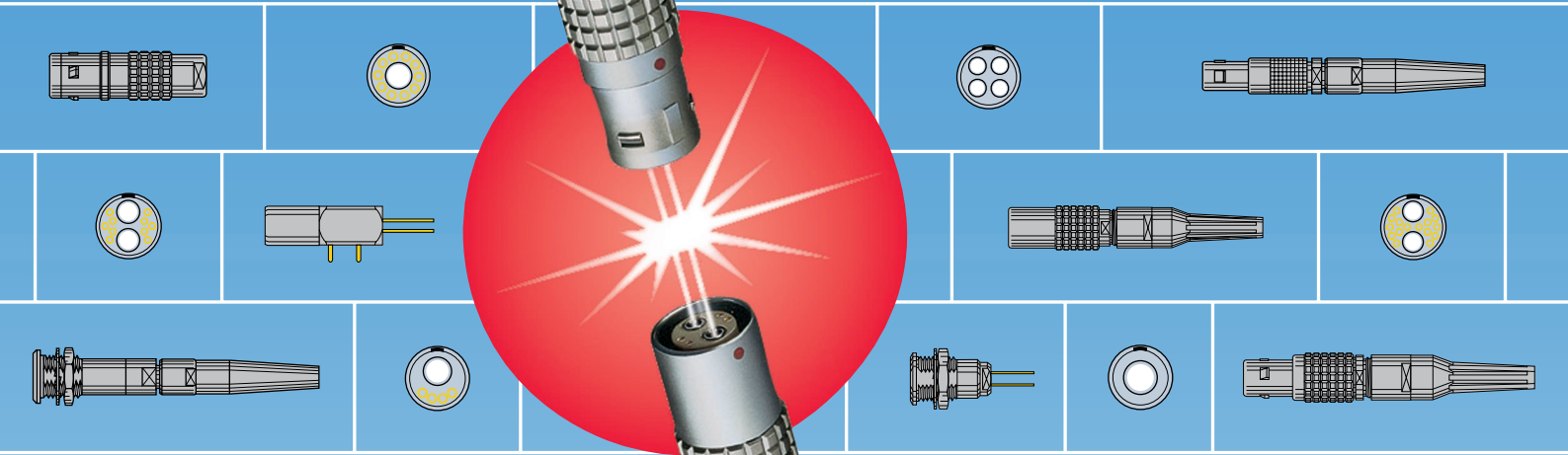
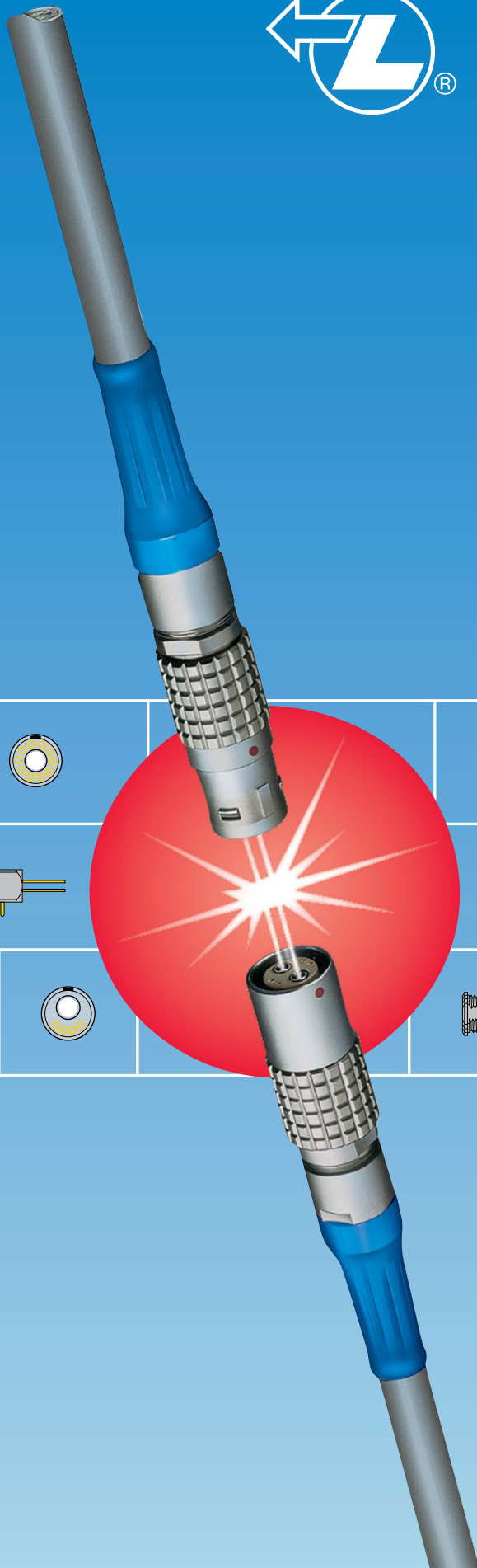




**LEMO**®



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**

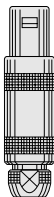
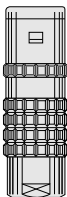

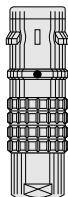
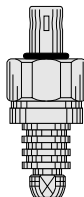
- Spanners
- Spanners for assembling plug
- Assembly tool
- Pliers
- Tap
- Crimping tools
- Positioners
- Crimping dies
- Extractors
- Insertion testing tool for crimp contacts
- Fibre optic termination workstation
- Fibre optic polishing tools

**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)   |

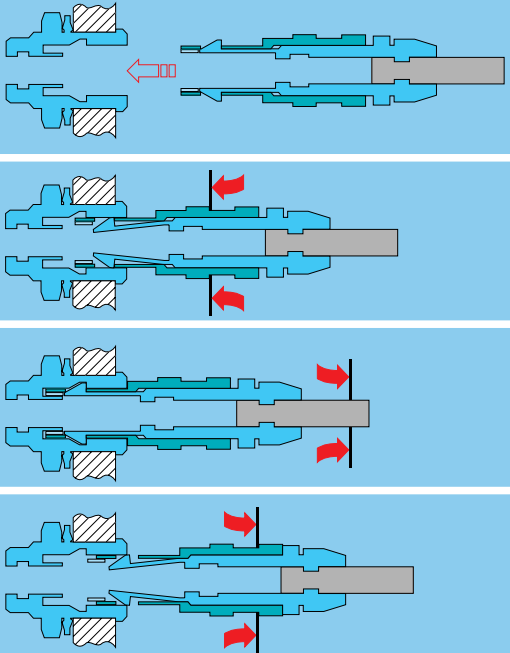
## Series and Types

|                  | 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.

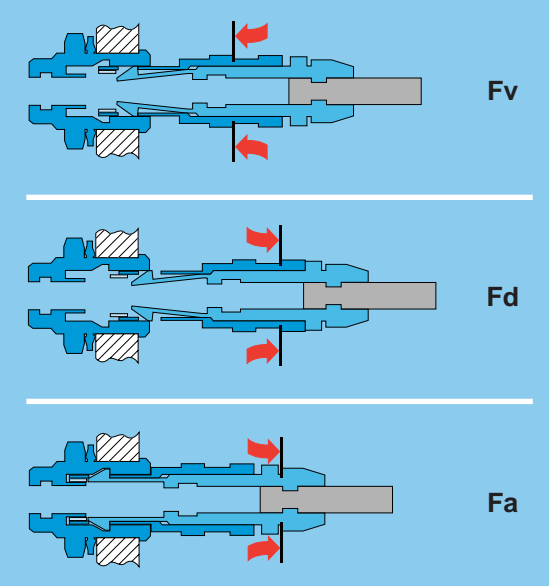


The LEMO Push-Pull self-latching system allows the connector to be mated by simply pushing the plug axially into socket.

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**.


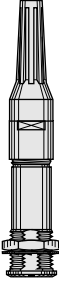
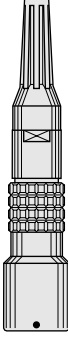
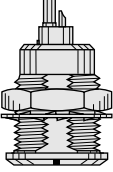
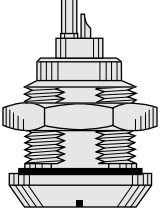
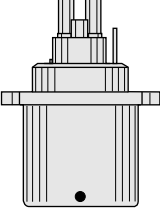

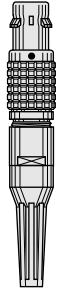
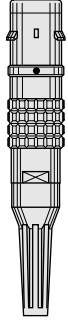
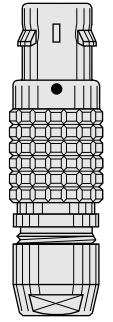
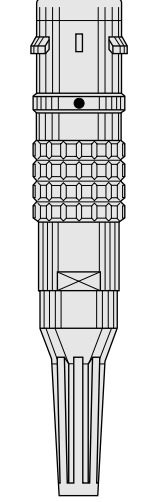
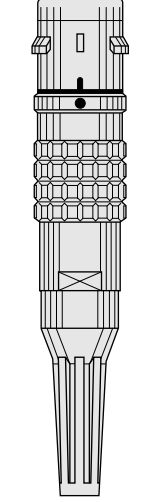
F<sub>v</sub>: average latching force

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 ≤ 100/140µm                                       | Multi-mode fibres ≥ 100/140µm  | Single-mode or Multi-mode fibres ≤ 100/140µm                                       | Multi-mode fibres ≥ 100/140µm   | Single-mode or Multi-mode fibres ≤ 100/140µm   | Single-mode or Multi-mode fibres ≤ 100/140µm   |
| <b>Mean insertion loss</b> | 0.10 dB (s/m)<br>0.25 dB (m/m)   | 1.13 dB  | 0.10 dB (s/m)<br>0.25 dB (m/m)   | 1.13 dB   | 0.10 dB (s/m)<br>0.25 dB (m/m)   | 0.10 dB (s/m)<br>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)                           |
| <b>Page</b>                | 11 to 18   | 19 to 26   | 27 to 34   | 35 to 46  | 47 to 54   | 63 to 76   |



## 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.

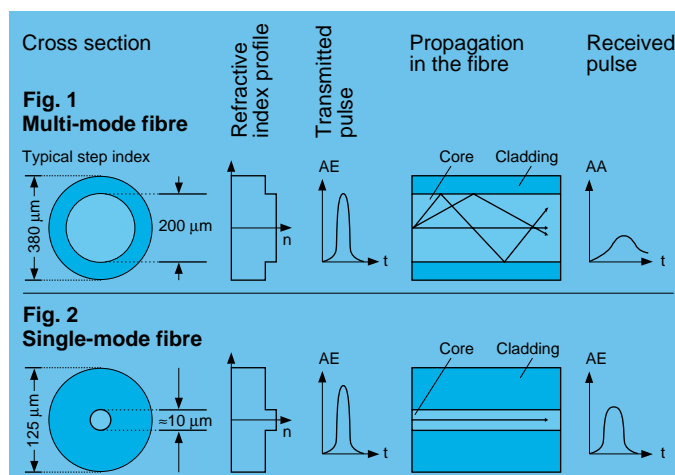
### The video HDTV 3K.93C Series

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.**






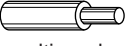




# General Characteristics

## 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 µm 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<br>≤ 100/140µm    ≥ 100/140µm  |
|    | <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                                  |        |    |    |       |       | ●     |       |        |

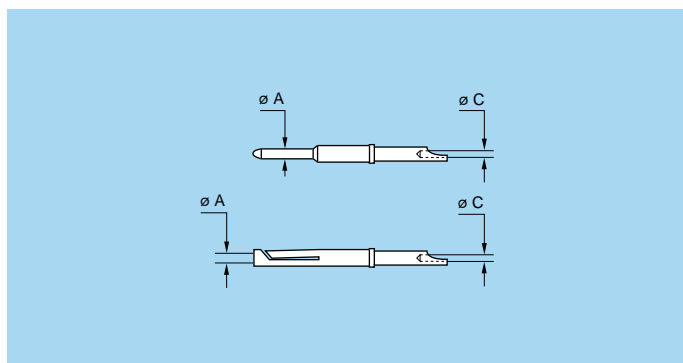
## Acceptable cable diameter

| 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.

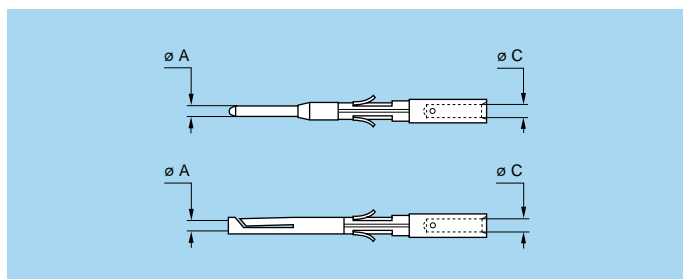


| Contact              |                      | Conductor |                                |                  |                                |
|----------------------|----------------------|-----------|--------------------------------|------------------|--------------------------------|
| $\varnothing A$ (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:** 1) 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:**

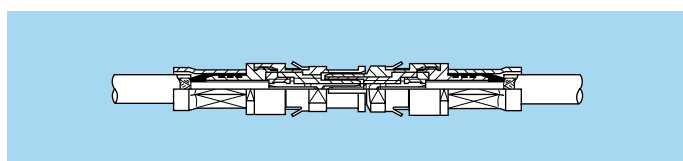
- 1) For a given AWG, the diameter of some stranded conductor designs is larger than the solder cup diameter. Make sure that the maximum conductor diameter is smaller than  $\varnothing C$ .
- 2) These contacts are special with an oversized crimp bucket and can be used only with the series 3K.93C.

**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

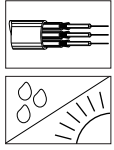
The type C coaxial contact is removable and fixed in place by clips. Cable attachment is made by crimping. The square form is used to captivate center conductor and hexagonal crimping method for the cable shield. A detailed range of coaxial cable that can be installed into our type C coaxial contact 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

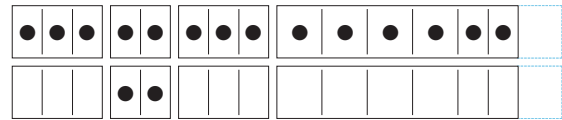


Connectors series and size should be selected according to the type of fibre, single-mode or multi-mode, cable structure and dimensions.

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...

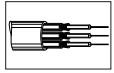
See again table on p. 6 (fibre optic connector production program).



**0 0** 00 series Single fibre

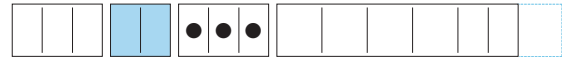
**3 K** 3K series Multi fibre or mixed

### 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.

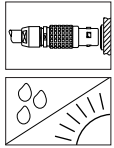
See table on p. 8 (series and contact configuration) and type table in each series.



**B A 4** Single fibre

**0 3 A** Multi fibre or mixed

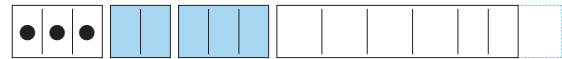
### Model



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

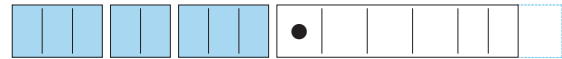
**E ●●** Socket

### 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.

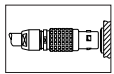
For multi fibre or mixed connector the insulator material is PEEK



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).

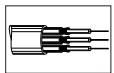
Verify again that contact size matches with the conductor diameter.



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.

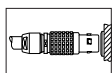


Nut for fitting a bend relief **Z**

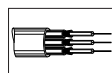
Supplied with black bend relief **N**



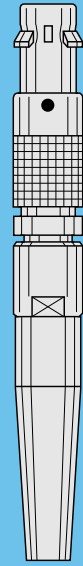
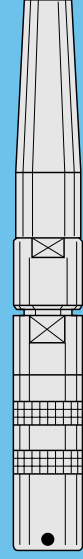
= Environment



= 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:

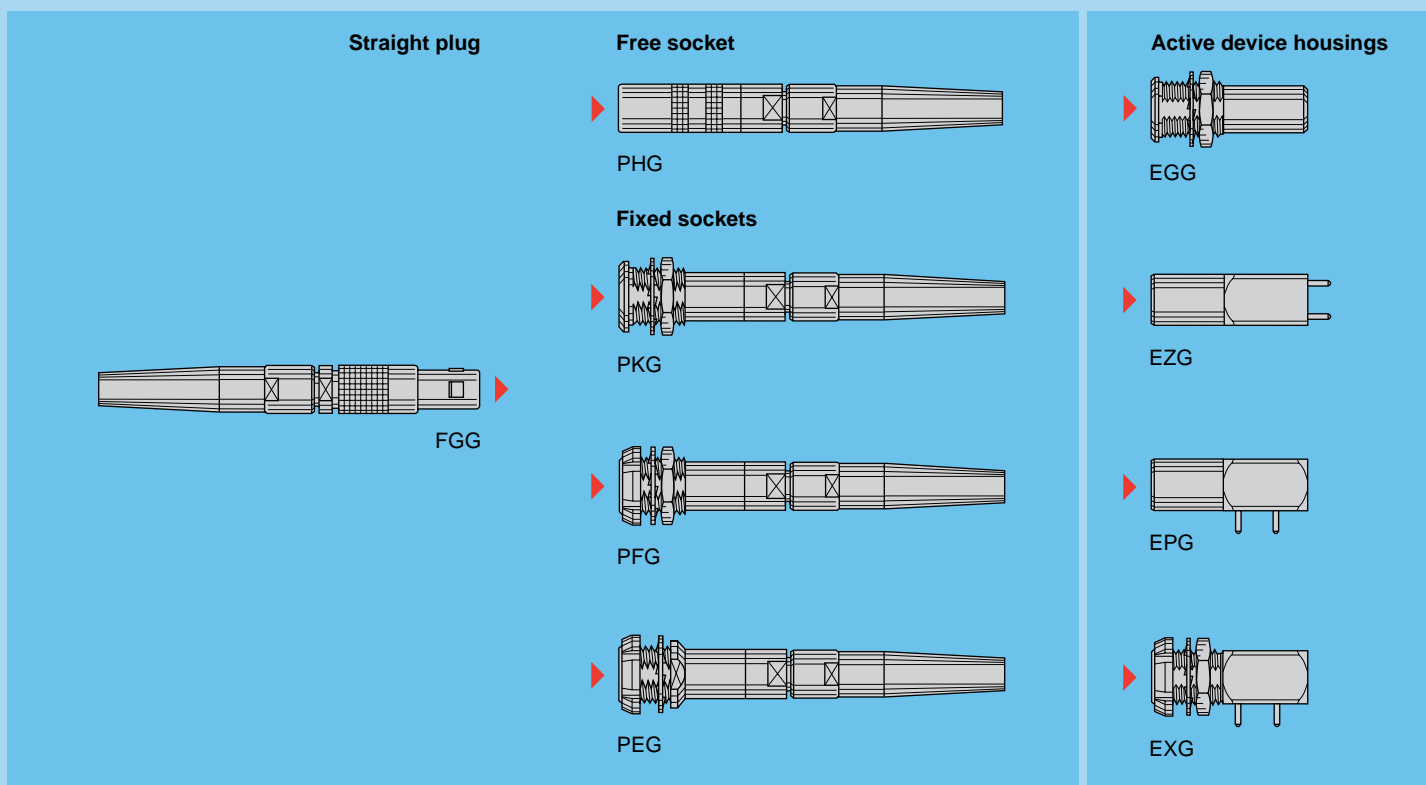
- Security of the LEMO Push-Pull self-latching system
- Minimum mounting space requirement (high packing density)
- Protection against accidental contamination or damage to the fibre end face because the ferrules do not protrude outside of the connector shell
- The alignment key (G, B) ensures excellent 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

**EGG** Fixed active device housing, nut fixing, key (G) or key (B)

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

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

**EZG** Straight active device housing for printed circuit, key (G) or key (B)

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

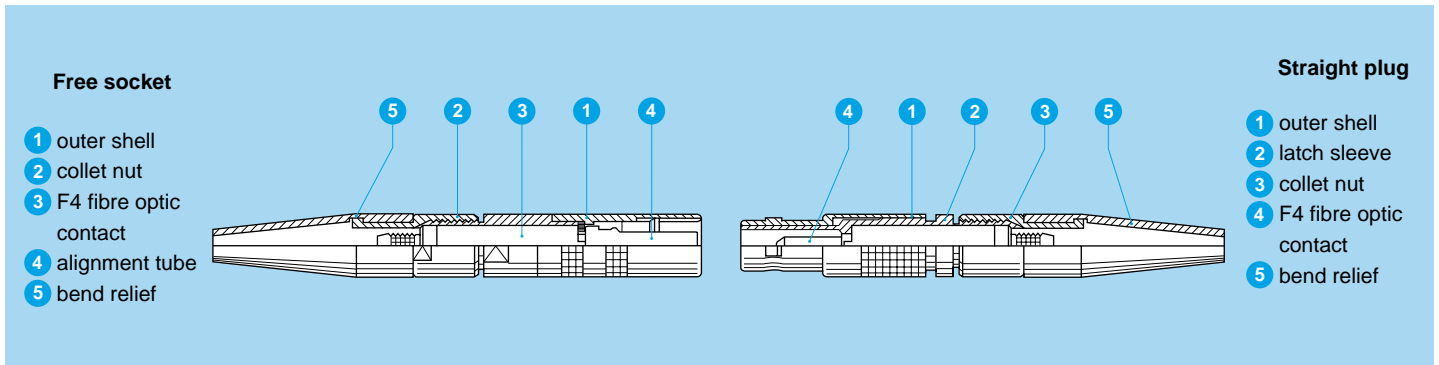
**PEG** Fixed socket, nut fixing, key (G) or key (B), with bend relief, (back panel mounting)

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

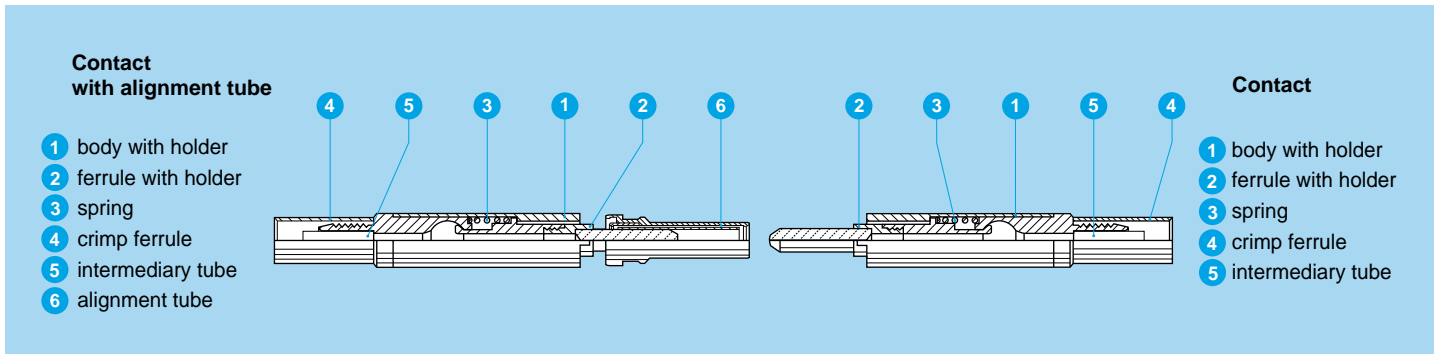
**PHG** Free socket, key (G)

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

## 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<br> | Model | No of keys | Angle    |     | Note |
|----------------------------|-------|------------|----------|-----|------|
|                            |       |            | $\alpha$ |     |      |
|                            | ●●G   | 1          |          | 0°  | ●    |
|                            | ●●B   | 2          | $\alpha$ | 60° | ○    |

● First choice alternative    ○ Special order alternative

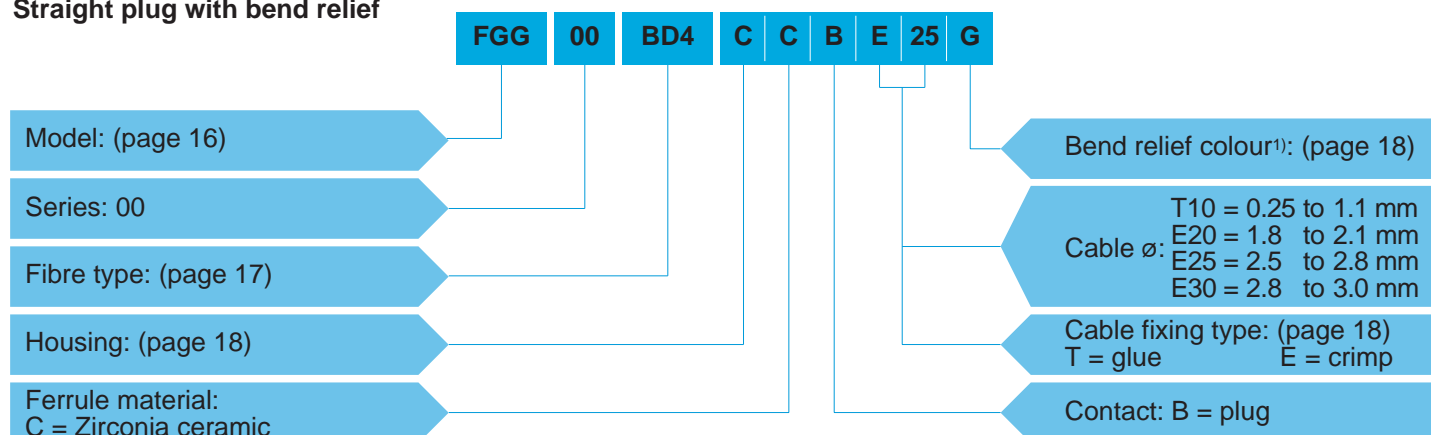


## Part Number Example

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

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

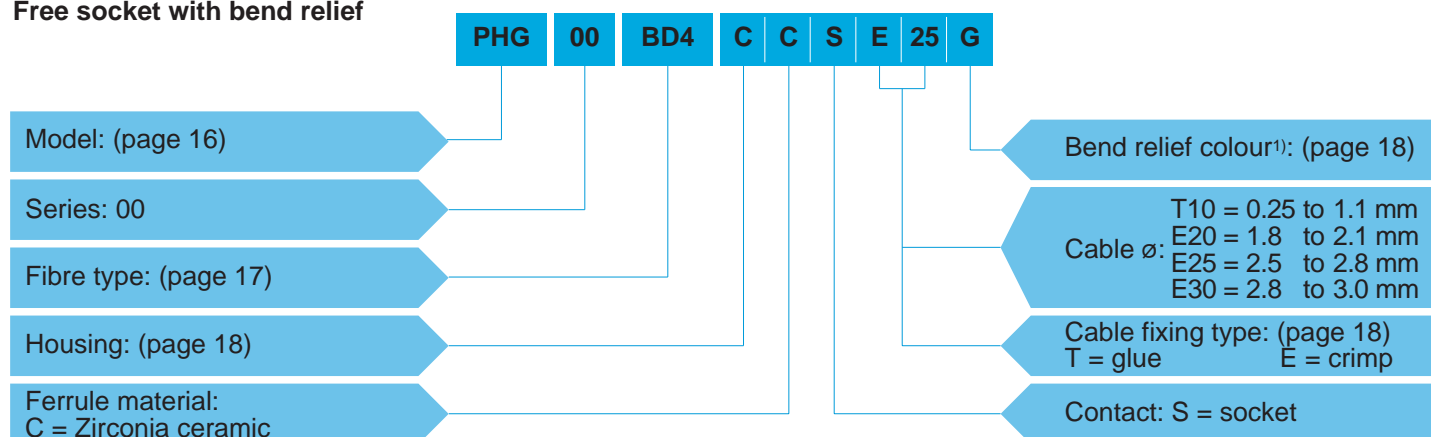
### Straight plug with bend relief



**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.

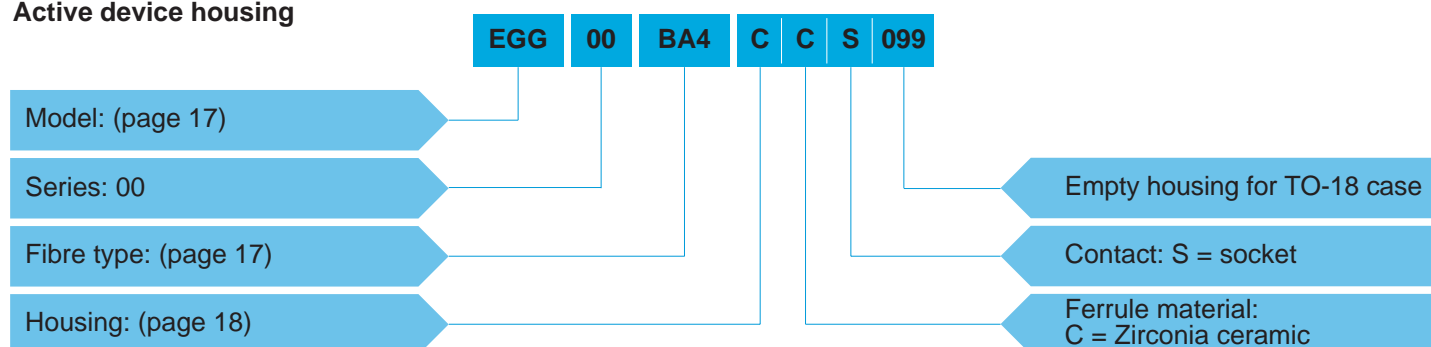
### Free socket with bend relief



**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.

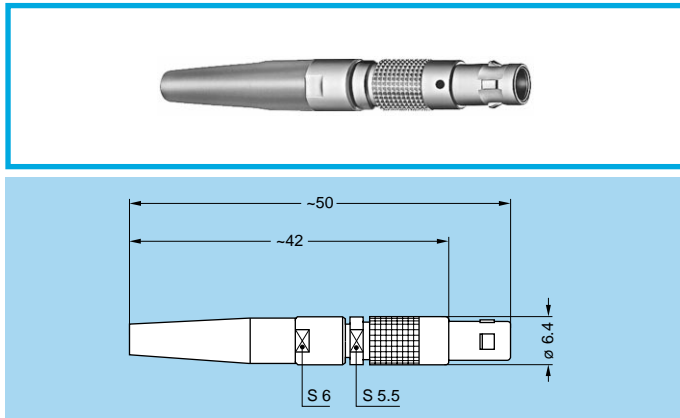
### Active device housing



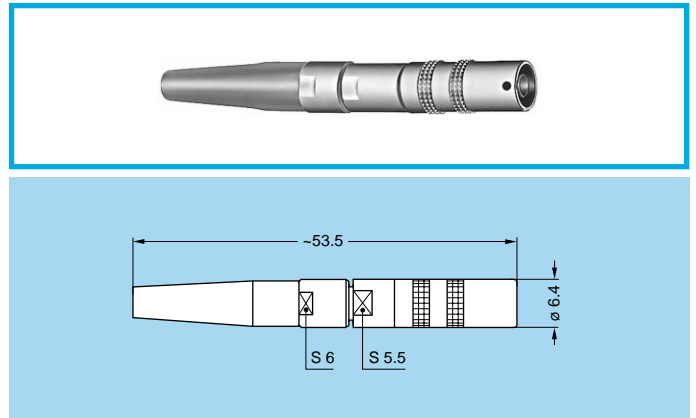
**EGG.00.BA4.CCS099** = Straight active device housing, nut fixing with key (G), 00 series, with ferrule for F4 fibre optic contact, assembled with single-mode fibre ø 9/125, chrome-plated brass housing, zirconia ceramic ferrule, socket contact, empty housing for TO-18 case.

**Model - Series**

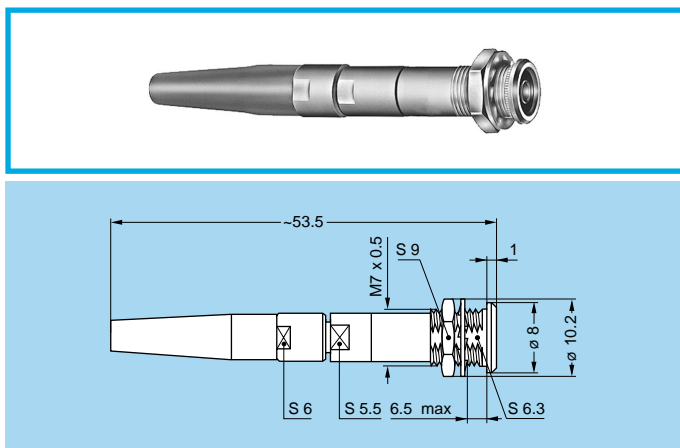
**FGG.00** Straight plug, key (G) or key (B), with bend relief



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

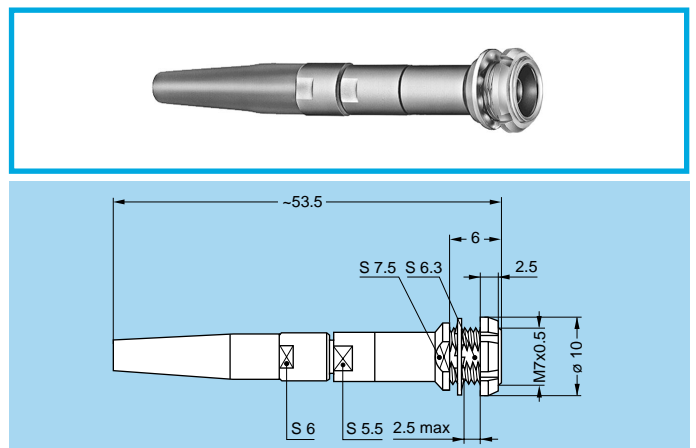


**PKG.00** Fixed socket, nut fixing, key (G) or key (B), with bend relief



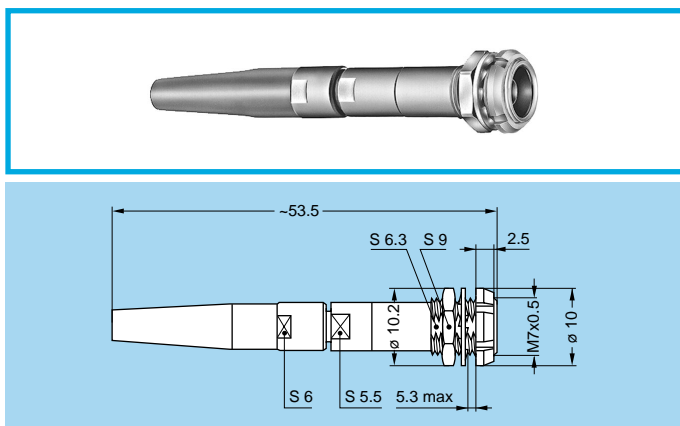
Panel cut-out (page 18)

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



Panel cut-out (page 18)

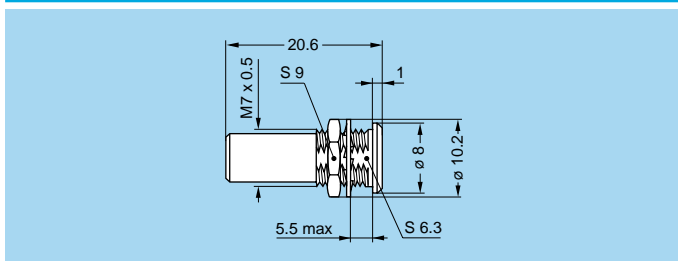
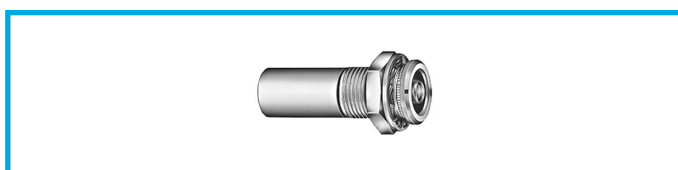
**PFG.00** Fixed socket, with two nuts, key (G) or key (B), with bend relief (back panel mounting)



Panel cut-out (page 18)

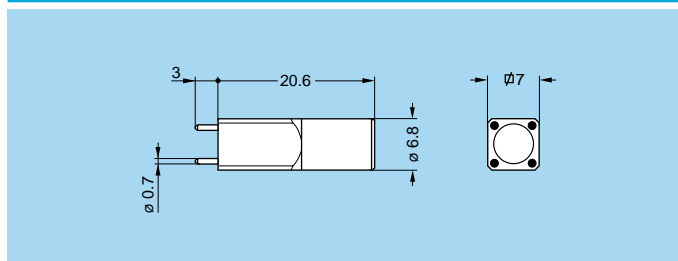
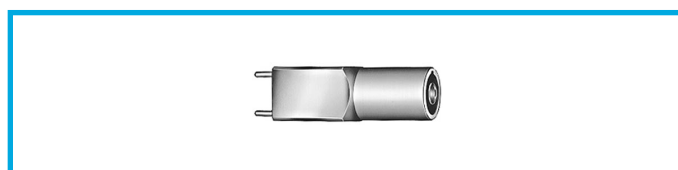
**Note:** The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

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



Panel cut-out (page 18)

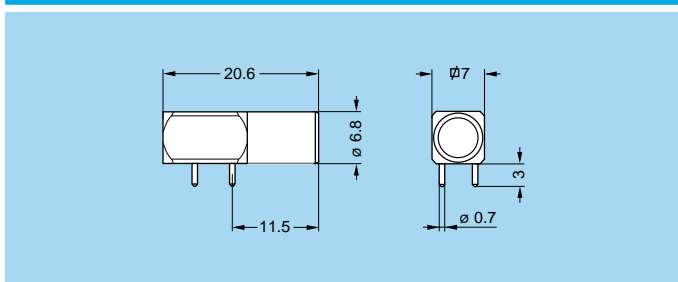
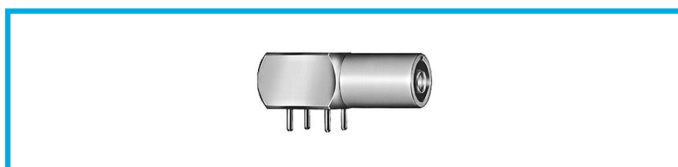
### EZG.00 Straight active device housing for printed circuit, key (G) or key (B)



Panel cut-out (page 18)

PCB drilling pattern (page 18)

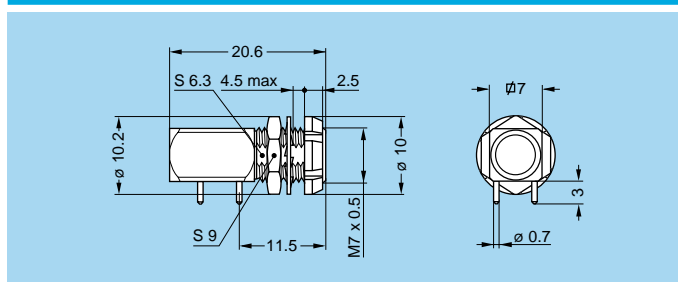
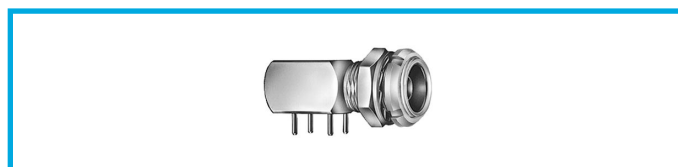
### EPG.00 Elbow active device housing (90°) for printed circuit, key (G) or key (B)



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 $\varnothing$ (mm) |
|-------------------|------------------------------|---------------------|--------------------------|
| Cable fixing Type | Reference $\varnothing$ (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.

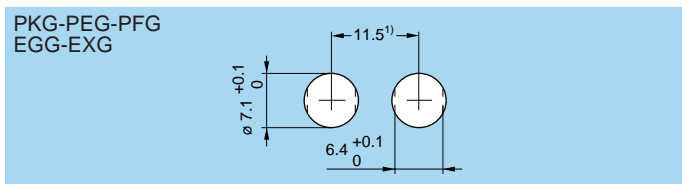
|      |        |      |        |      |        |      |        |      |        |
|------|--------|------|--------|------|--------|------|--------|------|--------|
| Ref. | Colour | Ref. | Colour | Ref. | Colour | Ref. | Colour | Ref. | Colour |
| A    | blue   | G    | grey   | M    | brown  | R   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

## Tooling

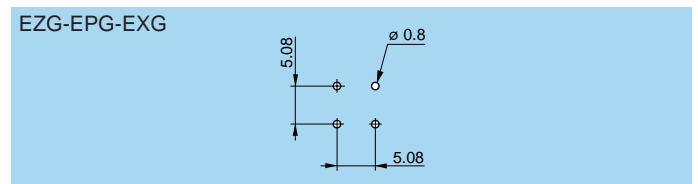
The full range of tools for terminating fibre optic F4 contacts for this 00 series is shown on pages 103 to 106. Consult the factory for the termination instructions.

