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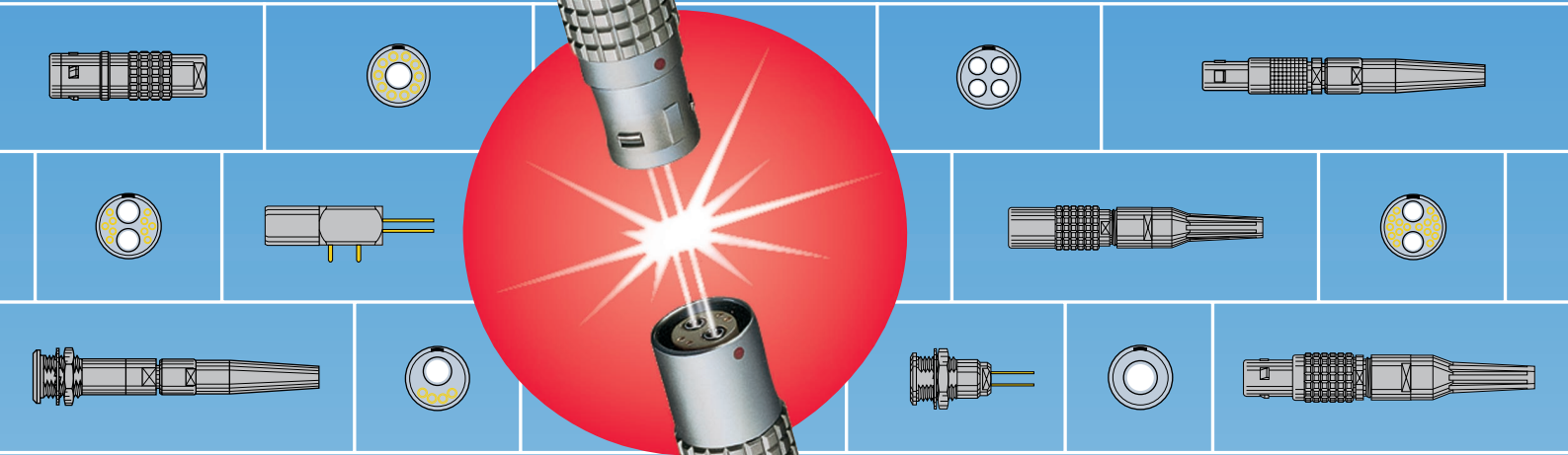
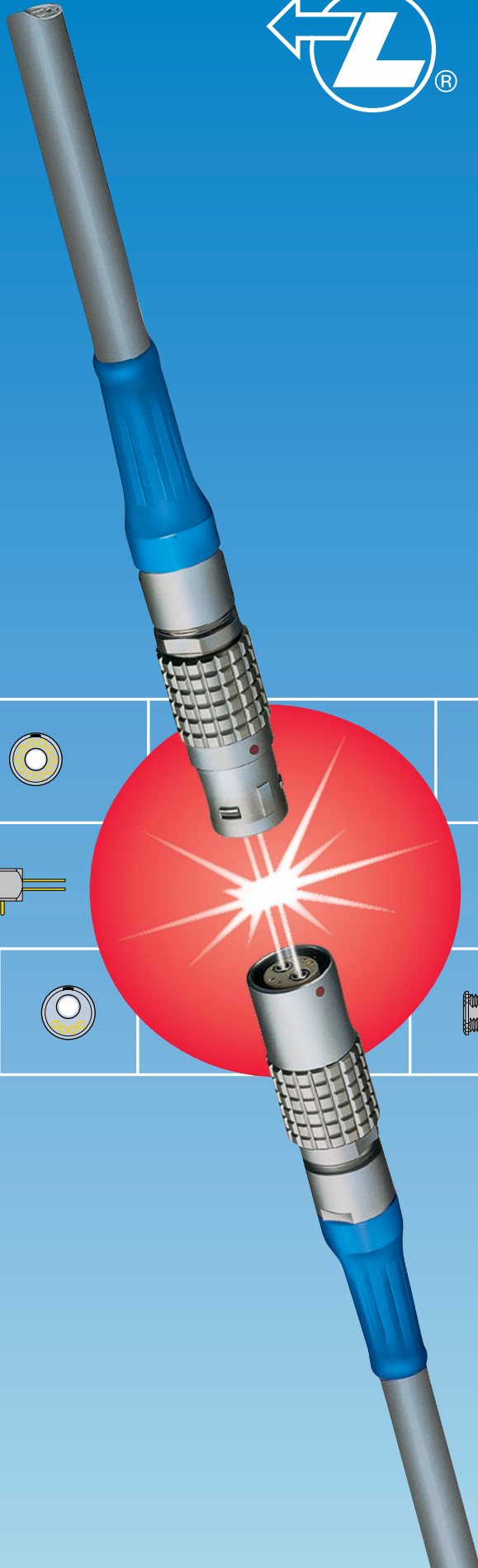
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**LEMO**®



## Single, Multi & Hybrid Fibre Optic Connectors

Dear Customers,

As far as data transmission is concerned, the superior characteristics of fibre optics compared to electrical cables are clearly recognised today.

The advantages of fibre optics include a transmission capacity 10 times greater than that of conventional coaxial cables, in only one tenth of the size. The reduced weight and space requirements make handling and line installation much easier. Furthermore, fibre optics is characterized by low signal amplitude loss, no susceptibility to electromagnetic interference, and an absence of interference between neighbouring lines. It also offers greater security due to the difficulty of intercepting optical signals.

The growing number of applications is more and more varied, and the annual growth rate of fibre optics is greater than 10%. Current applications of fibre optics include: telemetry, process control, data transmission, cable and closed circuit television, as well as laser signal transmission in medical applications.

However, most systems equipped with fibre optics also require simultaneous electrical energy for control operations and power supply. Current practice involves the use of separate electrical and fibre optic connectors.

The new technology developed by LEMO greatly simplifies this practice by combining electrical and fibre optic signals in a single connector.

LEMO can now offer you a full range of mixed electrical/fibre optic connectors for singlemode or multi-mode transmission. This product range is available with metal or plastic outer shells, as well as in a watertight version.

The range is completed by the addition of a single channel fibre optic connector series. All LEMO fibre optic connectors use a plug and socket push-pull self-latching connection system, obviating the need for plug to plug adaptors. This is a major advantage of the LEMO technology over its competitors.

With the aim of providing the best possible answers to your fibre optic needs, LEMO has established an important research and development facility to provide quick and effective solutions to your design requirements.

LEMO ISO 9001 certified has been improving its "quality culture" with the aim of reaching TQM. Offering zero defect products with due regard to the environment and meeting delivery requirements, are LEMO's two main concerns.



LEMO SA  
General Management



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## General Production Program

**Connectors**

- Unipole from 2 to 150 Amps
- Coaxial 50 and 75 Ω
- Coaxial 50 Ω (NIM-CAMAC)
- Coaxial 50 Ω for frequency → 12 GHz
- Multicoaxial 50 and 75 Ω
- Multipole from 2 to 106 contacts
- High Voltage 3, 5, 8, 10, 15, 30 and 50 kV cc
- Multi High Voltage 3, 5, and 10 kV cc
- Triaxial 50 and 75 Ω
- Quadrax
- Mixed: High Voltage (LV) + Low Voltage (LV)
- Mixed: Coax + LV
- Mixed: Triax + LV
- Thermocouple
- Multithermocouple
- Fibre optic single-mode
- Fibre optic multi-mode
- Mixed: fibre optic + LV
- Mixed: fibre optic + coax + LV
- Fluidic
- Multifluidic
- Mixed: fluidic + LV
- Subminiature
- Miniature
- Printed circuit board
- Remote handling
- Watertight
- Sealed (pressure and/or vacuum)
- With plastic outer shell
- With aluminium outer shell
- With stainless steel outer shell
- With special radiation resistant insulator material
- With screw thread coupling for very high pressure
- With microswitch

**Patch Panels**

- For audio-mono applications: triax
- For audio-mono applications: 3 contacts
- For audio-stereo applications: quadrax
- For audio-stereo applications: 6 contacts
- For video applications: coax 75 Ω

**Patch Panels**

- For video HDTV applications: 3 coax 75 Ω + 2LV
- For fibre optic applications

**Adaptors**

- For BNC, C, UHF, N, CINCH, GEN-RADIO connectors
- For TNC, SMA connectors

**Accessories**

- Insulator for crimp contacts
- Crimp contacts
- Coaxial contacts
- Triaxial contacts
- Fibre optic contacts
- Fibre optic ferrules
- Caps and bend reliefs
- Insulating washers
- Double plastic panel washers
- Locking washers
- Tapered washers
- Hexagonal nuts
- Conical nuts
- Round nuts
- Notched nuts
- Earthing washers
- Lead-through with cable collet

**Tooling**

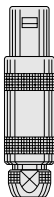
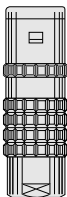

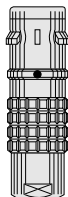
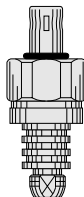
- Spanners
- Spanners for assembling plug
- Assembly tool
- Pliers
- Tap
- Crimping tools
- Positioners
- Crimping dies
- Extractors
- Insertion testing tool for crimp contacts
- Fibre optic termination workstation
- Fibre optic polishing tools

**On request**

- Filtered connectors
- Connectors with special alloy housing
- Mixed special connectors
- Assembly onto cable

● Connectors, accessories and tools found in this catalogue.

