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Edition 1.2

2000-11

Edition 1:1996 consolidated with amendments 1:1999 and 2:2000

Fibre optic connector interfaces –

Part 7: Type MPO connector family

Interfaces de connecteurs pour fibres optiques –

Partie 7: Famille de connecteurs de type MPO

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INTERNATIONAL STANDARD

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE OPTIC CONNECTOR INTERFACES –

Part 7: Type MPO connector family

FOREWORD

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International Standard IEC 61754-7 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This consolidated version of IEC 61754-7 is based on the first edition (1996) [documents 86B/836/FDIS and 86B/926/RVD], its amendment 1 (1999) [documents 86B/1213/FDIS and 86B/1250/RVD] and amendment 2 (2000) [documents 86B/1324/FDIS and 86B/1372/RVD].

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

A bilingual version of this publication may be issued at a later date.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until 2004. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

FIBRE OPTIC CONNECTOR INTERFACES –

Part 7: Type MPO connector family

1 Scope

This part of IEC 61754 defines the standard interface dimensions for type MPO family of connectors.

2 Description

The parent connector for type MPO connector family is a multiway plug connector characterized by a rectangular ferrule normally 6,4 mm × 2,5 mm which utilizes two pins of 0,7 mm diameter as its alignment. It is applicable to a joint of multiple fibres up to 12 fibres by arraying them between two pin-positioning holes in the ferrule. The connector includes a push-pull coupling mechanism and a ferrule spring loaded in the direction of the optical axis. The connector has a single male key which may be used to orient and limit the relative position between the connector and the component to which it is mated.

Connector interfaces are configured using a female plug without pins, a male plug with pins fixed and an adaptor as shown in figure 1. The female plug is intermateable with the male plug.

Moreover, connector interfaces between the female plug and the male plug are configured by applying a backplane housing and a printed board housing instead of the adaptor.

Connector interfaces with different numbers of optical datum targets will intermate and will correctly align the lower defined numbers of optical datum targets.

3 Interfaces

This standard contains the following standard interfaces.

Interface 7-1: MPO female plug connector angled interface – Push/pull

Interface 7-2: MPO male plug connector angled interface – Push/pull

Interface 7-3: MPO adaptor interface – Push/pull

Interface 7-4: MPO female plug connector flat interface – Push/pull

Interface 7-5: MPO male plug connector flat interface – Push/pull

Interface 7-6: MPO backplane housing interface – Self-retaining

Interface 7-7: MPO printed board housing interface – Self-retaining

The following standards are intermateable:

Female plugs	Adaptors/housings	Male plugs
61754-7-1	61754-7-3	61754-7-2
61754-7-4	61754-7-3	61754-7-5
61754-7-1	61754-7-6 and 61754-7-7	61754-7-2
61754-7-4	61754-7-6 and 61754-7-7	61754-7-5

