

INTERNATIONAL STANDARD

Fibre optic interconnecting devices and passive components – Fibre optic
connector interfaces –
Part 7-1: Type MPO connector family – One fibre row

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING
DEVICES AND PASSIVE COMPONENTS –
FIBRE OPTIC CONNECTOR INTERFACES –****Part 7-1: Type MPO connector family –
One fibre row**

FOREWORD

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International Standard IEC 61754-7-1 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This first edition of IEC 61754-7-1, along with the first edition of IEC 61754-7-2, cancels and replaces the third edition of IEC 61754-7, published in 2008.

This first edition of IEC 61754-7-1 includes the one fibre row MPO variants, including the addition of active device receptacles and up-angled plugs.

The first edition of IEC 61754-7-2 will include the two fibre row MPO variants and related active device receptacles and up-angled plugs.

Following the publication of both IEC 61754-7-1 and IEC 61754-7-2, IEC 61754-7 will be withdrawn.

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

FDIS	Report on voting
86B/3794A/FDIS	86B/3826/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 the parts in the IEC 61754 series, under the general title *Fibre optic interconnecting devices and passive components – fibre optic connector interfaces*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

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

Part 7-1: Type MPO connector family – One fibre row

1 Scope

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

2 Description

The parent connector for type MPO connector family is a multiway plug characterized by a rectangular ferrule normally 6,4 mm × 2,5 mm which utilizes two pins of 0,7 mm diameter as its alignment. The variant in this standard provides a joint of 2 to 12 fibres by arraying them between two pin-positioning holes in the ferrule in a one-layer, (one-row) arrangement. 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.

There are two angled-interface plugs, one called down-angled and the other up-angled. They are defined for both male and female plugs. The up and down descriptors refer to the tilt direction of the ferrule's angled end-face relative to the fibre axis when looking toward the end-face with the plug's key feature on the top. For down-angled plugs, the angled surface faces slightly downward. For up-angled plugs, the angled surface faces slightly upward. These different angles affect intermateability for the two adaptor types. An opposed keyway adaptor mates two plugs with the keys in opposite orientations, for example one side keyway-up and the other keyway-down. In contrast, an aligned keyway adaptor mates two plugs with the keys at the same orientation. When using an opposed keyway adaptor with angled interfaces, two down-angled plugs or two up-angled plugs are connected. For aligned keyway adaptors with angled interfaces, one down-angled plug and one up-angled plug are connected.

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.

Additionally, the female plug interface is intermateable with the active device receptacle.

3 Interfaces

This standard contains the following standard interfaces:

- Interface IEC 61754-7-1-1: MPO female plug, down-angled interface for 2 to 12 fibres
- Interface IEC 61754-7-1-2: MPO male plug, down-angled interface for 2 to 12 fibres
- Interface IEC 61754-7-1-3: MPO adaptor interface – Opposed keyway configuration
- Interface IEC 61754-7-1-4: MPO female plug, flat interface for 2 to 12 fibres

- Interface IEC 61754-7-1-5: MPO male plug, flat interface for 2 to 12 fibres
- Interface IEC 61754-7-1-6: MPO backplane housing interface
- Interface IEC 61754-7-1-7: MPO printed board housing interface
- Interface IEC 61754-7-1-8: MPO adaptor interface – Aligned keyway configuration
- Interface IEC 61754-7-1-9: MPO active device receptacle, angled interface
- Interface IEC 61754-7-1-10: MPO active device receptacle, flat interface
- Interface IEC 61754-7-1-11: MPO female plug, up-angled interface for 2 to 12 fibres
- Interface IEC 61754-7-1-12: MPO male plug, up-angled interface for 2 to 12 fibres

The following interfaces are intermateable:

Female plugs	Adaptors/housings/receptacles	Male plugs
61754-7-1-1	61754-7-1-3	61754-7-1-2
61754-7-1-11	61754-7-1-3	61754-7-1-12
61754-7-1-1	61754-7-1-8	61754-7-1-12
61754-7-1-11	61754-7-1-8	61754-7-1-2
61754-7-1-4	61754-7-1-3 and 61754-7-1-8	61754-7-1-5
61754-7-1-1 or 61754-7-1-11	61754-7-1-6 and 61754-7-1-7	61754-7-1-2 or 61754-7-1-12
61754-7-1-4	61754-7-1-6 and 7-1-7	61754-7-1-5
61754-7-1-1	61754-7-1-9	N/A
61754-7-1-4	61754-7-1-10	N/A

NOTE Connector interfaces with 2 to 12 fibres will intermate and will correctly align the lower defined numbers of optical datum targets (see Figure 4)

Figure 1 shows MPO connector configurations.

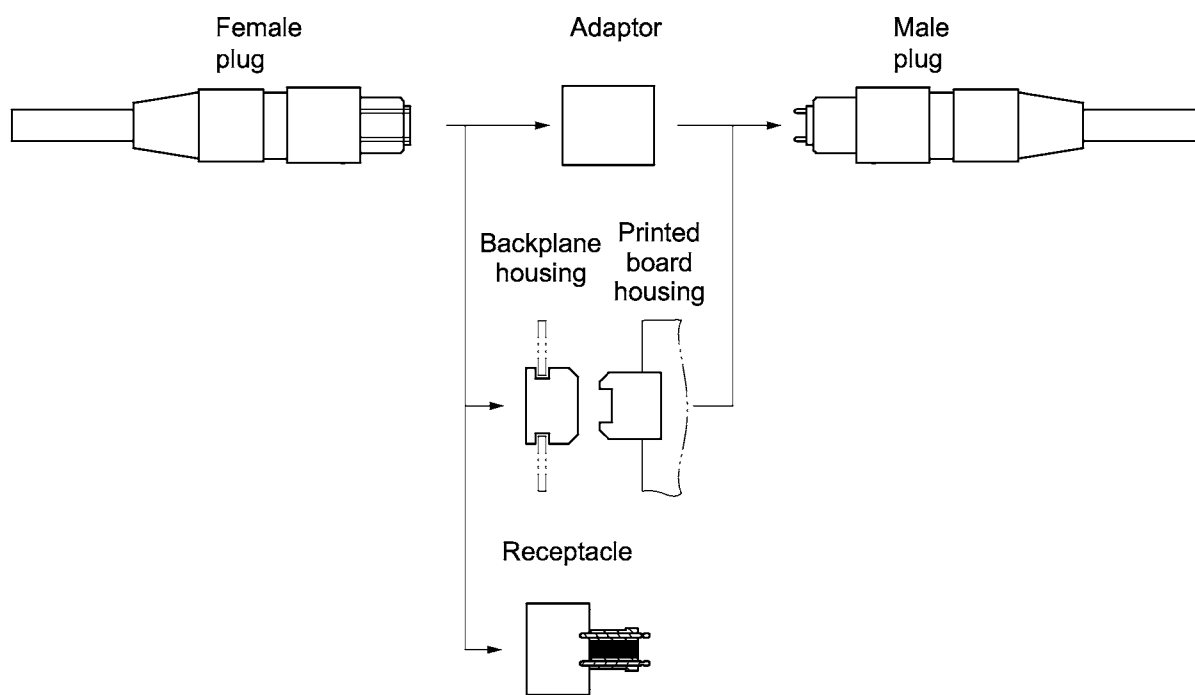


Figure 1 – MPO connector configurations

Figures 2 and 3 show down-angled and up-angled interface of the MPO female plug. Table 1 gives the dimensions of the MPO female plug, down- or up-angled interfaces.

