fibres optiques - Partie 27: Famille de connecteurs de type M12-FO (CEI 61754-27:2013)

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Foreword

The text of document 86B/3597/FDIS, future edition 1 of IEC 61754-27, prepared by IEC/TC 86B "Fibre optic interconnecting devices and passive components" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61754-27:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-03-20
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-06-20

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The text of the International Standard IEC 61754-27:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60793-2	NOTE	Harmonised as EN 60793-2.
IEC 61754-1	NOTE	Harmonised as EN 61754-1.
IEC 61755 Series	NOTE	Harmonised as EN 61755 Series (partly modified).
IEC 61755-1	NOTE	Harmonised as EN 61755-1.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

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 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60793-2-30	-	Optical fibres - Part 2-30: Product specifications - Sectional specification for category A3 multimode fibres	EN 60793-2-30	-
IEC 60793-2-40	-	Optical fibres - Part 40: Product specifications - Sectional specification for category A4 multimode fibres	EN 60793-2-40	-
IEC 60793-2-50	-	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN 60793-2-50	-
IEC 61076-2-101	-	Connectors for electronic equipment - Product requirements - Part 2-101: Circular connectors - Detail specification for M12 connectors with screw-locking	EN 61076-2-101	-
IEC 61755-3	Series	Fibre optic connector optical interfaces - Part 3: Optical interface	EN 61755-3	Series
ISO/IEC/TR 29106	-	Information technology - Generic cabling - Introduction to the MICE environmental classification	-	-

CONTENTS

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

Part 27: Type M12-FO connector family

1 Scope

This part of IEC 61754 defines the standard interface dimensions for the type M12-FO family of connectors.

This connector is of duplex plug/adaptor/plug configuration and designed for industrial environment as described in ISO/IEC TR 29106, severity class M_3 and I_3. Multiple designs for machines and equipment require solutions with different fibre types.

2 Normative references

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

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

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 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 61076-2-101, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 61755-3 (all parts 3), *Fibre optic connector optical interfaces – Part 3: Optical interface*

ISO/IEC TR 29106, *Information technology – Generic cabling – Introduction to the MICE environmental classification*

3 Description

The M12-FO connector family is a duplex plug connector set of plug/adaptor configuration which is characterized by a 2,5 mm nominal ferrule diameter and can be used for fibres as described in Table 1.

This circular connector includes a housing with a M12-thread screw locking mechanism and a protection according to IEC 60529, IP 65 and IP 67. Electrical M12-connectors are typically used for industrial process, measurement and control. They are described and dimensioned in IEC 61076-2-101 and additional information for the optical connector is given in this standard.

The coupling mechanism is spring loaded relative to the ferrules in the direction of the optical axes. The ferrules stand back from the front face in the unmated condition due to a shroud to shelter them from mechanical impact during handling and the mating process.

The plug and adaptor are equipped with four keys to define the mating orientation of the duplex connector. The optical alignment mechanism of the adaptor is from a resilient sleeve style. The alignment mechanism for the active device interface can be a rigid bore or a resilient sleeve.

4 Interfaces

4.1 General

This standard contains the interfaces for the type M12-FO connector family as described in Table 1. The interfaces are intermatable according to Table 2.

Table 1 – Interfaces

Interface	Title
27-1	Plug connector interface with spherical polished endface (PC) for IEC 60793-2-50 category B1.1 or B1.3 fibres.
27-2	Plug connector interface for IEC 60793-2-30 category A3c or A3d fibres.
27-3	Plug connector interface for IEC 60793-2-40 category A4a or A4d fibres.
27-4	Adaptor connector interface
27-5	Active device interface
NOTE A plug connector interface with angled polished endface (APC) 8° is not described.	

Table 2 – Intermatability

M12-FO connector family	**IEC 61754-27 interface**	**Adaptor** 27-4	**Active device** 27-5
Plug	27-1	Mate	Mate
	27-2	Mate	Mate
	27-3	Mate	Mate

4.2 Part 27-1 plug connector interface for category B1.1 or B1.3 fibres

The M12-FO plug connector interface with spherical polished endface (PC 0°, SM fibre) is described in Figures 1 and 2 and Tables 3 to 5. All dimensions are under mated conditions.