## Main Characteristics and Types

					
Series	STANDARD	WATERTIGHT	KEYED	KEYED WATERTIGHT	SCREW
	01 (Minax)	0E to 6E	00 (multipole)	0K to 5K	03
	00 (NIM-CAMAC)	3T	0B to 5B	0F to 5F	0V to 5V
	00 (unipole)	4M	2G/5G	2N to 5N	0W to 5W
	05 / R0				2U to 5U
	0S to 6S				
	0A / 4A				
	1D / 2C				
	1Y-3Y-6Y				
Latching	Push-Pull				Screw
Key	Stepped insulator (Half-Moon)		Key (G) or other key-way code		Key (G) or stepped insulator (Half-Moon)
Shell	Metal or plastic	Metal	Metal or plastic	Metal	Metal
Insulator	Hermaphroditic or cylindrical		Cylindrical		Hermaphroditic or cylindrical
Contact	Solder or print		Solder, crimp or print		Solder (crimp or print)

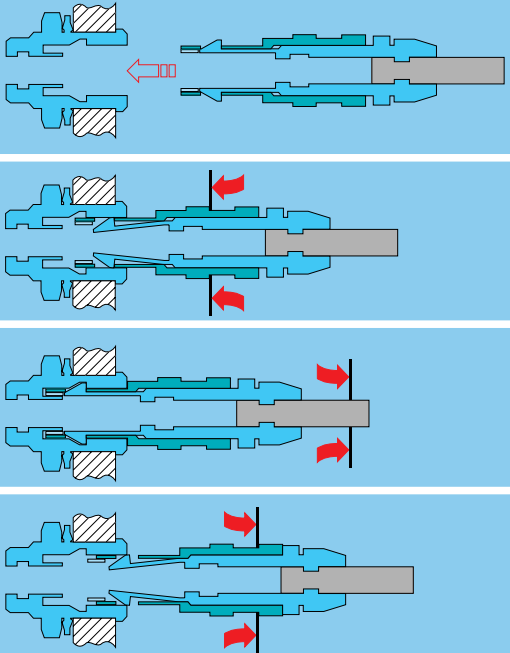
## Series and Types

	Series	Types																				
		Unipole	Coaxial 50 Ω	Coaxial 75 Ω	Multipole	High Voltage	Triaxial 50 Ω	Triaxial 75 Ω	Quadtrax	Multi HV	Multi Coaxial	Mixed HV+LV	Mixed Coax+LV	Mixed Triax+LV	Fibre Optic	Multi FO	Mixed FO+LV+...	Fluidic	Multi fluidic	Mixed fluidic+LV	Thermocouple	
Standard	01		●																			
	00	●	●				●											●				
	05					●																
	R0		●																			
	0A		●	●																		
	0S	●	●		●	●	●															●
	1S	●	●	●	●	●	●															●
	2S	●	●	●	●	●	●	●				●										●
	3S	●	●	●	●	●	●	●		●		●	●									
	4S	●	●	●	●	●	●	●		●	●	●	●									
	5S	●	●	●	●					●	●	●	●									
	6S				●						●		●									
	1D								●													
	2C		●		●																	
4A							●															
1Y-3Y-6Y					●																	
Watertight	0E	●	●		●	●															●	
	1E	●	●	●	●	●															●	
	2E	●	●	●	●	●	●				●										●	
	3E	●	●	●	●	●	●		●		●	●										
	4E	●	●	●	●		●	●				●	●									
	5E	●			●				●	●	●	●	●									
	6E				●					●		●	●									
	3T			●				●														
4M						●	●															
Keyed	00				●										●						●	
	0B				●										●			●			●	
	1B				●						●										●	
	2B				●					●	●	●	●	●		●			●	●	●	
	3B				●						●	●	●	●		●	●		●	●	●	
	4B				●					●	●	●	●	●		●	●		●	●		
	5B				●					●	●	●	●	●		●	●					
	2G				●																	
5G								●														
Keyed watertight	0K				●										●			●			●	
	1K				●						●										●	
	2K				●					●	●	●	●			●			●	●	●	
	3K			●	●						●	●	●	●		●	●		●	●	●	
	4K				●					●	●	●	●	●		●	●		●	●		
	5K				●					●	●	●	●	●		●	●					
	0F to 5F				●																	
2N to 5N	●	●	●	●		●	●								●	●						
Screw	03		●		●																	
	0V	●	●		●		●														●	
	1V	●	●	●	●		●														●	
	2V	●	●	●	●		●	●				●									●	
	3V	●	●	●	●		●	●		●		●	●									
	4V	●	●	●	●		●	●				●	●									
	5V	●			●				●	●	●	●	●									
	0W to 5W				●						●	●	●	●		●	●			●	●	
	2U to 5U				●										●	●	●					

Note: ● = included in this catalogue, ● = available but not included in this catalogue.

## LEMO's Push-Pull Self-Latching Connection System

This self-latching system is renowned worldwide for its easy and quick mating and unmating features. It provides absolute security against vibration, shock or pull on the cable, and facilitates operation in a very limited space.

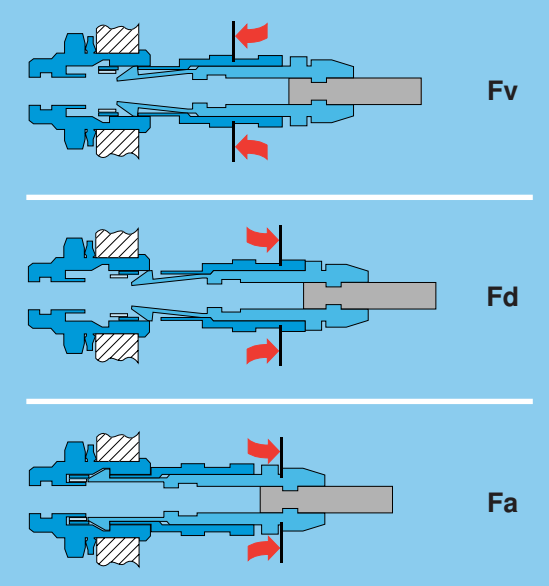


The LEMO Push-Pull self-latching system allows the connector to be mated by simply pushing the plug axially into socket.

Once firmly latched, connection cannot be broken by pulling on the cable or any other component part other than the outer release sleeve.

When required, the connector is disengaged by a single axial pull on the outer release sleeve. This first disengages the latches and then withdraws the plug from the socket.

### Mechanical latching characteristics



**F<sub>v</sub>**

**F<sub>d</sub>**

**F<sub>a</sub>**

#### 00, B series

Force (N)	Series					
	00	0B	2B	3B	4B	5B
F <sub>v</sub>	9	10	15	17	39	48
F <sub>d</sub>	7	8	12	14	38	38
F <sub>a</sub>	120	250	300	550	700	800

#### K watertight series

Force (N)	Series				
	0K	2K	3K	4K	5K
F <sub>v</sub>	14	20	32	65	85
F <sub>d</sub>	9	13	25	40	60
F <sub>a</sub>	250	400	550	700	800

**Notes:** Forces were measured on outer shells **not fitted with contacts**.

F<sub>v</sub>: average latching force


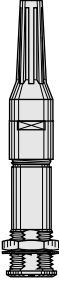
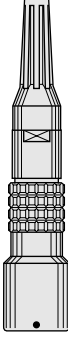
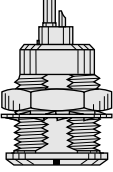
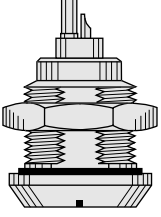
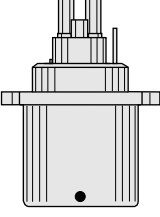


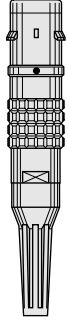
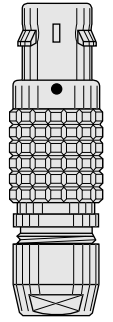
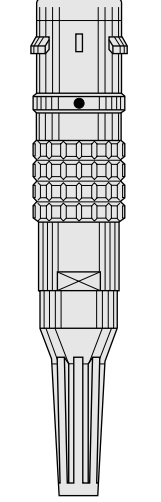
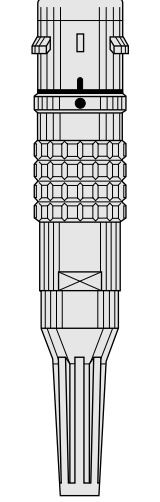
F<sub>d</sub>: average unmating force  
with axial pull on the outer shell

F<sub>a</sub>: average pull force  
with axial pull on the collet nut



## Fibre Optic Connectors Production Program

The production program is divided into 12 series of connectors. Their main characteristics and applications are shown below.

						
						
<b>Series</b>	00	0B	0K	2B to 5B	2K to 5K	3K.93C
<b>Latching</b>	Push-Pull					With «W» key-way
<b>Shell</b>	Metal			Metal or plastic	Metal	
<b>Feature</b>	Miniature		Watertight to IP68		Watertight to IP68	Watertight to IP68
<b>Cable Construction</b>	Single fibre			Multi fibre or Mixed optical/electrical		Mixed HDTV optical/electrical
<b>Contact Type</b>	F4	F3	F2	F1	F2	F2
<b>Fibre Type</b>	Single-mode or Multi-mode fibres $\leq 100/140\mu\text{m}$	Multi-mode fibres $\geq 100/140\mu\text{m}$	Single-mode or Multi-mode fibres $\leq 100/140\mu\text{m}$	Multi-mode fibres $\geq 100/140\mu\text{m}$	Single-mode or Multi-mode fibres $\leq 100/140\mu\text{m}$	Single-mode or Multi-mode fibres $\leq 100/140\mu\text{m}$
<b>Mean insertion loss</b>	0.10 dB (s/m) 0.25 dB (m/m)	1.13 dB	0.10 dB (s/m) 0.25 dB (m/m)	1.13 dB	0.10 dB (s/m) 0.25 dB (m/m)	0.10 dB (s/m) 0.25 dB (m/m)
<b>Ferrule Material</b>	Ceramic	Ceramic or metal	Ceramic	Ceramic or metal	Ceramic	Ceramic
<b>Interface Type</b>	Spherical with physical contact of the fibre end face (PC)	Spherical, non-contact with controlled gap of the fibre end face	Spherical with physical contact of the fibre end face (PC)	Spherical, non-contact with controlled gap of the fibre end face	Spherical with physical contact of the fibre end face (PC)	Spherical with physical contact of the fibre end face (PC)
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## Introduction

This catalog gives the complete description of LEMO fibre optic connectors. Our manufacturing program has been extended to 12 series with specific mating and environmental characteristics.

Each series includes a wide variety of plugs, sockets or housings for electro-optic devices available in a large choice of combinations of fibre optic and electrical contacts within the same housing.

Shells are adapted to all round cables to a maximum diameter of 25 mm.

LEMO connectors feature ceramic or metal ferrules for the fibre optic contacts to provide alignment for both single-mode and multi-mode fibres.

They are manufactured to the highest precision in order to ensure optimum optical performances even in the most severe applications.

Numerous accessories as well as a complete range of tools for fibre optic termination, are available.

### The 00 Series

The characteristic feature of this connector series is the small size requiring minimum mounting space requirement.

Connectors are suitable for use with single fibre cables fitted with single-mode or multi-mode fibres.