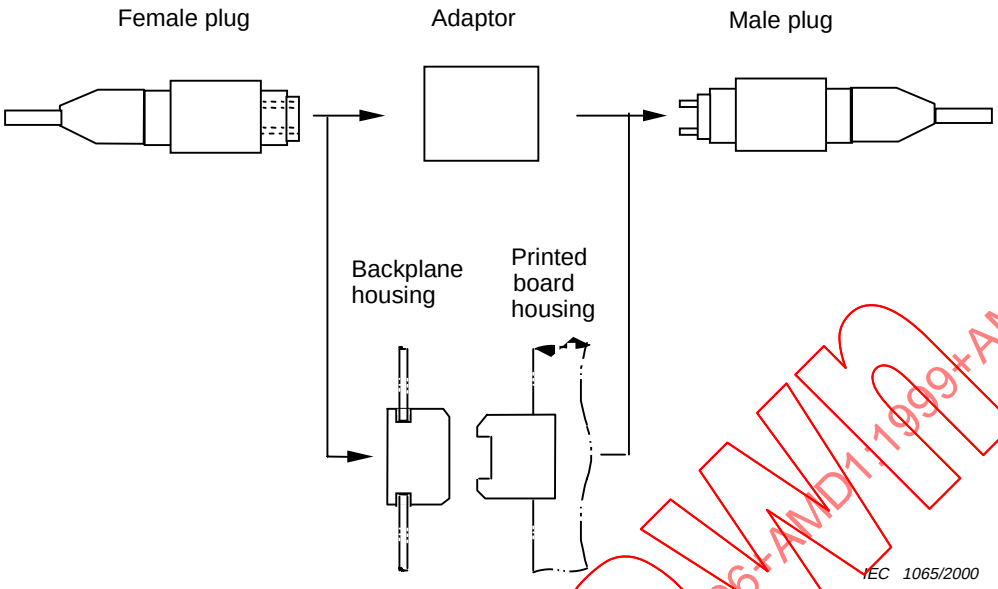


Figure 1 – MPO connector configurations

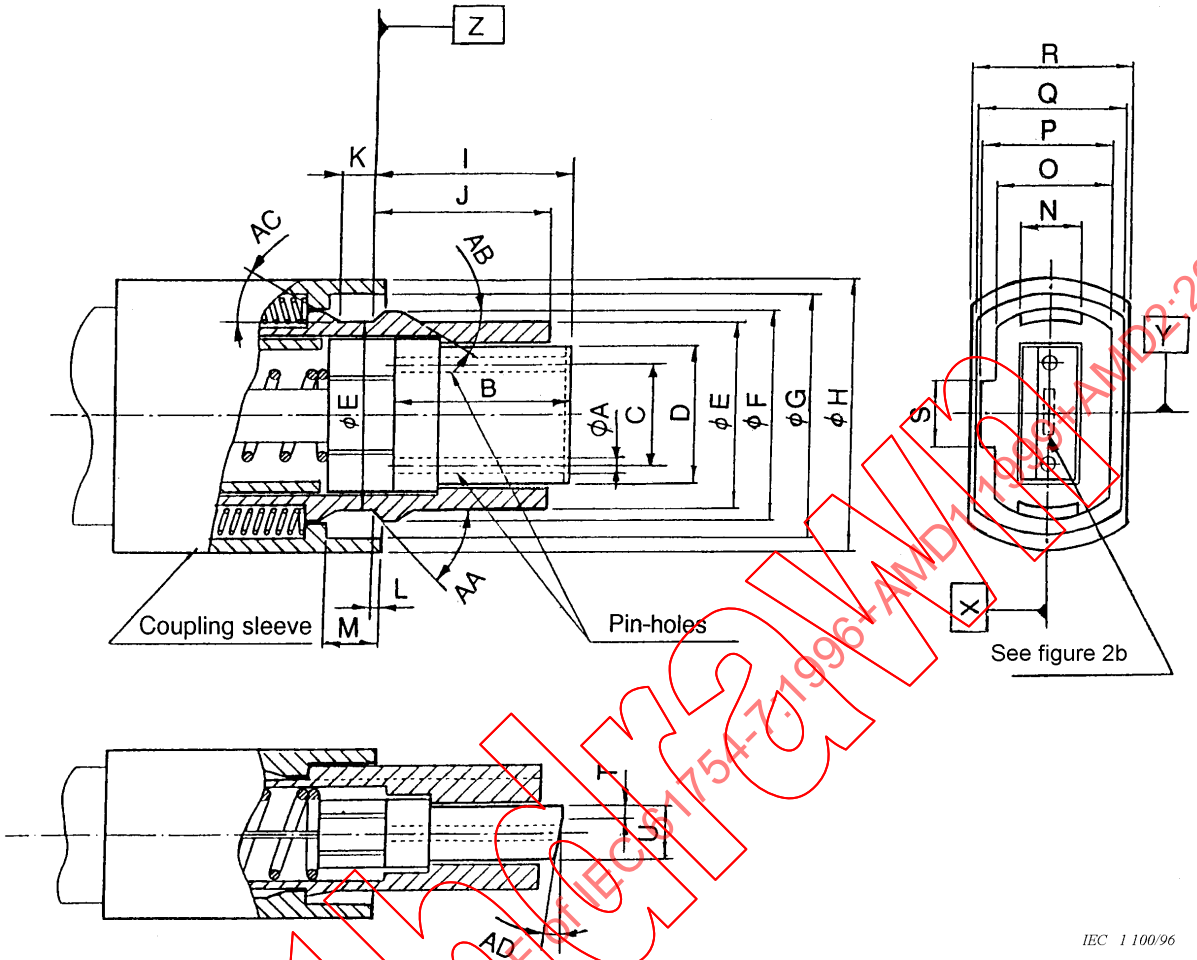


Figure 2a – MPO female plug connector angled interface

Table 1a – Dimensions of the MPO female plug connector angled interface

Reference	Dimensions		Notes
	Minimum	Maximum	
A	0,699 mm	0,701 mm	1
B	7,9 mm	8,1 mm	
C	4,597 mm	4,603 mm	2
D	6,3 mm	6,5 mm	
E	8,34 mm	8,54 mm	
F	9,49 mm	9,59 mm	
G	10,85 mm	11,05 mm	
H	12,19 mm	12,59 mm	
I	8,8 mm	9,2 mm	3
J	7,9 mm	8,1 mm	
K	1,4 mm	–	
L	0,2 mm	0,8 mm	4 and 5
M	2,4 mm	2,6 mm	
N	2,8 mm	3,0 mm	
O	4,89 mm	4,99 mm	
P	5,59 mm	5,69 mm	
Q	5,7 mm	–	
R	–	7,7 mm	
S	2,9 mm	3,1 mm	
T	–	0,8 mm	
U	2,4 mm	2,5 mm	
AA	42°	45°	
AB	–	45°	
AC	–	45°	
AD	7,5°	8,5°	

NOTE 1 Each pin-hole shall accept a gauge pin as shown in figure **2c** to a depth of 5,5 mm with a maximum force of 1,7 N. In addition, two pin-holes of a plug shall accept a gauge as shown in figure **2d** to a depth of 5,5 mm with a maximum force of 3,4 N.

NOTE 2 Dimension **C** is defined as the distance between two pin-hole centres.

NOTE 3 Dimension **I** is given for a fibre endface centre of a plug end when not mated. It is noticed that a ferrule is movable by a certain axial compression force, and therefore the dimension **I** is variable. Ferrule compression force shall be 7,8 N to 11,8 N when a position of the fibre endface from the datum **Z** is in the range of 8,2 mm to 8,4 mm.

NOTE 4 Coupling sleeve shall be movable by a certain axial compression force. Dimension **L** is given for a coupling sleeve end when not mated. Coupling sleeve compression force shall be 2,9 N to 6,9 N when a position of the coupling sleeve endface from datum **Z** is in the range of 0 to 0,1 mm.

NOTE 5 An adaptor coupling part shall be unlocked by a left-direction movement of a coupling sleeve, when it is separate from an adaptor. When the coupling sleeve is moved for unlocking, a position of the coupling sleeve endface shall be larger than 2,0 mm in the left direction from the datum **Z**.