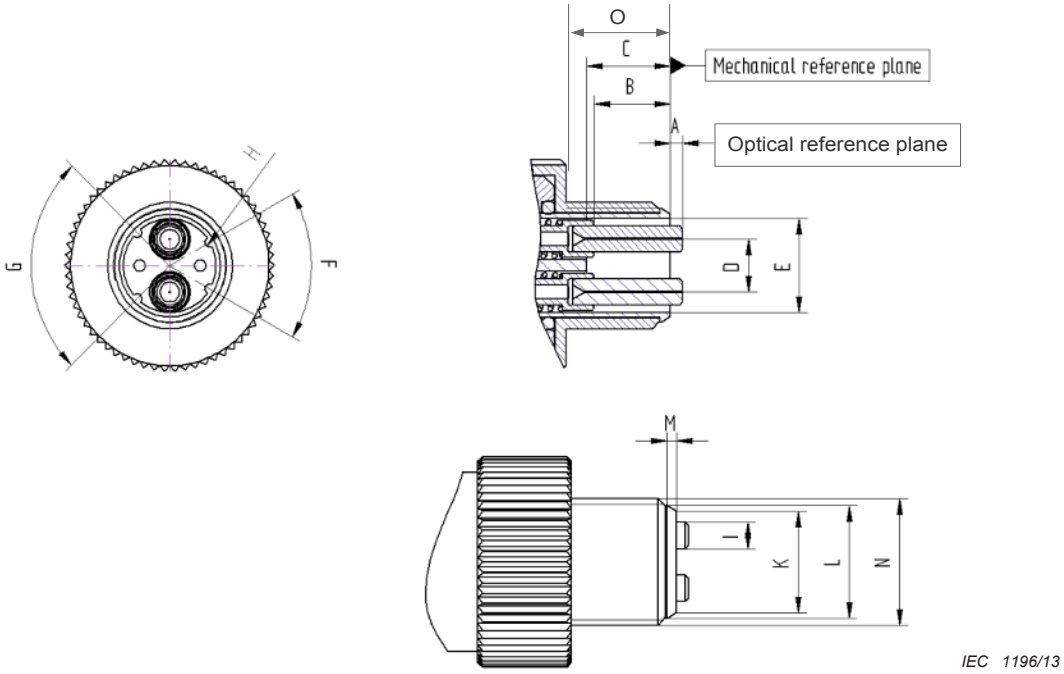

Figure 1 – Plug connector interface PC

Table 3 – Dimensions for the details in Figure 1

Reference	Dimensions mm			Remarks
	Minimum	Nominal	Maximum	
A[a]	1,0		1,3	Dimensions in unmated condition
B	7,0		7,5	
C	8,0		8,2	
D	4,95		5,05	
E	8,8		9,0	
F		60°		
G		90°		
H	R0,4		R0,5	
I	2,497		2,4 995	
K	9,6		9,8	
L	10,3		10,8	
M	0,8		1,0	
N		M12		
O	10			

[a] Ferrule compression force shall be from 7,8 N to 11,8 N when the ferrule is compressed to a point where A is 0,50 mm ± 0,10 mm.

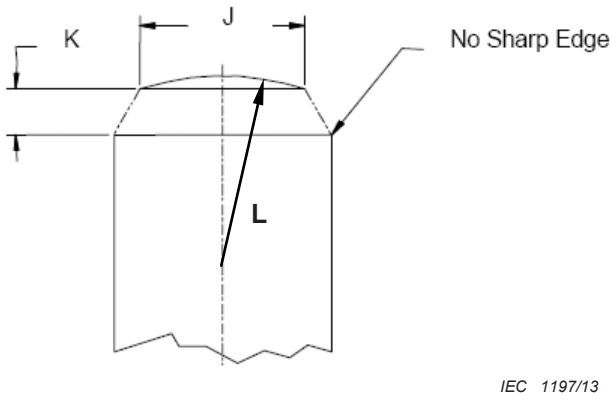

Figure 2 – Detail of spherically polished ferrule PC endface

Table 4 – Dimensions for the details in Figure 2

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
J[a]	0,8	N/A	Diameter
K[b]	N/A	1,8	
L[c]	5	30	Radius

[a] Maximum value for J is not defined in the IEC 61755-3 series.

[b] Minimum value for K is not defined in the IEC 61755-3 series.

[c] Dome eccentricity of the spherical polished endface shall be less than 70 μm.

N/A = not applicable.

Table 5 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Remarks
	Minimum	Maximum	
1	2,4 985	2,4 995	
2	2,4 980	2,4 995	
3	2,4 970	2,4 995	

4.3 Part 27-2 plug connector interface for category A3c or A3d fibres

The M12-FO plug connector interface for category A3c or A3d fibres are described in Figures 3 and 4 and Tables 6 to 8. All dimensions are under mated conditions.