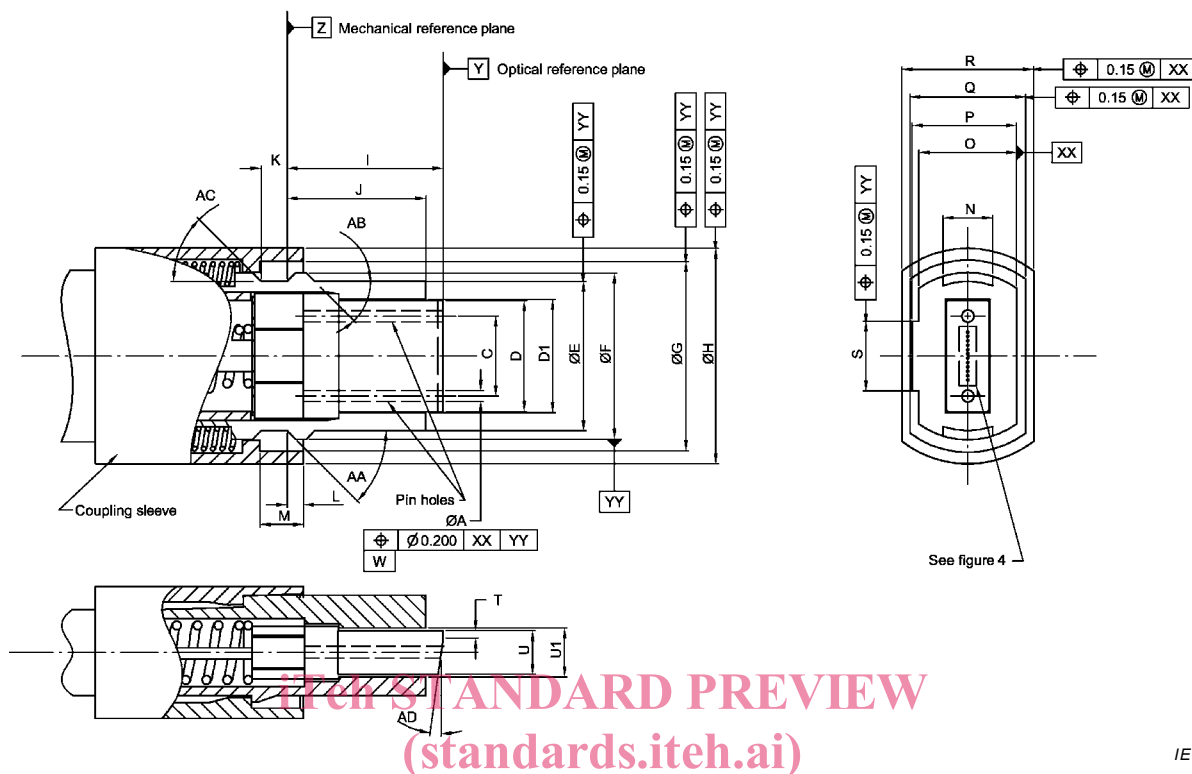


Figure 2 – MPO female plug, down-angled interface

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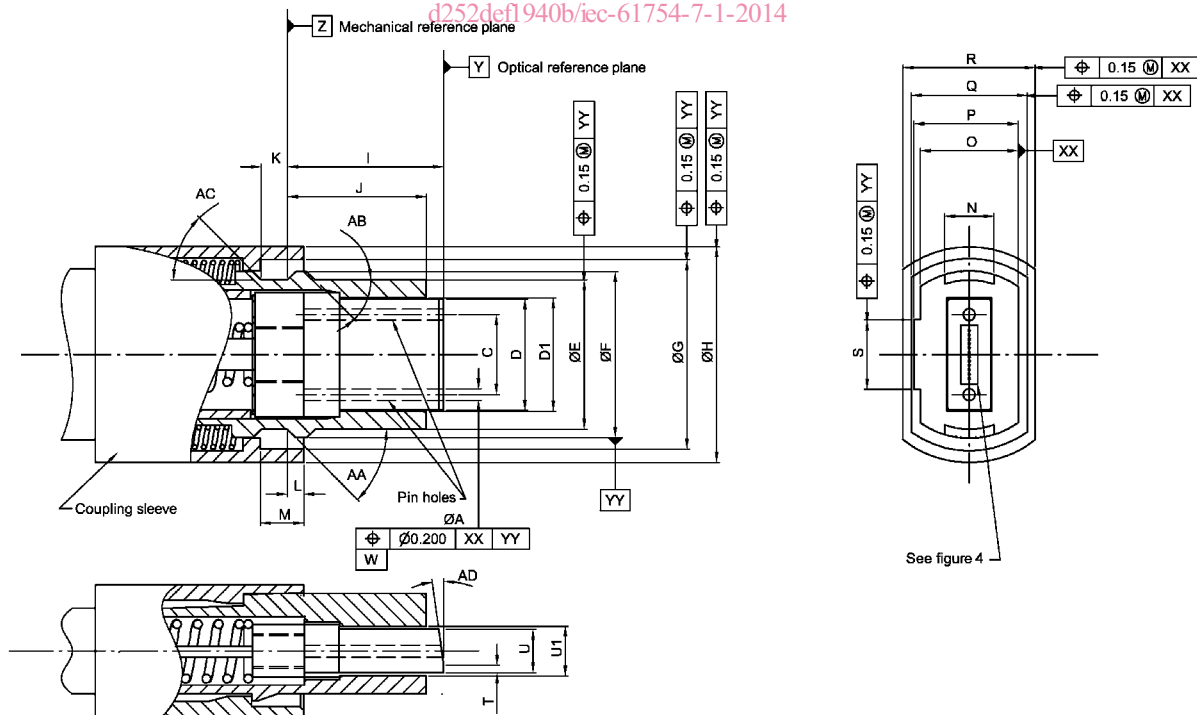


Figure 3 – MPO female plug, up-angled interface

Table 1 – Dimensions of the MPO female plug, down- or up-angled interfaces

Reference	Dimensions	
	Minimum	Maximum
A ^a	0,699 mm	0,701 mm
C ^b	4,597 mm	4,603 mm
D	6,3 mm	6,5 mm
D1 ^h	6,7 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 ^{c,f}	8,8 mm	9,2 mm
J	7,9 mm	8,1 mm
K	1,4 mm	–
L ^{d,e}	0,2 mm	0,8 mm
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
U1 ^h	2,7 mm	–
AA	42°	45°
AB	–	45°
AC	–	45°
AD ^{i,j}	7,5°	8,5°

- ^a Each pin-hole shall accept a gauge pin as shown in Figure 5 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 5 to a depth of 5,5 mm with a maximum force of 3,4 N.
- ^b Dimension C is defined as the distance between two pin-hole centres.
- ^c 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 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.
- ^d The 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 the position of the coupling sleeve endface from datum Z is in the range of 0 mm to 0,1 mm to the right or to the left of datum Z.
- ^e 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, the position of the coupling sleeve endface shall be larger than 2,0 mm in the left direction from the datum Z.
- ^f Dimension I is defined at the centre line between the two pin-hole centres.
- ^g The mating/unmating force between an MPO plug and adaptor shall not exceed 30,0 N.
- ^h Dimensions D1 and U1 are defined only at the end of the plug as shown.
- ⁱ The down-angled and up-angled plugs shall be clearly marked to distinguish them from each other and flat interfaces through the use of colour, labelling or other appropriate identification method. This identification method shall be visible when the plug is in the mated or unmated condition.
- ^j Since angled MPO plugs require a Y-offset of the fibre holes in relation to the guide pin holes, and the Y-offset is referenced from the epoxy window of the ferrule, the angle shall be polished as a down-angle from the epoxy window. The orientation of the ferrule epoxy window may be reversed in the MPO plug to produce the up-angle variant.

Figure 4 shows optical datum target location diagrams. Figure 5 shows the gauge pin and Table 2 shows its dimensions.