### The 0B Series

A simple and proven construction with ceramic or metallic ferrules in a fibre optic contact primarily intended for use with large size multi-mode fibres ranging from 140 to 1500 micron external diameters.

### The 0K Series

This series is watertight (IEC 60529/IP 66-IP 68) and is ideal for use in harsh environments.

It uses the standard LEMO F2 fibre optic contact which has undergone extensive mechanical, optical and environmental testing.

Connectors are suitable for use with single fibre cables fitted with single-mode or multi-mode fibres.

## Propagation of Light and Fibre Type

The diagrams show the typical transmission characteristic of single-mode and multi-mode fibres. In multi-mode fibres, the effect of modal dispersion causes a spread in the received pulse and therefore limits the bandwidth of the transmission system (Fig. 1).

If the fibre core is  $< 10 \mu\text{m}$  and the wavelength is  $\geq 1300 \text{ nm}$ , then only the fundamental mode is transmitted in the single-mode fibre (Fig. 2).

The dispersion effects of single-mode fibres are very small and consequently they offer higher bandwidths when compared with multi-mode fibres. However, multi-mode fibres are usually ideal for short distance applications because they require less input optical power and can be driven by simple low cost LEDs.

### The 2B to 5B Series

These connectors series range from 2B to 5B, and have been designed to work with LEMO F1 or F2 type fibre optic contacts. They are suitable for use with multi fibre or mixed fibre optical/electrical cables fitted with single-mode or multi-mode fibres up to 1500 micron in diameter. The connectors offer a variety of features:

- alignment key preventing all errors in alignment;
- polarized keying system, the various keying alternatives prevent unwanted cross mating of otherwise similar connectors;
- higher contact density; and
- possible use of crimp contacts to reduce cable assembly time.

### The 2K to 5K Series

This product family includes the 2K to 5K series, and are watertight (IEC 60529/IP 66-IP 68) available in the same types as the 2B to 5B series. The connectors are ideal for use in harsh environments.

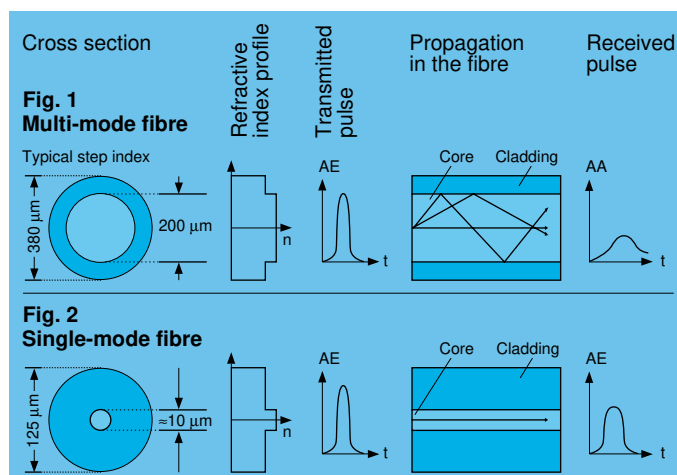
### The video HDTV 3K.93C Series

This new range of high performance fibre optic camera connectors has been developed to meet the needs of the new generation of digital TV cameras. Contact configuration includes 2 fibre optic contacts for single-mode fibres, 2 electrical contacts for power and 2 electrical contacts for signal. This series conforms to the Japanese ARIB technical report BTA S-1005B, to the ANSI/SMPTE 304 M-1998 and 311M-1998 standards and to the European EBU Technical Recommendation R100-1999. Connectors are qualified for use in UL approved equipment such as those specified in UL 1419 «Professional Video and Audio Equipment»

### CE marking

CE marking means that the appliance or equipment bearing it complies with the protection requirements of one or several European safety directives.

**CE marking applies to complete products or equipment, but not to optical/electromechanical components, such as connectors.**






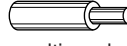

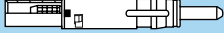


# General Characteristics

## Selection of the LEMO Fibre Optic Contacts

In order to ensure the highest technical performance and to provide the optimum solution for a diversity of applications, LEMO has developed four types of fibre optic contacts; designated **F1**, **F2**, **F3**, and **F4**. These contacts are designed to operate with single fibre, multi fibre, and mixed fibre optical/electrical cable constructions and cater to single and multi-mode fibres from 9/125 to 1500  $\mu\text{m}$  diameter.

The choice of fibre optic contacts depends upon the following criteria:  
 – Cable construction (single fibre, multi fibre, mixed optical/electrical)  
 – Fibre type (single-mode or multi-mode).

The table below shows the suitability of each contact type with different fibres and cables. Note that the multi fibre cable can contain many types of optic fibres or a group of fibres and electrical cables leading to mixed optical/electrical connectors.

Contact type	Cable Structure		Fibre Types and dimensions	
				
	single fibre	multi fibre or mixed	single-mode	multi-mode ≤ 100/140 $\mu\text{m}$ ≥ 100/140 $\mu\text{m}$
	<b>F1</b>			
	<b>F2</b>			
	<b>F3</b>			
	<b>F4</b>			

## Series and contact configurations

### Single and Multi F.O.

Number of F.O. contacts	Series							
	00	0B	0K	2B-2K	3B-3K	4B-4K	5B-5K	3K.93C
1	●	●	●					
2					●			
4						●		
10							●	
14							●	

Note: ● = available contact configuration

### Mixed F.O. + L.V.

Number of F.O. contacts	Number of L.V. electrical contacts	Series						
		00	0B	0K	2B-2K	3B-3K	4B-4K	5B-5K
1	2, 4, 6 or 10				●			
1	22					●		
2	4, 6, 10 or 16					●		
2	6, 7, 12, 16 or 18						●	
3	6 or 12						●	
3	10							●
4	5 or 9						●	
9	3							●

### Mixed F.O. + L.V. + H.V.

Number of F.O. contacts	Number of L.V. electrical contacts	Number of H.V. electrical contacts	Series							
			00	0B	0K	2B-2K	3B-3K	4B-4K	5B-5K	3K.93C
2	2	2								●
6	2	4							●	
12	1	2							●	

### Mixed F.O. + L.V. + Coax

Number of F.O. contacts	Number of L.V. electrical contacts	Number of coax electrical contacts	Series							
			00	0B	0K	2B-2K	3B-3K	4B-4K	5B-5K	3K.93C
1	6	1					●			
1	16	1					●			
2	–	2						●		
2	6	1						●		

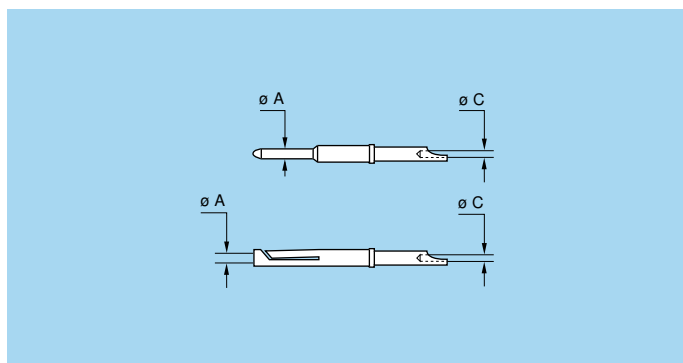
## Acceptable cable diameter

Cable $\varnothing$ (mm)	Series											
	00	0B	0K	2B	3B	4B	5B	3K.93C	2K	3K	4K	5K
min	0.25	2.5	2.5	1.5	4.1	5.1	9.6	8.3	3.6	3.6	3.6	3.6
max	3.00	4.4	3.0	9.7	11.7	16.0	25.0	16.5	6.5	9.0	13.5	23.5

## Selection of electrical contact types

### Solder contacts

The conductor bucket of these contacts is machined at an angle to form a cup into which the solder can flow.

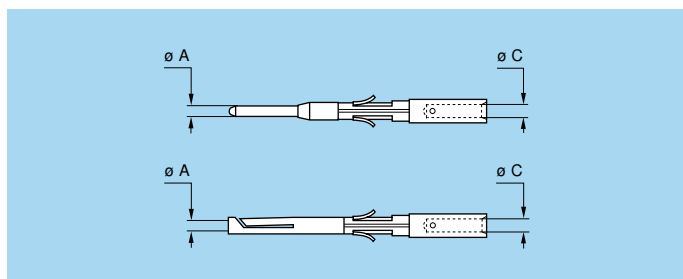


Contact		Conductor			
$\varnothing A$ (mm)	$\varnothing C$ (mm)	Solid		Stranded	
		AWG max.	Section max (mm <sup>2</sup> )	AWG max.	Section max (mm <sup>2</sup> )
0.7	0.80	22	0.34	22 <sup>1)</sup>	0.34
0.9	0.80	22	0.34	22 <sup>1)</sup>	0.34
1.3	1.00	20	0.50	20 <sup>1)</sup>	0.50
2.0	1.80	14	1.50	16	1.50
4.0	3.70	10	6.00	10	6.00

**Note:** <sup>1)</sup> For a given AWG, the diameter of some stranded conductor designs is larger than the solder cup diameter. Make sure that the maximum conductor diameter is smaller than  $\varnothing C$ .

### Crimp contacts

The crimp contacts are designed to be crimped with the standard four-indent method according to MIL-C-22520F, class 1, type 1.



Contact		Conductor stranded				$F_r$ (N)
$\varnothing A$ (mm)	$\varnothing C$ (mm)	AWG stranded		Section (mm <sup>2</sup> )		
		min.	max.	min.	max.	
0.7	0.80	26	22 <sup>1)</sup>	0.140	0.34	22
0.9	1.10	24	20	0.250	0.50	30
1.3	1.40	20	18	0.500	1.00	40
	1.90 <sup>2)</sup>	18	14	1.000	1.50	
1.6	1.90	18	14 <sup>1)</sup>	1.000	1.50	50
2.0	2.40	16	12 <sup>1)</sup>	1.500	2.50	65

**Note:**

<sup>1)</sup> For a given AWG, the diameter of some stranded conductor designs is larger than the solder cup diameter. Make sure that the maximum conductor diameter is smaller than  $\varnothing C$ .

<sup>2)</sup> These contacts are special with an oversized crimp bucket and can be used only with the series 3K.93C.