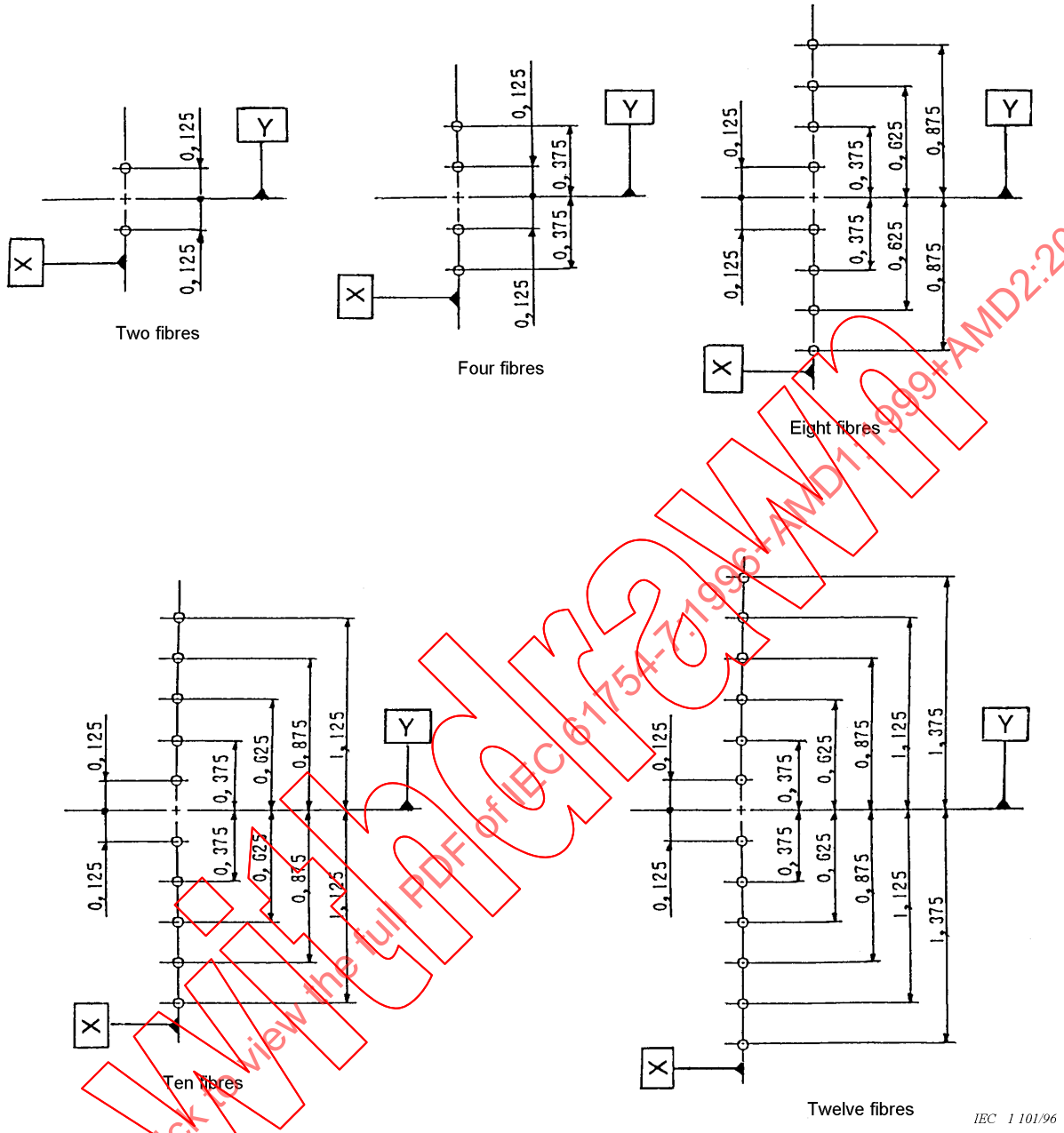


Figure 2b – Optical datum target location diagrams

NOTE The optical datum target location diagram is shown in the figure. Here, datum **X** is defined as the line passing through two pin-hole centres, and datum **Y** is defined as the line perpendicular to datum **X** and passing through the midpoint of two pin-hole centres.

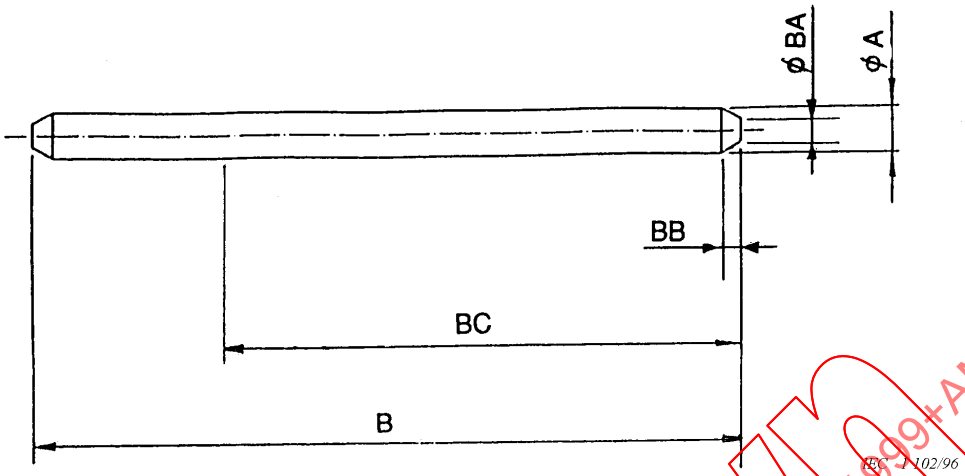


Figure 2c – Gauge pin

Table 1b – Dimensions of the gauge pin

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	0,6985	0,6990	1
B	10,8	11,2	2
BA	0,2	0,4	
BB	0,2	0,5	
BC	6,0	–	

NOTE 1 Surface roughness R_z = 0,1 µm for the length of dimension BC.

NOTE 2 Typical dimensions.

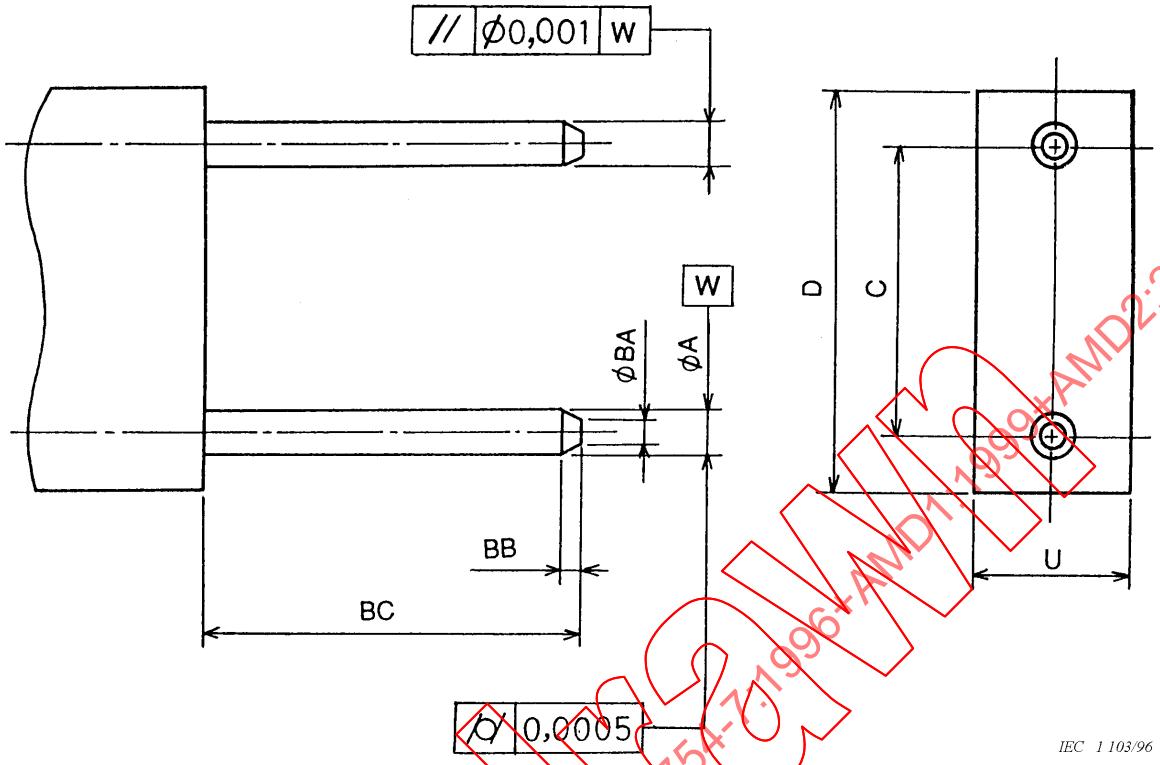


Figure 2d – Gauge for plug

Table 1c – Dimensions of the gauge for plug

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	0,6985	0,6990	for two pins, 1
C	4,5995	4,6005	
D	6,3	6,5	2
U	2,4	2,5	2
BA	0,2	0,4	
BB	0,2	0,5	
BC	6,0	6,5	

NOTE 1 Surface roughness R_z = 0,1 µm.

NOTE 2 Typical dimensions.