## Panel Cut-Outs

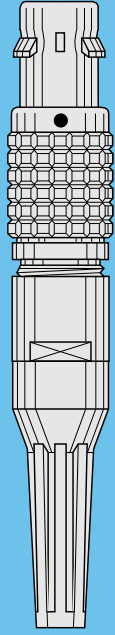
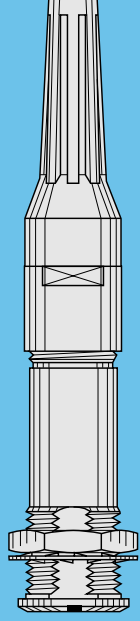
### Panel cut-outs



### 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:

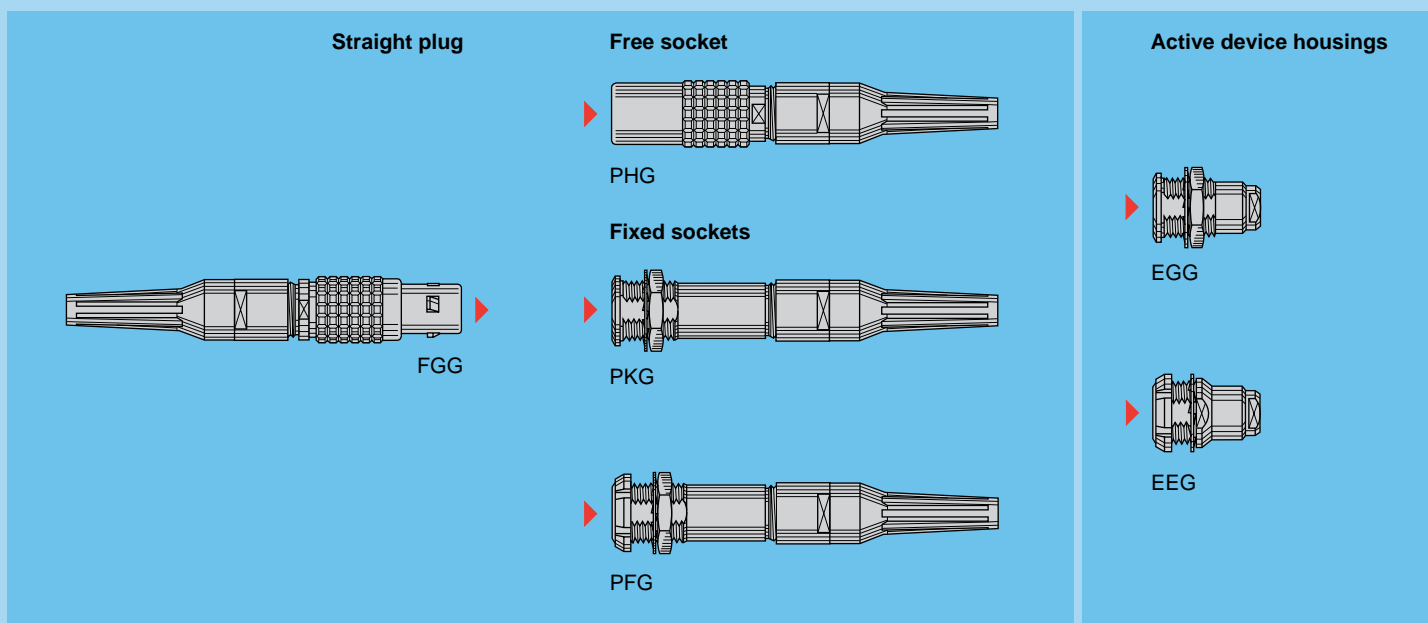
- Security of the LEMO Push-Pull self-latching system
- Minimum mounting space requirement (high packing density)
- Protection against accidental contamination or damage to the fibre end face because the ferrules do not protrude outside the connector shell
- The alignment key (G, A...F) ensures excellent 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)

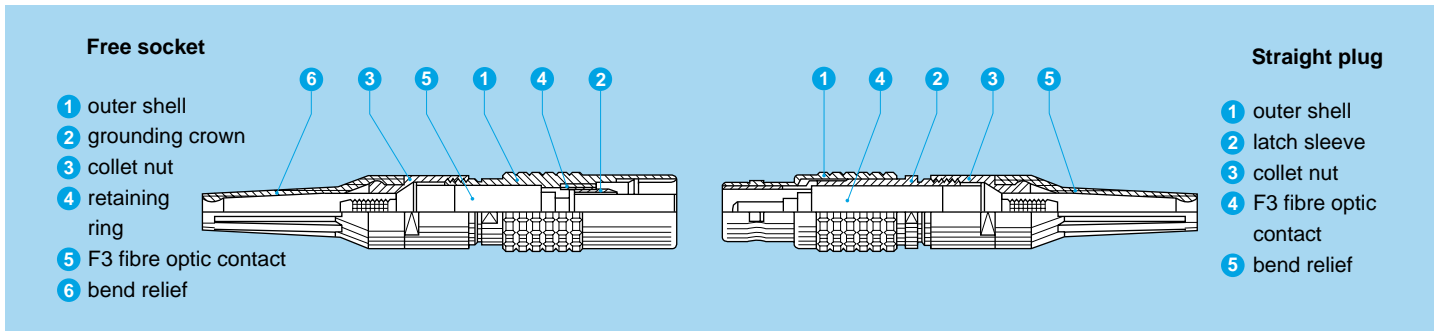
**FGG** Straight plug, key (G) or keys (A...F), with bend relief

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

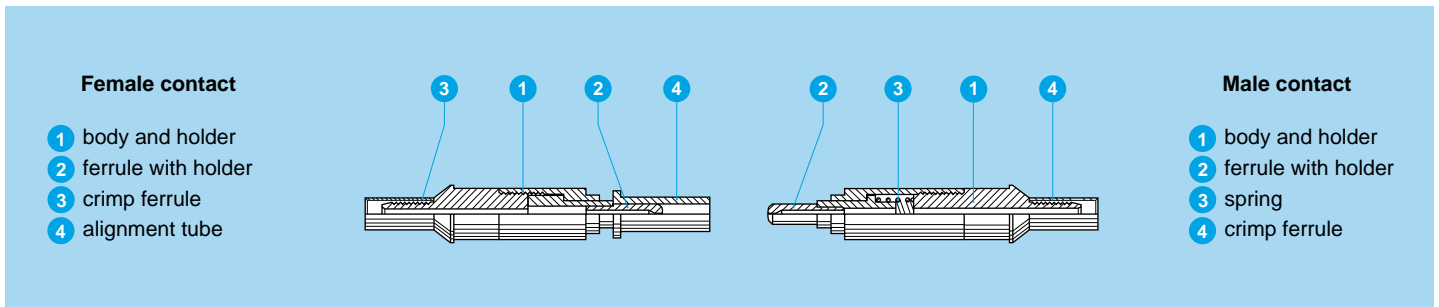
**PHG** Free socket, key (G) or keys (A...F), with bend relief

**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<br> | 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

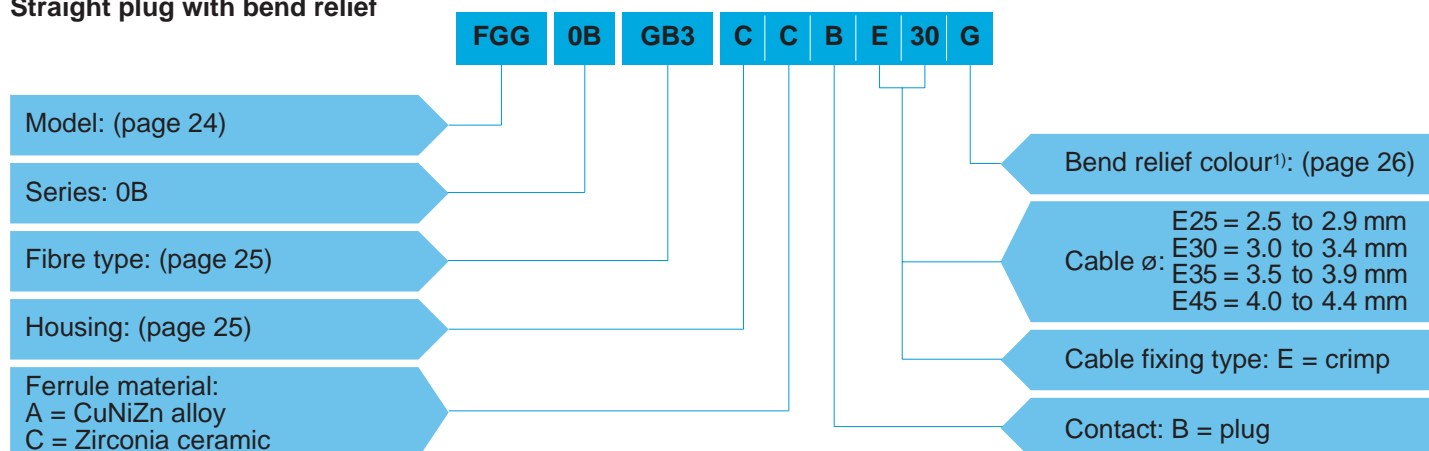


## Part Number Example

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

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

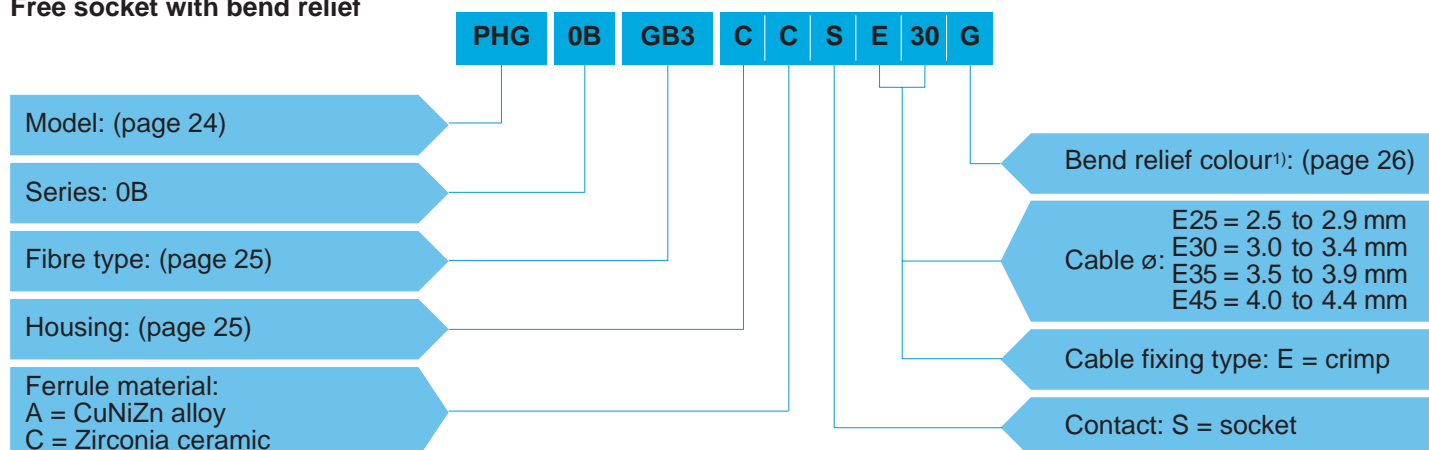
### Straight plug with bend relief



**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.

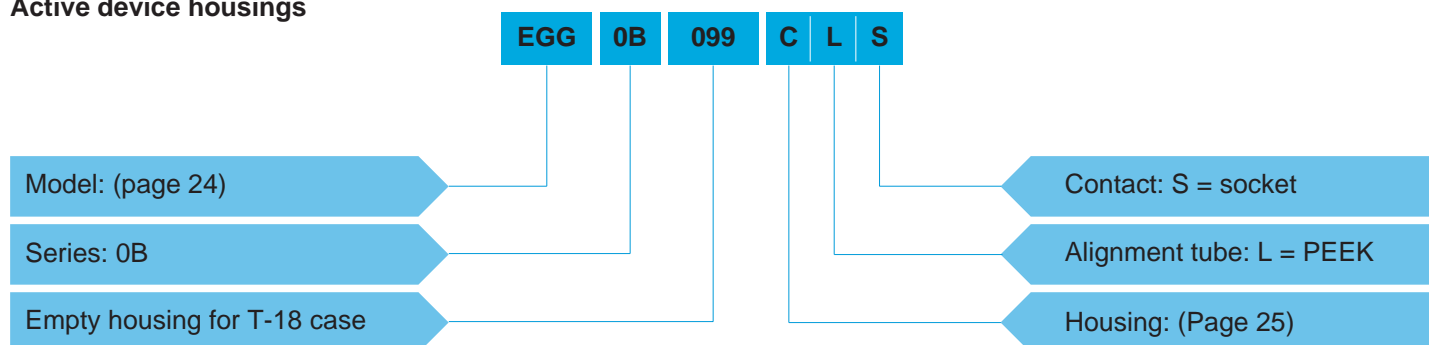
### Free socket with bend relief



**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.

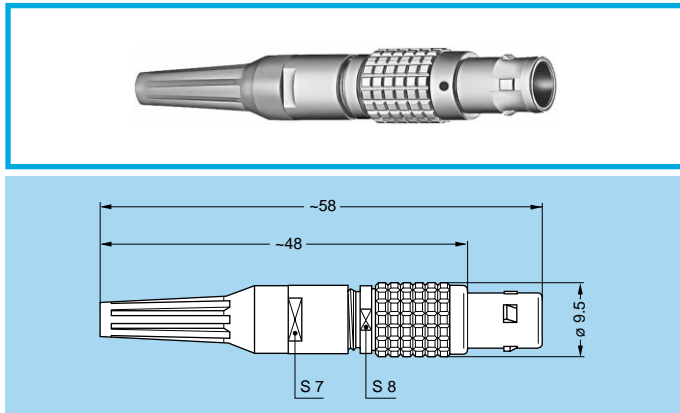
### Active device housings



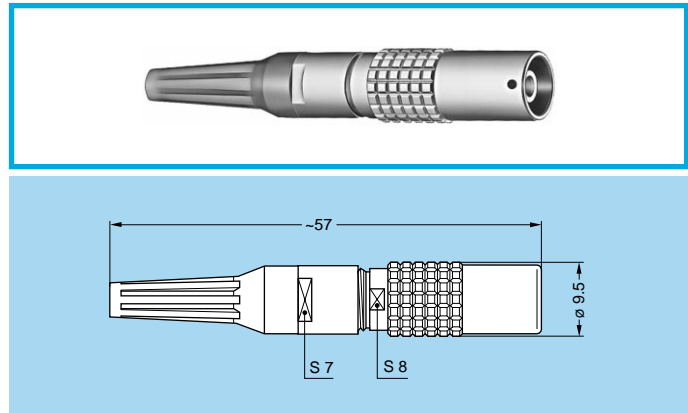
**EGG.0B.099.CLS** = Fixed active device housing, nut fixing, with key (G), 0B series, empty housing for TO-18 case, chrome-plated brass housing, PEEK alignment tube, socket contact.

**Model - Series**

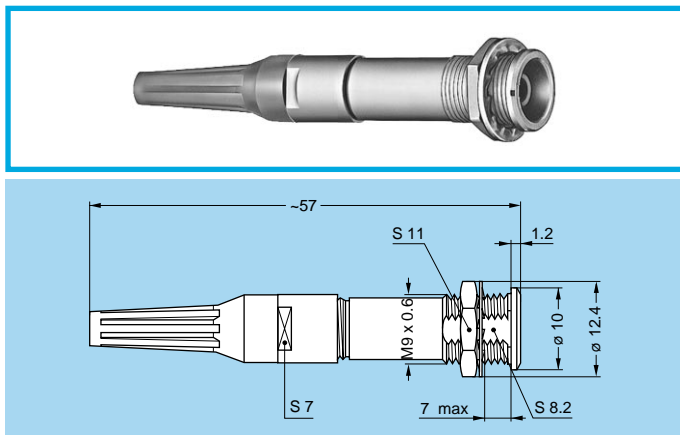
**FGG.0B** Straight plug, key (G) or keys (A...F), with bend relief



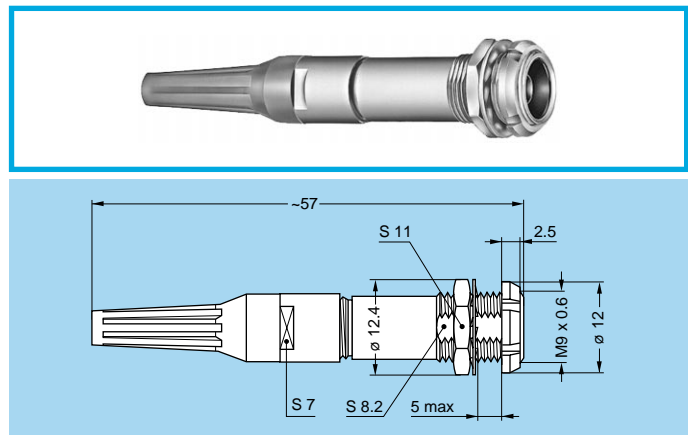
**PHG.0B** Free socket, key (G) or keys (A...F), with bend relief



**PKG.0B** Fixed socket, nut fixing, key (G) or keys (A...F), with bend relief



**PFG.0B** Fixed socket, with two nuts, key (G) or keys (A...F), with bend relief, (back panel mounting)

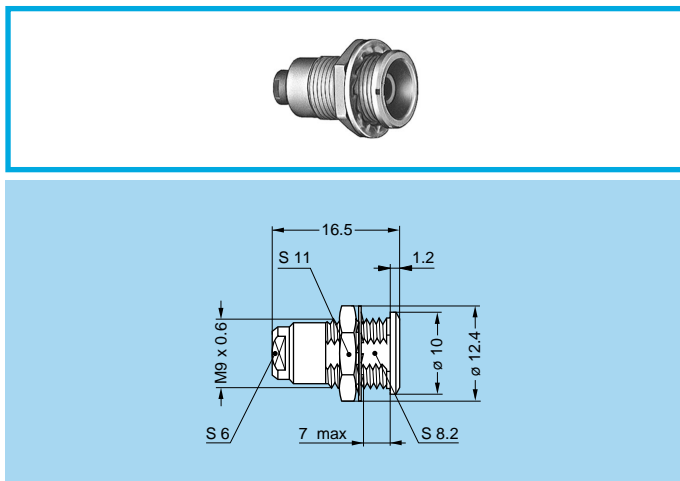


Panel cut-out (page 26)

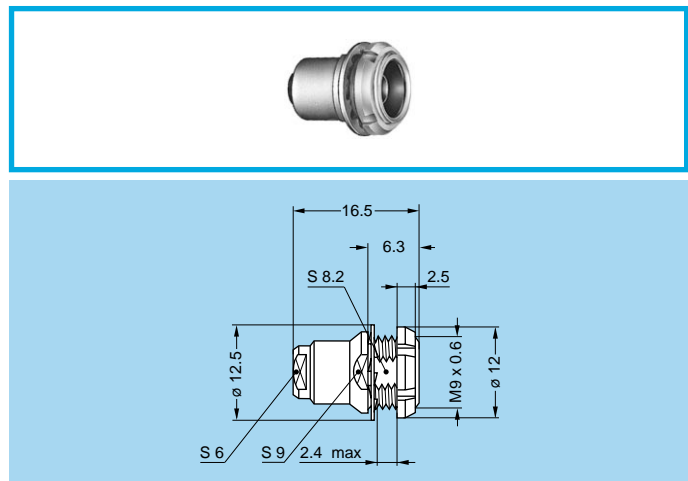
Panel cut-out (page 26)

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

**EGG.0B** Fixed active device housing, nut fixing, key (G) or keys (A...F)



**EEG.0B** Fixed active device housing, nut fixing, key (G) or keys (A...F), (back panel mounting)



Panel cut-out (page 26)

Panel cut-out (page 26)

## Fibre Type

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

| Reference | Core/cladding ø (µm) | Ferrule hole ø (µm) | Ferrule material | Material ref. | Fibre type | Note |
|-----------|----------------------|---------------------|------------------|---------------|------------|------|
| FB3       | 100/140              | 144                 | Ceramic          | C             | Silica     | ●    |
| GA3       | 200/230              | 230                 | Ceramic          | C             | HCS        | ○    |
| GB3       | 200/230              | 235                 | Ceramic          | C             | HCS        | ●    |
| HA3       | 300/330              | 330                 | Ceramic          | C             | HCS        | ○    |
| HB3       | 300/330              | 335                 | Ceramic          | C             | HCS        | ●    |
| JA3       | 400/430              | 430                 | Metal            | A             | HCS        | ○    |
| JB3       | 400/430              | 435                 | Metal            | A             | HCS        | ●    |
| KA3       | 600/630              | 630                 | Metal            | A             | HCS        | ○    |
| KB3       | 600/630              | 640                 | Metal            | A             | HCS        | ●    |
| LA3       | 800/830              | 830                 | Metal            | A             | HCS        | ○    |
| LB3       | 800/830              | 845                 | Metal            | A             | HCS        | ●    |
| MA3       | 1000/1035            | 1035                | Metal            | A             | HCS        | ○    |
| MB3       | 1000/1035            | 1050                | Metal            | A             | HCS        | ●    |
| NA3       | 500                  | 500                 | Metal            | A             | Polymer    | ○    |
| NB3       | 500                  | 550                 | Metal            | A             | Polymer    | ●    |
| PA3       | 750                  | 750                 | Metal            | A             | Polymer    | ○    |
| PB3       | 750                  | 825                 | Metal            | A             | Polymer    | ●    |
| RA3       | 1000                 | 1000                | Metal            | A             | Polymer    | ○    |
| RB3       | 1000                 | 1100                | Metal            | A             | Polymer    | ●    |
| RK3       | 1400                 | 1430                | Metal            | A             | Polymer    | ●    |
| SA3       | 1500                 | 1500                | Metal            | A             | Polymer    | ○    |
| SB3       | 1500                 | 1650                | Metal            | A             | Polymer    | ●    |
| TA3       | 200/380              | 380                 | Metal            | A             | PCS        | ○    |
| TB3       | 200/380              | 410                 | Metal            | A             | PCS        | ●    |
| VA3       | 300/440              | 440                 | Metal            | A             | PCS        | ○    |
| VB3       | 300/440              | 475                 | Metal            | A             | PCS        | ●    |
| WA3       | 600/750              | 750                 | Metal            | A             | PCS        | ●    |
| WB3       | 600/750              | 810                 | Metal            | A             | PCS        | ●    |

● First choice alternative  
○ Special order alternative

## Housing

| Ref. | Material        | Surface treatment          |                                     | Note |
|------|-----------------|----------------------------|-------------------------------------|------|
|      |                 | Outer shell and collet nut | Latching 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

## ▶ Bend Relief

Models FGG, PHG, PKG 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 |
|------|--------|
| A    | blue   |
| B    | white  |

| Ref. | Colour |
|------|--------|
| G    | grey   |
| J    | yellow |

| Ref. | Colour |
|------|--------|
| M    | brown  |
| N    | black  |

| Ref. | Colour |
|------|--------|
| R    | red    |
| S    | orange |

| Ref. | Colour |
|------|--------|
| V    | green  |

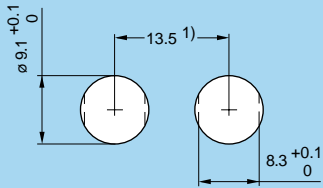
## ▶ Tooling

The full range of tools for terminating fibre optic F3 contacts of this 0B series is shown on pages 104 to 106. Consult the factory for the termination instructions.

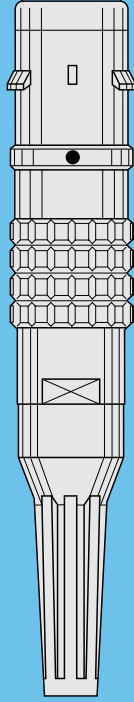
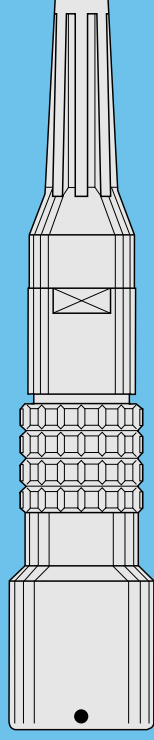
## Panel Cut-Outs

### Panel cut-outs

PKG-PFG-EGG-EEG



**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.  
Mounting nut torque: **2.5 Nm**.  
The value shown above is the maximum torque for each connector type.



**OK SERIES**



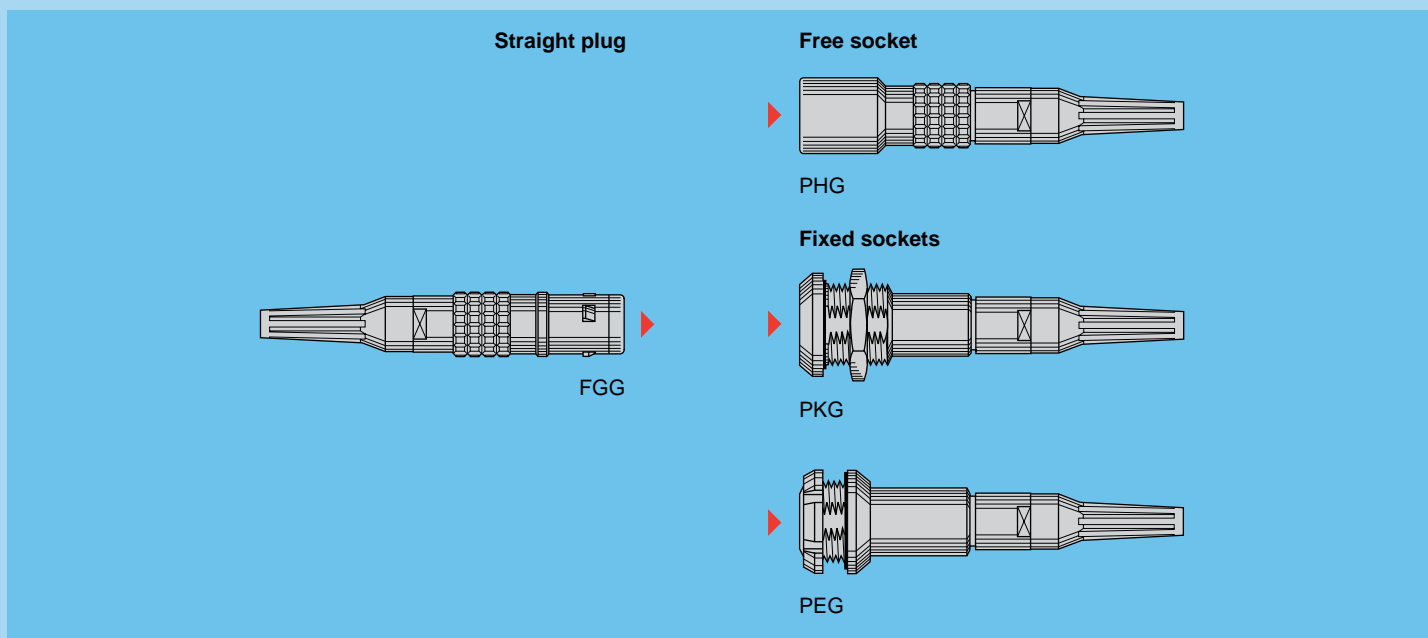
# OK Series

The LEMO OK series fibre optic connector is ideal for use in harsh environments. The mated connectors are sealed to IP 66-IP 68 (underwater immersion to 1.5 m depth). It uses the standard LEMO **F2** fibre optic contact which has undergone extensive mechanical, optical and environmental testing and has seen service in many critical applications such as outside broadcast television.

Based upon the proven LEMO Push-Pull self-latching system, this new fibre optic connector features:

- Sealed to IP 66-IP 68 for environmental protection
- Highly compact design for space saving
- Very low insertion loss for both multi-mode and single-mode fibres
- Low back reflection performance
- The alignment key (G, A...F) ensures excellent repeatability of performance during frequent matings
- Fully floating 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
- Field termination possible
- Excellent shock and vibration resistance.

## Interconnections



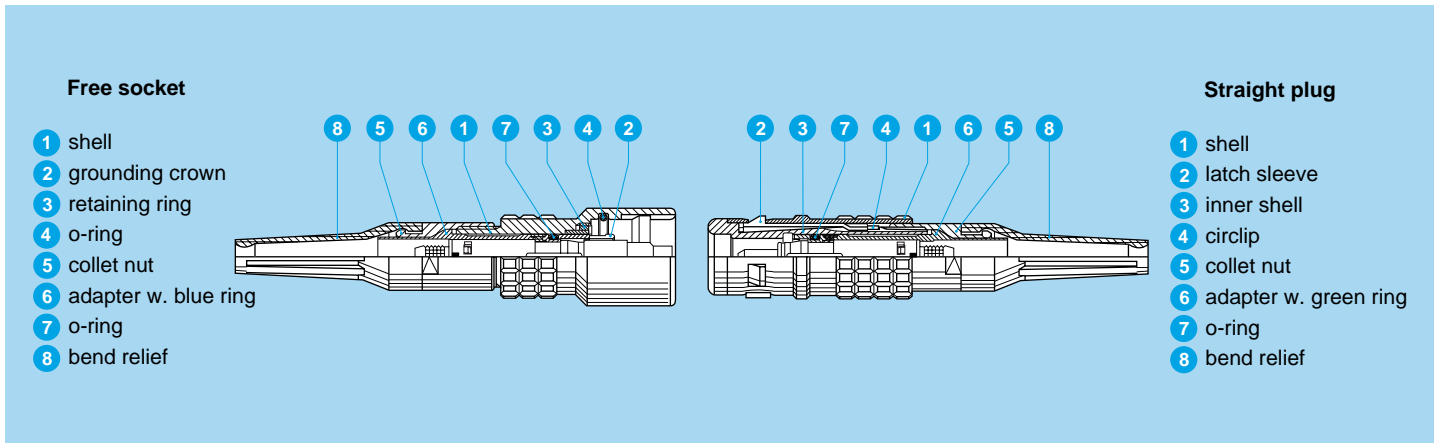
## Model Description

- FGG** Straight plug, key (G) or keys (A...F) and cable adapter, with bend relief
- PEG** Fixed socket, nut fixing, key (G) or keys (A...F) and cable adapter, with bend relief (back panel mounting)

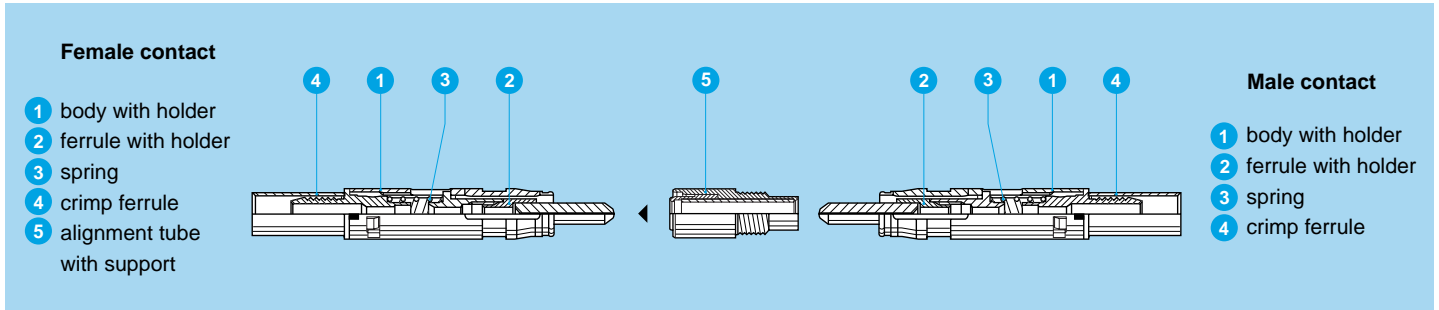
- PHG** Free socket, key (G) or keys (A...F) and cable adapter, with bend relief

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

## Part Section Showing Internal Components Connector



## F2 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 66-IP 68                     | IEC 60529       |
| Cable retention                  | 100 N                           | IEC 61300-02-04 |
| Impact (Method A)                | 1 m onto concrete floor         | IEC 61300-02-12 |
| Shock (3 cycles in 2 directions) | 100 g, 10-50 ms;<br>20 g 6-9 ms | IEC 61300-02-09 |
| Vibration (7 cycles)             | Diagram 2 page 111              | IEC 61300-02-01 |

### 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

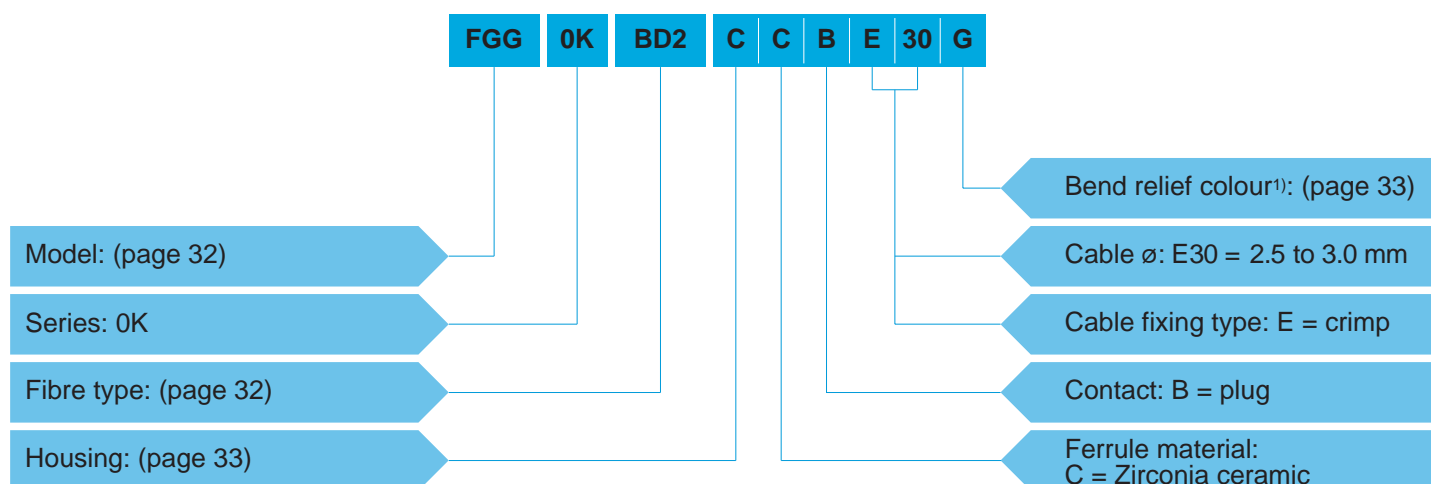
| Model | No of keys | Angles |      | Note |
|-------|------------|--------|------|------|
| ●●G   | 1          | α      | 0°   | ●    |
| ●●A   | 2          |        | 30°  | ●    |
| ●●B   | 2          |        | 45°  | ●    |
| ●●C   | 2          |        | 60°  | ●    |
| ●●D   | 2          | γ      | 95°  | ○    |
| ●●E   | 2          | β      | 120° | ○    |
| ●●F   | 2          |        | 145° | ○    |

● First choice alternative    ○ Special order alternative



## Part Number Example

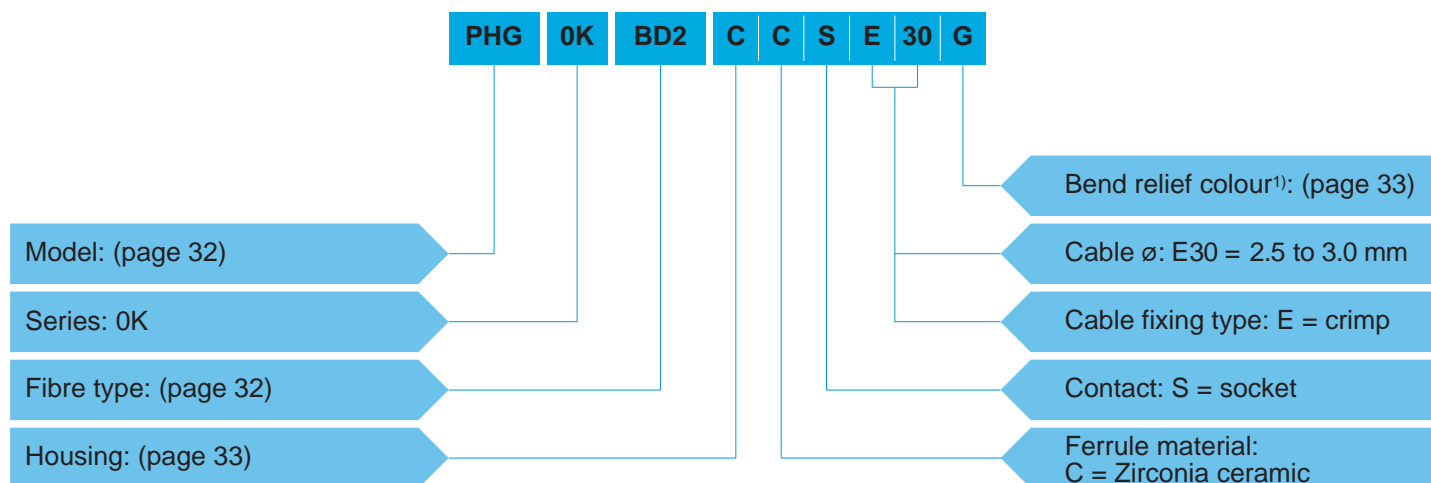
### Straight plug with bend relief



**FGG.0K.BD2.CCBE30G** = Straight plug with key (G), 0K series, F2 fibre optic contact, ferrule hole ø 128 µm, chrome-plated brass housing, zirconia ceramic ferrule, plug type contact, crimp type cable fixing for 2.5 to 3.0 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

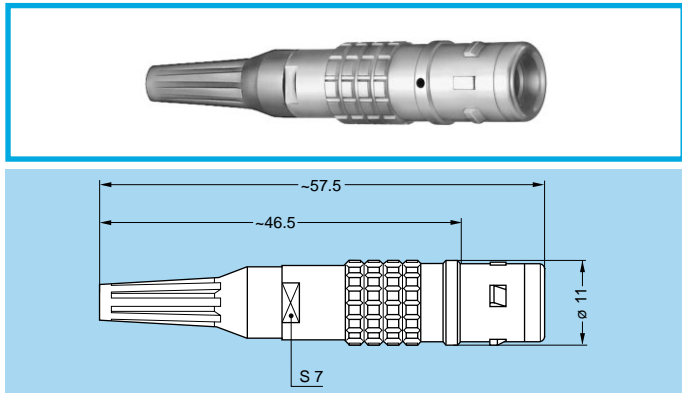


**PHG.0K.BD2.CCSE30G** = Free socket with key (G), 0K series, F2 fibre optic contact, ferrule hole ø 128 µm, chrome-plated brass housing, zirconia ceramic ferrule, socket type contact, crimp type cable fixing for 2.5 to 3.0 mm diameter cable, and gray bend relief.

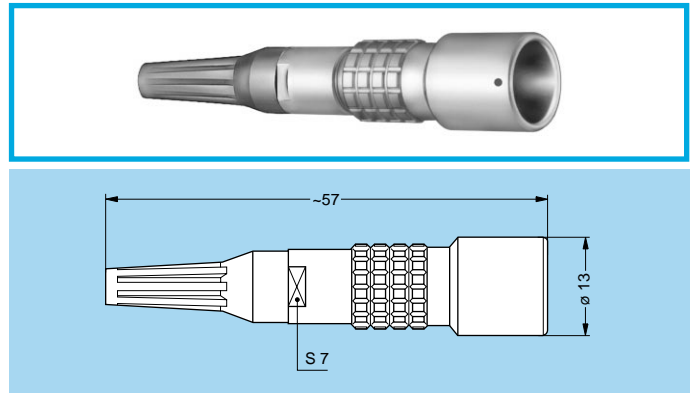
**Note:** <sup>1)</sup> The bend relief sleeve is necessary to the proper function of the connector thus the connector can only be ordered with the appropriate sleeve.

# Models - Series

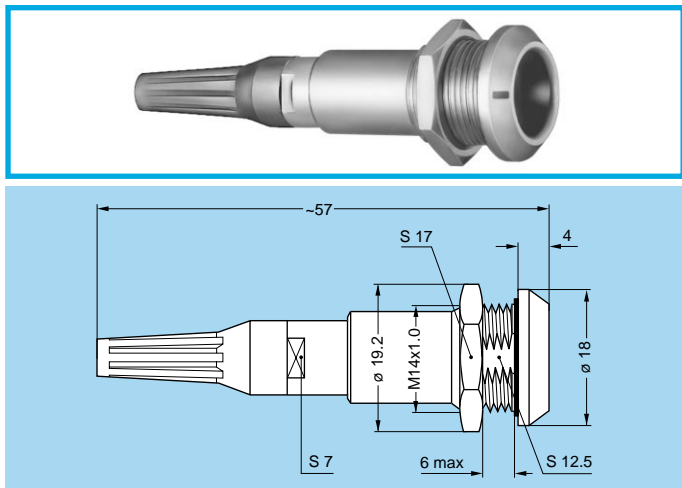
**FGG.0K** Straight plug, key (G) or keys (A...F) and cable adapter, with bend relief



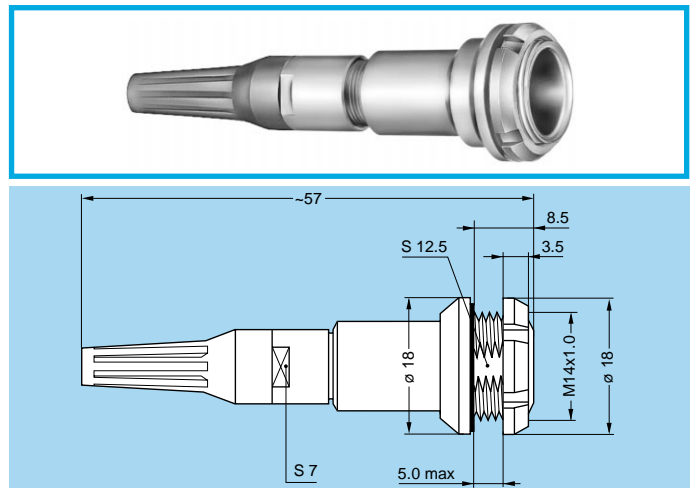
**PHG.0K** Free socket, key (G) or keys (A...F) and cable adapter, with bend relief



**PKG.0K** Fixed socket, nut fixing, key (G) or keys (A...F) and cable adapter, with bend relief



**PEG.0K** Fixed socket, nut fixing, key (G) or keys (A...F) and cable adapter, with bend relief (back panel mounting)



Panel cut-out (page 33)

Panel cut-out (page 33)

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

# 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) |
|-----------|----------------------|----------------------------|---------|
| BA2       | 9/125                | 125                        | ●       |
| BB2       | 50/125               | 126                        | ●       |
| BC2       | 62.5/125             | 127                        | ○       |
| BD2       | 100/125              | 128                        | ○       |
| FA2       | 100/140              | 140                        | ○       |
| FB2       |                      | 144                        | ●       |

**Note:**

1) The BA2 type (ferrule hole 125 µm) is recommended for single-mode fibres. The BB2 type (ferrule hole 126 µm) is commonly used with multi-mode fibres.

● First choice alternative ○ Special order alternative

## ▶ □ □ □ □ □ □ □ □ Housing

| Ref. | Material        | Surface treatment          |                                     | Note |
|------|-----------------|----------------------------|-------------------------------------|------|
|      |                 | Outer shell and collet nut | Latching 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

## ▶ □ □ □ □ □ □ □ □ Bend Relief

All models 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 |
|------|--------|
| A    | blue   |
| B    | white  |

| Ref. | Colour |
|------|--------|
| G    | grey   |
| J    | yellow |

| Ref. | Colour |
|------|--------|
| M    | brown  |
| N    | black  |

| Ref. | Colour |
|------|--------|
| R    | red    |
| S    | orange |

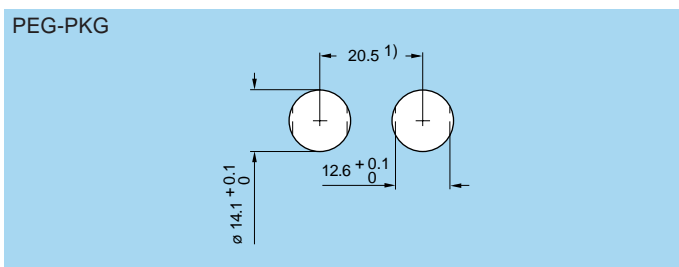
| Ref. | Colour |
|------|--------|
| V    | green  |
|      |        |

## ▶ □ □ □ □ □ □ Tooling

The full range of tools for terminating fibre optic F2 contacts of this OK series is shown on pages 103 to 106. Consult the factory for the termination instructions.

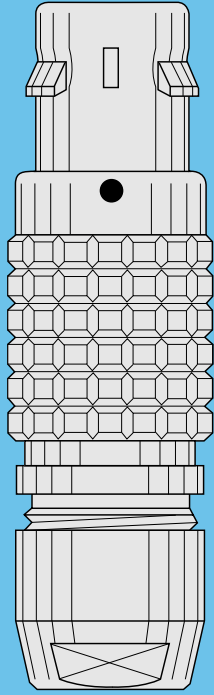
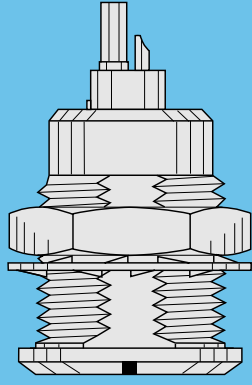
## Panel Cut-Outs

### Panel cut-outs

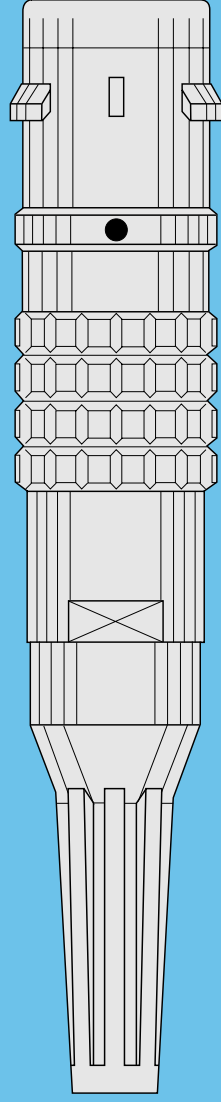
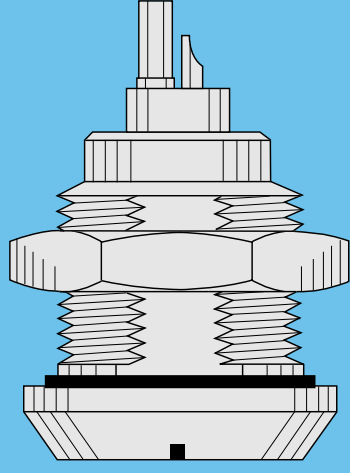


**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.  
 Mounting nut torque: **5 Nm**.  
 The value shown above is the maximum torque for each connector type.





**2B-5B SERIES**



**2K-5K SERIES**



## 2B-5B Series

The 2B-5B connectors have been designed to work with the LEMO **F1** or **F2** type fibre optic contacts.

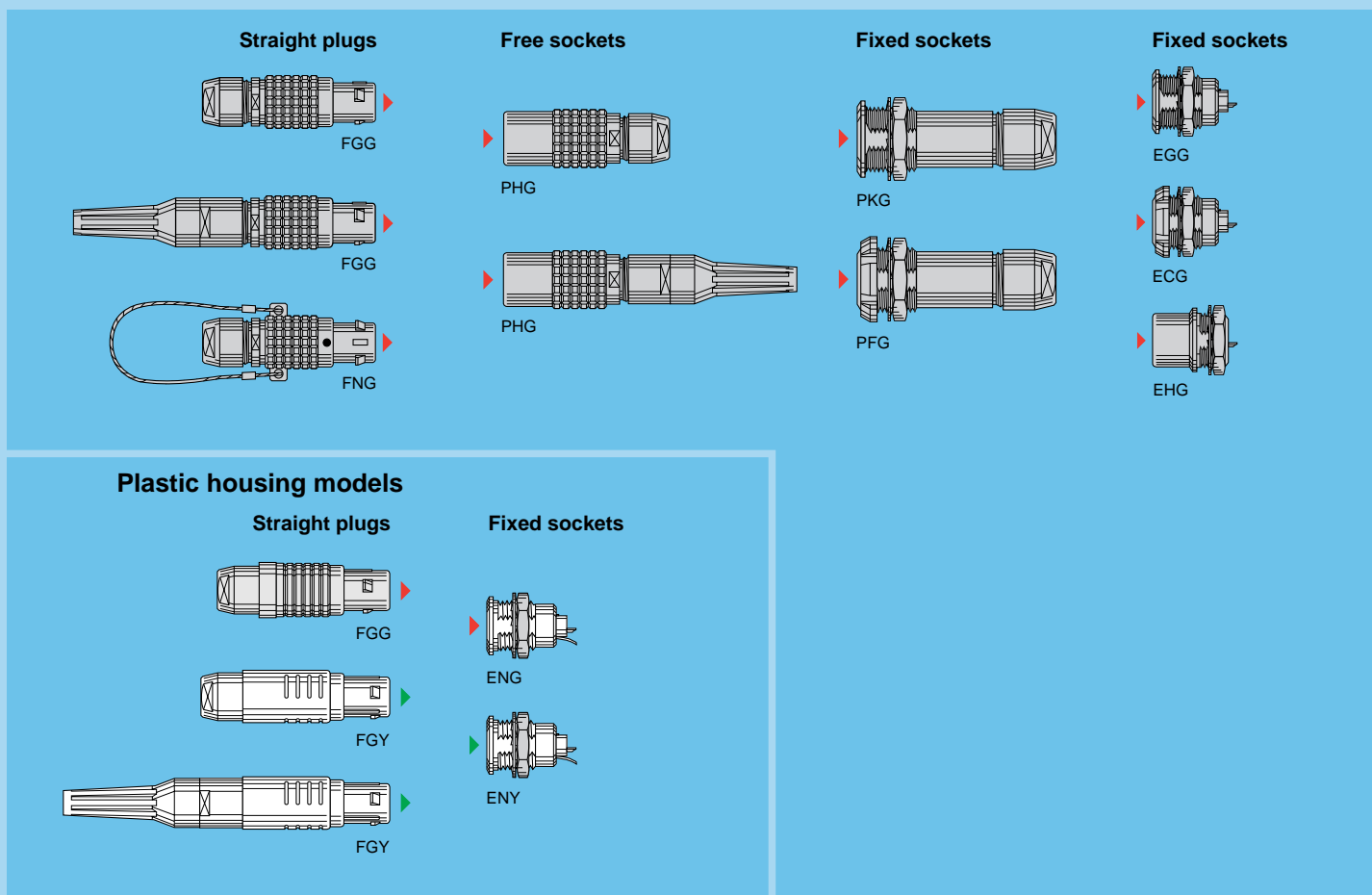
The main features of these series are as follows:

- Security of the LEMO Push-Pull self-latching system
- Protection against accidental contamination or damage to the fibre end face because the ferrules are recessed within the connector shell
- The alignment key (G, A...L, Y and R) ensures excellent repeatability of performance during frequent matings
- A choice of configurations of multi fibre or mixed optical/electrical contacts.

The 2B-5B series consist of fifteen models. The possible outer cable diameters range from 1.5 to 25 mm.

Depending upon the type of fibre optic contact chosen, the connectors can accommodate single-mode fibres in Si/Si 9/125 or multi-mode fibres in silica or plastic with an external diameter up to 1500 µm.