**Note:**  $F_r$  = mean contact retention force in the insulator (according to IEC 60512-8 test 15a).

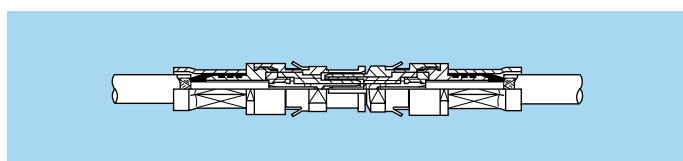
Crimp contacts can also be supplied with a reduced crimp barrel. Please consult factory or our Unipole/Multipole catalog.

A detailed range of conductor dimensions that can be crimped into LEMO contacts is given in the table above. See also the section on tooling (pages 97 to 106).

### Coaxial contacts

The type C coaxial contact is removable and fixed in place by clips. Cable attachment is made by crimping. The square form is used to captivate center conductor and hexagonal crimping method for the cable shield.

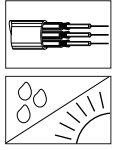
A detailed range of coaxial cable that can be installed into our type C coaxial contact is given in the table below.



Group	Type
1	RG.174A/U, RG.188A/U, RG.316/U
2	RG.178B/U, RG.196A/U
3	RG.179B/U, RG.187A/U

## Part Numbering System

### Series

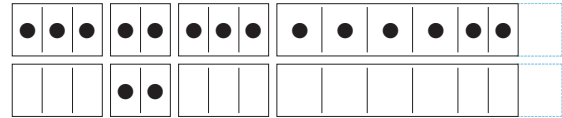


Connectors series and size should be selected according to the type of fibre, single-mode or multi-mode, cable structure and dimensions.

See table on p. 6 (fibre optic connectors production program) and p. 8 (selection of the LEMO fibre optic contacts).

Selection should also consider the environmental requirements such as indoor or outdoor applications etc...

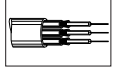
See again table on p. 6 (fibre optic connector production program).



**0 0** 00 series Single fibre

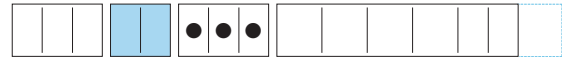
**3 K** 3K series Multi fibre or mixed

### Type



Contact arrangements (type) within a given series can be defined according to the fibre size for single fibre connector or cable design for multi fibre or mixed.

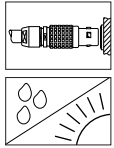
See table on p. 8 (series and contact configuration) and type table in each series.



**B A 4** Single fibre

**0 3 A** Multi fibre or mixed

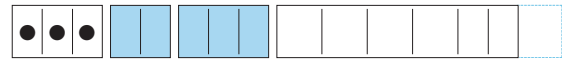
### Model



Models within a given series can be selected according to the application and the panel mounting conditions.

See models available in each series.

When available make the right key-way selection.



**F** Plug

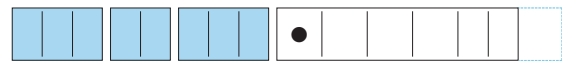
**E** Socket

### Housing material



The housing material and surface finish depends on the environmental requirements.

See material available in each series.



**C** Chrome-plated brass

### Ferrule or insulator material

The ferrule material should be selected according to the availability in each series.

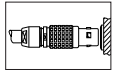
For multi fibre or mixed connector the insulator material is PEEK



Ceramic ferrule **C** Single fibre

PEEK **L** Multi fibre or mixed

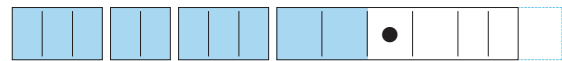
### Contact



The fibre optic contact should be indicated according to the model.

The electrical contact type can be selected according to the model (male or female), or conductor retention (solder or crimp).

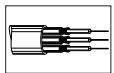
Verify again that contact size matches with the conductor diameter.



Single fibre **B** Fibre optic plug contact

Mixed **L** Electrical female to solder

### Collet



Different clamping systems are proposed for various cable diameters.

See collet type for each series and cable diameter.

Not applicable for sockets E●●.



●● = cable range **T** ●●

### Variant

Some variants are available according to special requirements of the application (bend relief collet nut, etc...).

See variant in each series.

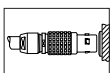


Nut for fitting a bend relief **Z**

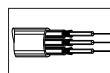
Supplied with black bend relief **N**



= Environment



= Application



= Cable





**00 SERIES**



# 00 Series

The 00 series connectors are fitted with LEMO **F4** type fibre optic contacts.

The main features of this series are as follows:

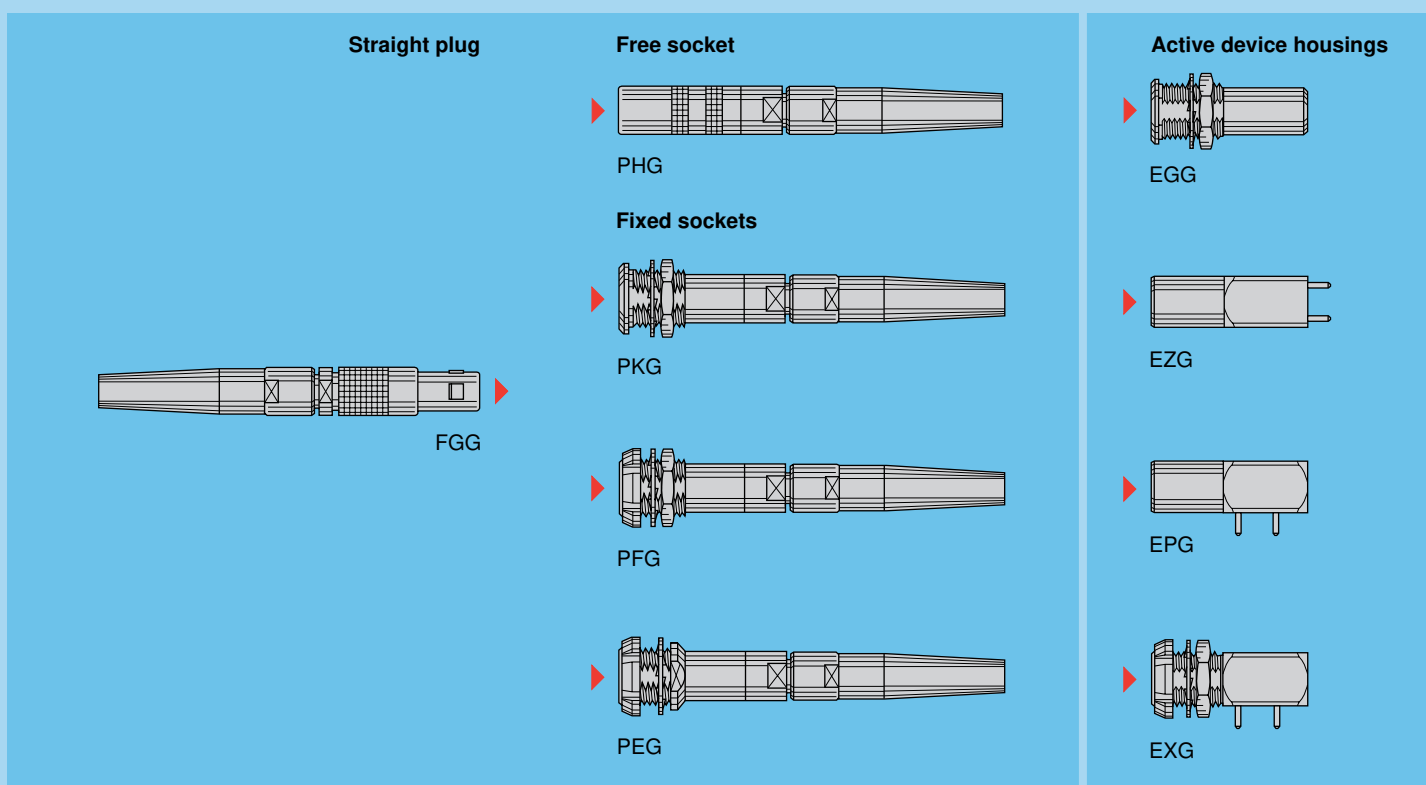
- Security of the LEMO Push-Pull self-latching system
- Minimum mounting space requirement (high packing density)
- Protection against accidental contamination or damage to the fibre end face because the ferrules do not protrude outside of the connector shell
- The alignment key (G, B) ensures excellent repeatability of performance during frequent matings
- Assembly of the fibre optic contact uses a ceramic ferrule with spherical end face
- Simple and fast polishing ensuring the physical contact of the fibre end face
- The alignment tube can be easily removed in order to clean the fibre end face.

00 Series consists of nine connector models.

The active device housings are designed to accept emitting or receiving components such as LEDs or photodiodes in a TO-18 case.

The plugs and sockets are suitable for use with single fibre cables fitted with single-mode or multi-mode fibres of the following dimensions; 9/125, 50/125, 62.5/125, 100/125 and 100/140 µm.