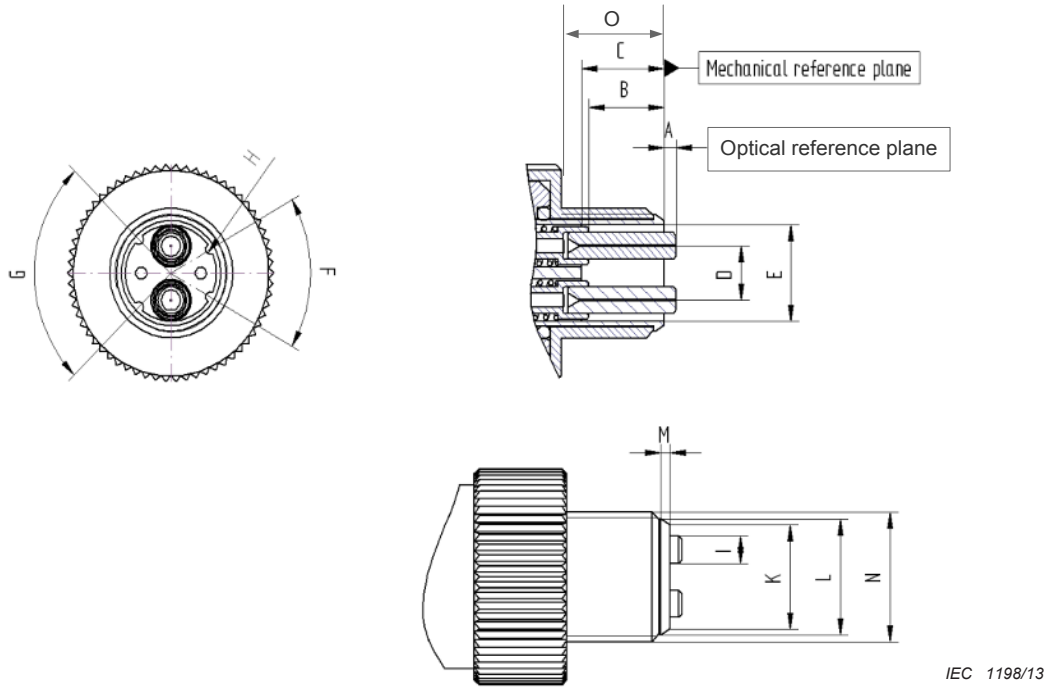

Figure 3 – Plug connector interface for category A3c or A3d fibres

Table 6 – Dimensions of plug connector interface for category A3c or A3d fibres

Reference	Dimensions mm			Remarks
	Minimum	Nominal	Maximum	
A[a]	1,0		1,3	Dimensions in unmated condition
B	7,0		7,5	
C	8,0		8,2	
D	4,95		5,05	
E	8,8		9,0	
F		60°		
G		90°		
H	R0,4		R0,5	
I	2,497		2,4 995	
K	9,6		9,8	
L	10,3		10,8	
M	0,8		1,0	
N		M12		
O	10			

[a] Ferrule compression force shall be from 7,8 N to 11,8 N when the ferrule is compressed to a point where A is 0,50 mm ± 0,10 mm.

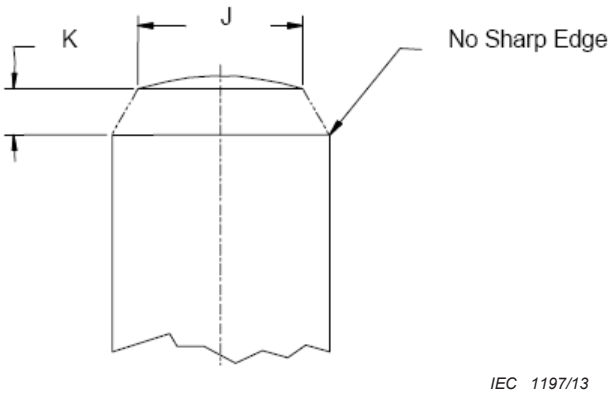

Figure 4 – Detail of polished ferrule endface for category A3c or A3d fibres

Table 7 – Dimensions for the details in Figure 4

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
J[a]	0,8	N/A[e]	Diameter
K[b]	N/A[e]	1,8	
L[c]	5	30	Radius
[a] Maximum value for J is not defined in the IEC 61755-3 series.			
[b] Minimum value for K is not defined in the IEC 61755-3 series.			
[c] Dome eccentricity of the spherical polished endface shall be less than 70 μm.			
[d] N/A: not applicable.			

Table 8 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Remarks
	Minimum	Maximum	
	2,470 0	2,499 5	Note
NOTE An OI for category A3c or A3d fibres is not yet defined in the IEC 61755 series.			