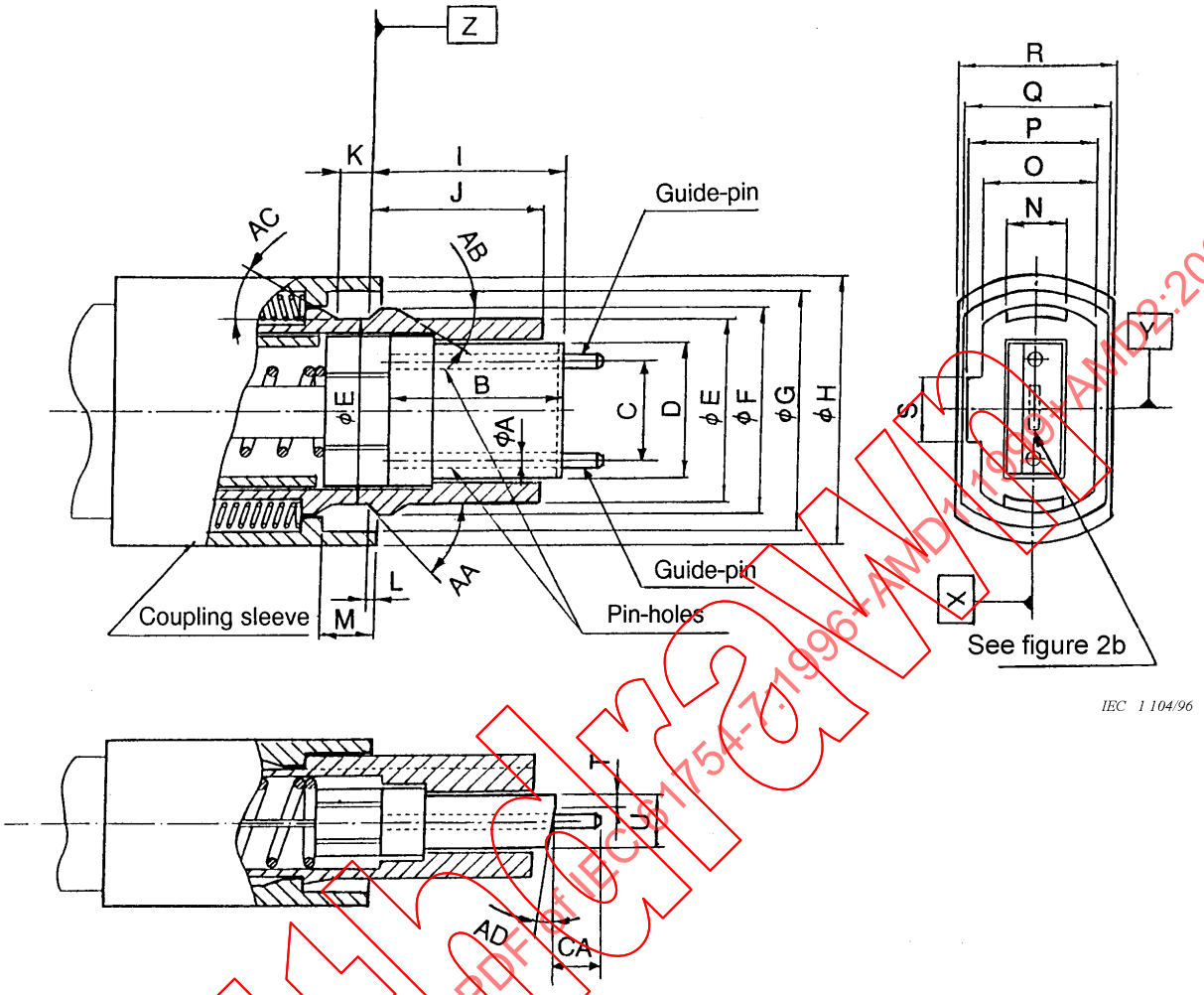


Figure 3a – MPO male plug connector angled interface

Table 2a – Dimensions of the MPO male plug connector angled interface

Reference	Dimensions		Notes
	Minimum	Maximum	
A	0,699 mm	0,701 mm	1
B	7,9 mm	8,1 mm	
C	4,597 mm	4,603 mm	2
D	6,3 mm	6,5 mm	
E	8,34 mm	8,54 mm	
F	9,49 mm	9,59 mm	
G	10,85 mm	11,05 mm	
H	12,19 mm	12,59 mm	
I	8,8 mm	9,2 mm	3
J	7,9 mm	8,1 mm	
K	1,4 mm	–	
L	0,2 mm	0,8 mm	4 and 5
M	2,4 mm	2,6 mm	
N	2,8 mm	3,0 mm	
O	4,89 mm	4,99 mm	
P	5,59 mm	5,69 mm	
Q	5,7 mm	–	
R	–	7,7 mm	
S	2,9 mm	3,1 mm	
T	–	0,8 mm	
U	2,4 mm	2,5 mm	
AA	42°	45°	
AB	–	45°	
AC	–	45°	
AD	7,5°	8,5°	
CA	1,6 mm	3,3 mm	

NOTE 1 Dimension **A** is the inner diameter of each pin-hole before two guide-pins are fixed in the plug. Each pin-hole shall accept a gauge pin as shown in figure **2c** to a depth of 5,5 mm with a maximum force of 1,7 N. In addition, two pin-holes of a plug shall accept a gauge as shown in figure **2d** to a depth of 5,5 mm with a maximum force of 3,4 N. After the guide-pins as shown in figure **3b** are fixed in the plug, each guide pin shall be retained with a minimum force of 3,4 N.

NOTE 2 Dimension **C** is defined as the distance between two pin-hole centres before two guide-pins are fixed in the plug.

NOTE 3 Dimension **I** is given for a fibre endface centre of a plug end when not mated. It is noticed that a ferrule is movable by a certain axial compression force, and therefore the dimension **I** is variable. Ferrule compression force shall be 7,8 N to 11,8 N when a position of the fibre endface from the datum **Z** is in the range of 8,2 mm to 8,4 mm.

NOTE 4 Coupling sleeve shall be movable by a certain axial compression force. Dimension **L** is given for a coupling sleeve end when not mated. Coupling sleeve compression force shall be 2,9 N to 6,9 N when a position of the coupling sleeve endface from datum **Z** is in the range of 0 to 0,1 mm.

NOTE 5 An adaptor coupling part shall be unlocked by a left-direction movement of a coupling sleeve, when it is separate from an adaptor. When the coupling sleeve is moved for unlocking, a position of the coupling sleeve endface shall be larger than 2,0 mm in the left direction from the datum **Z**.

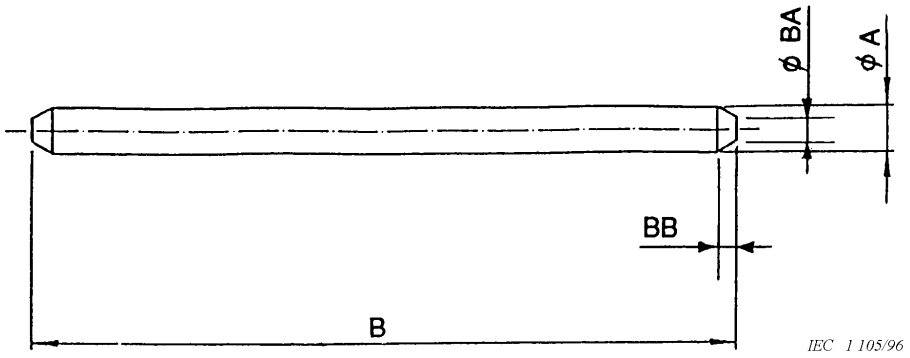


Figure 3b – Guide pin

Table 2b – Dimensions of the guide pin

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	0,697	0,699	See note
B	10,8	11,2	
BA	0,2	0,4	
BB	0,2	0,5	
NOTE Typical dimensions.			