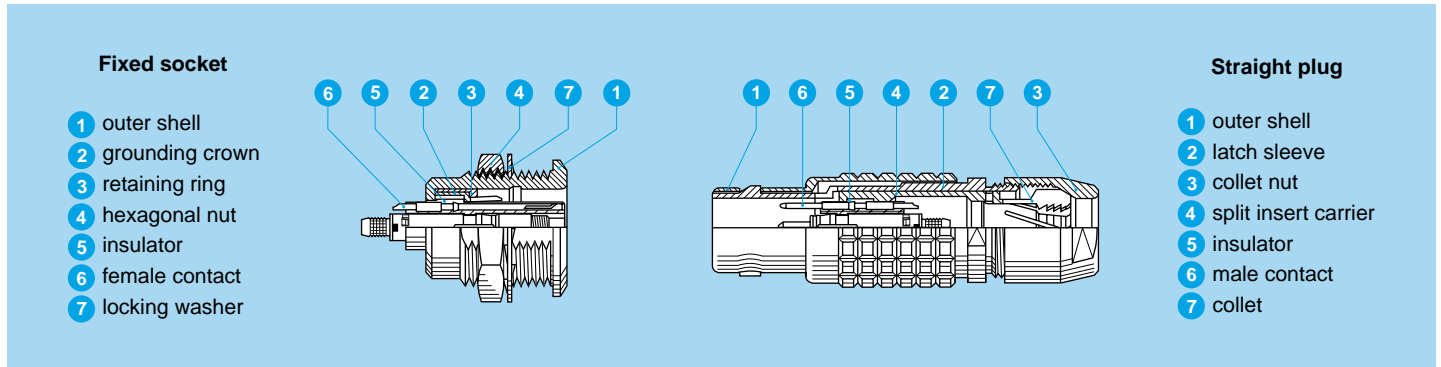
### Interconnections



### Model Description

- |  |  |  |
|--|--|--|
| <b>ECG</b> Fixed socket, with two nuts, key (G) or keys (A...L and R), (back panel mounting)     | <b>FGG</b> Straight plug, key (G or J), cable collet, PEEK outer shell   | <b>PHG</b> Free socket, key (G) or keys (A...L) and cable collet and nut for fitting a bend relief |
| <b>EGG</b> Fixed socket, nut fixing, key (G) or keys (A...L and R)                               | <b>FGY</b> Straight plug, keys (Y), cable collet and PSU or PPSU outer shell                                   | <b>PKG</b> Fixed socket, nut fixing, key (G) or keys (A...L and R) and cable collet                |
| <b>EHG</b> Fixed socket, nut fixing, key (G) or keys (A...L and R) with visible shell            | <b>FGY</b> Straight plug, keys (Y), cable collet and PSU or PPSU outer shell and nut for fitting a bend relief |  |
| <b>ENG</b> Fixed socket with grounding tab, nut fixing, key (G or J), PEEK outer shell           | <b>FNG</b> Straight plug, key (G) or keys (A...L and R) and cable collet with lanyard release                  |  |
| <b>ENY</b> Fixed socket with grounding tab, nut fixing, keys (Y), PSU or PPSU outer shell        | <b>PFG</b> Fixed socket, with two nuts, key (G) or keys (A...L and R) and cable collet (back panel mounting)   |  |
| <b>FGG</b> Straight plug, key (G) or keys (A...L and R) and cable collet                         | <b>PHG</b> Free socket, key (G) or keys (A...L and R) and cable collet   |  |
| <b>FGG</b> Straight plug, key (G) or keys (A...L) cable collet and nut for fitting a bend relief |  |  |

## Part Section Showing Internal Components



## Technical Characteristics

### Mechanical and Environmental

| Characteristics                         | Value            | Standard             |
|---|------------------|----------------------|
| Mating durability                       | > 5000 cycles    | IEC 60512-5 test 9a  |
| Humidity                                | up 95% to 60°C   |                      |
| Temperature cycling                     | -55°C + 90°C     |                      |
| Resistance to vibration                 | 10-2000 Hz, 15 g | IEC 60512-4 test 6d  |
| Shock resistance                        | 100 g, 6 ms      | IEC 60512-4 test 6c  |
| Salt spray corrosion test <sup>1)</sup> | > 144h           | IEC 60512-6 test 11f |
| Protection index (mated)                | IP 50            | IEC 60529            |

**Note:** <sup>1)</sup> The outer shells are in chrome-plated brass (Cr1).

### Electrical

| Characteristics      | Value     | Standard |
|----------------------|-----------|----------|
| Shielding efficiency | at 10 MHz | > 75 dB  |
|                      | at 1 GHz  | > 40 dB  |

**Note:**

The various tests have been carried out with FGG and EGG connector pairs, with chrome-plated brass shell and PEEK insulator. Detailed electrical characteristics, as well as materials and treatment are presented in the chapter Technical Characteristics on page 107.

### Optical

**Note:** Detailed optical performances for F1 or F2 fibre optic contacts are given on pages 109 to 111.

## Alignment Key and Polarized Keying Systems

| Front view of a socket | Model | No of keys | Angle    | Series |       |        |       | Type of fibre optic or LV contact |        | Note            |
|------------------------|-------|------------|----------|--------|-------|--------|-------|-----------------------------------|--------|-----------------|
|                        |       |            |          | 2B     | 3B    | 4B     | 5B    | Plug                              | Socket |                 |
|                        |       |            |          | Series |       | Series |       | Series                            |        |                 |
|                        | ●●G   | 1          | $\alpha$ | 0°     | 0°    | 0°     | 0°    | male                              | female | ●               |
|                        | ●●A   | 2          |          | 30°    | 30°   | 30°    | 30°   | male                              | female | ●               |
|                        | ●●B   | 2          |          | 45°    | 45°   | 45°    | 45°   | male                              | female | ●               |
|                        | ●●C   | 2          |          | 60°    | 60°   | 60°    | 60°   | male                              | female | ●               |
|                        | ●●D   | 2          | $\gamma$ | 95°    | 95°   | 95°    | 95°   | male                              | female | ○               |
|                        | ●●E   | 2          |          | 120°   | 120°  | 120°   | 120°  | male                              | female | ○               |
|                        | ●●F   | 2          | $\beta$  | 145°   | 145°  | 145°   | 145°  | male                              | female | ○               |
|                        | ●●J   | 2          |          | 37.5°  | 37.5° | 37.5°  | 37.5° | female                            | male   | ●               |
|                        | ●●K   | 2          | $\alpha$ | 52.5°  | 52.5° | 52.5°  | 52.5° | female                            | male   | ○               |
|                        | ●●L   | 2          |          | 70°    | 70°   | 70°    | 70°   | female                            | male   | ○               |
|                        | ●●Y   | 3          | $\beta$  | 112.5° | 126°  | –      | –     | male                              | female | ● <sup>1)</sup> |
|                        |       | $\gamma$   |          | 100°   | 102°  | –      | –     |                                   |        |                 |

| Front view of a socket | Model | No of keys | Angle    | Series   |    |        |     | Type of fibre optic or LV contact |        | Note |      |
|------------------------|-------|------------|----------|----------|----|--------|-----|-----------------------------------|--------|------|------|
|                        |       |            |          | 2B       | 3B | 4B     | 5B  | Plug                              | Socket |      |      |
|                        |       |            |          | Series   |    | Series |     | Series                            |        |      |      |
|                        | ●●R   | 5          | $\alpha$ | –        | –  | –      | 95° | male                              | female | ○    |      |
|                        |       |            |          | $\beta$  | –  | –      | –   |                                   |        |      | 115° |
|                        |       |            |          | $\gamma$ | –  | –      | –   |                                   |        |      | 20°  |
|                        |       |            |          | $\delta$ | –  | –      | –   |                                   |        |      | 30°  |

**Note:** FGY, ENY models are not available with all the keys. Please consult pages corresponding to these models.

<sup>1)</sup> Only FGY and ENY models are available.

● First choice alternative    ○ Special order alternative

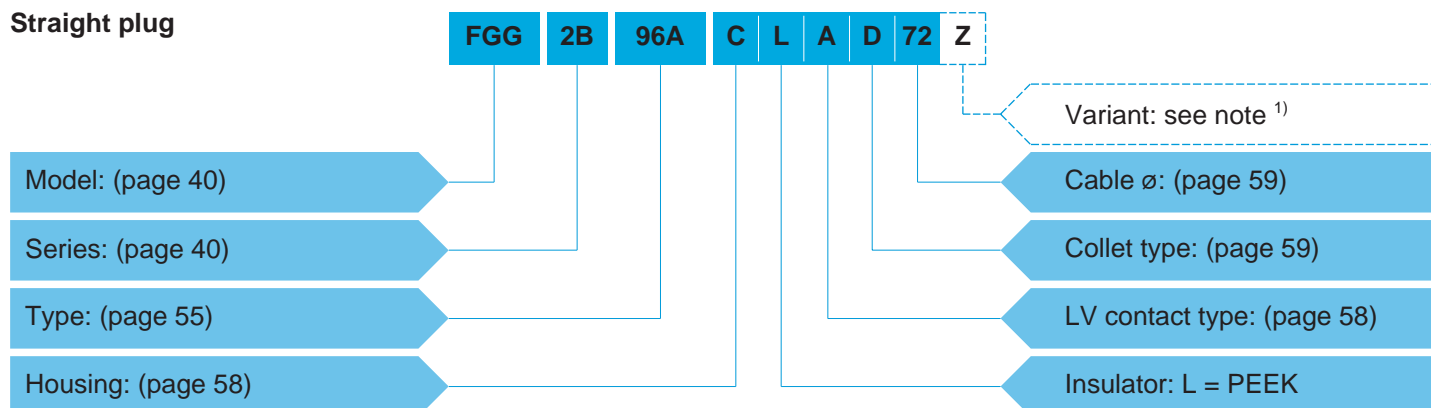


## Part Number Example

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

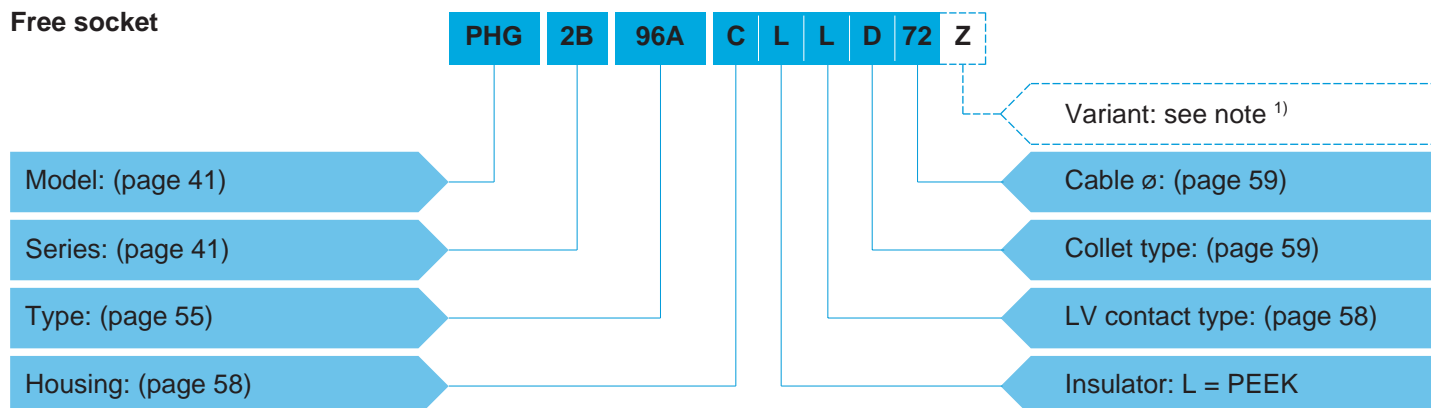
- Plugs or sockets for assembly onto cables
- Fixed sockets.

### Straight plug



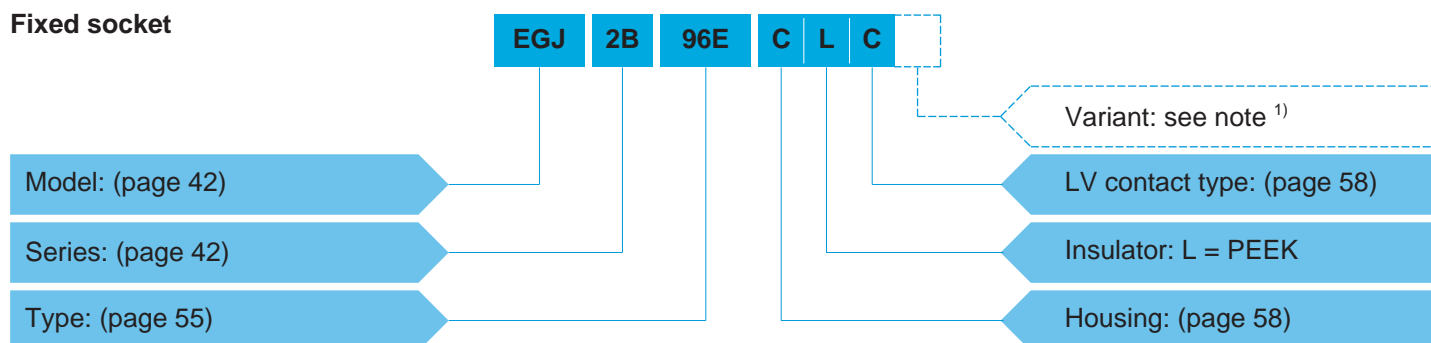
**FGG.2B.96A.CLAD72Z** = Straight plug with key (G), 2B series, mixed type to accept 1 F1 fibre optic contact and 2 low voltage electrical contacts, chrome-plated brass housing, PEEK insulator, 2 male solder electrical contacts, type D collet system to suit a 7.2 mm diameter cable, and a nut for fitting a bend relief.

### Free socket



**PHG.2B.96A.CLLD72Z** = Free socket with key (G), 2B series, mixed type to accept 1 F1 fibre optic contact and 2 low voltage electrical contacts, chrome-plated brass housing, PEEK insulator, 2 female solder electrical contacts, type D collet system to suit a 7.2 mm diameter cable, and a nut for fitting a bend relief.

### Fixed socket

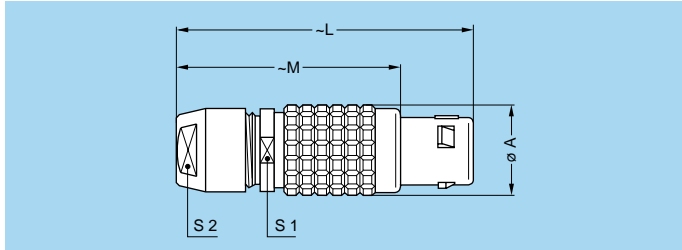
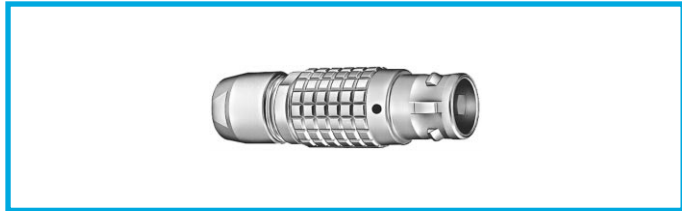


**EGJ.2B.96E.CLC** = Fixed socket with key (code J) 2B series, mixed type to accept 1 F1 fibre optic contact and 6 low voltage electrical contacts, chrome-plated brass housing, PEEK insulator, 6 male crimp electrical contacts.

**Connectors are delivered without fibre optic contacts, therefore they must be ordered separately according to the size and type of fibre (see pages 77 and 79). In case of hybrid with coax contacts type C, connectors are delivered without the coax contact. See page 58 for ordering.**

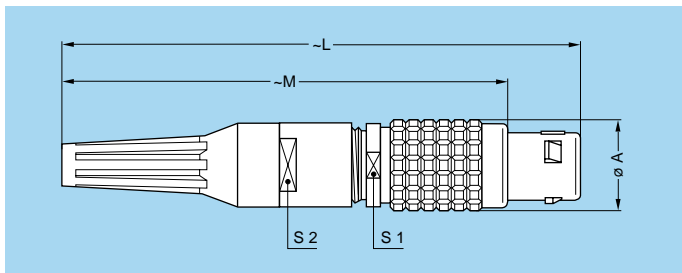
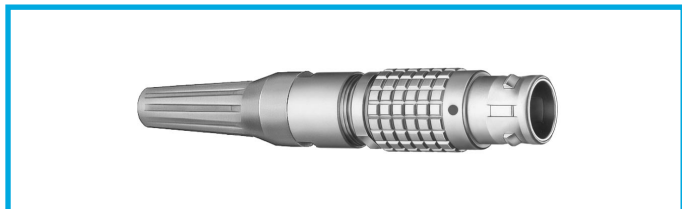
**Note:** <sup>1)</sup> The «Variant» position in the reference is used to specify either the presence of a collet nut for fitting the bend relief, or the anodized colour of the housing in aluminium alloy. For models with collet nut for fitting the bend relief, a «Z» should be indicated and a bend relief can be ordered separately as indicated in the «Accessories» section. An order for a connector with bend relief should thus include two part numbers. For the various housings available in colours, the corresponding letter in the part number for the colour is indicated on page 61.

# Models - Series



## FGG Straight plug, key (G) or keys (A...L and R) and cable collet

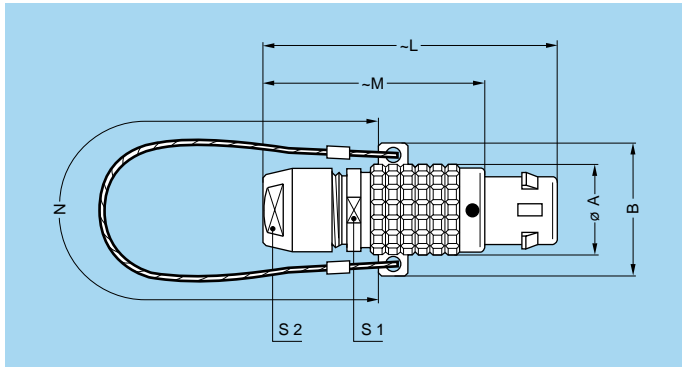
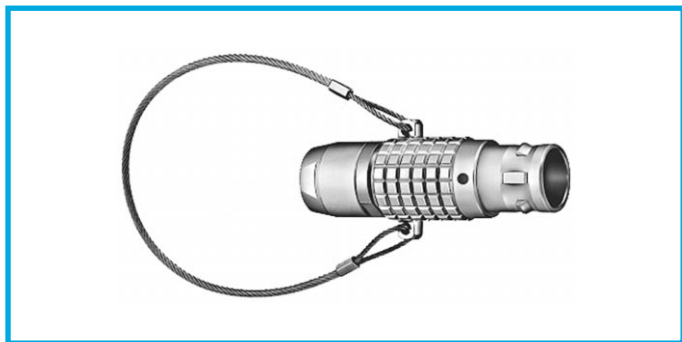
| Reference |        | Dimensions (mm) |     |    |    |    |
|-----------|--------|-----------------|-----|----|----|----|
| Model     | Series | A               | L   | M  | S1 | S2 |
| FGG       | 2B     | 15              | 50  | 38 | 13 | 12 |
| FGG       | 3B     | 18              | 58  | 43 | 15 | 14 |
| FGG       | 4B     | 25              | 75  | 57 | 21 | 20 |
| FGG       | 5B     | 35              | 103 | 78 | 31 | 30 |



## FGG Straight plug, key (G) or keys (A...L) cable collet and nut for fitting a bend relief

| Reference |        | Dimensions (mm) |       |       |    |    |
|-----------|--------|-----------------|-------|-------|----|----|
| Model     | Series | A               | L     | M     | S1 | S2 |
| FGG       | 2B     | 15              | 84.0  | 72.0  | 13 | 12 |
| FGG       | 3B     | 18              | 98.5  | 83.5  | 15 | 15 |
| FGG       | 4B     | 25              | 131.0 | 113.0 | 21 | 20 |
| FGG       | 5B     | 35              | 167.5 | 142.5 | 31 | 30 |

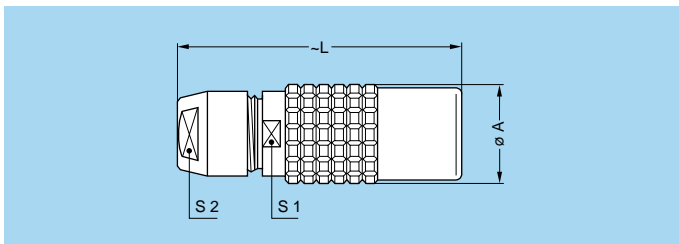
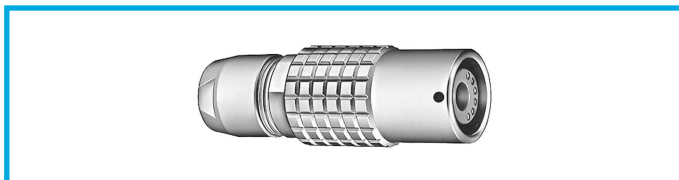
**Note:** The bend relief must be ordered separately (see pages 61 and 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).



## FNG Straight plug, key (G) or keys (A...L and R) and cable collet with lanyard release

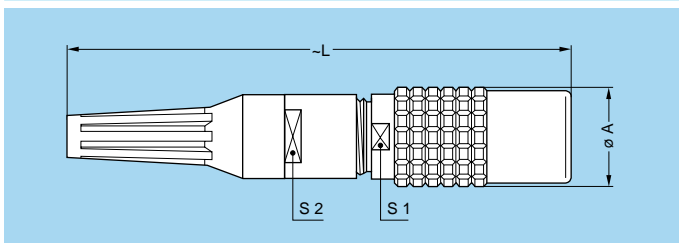
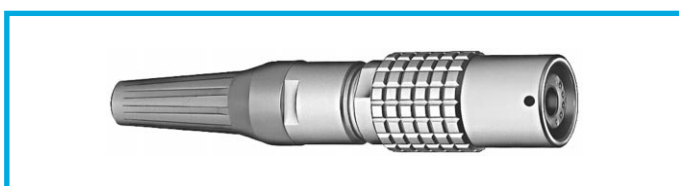
| Reference |        | Dimensions (mm) |      |     |    |     |    |    |
|-----------|--------|-----------------|------|-----|----|-----|----|----|
| Model     | Series | A               | B    | L   | M  | N   | S1 | S2 |
| FNG       | 2B     | 15              | 22.6 | 49  | 37 | 160 | 13 | 12 |
| FNG       | 3B     | 18              | 25.6 | 58  | 43 | 190 | 15 | 14 |
| FNG       | 4B     | 25              | 35.2 | 75  | 57 | 230 | 21 | 20 |
| FNG       | 5B     | 35              | 47.0 | 103 | 78 | 300 | 31 | 30 |

**Note:** Cable material: stainless steel with PVC sheath.



### PHG Free socket, key (G) or keys (A...L and R) and cable collet

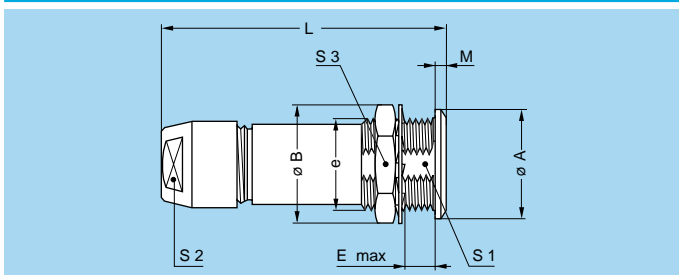
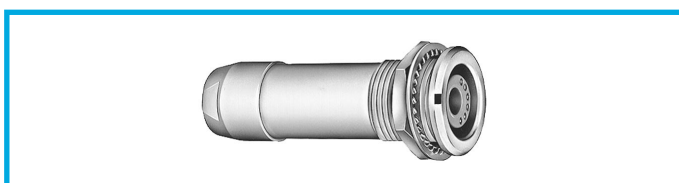
| Reference |        | Dimensions (mm) |    |    |    |
|-----------|--------|-----------------|----|----|----|
| Model     | Series | A               | L  | S1 | S2 |
| PHG       | 2B     | 16.5            | 47 | 13 | 12 |
| PHG       | 3B     | 19.0            | 56 | 15 | 14 |
| PHG       | 4B     | 24.4            | 73 | 21 | 20 |
| PHG       | 5B     | 34.2            | 99 | 31 | 30 |



### PHG Free socket, key (G) or keys (A...L) and cable collet and nut for fitting a bend relief

| Reference |        | Dimensions (mm) |       |    |    |
|-----------|--------|-----------------|-------|----|----|
| Model     | Series | A               | L     | S1 | S2 |
| PHG       | 2B     | 16.5            | 82.0  | 13 | 12 |
| PHG       | 3B     | 19.0            | 96.5  | 15 | 15 |
| PHG       | 4B     | 24.4            | 129.0 | 21 | 20 |
| PHG       | 5B     | 34.2            | 163.5 | 31 | 30 |

**Note:** The bend relief must be ordered separately (see pages 61 and 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

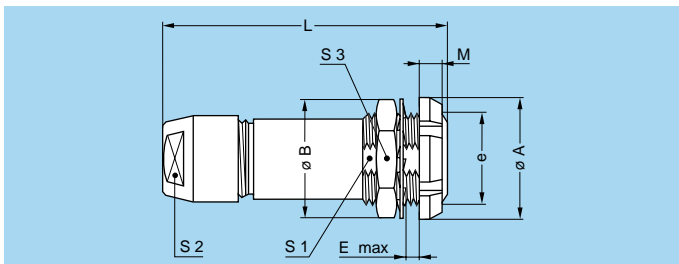
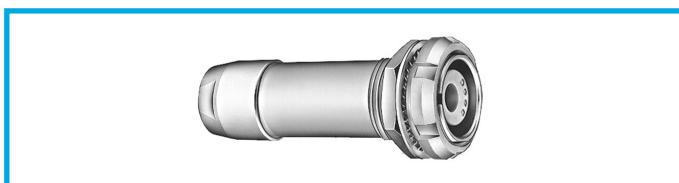


### PKG Fixed socket, nut fixing, key (G) or keys (A...L and R) and cable collet

| Reference |        | Dimensions (mm) |      |       |      |    |     |      |    |    |
|-----------|--------|-----------------|------|-------|------|----|-----|------|----|----|
| Model     | Series | A               | B    | e     | E    | L  | M   | S1   | S2 | S3 |
| PKG       | 2B     | 18              | 19.2 | M15x1 | 8.5  | 47 | 1.8 | 13.5 | 12 | 17 |
| PKG       | 3B     | 22              | 25.0 | M18x1 | 11.5 | 56 | 2.0 | 16.5 | 14 | 22 |
| PKG       | 4B     | 28              | 34.0 | M25x1 | 12.5 | 73 | 2.5 | 23.5 | 20 | 30 |
| PKG       | 5B     | 40              | 40.0 | M35x1 | 11.0 | 99 | 3.0 | 33.5 | 30 | -  |

Panel cut-out: **P1** (see page 45)

**Note:** The 5B series is delivered with a tapered washer and a round nut (see pages 94 and 95).

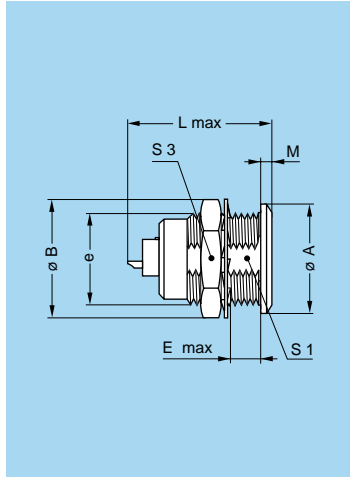


### PFG Fixed socket, with two nuts, key (G) or keys (A...L and R) and cable collet, (back panel mounting)

| Reference |        | Dimensions (mm) |      |       |      |    |     |      |    |    |
|-----------|--------|-----------------|------|-------|------|----|-----|------|----|----|
| Model     | Series | A               | B    | e     | E    | L  | M   | S1   | S2 | S3 |
| PFG       | 2B     | 20              | 19.2 | M15x1 | 6.5  | 47 | 3.5 | 13.5 | 12 | 17 |
| PFG       | 3B     | 24              | 25.0 | M18x1 | 9.0  | 56 | 4.5 | 16.5 | 14 | 22 |
| PFG       | 4B     | 30              | 34.0 | M25x1 | 11.0 | 73 | 4.5 | 23.5 | 20 | 30 |
| PFG       | 5B     | 41              | 40.0 | M35x1 | 10.0 | 99 | 5.0 | 33.5 | 30 | -  |

Panel cut-out: **P1** (see page 45)

**Note:** The 3B, 4B and 5B series are delivered with a conical nut. The 5B series is delivered with a tapered washer and a round nut (see pages 94 and 95).

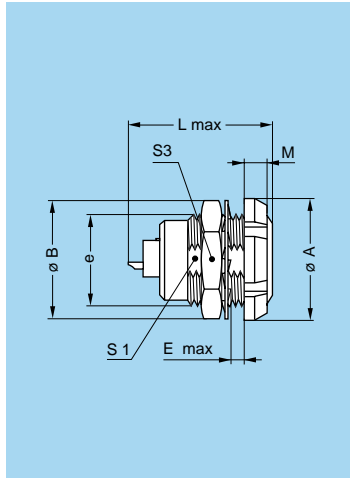


### EGG Fixed socket, nut fixing, key (G) or keys (A...L and R)

| Reference |        | Dimensions (mm) |      |       |      |                     |      |     |      |    |
|-----------|--------|-----------------|------|-------|------|---------------------|------|-----|------|----|
| Model     | Series | A               | B    | e     | E    | L max <sup>1)</sup> |      | M   | S1   | S3 |
|           |        |                 |      |       |      | F1                  | F2   |     |      |    |
| EGG       | 2B     | 18              | 19.2 | M15x1 | 8.5  | 27.0                | 37.0 | 1.8 | 13.5 | 17 |
| EGG       | 3B     | 22              | 25.0 | M18x1 | 11.5 | 30.0                | 37.0 | 2.0 | 16.5 | 22 |
| EGG       | 4B     | 28              | 34.0 | M25x1 | 12.0 | 34.5                | 38.5 | 2.5 | 23.5 | 30 |
| EGG       | 5B     | 40              | 40.0 | M35x1 | 11.0 | 36.5                | 38.0 | 3.0 | 33.5 | -  |

Panel cut-out: **P1** (see page 45)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted. The 5B series is delivered with a tapered washer and a round nut (see pages 94 and 95).

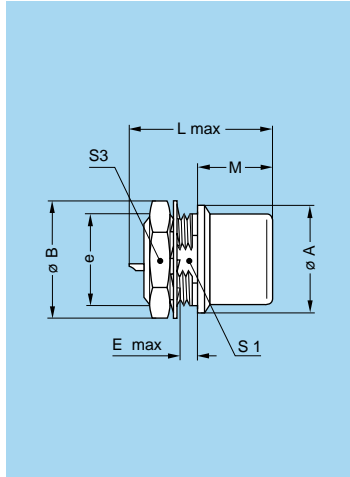


### ECG Fixed socket, with two nuts, key (G) or keys (A...L and R), (back panel mounting)

| Reference |        | Dimensions (mm) |      |       |      |                     |      |     |      |    |
|-----------|--------|-----------------|------|-------|------|---------------------|------|-----|------|----|
| Model     | Series | A               | B    | e     | E    | L max <sup>1)</sup> |      | M   | S1   | S3 |
|           |        |                 |      |       |      | F1                  | F2   |     |      |    |
| ECG       | 2B     | 20              | 19.2 | M15x1 | 6.5  | 27.0                | 37.0 | 3.5 | 13.5 | 17 |
| ECG       | 3B     | 24              | 25.0 | M18x1 | 9.0  | 30.0                | 37.0 | 4.5 | 16.5 | 22 |
| ECG       | 4B     | 30              | 34.0 | M25x1 | 10.0 | 34.5                | 38.5 | 4.5 | 23.5 | 30 |
| ECG       | 5B     | 41              | 40.0 | M35x1 | 9.0  | 36.5                | 38.0 | 5.0 | 33.5 | -  |

Panel cut-out: **P1** (see page 45)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted. The 3B, 4B and 5B series are delivered with a conical nut. The 5B series is delivered with a tapered washer and a round nut (see pages 94 and 95).



### EHG Fixed socket, nut fixing, key (G) or keys (A...L and R), visible shell

| Reference |        | Dimensions (mm) |      |       |     |                     |      |      |      |    |
|-----------|--------|-----------------|------|-------|-----|---------------------|------|------|------|----|
| Model     | Series | A               | B    | e     | E   | L max <sup>1)</sup> |      | M    | S1   | S3 |
|           |        |                 |      |       |     | F1                  | F2   |      |      |    |
| EHG       | 2B     | 18              | 19.2 | M15x1 | 5.2 | 27.0                | 37.0 | 12.5 | 13.5 | 17 |
| EHG       | 3B     | 22              | 25.0 | M18x1 | 4.2 | 30.0                | 37.0 | 12.5 | 16.5 | 22 |
| EHG       | 5B     | 40              | 40.0 | M35x1 | 2.5 | 36.5                | 38.0 | 28.5 | 33.5 | -  |

Panel cut-out: **P1** (see page 45)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted. The 5B series is delivered without locking washer or tapered washer and with a round nut (see pages 94 and 95).

## Plastic housing models

FGG, FGY, ENG and ENY plug and socket models are available with the outer shell and collet nut made with various insulating materials.

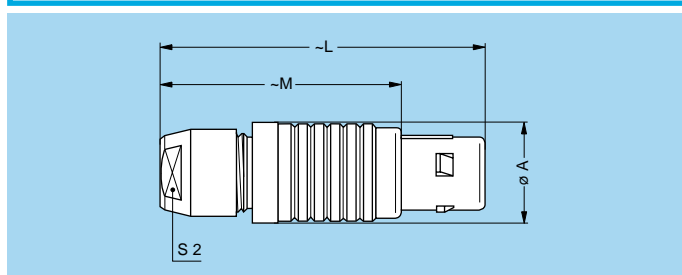
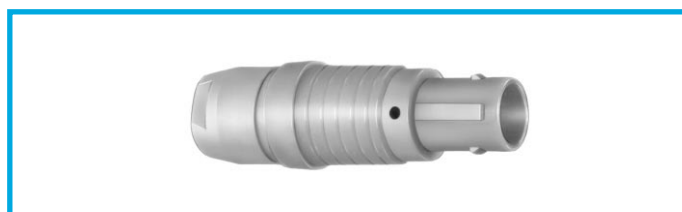
These connectors are particularly recommended for all applications requiring maximum electrical insulation when mated. The design, including a latch sleeve and a metal grounding crown, guarantees EMC screening efficiency to meet most requirements.

## Technical Characteristics

### Mechanical and Environmental

| Characteristics                        | Value             |               |               | Standard            |
|--|-------------------|---------------|---------------|---------------------|
|  | PEEK              | PSU           | PPSU          |                     |
| Colour                                 | natural (beige)   | white or grey | cream         | –                   |
| Endurance                              | > 5000 cycles     | > 5000 cycles | > 5000 cycles | IEC 60512-5 test 9a |
| Humidity                               | up to 95% at 60°C |               |               | –                   |
| Temperature range                      | -50°C/+250°C      | -50°C/+150°C  | -50°C/+180°C  | –                   |
| Sterilization resistance <sup>1)</sup> | ~200 cycles       | ~20 cycles    | ~100 cycles   | IEC 60601-1 § 44.7  |
| Resistance to solvents                 | very good         | limited       | good          | –                   |

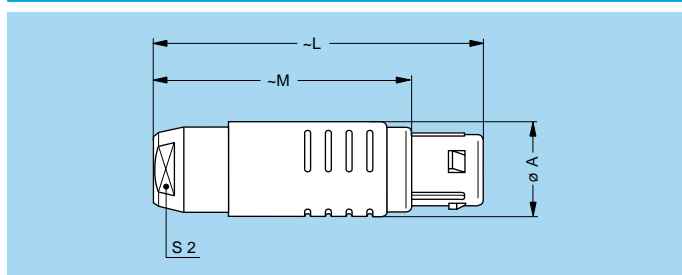
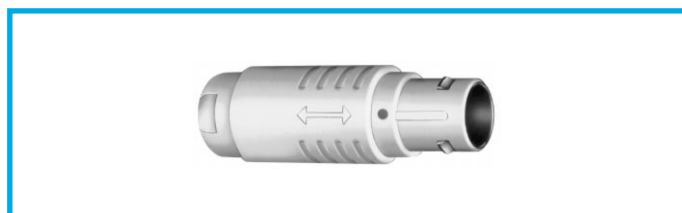
**Note:** 1) Steam sterilization



### FGG Straight plug, key (G or J), cable collet, PEEK outer shell

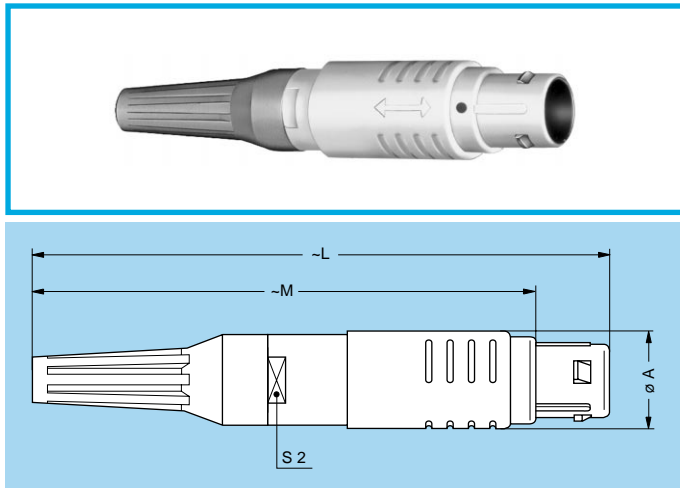
| Reference |        | Dimensions (mm) |      |      |    |
|-----------|--------|-----------------|------|------|----|
| Model     | Series | A               | L    | M    | S2 |
| FGG       | 3B     | 19.0            | 62.0 | 47.0 | 15 |
| FGG       | 4B     | 26.0            | 78.5 | 60.5 | 20 |

**Note:** Model also available with a nut for fitting a bend relief.



### FGY Straight plug, keys (Y), cable collet and PSU or PPSU outer shell

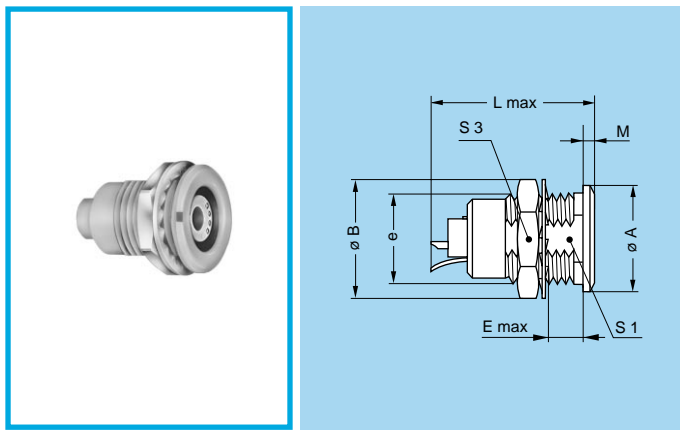
| Reference |        | Dimensions (mm) |      |      |    |
|-----------|--------|-----------------|------|------|----|
| Model     | Series | A               | L    | M    | S2 |
| FGY       | 2B     | 16.5            | 50.5 | 39.5 | 13 |
| FGY       | 3B     | 19.0            | 58.0 | 43.0 | 15 |
| FGY       | 4B     | 26.0            | 76.2 | 58.2 | 20 |



**FGY** Straight plug, keys (Y), cable collet and PSU or PPSU outer shell and nut for fitting a bend relief

| Reference |        | Dimensions (mm) |    |    |    |
|-----------|--------|-----------------|----|----|----|
| Model     | Series | A               | L  | M  | S2 |
| FGY       | 2B     | 16.5            | 81 | 70 | 13 |
| FGY       | 3B     | 19.0            | 94 | 79 | 15 |

**Note:** The bend relief must be ordered separately (see pages 61 and 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

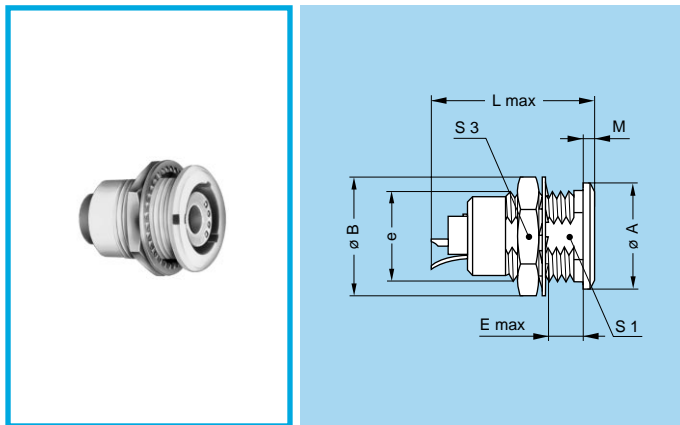


**ENG** Fixed socket with grounding tab, nut fixing, key (G or J), PEEK outer shell

| Reference |        | Dimensions (mm) |      |       |      |                     |      |     |      |    |
|-----------|--------|-----------------|------|-------|------|---------------------|------|-----|------|----|
| Model     | Series | A               | B    | e     | E    | L max <sup>1)</sup> |      | M   | S1   | S3 |
|           |        |                 |      |       |      | F1                  | F2   |     |      |    |
| ENG       | 3B     | 22              | 25.0 | M18x1 | 11.5 | 30.0                | 37.0 | 2.0 | 16.5 | 22 |
| ENG       | 4B     | 28              | 34.0 | M25x1 | 12.0 | 34.5                | 38.5 | 2.5 | 23.5 | 30 |

Panel cut-out: **P1** (see page 45)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.



**ENY** Fixed socket with grounding tab, nut fixing, keys (Y), PSU or PPSU outer shell

| Reference |        | Dimensions (mm) |      |       |      |                     |      |     |      |    |
|-----------|--------|-----------------|------|-------|------|---------------------|------|-----|------|----|
| Model     | Series | A               | B    | e     | E    | L max <sup>1)</sup> |      | M   | S1   | S3 |
|           |        |                 |      |       |      | F1                  | F2   |     |      |    |
| ENY       | 2B     | 18              | 19.2 | M15x1 | 8.5  | 27.0                | 37.0 | 1.8 | 13.5 | 17 |
| ENY       | 3B     | 22              | 25.0 | M18x1 | 11.5 | 30.0                | 37.0 | 2.0 | 16.5 | 22 |
| ENY       | 4B     | 28              | 34.0 | M25x1 | 12.0 | 34.5                | 38.5 | 2.5 | 23.5 | 30 |

Panel cut-out: **P1** (see page 45)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.

**Note:** Other models with plastic outer shell are available on request.

# Tooling

## Fibre optic contacts

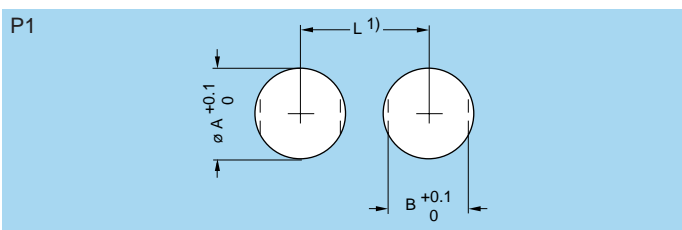
The full range of tools for terminating fibre optic contacts F1 or F2 used with these 2B-5B series is shown on pages 103 to 106.

Consult the factory for the termination instructions.

## Electrical contacts

The specific tools that may be used for the termination of crimp LV contacts or the type C coax contacts are shown on pages 100 to 102.

# Panel Cut-Outs



| Series | Dimensions (mm) |      |      |
|--------|-----------------|------|------|
|        | A               | B    | L    |
| 2B     | 15.1            | 13.6 | 21.5 |
| 3B     | 18.2            | 16.6 | 27.0 |
| 4B     | 25.2            | 23.6 | 34.0 |
| 5B     | 35.2            | 33.6 | 44.0 |

**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.

## Mounting torque

| Series | Torque (Nm) |  |               |
|--------|-------------|--|---------------|
|        | Metal shell | Metal shell with GRA insulating washer | Plastic shell |
| 2B     | 6.0         | 0.8                                    | 0.8           |
| 3B     | 9.0         | 1.0                                    | 1.0           |
| 4B     | 12.0        | 5.0                                    | 5.0           |
| 5B     | 17.0        | –                                      | –             |

**Note:** The values shown in the table above are the maximum torque for each connector type.





## 2K-5K Series

The 2K-5K series connectors are designed to work with the LEMO **F1** or **F2** fibre optic contacts.

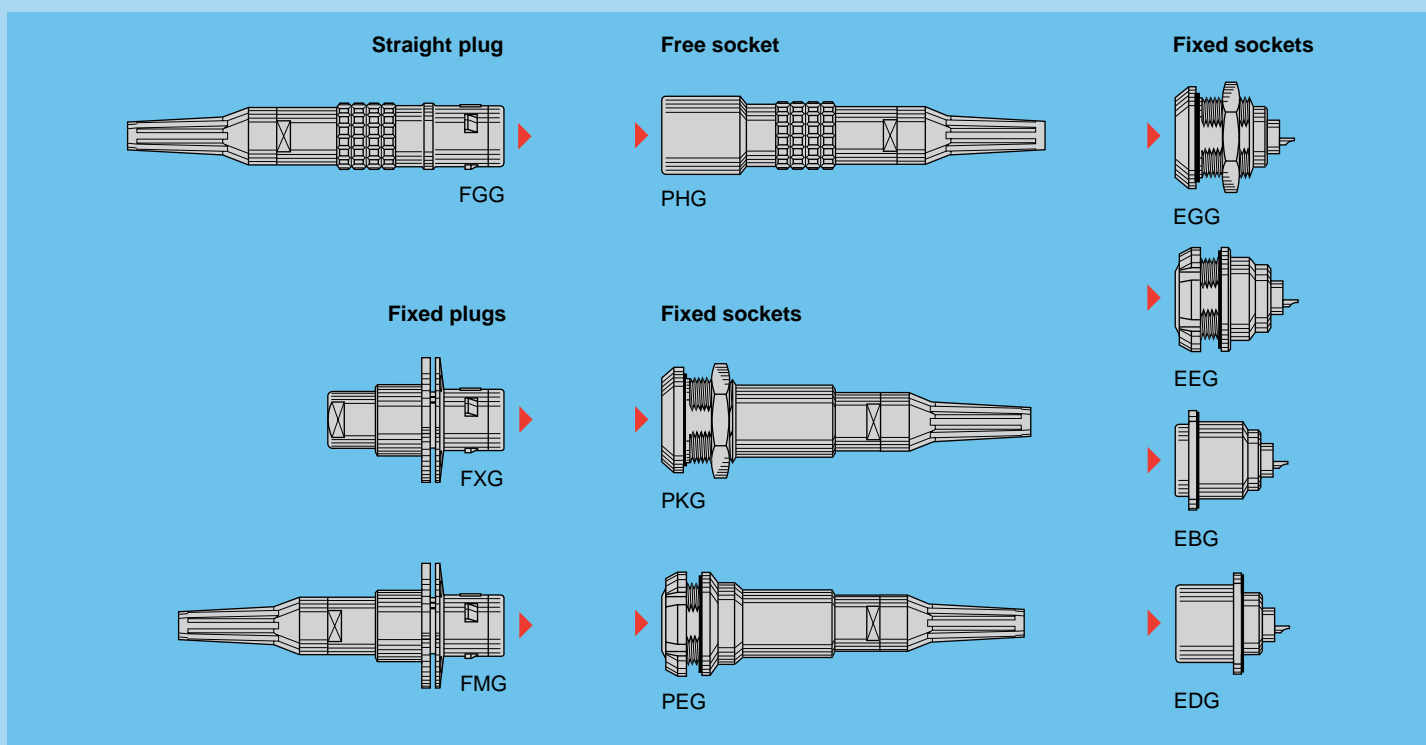
The main features of these series are as follows:

- Security of the LEMO Push-Pull self-latching system
- Specially designed for outdoors applications. All these models are waterproof when mated and reach a protection index of IP 66-IP 68, according to the IEC 60529 standard
- Protection against accidental contamination or damage to the fibre end face because the ferrules are recessed within the connector shell
- The alignment key (G, A...F, L and R) ensures excellent repeatability of performance during frequent matings
- A choice of configurations of multi fibre or mixed optical/electrical contacts.