Dimensions in millimetres

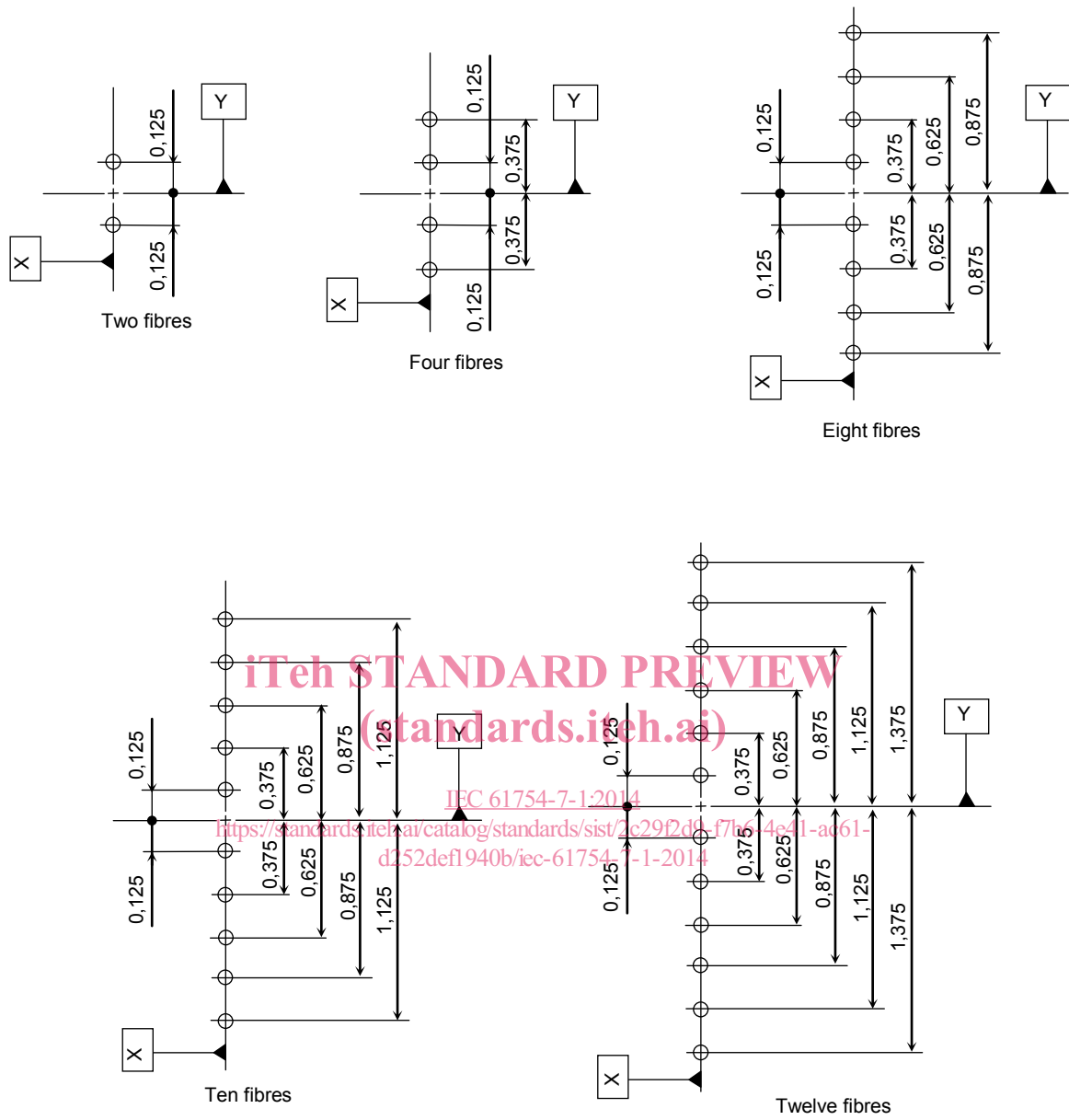


Figure 4 – Optical datum target location diagrams

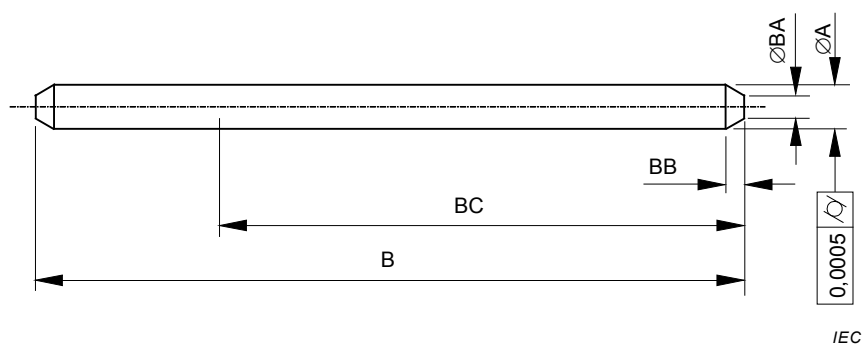


Figure 5 – Gauge pin

Table 2 – Dimensions of the gauge pin

Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	0,698 5	0,699 0	1