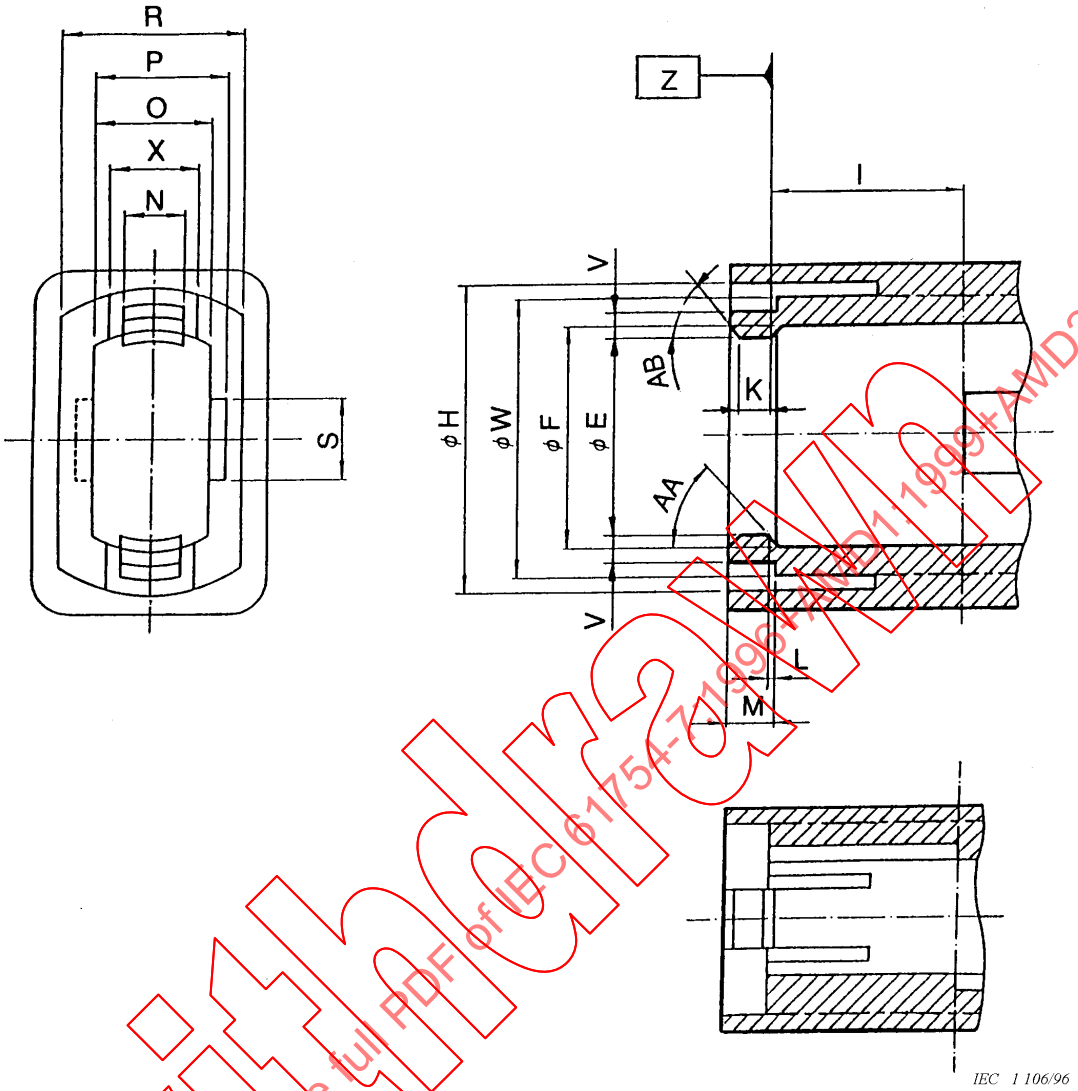


Figure 4 – MPO adaptor interface

NOTE The adaptor may be of a structure as shown by an alternate long and short dash line in the figure.

Table 3 – Dimensions of the MPO adaptor interface

Reference	Dimensions		Notes
	Minimum	Maximum	
E	8,54 mm	8,74 mm	
F	9,6 mm	9,7 mm	
H	12,6 mm	–	
I	8,2 mm	8,4 mm	
K	–	1,39 mm	
L	0	0,1 mm	
M	1,6 mm	2,0 mm	
N	2,4 mm	2,6 mm	
O	5,0 mm	5,1 mm	
P	5,7 mm	5,9 mm	
R	7,8 mm	–	
S	3,4 mm	3,6 mm	
V	0,95 mm	1,15 mm	
W	11,8 mm	12,2 mm	
X	3,4 mm	–	
AA	45°	48°	
AB	45°	50°	