The 2K-5K series consists of ten models which will accept outer cable diameters ranging from 3.6 mm to 23.5 mm.

Depending upon the type of fibre optic contact chosen, the connectors can accommodate single-mode fibres in Si/Si 9/125 or multi-mode fibres in silica or plastic with dimensions reaching 1500 µm.

### Interconnections



### Model Description

**EBG** Fixed socket with square flange, key (G) or keys (A...F, L and R), four holes fixing

**EDG** Fixed socket with square flange, key (G) or keys (A...F, L and R), protruding shell and earthing tag, screw fixing

**EEG** Fixed socket, nut fixing, key (G) or keys (A...F, L and R) (back panel mounting)

**EGG** Fixed socket, nut fixing, key (G) or keys (A...F, L and R)

**FGG** Straight plug, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

**FMG** Fixed plug with round flange, four holes fixing, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

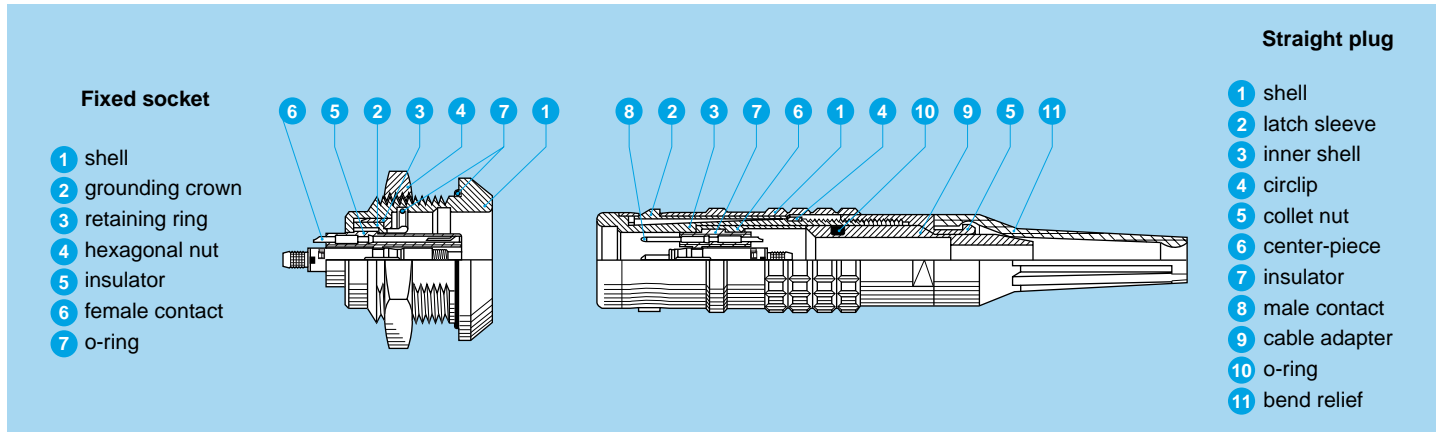
**FXG** Fixed plug with round flange, four holes fixing, key (G) or keys (A...F, L and R)

**PKG** Fixed socket, nut fixing, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief (back panel mounting)

**PHG** Free socket, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

**PEG** Fixed socket, nut fixing, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

## Part Section Showing Internal Components



## Technical Characteristics

### Mechanical and Environmental

| Characteristics                         | Value             | Standard             |
|---|-------------------|----------------------|
| Mating durability                       | > 5000 cycles     | IEC 60512-5 test 9a  |
| Humidity                                | up to 95% at 60°C |                      |
| Temperature range                       | -50°C + 200°C     |                      |
| Resistance to vibrations                | 10-2000 Hz, 15 g  | IEC 60512-4 test 6d  |
| Shock resistance                        | 100 g, 6 ms       | IEC 60512-4 test 6c  |
| Salt spray corrosion test <sup>1)</sup> | > 144h            | IEC 60512-6 test 11f |
| Protection index (mated)                | IP 68/IP 66       | IEC 60529            |

**Note:** 1) The outer shells are in chrome-plated brass (Cr1). The various tests have been carried out with FGG and EGG connector pairs, with chrome-plated brass shell, PEEK insulator and silicone O-ring. Detailed electrical characteristics, as well as materials and treatment are presented in the chapter Technical Characteristics on page 107.

### Electrical

| Characteristics      | Value     | Standard |               |
|----------------------|-----------|----------|---------------|
| Shielding efficiency | at 10 MHz | > 95 dB  | IEC 60169-1-3 |
|                      | at 1 GHz  | > 80 dB  | IEC 60169-1-3 |

### Optical

**Note:** Detailed optical performances for F1 or F2 fibre optic contacts are given on pages 109 to 111.

## Alignment Key and Polarized Keying Systems

| Front view of a socket | Model | No of keys | Angles | Series |      |      |      | Type of electrical or fibre optic contact |        | Note |
|------------------------|-------|------------|--------|--------|------|------|------|---|--------|------|
|                        |       |            |        | 2K     | 3K   | 4K   | 5K   | Plug                                      | Socket |      |
|                        | ●●G   | 1          | α      | 0°     | 0°   | 0°   | 0°   | male                                      | female | ●    |
|                        | ●●A   | 2          |        | 30°    | 30°  | 30°  | 30°  | male                                      | female | ●    |
|                        | ●●B   | 2          |        | 45°    | 45°  | 45°  | 45°  | male                                      | female | ●    |
|                        | ●●C   | 2          |        | 60°    | 60°  | 60°  | 60°  | male                                      | female | ●    |
|                        | ●●D   | 2          | γ      | 95°    | 95°  | 95°  | 95°  | male                                      | female | ○    |
|                        | ●●E   | 2          | β      | 120°   | 120° | 120° | 120° | male                                      | female | ○    |
|                        | ●●F   | 2          | β      | 145°   | 145° | 145° | 145° | male                                      | female | ○    |
|                        | ●●L   | 2          | γ      | 75°    | 75°  | 75°  | 75°  | female                                    | male   | ●    |

| Front view of a socket | Model | No of keys | Angles | Series |      |    |    | Type of electrical or fibre optic contact |        | Note |
|------------------------|-------|------------|--------|--------|------|----|----|---|--------|------|
|                        |       |            |        | 2K     | 3K   | 4K | 5K | Plug                                      | Socket |      |
|                        | ●●R   | 5          | α      | –      | 95°  | –  | –  | male                                      | female | ●    |
|                        |       |            | β      | –      | 115° | –  | –  |   |        |      |
|                        |       |            | γ      | –      | 35°  | –  | –  |   |        |      |
|                        |       |            | δ      | –      | 25°  | –  | –  |   |        |      |

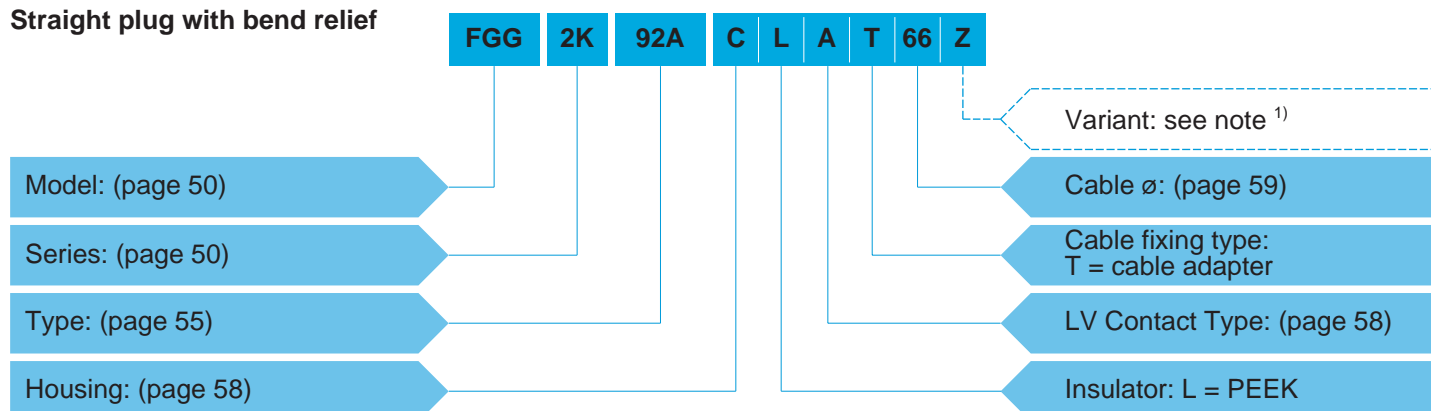
● First choice alternative    ○ Special order alternative

## Part Number Example

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

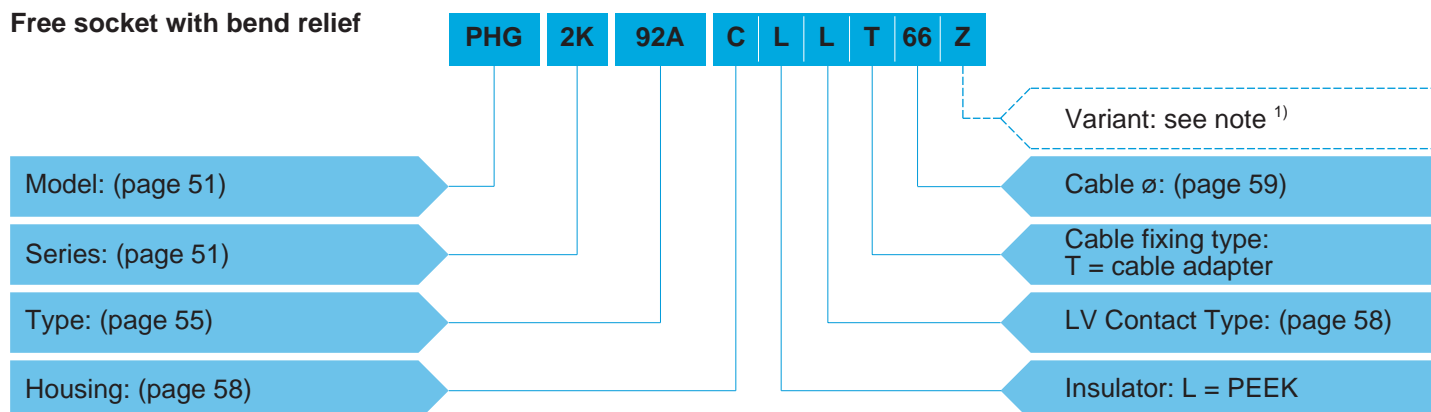
- Plugs and free sockets for assembly onto cables
- Fixed sockets.

### Straight plug with bend relief



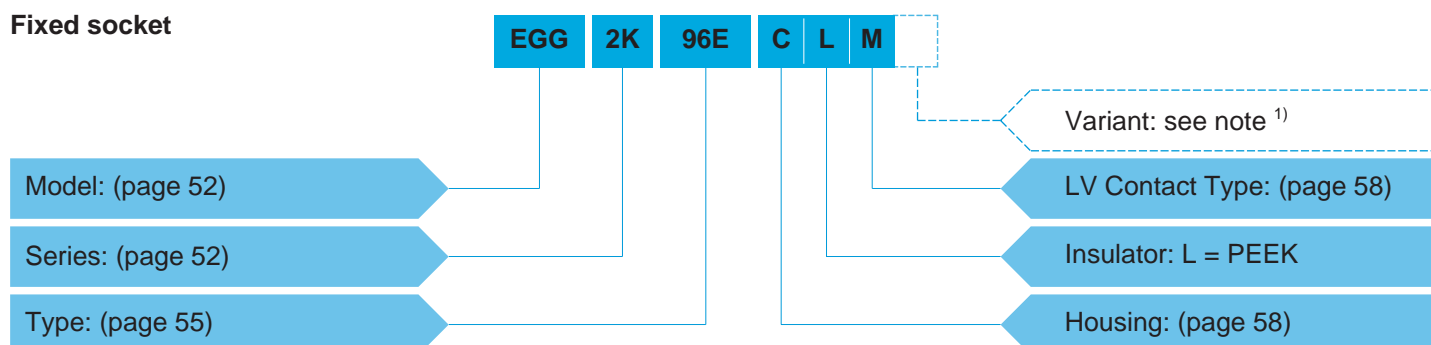
**FGG.2K.92A.CLAT66Z** = Straight plug with key (G), 2K series, mixed type to accept 1 F2 type fibre optic contact and 2 low voltage contacts, chrome-plated brass housing, PEEK insulator, 2 male solder electrical contacts, cable fixing type T for 6.5 mm diameter cable, and nut for fitting a bend relief.

### Free socket with bend relief



**PHG.2K.92A.CLLT66Z** = Free socket with key (G), 2K series, mixed type to accept 1 F2 type fibre optic contact and 2 low voltage contacts, chrome-plated brass housing, PEEK insulator, 2 female solder electrical contacts, cable fixing type T for 6.5 mm diameter cable, and nut for fitting a bend relief.

### Fixed socket

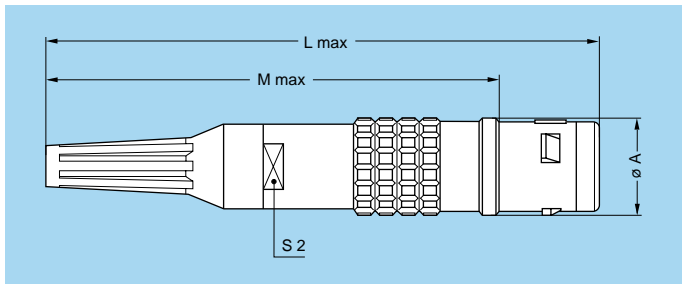
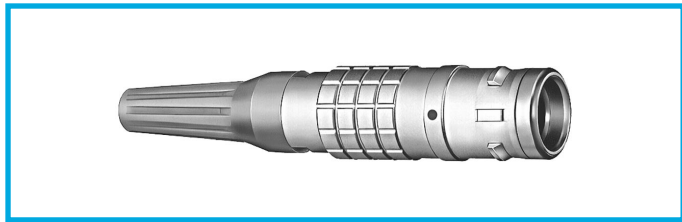


**EGG.2K.96E.CLM** = Fixed socket with key (G), 2K series, mixed type to accept take 1 F1 type fibre optic contact and 6 low voltage contacts, chrome-plated brass housing, PEEK insulator, 6 female crimp electrical contacts.

**Connectors are delivered without fibre optic contacts, therefore they must be ordered separately according to the size and type of fibre (see pages 77 and 79). In case of hybrid (with coax contacts type C), connectors are delivered without the coax contact. See page 58 for ordering.**

**Note:** <sup>1)</sup> The «Variant» position in the reference is used to indicate the presence of a collet nut for fitting the bend relief. For models with the «T» type of cable adapter the «Z» should always be indicated and a bend relief can be ordered separately as indicated in the «Accessories» section. An order for a connector with bend relief should thus include two part numbers.

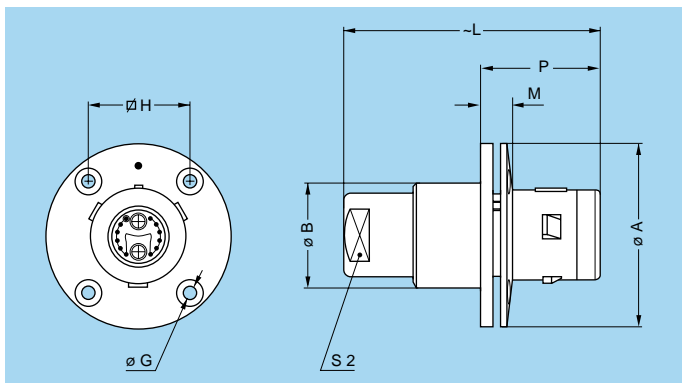
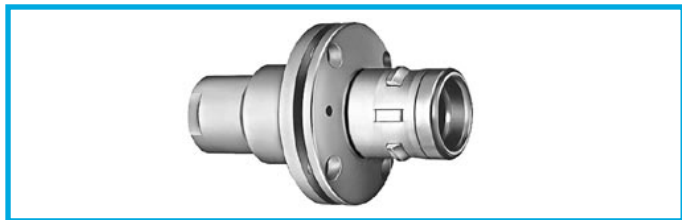
# Models - Series



**FGG** Straight plug, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

| Reference |        | Dimensions (mm) |     |       |    |
|-----------|--------|-----------------|-----|-------|----|
| Model     | Series | A               | L   | M     | S2 |
| FGG       | 2K     | 16              | 101 | 85.0  | 12 |
| FGG       | 3K     | 19              | 109 | 89.0  | 15 |
| FGG       | 4K     | 25              | 131 | 110.5 | 19 |
| FGG       | 5K     | 38              | 160 | 135.0 | 30 |

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

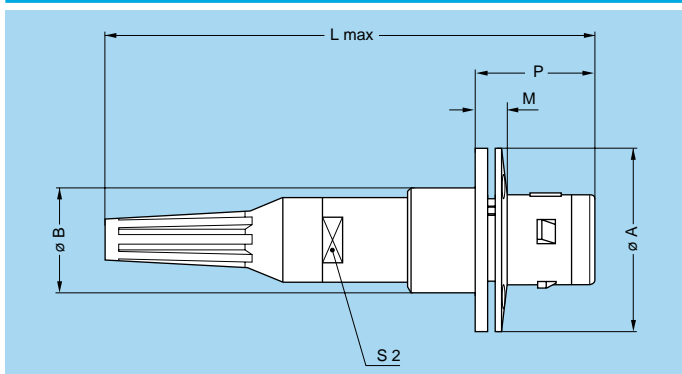
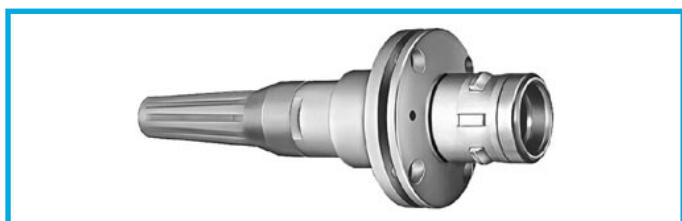


**FXG** Fixed plug with round flange, four holes fixing, key (G) or keys (A...F, L and R)

| Reference |        | Dimensions (mm) |      |     |      |     |      |      |    |
|-----------|--------|-----------------|------|-----|------|-----|------|------|----|
| Model     | Series | A               | B    | G   | H    | L   | M    | P    | S2 |
| FXG       | 3K     | 38              | 22.5 | 3.4 | 20.6 | 61  | 10.0 | 30.0 | 15 |
| FXG       | 4K     | 47              | 28.5 | 3.4 | 27.0 | 71  | 11.0 | 32.0 | 19 |
| FXG       | 5K     | 65              | 42.5 | 4.4 | 38.0 | 100 | 12.5 | 38.5 | 30 |

Panel cut-out: **P2** (see page 53)

**Note:** This model does not include an O-ring behind the flange, it allows the device on which it is fitted to reach only IP50 protection index. It does not have a cable adapter.

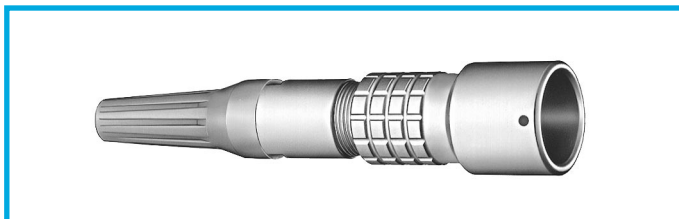


**FMG** Fixed plug with round flange, four hole fixing, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief

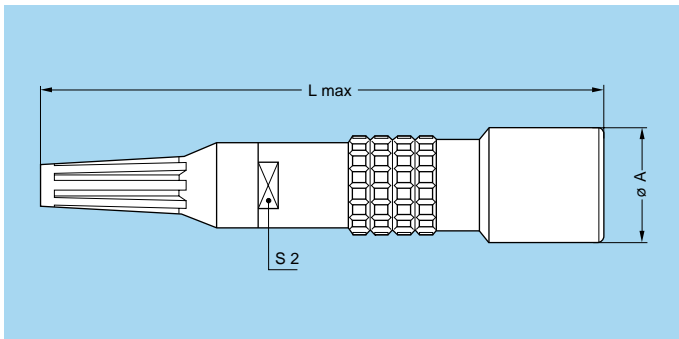
| Reference |        | Dimensions (mm) |      |                 |                 |       |      |      |    |  |
|-----------|--------|-----------------|------|-----------------|-----------------|-------|------|------|----|--|
| Model     | Series | A               | B    | G <sup>1)</sup> | H <sup>1)</sup> | L     | M    | P    | S2 |  |
| FMG       | 3K     | 38              | 22.5 | 3.4             | 20.6            | 109.0 | 10.0 | 30.0 | 15 |  |
| FMG       | 4K     | 47              | 28.5 | 3.4             | 27.0            | 131.0 | 11.0 | 32.0 | 19 |  |
| FMG       | 5K     | 65              | 42.5 | 4.4             | 38.0            | 163.5 | 12.5 | 38.5 | 30 |  |

Panel cut-out: **P2** (see page 53)

**Note:** <sup>1)</sup> See FXG drawing for front view. This model does not include an O-ring behind the flange, it allows the device on which it is fitted to reach only IP50 protection index. The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

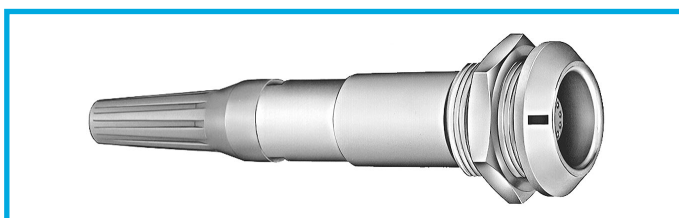


**PHG Free socket, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief**

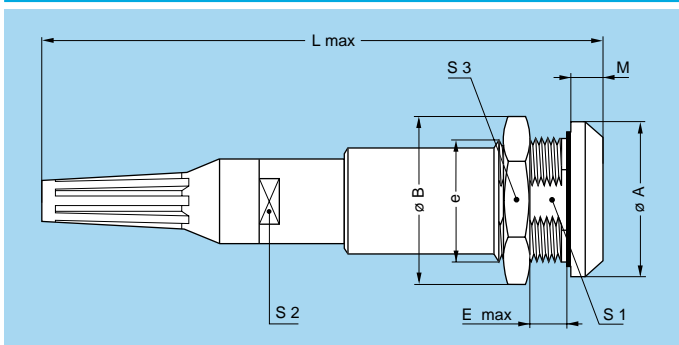


| Reference |        | Dimensions (mm) |       |    |
|-----------|--------|-----------------|-------|----|
| Model     | Series | A               | L     | S2 |
| PHG       | 2K     | 19              | 103.0 | 12 |
| PHG       | 3K     | 23              | 113.0 | 15 |
| PHG       | 4K     | 29              | 135.5 | 19 |
| PHG       | 5K     | 42              | 164.0 | 30 |

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



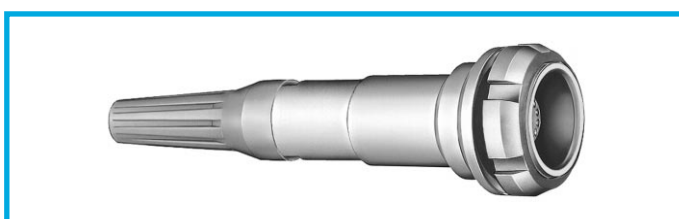
**PKG Fixed socket, nut fixing, key (G) or keys (A...F, L and R) and cable adapter and nut for fitting a bend relief**



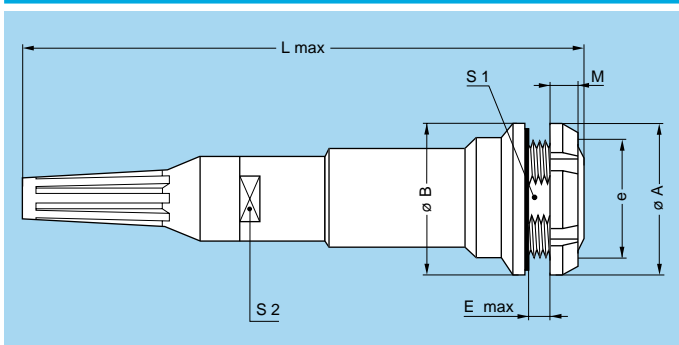
| Reference |        | Dimensions (mm) |      |         |    |       |     |      |    |    |
|-----------|--------|-----------------|------|---------|----|-------|-----|------|----|----|
| Model     | Series | A               | B    | e       | E  | L     | M   | S1   | S2 | S3 |
| PKG       | 2K     | 25              | 27.0 | M20x1.0 | 9  | 103.0 | 5.0 | 18.5 | 12 | 24 |
| PKG       | 3K     | 31              | 34.0 | M24x1.0 | 11 | 113.0 | 6.0 | 22.5 | 15 | 30 |
| PKG       | 4K     | 37              | 40.5 | M30x1.0 | 9  | 135.5 | 6.5 | 28.5 | 19 | 36 |
| PKG       | 5K     | 55              | 54.0 | M45x1.5 | 15 | 164.0 | 9.0 | 42.5 | 30 | -  |

Panel cut-out: **P1** (see page 53)

**Note:** The 5K series is delivered with a round nut (see page 95). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).



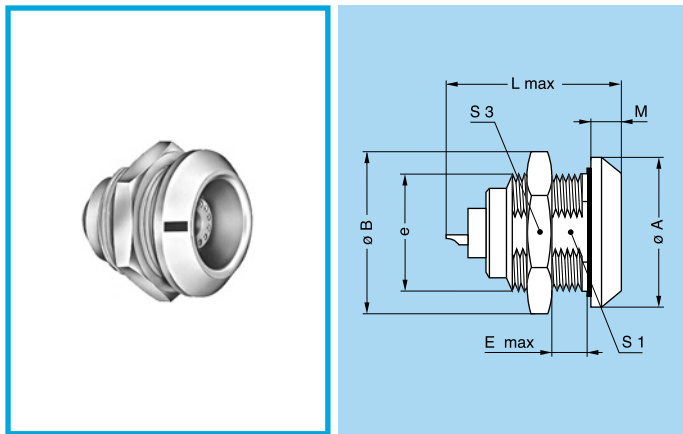
**PEG Fixed socket, nut fixing, key (G) or keys (A...F, L and R), cable adapter and nut for fitting a bend relief (back panel mounting)**



| Reference |        | Dimensions (mm) |    |         |     |     |     |      |    |
|-----------|--------|-----------------|----|---------|-----|-----|-----|------|----|
| Model     | Series | A               | B  | e       | E   | L   | M   | S1   | S2 |
| PEG       | 2K     | 25              | 25 | M20x1.0 | 4.0 | 103 | 3.5 | 18.5 | 12 |
| PEG       | 3K     | 30              | 31 | M24x1.0 | 7.5 | 113 | 4.5 | 22.5 | 15 |

Panel cut-out: **P1** (see page 53)

**Note:** The 3K series is delivered with a conical nut (see page 95). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

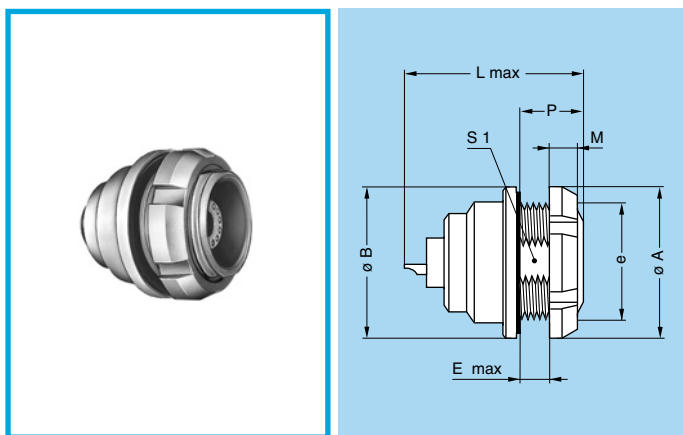


### EGG Fixed socket, nut fixing, key (G) or keys (A...F, L and R)

| Reference |        | Dimensions (mm) |      |         |    |                     |      |     |      |    |
|-----------|--------|-----------------|------|---------|----|---------------------|------|-----|------|----|
| Model     | Series | A               | B    | e       | E  | L max <sup>1)</sup> |      | M   | S1   | S3 |
|           |        |                 |      |         |    | F1                  | F2   |     |      |    |
| EGG       | 2K     | 25              | 27.0 | M20x1.0 | 9  | 31.0                | 41.0 | 5.0 | 18.5 | 24 |
| EGG       | 3K     | 31              | 34.0 | M24x1.0 | 11 | 35.5                | 42.5 | 6.0 | 22.5 | 30 |
| EGG       | 4K     | 37              | 40.5 | M30x1.0 | 9  | 37.0                | 41.0 | 6.5 | 28.5 | 36 |
| EGG       | 5K     | 55              | 54.0 | M45x1.5 | 10 | 40.5                | 42.0 | 9.0 | 42.5 | -  |

Panel cut-out: **P1** (see page 53)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.  
The 5K series is delivered with a round nut (see page 95).

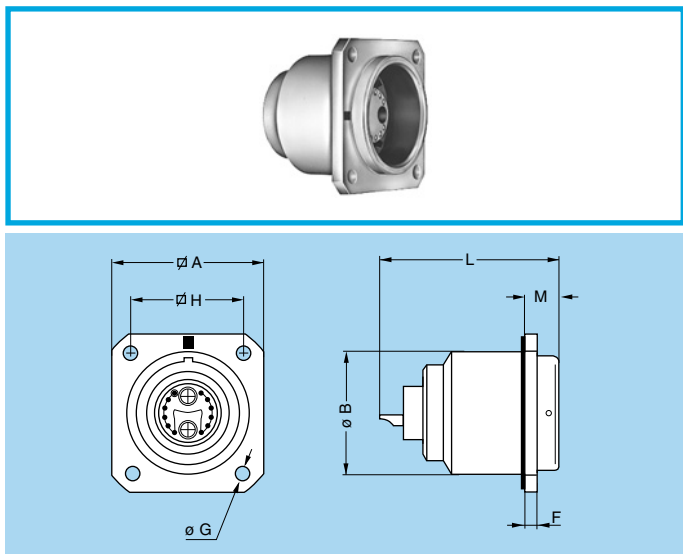


### EEG Fixed socket, nut fixing, key (G) or keys (A...F, L and R) (back panel mounting)

| Reference |        | Dimensions (mm) |    |       |     |                     |      |     |    |      |
|-----------|--------|-----------------|----|-------|-----|---------------------|------|-----|----|------|
| Model     | Series | A               | B  | e     | E   | L max <sup>1)</sup> |      | M   | P  | S1   |
|           |        |                 |    |       |     | F1                  | F2   |     |    |      |
| EEG       | 2K     | 25              | 25 | M20x1 | 5.0 | 31.0                | 41.0 | 3.5 | 10 | 18.5 |
| EEG       | 3K     | 30              | 31 | M24x1 | 7.5 | 35.5                | 42.5 | 4.5 | 12 | 22.5 |

Panel cut-out: **P1** (see page 53)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.  
The 3K series is delivered with a conical nut (see page 95).

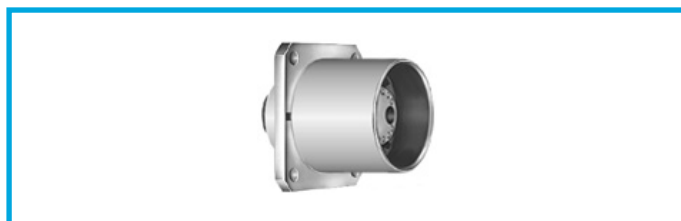


### EBG Fixed socket with square flange, key (G) or keys (A...F, L and R), four holes fixing

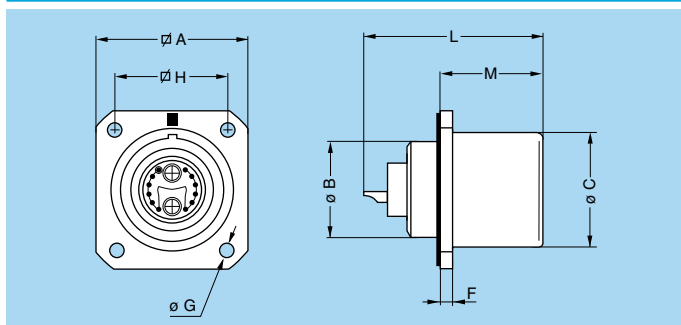
| Reference |        | Dimensions (mm) |    |   |     |    |                     |      |     |
|-----------|--------|-----------------|----|---|-----|----|---------------------|------|-----|
| Model     | Series | A               | B  | F | G   | H  | L max <sup>1)</sup> |      | M   |
|           |        |                 |    |   |     |    | F1                  | F2   |     |
| EBG       | 3K     | 29              | 23 | 3 | 3.4 | 23 | 35.5                | 42.5 | 6.0 |
| EBG       | 4K     | 37              | 30 | 3 | 3.4 | 29 | 37.0                | 41.0 | 6.5 |

Panel cut-out: **P3** (see page 53)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.



### EDG Fixed socket with square flange, key (G) or keys (A...F, L and R), protruding shell and earthing tag, screw fixing



| Reference |        | Dimensions (mm) |    |    |   |     |    |                     |      |      |
|-----------|--------|-----------------|----|----|---|-----|----|---------------------|------|------|
| Model     | Series | A               | B  | C  | F | G   | H  | L max <sup>1)</sup> |      | M    |
|           |        |                 |    |    |   |     |    | F1                  | F2   |      |
| EDG       | 3K     | 29              | 18 | 23 | 3 | 3.4 | 23 | 35.5                | 42.5 | 22.5 |

Panel cut-out: **P4** (see page 53)

**Note:** <sup>1)</sup> The overall length (L) may vary depending upon the type of electrical LV or fibre optic contact fitted.

## Tooling

### Fibre optic contacts

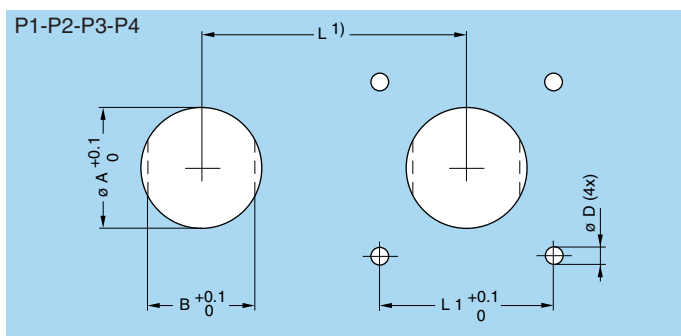
The full range of tools for terminating fibre optic contacts F1 or F2 used with these 2K-5K series is shown on pages 103 to 106.

Consult the factory for the termination instructions.

### Electrical contacts

The specific tools that may be used for the termination of crimp LV contacts or the type C coax contacts are shown on pages 100 to 102.

## Panel Cut-Outs



| Series | P1              |      |      | P2              |    |      |      |
|--------|-----------------|------|------|-----------------|----|------|------|
|        | $\varnothing A$ | B    | L    | $\varnothing A$ | D  | L    | L1   |
| 2K     | 20.2            | 18.6 | 29.0 | -               | -  | -    | -    |
| 3K     | 24.2            | 22.6 | 35.5 | 22.6            | M3 | 40.0 | 20.6 |
| 4K     | 30.2            | 28.6 | 43.0 | 28.6            | M3 | 49.0 | 27.0 |
| 5K     | 45.2            | 42.6 | 57.0 | 42.6            | M4 | 67.0 | 38.0 |

| Series | P3              |    |      |      | P4              |    |      |      |
|--------|-----------------|----|------|------|-----------------|----|------|------|
|        | $\varnothing A$ | D  | L    | L1   | $\varnothing A$ | D  | L    | L1   |
| 3K     | 23.1            | M3 | 31.0 | 23.0 | 18.1            | M3 | 31.0 | 23.0 |
| 4K     | 30.1            | M3 | 39.0 | 29.0 | -               | -  | -    | -    |

**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.

### Mounting torque

| Series | Torque (Nm) |                      |
|--------|-------------|----------------------|
|        | Nut         | Screws               |
| 2K     | 9           | -                    |
| 3K     | 12          | 1 to 2 <sup>1)</sup> |
| 4K     | 17          | 1 to 2 <sup>1)</sup> |
| 5K     | 22          | 1 to 2 <sup>1)</sup> |

**Note:** <sup>1)</sup> Depends on screw material selected. The values shown in the table above are the maximum torque for each connector type.

### Cut-out types

| Model | Type | Model | Type |
|-------|------|-------|------|
| EBG   | P3   | FMG   | P2   |
| EDG   | P4   | FXG   | P2   |
| EEG   | P1   | PEG   | P1   |
| EGG   | P1   | PKG   | P1   |





# Types

## Multi fibre and Mixed fibre optic (F1 or F2 contact) + LV

|                      |  | Reference FO Contact Type |         | Low Voltage contact |            |            |              |       |   |   |   |   |                   |
|----------------------|--|---------------------------|---------|---------------------|------------|------------|--------------|-------|---|---|---|---|-------------------|
|                      |  | F1                        | F2      | Fibre optic No      | Contact No | ø A (mm)   | Contact type |       | Solder contact                                      |   | Crimp contact                                       |   | Rated current (A) |
|                      |  |                           |         |                     |            |            | Solder       | Crimp | Test voltage (kV rms) <sup>1)</sup> Contact-contact | Test voltage (kV rms) <sup>1)</sup> Contact-shell | Test voltage (kV rms) <sup>1)</sup> Contact-contact | Test voltage (kV rms) <sup>1)</sup> Contact-shell |                   |
| Male solder contacts |  | Female solder contacts    |         |                     |            |            |              |       |   |   |   |   |                   |
| Male crimp contacts  |  | Female crimp contacts     |         |                     |            |            |              |       |   |   |   |   |                   |
| <b>2B<br/>2K</b>     |  |                           | 96A 92A | 1                   | 2          | 0.9        | ●            | ●     | 1.75  | 1.60  | 1.85  | 1.60  | 9.0               |
|                      |  |                           | 96C 92C | 1                   | 4          | 0.7        | ●            | ●     | 0.85  | 1.20  | 0.85  | 1.25  | 6.0               |
|                      |  |                           | 96E 92E | 1                   | 6          | 0.7        | ●            | ●     | 0.85  | 1.20  | 0.85  | 1.25  | 6.0               |
|                      |  |                           | 96J 92J | 1                   | 10         | 0.7        | ●            | ●     | 1.15  | 1.35  | 1.30  | 1.05  | 6.0               |
| <b>3B<br/>3K</b>     |  |                           | 07A 03A | 2                   | -          | -          | -            | -     | -   | -   | -   | -   | -                 |
|                      |  |                           | 97C 93B | 2                   | 4          | 0.9        | ●            | ●     | 1.20  | 1.05  | 1.00  | 0.80  | 8.0               |
|                      |  |                           | 97E 93E | 2                   | 6          | 0.9        | ●            | ●     | 1.20  | 1.05  | 1.00  | 0.80  | 8.0               |
|                      |  |                           | 97J 93J | 2                   | 10         | 0.7        | ●            | ●     | 0.95  | 0.75  | 0.85  | 0.65  | 6.0               |
|                      |  |                           | 97R 93R | 2                   | 16         | 0.7        | ●            | ●     | 0.80  | 0.70  | 0.80  | 0.75  | 5.5               |
|                      |  |                           | 96X 92X | 1                   | 22         | 0.7        | ●            | ●     | 0.80  | 0.70  | 0.80  | 0.75  | 5.0               |
| <b>4B<br/>4K</b>     |  |                           | 07C 03C | 4                   | -          | -          | -            | -     | -   | -   | -   | -   | -                 |
|                      |  |                           | - 95D   | 4                   | 5          | 1.3        | ●            | ●     | 1.20  | 1.30  | 1.30  | 1.05  | 13                |
|                      |  |                           | 99H -   | 4                   | 9          | 0.7        | ●            | ●     | 1.00  | 1.00  | 0.80  | 0.80  | 8                 |
|                      |  |                           | 98E 94E | 3                   | 6          | 0.7        | ●            | ●     | 0.90  | 0.95  | 0.80  | 0.80  | 8                 |
|                      |  |                           | 98L 94L | 3                   | 12         | 0.7        | ●            | ●     | 0.90  | 0.95  | 0.80  | 0.80  | 6                 |
|                      |  |                           | - 93E   | 2                   | 2<br>4     | 0.9<br>1.3 | -            | ●     | -   | -   | 1.90<br>1.85  | 1.60<br>2.55                                      | 8<br>12           |

● First choice alternative ○ Special order alternative Note: 1) See calculation method, caution and suggested standard on page 114.

## Multi fibre and Mixed fibre optic (F1 or F2 contact) + LV

|                        |  | Reference FO Contact Type |     | Low Voltage contact |            |          |              |       |  |  |  |  |                   |          |
|------------------------|--|---------------------------|-----|---------------------|------------|----------|--------------|-------|--|--|--|--|-------------------|----------|
|                        |  | F1                        | F2  | Fibre optic No      | Contact No | ø A (mm) | Contact type |       | Solder contact   |  | Crimp contact  |  | Rated current (A) |          |
|                        |  |                           |     |                     |            |          | Solder       | Crimp | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell |                   |          |
| Male solder contacts   |  | Female solder contacts    |     |                     |            |          |              |       |  |  |  |  |                   |          |
| Male crimp contacts    |  | Female crimp contacts     |     |                     |            |          |              |       |  |  |  |  |                   |          |
| <b>4B</b><br><b>4K</b> |  |                           | 97F | –                   | 2          | 3<br>4   | 0.9<br>1.3   | –     | ●  | –  | –  | 1.15<br>1.85   | 1.50<br>2.55      | 8<br>12  |
|                        |  |                           | 97L | 93L                 | 2          | 12       | 0.9          | ●     | ●  | 0.95   | 0.85   | 0.90   | 1.20              | 10       |
|                        |  |                           | 97R | 93R                 | 2          | 16       | 0.9          | ●     | ●  | 0.95   | 0.85   | 0.85   | 0.85              | 10       |
|                        |  |                           | 97T | 93T                 | 2          | 18       | 0.7          | ●     | ●  | 0.90   | 0.95   | 0.85   | 0.75              | 8        |
| <b>5B</b><br><b>5K</b> |  |                           | 07J | 03J                 | 10         | –        | –            | –     | –  | –  | –  | –  | –                 | –        |
|                        |  |                           | –   | 03N                 | 14         | –        | –            | –     | –  | –  | –  | –  | –                 | –        |
|                        |  |                           | –   | 99B                 | 9          | 1<br>2   | 4<br>2       | ●     | –  | 2.55<br>2.55   | 2.05<br>2.05   | –  | –                 | 35<br>18 |
|                        |  |                           | –   | 94B                 | 3          | 10       | 2            | ●     | ●  | 2.10   | 2.00   | 2.05   | 1.75              | 18       |

● First choice alternative ○ Special order alternative **Note:** 1) See calculation method, caution and suggested standard on page 114.

**Note:** The above mentioned multi fibre and mixed fibre optic + LV connectors are delivered **without** fibre optic contacts (See pages 77 and 79 for ordering).

### Mixed fibre optic (F2 contact) + HV + LV

|                  |  |  |  | Reference | High Voltage contact |            |          |       |  |  | Low Voltage contact |            |          |              |       |                   |  |  |
|------------------|--|--|--|-----------|----------------------|------------|----------|-------|--|--|---------------------|------------|----------|--------------|-------|-------------------|--|--|
|                  |  |  |  |           | Fibre optic F2 No    | Contact No | ø A (mm) | Crimp | Cont type  |  | Rated current (A)   | Contact No | ø A (mm) | Contact type |       | Rated current (A) |  |  |
|                  |  |  |  |           |                      |            |          |       | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell |                     |            |          | Solder       | Crimp |                   | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell |
|                  |  |  |  |           |                      |            |          |       |  |  |                     |            |          |              |       |                   |  |  |
|                  |  |  |  |           |                      |            |          |       |  |  |                     |            |          |              |       |                   |  |  |
| <b>3K</b>        |  |  |  | 93C       | 2                    | 2          | 1.3      | ●     | 2.25   | 2.25   | 10                  | 2          | 0.9      | -            | ●     | 1.00              | 1.00   | 3  |
| <b>5B<br/>5K</b> |  |  |  | 90C       | 6                    | 4          | 1.6      | ●     | 2.05   | 1.75   | 15                  | 2          | 1.3      | ●            | -     | 1.85              | 2.55   | 8  |
|                  |  |  |  | 956       | 12                   | 2          | 1.6      | ●     | 2.05   | 1.75   | 18                  | 1          | 2.0      | -            | ●     | 2.05              | 1.75   | 19   |

● First choice alternative ○ Special order alternative **Note:** <sup>1)</sup> See calculation method, caution and suggested standard on page 114.

**Note:** The above mentioned mixed fibre optic + HV + LV connectors are delivered **without** fibre optic contacts (See page 79 for ordering). More informations about the 3K.93C series are detailed on page 71.

### Mixed fibre optic (F2 contact) + coaxial + LV

|                  |  |  |  | Reference | Coaxial contact   |            |               |      |             |            | Low Voltage contact |              |       |  |  |  |  |                   |
|------------------|--|--|--|-----------|-------------------|------------|---------------|------|-------------|------------|---------------------|--------------|-------|--|--|--|--|-------------------|
|                  |  |  |  |           | Fibre optic F2 No | Contact No | Impedance (Ω) | Type | Cable group | Contact No | ø A (mm)            | Contact type |       | Solder contact   |  | Crimp contact  |  | Rated current (A) |
|                  |  |  |  |           |                   |            |               |      |             |            |                     | Solder       | Crimp | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell | Test voltage (kV rms) <sup>1)</sup><br>Contact-contact | Test voltage (kV rms) <sup>1)</sup><br>Contact-shell |                   |
|                  |  |  |  |           |                   |            |               |      |             |            |                     |              |       |  |  |  |  |                   |
|                  |  |  |  |           |                   |            |               |      |             |            |                     |              |       |  |  |  |  |                   |
| <b>3B<br/>3K</b> |  |  |  | 82E       | 1                 | 1          | 50            | C    | 1<br>2<br>3 | 6          | 0.9                 | ●            | ●     | 1.30   | 1.20   | 0.85   | 0.95   | 10                |
|                  |  |  |  | 82R       | 1                 | 1          | 50            | C    | 1<br>2<br>3 | 16         | 0.7                 | ●            | ●     | 0.85   | 0.85   | 0.60   | 0.80   | 6                 |
| <b>4B<br/>4K</b> |  |  |  | 05C       | 2                 | 2          | 50            | C    | 1<br>2<br>3 | -          | -                   | -            | -     | -  | -  | -  | -  | -                 |
|                  |  |  |  | 88E       | 2                 | 1          | 50            | C    | 1<br>2<br>3 | 6          | 0.7                 | ●            | ●     | 1.05   | 1.05   | 0.80   | 0.80   | 3                 |

● First choice alternative ○ Special order alternative **Note:** <sup>1)</sup> See calculation method, caution and suggested standard on page 114.