4.4 Part 27-3 plug connector interface for category A4a or A4d fibres

The M12-FO plug connector interface for category A4a or A4d fibres is described in Figure 5 and 6 and Table 9 to 11. All dimensions are under mated conditions.

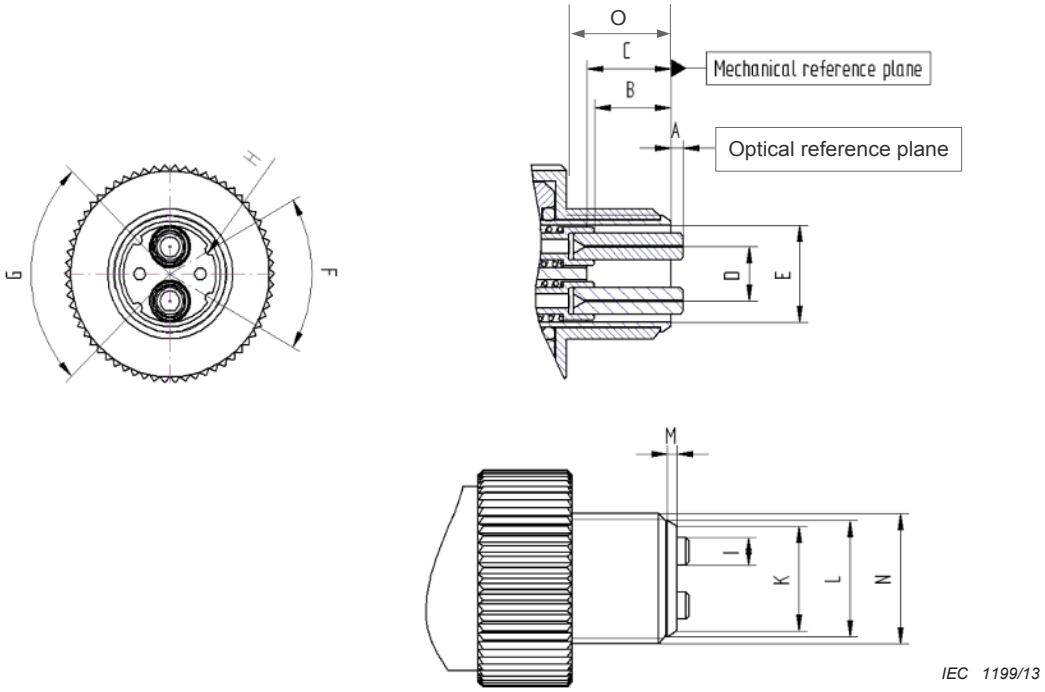

Figure 5 – Plug connector interface for category A4a or A4d fibres

Table 9 – Dimensions of plug connector interface for category A4a or A4d fibres

Reference	Dimensions mm			Remarks
	Minimum	Nominal	Maximum	
A[a]	1,0		1,3	Dimensions in unmated condition
B	7,0		7,5	
C	8,0		8,2	
D	4,95		5,05	
E	8,8		9,0	
F		60°		
G		90°		
H	R0,4		R0,5	
I	2,48		2,4 995	
K	9,6		9,8	
L	10,3		10,8	
M	0,8		1,0	
N	M12	M12		
O	10			

[a] Ferrule compression force shall be from 7,8 N to 11,8 N when the ferrule is compressed to a point where A is 0,50 mm ± 0,10 mm.

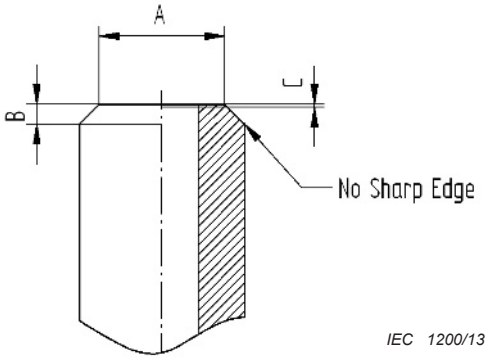

Figure 6 – Detail of polished ferrule endface for category A4a or A4d fibres

Table 10 – Dimensions for the details in Figure 6

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
A	1,8	2,0	Diameter
B	0,5	0,3	
C	0,03	–0,03	
NOTE An OI for category A4a or A4d fibres is not yet defined in the IEC 61755 series.			

Table 11 – Ferrule grades

Precision grade level	Dimensions outer diameter mm		Remarks
	Minimum	Maximum	
	2,4 700	2,4 995	Note
NOTE An OI for category A4a or A4d fibres is not yet defined in the IEC 61755 series.			