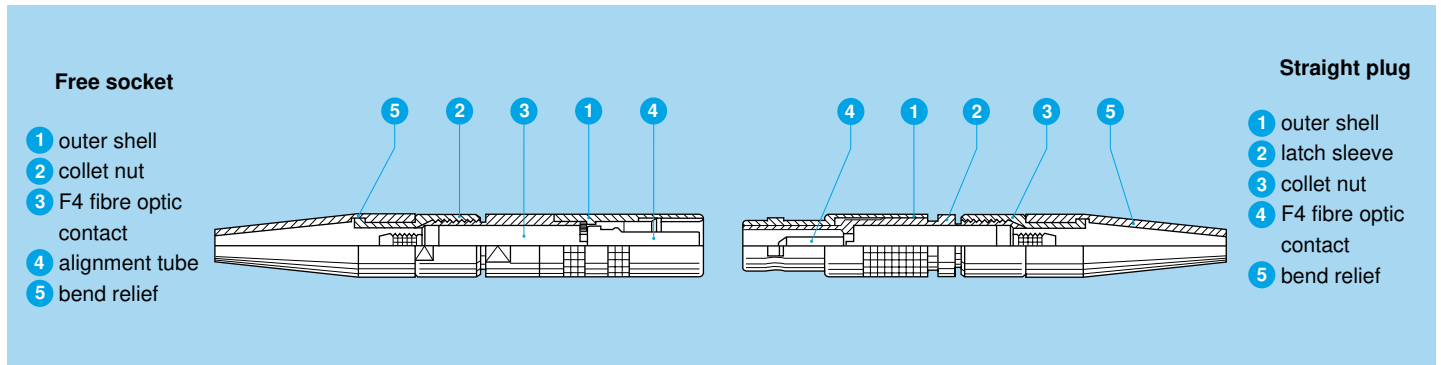
## Interconnections



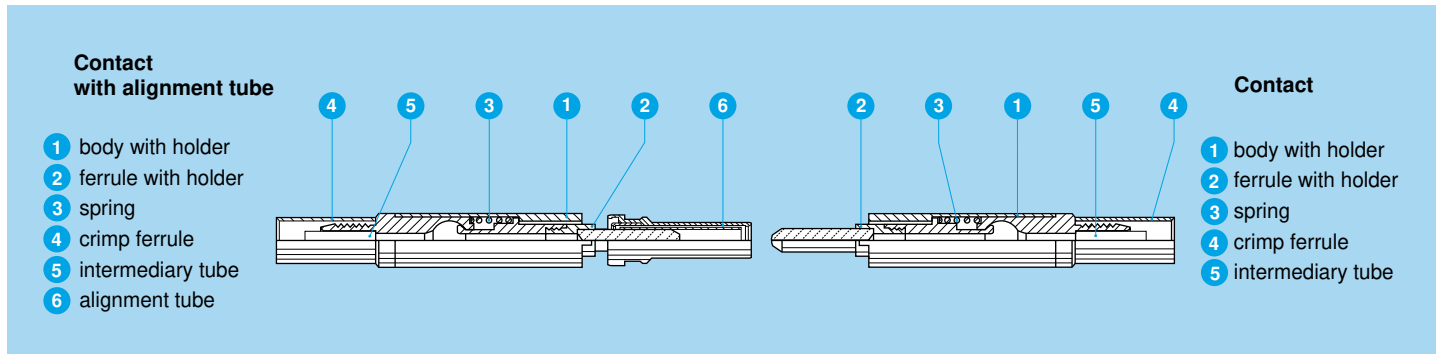
## Model Description

- |   |  |  |
|---|--|--|
| <p><b>EGG</b> Fixed active device housing, nut fixing, key (G) or key (B)</p> <p><b>EPG</b> Elbow active device housing (90°) for printed circuit, key (G) or key (B)</p> <p><b>EXG</b> Elbow active device housing (90°) for printed circuit, with two nuts, key (G) or key (B), (back panel mounting)</p> | <p><b>EZG</b> Straight active device housing for printed circuit, key (G) or key (B)</p> <p><b>FGG</b> Straight plug, key (G) or key (B), with bend relief</p> <p><b>PEG</b> Fixed socket, nut fixing, key (G) or key (B), with bend relief, (back panel mounting)</p> | <p><b>PFG</b> Fixed socket, with two nuts, key (G) or key (B), with bend relief, (back panel mounting)</p> <p><b>PHG</b> Free socket, key (G)</p> <p><b>PKG</b> Fixed socket, nut fixing, key (G) or key (B), with bend relief</p> |
|---|--|--|

## Part Section Showing Internal Components Connector



### F4 Contact



## Technical Characteristics

### Mechanical and Environmental

Characteristic	Value	Standard
Mating durability	5000 cycles	IEC 61300-02-02
Damp heat steady state	up to 95 % at 60°C	IEC 61300-02-19
High temperature	+80°C	IEC 61300-02-18
Low temperature	-40°C	IEC 61300-02-17
Protection index (mated)	IP 50	IEC 60529
Cable retention	100 N	IEC 61300-02-04

### Optical

Characteristic	Value	Standard	Method
Average insertion loss fibre 9/125 µm	0.10 dB	IEC 61300-03-04	Insertion Method B
Average insertion loss fibre 50/125 µm	0.25 dB	IEC 61300-03-04	Insertion Method B
Return loss fibre 9/125 µm (UPC)	≥45 dB	IEC 61300-03-06	Branching Device Met.
Return loss fibre 9/125 µm (Hand polish)	~30 dB	IEC 61300-03-06	Branching Device Met.

**Note:** Detailed characteristics are presented on pages 109 to 111.

## Alignment Key and Polarized Keying Systems

Front view of a socket

Model	No of keys	Angle		Note
●●G	1	0°		●
●●B	2	α	60°	○

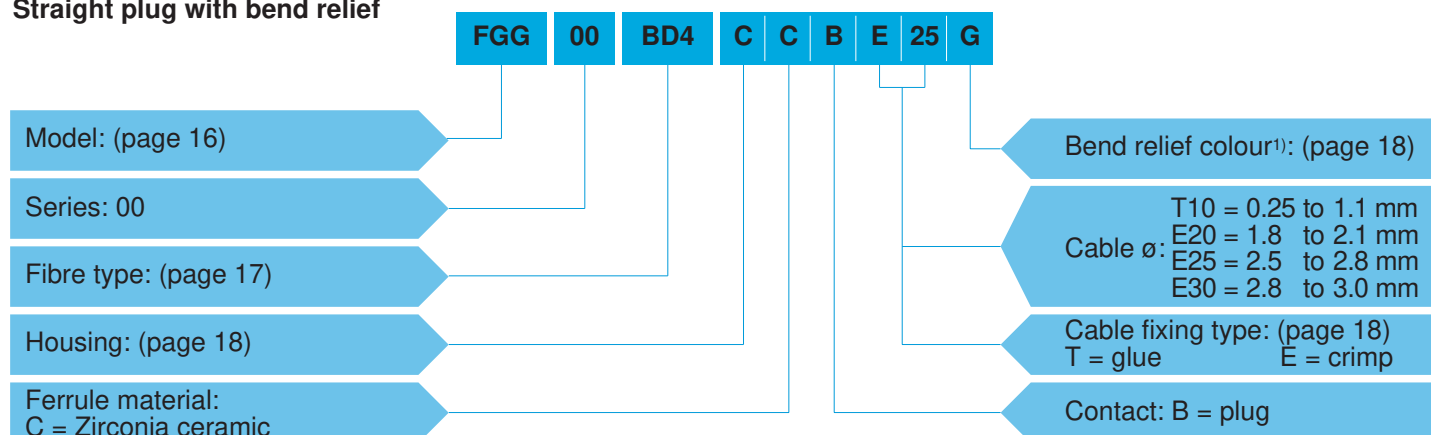
● First choice alternative    ○ Special order alternative

## Part Number Example

A different part number is applicable for each of the following product type:

- Plugs or sockets for assembly onto cables
- Active device housings

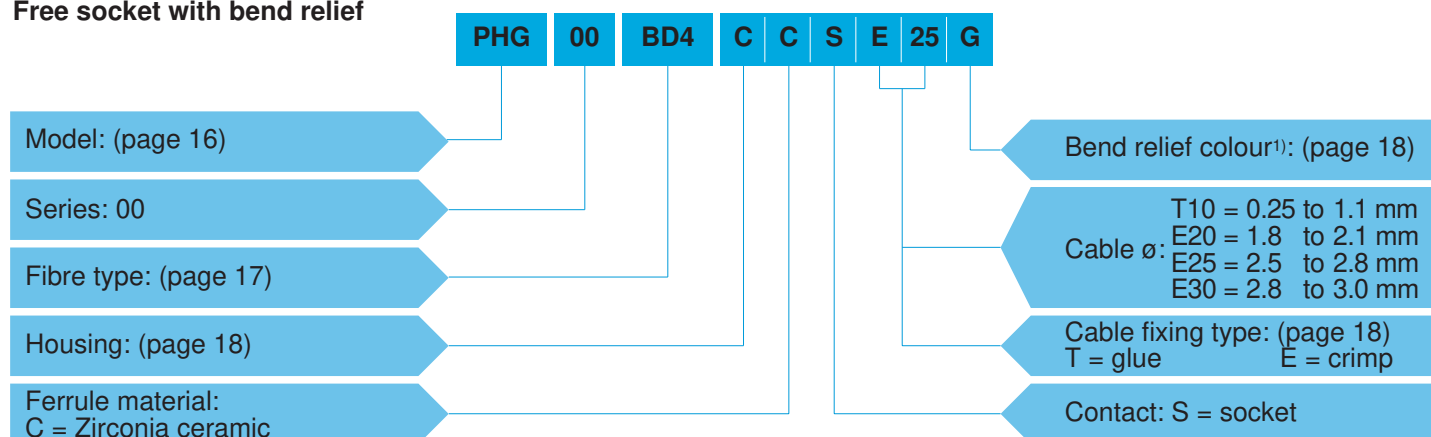
### Straight plug with bend relief



**FGG.00.BD4.CCBE25G** = Straight plug with key (G), 00 series for single-mode or multi-mode fibres, F4 fibre optic contact, ferrule hole diameter 128 µm, chrome-plated brass housing, zirconia ceramic ferrule, plug type contact, crimp type cable fixing for 2.5 to 2.8 mm diameter cable, and gray bend relief.

**Note:** <sup>1)</sup> The bend relief sleeve is necessary to the proper function of the connector thus the connector can only be ordered with the appropriate sleeve.

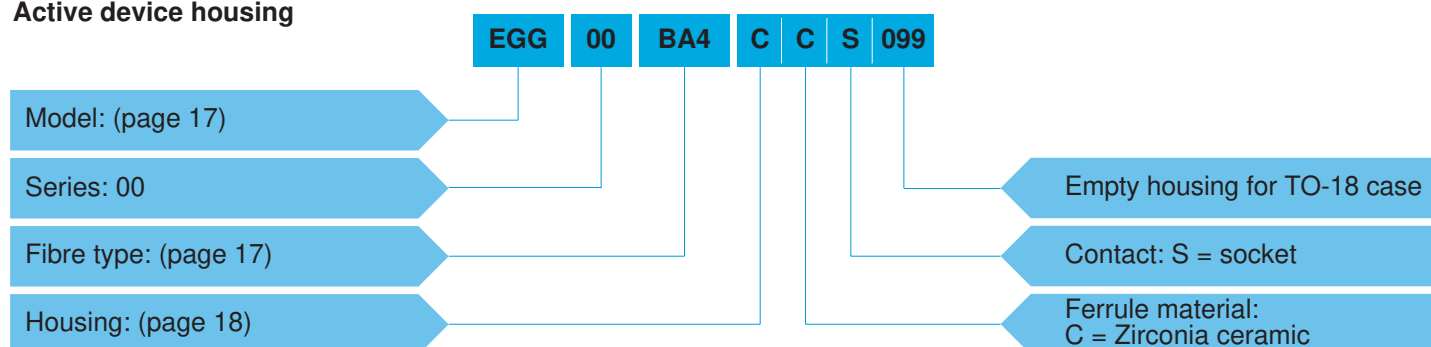
### Free socket with bend relief



**PHG.00.BD4.CCSE25G** = Free socket with key (G), 00 series for single-mode or multi-mode fibres, F4 fibre optic contact, ferrule hole diameter 128 µm, chrome-plated brass housing, zirconia ceramic ferrule, socket type contact, crimp type cable fixing for 2.5 to 2.8 mm diameter cable, and gray bend relief.