B	10,8	11,2	2
BA	0,2	0,4	
BB	0,2	0,5	
BC	6,0		

NOTE 1 Surface roughness $R_z = 0,1 \mu\text{m}$ for the length of dimension BC.

NOTE 2 Typical dimensions

Figure 6 shows the gauge for the plug and Table 3 shows its dimensions..

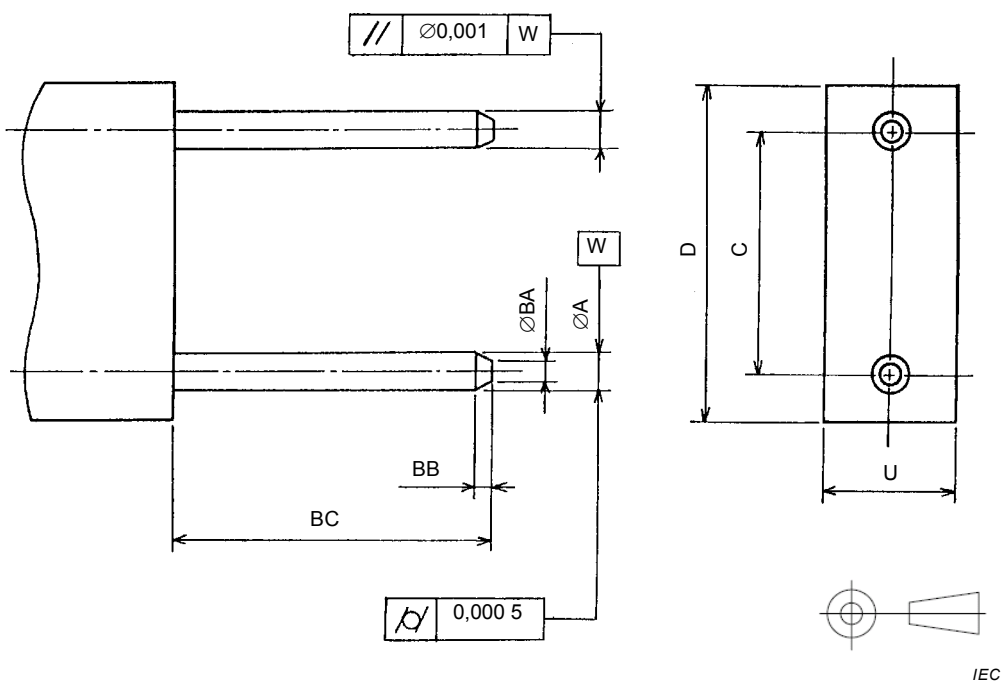


Figure 6 – Gauge for plug