4.5 Part 27-4 adaptor connector interface

The M12-FO adaptor connector interface is described in Figure 7 and Table 12. All dimensions are under mated conditions.

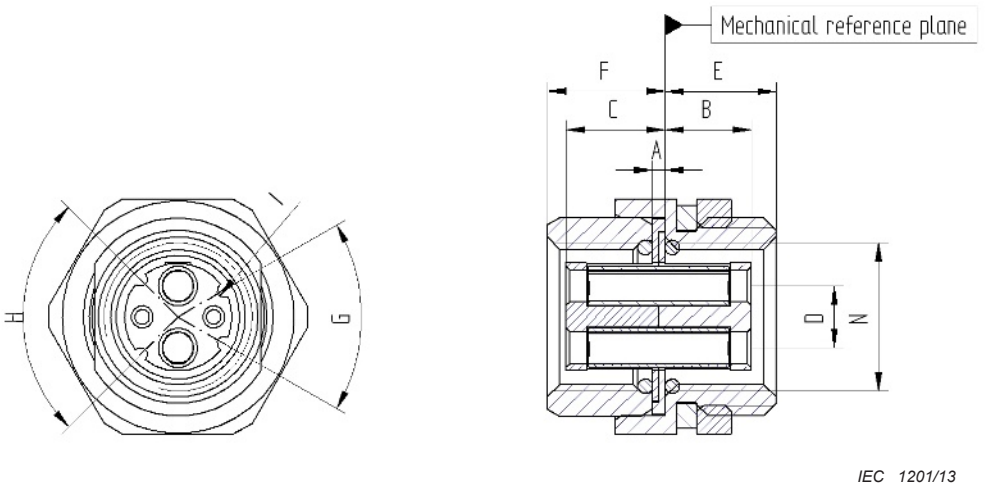

Figure 7 – Adaptor connector interface

Table 12 – Dimensions of adaptor connector interface

Reference	Dimensions mm			Remarks
	Minimum	Nominal	Maximum	
A	1,0		1,2	
B	7,0		7,2	
C	8,0		8,2	
D	4,95		5,05	
E	8,8		9,0	
F	9,3		9,5	
G		60°		
H		90°		
I	R0,6		R0,7	
N		M12		

4.6 Part 27-5 active device interface

The M12-FO active device interface is described in Figure 8 and Table 13. All dimensions are under mated conditions.

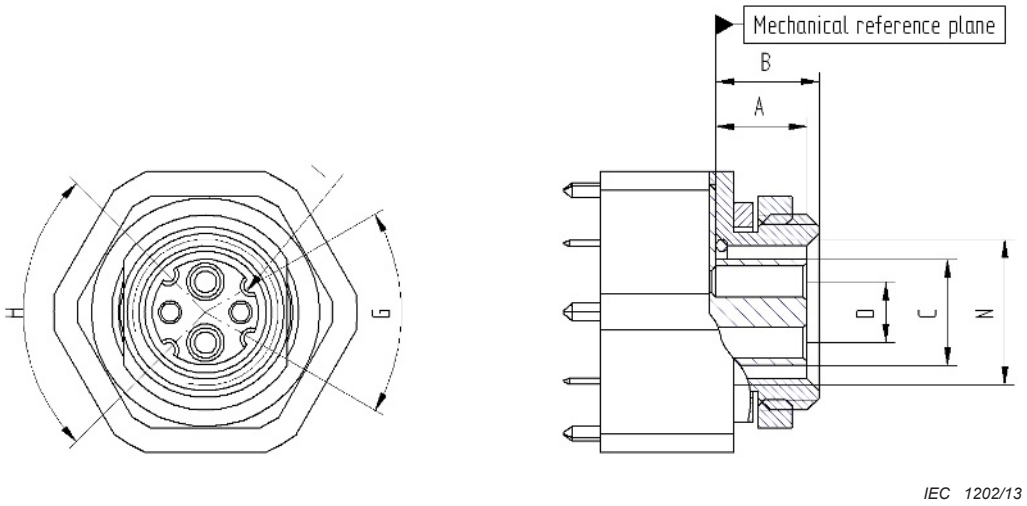

Figure 8 – Active device interface

Table 13 – Dimensions of active device interface

Reference	Dimensions mm			Remarks
	Minimum	Nominal	Maximum	
A	7,5		7,7	
B	8,3		8,5	
C	8,5		8,7	
D	4,95		5,05	
G	60°	60°		
H	90°	90°		
I	R0,6		R0,7	
N	M12	M12		

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

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

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