**Note:** <sup>1)</sup> The bend relief sleeve is necessary to the proper function of the connector thus the connector can only be ordered with the appropriate sleeve.

### Active device housing

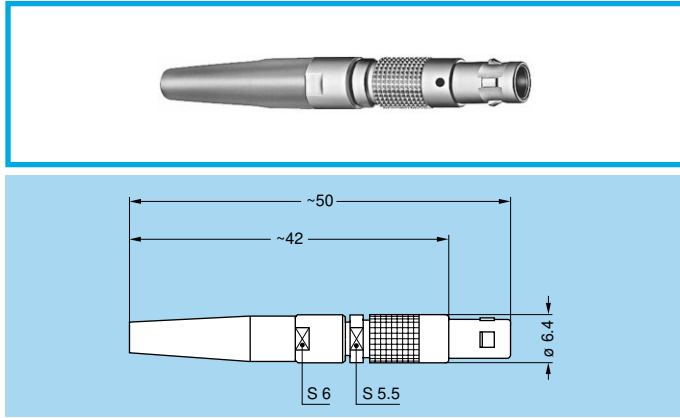


**EGG.00.BA4.CCS099** = Straight active device housing, nut fixing with key (G), 00 series, with ferrule for F4 fibre optic contact, assembled with single-mode fibre ø 9/125, chrome-plated brass housing, zirconia ceramic ferrule, socket contact, empty housing for TO-18 case.

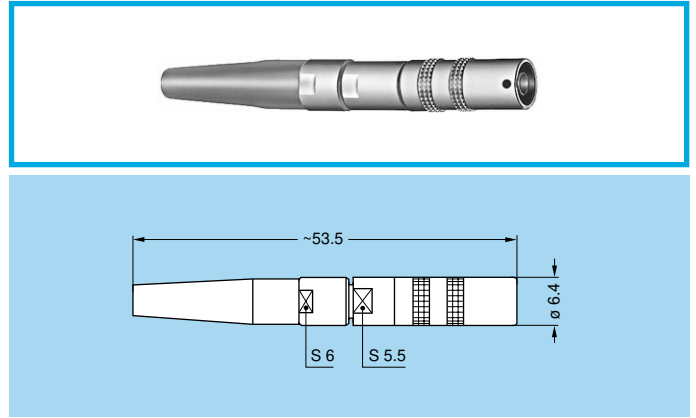


# Model - Series

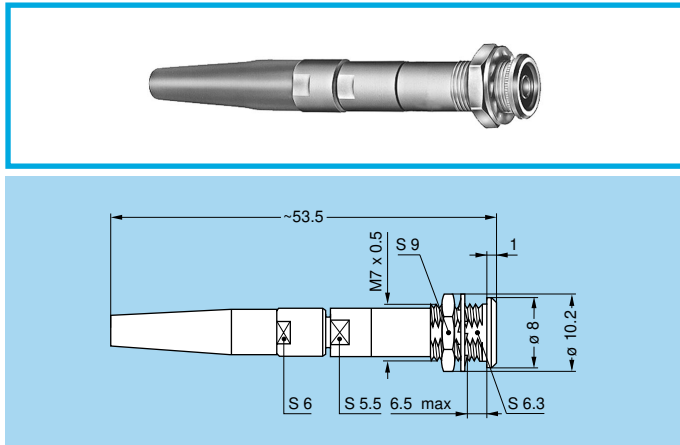
**FGG.00** Straight plug, key (G) or key (B), with bend relief



**PHG.00** Free socket, key (G) or key (B), with bend relief

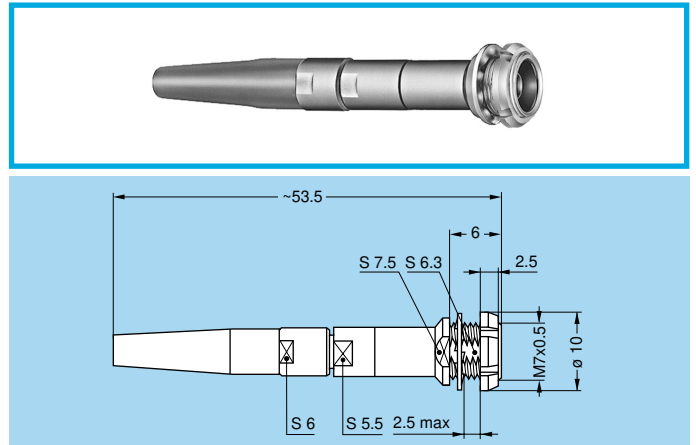


**PKG.00** Fixed socket, nut fixing, key (G) or key (B), with bend relief



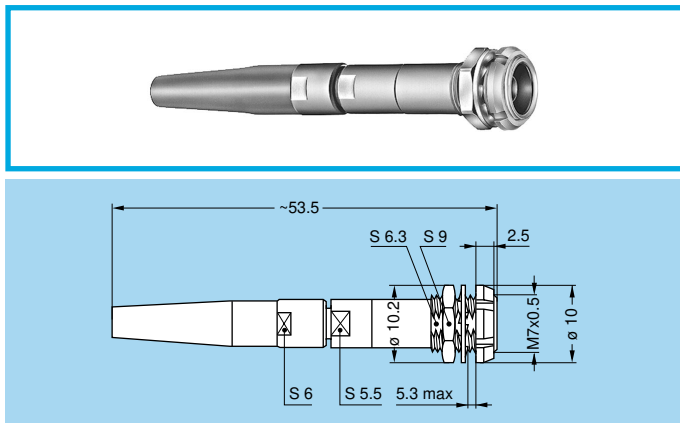
Panel cut-out (page 18)

**PEG.00** Fixed socket, nut fixing, key (G) or key (B), with bend relief (back panel mounting)



Panel cut-out (page 18)

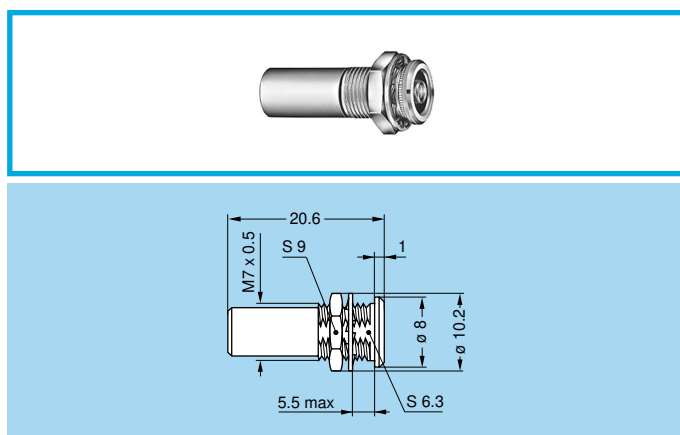
**PFG.00** Fixed socket, with two nuts, key (G) or key (B), with bend relief (back panel mounting)



Panel cut-out (page 18)

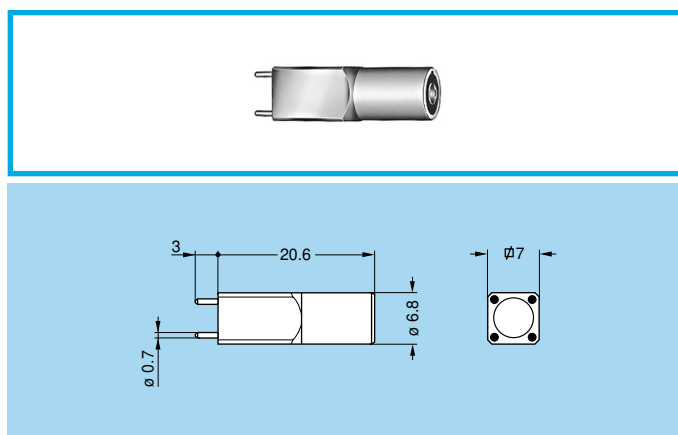
**Note:** The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

### EGG.00 Fixed active device housing, nut fixing, key (G) or key (B)



Panel cut-out (page 18)

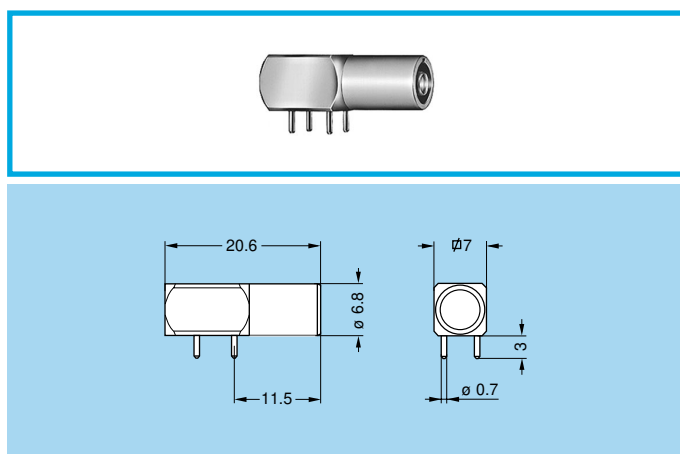
### EZG.00 Straight active device housing for printed circuit, key (G) or key (B)



Panel cut-out (page 18)

PCB drilling pattern (page 18)

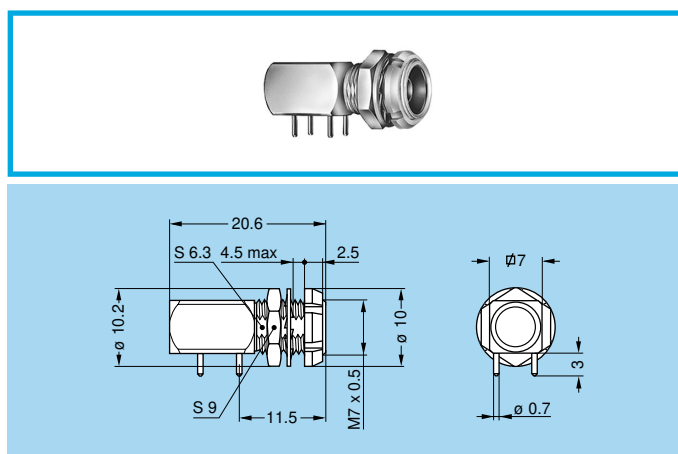
### EPG.00 Elbow active device housing (90°) for printed circuit, key (G) or key (B)



Panel cut-out (page 18)

PCB drilling pattern (page 18)

### EXG.00 Elbow active device housing (90°) for printed circuit, with two nuts, key (G) or key (B), (back panel mounting)



Panel cut-out (page 18)

PCB drilling pattern (page 18)

**Note:** Upon request active device could be delivered with a specific device of your choice already fitted into. Please consult the factory.