**Note:** The above mentioned mixed fibre optic + coaxial + LV connectors are delivered **without** coax contacts (See page 58 for ordering). Other configurations are available. All insulators designed for F1 F.O. contacts can accept both F1 F.O. or type C coax contacts.

# 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                  | ○    |
| L    | Aluminium alloy <sup>1)</sup> | anodized                   | nickel-plated brass              | ○    |
| G    | PEEK <sup>2)</sup>            | without treatment          | nickel-plated brass              | ●    |
| P    | PSU <sup>3)</sup>             | without treatment          | nickel-plated brass              | ●    |
| R    | PPSU <sup>4)</sup>            | without treatment          | nickel-plated brass              | ●    |

**Note:** Detailed characteristics of these materials and treatments are presented on page 107.

1) The «variant» position of the reference is used to specify the anodized colour.

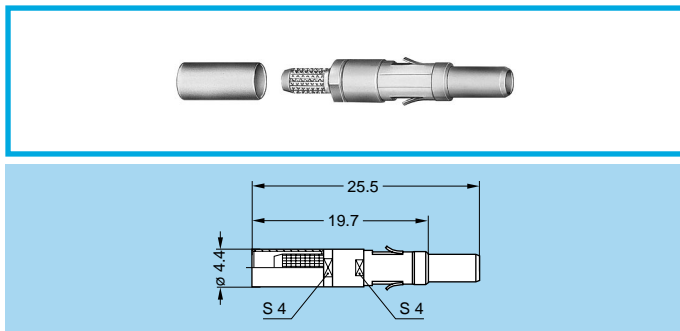
2) Only available for FGG and ENG models of the B series.

3) Only available for ENY and FGY models of the B series. For the colour, see the «variant» position.

4) Only available for ENY and FGY models of the B series.

● First choice alternative ○ Special order alternative

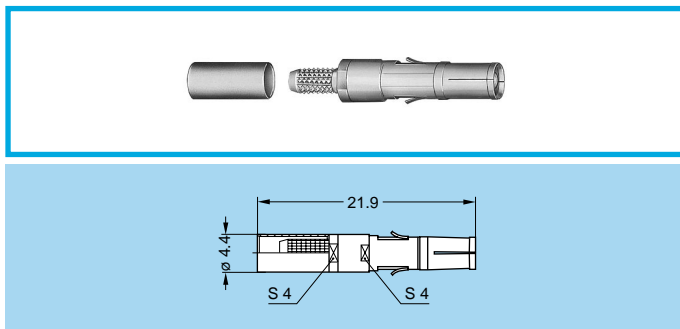
# Coaxial Contact



## FFS Male coaxial contact type C

| Part number       | Cable group <sup>1)</sup> |
|-------------------|---------------------------|
| FFS.2B.250.ZTCE24 | 2                         |
| FFS.2B.250.ZTCE30 | 1                         |
| FFS.2B.250.ZTCE31 | 3                         |

**Note:** <sup>1)</sup> See page 9 for cable group.



## PSS Female coaxial contact type C

| Part number       | Cable group <sup>1)</sup> |
|-------------------|---------------------------|
| PSS.2B.250.ZTME24 | 2                         |
| PSS.2B.250.ZTME30 | 1                         |
| PSS.2B.250.ZTME31 | 3                         |

**Note:** <sup>1)</sup> See page 9 for cable group.

**Note:** Detailed characteristics of these contacts are presented on page 113.

# Electrical Contact

## Contact for plug, socket, and fixed socket

| Ref. | Contact type  |
|------|---------------|
| A    | male solder   |
| C    | male crimp    |
| L    | female solder |
| M    | female crimp  |
| Z    | no contact    |

# Collets (B and K series)

## D and M type collets



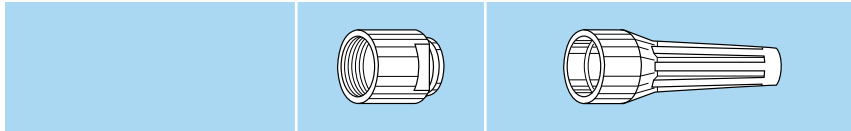
|           | Reference |               | Collet $\varnothing$ |                 | Cable $\varnothing$ |        | Collet part number <sup>1)</sup> | Reducer part number <sup>2)</sup> | Reducing cone part number <sup>2)</sup> | Collet nut part number |
|-----------|-----------|---------------|----------------------|-----------------|---------------------|--------|----------------------------------|-----------------------------------|---|------------------------|
|           | Type      | $\varnothing$ | $\varnothing A$      | $\varnothing B$ | max.                | min.   |                                  |                                   |   |                        |
| <b>2B</b> | M         | 21            | 2.1                  | –               | 2.2                 | 1.4    | FGG.0B.722.DN                    | FGG.2B.138.LN                     | FGG.2B.158.LN                           | FGG.2B.130.LC          |
|           | M         | 31            | 3.1                  | –               | 3.2                 | > 2.2  | FGG.0B.732.DN                    | FGG.2B.138.LN                     | FGG.2B.158.LN                           | FGG.2B.130.LC          |
|           | D         | 42            | 4.2                  | –               | 4.2                 | > 3.2  | FGG.0B.742.DN                    | FGG.2B.138.LN                     | FGG.2B.158.LN                           | FGG.2B.130.LC          |
|           | D         | 52            | 5.2                  | –               | 5.2                 | > 4.2  | FGG.2B.752.DN                    | –                                 | –                                       | FGG.2B.130.LC          |
|           | D         | 62            | 6.2                  | –               | 6.2                 | > 5.2  | FGG.2B.762.DN                    | –                                 | –                                       | FGG.2B.130.LC          |
|           | D         | 72            | 7.2                  | –               | 7.2                 | > 6.2  | FGG.2B.772.DN                    | –                                 | –                                       | FGG.2B.130.LC          |
|           | D         | 82            | 8.2                  | –               | 8.2                 | > 7.2  | FGG.2B.782.DN                    | –                                 | –                                       | FGG.2B.130.LC          |
|           | D         | 92            | 9.2                  | 8.6             | 9.2                 | > 8.2  | FGG.2B.792.DN                    | –                                 | –                                       | FGG.2B.130.LC          |
|           | D         | 99            | 9.9                  | 8.6             | 9.9                 | > 9.2  | FGG.2B.799.DN <sup>3)</sup>      | –                                 | –                                       | FGG.2B.132.LC          |
| <b>3B</b> | M         | 52            | 5.2                  | –               | 5.2                 | > 4.2  | FGG.1B.752.DN                    | FGG.3B.138.LN                     | FGG.3B.158.LN                           | FGG.3B.130.LC          |
|           | D         | 62            | 6.2                  | –               | 6.2                 | 4.9    | FGG.3B.762.DN                    | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 72            | 7.2                  | –               | 7.7                 | > 6.2  | FGG.3B.777.DN                    | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 82            | 8.2                  | –               | 9.2                 | > 7.7  | FGG.3B.792.DN                    | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 92            | 9.2                  | –               | 9.2                 | > 7.7  | FGG.3B.792.DN                    | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 10            | 10.2                 | –               | 10.7                | > 9.2  | FGG.3B.710.DN                    | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 11            | 11.2                 | 10.2            | 11.9                | > 10.7 | FGG.3B.712.DN <sup>3)</sup>      | –                                 | –                                       | FGG.3B.130.LC          |
|           | D         | 12            | 11.9                 | 10.2            | 11.9                | > 10.7 | FGG.3B.712.DN <sup>3)</sup>      | –                                 | –                                       | FGG.3B.132.LC          |
| <b>4B</b> | M         | 62            | 6.2                  | –               | 6.0                 | 5.1    | FGG.2B.762.DN                    | FGG.4B.138.LN                     | FGG.4B.158.LN                           | FGG.4B.130.LC          |
|           | M         | 72            | 7.2                  | –               | 7.0                 | 6.1    | FGG.2B.772.DN                    | FGG.4B.138.LN                     | FGG.4B.158.LN                           | FGG.4B.130.LC          |
|           | M         | 82            | 8.2                  | –               | 8.0                 | 7.1    | FGG.2B.782.DN                    | FGG.4B.138.LN                     | FGG.4B.158.LN                           | FGG.4B.130.LC          |
|           | M         | 92            | 9.2                  | 8.6             | 9.0                 | 8.1    | FGG.2B.792.DN                    | FGG.4B.138.LN                     | FGG.4B.158.LN                           | FGG.4B.130.LC          |
|           | D         | 10            | 10.8                 | –               | 10.5                | 9.1    | FGG.4B.710.DN                    | –                                 | –                                       | FGG.4B.130.LC          |
|           | D         | 12            | 12.3                 | –               | 12.0                | 10.6   | FGG.4B.712.DN                    | –                                 | –                                       | FGG.4B.130.LC          |
|           | D         | 13            | 13.8                 | 12.5            | 13.5                | 12.1   | FGG.4B.713.DN                    | –                                 | –                                       | FGG.4B.130.LC          |
|           | D         | 15            | 15.3                 | 12.5            | 15.0                | 13.6   | FGG.4B.715.DN                    | –                                 | –                                       | FGG.4B.130.LC          |
|           | D         | 16            | 16.3                 | 12.5            | 16.0                | 15.1   | FGG.4B.716.DN <sup>3)</sup>      | –                                 | –                                       | FGG.4B.132.LC          |
| <b>5B</b> | D         | 11            | 11.8                 | –               | 11.5                | 9.6    | FGG.5B.711.DN                    | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 13            | 13.8                 | –               | 13.5                | 11.6   | FGG.5B.713.DN                    | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 15            | 15.8                 | –               | 15.5                | 13.6   | FGG.5B.715.DN                    | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 17            | 17.8                 | –               | 17.5                | 15.6   | FGG.5B.717.DN <sup>3)</sup>      | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 19            | 19.8                 | –               | 19.5                | 17.6   | FGG.5B.719.DN <sup>3)</sup>      | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 21            | 21.8                 | –               | 21.5                | 19.6   | FGG.5B.721.DN <sup>3)</sup>      | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 23            | 23.8                 | 21.8            | 23.5                | 21.6   | FGG.5B.723.DN <sup>3)</sup>      | –                                 | –                                       | FGG.5B.130.LC          |
|           | D         | 25            | 25.3                 | 21.8            | 25.0                | 23.6   | FGG.5B.725.DN <sup>3)</sup>      | –                                 | –                                       | FGG.5B.132.LC          |

**Note:**

- <sup>1)</sup> For ordering collet separately.
- <sup>2)</sup> For ordering an M type collet, a reducer and its reducing cone should also be ordered.
- <sup>3)</sup> These collets cannot be used for connector models with collet nut for fitting a bend relief.

All dimensions are in millimeters.

## Bend relief collet nut and bend relief

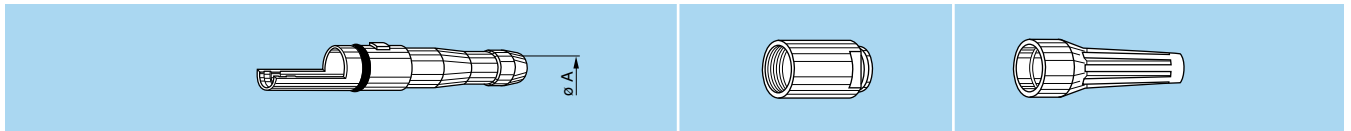


| Reference |   | Collet nut part number | Bend relief to be used <sup>1)</sup> |             |
|-----------|---|------------------------|--------------------------------------|-------------|
| Type      | ø |                        |                                      |             |
| 2B        | M | 21 and 31              | FFM.2B.132.LC                        | GMA.0B.●●●● |
|           | D | 42                     | FFM.2B.130.LC                        | GMA.2B.●●●● |
|           | D | 52 to 92               | FFM.2B.130.LC                        | GMA.2B.●●●● |
| 3B        | M | 52                     | FFM.3B.131.LC                        | GMA.1B.●●●● |
|           | D | 62 to 10               | FFM.3B.130.LC                        | GMA.3B.●●●● |
| 4B        | M | 62 and 72              | FFM.4B.132.LC                        | GMA.2B.●●●● |
|           | M | 82 and 92              | FFM.4B.130.LC                        | GMA.4B.●●●● |
|           | D | 10 to 15               | FFM.4B.130.LC                        | GMA.4B.●●●● |
| 5B        | D | 11 to 15               | FFM.5B.130.LC                        | GMA.4B.●●●● |

**Note:** <sup>1)</sup> The bend relief is to be ordered separately (see pages 91 and 92).

All dimensions are in millimeters.

## T type cable adapter



|    | Reference |      | Adapter ø A | Cable ø |                | Adapter with gasket part number | Collet nut part number | Bend relief to be used <sup>1)</sup> | Note |
|----|-----------|------|-------------|---------|----------------|---------------------------------|------------------------|--------------------------------------|------|
|    | Type      | ø    |             | max.    | min.           |                                 |                        |                                      |      |
| 2K | T         | 46   | 4.6         | 4.5     | 3.6            | FGG.2K.846.TNV                  | FFM.2K.130.LC          | GMA.2B.040.D●                        | ●    |
|    | T         | 51   | 5.1         | 5.0     | 4.1            | FGG.2K.851.TNV                  | FFM.2K.130.LC          | GMA.2B.045.D●                        | ○    |
|    | T         | 56   | 5.6         | 5.5     | 4.6            | FGG.2K.856.TNV                  | FFM.2K.130.LC          | GMA.2B.050.D●                        | ●    |
|    | T         | 61   | 6.1         | 6.0     | 5.1            | FGG.2K.861.TNV                  | FFM.2K.130.LC          | GMA.2B.057.R●                        | ○    |
|    | T         | 66   | 6.6         | 6.5     | 5.6            | FGG.2K.866.TNV                  | FFM.2K.130.LC          | GMA.2B.060.D●                        | ●    |
| 3K | T         | 46   | 4.6         | 4.5     | 3.6            | FGG.3K.846.TNV                  | FFM.3K.134.LC          | GMA.2B.040.D●                        | ●    |
|    | T         | 51   | 5.1         | 5.0     | 4.1            | FGG.3K.851.TNV                  | FFM.3K.134.LC          | GMA.2B.045.D●                        | ○    |
|    | T         | 56   | 5.6         | 5.5     | 4.6            | FGG.3K.856.TNV                  | FFM.3K.134.LC          | GMA.2B.050.D●                        | ●    |
|    | T         | 61   | 6.1         | 6.0     | 5.1            | FGG.3K.861.TNV                  | FFM.3K.134.LC          | GMA.2B.057.R●                        | ○    |
|    | T         | 66   | 6.6         | 6.5     | 5.6            | FGG.3K.866.TNN                  | FFM.3K.134.LC          | GMA.2B.060.D●                        | ●    |
|    | T         | 71   | 7.1         | 7.0     | 6.1            | FGG.3K.871.TNN                  | FFM.3K.130.LC          | GMA.3B.060.D●                        | ●    |
|    | T         | 76   | 7.6         | 7.5     | 6.6            | FGG.3K.876.TNN                  | FFM.3K.130.LC          | GMA.3B.070.D●                        | ●    |
|    | T         | 81   | 8.1         | 8.0     | 7.1            | FGG.3K.881.TNN                  | FFM.3K.130.LC          | GMA.3B.070.D●                        | ○    |
|    | T         | 86   | 8.6         | 8.5     | 7.6            | FGG.3K.886.TNN                  | FFM.3K.130.LC          | GMA.3B.080.D●                        | ●    |
|    | T         | 91   | 9.1         | 9.0     | 8.1            | FGG.3K.891.TNN                  | FFM.3K.130.LC          | GMA.3B.080.D●                        | ●    |
| 4K | T         | 46   | 4.6         | 4.5     | 3.6            | FGG.4K.846.TNV                  | FFM.4K.132.LC          | GMA.2B.040.D●                        | ●    |
|    | T         | 51   | 5.1         | 5.0     | 4.1            | FGG.4K.851.TNV                  | FFM.4K.132.LC          | GMA.2B.045.D●                        | ●    |
|    | T         | 56   | 5.6         | 5.5     | 4.6            | FGG.4K.856.TNV                  | FFM.4K.132.LC          | GMA.2B.050.D●                        | ●    |
|    | T         | 61   | 6.1         | 6.0     | 5.1            | FGG.4K.861.TNV                  | FFM.4K.132.LC          | GMA.2B.057.R●                        | ○    |
|    | T         | 66   | 6.6         | 6.5     | 5.6            | FGG.4K.866.TNV                  | FFM.4K.132.LC          | GMA.2B.060.D●                        | ●    |
|    | T         | 71   | 7.1         | 7.0     | 6.1            | FGG.4K.871.TNV                  | FFM.4K.133.LC          | GMA.3B.060.D●                        | ●    |
|    | T         | 76   | 7.6         | 7.5     | 6.6            | FGG.4K.876.TNV                  | FFM.4K.133.LC          | GMA.3B.070.D●                        | ●    |
|    | T         | 81   | 8.1         | 8.0     | 7.1            | FGG.4K.881.TNV                  | FFM.4K.133.LC          | GMA.3B.070.D●                        | ○    |
|    | T         | 86   | 8.6         | 8.5     | 7.6            | FGG.4K.886.TNV                  | FFM.4K.133.LC          | GMA.3B.080.D●                        | ●    |
|    | T         | 91   | 9.1         | 9.0     | 8.1            | FGG.4K.891.TNV                  | FFM.4K.133.LC          | GMA.3B.080.D●                        | ○    |
|    | T         | 96   | 9.6         | 9.5     | 8.6            | FGG.4K.896.TNV                  | FFM.4K.132.LC          | GMA.4B.010.D● <sup>2)</sup>          | ●    |
|    | T         | 10   | 10.6        | 10.5    | 9.6            | FGG.4K.810.TNV                  | FFM.3K.132.LC          | GMA.4B.010.D●                        | ●    |
|    | T         | 11   | 11.6        | 11.5    | 10.6           | FGG.4K.811.TNV                  | FFM.3K.132.LC          | GMA.4B.011.D●                        | ●    |
| T  | 12        | 12.6 | 12.5        | 11.6    | FGG.4K.812.TNV | FFM.3K.132.LC                   | GMA.4B.012.D●          | ●                                    |      |
| T  | 13        | 13.6 | 13.5        | 12.6    | FGG.4K.813.TNV | FFM.3K.132.LC                   | GMA.4B.013.D●          | ●                                    |      |

**Note:** <sup>1)</sup> The bend relief is to be ordered separately (see pages 91 and 92).

● First choice alternative ○ Special order alternative

<sup>2)</sup> Add a short piece of heat-shrink tubing under the bend relief.

## T type cable adapter



| Reference | Adapter |               | Cable $\varnothing$ |      | Adapter with gasket part number | Collet nut part number | Bend relief to be used <sup>1)</sup> | Note                           |   |
|-----------|---------|---------------|---------------------|------|---------------------------------|------------------------|--------------------------------------|--------------------------------|---|
|           | Type    | $\varnothing$ | max.                | min. |                                 |                        |                                      |                                |   |
| 5K        | T       | 46            | 4.6                 | 4.5  | 3.6                             | FGG.5K.846.TNV         | FFM.5K.132.LC                        | GMA.2B.040.D●                  | ○ |
|           | T       | 51            | 5.1                 | 5.0  | 4.1                             | FGG.5K.851.TNV         | FFM.5K.132.LC                        | GMA.2B.045.D●                  | ○ |
|           | T       | 56            | 5.6                 | 5.5  | 4.6                             | FGG.5K.856.TNV         | FFM.5K.132.LC                        | GMA.2B.050.D●                  | ○ |
|           | T       | 61            | 6.1                 | 6.0  | 5.1                             | FGG.5K.861.TNV         | FFM.5K.132.LC                        | GMA.2B.057.R●                  | ● |
|           | T       | 66            | 6.6                 | 6.5  | 5.6                             | FGG.5K.866.TNV         | FFM.5K.132.LC                        | GMA.2B.060.D●                  | ● |
|           | T       | 71            | 7.1                 | 7.0  | 6.1                             | FGG.5K.871.TNV         | FFM.5K.131.LC                        | GMA.3B.060.D●                  | ● |
|           | T       | 76            | 7.6                 | 7.5  | 6.6                             | FGG.5K.876.TNV         | FFM.5K.131.LC                        | GMA.3B.070.D●                  | ○ |
|           | T       | 81            | 8.1                 | 8.0  | 7.1                             | FGG.5K.881.TNV         | FFM.5K.131.LC                        | GMA.3B.070.D●                  | ● |
|           | T       | 86            | 8.6                 | 8.5  | 7.6                             | FGG.5K.886.TNV         | FFM.5K.131.LC                        | GMA.3B.080.D●                  | ○ |
|           | T       | 91            | 9.1                 | 9.0  | 8.1                             | FGG.5K.891.TNV         | FFM.5K.131.LC                        | GMA.3B.080.D●                  | ● |
|           | T       | 96            | 9.6                 | 9.5  | 8.6                             | FGG.5K.896.TNV         | FFM.5K.133.LC                        | GMA.4B.010.D● <sup>2)</sup>    | ○ |
|           | T       | 10            | 10.6                | 10.5 | 9.6                             | FGG.5K.810.TNV         | FFM.5K.133.LC                        | GMA.4B.010.D●                  | ● |
|           | T       | 11            | 11.6                | 11.5 | 10.6                            | FGG.5K.811.TNV         | FFM.5K.133.LC                        | GMA.4B.011.D●                  | ● |
|           | T       | 12            | 12.6                | 12.5 | 11.6                            | FGG.5K.812.TNV         | FFM.5K.133.LC                        | GMA.4B.012.D●                  | ● |
|           | T       | 13            | 13.6                | 13.5 | 12.6                            | FGG.5K.813.TNV         | FFM.5K.133.LC                        | GMA.4B.013.D●                  | ○ |
|           | T       | 14            | 14.6                | 14.5 | 13.6                            | FGG.5K.814.TNV         | FFM.5K.133.LC                        | GMA.4B.013.D●                  | ● |
|           | T       | 15            | 15.6                | 15.5 | 14.6                            | FGG.5K.815.TNV         | FFA.5K.131.LC                        | heat-shrink tube <sup>3)</sup> | ● |
|           | T       | 16            | 16.6                | 16.5 | 15.6                            | FGG.5K.816.TNV         | FFA.5K.131.LC                        | heat-shrink tube               | ● |
|           | T       | 17            | 17.6                | 17.5 | 16.6                            | FGG.5K.817.TNV         | FFA.5K.131.LC                        | heat-shrink tube               | ● |
|           | T       | 18            | 18.6                | 18.5 | 17.6                            | FGG.5K.818.TNV         | FFA.5K.134.LC                        | heat-shrink tube               | ● |
|           | T       | 19            | 19.6                | 19.5 | 18.6                            | FGG.5K.819.TNV         | FFA.5K.134.LC                        | heat-shrink tube               | ● |
|           | T       | 20            | 20.6                | 20.5 | 19.6                            | FGG.5K.820.TNV         | FFA.5K.134.LC                        | heat-shrink tube               | ● |
|           | T       | 21            | 21.6                | 21.5 | 20.6                            | FGG.5K.821.TNV         | FFA.5K.132.LC                        | heat-shrink tube               | ● |
| T         | 22      | 22.6          | 22.5                | 21.6 | FGG.5K.822.TNV                  | FFA.5K.132.LC          | heat-shrink tube                     | ●                              |   |
| T         | 23      | 23.6          | 23.5                | 22.6 | FGG.5K.823.TNV                  | FFA.5K.132.LC          | heat-shrink tube                     | ●                              |   |

### Note:

- 1) The bend relief is to be ordered separately (see pages 91 and 92).
- 2) Add a short piece of heat-shrink tubing under the bend relief.
- 3) The heat-shrink tube is supplied.

● First choice alternative ○ Special order alternative

All dimensions are in millimeters.



The «variant» position of the reference is used to specify the colour of the shell, the anodized colour according to the table below or the cable group.

### Colour of connectors shell made of plastic material

| Ref.            | Colour |
|-----------------|--------|
| B <sup>1)</sup> | white  |
| G <sup>1)</sup> | grey   |

Note: <sup>1)</sup> PSU connector shells are only available in white or grey colours.

### Anodized colour

Part number for connector with standard collet nut

| Ref. | Anodized colour | Ref. | Anodized colour |
|------|-----------------|------|-----------------|
| A    | blue            | R    | red             |
| J    | yellow          | T    | natural         |
| N    | black           | V    | green           |

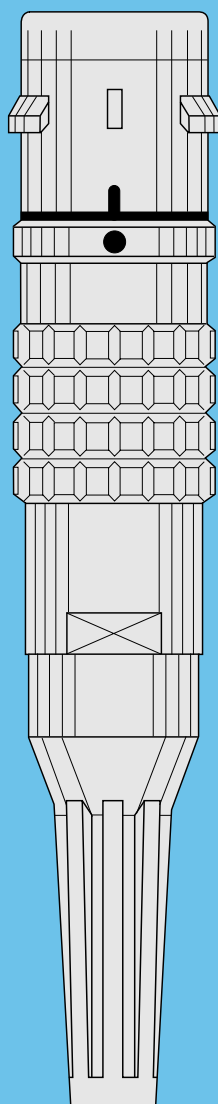
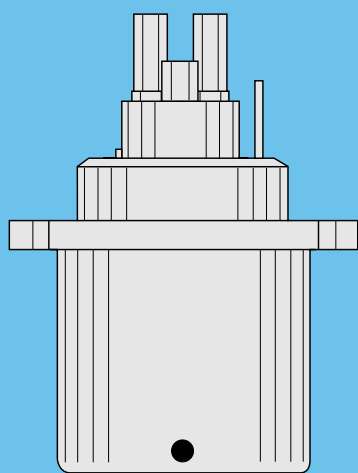
Part number for connector with collet nut for bend relief

| Ref. | Anodized colour |
|------|-----------------|
| L    | black           |
| X    | natural         |

Note: Other anodizing colours are available for connectors with collet nut for bend relief. Please consult the factory.







**3K.93C SERIES**



## 3K.93C Series

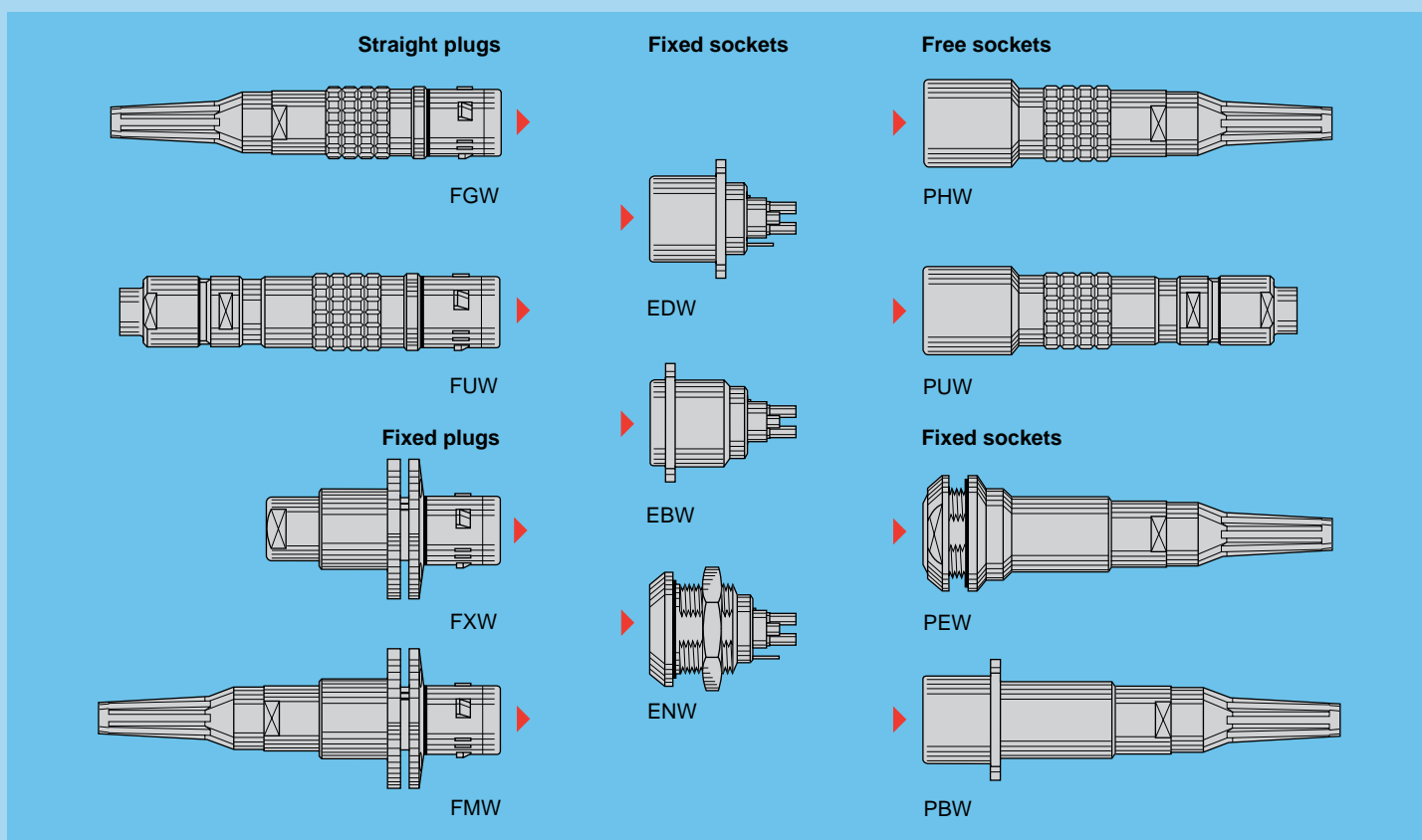
The LEMO 3K.93C connectors with keys (W) were developed to meet the critical requirements of the new generation of digital HDTV cameras.

The main features of this series are as follows:

- Security of the LEMO Push-Pull self-latching system
- Fitted with the standard LEMO F2 fibre optic contacts.
- 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.
- Qualified for use in UL approved equipment such as those specified in UL 1419 «Professional Video and Audio Equipment».
- Cabled connectors have obtained the EC Attestation of conformity No: N8 00 03 39058 001 from the German TÜV Product Service.

The 3K.93C series consists of eleven models which will accept cables specific to this application. It includes the HEAVY DUTY line with stainless steel shells that is guaranteed to at least 20,000 mating cycles and offer more resistance to heavy wear conditions.

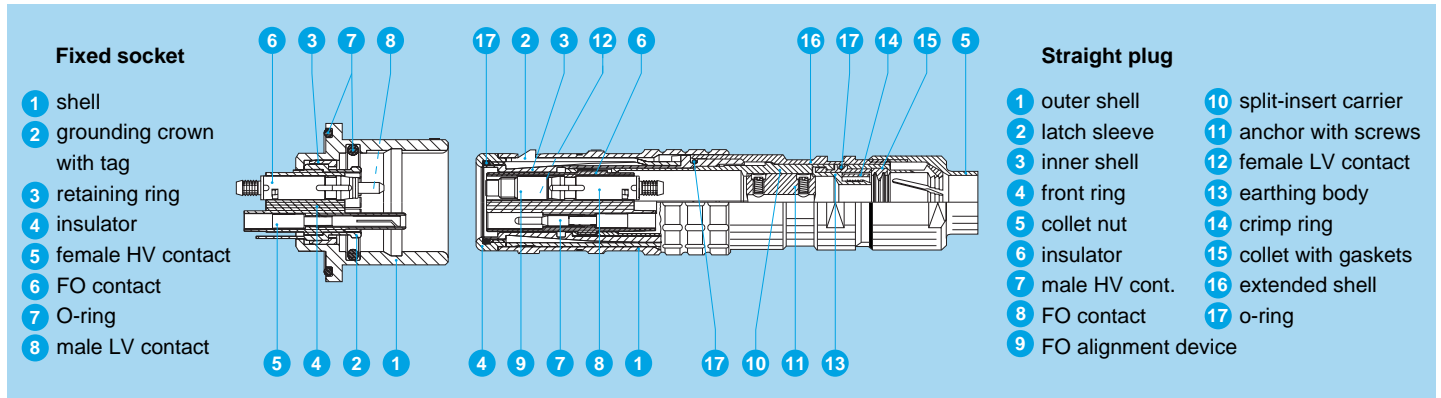
### Interconnections



### Model Description

- |  |   |  |
|--|---|--|
| <b>FGW</b> Straight plug, keys (W), cable adapter, with bend relief  | <b>EDW</b> Fixed socket with rear square flange (4 holes fixing), keys (W), and earthing tag                | <b>PUW</b> Free socket, keys (W), cable collet adapter and long shell for fitting a bend relief with cap (with enhanced screen efficiency) |
| <b>FMW</b> Fixed plug with round flange (4 holes fixing), keys (W), cable adapter, with bend relief  | <b>ENW</b> Fixed socket, nut fixing, keys (W), and earthing tag   |  |
| <b>FUW</b> Straight plug, keys (W), cable collet adapter and long shell for fitting a bend relief with cap (with enhanced screen efficiency) | <b>PBW</b> Fixed socket with rear square flange (4 holes fixing), keys (W), cable adapter, with bend relief |  |
| <b>FXW</b> Fixed plug with round flange (4 holes fixing), keys (W)   | <b>PEW</b> Fixed socket, nut fixing, keys (W), cable adapter, with bend relief (back panel mounting)        |  |
| <b>EBW</b> Fixed socket with front square flange (4 holes fixing), keys (W)  | <b>PHW</b> Free socket, keys (W), cable adapter, with bend relief   |  |

## Part Section Showing Internal Components



## Technical Characteristics

### Materials and Treatments

| Component                                    | Material (Standard)                             | Surface treatment (µm) |    |     |        |    |      |    |     |  |
|--|---|------------------------|----|-----|--------|----|------|----|-----|--|
|  |   | chrome                 |    |     | nickel |    | gold |    |     |  |
|  |   | Cu                     | Ni | Cr  | Cu     | Ni | Cu   | Ni | Au  |  |
| Outer shell, collet nut and oversized collet | Brass (UNS C 38500)                             | 0.5                    | 3  | 0.3 | –      | –  | –    | –  | –   |  |
|  | Stainless steel (AISI 303)                      | without treatment      |    |     |        |    |      |    |     |  |
| Grounding crown                              | Special brass                                   | –                      | –  | –   | 0.5    | 3  | –    | –  | –   |  |
|  | Stainless steel (AISI 416)                      | without treatment      |    |     |        |    |      |    |     |  |
| Latch sleeve                                 | Special brass                                   | 0.5                    | 3  | 0.3 | –      | –  | –    | –  | –   |  |
|  | Stainless steel (AISI 416)                      | without treatment      |    |     |        |    |      |    |     |  |
| Locking washer                               | Bronze (UNS C 52100)                            | –                      | –  | –   | 0.5    | 3  | –    | –  | –   |  |
| Hexagonal or round nut                       | Brass (UNS C 38500)                             | –                      | –  | –   | 0.5    | 3  | –    | –  | –   |  |
| Male crimp contact                           | Brass (UNS C 34500)                             | –                      | –  | –   | –      | –  | 0.5  | 3  | 1.0 |  |
| Female crimp contact                         | Bronze (UNS C 54400)                            | –                      | –  | –   | –      | –  | 0.5  | 3  | 1.5 |  |
| Clips  | Cu-Be (FS QQ-C-530)                             | without treatment      |    |     |        |    |      |    |     |  |
| Insulator                                    | PEEK  | –                      |    |     |        |    |      |    |     |  |
| Crimping tube                                | Copper (UNS C 18700)                            | –                      | –  | –   | 0.5    | 3  | –    | –  | –   |  |
| Other metallic components                    | Brass (UNS C 38500)                             | –                      | –  | –   | 0.5    | 3  | –    | –  | –   |  |
|  | Stainless steel (AISI 303)                      | without treatment      |    |     |        |    |      |    |     |  |
| O-ring and gaskets                           | Silicone MQ/MVQ, FPM/FKM (Viton®) or Nitril NBR | –                      |    |     |        |    |      |    |     |  |

**Notes:** Standards for surface treatment are as follows:  
 – Chrome-plated: FS QQ-C-320B;  
 – Nickel-plated: FS QQ-N-290A, or MIL-C-26074C;  
 – Gold-plated: ISO 4523

### Mechanical and Environmental

| Characteristic                                | Value                           | Standard             |
|---|---------------------------------|----------------------|
| Mating durability (Brass+Brass)               | 10,000 cycles                   | IEC 61300-02-02      |
| Mating durability (Brass+Stainless steel)     | 8,000 cycles                    | IEC 61300-02-02      |
| Mating durability (Stainless steel+St. steel) | 20,000 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      |
| Temperature cycling                           | -55°C + 90°C                    |                      |
| Cable retention                               | 1000 N                          | IEC 61300-02-04      |
| Impact (Method A)                             | 2 m onto concrete floor         | IEC 61300-02-12      |
| Shock (3 cycles in 2 directions)              | 100 g, 10-50 ms;<br>20 g 6-9 ms | IEC 61300-02-09      |
| Vibration (7 cycles)                          | Diagram 2 page 111              | IEC 61300-02-01      |
| Water resistance (Depth of 1.8 for 48 h)      | IP 68                           | IEC 60529            |
| Salt spray corrosion test <sup>1)</sup>       | > 144h                          | IEC 60512-6 test 11f |

**Note:** <sup>1)</sup> the outer shells are in chrome-plated brass (Cr1).

### Optical

| Characteristic                           | Value   | Standard        | Method                |
|--|---------|-----------------|-----------------------|
| Average insertion loss fibre 9/125 µm    | 0.10 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. |

### Electrical

| Characteristic                  | Value                | Standard    | Section          |
|---------------------------------|----------------------|-------------|------------------|
| Insulation resistance           | > 10 <sup>12</sup> Ω | IEC 60512-2 | test 3a          |
| Shell electrical continuity     | < 1.6 mΩ             | IEC 60512-2 | test 2f          |
| Contact resistance (signal)     | < 4.8 mΩ             | IEC 60512-2 | test 2a          |
| Contact resistance (power)      | < 3.6 mΩ             | IEC 60512-2 | test 2a          |
| Radiated emission <sup>1)</sup> | freq. 30-220 MHz     | < 30 dBµV/m | EN 55022 class B |
|                                 | freq. 220-1000 MHz   | < 37 dBµV/m | EN 55022 class B |

**Note:** <sup>1)</sup> for FUW and PUW model only.  
 Detailed characteristics are presented on pages 109 to 111.

## Alignment Key and Polarized Keying Systems

|  |       |            |          |      |
|--|-------|------------|----------|------|
|  | Model | No of keys | Angles   |      |
|  | ●●W   | 5          | $\alpha$ | 95°  |
|  |       |            | $\beta$  | 115° |
|  |       |            | $\gamma$ | 20°  |
|  |       |            | $\delta$ | 30°  |

## Recommended cables

| Cable group     | Type         | Utilisation    | Sheath outer $\varnothing$ |
|-----------------|--------------|----------------|----------------------------|
| 1               | 2SM-8.6-37.5 | outdoor        | 8.6 ± 0.3                  |
| 2               | 2SM-9.2-37.5 | outdoor        | 9.2 ± 0.3                  |
| 3               | 2SM-12-15    | long distances | 12.0 ± 0.4                 |
| 4 <sup>1)</sup> | 2SM-16-37.5  | indoor         | 16.0 ± 0.5                 |

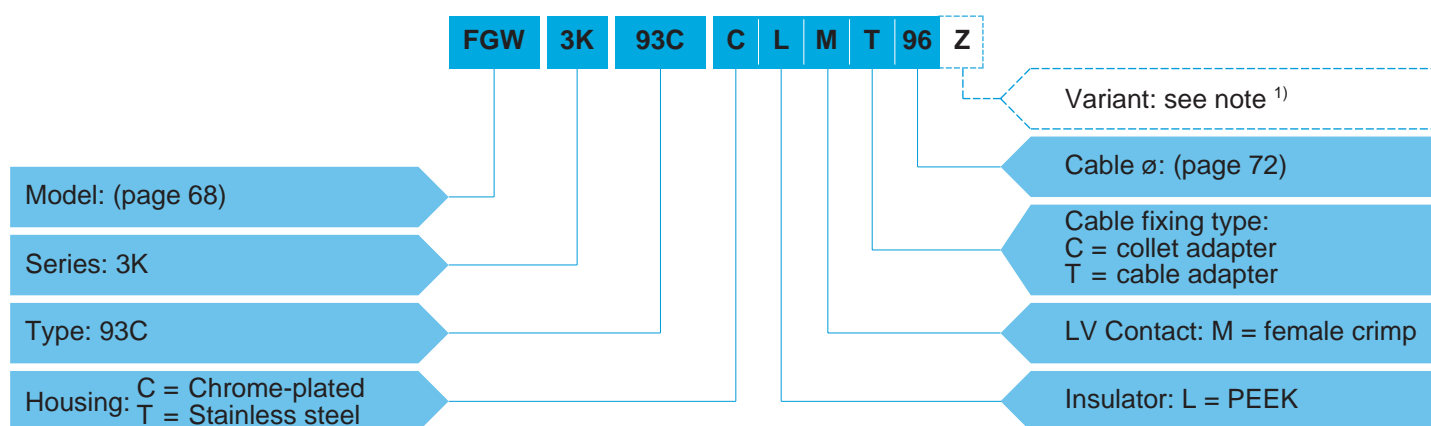
**Note:** <sup>1)</sup> The outer sheath shall be removed for assembly.

## Part Number Example

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

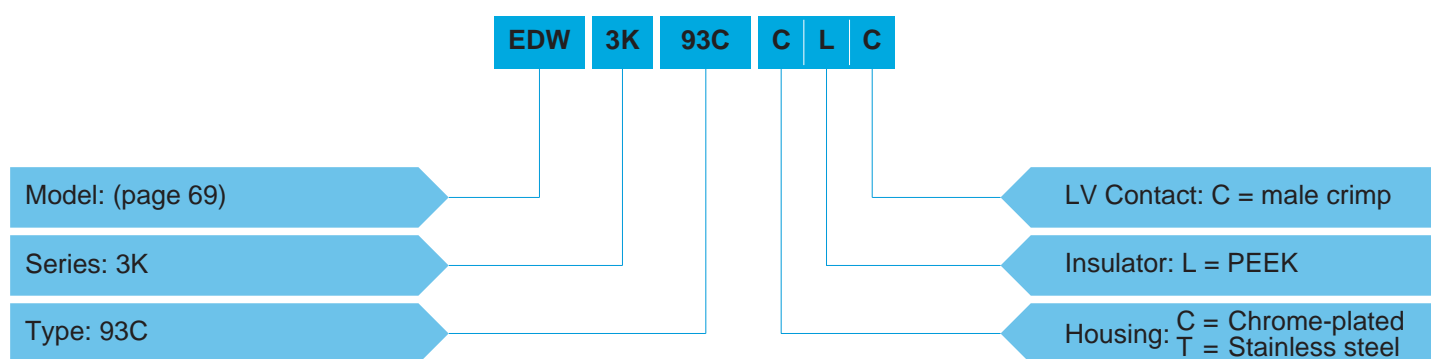
- Plugs and sockets for assembly onto cables
- Fixed plugs and sockets.

### Straight plug with cable adapter



**FGW.3K.93C.CLMT96Z** = Straight plug with keys (W), 3K series, mixed type to accept 2 F2 type fibre optic contacts, 2 power and 2 signal electrical contacts, chrome-plated brass housing, PEEK insulator, female crimp signal contacts, cable fixing type T for 9.2 mm diameter cable, and nut for fitting a bend relief.

### Fixed socket

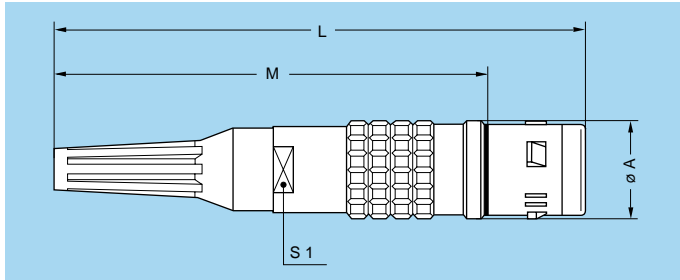
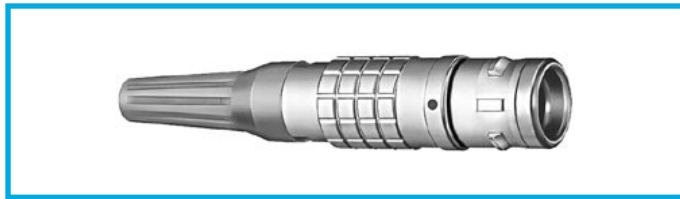


**EDW.3K.93C.CLC** = Fixed socket with rear square flange, keys (W), 3K series, mixed type to accept 2 F2 type fibre optic contacts, 2 power and 2 signal electrical contacts, chrome-plated brass housing, PEEK insulator, male crimp signal contacts.

**The fibre optic contacts must be ordered separately (see page 79).**

**Note:** <sup>1)</sup> The «Variant» position in the reference is used to indicate the presence of a collet nut for fitting the bend relief. For models with the «T» type of cable adapter the «Z» should always be indicated and a bend relief can be ordered separately as indicated in the «Accessories» section. An order for a connector with bend relief should thus include two part numbers.