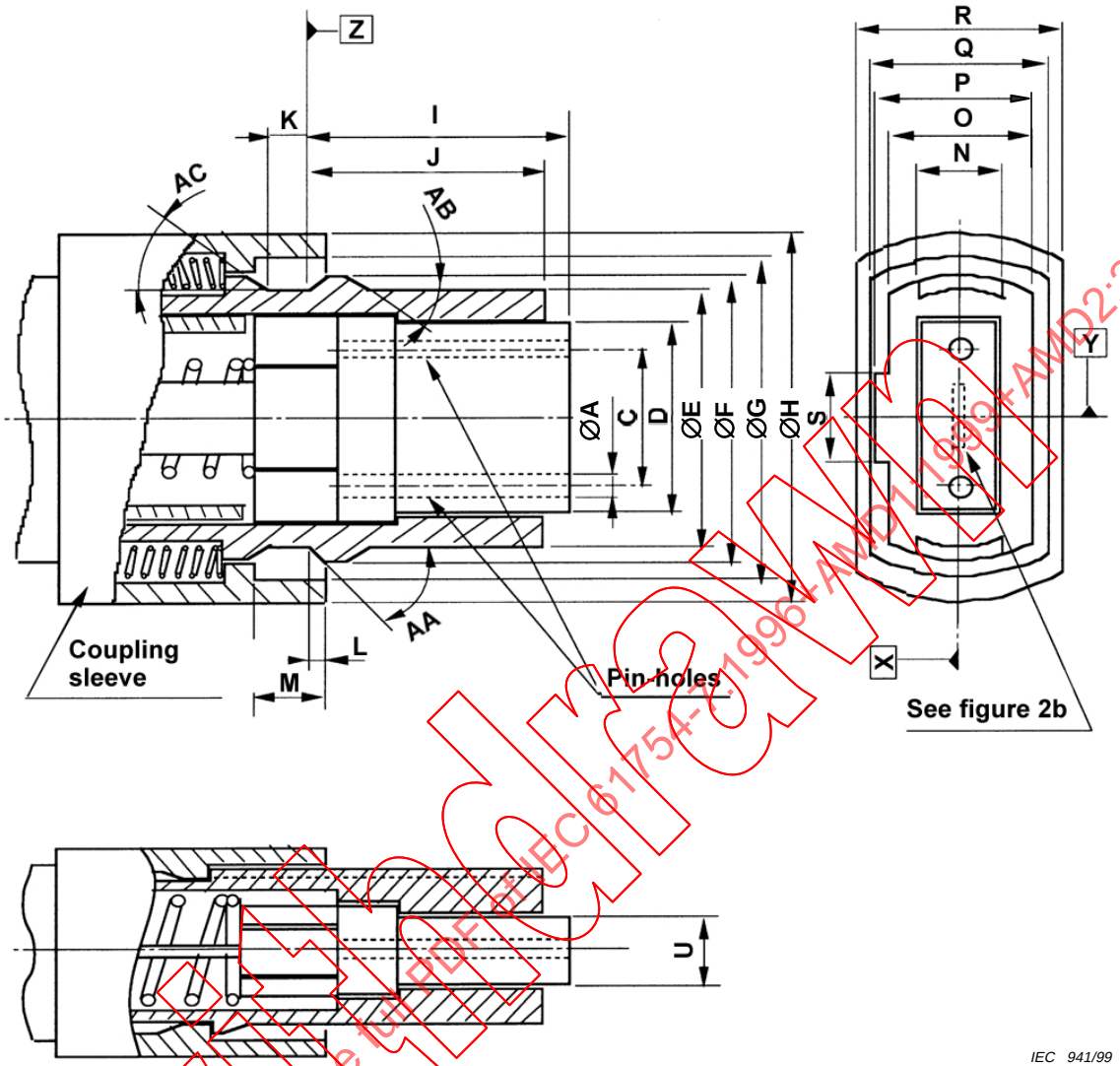


Figure 5 – MPO female plug connector flat interface

Table 4 – Dimensions of the MPO female plug connector flat interface

Reference	Dimensions		Notes
	Minimum	Maximum	
A	0,699 mm	0,701 mm	1
C	4,597 mm	4,603 mm	2
D	6,3 mm	6,5 mm	
E	8,34 mm	8,54 mm	
F	9,49 mm	9,59 mm	
G	10,85 mm	11,05 mm	
H	12,19 mm	12,59 mm	
I	8,8 mm	9,2 mm	3
J	7,9 mm	8,1 mm	
K	1,4 mm	–	
L	0,2 mm	0,8 mm	4 and 5
M	2,4 mm	2,6 mm	
N	2,8 mm	3,0 mm	
O	4,89 mm	4,99 mm	
P	5,59 mm	5,69 mm	
Q	5,7 mm	–	
R	–	7,7 mm	
S	2,9 mm	3,1 mm	
U	2,4 mm	2,5 mm	
AA	42°	45°	
AB	–	45°	
AC	–	45°	

NOTE 1 Each pin-hole shall accept a gauge pin as shown in figure **2c** to a depth of 5,5 mm with a maximum force of 1,7 N. In addition, two pin-holes of a plug shall accept a gauge as shown in figure **2d** to a depth of 5,5 mm with a maximum force of 3,4 N.

NOTE 2 Dimension **C** is defined as the distance between two pin-hole centres.

NOTE 3 Dimension **I** is given for a fibre endface centre of a plug end when not mated. It is noticed that a ferrule is movable by a certain axial compression force, and therefore the dimension **I** is variable. Ferrule compression force shall be 7,8 N to 11,8 N when a position of the fibre endface from the datum **Z** is in the range of 8,2 mm to 8,4 mm.

NOTE 4 Coupling sleeve shall be movable by a certain axial compression force. Dimension **L** is given for a coupling sleeve end when not mated. Coupling sleeve compression force shall be 2,9 N to 6,9 N when a position of the coupling sleeve endface from datum **Z** is in the range of 0 to 0,1 mm.

NOTE 5 An adaptor coupling part shall be unlocked by a movement away from the adaptor of a coupling sleeve, when it is separate from the adaptor. When the coupling sleeve is moved for unlocking, a position of the coupling sleeve endface shall be larger than 2,0 mm in the left direction from the datum **Z**.