## Fibre Type

The choice of the ferrule hole diameter is dependent upon the fibre core/cladding size. LEMO offers a range of ferrule hole diameters to suit the users' specific requirements.

### Plug or sockets

The type reference represents the ferrule hole diameter.

Reference	ø Core/Cladding (µm)	Ferrule hole diameter (µm)	Note 1)
BA4	9/125	125	●
BB4	50/125	126	●
BC4	62.5/125	127	○
BD4	100/125	128	○
FA4	100/140	140	○
FB4		144	●

**Note:** 1) The BA4 type (ferrule hole 125 µm) is recommended for single-mode fibres. The BB4 type (ferrule hole 126 µm) is commonly used with multi-mode fibres.

### Active device housings

The type reference represents the type of fibre used.

Reference	ø Core/Cladding (µm)	Note
BA4	9/125	●
CA4	50/125	○
DA4	62.5/125	●
EA4	100/125	○
FA4	100/140	●

● First choice alternative ○ Special order alternative

## ▶ Housing

Ref.	Material	Surface treatment		Note
		Outer shell and collet nut	Latch sleeve and grounding crown	
C	Brass	chrome	nickel	●
N	Brass	nickel	nickel	○
K	Brass	black chrome	nickel	○
T	Stainless steel	without treatment	stainless steel	○

● First choice alternative    ○ Special order alternative

## ▶ Cable Fixing Type

Reference		Cable structure	Cable $\phi$ (mm)
Cable fixing Type	Reference $\phi$ (mm)		
T	10	Buffer coated fibre	0.25 to 1.1
E	20	Tight jacket cable	1.8 to 2.1
E	25		2.5 to 2.8
E	30		2.8 to 3.0

## ▶ Bend Relief

Models FGG, PHG, PKG, PEG and PFG are supplied with a bend relief. The reference for the colour of the bend relief is chosen from the table below and it should be stated in the «bend relief» position of the connector part number.

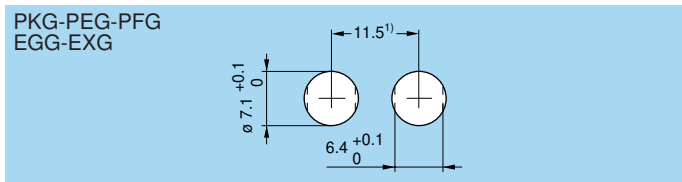
Ref.	Colour	Ref.	Colour	Ref.	Colour	Ref.	Colour	Ref.	Colour
A	blue	G	grey	M	brown	R	red	V	green
B	white	J	yellow	N	black	S	orange		

## ▶ Tooling

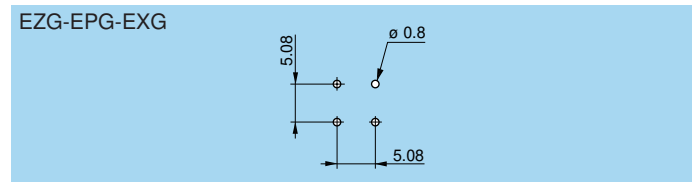
The full range of tools for terminating fibre optic F4 contacts for this 00 series is shown on pages 103 to 106. Consult the factory for the termination instructions.

## Panel Cut-Outs

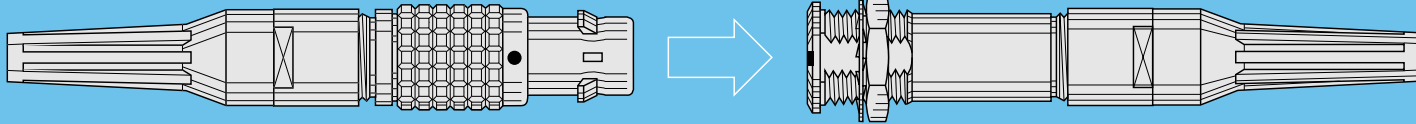
### Panel cut-outs



### PCB drilling pattern, for the fixing pins



**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.  
Mounting nut torque: **1 Nm**. The value shown above is the maximum torque for each connector type.



**0B SERIES**





# 0B Series

The 0B series connectors are fitted with the LEMO **F3** type fibre optic contacts.

The main features of this series are as follows:

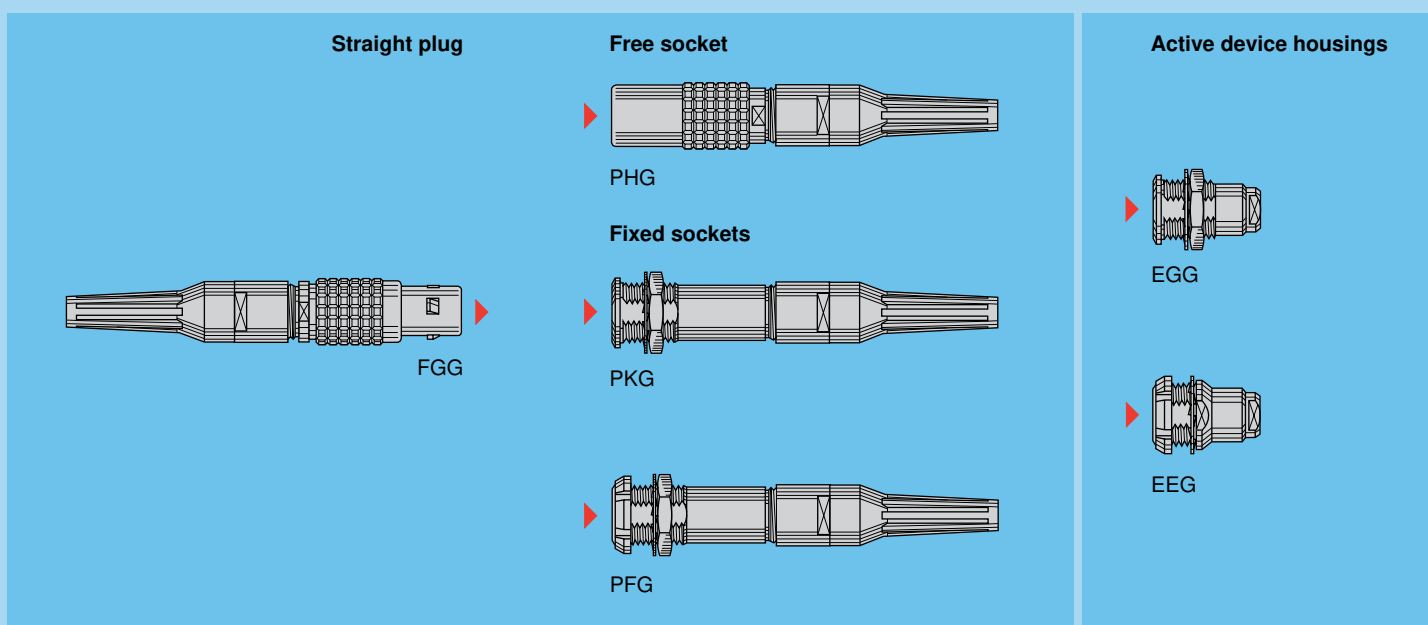
- Security of the LEMO Push-Pull self-latching system
- Minimum mounting space requirement (high packing density)
- Protection against accidental contamination or damage to the fibre end face because the ferrules do not protrude outside the connector shell
- The alignment key (G, A...F) ensures excellent repeatability of performance during frequent matings
- Simple and proven construction of the fibre optic contact with a ceramic or metallic ferrule
- Polishing with special tooling ensuring a minimum spacing of fibres which are not in physical contact.

0B series consists of six connector models.

The active device housings are designed to accept emitting or receiving components such as LEDs or photodiodes in a TO-18 case (without plastic can).

The plugs and straight sockets are suitable for use with single fibre cables fitted with Si/Si or plastic multi-mode fibres with dimensions ranging from 100/140 to 1500 µm external diameter.

## Interconnections



## Model description

**EEG** Fixed active device housing, nut fixing, key (G) or keys (A...F), (back panel mounting)

**EGG** Fixed active device housing, nut fixing, key (G) or keys (A...F)

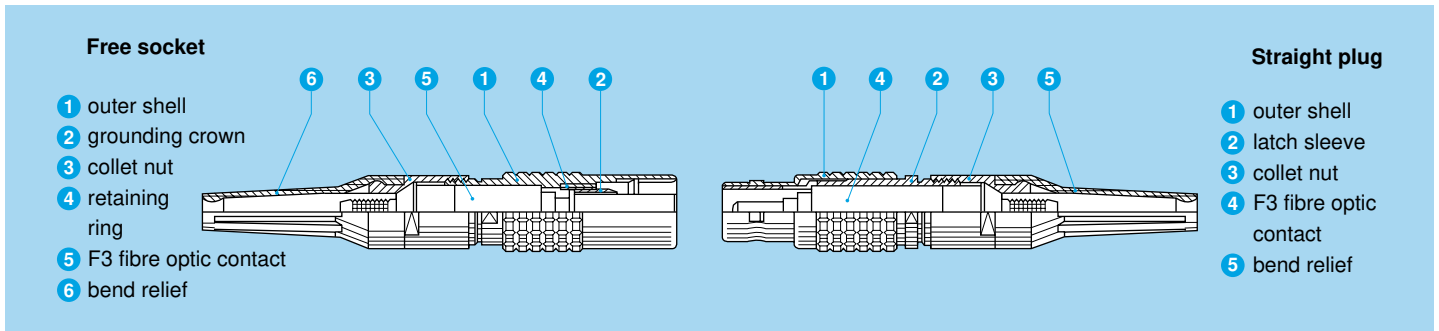
**FGG** Straight plug, key (G) or keys (A...F), with bend relief