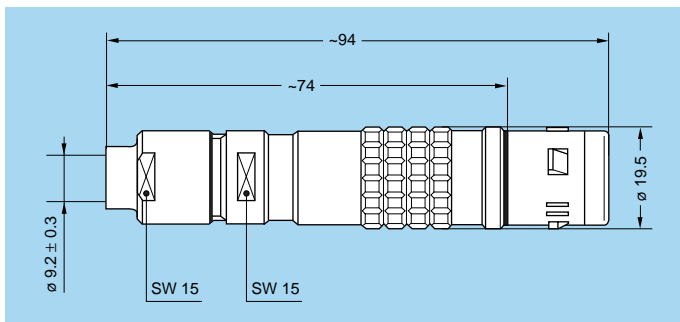
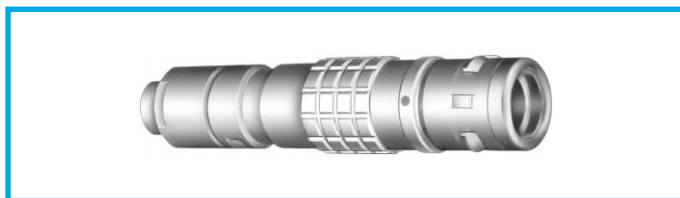
# ▶ Model - Series



**FGW.3K** Straight plug, keys (W), cable adapter, with bend relief

| Part Number        | Cable group | Dimension (mm) |     |     |    |
|--------------------|-------------|----------------|-----|-----|----|
|                    |             | A              | L   | M   | S1 |
| FGW.3K.93C.CLMT90Z | 1           | 19             | 101 | 81  | 15 |
| FGW.3K.93C.CLMT96Z | 2, 4        | 19             | 101 | 81  | 15 |
| FGW.3K.93C.CLMT12Z | 3           | 19             | 135 | 115 | 20 |

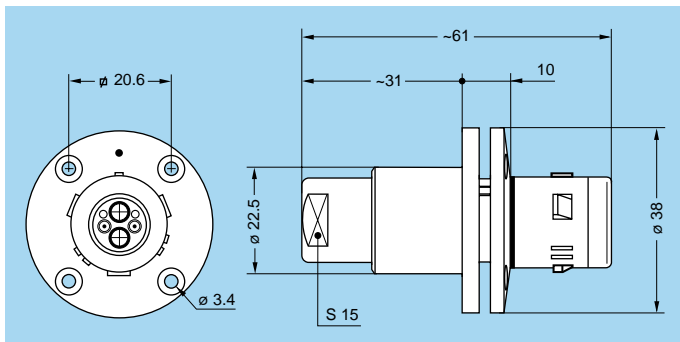
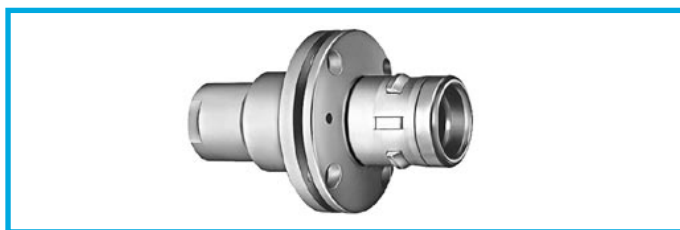
**Note:** The bend relief must be ordered separately (see page 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).



**FUW.3K** Straight plug, keys (W), cable collet adapter and long shell for fitting a bend relief with cap (with enhanced screen efficiency)

| Part Number       | Cable group | Note            |
|-------------------|-------------|-----------------|
| FUW.3K.93C.CLMC96 | 2, 4        | –               |
| FUW.3K.93C.TLMC96 | 2, 4        | HEAVY DUTY LINE |

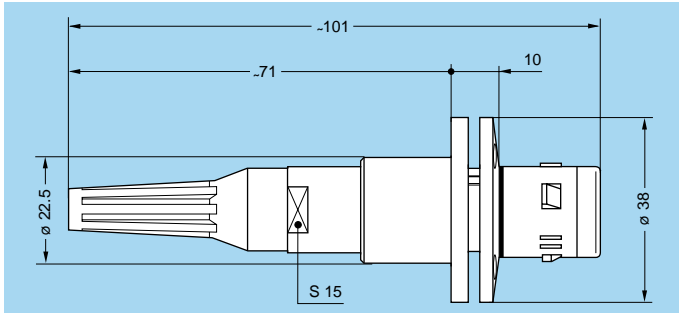
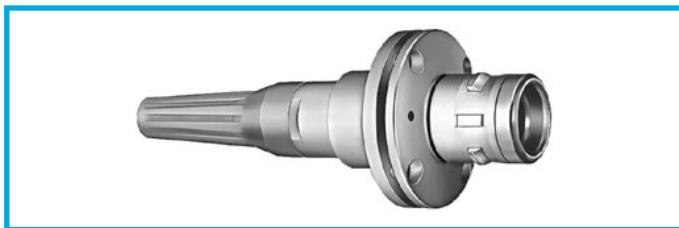
**Note:** The bend relief with cap must be ordered separately (see page 91).



**FXW.3K** Fixed plug with round flange (4 holes fixing), keys (W)

| Part Number    | Note            |
|----------------|-----------------|
| FXW.3K.93C.CL  | –               |
| FXW.3K.93C.TLM | HEAVY DUTY LINE |

Panel cut-out (page 76)

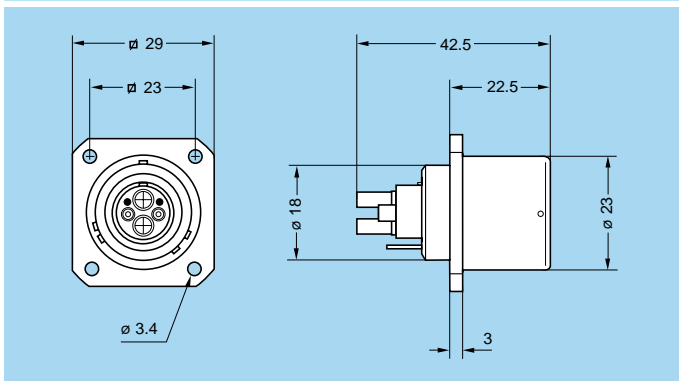


**FMW.3K** Fixed plug with round flange (4 holes fixing), keys (W), cable adapter, with bend relief

| Part Number        | Cable group | Note            |
|--------------------|-------------|-----------------|
| FMW.3K.93C.CLMT90Z | 1           | -               |
| FMW.3K.93C.CLMT96Z | 2, 4        | -               |
| FMW.3K.93C.TLMT96Z | 2, 4        | HEAVY DUTY LINE |

Panel cut-out (page 76)

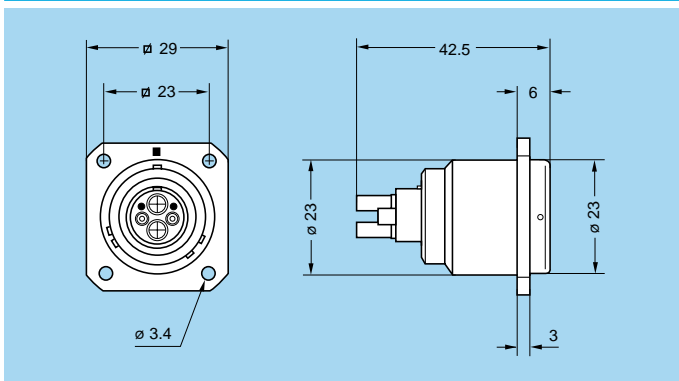
**Note:** See FXW drawing for front view. The bend relief must be ordered separately (see page 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).



**EDW.3K** Fixed socket with rear square flange (4 holes fixing), keys (W), and earthing tag

| Part Number    | Note            |
|----------------|-----------------|
| EDW.3K.93C.CLC | -               |
| EDW.3K.93C.TLC | HEAVY DUTY LINE |

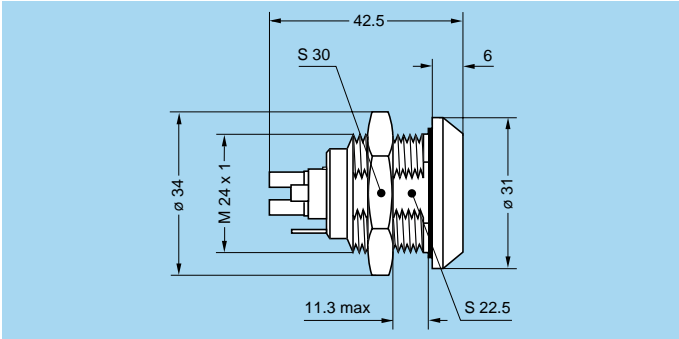
Panel cut-out (page 76)



**EBW.3K** Fixed socket with front square flange (4 holes fixing), keys (W)

| Part Number    |
|----------------|
| EBW.3K.93C.CLC |

Panel cut-out (page 76)

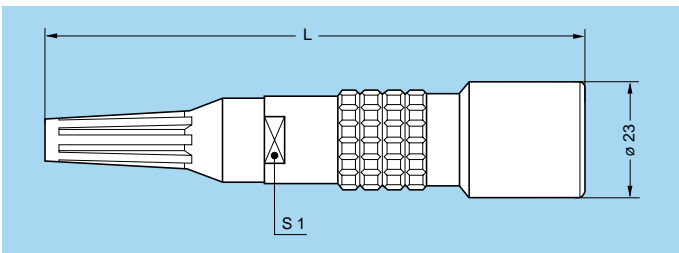
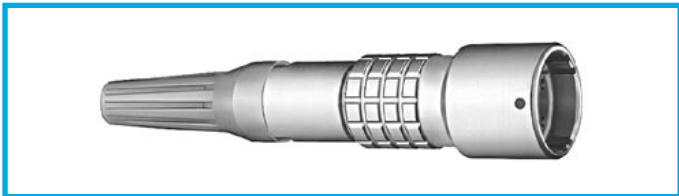


### ENW.3K Fixed socket, nut fixing, keys (W), and earthing tag

Part Number

ENW.3K.93C.CLC

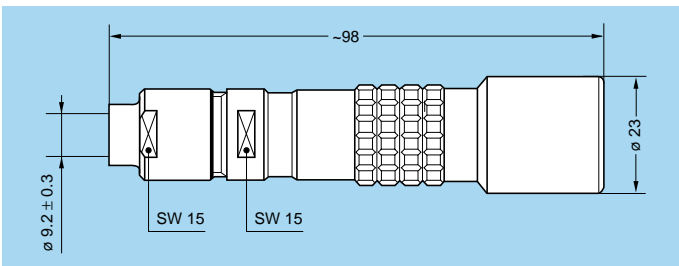
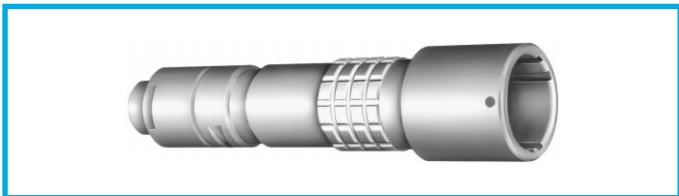
Panel cut-out (page 76)



### PHW.3K Free socket, keys (W), cable adapter, with bend relief

| Part Number        | Cable group | Dimension (mm) |    |
|--------------------|-------------|----------------|----|
|                    |             | L              | S1 |
| PHW.3K.93C.CLCT90Z | 1           | 105            | 15 |
| PHW.3K.93C.CLCT96Z | 2, 4        | 105            | 15 |
| PHW.3K.93C.CLCT12Z | 3           | 139            | 20 |

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

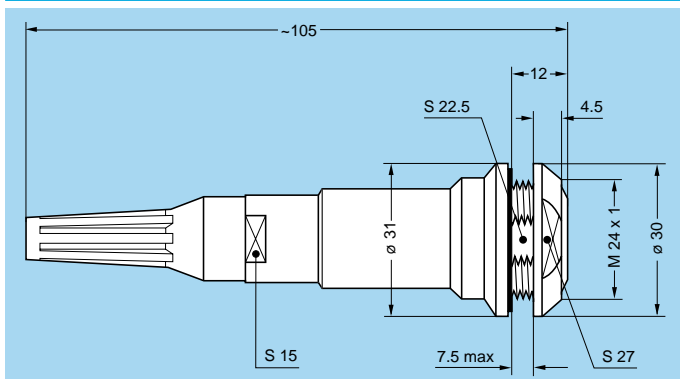
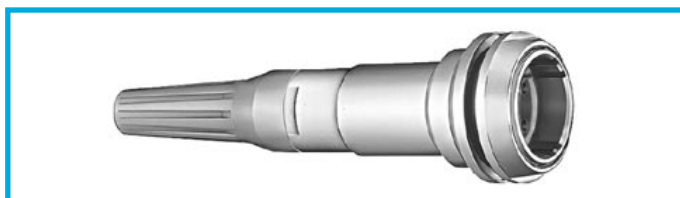


### PUW.3K Free socket, keys (W), cable collet adapter and long shell for fitting a bend relief with cap (with enhanced screen efficiency)

| Part Number       | Cable group | Note            |
|-------------------|-------------|-----------------|
| PUW.3K.93C.CLCC96 | 2, 4        | –               |
| PUW.3K.93C.TLCC96 | 2, 4        | HEAVY DUTY LINE |

**Note:** The bend relief with cap must be ordered separately (see page 91).



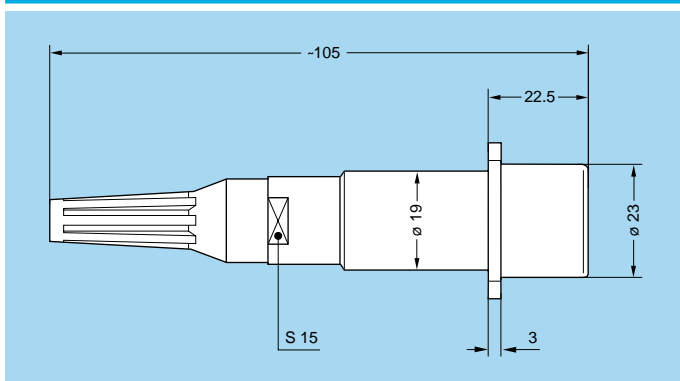
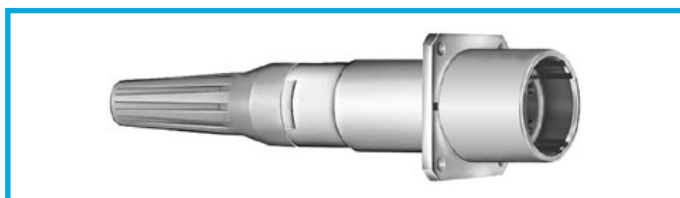


**PEW.3K** Fixed socket, nut fixing, keys (W), cable adapter, with bend relief (back panel mounting)

| Part Number        | Cable group | Note            |
|--------------------|-------------|-----------------|
| PEW.3K.93C.CLCT90Z | 1           | -               |
| PEW.3K.93C.CLCT96Z | 2, 4        | -               |
| PEW.3K.93C.TLCT96Z | 2, 4        | HEAVY DUTY LINE |

Panel cut-out (page 76)

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



**PBW.3K** Fixed socket with rear square flange (4 holes fixing), keys (W), cable adapter, with bend relief

| Part Number        | Cable group |
|--------------------|-------------|
| PBW.3K.93C.CLCT90Z | 1           |
| PBW.3K.93C.CLCT96Z | 2, 4        |

Panel cut-out (page 76)

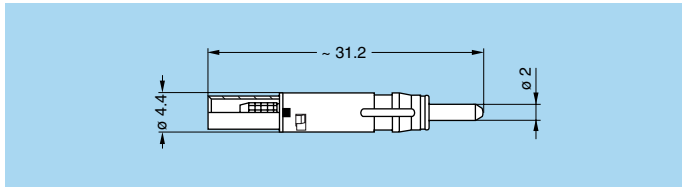
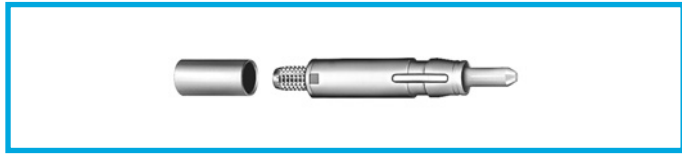
**Note:** See EDW drawing for front view. The bend relief must be ordered separately (see page 91). The overall length dimension is with Desmopan bend relief (see pages 91 and 92).

## Types

| Socket insulator | Plug insulator | Reference | Fibre optic contact |                       |                          |                            | Electrical crimp contacts |                  |                       |                  |           |  |                         |                      |                   |
|------------------|----------------|-----------|---------------------|-----------------------|--------------------------|----------------------------|---------------------------|------------------|-----------------------|------------------|-----------|--|-------------------------|----------------------|-------------------|
|                  |                |           | Fibre optic F2 No   | Contact type for plug | Fibre core/cladding (µm) | Ferrule bore inside ø (µm) | No of contacts            | Contact function | Contact type for plug | Contact ø A (mm) | AWG range | Creepage distance and air clearance (mm) | Working voltage (V rms) | Test voltage (V rms) | Rated current (A) |
|                  |                | 93C       | 2                   | fem.                  | 9/125                    | 125                        | 2                         | signal           | L.V. fem.             | 0.9              | 20-24     | -  | ≤42                     | 1000                 | 3                 |
|                  |                |           |                     |                       |                          |                            | 2                         | power            | H.V. male             | 1.3              | 14-18     | >6.5                                     | ≤600                    | 2250                 | 10                |

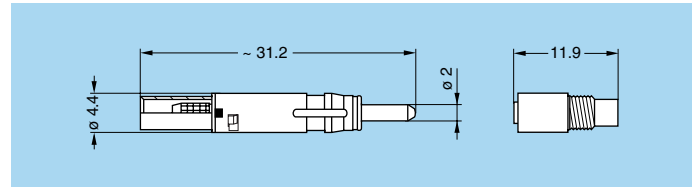
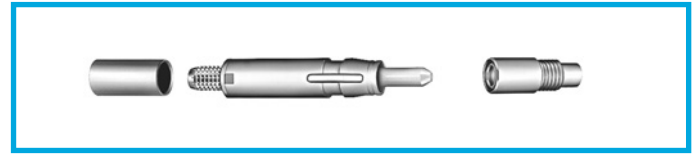
# Fibre Optic Contact

## FFS.F2 Male F2 Fibre Optic Contact



| Part number      | Models             |
|------------------|--------------------|
| FFS.F2.BA2.LCT10 | PHW, PEW, PBW, PUW |
| FFS.F2.BA2.LCE30 | EDW, ENW, EBW      |

## PSS.F2 Female F2 Fibre Optic Contact

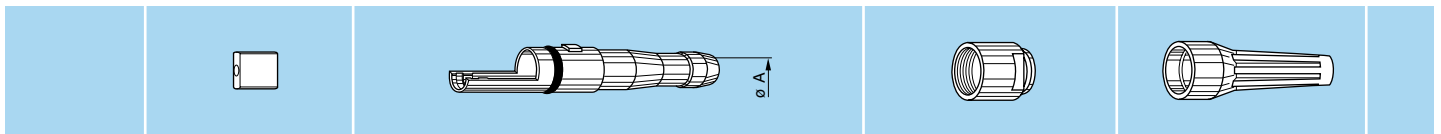


| Part number      | Models        |
|------------------|---------------|
| PSS.F2.BA2.LCT10 | FGW, FMW, FUW |
| PSS.F2.BA2.LCE30 | FXW           |

**Note:** The above contacts are fitted with a 125 micron bore ferrules. If as an alternative 126 micron bore ferrule is required the «BA2» in the part number should be replaced with the reference «BB2».

# Accessories

## Cable adapter type «T» for FGW, FMW, PHW, PEW and PBW



| Reference Type | Part number of the anchor with screws | Adapter ø A | Cable ø |      | Part number of the adapter with gasket | Part number of the collet nut | Bend relief to be used <sup>1)</sup> | Cable group |
|----------------|---------------------------------------|-------------|---------|------|--|-------------------------------|--------------------------------------|-------------|
|                |                                       |             | max.    | min. |  |                               |                                      |             |
| T 90           | FGW.3K.145.ZZA                        | 9.1         | 9.0     | 8.1  | FGW.3K.890.TNN                         | FFM.3E.130.●●                 | GMA.3B.080.DN                        | 1           |
| T 96           | FGW.3K.146.ZZA                        | 9.6         | 9.5     | 8.6  | FGW.3K.896.TNN                         | FFM.3K.131.●●                 | GMA.3B.090.DN                        | 2, 4        |
| T 12           | FGW.3K.147.ZZA                        | 12.6        | 12.5    | 11.6 | FGW.3K.812.TNV                         | FFM.3K.132.●●                 | GMA.4B.011.DN                        | 3           |

**Note:** <sup>1)</sup> The last letter «N» on the part number indicates black colour of the bend relief. For ordering a bend relief with another colour see table on page 92 and replace the letter «N» by the letter of the colour required.

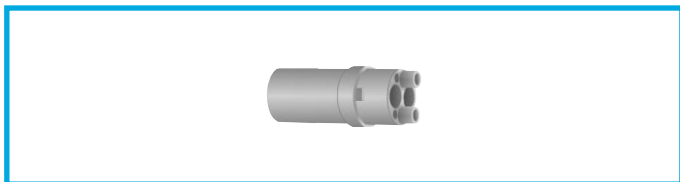
## Collet adapter type «C» for FUW and PUW



| Reference Type | Part number of the anchor with screws | Part number of earthing body with o-ring | Part number of crimp ring | Collet ø A | Cable ø |      | Part number of collet with gaskets | Part number of extended shell | Part number of the collet nut | Cable group |
|----------------|---------------------------------------|--|---------------------------|------------|---------|------|------------------------------------|-------------------------------|-------------------------------|-------------|
|                |                                       |  |                           |            | max.    | min. |                                    |                               |                               |             |
| C 96           | FGW.3K.146.ZZA                        | FFS.3K.130.LNV                           | FFS.3K.160.DN             | 9.6        | 9.5     | 8.6  | FUW.3K.796.ZZS                     | FUW.3K.137.●●                 | FUW.3K.130.●●                 | 2, 4        |

**Note:**  
 ●● = LC for chrome-plated brass version  
 ●● = AZ for stainless steel version

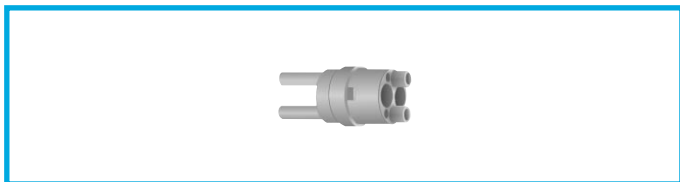
All dimensions are in millimeters.



### Insulator for plug

| Part number   | Contact type |       |
|---------------|--------------|-------|
|               | Signal       | Power |
| EGW.3K.444.EL | Female       | Male  |

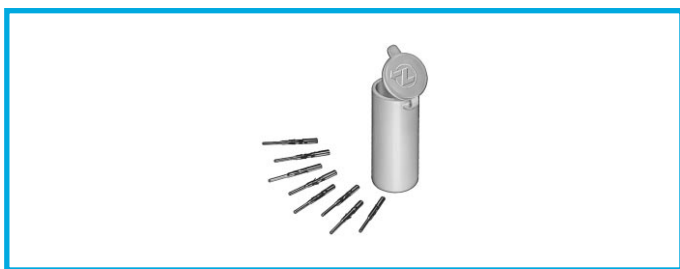
**Note:** Insulator should be ordered as replacement item.



### Insulator for socket

| Part number   | Contact type |        |
|---------------|--------------|--------|
|               | Signal       | Power  |
| FGW.3K.344.EL | Male         | Female |

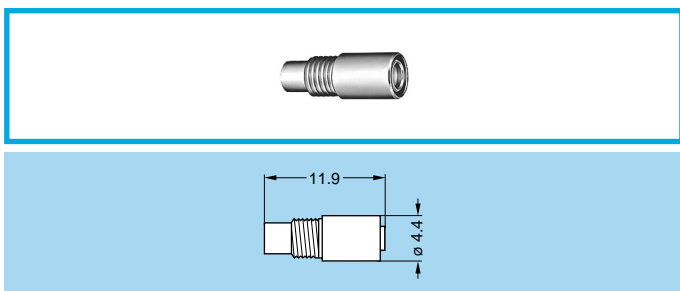
**Note:** Insulator should be ordered as replacement item.



### Crimp contacts

| ∅ Contact LV | Contact function | Contact part number |                |
|--------------|------------------|---------------------|----------------|
|              |                  | Male                | Female         |
| 0.9          | Signal           | FGG.3B.560.ZZC      | EGG.3B.660.ZZM |
| 1.3          | Power 1)         | FGW.3K.565.ZZC      | EGW.3K.666.ZZM |

**Note:** 1) Power contacts are special with an oversized crimp barrel. Crimp contacts should be ordered as replacement items.



### PSS Alignment device for F2 fibre optic contacts

| Part number    |
|----------------|
| PSS.F2.290.NZZ |

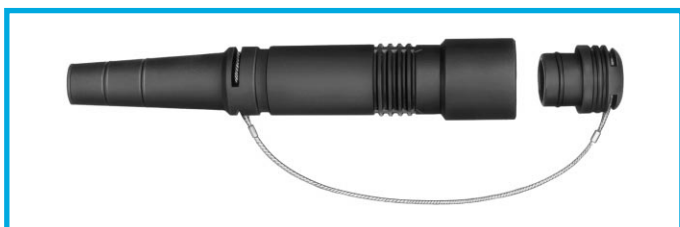
**Note:** Alignment device should be ordered as replacement item.



### GMF.3K Bend relief with cap for FUW plug

| Part number     |
|-----------------|
| GMF.3K.085.EANZ |

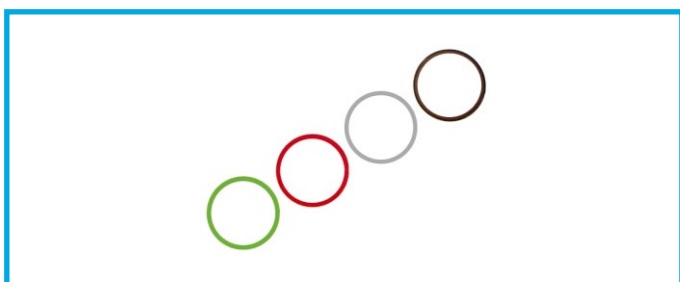
● Material: black EPDM



### GMP.3K Bend relief with cap for PUW free socket

| Part number     |
|-----------------|
| GMP.3K.085.EANZ |

● Material: black EPDM

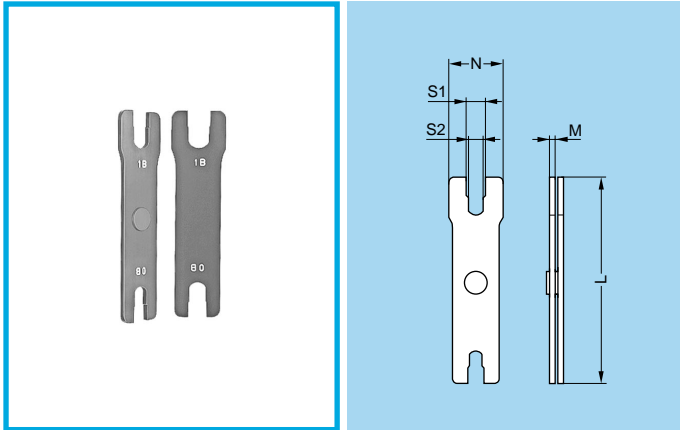


### GMF.3K Coloured ring for bend relief with cap

| Part number   | Colour |
|---------------|--------|
| GMF.3K.265.RG | grey   |
| GMF.3K.265.RN | black  |
| GMF.3K.265.RR | red    |
| GMF.3K.265.RV | green  |

● Material: Silicone

## Tooling



### DCP Spanner for tightening collet nut

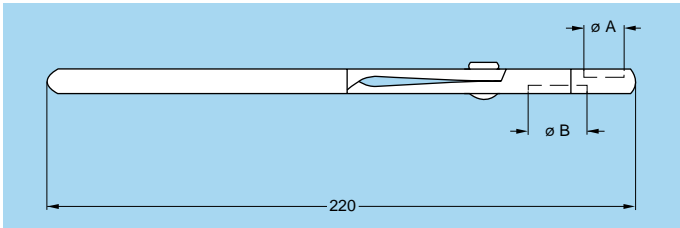
| Part number   | Series | Dimensions (mm) |     |    |      |      |
|---------------|--------|-----------------|-----|----|------|------|
|               |        | L               | M   | N  | S1   | S2   |
| DCP.91.023.TN | 2K     | 115             | 3.0 | 30 | 13.1 | 12.1 |
|               | 3K     | 115             | 3.0 | 35 | 15.1 | 14.1 |

- Material: Blackened steel



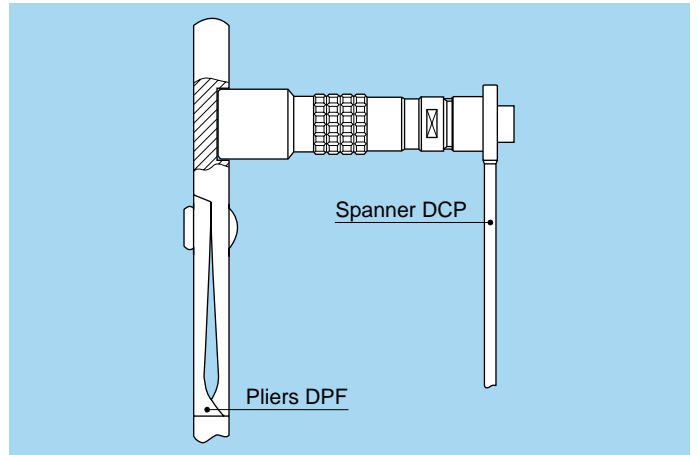
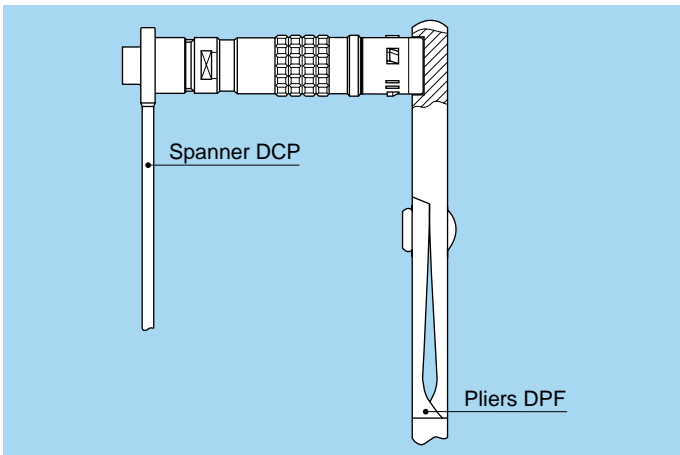
### DPF Pliers for assembling plugs or free sockets

| Part number   | Dimensions (mm) |              |
|---------------|-----------------|--------------|
|               | A               | B            |
| DPF.91.033.TA | 18              | 23           |
| Model         | plugs           | free sockets |

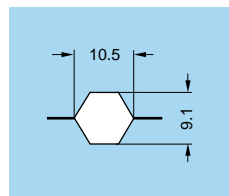


### Example for use

The plug or socket end must be held in the pliers while the nut is tightened with the spanner.



### DPD Crimping tool for screen crimping on FUW and PUW

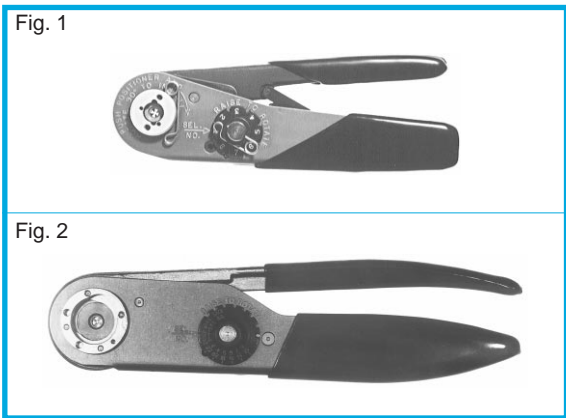


| Part number   |
|---------------|
| DPD.99.010.5K |

# Fibre Optic Tooling

The full range of tools for terminating fibre optic contacts is shown on pages 103 to 106.

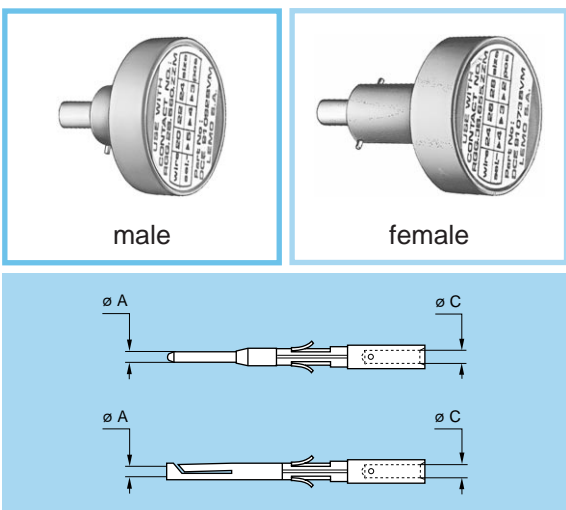
# Crimping Tools for Electrical Contacts



## Manual crimping tools

| Supplier | Part number                |                            |
|----------|----------------------------|----------------------------|
|          | signal contacts<br>ø 0.9   | power contacts<br>ø 1.3    |
| LEMO     | DPC.91.701.V <sup>1)</sup> | DPC.91.101.A <sup>2)</sup> |
| DANIELS  | MH860 <sup>1)</sup>        | AF8 <sup>2)</sup>          |
| BALMAR   | 23-000                     | 55-000                     |
| BUCHANAN | 616336 <sup>1)</sup>       | 615708 <sup>2)</sup>       |

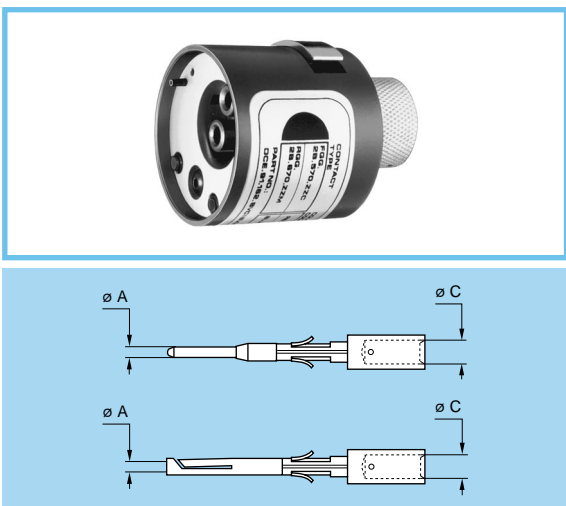
1) According to specification MIL-C-22520/7-01.  
2) According to specification MIL-C-22520/1-01.



## DCE Positioners for signal contacts ø 0.9 mm

| Contacts dimensions |     | Conductor<br>AWG | Selector<br>Pos. | Positioners part number |                       |
|---------------------|-----|------------------|------------------|-------------------------|-----------------------|
| ø A                 | ø C |                  |                  | For male<br>contact     | For female<br>contact |
| 0.9                 | 1.1 | 20-22-24         | 6-5-5            | DCE.91.093.BVC          | DCE.91.093.BVM        |

**Note:** These positioners are suitable for use with both manual and pneumatic crimping tools according to the MIL-C-22520/7-01 standard.



## DCE Turret for power contacts ø 1.3 mm

Power contacts are special with an oversized crimp barrel.

| Contacts dimensions |     | Conductor<br>AWG | Selector<br>Pos. | Positioners part number     |
|---------------------|-----|------------------|------------------|-----------------------------|
| ø A                 | ø C |                  |                  | For male and female contact |
| 1.3                 | 1.9 | 14-16-18         | 7-6-5            | DCE.91.133.BVCW             |

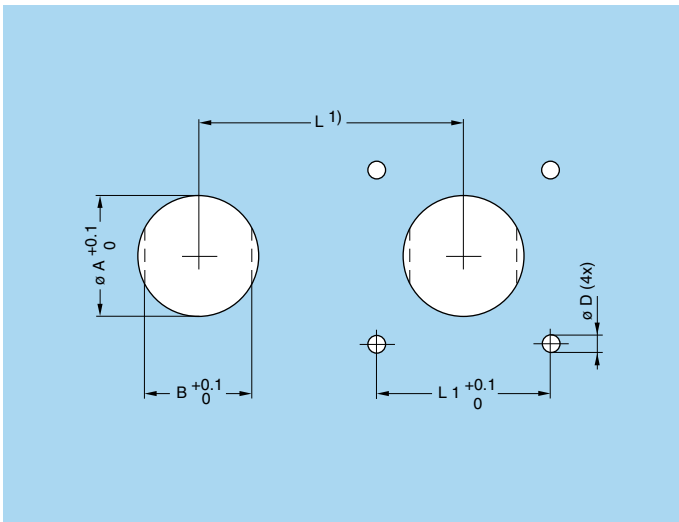
**Note:** These turrets can be used with manual crimping tool according to MIL-C-22520/1-01 standard.

## Termination Instruction



| Part Number     | Models |
|-----------------|--------|
| DOC.FO.W3K.93CO | All    |

## Panel Cut-Outs



| Models   | Dimension (mm) |      |           |    |      |
|----------|----------------|------|-----------|----|------|
|          | A              | B    | D         | L  | L1   |
| FMW, FXW | 22.6           | –    | 3.2 or M3 | 39 | 20.6 |
| EBW      | 23.1           | –    | 3.2 or M3 | 30 | 23.0 |
| EDW      | 18.1           | –    | 3.2 or M3 | 30 | 23.0 |
| ENW, PEW | 24.2           | 22.6 | –         | 32 | –    |
| PBW      | 19.2           | –    | 3.2 or M3 | 30 | 23.0 |

**Note:** <sup>1)</sup> Minimum distance between two neighbouring components.

### Mounting torque

| Series | Torque (Nm) |                      |
|--------|-------------|----------------------|
|        | Nut         | Screws               |
| 3K     | 12          | 1 to 2 <sup>1)</sup> |

**Note:** <sup>1)</sup> Depends on screw material selected.  
The values shown in the table above are the maximum torque for each connector type.

# F1 Fibre Optic Contact

## Introduction

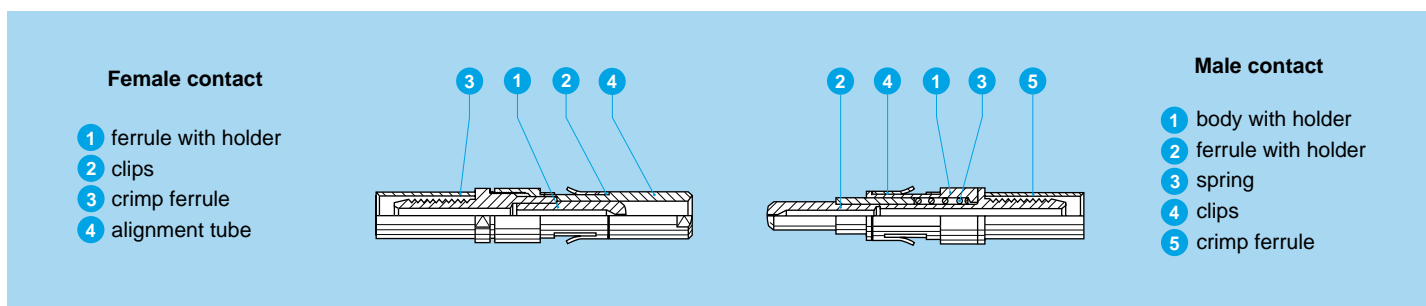
The F1 type contact is designed for fitting into multi fibre or mixed fibre optical/electrical connectors from the 2B to 5B, 2K to 5K series.

Its main features are as follows:

- Simple and proven construction with a metallic or ceramic ferrule
- Polishing with specific tooling ensuring a minimum gap between fibres which are not in physical contact
- After mounting on the cable, the contact is installed in the main connector insulator, and retained with a metallic clip.

This contact is suitable for use with multi-mode fibres in Si/Si or plastic, ranging in sizes from 100/140 to 1500 µm.

## Part Section Showing Internal Components



## Technical Characteristics

### Material and treatment of the Fibre Optic Contact

| Component       | Material                | Surface treatment (µm) |    |
|-----------------|-------------------------|------------------------|----|
|                 |                         | Cu                     | Ni |
| Body and holder | Alloy CuNiZn            | without treatment      |    |
| Ferrule         | Alloy CuNiZn or ceramic | without treatment      |    |
| Spring          | Stainless steel         | without treatment      |    |
| Clip            | Cu-Be                   | without treatment      |    |
| Crimp ferrule   | Cu 99                   | 0.5                    | 3  |
| Alignment tube  | Alloy CuNiZn            | without treatment      |    |

### Mechanical and Environmental

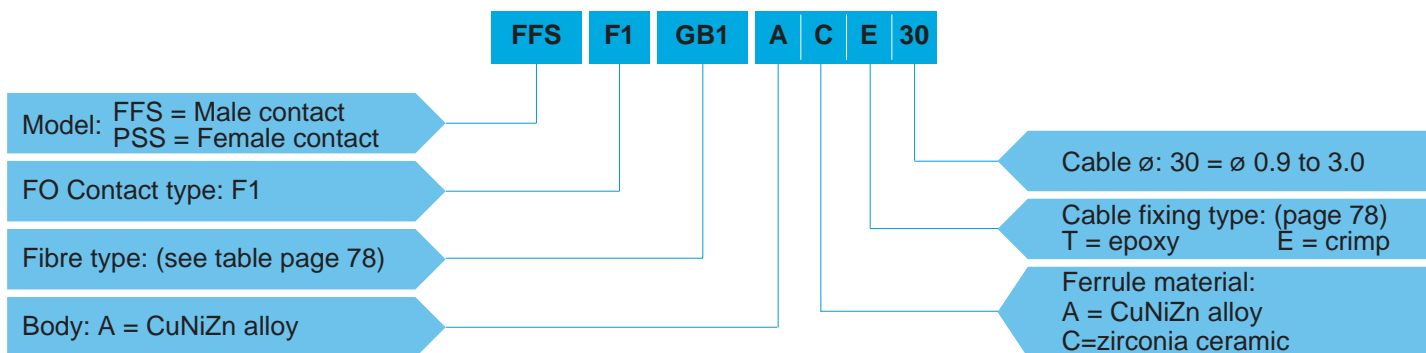
| Characteristic         | Value              | Standard        |
|------------------------|--------------------|-----------------|
| Mating durability      | 1000 cycles        | IEC 61300-02-02 |
| Damp heat steady state | up to 95 % at 60°C | IEC 61300-02-19 |
| High temperature       | +80°C              | IEC 61300-02-18 |
| Low temperature        | -40°C              | IEC 61300-02-17 |
| 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.

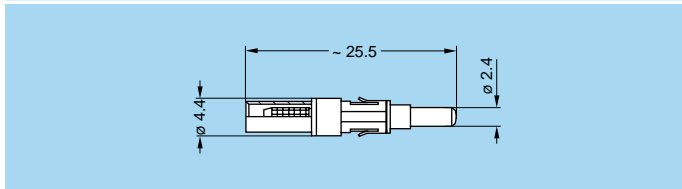
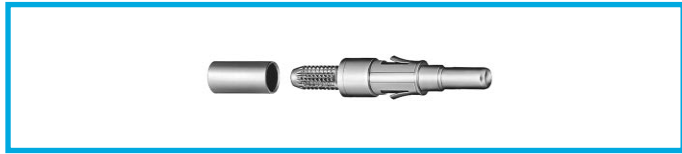
## Part Number Example



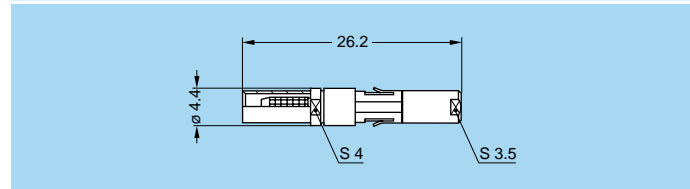
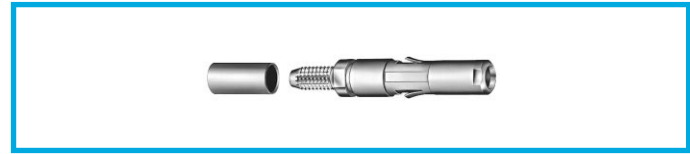
**FFS.F1.GB1.ACE30** = Male F1 type fibre optic contact, ferrule bore diameter of 235 µm, ferrule made of zirconia ceramic, crimp type cable fixing for a cable diameter of 0.9 mm to 3.0 mm.

## Model - FO Contact Type

### FFS.F1 Male F1 Fibre Optic Contact



### PSS.F1 Female F1 Fibre Optic Contact



## Fibre Type

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

| Reference | Core/cladding $\varnothing$ ( $\mu\text{m}$ ) | Ferrule hole $\varnothing$ ( $\mu\text{m}$ ) | Ferrule material | Material ref. | Fibre type | Cable fixing type | Note |
|-----------|---|--|------------------|---------------|------------|-------------------|------|
| FB1       | 100/140                                       | 144  | Ceramic          | C             | Silica     | E                 | ●    |
| GA1       | 200/230                                       | 230  | Ceramic          | C             | HCS        | E                 | ○    |
| GB1       | 200/230                                       | 235  | Ceramic          | C             | HCS        | E                 | ●    |
| HA1       | 300/330                                       | 330  | Ceramic          | C             | HCS        | E                 | ○    |
| HB1       | 300/330                                       | 335  | Ceramic          | C             | HCS        | E                 | ●    |
| JA1       | 400/430                                       | 430  | Metal            | A             | HCS        | E                 | ○    |
| JB1       | 400/430                                       | 435  | Metal            | A             | HCS        | E                 | ●    |
| KA1       | 600/630                                       | 630  | Metal            | A             | HCS        | E                 | ○    |
| KB1       | 600/630                                       | 640  | Metal            | A             | HCS        | E                 | ●    |
| LA1       | 800/830                                       | 830  | Metal            | A             | HCS        | E                 | ○    |
| LB1       | 800/830                                       | 845  | Metal            | A             | HCS        | E                 | ●    |
| MA1       | 1000/1035                                     | 1035   | Metal            | A             | HCS        | E                 | ○    |
| MB1       | 1000/1035                                     | 1050   | Metal            | A             | HCS        | E                 | ●    |
| NA1       | 500   | 500  | Metal            | A             | Polymer    | E                 | ○    |
| NB1       | 500   | 550  | Metal            | A             | Polymer    | E                 | ●    |
| PA1       | 750   | 750  | Metal            | A             | Polymer    | E                 | ○    |
| PB1       | 750   | 825  | Metal            | A             | Polymer    | E                 | ●    |
| RA1       | 1000  | 1000   | Metal            | A             | Polymer    | E                 | ○    |
| RB1       | 1000  | 1100   | Metal            | A             | Polymer    | E                 | ●    |
| RK1       | 1400  | 1430   | Metal            | A             | Polymer    | E                 | ●    |
| SA1       | 1500  | 1500   | Metal            | A             | Polymer    | T                 | ○    |
| SB1       | 1500  | 1650   | Metal            | A             | Polymer    | T                 | ●    |
| TA1       | 200/380                                       | 380  | Metal            | A             | PCS        | E                 | ○    |
| TB1       | 200/380                                       | 410  | Metal            | A             | PCS        | E                 | ●    |
| VA1       | 300/440                                       | 440  | Metal            | A             | PCS        | E                 | ○    |
| VB1       | 300/440                                       | 475  | Metal            | A             | PCS        | E                 | ●    |
| WA1       | 600/750                                       | 750  | Metal            | A             | PCS        | E                 | ●    |
| WB1       | 600/750                                       | 810  | Metal            | A             | PCS        | E                 | ●    |

● First choice alternative  
○ Special order alternative



## F2 Fibre Optic Contact

### Introduction

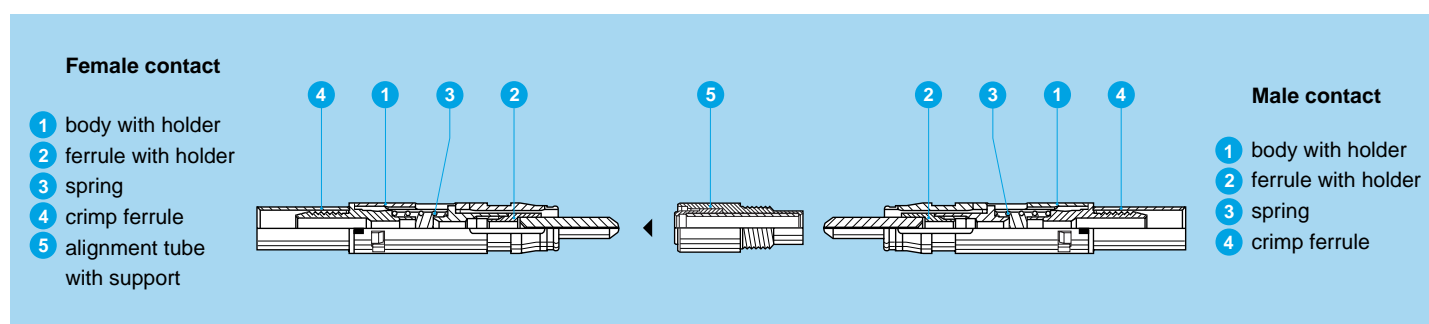
The F2 type contact is designed for fitting into single fibre 0K series, multi fibre connectors or mixed fibre optical/electrical connectors from 2B to 5B, 2K to 5K series.