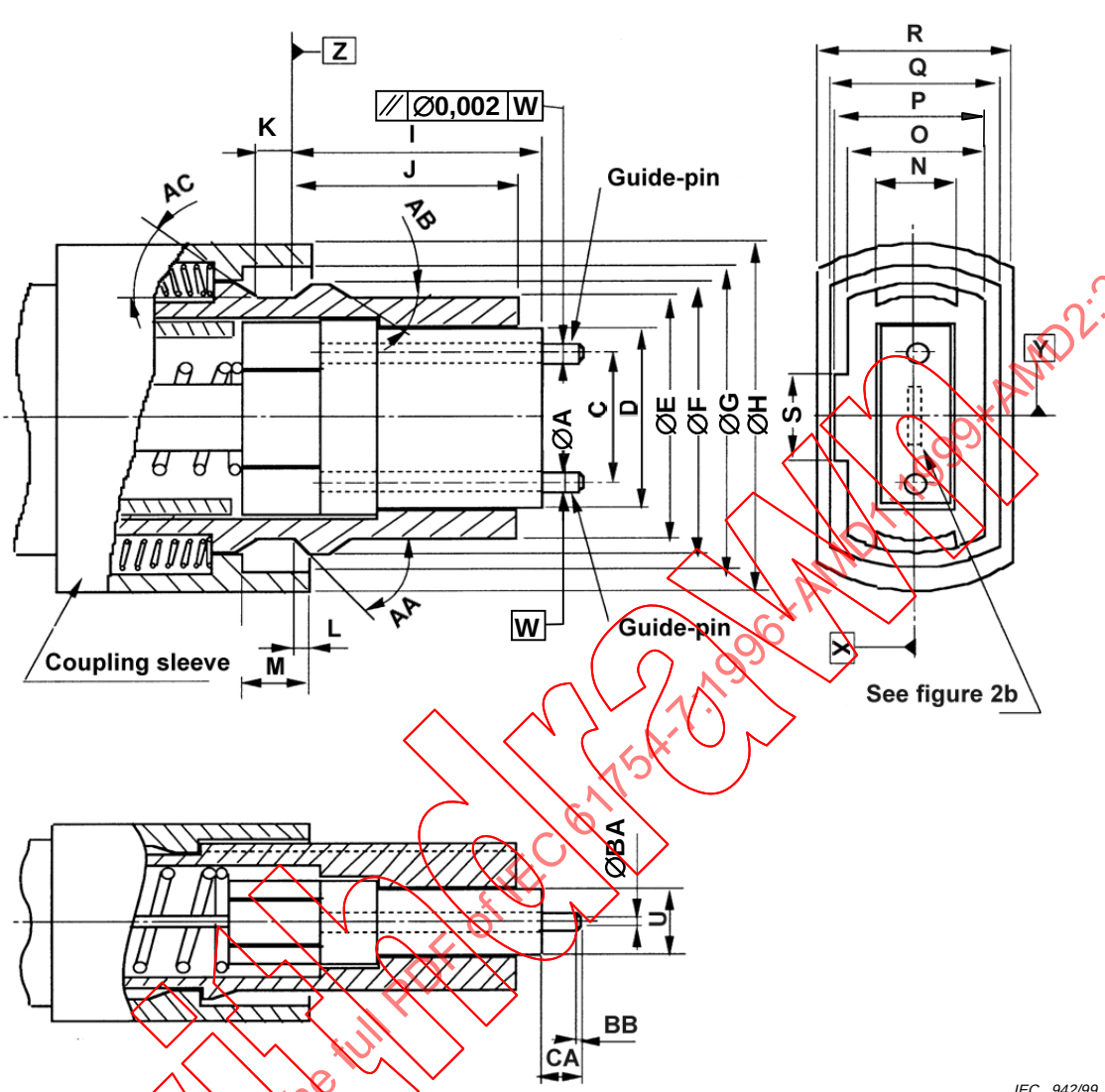


Figure 6 – MPO male plug connector flat interface

Table 5 – Dimensions of the MPO male plug connector flat interface

Reference	Dimensions		Notes
	Minimum	Maximum	
A	0,697 mm	0,699 mm	1
C	4,597 mm	4,603 mm	2
D	6,3 mm	6,5 mm	
E	8,34 mm	8,54 mm	
F	9,49 mm	9,59 mm	
G	10,85 mm	11,05 mm	
H	12,19 mm	12,59 mm	
I	8,8 mm	9,2 mm	3
J	7,9 mm	8,1 mm	
K	1,4 mm	–	
L	0,2 mm	0,8 mm	4 and 5
M	2,4 mm	2,6 mm	
N	2,8 mm	3,0 mm	
O	4,89 mm	4,99 mm	
P	5,59 mm	5,69 mm	
Q	5,7 mm	–	
R	–	7,7 mm	
S	2,9 mm	3,1 mm	
U	2,4 mm	2,5 mm	
AA	42°	45°	
AB	–	45°	
AC	–	45°	
BA	0,2 mm	0,4 mm	
BB	0,2 mm	0,5 mm	
CA	1,6 mm	3,3 mm	

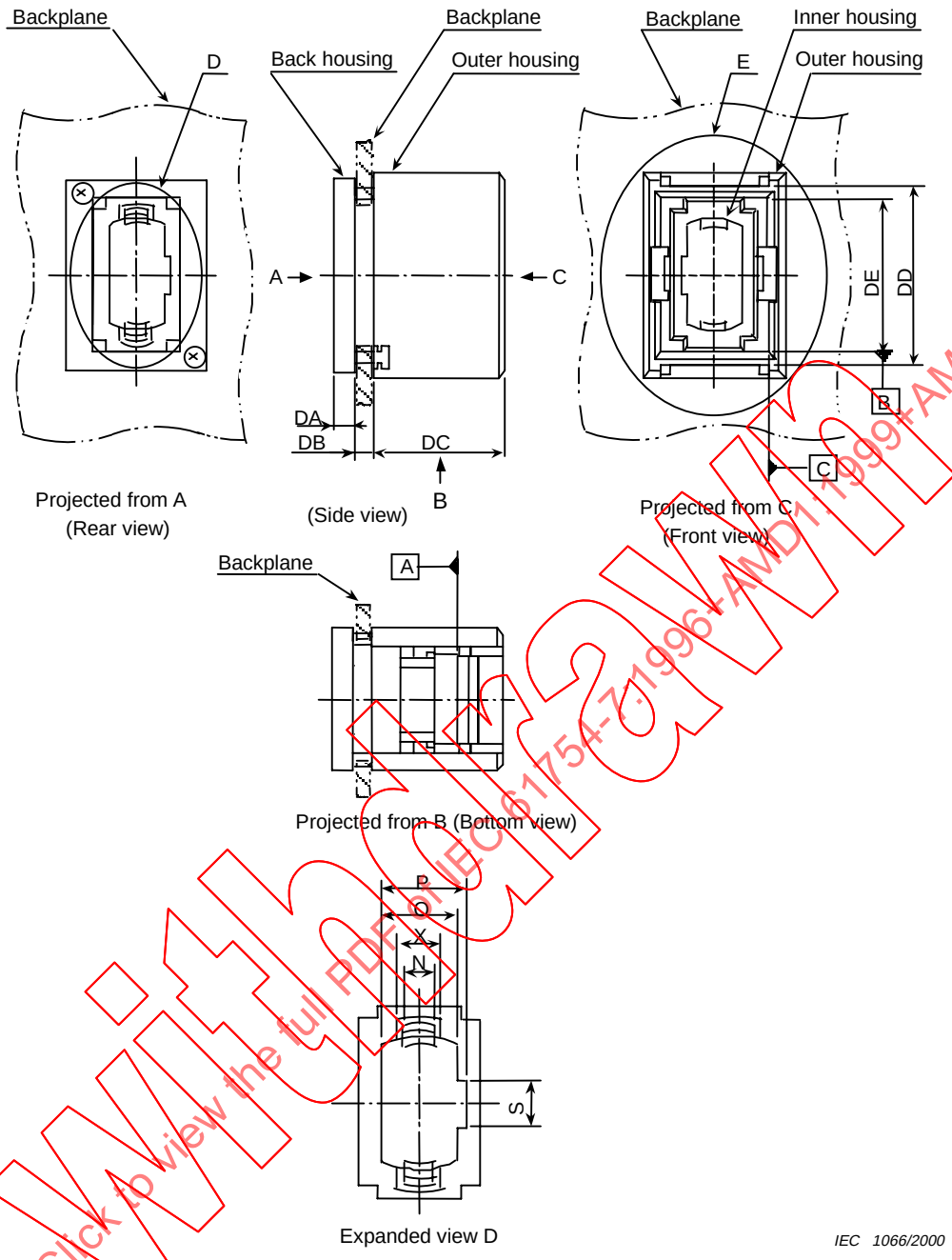
NOTE 1 Each guide-pin shall be retained with a minimum force of 3,4 N.