**PFG** Fixed socket, with two nuts, key (G) or keys (A...F), with bend relief, (back panel mounting)

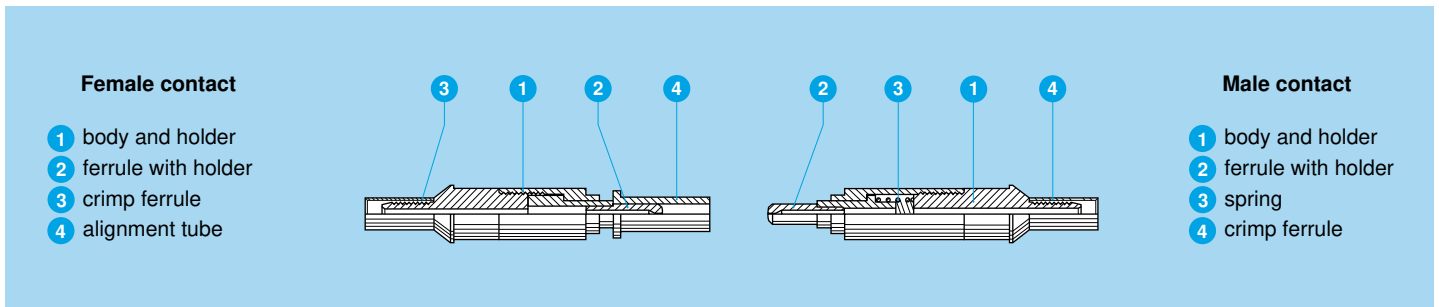
**PHG** Free socket, key (G) or keys (A...F), with bend relief

**PKG** Fixed socket, nut fixing, key (G) or keys (A...F), with bend relief

## Part Section Showing Internal Components Connector



## F3 Contact



## Technical Characteristics

### Mechanical and Environmental

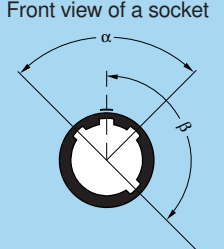
Characteristic	Value	Standard
Mating durability	1000 to 5000 cycles	IEC 61300-02-02
Damp heat steady state	up to 95 % at 60°C	IEC 61300-02-19
High temperature	+80°C	IEC 61300-02-18
Low temperature	-40°C	IEC 61300-02-17
Protection index (mated)	IP 50	IEC 60529
Cable retention	100 N	IEC 61300-02-04

### Optical

Characteristic	Value	Standard	Method
Average insertion loss fibre 200/230 µm	1.13 dB	IEC 61300-03-04	Insertion Method B

**Note:** Detailed characteristics are presented on pages 109 to 111.

## Alignment Key and Polarized Keying Systems

Front view of a socket 	Model	No of keys	Angles	Note
	●●G	1	α	0°
●●A	2	30°		●
●●B	2	60°		●
●●C	2	90°		●
●●D	2	β	135°	○
●●E	2		145°	○
●●F	2		155°	○

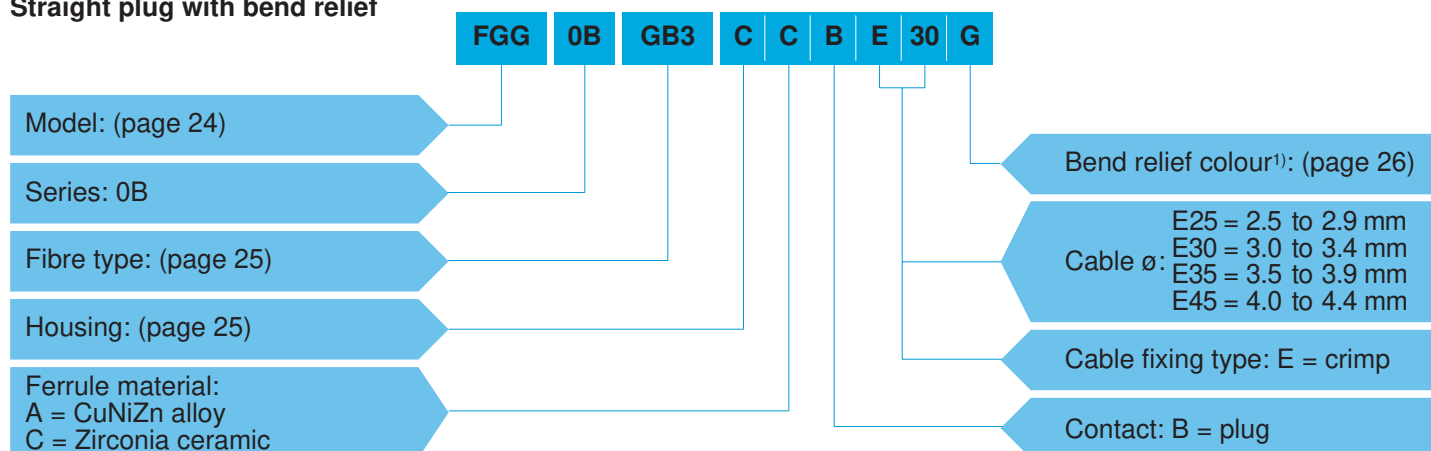
● First choice alternative    ○ Special order alternative

## Part Number Example

A different part number structure is applicable for each of the following product types:

- Plugs or sockets for assembly onto cables
- Active device housings

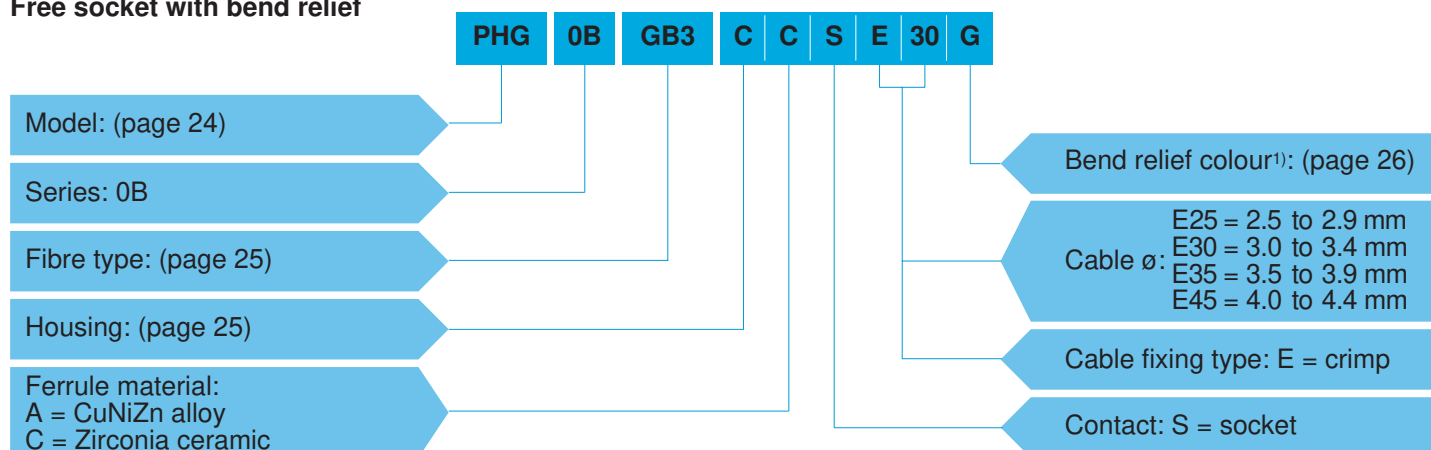
### Straight plug with bend relief



**FGG.0B.GB3.CCBE30G** = Straight plug with key (G), 0B series, F3 fibre optic contact, ferrule hole diameter 235 µm, chrome-plated brass housing, zirconia ceramic ferrule, plug type contact, crimp type cable fixing for 3.0 to 3.4 mm diameter cable, and gray bend relief.

**Note:** <sup>1)</sup> The bend relief sleeve is necessary to the proper function of the connector thus the connector can only be ordered with the appropriate sleeve.

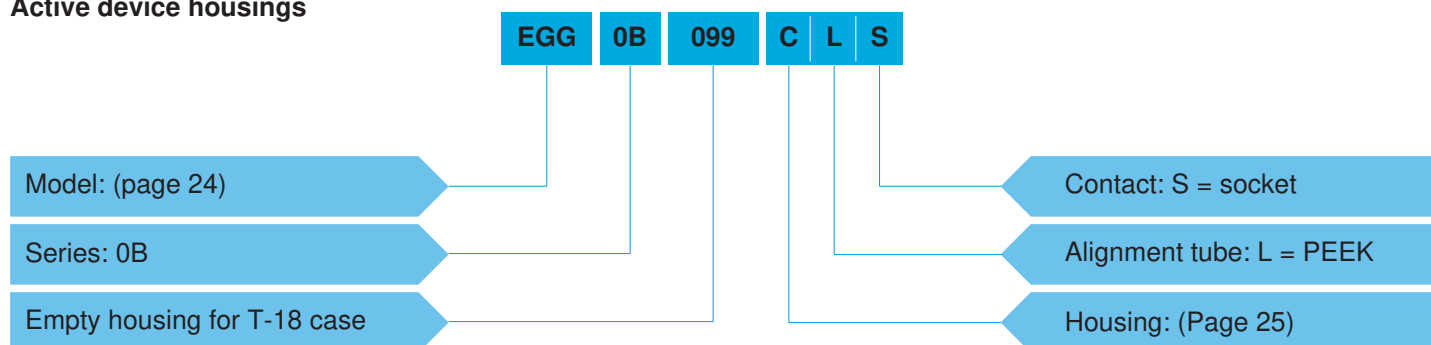
### Free socket with bend relief



**PHG.0B.GB3.CCSE30G** = Free socket with key (G), 0B series, F3 fibre optic contact, ferrule hole diameter 235 µm, chrome-plated brass housing, zirconia ceramic ferrule, socket type contact, crimp type cable fixing for 3.0 to 3.4 mm diameter cable, and gray bend relief.

**Note:** <sup>1)</sup> The bend relief sleeve is necessary to the proper function of the connector thus the connector can only be ordered with the appropriate sleeve.

### Active device housings



**EGG.0B.099.CLS** = Fixed active device housing, nut fixing, with key (G), 0B series, empty housing for TO-18 case, chrome-plated brass housing, PEEK alignment tube, socket contact.