Its main features are as follows:

- Assembly uses pre-domed ceramic ferrules
- Simple and fast polishing ensuring the physical contact of the fibre end face
- After mounting on the cable, the contact is very easily installed in the main connector insulator, the particular shape of the contact body retains it in the insulator
- Unique cable assembly independent of the connector shell
- The alignment tube can be easily removed in order to clean the fibre end face.

This contact makes it possible to use single fibre cables with single-mode or multi-mode fibres of the following sizes; 9/125, 50/125, 62.5/125, 100/125 and 100/140  $\mu\text{m}$ .

### Part Section Showing Internal Components



### Technical Characteristics

#### Material and Treatment

| Component      | Material        | Surface treatment ( $\mu\text{m}$ ) |    |
|----------------|-----------------|-------------------------------------|----|
|                |                 | Cu                                  | Ni |
| Body           | PEEK            | without treatment                   |    |
| Ferrule        | Ceramic         | without treatment                   |    |
| Holder         | Alloy CuNiZn    | without treatment                   |    |
| Crimp holder   | Brass           | 0.5                                 | 3  |
| Spring         | Stainless steel | without treatment                   |    |
| Crimp ferrule  | Cu 99           | 0.5                                 | 3  |
| Support        | Alloy CuNiZn    | without treatment                   |    |
| Alignment tube | Ceramic         | without treatment                   |    |

#### Optical

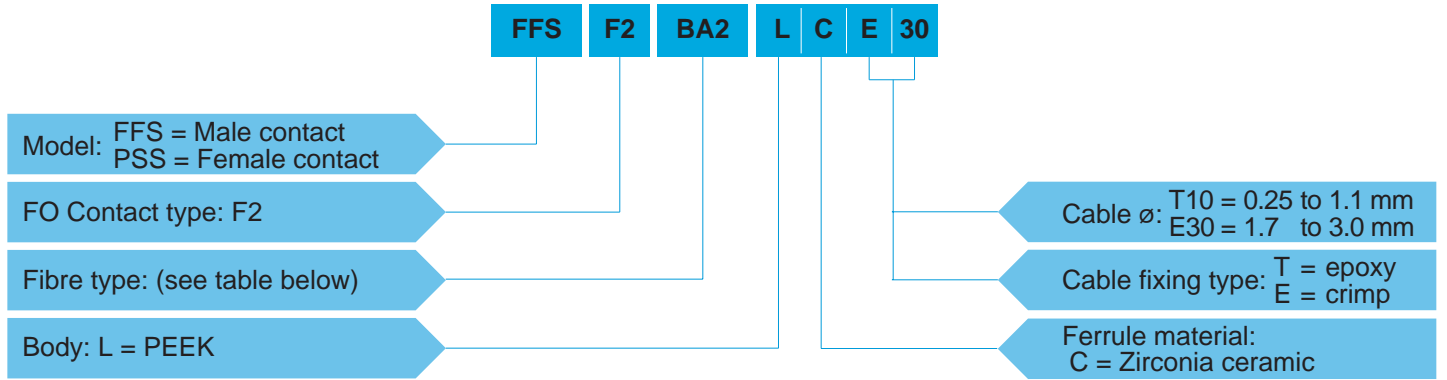
| Characteristic                                      | Value        | Standard        | Method                |
|---|--------------|-----------------|-----------------------|
| Average insertion loss fibre 9/125 $\mu\text{m}$    | 0.10 dB      | IEC 61300-03-04 | Insertion Method B    |
| Average insertion loss fibre 50/125 $\mu\text{m}$   | 0.25 dB      | IEC 61300-03-04 | Insertion Method B    |
| Return loss fibre 9/125 $\mu\text{m}$ (UPC)         | $\geq 45$ dB | IEC 61300-03-06 | Branching Device Met. |
| Return loss fibre 9/125 $\mu\text{m}$ (Hand polish) | $\sim 30$ dB | IEC 61300-03-06 | Branching Device Met. |

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

#### Mechanical and Environmental

| Characteristic                   | Value                           | Standard        |
|----------------------------------|---------------------------------|-----------------|
| Mating durability                | 10,000 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 |
| Cable retention                  | 100 N                           | IEC 61300-02-04 |
| Impact (Method A)                | 1 m onto concrete floor         | IEC 61300-02-12 |
| Shock (3 cycles in 2 directions) | 100 g, 10-50 ms;<br>20 g 6-9 ms | IEC 61300-02-09 |
| Vibration (7 cycles)             | Diagram 2 page 111              | IEC 61300-02-01 |

## Part Number Example



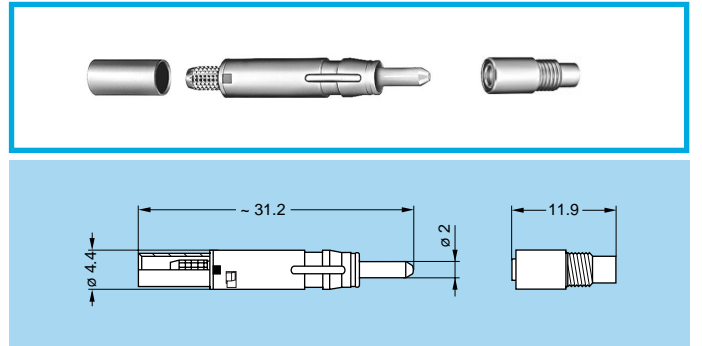
**FFS.F2.BA2.LCE30** = Male F2 type fibre optic contact, ferrule bore diameter of 125  $\mu\text{m}$ , PEEK body, Zirconia ceramic ferrule, crimp cable fixing, for tight jacket cable with a diameter between 1.7 to 3.0 mm.

## Model - FO Contact Type

### FFS.F2 Male F2 Fibre Optic Contact



### PSS.F2 Female F2 Fibre Optic Contact



## Fibre Type

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

| Reference | $\varnothing$ Core/Cladding ( $\mu\text{m}$ ) | Ferrule hole diameter ( $\mu\text{m}$ ) | Note 1) |
|-----------|---|---|---------|
| BA2       | 9/125   | 125                                     | ●       |
| BB2       | 50/125  | 126                                     | ●       |
| BC2       | 62.5/125                                      | 127                                     | ○       |
| BD2       | 100/125                                       | 128                                     | ○       |
| FA2       | 100/140                                       | 140                                     | ○       |
| FB2       | 100/140                                       | 144                                     | ●       |

● First choice alternative    ○ Special order alternative

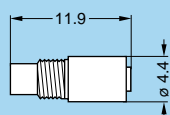
**Note:** <sup>1)</sup> The BA2 type (ferrule hole 125  $\mu\text{m}$ ) is recommended for single-mode fibres. The BB2 type (ferrule hole 126  $\mu\text{m}$ ) is commonly used with multi-mode fibres.

## Cable Fixing Type



| Reference    |             | Cable Structure     | Cable ø     |
|--------------|-------------|---------------------|-------------|
| Cable fixing | Reference ø |                     |             |
| T            | 10          | Buffer coated fibre | 0.25 to 1.1 |
| E            | 30          | Tight jacket cable  | 1.7 to 3.0  |

## Accessory



### PSS Alignment device for F2 fibre optic contact

Part number

PSS.F2.290.NZZ

**Note:** Alignment device should be ordered as replacement item.

## Insertion and Extraction of the Fibre Optic Contacts

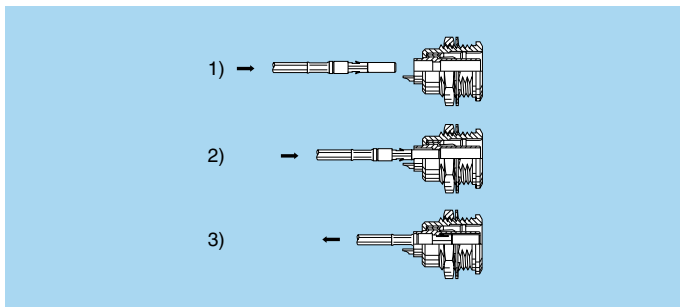
### Cable Termination

Detailed instructions for terminating single fibre cables with LEMO F2 fibre optic contacts are given in the reference manual DOC.FO.CF2.0000 supplied with the complete termination workstation (see page 103). After termination contacts shall be introduced in the main insulator as shown below. For purpose of cleaning they can also be removed.

### Insertion and Extraction of the F1 Type Contact

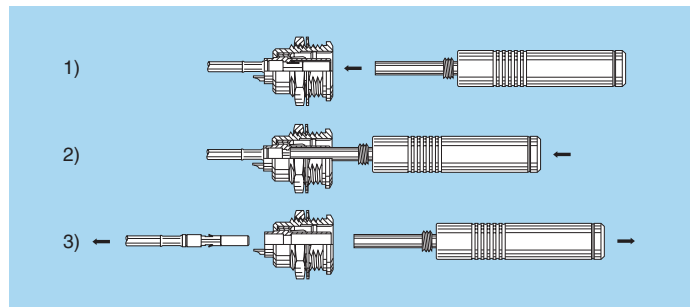
#### Insertion

The fibre optic contact, male or female, terminated on the cable, must be inserted into the connector insulator from the back end until it comes to a stop (step 1 and 2). Check that the contact is correctly retained by gently pulling on it (step 3).



#### Extraction

Introduce the extractor, reference DCC.91.312.5LA (see page 105), in the insulator around the contact and push until it comes to a stop (step 1 and 2). Gently remove the fibre optic contact by pulling on the cable (step 3).

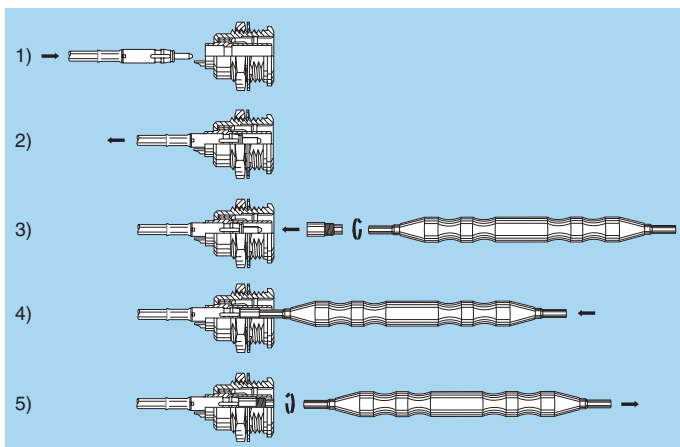


### Insertion and Extraction of the F2 Type Contact

#### Insertion

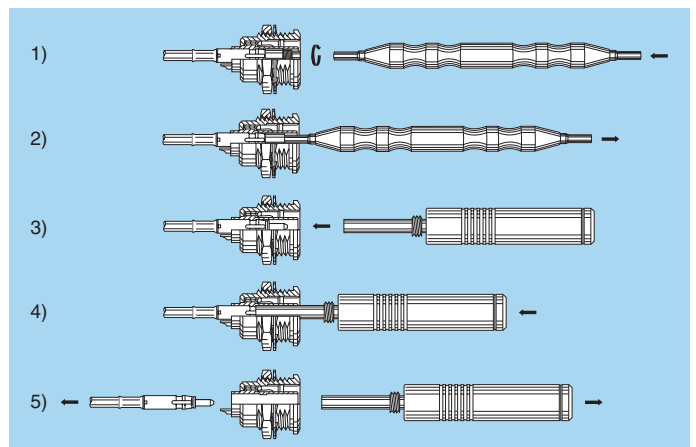
The male fibre optic contact terminated on the cable must be inserted into the connector insulator from the back end until it comes to a stop. Make sure that the contact is correctly positioned into the inner antirotation key. Key is in line with the red dot on the rear of the contact (step 1). Check that the contact is correctly retained by gently pulling on it (step 2).

For female contacts, the alignment device shall be clipped onto the fibre optic contacts which is already fitted into female insulator. This procedure is performed using the alignment device, reference DCS.F2.035.PN. The alignment device shall be first installed onto threaded end of the alignment device (step 3). Then clip the adapter (step 4), unscrew and remove the alignment device (step 5).

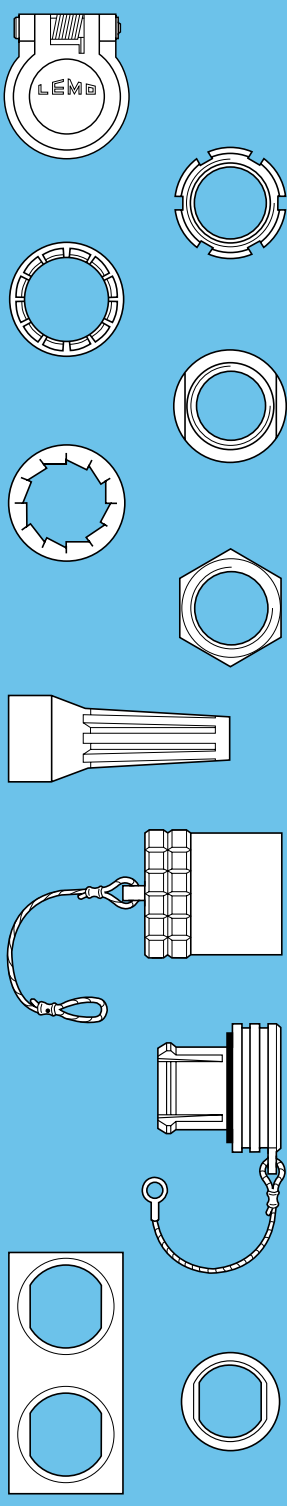


#### Extraction

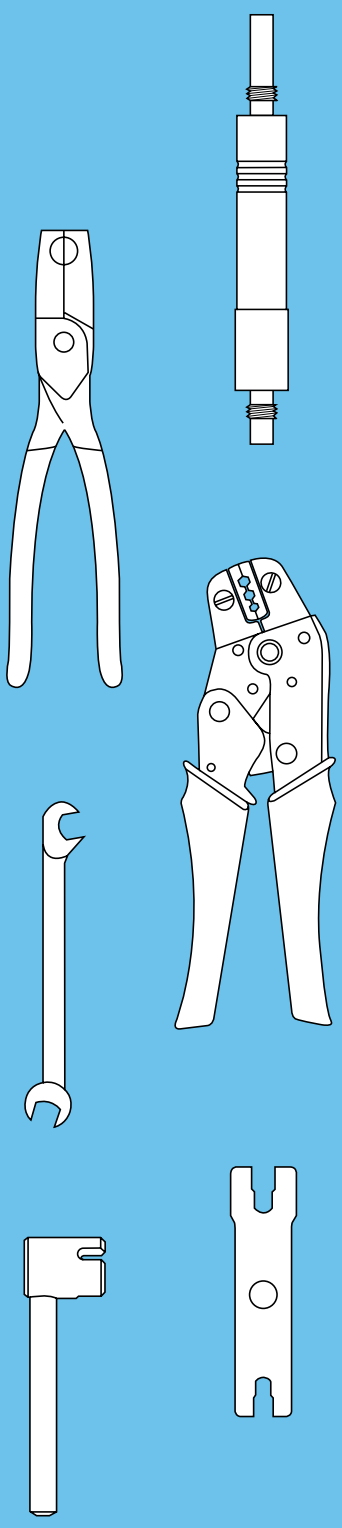
Reverse the order of the operation previously described. For female contact remove first the alignment device. Screw the threaded end of the alignment device reference, DCS.F2.035.PN (step 1), onto the alignment device and pull out strongly (step 2). Then use the extractor reference, DCC.91.312.5LA, introduce it into the insulator and push until it comes to a stop to compress the contact body (step 3 and 4). Gently remove the fibre optic contact by pulling on the cable (step 5).



**Note:** The life time installation of the alignment device is minimum 300 cycles.



ACCESSORIES



TOOLING



# Accessories



male



female

## FGG-EGG Insulators

Insulators for 2B-5B and 2K-5K series vary according to the fibre optic contact type chosen.

They are only necessary as replacement item when electrical crimp contacts are available.

|                  | FO Contact |  | Insulator part number |                |
|------------------|------------|--|-----------------------|----------------|
|                  | Type F1    |  | Male contact          | Female contact |
| <b>2B<br/>2K</b> | 96A        |  | FGG.2B.302.XLY        | EGG.2B.402.XLY |
|                  | 96C        |  | FGG.2B.304.XLY        | EGG.2B.404.XLY |
|                  | 96E        |  | FGG.2B.306.XLY        | EGG.2B.406.XLY |
|                  | 96J        |  | FGG.2B.310.XL         | EGG.2B.410.XL  |
| <b>3B<br/>3K</b> | 07A        |  | FGG.3B.302.CL         | EGG.3B.402.CL  |
|                  | 96X        |  | FGG.3B.322.XL         | EGG.3B.422.XL  |
|                  | 97C        |  | FGG.3B.344.XL         | EGG.3B.444.XL  |
|                  | 97E        |  | FGG.3B.346.XL         | EGG.3B.446.XL  |
|                  | 97J        |  | FGG.3B.350.XL         | EGG.3B.450.XL  |
|                  | 97R        |  | FGG.3B.356.XL         | EGG.3B.456.XL  |
| <b>4B<br/>4K</b> | 07C        |  | FGG.4B.304.CL         | EGG.4B.404.CL  |
|                  | 99H        |  | FGG.4B.379.XL         | EGG.4B.479.XL  |
|                  | 97F        |  | FGG.4B.347.XL         | EGG.4B.447.XL  |
|                  | 97L        |  | FGG.4B.352.XL         | EGG.4B.452.XL  |
|                  | 97R        |  | FGG.4B.356.XL         | EGG.4B.456.XL  |
|                  | 97T        |  | FGG.4B.358.XL         | EGG.4B.458.XL  |
|                  | 98E        |  | FGG.4B.366.XL         | EGG.4B.466.XL  |
| <b>5B<br/>5K</b> | 07J        |  | FGG.5B.340.CL         | EGG.5B.440.CL  |
|                  |            |  |                       |                |

|                  | FO Contact |  | Insulator part number |                |
|------------------|------------|--|-----------------------|----------------|
|                  | Type F2    |  | Male contact          | Female contact |
| <b>2B<br/>2K</b> | 92A        |  | FGG.2B.302.EL         | EGG.2B.402.EL  |
|                  | 92C        |  | FGG.2B.304.EL         | EGG.2B.404.EL  |
|                  | 92E        |  | FGG.2B.306.EL         | EGG.2B.406.EL  |
|                  | 92J        |  | FGG.2B.310.EL         | EGG.2B.410.EL  |
| <b>3B<br/>3K</b> | 03A        |  | FGG.3B.302.EL         | EGG.3B.402.EL  |
|                  | 92X        |  | FGG.3B.322.EL         | EGG.3B.422.EL  |
|                  | 93B        |  | FGG.3B.344.EL         | EGG.3B.444.EL  |
|                  | 93E        |  | FGG.3B.346.EL         | EGG.3B.446.EL  |
|                  | 93J        |  | FGG.3B.350.EL         | EGG.3B.450.EL  |
|                  | 93R        |  | FGG.3B.356.EL         | EGG.3B.456.EL  |
|                  | 87E        |  | FGG.3B.376.WL         | EGG.3B.476.WL  |
|                  | 87R        |  | FGG.3B.386.WL         | EGG.3B.486.WL  |
| <b>4B<br/>4K</b> | 03C        |  | FGG.4B.304.EL         | EGG.4B.404.EL  |
|                  | 95D        |  | FGG.4B.375.EL         | EGG.4B.475.EL  |
|                  | 93E        |  | FGG.4B.346.EL         | EGG.4B.446.EL  |
|                  | 93L        |  | FGG.4B.352.EL         | EGG.4B.452.EL  |
|                  | 93R        |  | FGG.4B.356.EL         | EGG.4B.456.EL  |
|                  | 93T        |  | FGG.4B.358.EL         | EGG.4B.458.EL  |
|                  | 94E        |  | FGG.4B.385.EL         | EGG.4B.485.EL  |
|                  | 05C        |  | FGG.4B.304.WL         | EGG.4B.404.WL  |
| <b>5B<br/>5K</b> | 88E        |  | FGG.4B.366.WL         | EGG.4B.466.WL  |
|                  | 03J        |  | FGG.5B.340.EL         | EGG.5B.440.EL  |
|                  | 03N        |  | FGG.5B.354.EL         | EGG.5B.454.EL  |
|                  | 956        |  | FGG.5B.356.WLL        | EGG.5B.456.WLL |
|                  | 94B        |  | FGG.5B.383.EL         | EGG.5B.483.EL  |
|                  |            |  |                       |                |
|                  |            |  |                       |                |

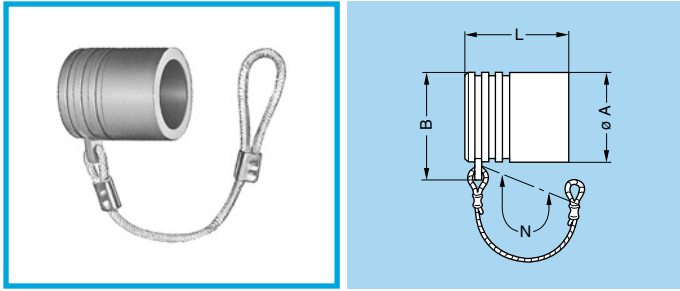


## FGG-EGG Crimp electrical contacts

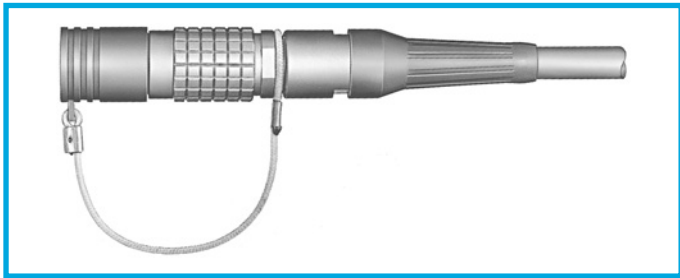
|                  | FO Contact |     | ø A Contact LV | Contact part number |                |
|------------------|------------|-----|----------------|---------------------|----------------|
|                  | Types      |     |                | Male                | Female         |
|                  | F1         | F2  |                |                     |                |
| <b>2B<br/>2K</b> | 96A        | 92A | 0.9            | FGG.2B.560.ZZC      | EGG.2B.660.ZZM |
|                  | 96C        | 92C | 0.7            | FGG.2B.555.ZZC      | EGG.2B.655.ZZM |
|                  | 96E        | 92E | 0.7            | FGG.2B.555.ZZC      | EGG.2B.655.ZZM |
|                  | 96J        | 92J | 0.7            | FGG.2B.555.ZZC      | EGG.2B.655.ZZM |
| <b>3B<br/>3K</b> | 97C        | 93B | 0.9            | FGG.3B.560.ZZC      | EGG.3B.660.ZZM |
|                  | 97E        | 93E | 0.9            | FGG.3B.560.ZZC      | EGG.3B.660.ZZM |
|                  | -          | 87E | 0.9            | FGG.3B.560.ZZC      | EGG.3B.660.ZZM |
|                  | 97J        | 93J | 0.7            | FGG.3B.555.ZZC      | EGG.3B.655.ZZM |
|                  | 97R        | 93R | 0.7            | FGG.3B.555.ZZC      | EGG.3B.655.ZZM |
|                  | 96X        | 92X | 0.7            | FGG.3B.555.ZZC      | EGG.3B.655.ZZM |
|                  | -          | 87R | 0.7            | FGG.3B.555.ZZC      | EGG.3B.655.ZZM |

|                  | FO Contact |     | ø A Contact LV +HV | Contact part number |                |
|------------------|------------|-----|--------------------|---------------------|----------------|
|                  | Types      |     |                    | Male                | Female         |
|                  | F1         | F2  |                    |                     |                |
| <b>4B<br/>4K</b> | -          | 95D | 1.3                | FGG.4B.565.ZZC      | EGG.4B.665.ZZM |
|                  | -          | 93E | 1.3 <sup>1)</sup>  | FGG.4K.565.ZZCY     | EGG.3B.665.ZZM |
|                  | -          |     | 0.9                | FGG.4B.560.ZZC      | EGG.4B.660.ZZM |
|                  | 97F        | -   | 1.3                | FGG.4B.565.ZZC      | EGG.4B.665.ZZM |
|                  | 97R        | 93R | 0.9                | FGG.4B.560.ZZC      | EGG.4B.660.ZZM |
|                  | 97L        | 93L | 0.9                | FGG.4B.560.ZZC      | EGG.4B.660.ZZM |
|                  | 98L        | 94L | 0.7                | FGG.4B.555.ZZC      | EGG.4B.655.ZZM |
|                  | 97T        | 93T | 0.7                | FGG.4B.555.ZZC      | EGG.4B.655.ZZM |
|                  | -          | 88E | 0.7                | FGG.4B.555.ZZC      | EGG.4B.655.ZZM |
|                  | 99H        | -   | 0.7                | FGG.4B.555.ZZC      | EGG.4B.655.ZZM |
| 98E              | 94E        | 0.7 | FGG.4B.555.ZZC     | EGG.4B.655.ZZM      |                |
| <b>5B<br/>5K</b> | -          | 94B | 2.0                | FGG.5B.575.ZZC      | EGG.5B.675.ZZM |
|                  | -          | 956 | 2.0 <sup>1)</sup>  | FGG.3B.575.ZZC      | EGG.4B.675.ZZM |
|                  | -          |     | 1.6 <sup>1)</sup>  | FGG.4B.570.ZZC      | EGG.2B.670.ZZM |
|                  | -          | 90C | 1.6 <sup>1)</sup>  | FGG.4B.570.ZZC      | EGG.2B.670.ZZM |

Note: 1) Arrangements with special contact length.



- Body material: Polyoxymethylene (POM) grey (or black)
- Cord material: Polyamide 6, grey (or black)
- Crimp ferrule material: Nickel-plated brass
- Gasket material: Silicone rubber
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529



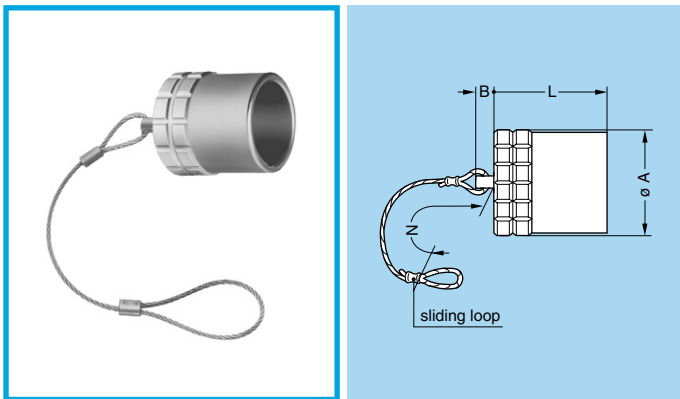
## BFG Plug caps

| Part number     | Series | Dimensions (mm) |      |      |    |
|-----------------|--------|-----------------|------|------|----|
|                 |        | A               | B    | L    | N  |
| BFG.00.100.PCSG | 00     | 7.5             | 9.8  | 10.0 | 60 |
| BFG.0B.100.PCSG | 0B     | 9.5             | 12.0 | 12.2 | 85 |
| BFG.2B.100.PCSG | 2B     | 15.0            | 18.0 | 15.0 | 85 |
| BFG.3B.100.PCSG | 3B     | 18.5            | 22.0 | 18.5 | 95 |

**Note:** This cap is available only with an alignment key (G). Upon request this cap can be supplied in black and the last letter «G» of the part number should be replaced with «N».

## Fitting the cord

Slide the plug into the loop of the cord. Place the loop into the groove in front of the collet nut and tighten the loop.

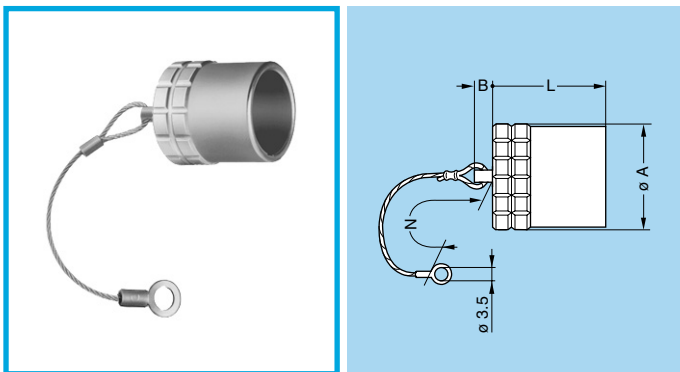


- Body material: Nickel-plated brass (Ni 3µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C
- Watertightness: IP68 according to IEC 60529 for K series

## BFG Plug caps with key (G)

| Part number    | Series | Dimensions (mm) |    |      |     |
|----------------|--------|-----------------|----|------|-----|
|                |        | A               | B  | L    | N   |
| BFG.0K.100.NAS | 0K     | 14.0            | 6  | 12.5 | 85  |
| BFG.2K.100.NAS | 2K     | 19.5            | 6  | 17.5 | 85  |
| BFG.3K.100.NAS | 3K     | 23.0            | 6  | 22.0 | 120 |
| BFG.4B.100.NAS | 4B     | 25.0            | 10 | 20.2 | 120 |
| BFG.4K.100.NAS | 4K     | 29.0            | 10 | 22.5 | 120 |
| BFG.5B.100.NAS | 5B     | 36.0            | 10 | 27.2 | 150 |
| BFG.5K.100.NAS | 5K     | 44.0            | 10 | 27.0 | 150 |

**Note:** This cap is available only with an alignment key (G). The last letter «S» of the part number stands for the material of the O-ring (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».



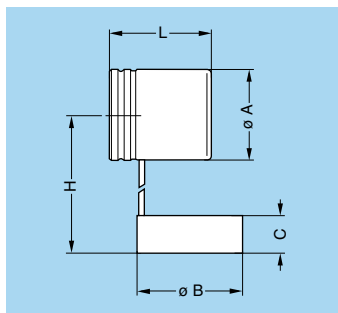
- Body material: Nickel-plated brass (Ni 3µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C
- Watertightness: IP68 according to IEC 60529 for K series

## BHG Plug caps, nut fixing or flange

| Part number    | Series | Dimensions (mm) |    |      |     |
|----------------|--------|-----------------|----|------|-----|
|                |        | A               | B  | L    | N   |
| BHG.0K.100.NAS | 0K     | 14.0            | 6  | 12.5 | 85  |
| BHG.2K.100.NAS | 2K     | 19.5            | 6  | 17.5 | 85  |
| BHG.3K.100.NAS | 3K     | 23.0            | 6  | 22.0 | 120 |
| BHG.4B.100.NAS | 4B     | 25.0            | 10 | 20.2 | 120 |
| BHG.4K.100.NAS | 4K     | 29.0            | 10 | 22.5 | 120 |
| BHG.5B.100.NAS | 5B     | 36.0            | 10 | 27.2 | 150 |
| BHG.5K.100.NAS | 5K     | 44.0            | 10 | 27.0 | 150 |

**Note:** This cap is available only with an alignment key (G). The last letter «S» of the part number stands for the material of the O-ring (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».



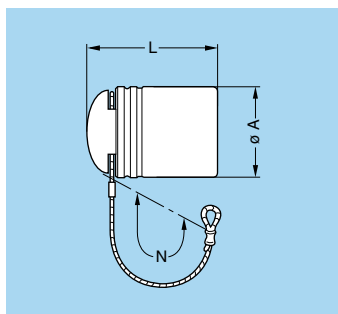


### BFA Plug cap

| Part number      | Series | Dimensions (mm) |    |    |    |    |
|------------------|--------|-----------------|----|----|----|----|
|                  |        | A               | B  | C  | H  | L  |
| BFA.3K.170.800EN | 3K     | 24              | 28 | 10 | 80 | 27 |

- Material: black EPDM

**Note:** These caps are suitable for use with any alignment key configuration.

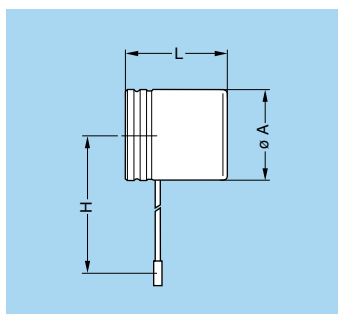


### BFG Plug cap

| Part number    | Series | Dimensions (mm) |    |     |
|----------------|--------|-----------------|----|-----|
|                |        | A               | L  | N   |
| BFG.3K.100.EAN | 3K     | 24              | 30 | 155 |

- Material: black EPDM
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin

**Note:** These caps are suitable for use with any alignment key configuration.

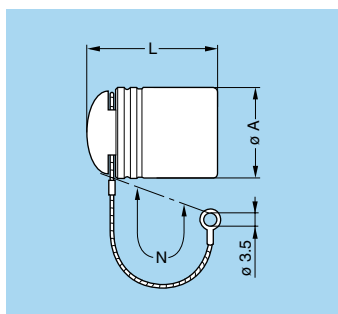


### BHA Plug cap

| Part number      | Series | Dimensions (mm) |    |    |
|------------------|--------|-----------------|----|----|
|                  |        | A               | H  | L  |
| BHA.3K.100.715EN | 3K     | 24              | 80 | 27 |

- Material: black EPDM

**Note:** These caps are suitable for use with any alignment key configuration.

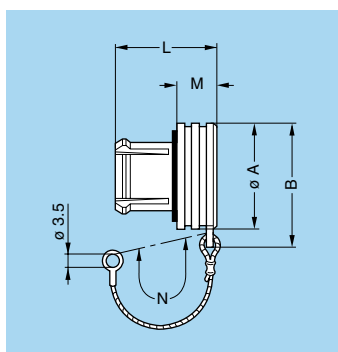


### BHA Plug cap

| Part number    | Series | Dimensions (mm) |    |     |
|----------------|--------|-----------------|----|-----|
|                |        | A               | L  | N   |
| BHA.3K.100.EAN | 3K     | 24              | 30 | 120 |

- Material: black EPDM
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin

**Note:** These caps are suitable for use with any alignment key configuration.

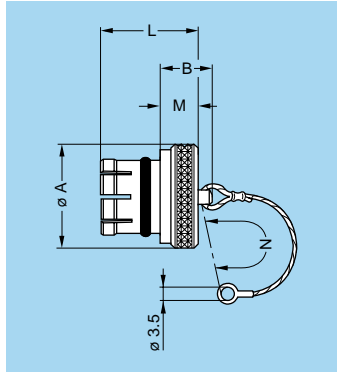


### BRA Blanking caps for fixed sockets and free straight sockets

| Part number     | Series | Dimensions (mm) |      |      |     |    |
|-----------------|--------|-----------------|------|------|-----|----|
|                 |        | A               | B    | L    | M   | N  |
| BRA.00.200.PCSG | 00     | 7.5             | 9.8  | 9.0  | 3.5 | 60 |
| BRA.0B.200.PCSG | 0B     | 10.0            | 12.5 | 11.0 | 4.8 | 60 |
| BRA.2B.200.PCSG | 2B     | 18.0            | 21.0 | 14.5 | 6.0 | 60 |
| BRA.3B.200.PCSG | 3B     | 22.0            | 25.5 | 17.0 | 7.0 | 60 |

**Note:** These caps are suitable for use with any alignment key configuration. On request this cap can be supplied in black. If so, replace the last letter «G» of the part number by «N».

- Body material: Polyoxymethylene (POM) grey (or black)
- Cord material: Polyamide 6, grey (or black)
- Crimp ferrule material: Nickel-plated brass
- Gasket material: Silicone rubber
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529

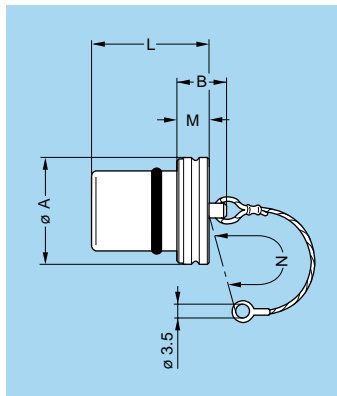


- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C

## BRE Blanking caps for fixed and free sockets

| Part number    | Series | Dimensions (mm) |      |      |      |     |
|----------------|--------|-----------------|------|------|------|-----|
|                |        | A               | B    | L    | M    | N   |
| BRE.00.200.NAS | 00     | 8               | 9.5  | 8.8  | 3.5  | 60  |
| BRE.0S.200.NAS | 0B     | 10              | 10.5 | 10.5 | 4.5  | 85  |
| BRE.2S.200.NAS | 2B     | 18              | 12.0 | 14.0 | 6.0  | 85  |
| BRE.3S.200.NAS | 3B     | 22              | 14.0 | 18.0 | 8.0  | 120 |
| BRE.4S.200.NAS | 4B     | 28              | 20.0 | 23.0 | 10.0 | 120 |
| BRE.5S.200.NAS | 5B     | 40              | 22.0 | 30.0 | 12.0 | 150 |

**Note:** These caps are suitable for use with any alignment key configuration. The last letter «S» of the part number stands for the O-ring material (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».

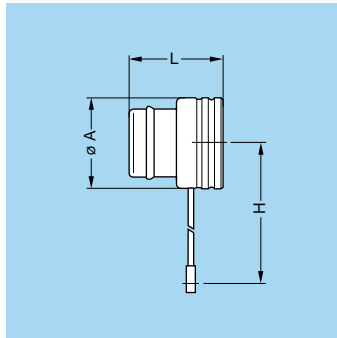


- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefines
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C
- Watertightness: IP68 according to IEC 60529

## BRE Blanking caps for fixed and free sockets

| Part number    | Series | Dimensions (mm) |    |      |    |     |
|----------------|--------|-----------------|----|------|----|-----|
|                |        | A               | B  | L    | M  | N   |
| BRE.0K.200.NAS | 0K     | 15.0            | 10 | 15.0 | 4  | 85  |
| BRE.2K.200.NAS | 2K     | 20.5            | 14 | 24.0 | 8  | 85  |
| BRE.3K.200.NAS | 3K     | 24.0            | 14 | 28.0 | 8  | 120 |
| BRE.4K.200.NAS | 4K     | 30.0            | 20 | 30.5 | 10 | 120 |
| BRE.5K.200.NAS | 5K     | 44.0            | 22 | 37.0 | 12 | 150 |

**Note:** These caps are suitable for use with any alignment key configuration. The last letter «S» of the part number stands for the O-ring material (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».

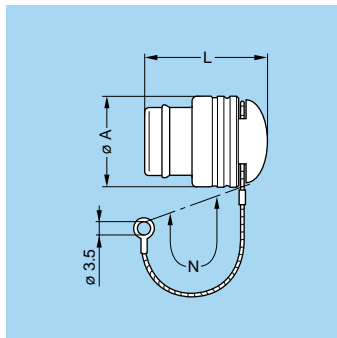


## BRA Blanking cap for free sockets

| Part number      | Series | Dimensions (mm) |    |    |
|------------------|--------|-----------------|----|----|
|                  |        | A               | H  | L  |
| BRA.3K.100.715EN | 3K     | 24              | 80 | 25 |

- Material: black EPDM

**Note:** These caps are suitable for use with any alignment key configuration.

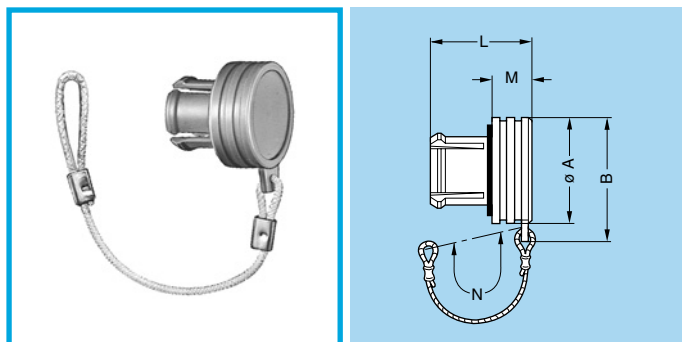


## BRA Blanking cap for free sockets

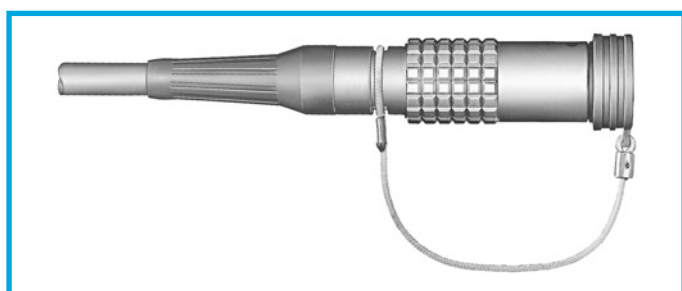
| Part number    | Series | Dimensions (mm) |    |     |
|----------------|--------|-----------------|----|-----|
|                |        | A               | L  | N   |
| BRA.3K.200.EAN | 3K     | 24              | 26 | 120 |

- Material: black EPDM
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin

**Note:** These caps are suitable for use with any alignment key configuration.



- Body material: Polyoxymethylene (POM) grey (or black)
- Cord material: Polyamide 6, grey (or black)
- Crimp ferrule material: Nickel-plated brass
- Gasket material: Silicone rubber
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529



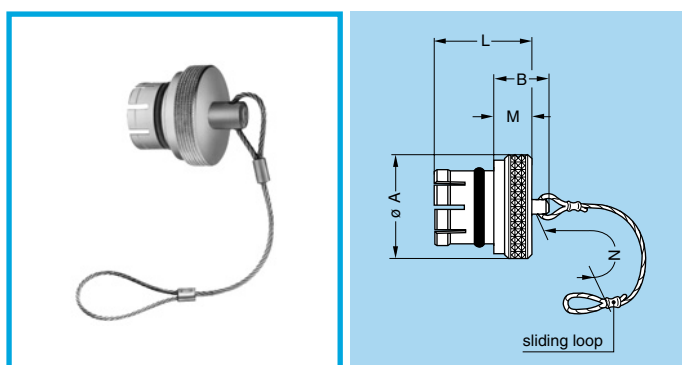
### BRD Blanking caps for free sockets

| Part number     | Series | Dimensions (mm) |      |      |     |    |
|-----------------|--------|-----------------|------|------|-----|----|
|                 |        | A               | B    | L    | M   | N  |
| BRD.00.200.PCSG | 00     | 7.5             | 9.8  | 9.0  | 3.5 | 85 |
| BRD.0B.200.PCSG | 0B     | 10.0            | 12.5 | 11.0 | 4.8 | 85 |
| BRD.2B.200.PCSG | 2B     | 18.0            | 21.0 | 14.5 | 6.0 | 85 |
| BRD.3B.200.PCSG | 3B     | 22.0            | 25.5 | 17.0 | 7.0 | 95 |

**Note:** On request this cap is available in black. If required, replace the last letter «G» of the part number by «N».

### Fitting the cord

Slide the socket into the loop of the cord.  
Place the loop into the groove in front of the collet nut.  
Tighten the loop.

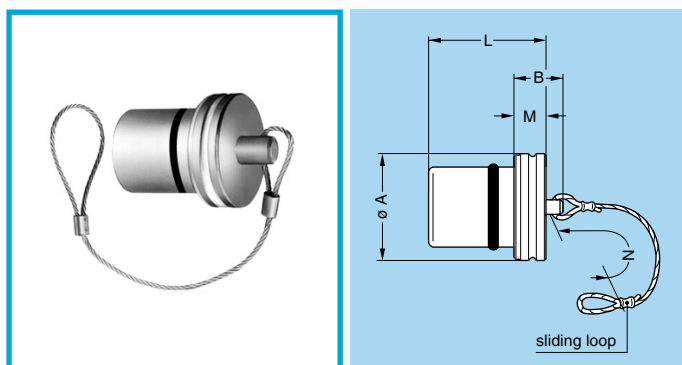


- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C

### BRF Blanking caps for free sockets

| Part number    | Series | Dimensions (mm) |      |      |      |     |
|----------------|--------|-----------------|------|------|------|-----|
|                |        | A               | B    | L    | M    | N   |
| BRF.00.200.NAS | 00     | 8               | 7.5  | 8.8  | 3.5  | 85  |
| BRF.0S.200.NAS | 0B     | 10              | 9.5  | 10.5 | 4.5  | 85  |
| BRF.2S.200.NAS | 2B     | 18              | 12.0 | 14.0 | 6.0  | 85  |
| BRF.3S.200.NAS | 3B     | 22              | 14.0 | 18.0 | 8.0  | 120 |
| BRF.4S.200.NAS | 4B     | 28              | 20.0 | 23.0 | 10.0 | 120 |
| BRF.5S.200.NAS | 5B     | 40              | 22.0 | 30.0 | 12.0 | 150 |

**Note:** These caps are suitable for use with any alignment key configuration. The last letter «S» of the part number stands for the O-ring material (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».