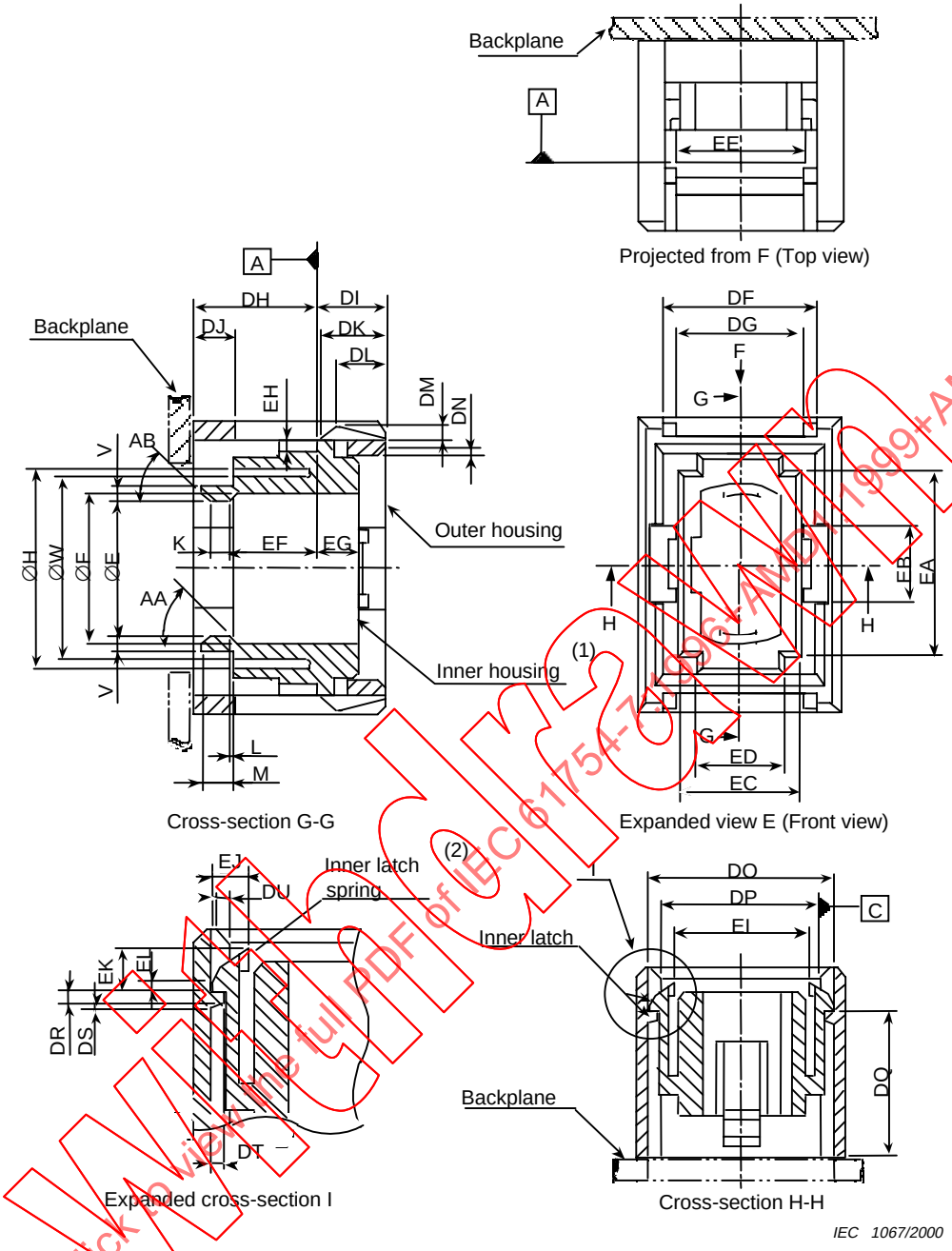
NOTE 2 Dimension **C** is defined as the distance between two guide-pin centres.

NOTE 3 Dimension **I** is given for a fibre endface centre of a plug end when not mated. It is noticed that a ferrule is movable by a certain axial compression force, and therefore the dimension **I** is variable. Ferrule compression force shall be 7,8 N to 11,8 N when a position of the fibre endface from the datum **Z** is in the range of 8,2 mm to 8,4 mm.

NOTE 4 Coupling sleeve shall be movable by a certain axial compression force. Dimension **L** is given for a coupling sleeve end when not mated. Coupling sleeve compression force shall be 2,9 N to 6,9 N when a position of the coupling sleeve endface from datum **Z** is in the range of 0 to 0,1 mm.

NOTE 5 An adaptor coupling part shall be unlocked by a movement away from the adaptor of a coupling sleeve, when it is separate from the adaptor. When the coupling sleeve is moved for unlocking, a position of the coupling sleeve endface shall be larger than 2,0 mm in the left direction from the datum **Z**.





NOTE 1 In the figure of cross-section **G-G**, the inner housing shall be movable to the right at least 0,9 mm under the condition that the inner latch is completed. In addition, the inner housing shall be movable at least 2 mm to the left when the inner latch is released.

NOTE 2 In the figure of expanded cross-section I, the inner latch spring shall be moved by more than 0,65 mm to the right when the inner latch is released or latched.

Figure 7 – MPO backplane housing interface

Table 6a – Dimensions of the MPO backplane housing

Reference	Dimensions		Notes
	Minimum	Maximum	
E	8,54 mm	8,74 mm	A part of diameter
F	9,6 mm	9,7 mm	A part of diameter
H	12,6 mm	–	A part of diameter
K	1,19 mm	1,39 mm	
L	0	0,1	
M	1,6 mm	2,0 mm	
N	2,4 mm	2,6 mm	
O	5,0 mm	5,1 mm	
P	5,7 mm	5,9 mm	
S	3,4 mm	3,6 mm	
V	0,95 mm	1,15 mm	
W	11,8 mm	12,2 mm	A part of diameter
X	3,4 mm	–	
AA	45°	48°	
AB	45°	50°	
DA			See table 6b
DB			See table 6b
DC	12,25 mm	12,35 mm	
DD	16,5 mm	16,6 mm	
DE	14,3 mm	14,4 mm	
DF	9,91 mm	10,01 mm	
DG	8,2 mm	8,4 mm	
DH	7,9 mm	8,1 mm	See note
DI	4,15 mm	4,45 mm	See note
DJ	2,65 mm	2,75 mm	
DK	4,1 mm	4,3 mm	
DL	3,35 mm	3,45 mm	
DM	0,9 mm	1,0 mm	
DN	0,55 mm	0,65 mm	
DO	11,55 mm	11,65 mm	
DP	9,91 mm	10,01 mm	
DQ	9,15 mm	9,25 mm	
DR	0,35 mm	0,45 mm	
DS	0,25 mm	0,35 mm	
DT	0,55 mm	0,65 mm	
DU	0,55 mm	0,70 mm	
EA	12,14 mm	12,2 mm	
EB	4,95 mm	5,05 mm	
EC	7,94 mm	8,00 mm	
ED	5,6 mm	5,8 mm	
EE	8,15 mm	8,25 mm	
EF	5,55 mm	5,65 mm	
EG	2,55 mm	2,65 mm	
EH	0,85 mm	0,95 mm	
EI	8,6 mm	8,7 mm	
EJ	1,45 mm	1,55 mm	
EK	1,9 mm	2,0 mm	
EL	0,35 mm	0,45 mm	

NOTE These dimensions are given when the inner housing is moved in its most left-side position under the condition that the inner latch is engaged.