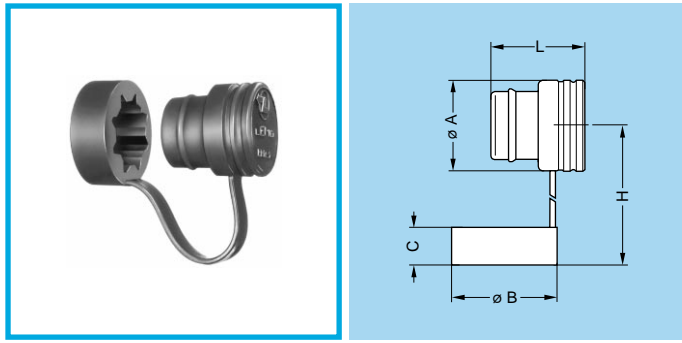
- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM

### BRF Blanking caps for free sockets

| Part number    | Series | Dimensions (mm) |    |      |    |     |
|----------------|--------|-----------------|----|------|----|-----|
|                |        | A               | B  | L    | M  | N   |
| BRF.0K.200.NAS | 0K     | 15.0            | 10 | 15.0 | 4  | 85  |
| BRF.2K.200.NAS | 2K     | 20.5            | 14 | 24.0 | 8  | 85  |
| BRF.3K.200.NAS | 3K     | 24.0            | 14 | 28.0 | 8  | 120 |
| BRF.4K.200.NAS | 4K     | 30.0            | 20 | 30.5 | 10 | 120 |
| BRF.5K.200.NAS | 5K     | 44.0            | 22 | 37.0 | 12 | 150 |

**Note:** These caps are suitable for use with any alignment key configuration. The last letter «S» of the part number stands for the O-ring material (silicone rubber). O-rings made from FPM are also available; if required, replace the letter «S» by «V».

- Maximum operating temperature: 135°C
- Watertightness: IP68 according to IEC 60529

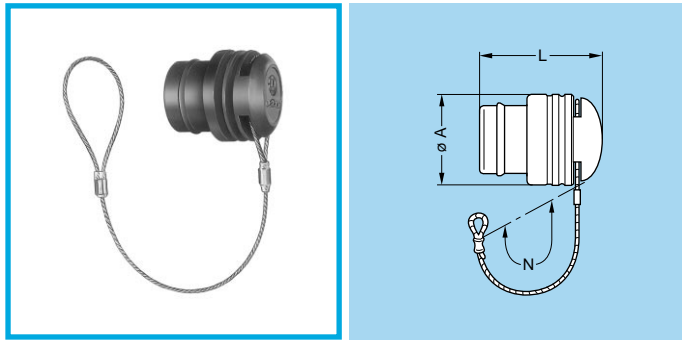


### BRD Blanking caps for free sockets

| Part number      | Series | Dimensions (mm) |    |    |    |    |
|------------------|--------|-----------------|----|----|----|----|
|                  |        | A               | B  | C  | H  | L  |
| BRD.3K.170.800EN | 3K     | 24              | 28 | 10 | 80 | 25 |

- Material: black EPDM

**Note:** These caps are suitable for use with any alignment key configuration.

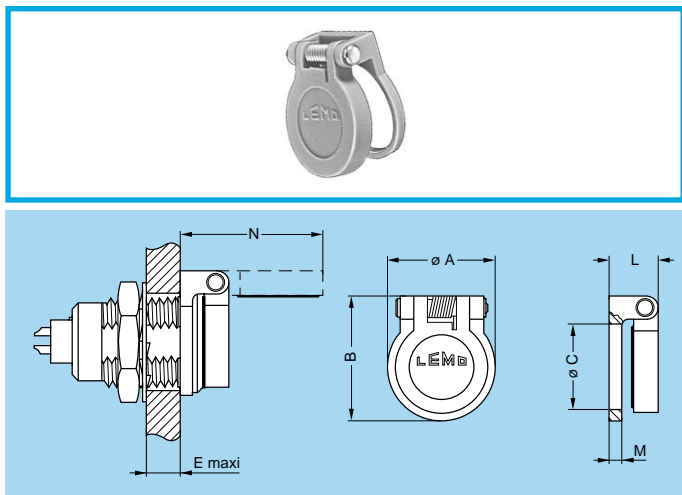


### BRF Blanking caps for free sockets

| Part number    | Series | Dimensions (mm) |    |     |
|----------------|--------|-----------------|----|-----|
|                |        | A               | L  | N   |
| BRF.3K.200.EAN | 3K     | 24              | 26 | 155 |

- Material: black EPDM
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin

**Note:** These caps are suitable for use with any alignment key configuration.

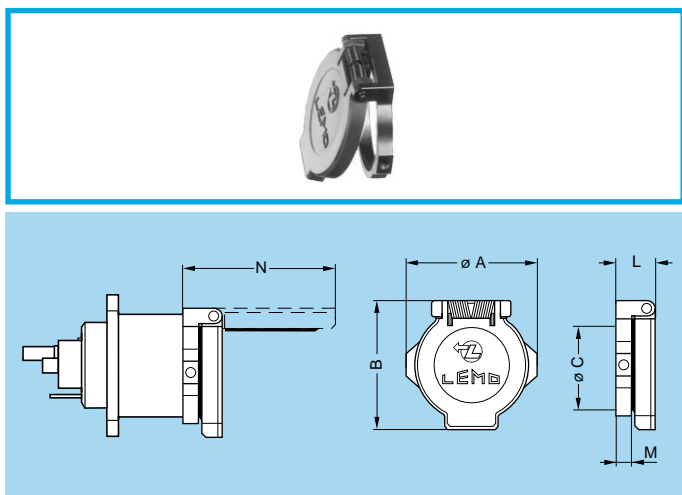


### BRR Spring loaded dust caps for ERA, ERN and EG sockets or PSA and PK fixed sockets

| Part number     | Series | Dimensions (mm) |      |      |     |     |     |      |
|-----------------|--------|-----------------|------|------|-----|-----|-----|------|
|                 |        | A               | B    | C    | E   | L   | M   | N    |
| BRR.0S.200.PZSG | 0B     | 11.0            | 13.3 | 9.0  | 5.8 | 5.0 | 1.2 | 15.3 |
| BRR.2S.200.PZSG | 2B     | 18.6            | 22.4 | 15.2 | 6.5 | 8.2 | 2.0 | 26.2 |
| BRR.3S.200.PZSG | 3B     | 22.5            | 26.5 | 18.2 | 9.0 | 8.8 | 2.5 | 30.8 |

**Note:** On request, this cap is available in black. If so replace the last letter «G» of the part number by «N».

- Body material: Polyoxymethylene (POM) grey (or black)
- Gasket material: Silicone rubber
- Spring material: Stainless steel
- Axes material: Nickel-plated brass
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529

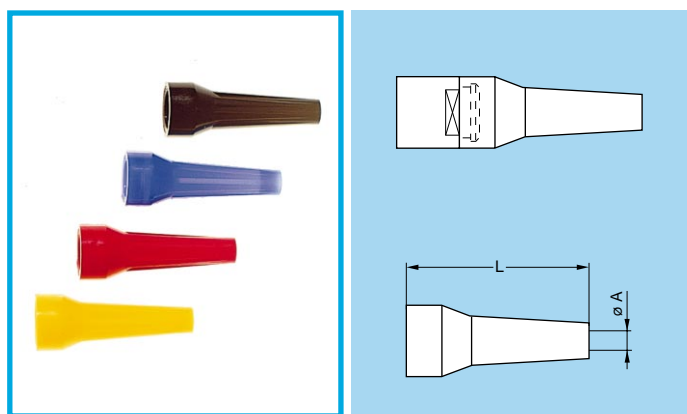


### BRR Spring loaded dust cap for ED and EB fixed sockets

| Part number     | Series | Dimensions (mm) |    |    |     |   |      |
|-----------------|--------|-----------------|----|----|-----|---|------|
|                 |        | A               | B  | C  | L   | M | N    |
| BRR.3K.200.PZSG | 3K     | 29              | 29 | 23 | 8.1 | 3 | 33.2 |

**Note:** On request, this cap is available in black. If so replace the last letter «G» of the part number by «N».

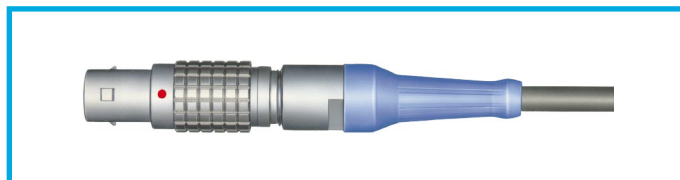
- Cap material: Polyoxymethylene (POM) grey (or black)
- Body material: Nickel-plated brass
- Gasket material: Silicone rubber
- Spring material: Stainless steel
- Axes material: Nickel-plated brass
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529



## GM• Bend reliefs (Polyurethane)

A bend relief made from thermoplastic polyurethane elastomer (Desmopan 786) can be fitted over LEMO plugs and sockets that are supplied with a specially fitted nut. These are available in nine different colours that match with the GRA insulating washers (see page 93).

Use the part numbers shown below to order this accessory separately.



### Main characteristics

- Material: Polyurethane elastomer
- Temperature range in dry atmosphere: -40°C to +80°C

| Part number   | Dimensions (mm) |    |         |      | Series | Part number of nut for fitting the bend relief |
|---------------|-----------------|----|---------|------|--------|--|
|               | Bend relief     |    | Cable ø |      |        |  |
|               | A               | L  | max.    | min. |        |  |
| GMA.00.012.DG | 1.2             | 22 | 1.4     | 1.1  | 00     | FFM.00.131.LC                                  |
| GMA.00.018.DG | 1.8             | 22 | 2.1     | 1.8  |        |  |
| GMD.00.025.DG | 2.5             | 22 | 2.8     | 2.5  |        |  |
| GMD.00.028.DG | 2.8             | 22 | 3.1     | 2.8  |        |  |
| GMD.00.032.DG | 3.2             | 22 | 3.5     | 3.2  |        |  |
| GMA.0B.025.DG | 2.5             | 24 | 2.9     | 2.5  | 0B     | FFM.0B.130.LC                                  |
| GMA.0B.030.DG | 3.0             | 24 | 3.4     | 3.0  | 2B     | FFM.2B.132.LC <sup>1)</sup>                    |
| GMA.0B.035.DG | 3.5             | 24 | 3.9     | 3.5  |        |  |
| GMA.0B.040.DG | 4.0             | 24 | 4.4     | 4.0  | 0K     | FFM.0E.130.LC                                  |
| GMA.0B.045.DG | 4.5             | 24 | 5.2     | 4.5  |        |  |
| GMA.1B.040.DG | 4.0             | 30 | 4.4     | 4.0  | 3B     | FFM.3B.131.LC <sup>2)</sup>                    |
| GMA.1B.045.DG | 4.5             | 30 | 4.9     | 4.5  |        |  |
| GMA.1B.054.DG | 5.4             | 30 | 6.0     | 5.4  |        |  |
| GMA.2B.040.DG | 4.0             | 36 | 4.5     | 4.0  | 2B     | FFM.2B.130.LC                                  |
| GMA.2B.045.DG | 4.5             | 36 | 5.0     | 4.5  | 4B     | FFM.4B.132.LC <sup>3)</sup>                    |
| GMA.2B.050.DG | 5.0             | 36 | 5.5     | 5.0  | 2K     | FFM.2E.130.LC                                  |
| GMA.2B.060.DG | 6.0             | 36 | 6.5     | 6.0  | 3K     | FFM.3K.133.LC                                  |
| GMA.2B.070.DG | 7.0             | 36 | 7.7     | 7.0  | 4K     | FFM.4K.132.LC                                  |
| GMA.2B.080.DG | 7.8             | 36 | 8.8     | 7.8  | 5K     | FFM.5K.132.LC                                  |
| GMA.3B.050.DG | 4.5             | 42 | 5.2     | 4.5  | 3B     | FFM.3B.130.LC                                  |
| GMA.3B.060.DG | 6.0             | 42 | 6.9     | 6.0  |        |  |
| GMA.3B.070.DG | 7.0             | 42 | 7.9     | 7.0  | 3K     | FFM.3E.130.LC                                  |
| GMA.3B.080.DG | 8.0             | 42 | 8.9     | 8.0  | 4K     | FFM.4K.133.LC                                  |
| GMA.3B.090.DG | 9.0             | 42 | 10.0    | 9.0  | 5K     | FFM.5K.131.LC                                  |
| GMA.4B.080.DG | 8.0             | 60 | 9.0     | 8.0  | 4B     | FFM.4B.130.LC                                  |
| GMA.4B.010.DG | 10.0            | 60 | 10.9    | 10.0 |        |  |
| GMA.4B.011.DG | 11.0            | 60 | 11.9    | 11.0 | 4K     | FFM.3K.132.LC                                  |
| GMA.4B.012.DG | 12.0            | 60 | 13.0    | 12.0 | 5K     | FFM.5K.133.LC                                  |
| GMA.4B.013.DG | 13.5            | 60 | 14.5    | 13.5 |        |  |

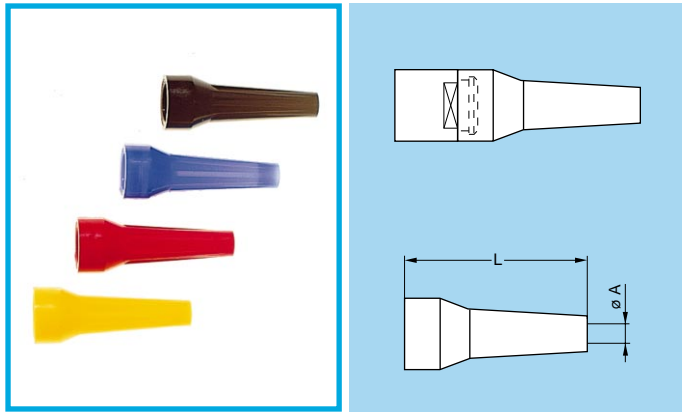
**Note:** The last letter «G» of the part number indicates the grey colour of the bend relief. For ordering a bend relief with another colour, see table on page 92 and replace the letter «G» by the letter of the required colour.

See also detailed information for each series: B series on page 61; K series on page 61.

<sup>1)</sup> For use only with connectors from series 2B equipped with cable fixing type M and where a bend relief from series 0B is used.

<sup>2)</sup> For use only with connectors from series 3B equipped with cable fixing type M and where a bend relief from series 1B is used.

<sup>3)</sup> For use only with connectors from series 4B equipped with cable fixing type M and where a bend relief from series 2B is used.



## GM Bend reliefs (Silicone)

A bend relief has been designed for connectors used in applications at high temperature or requiring vapor sterilization.

These bend reliefs are different from previous ones; their material, a silicone elastomer, is noted for its retention of flexibility over a wide temperature range. They are available in nine colours.

Use the part numbers shown below to order this accessory separately.

### Main characteristics

- Material: Silicone elastomer VMQ
- Temperature range in dry atmosphere: -60°C to +200°C
- Temperature range in water steam: +140°C
- Inflammability: not flammable (no UL classification)

| Part number   | Dimensions (mm) |    |                     |      | Series | Part number of nut for fitting the bend relief |
|---------------|-----------------|----|---------------------|------|--------|--|
|               | Bend relief     |    | Cable $\varnothing$ |      |        |  |
|               | A               | L  | max.                | min. |        |  |
| GMA.0B.025.RG | 2.5             | 27 | 2.9                 | 2.5  | 0B     | FFM.0B.130.LC                                  |
| GMA.0B.030.RG | 3.0             | 27 | 3.4                 | 3.0  |        |  |
| GMA.0B.035.RG | 3.5             | 27 | 3.9                 | 3.5  | 2B     | FFM.2B.132.LC <sup>1)</sup>                    |
| GMA.0B.040.RG | 4.0             | 27 | 4.4                 | 4.0  |        |  |
| GMA.0B.045.RG | 4.5             | 27 | 5.2                 | 4.5  | 0K     | FFM.0E.130.LC                                  |
| GMA.1B.040.RG | 4.0             | 34 | 4.4                 | 4.0  | 3B     | FFM.3B.131.LC <sup>2)</sup>                    |
| GMA.1B.045.RG | 4.5             | 34 | 5.0                 | 4.5  |        |  |
| GMA.2B.040.RG | 4.0             | 41 | 4.4                 | 4.0  | 2B     | FFM.2B.130.LC                                  |
| GMA.2B.045.RG | 4.5             | 41 | 5.0                 | 4.5  | 4B     | FFM.4B.132.LC <sup>3)</sup>                    |
| GMA.2B.051.RG | 5.1             | 41 | 5.6                 | 5.1  |        |  |
| GMA.2B.057.RG | 5.7             | 41 | 6.2                 | 5.7  | 2K     | FFM.2E.130.LC                                  |
| GMA.2B.063.RG | 6.3             | 41 | 7.0                 | 6.3  | 3K     | FFM.3K.133.LC                                  |
| GMA.2B.071.RG | 7.1             | 41 | 7.9                 | 7.1  | 4K     | FFM.4K.132.LC                                  |
| GMA.2B.080.RG | 8.0             | 41 | 9.0                 | 8.0  | 5K     | FFM.5K.132.LC                                  |

**Note:** The last letter «G» of the part number indicates the grey colour of the bend relief. For ordering a bend relief with another colour, see table on page 92 and replace the letter «G» by the letter of the required colour.

See also detailed information for each series: B series on page 61; K series on page 61.

<sup>1)</sup> For use only with connectors from series 2B equipped with cable fixing type M and where a bend relief from series 0B is used.

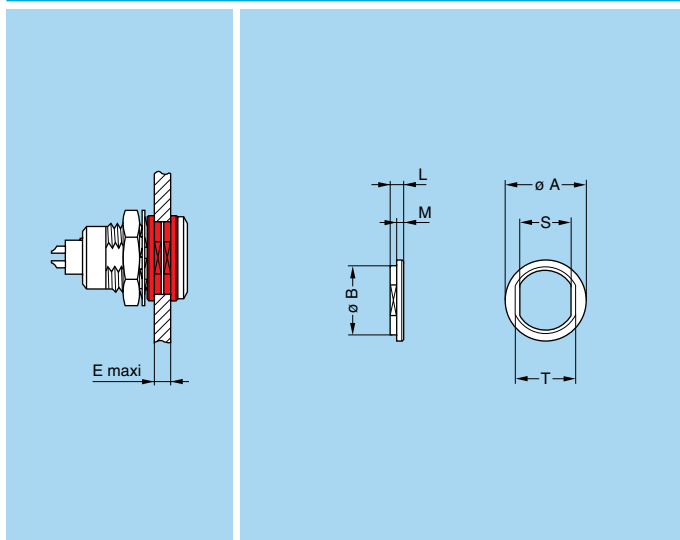
<sup>2)</sup> For use only with connectors from series 3B equipped with cable fixing type M and where a bend relief from series 1B is used.

<sup>3)</sup> For use only with connectors from series 4B equipped with cable fixing type M and where a bend relief from series 2B is used.

**Note:** The selection of pigments, which should remain stable at high temperature, is limited by new regulations. For this reason, some colours will be a shade different from those used for Desmopan bend reliefs. The selected solutions represent the best possible compromise.

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





- Material: Polyamide
- Maximum operating temperature: 90°C

## GRA Insulating washers

Sockets or plugs mounted on panels can be fitted with insulating washers. The nine colours available combined with those for the overall protective coverings with bend relief makes colour coding possible.

| Part number   | Series | Dimensions (mm) |      |      |     |     |      |      |
|---------------|--------|-----------------|------|------|-----|-----|------|------|
|               |        | A               | B    | E    | L   | M   | S    | T    |
| GRA.00.269.GG | 00     | 10.0            | 8.8  | 4.5  | 1.8 | 1.0 | 6.4  | 8.0  |
| GRA.0S.269.GG | 0B     | 12.0            | 10.8 | 6.0  | 1.8 | 1.0 | 8.3  | 9.9  |
| GRA.2S.269.GG | 2B     | 21.1            | 17.9 | 7.3  | 2.3 | 1.3 | 13.6 | 16.2 |
| GRA.3S.269.GG | 3B     | 25.0            | 21.8 | 10.3 | 2.2 | 1.2 | 16.7 | 20.2 |
| GRA.4S.269.GG | 4B     | 31.9            | 28.7 | 10.5 | 2.5 | 1.5 | 23.6 | 27.1 |

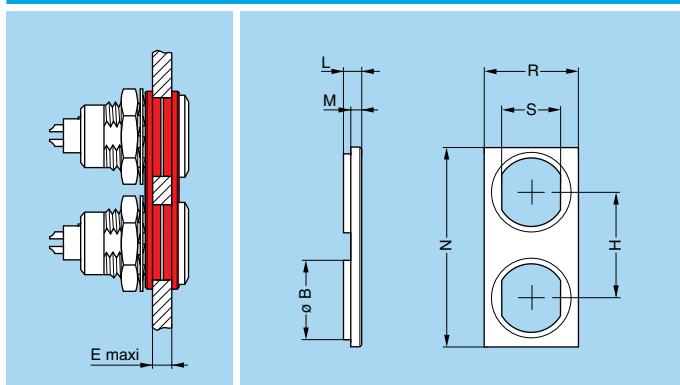
**Note:** Insulating washers for series 5B are available on request.

**Caution:** These insulating washers can be used with fixed and straight sockets with across flat dimension S1 equivalent to the S dimension of the washer.

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

**Note:** The last letter «G» of the part number indicates the colour grey for the insulating washer. To obtain an insulating washer of another colour, refer to the table above and change the letter «G» of the part number to the corresponding letter of the colour required.

For the panel cut-out, please consult chapter «Panel cut-out» on pages 18, 26 and 45.



- Material: Polyamide
- Maximum operating temperature: 90°C

## GRC Double panel washers

Double panel washers have been designed to make the drilling of panel holes easier for mounting fixed and straight sockets. The combination of the nine different colours of the double panel washers and of the overall protective coverings with bend relief makes colour coding possible.

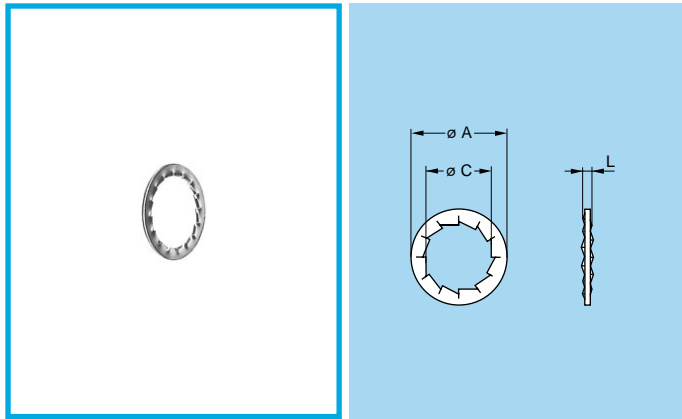
| Part number   | Series | Dimensions (mm) |   |    |     |     |      |      |     |
|---------------|--------|-----------------|---|----|-----|-----|------|------|-----|
|               |        | B               | E | H  | L   | M   | N    | R    | S   |
| GRC.0S.260.HG | 0B     | 10.9            | 5 | 14 | 2.5 | 1.5 | 26.5 | 12.5 | 8.3 |

**Caution:** These double panel washers can be used with fixed or free sockets with across flat dimension S1 equivalent to the S dimension of the washer.

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

**Note:** The last letter «G» of the washer's part number indicates the colour grey. For other colours, refer to the above table and replace letter «G» by the one corresponding to the colour required.

For the panel cut-out, please consult chapter «Panel cut-out» on page 26.

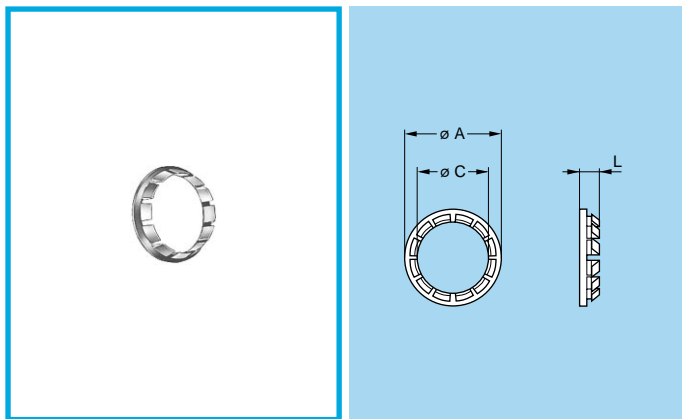


- Material: Nickel-plated bronze (3  $\mu\text{m}$ )

## GBA Locking washers

| Part number   | Series | Dimensions (mm) |      |     |
|---------------|--------|-----------------|------|-----|
|               |        | A               | C    | L   |
| GBA.00.250.FN | 00     | 9.5             | 7.1  | 1.0 |
| GBA.0S.250.FN | 0B     | 12.5            | 9.1  | 1.0 |
| GBA.2S.250.FN | 2B     | 19.5            | 15.1 | 1.2 |
| GBA.3S.250.FN | 3B     | 25.0            | 18.1 | 1.4 |
| GBA.4S.250.FN | 4B     | 32.0            | 25.1 | 1.4 |

**Note:** To order this accessory separately, use the above part numbers.

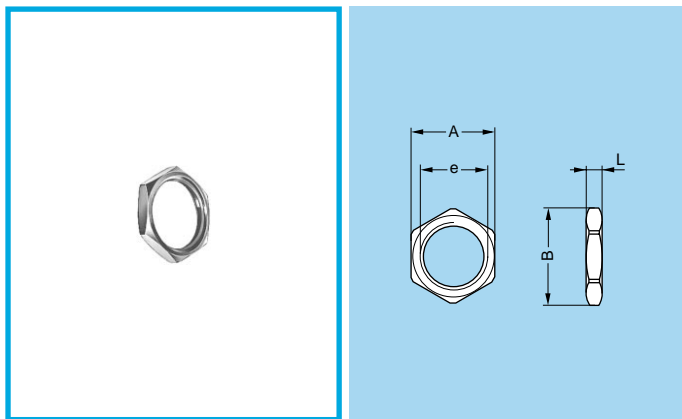


- Material: Nickel-plated brass (3  $\mu\text{m}$ )

## GBB Tapered washers

| Part number   | Series | Dimensions (mm) |      |     |
|---------------|--------|-----------------|------|-----|
|               |        | A               | C    | L   |
| GBB.00.250.LN | 00     | 9               | 7.1  | 2.0 |
| GBB.0S.250.LN | 0B     | 11              | 9.1  | 2.5 |
| GBB.2S.250.LN | 2B     | 18              | 15.1 | 4.0 |
| GBB.3S.250.LN | 3B     | 22              | 18.1 | 4.5 |
| GBB.4S.250.LN | 4B     | 28              | 25.2 | 5.0 |
| GBB.5S.250.LN | 5B     | 40              | 35.2 | 7.5 |

**Note:** Sockets of series 5B are always supplied with a tapered washer. To order this accessory separately, use the above part numbers.



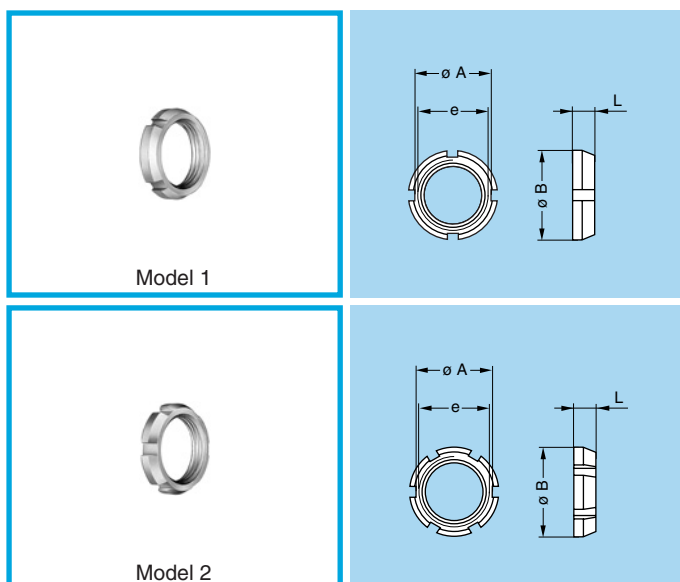
- Material:
  - Nickel-plated brass (3  $\mu\text{m}$ )
  - Natural anodized aluminium alloy
  - Stainless steel

## GEA Hexagonal nuts

| Part number   | Series | Dimensions (mm) |      |            |     |
|---------------|--------|-----------------|------|------------|-----|
|               |        | A               | B    | e          | L   |
| GEA.00.240.LN | 00     | 9               | 10.2 | M7 x 0.50  | 2.0 |
| GEA.0S.240.LN | 0B     | 11              | 12.4 | M9 x 0.60  | 2.0 |
| GEA.0E.240.LN | 0K     | 17              | 19.2 | M14 x 1.00 | 2.5 |
| GEA.2S.240.LN | 2B     | 17              | 19.2 | M15 x 1.00 | 2.7 |
| GEA.2E.240.LN | 2K     | 24              | 27.0 | M20 x 1.00 | 4.0 |
| GEA.3S.240.LN | 3B     | 22              | 25.0 | M18 x 1.00 | 3.0 |
| GEA.3E.240.LN | 3K     | 30              | 34.0 | M24 x 1.00 | 5.0 |
| GEA.4S.240.LN | 4B     | 30              | 34.0 | M25 x 1.00 | 5.0 |
| GEA.4E.240.LN | 4K     | 36              | 40.5 | M30 x 1.00 | 7.0 |

**Note:** To order this part separately, use the above part numbers. The last letters «LN» of the part number refer to the nut material and treatment. If a nut in aluminium alloy or stainless steel is desired, replace the last letters of the part number by «PT» or «AZ» respectively.



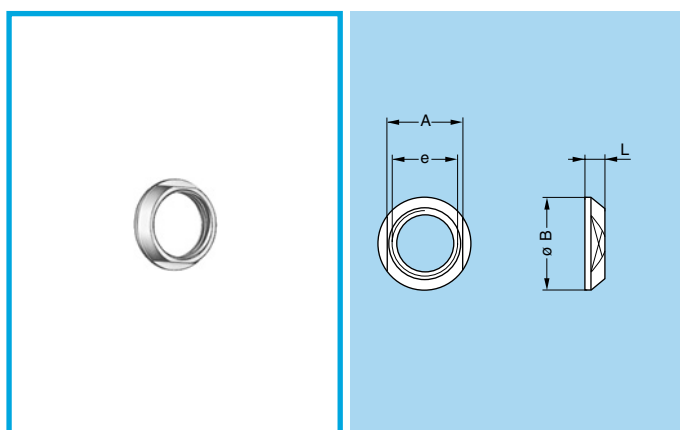


## GEG Notched nuts

| Part number   | Series | Model | Dimensions (mm) |    |           |     |
|---------------|--------|-------|-----------------|----|-----------|-----|
|               |        |       | A               | B  | e         | L   |
| GEG.00.240.LC | 00     | 1     | 8.7             | 10 | M7 x 0.5  | 2.5 |
| GEG.0S.240.LC | 0B     | 1     | 10.5            | 12 | M9 x 0.6  | 2.5 |
| GEG.0E.240.LC | 0K     | 1     | 15.8            | 18 | M14 x 1.0 | 3.5 |
| GEG.2S.240.LC | 2B     | 2     | 17.5            | 20 | M15 x 1.0 | 3.5 |
| GEG.2E.240.LC | 2K     | 2     | 22.5            | 25 | M20 x 1.0 | 3.5 |

- Material: Chrome-plated brass (Ni 3  $\mu\text{m}$  + Cr 0.3  $\mu\text{m}$ )

**Note:** 00, 0B and 2B series fixed and free sockets for back panel mounting are always delivered with this notched nut. To order this accessory separately, use the above part numbers.

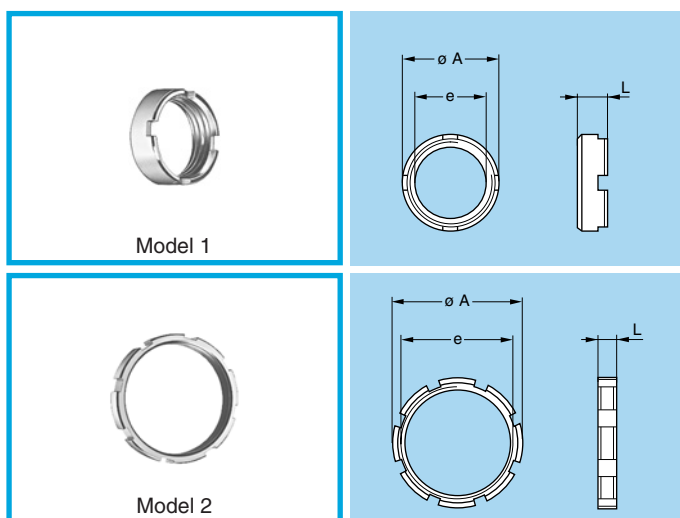


## GEC Conical nuts

| Part number   | Series | Dimensions (mm) |      |           |     |    |
|---------------|--------|-----------------|------|-----------|-----|----|
|               |        | A               | B    | e         | L   | S1 |
| GEC.00.240.LC | 00     | 8               | 10.0 | M7 x 0.5  | 2.5 | 8  |
| GEC.0S.240.LC | 0B     | 10              | 12.0 | M9 x 0.6  | 2.5 | 10 |
| GEC.0E.240.LC | 0K     | 16              | 18.0 | M14 x 1.0 | 3.0 | 16 |
| GEC.2S.240.LC | 2B     | 17              | 20.0 | M15 x 1.0 | 3.8 | 17 |
| GEC.2E.240.LC | 2K     | 22              | 25.0 | M20 x 1.0 | 5.0 | 22 |
| GEC.3S.240.LC | 3B     | 20              | 24.0 | M18 x 1.0 | 4.5 | 20 |
| GEC.3E.240.LC | 3K     | 27              | 30.0 | M24 x 1.0 | 4.5 | 27 |
| GEC.4S.240.LC | 4B     | 27              | 30.0 | M25 x 1.0 | 4.5 | 27 |
| GEC.4K.241.LC | 4K     | 32              | 35.5 | M30 x 1.0 | 5.0 | 32 |
| GEC.5S.240.LC | 5B     | 37              | 41.0 | M35 x 1.0 | 5.0 | 37 |

- Material: Chrome-plated brass (Ni 3  $\mu\text{m}$  + Cr 0.3  $\mu\text{m}$ )

**Note:** 3B, 3K, 4B, 4K, 5B and 5K series fixed and free sockets for back panel mounting are always delivered with a conical nut. To order this accessory separately, use the part numbers in the table above.

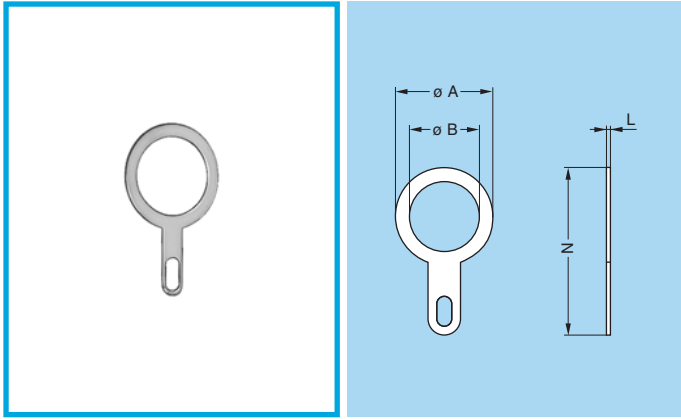


## GEB Round nuts

| Part number   | Series | Model | Dimensions (mm) |            |     |
|---------------|--------|-------|-----------------|------------|-----|
|               |        |       | A               | e          | L   |
| GEB.00.240.LN | 00     | 1     | 9.0             | M7 x 0.50  | 4.0 |
| GEB.0S.240.LN | 0B     | 1     | 11.0            | M9 x 0.60  | 4.0 |
| GEB.2S.240.LN | 2B     | 1     | 18.0            | M15 x 1.00 | 5.5 |
| GEB.3S.240.LN | 3B     | 1     | 22.0            | M18 x 1.00 | 5.5 |
| GEB.4S.240.LN | 4B     | 1     | 28.0            | M25 x 1.00 | 6.0 |
| GEB.5S.240.LN | 5B     | 2     | 40.0            | M35 x 1.00 | 8.0 |
| GEB.5E.240.LN | 5K     | 2     | 54.0            | M45 x 1.50 | 8.0 |

- Material: Nickel-plated brass (3  $\mu\text{m}$ )

**Note:** 5B and 5K series sockets are always supplied with model 2 round nuts. To order this accessory separately, use the part numbers in the table above.

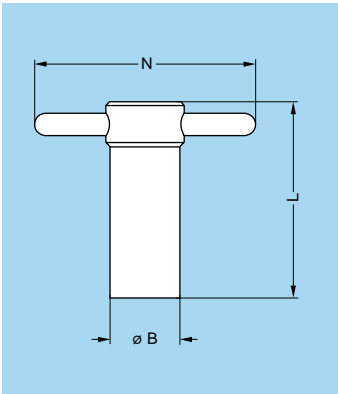


## GCA Earthing washers

| Part number   | Series | Dimensions (mm) |      |     |      |
|---------------|--------|-----------------|------|-----|------|
|               |        | A               | B    | L   | N    |
| GCA.00.255.LT | 00     | 9.5             | 7.1  | 0.4 | 18.2 |
| GCA.0S.255.LT | 0B     | 13.0            | 9.1  | 0.4 | 22.0 |
| GCA.0E.255.LT | 0K     | 17.0            | 14.1 | 0.5 | 27.5 |
| GCA.2S.255.LT | 2B     | 20.0            | 15.2 | 0.5 | 32.0 |
| GCA.2E.255.LT | 2K     | 25.0            | 20.2 | 0.5 | 39.0 |
| GCA.3S.255.LT | 3B     | 25.0            | 18.2 | 0.5 | 39.0 |
| GCA.4S.255.LT | 4B     | 35.0            | 25.6 | 0.6 | 50.0 |
| GCA.4E.255.LT | 4K     | 35.0            | 30.6 | 0.6 | 50.0 |
| GCA.5S.255.LT | 5B     | 42.0            | 35.1 | 0.3 | 57.5 |

- Material: CuSnZn plated brass (2 µm)

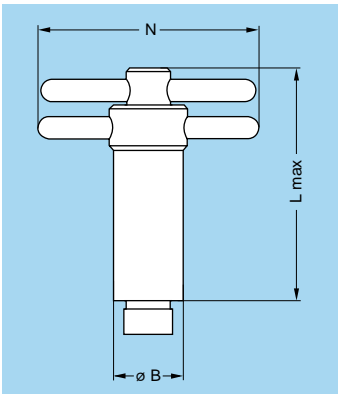
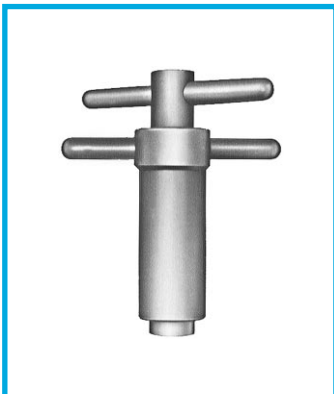
# Tooling



### DCG Spanners for hexagonal nuts

| Part number    | Series | Dim. (mm) |    |    | Part number of the nut |
|----------------|--------|-----------|----|----|------------------------|
|                |        | B         | L  | N  |                        |
| DCG.91.149.0TN | 00     | 14        | 40 | 50 | GEA.00.240.LN          |
| DCG.91.161.1TN | 0B     | 16        | 45 | 52 | GEA.0S.240.LN          |
| DCG.91.231.7TN | 2B     | 23        | 62 | 68 | GEA.2S.240.LN          |
| DCG.91.282.2TN | 3B     | 28        | 76 | 73 | GEA.3S.240.LN          |

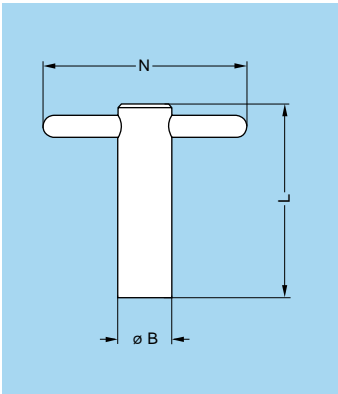
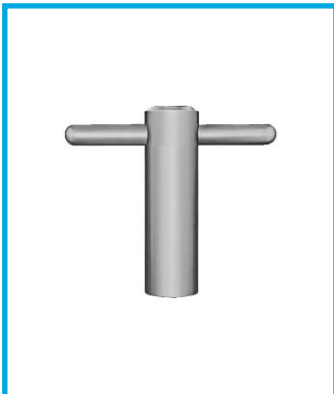
● Material: Blackened steel



### DCA Spanners for hexagonal nuts, with alignment of the sockets by the flats

| Part number    | Series | Dim. (mm) |     |    | Part number of the nut |
|----------------|--------|-----------|-----|----|------------------------|
|                |        | B         | L   | N  |                        |
| DCA.91.149.0TN | 00     | 14        | 65  | 50 | GEA.00.240.LN          |
| DCA.91.161.1TN | 0B     | 16        | 73  | 52 | GEA.0S.240.LN          |
| DCA.91.231.7TN | 2B     | 23        | 100 | 68 | GEA.2S.240.LN          |
| DCA.91.282.2TN | 3B     | 28        | 120 | 73 | GEA.3S.240.LN          |

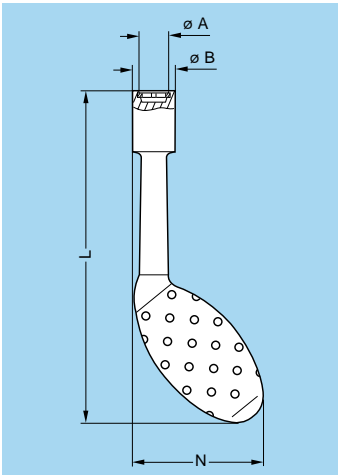
● Material: Blackened steel



### DCB Spanners type wrench for Model 1 round nuts

| Part number    | Series | Dim. (mm) |    |    | Part number of the nut |
|----------------|--------|-----------|----|----|------------------------|
|                |        | B         | L  | N  |                        |
| DCB.91.119.0TN | 00     | 11        | 40 | 50 | GEB.00.240.LN          |
| DCB.91.131.1TN | 0B     | 13        | 45 | 50 | GEB.0S.240.LN          |
| DCB.91.201.8TN | 2B     | 20        | 62 | 65 | GEB.2S.240.LN          |
| DCB.91.242.2TN | 3B     | 24        | 76 | 70 | GEB.3S.240.LN          |

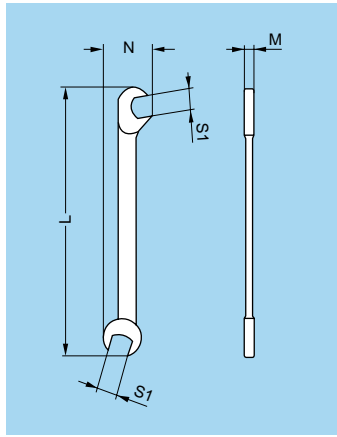
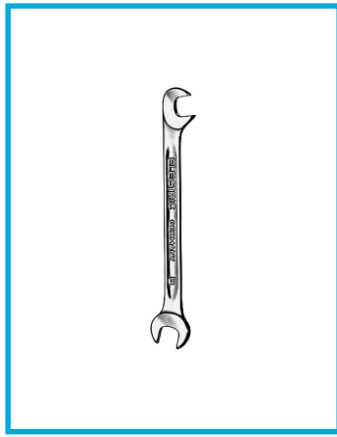
● Material: Blackened steel



### DCH Spanners for conical nut

| Part number   | Series | Dimensions (mm) |      |     |      | Part number of the nut |
|---------------|--------|-----------------|------|-----|------|------------------------|
|               |        | A               | B    | L   | N    |                        |
| DCH.91.101.PN | 00     | 10.1            | 12.8 | 124 | 48.3 | GEC.00.240.LC          |
| DCH.91.121.PN | 0B     | 12.1            | 14.8 | 124 | 49.3 | GEC.0S.240.LC          |
| DCH.91.201.PN | 2B     | 20.1            | 22.8 | 129 | 53.5 | GEC.2S.240.LC          |

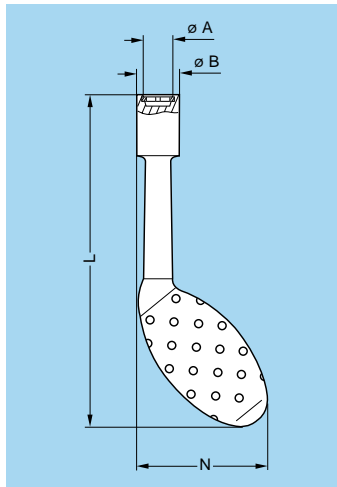
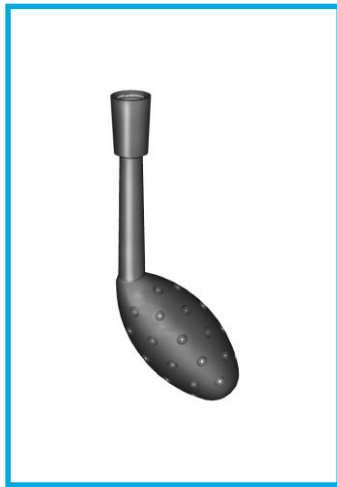
● Material: Dark grey polyurethane



### DCP Flat spanners for collet nut

| Part number   | Series | Dimensions (mm) |   |      |     |
|---------------|--------|-----------------|---|------|-----|
|               |        | L               | M | N    | S1  |
| DCP.99.045.TC | 00     | 70              | 2 | 10.5 | 4.5 |
| DCP.99.050.TC | 00     | 78              | 2 | 12.6 | 5.0 |
| DCP.99.055.TC | 00     | 78              | 2 | 12.6 | 5.5 |
| DCP.99.060.TC | 00     | 78              | 2 | 12.6 | 6.0 |

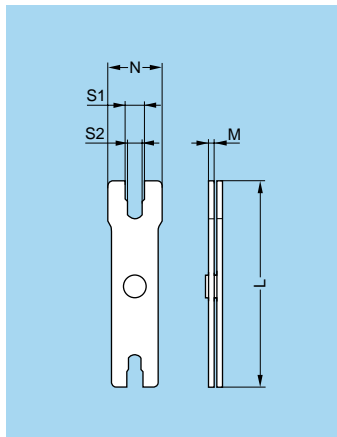
- Material: Chrome-plated steel



### DCH Spanners for notched nuts

| Part number   | Series | Dimensions (mm) |      |     |      | Part number of the nut |
|---------------|--------|-----------------|------|-----|------|------------------------|
|               |        | A               | B    | L   | N    |                        |
| DCH.91.101.PA | 00     | 10.1            | 12.8 | 124 | 48.3 | GEG.00.240.LC          |
| DCH.91.121.PA | 0B     | 12.1            | 14.8 | 124 | 49.3 | GEG.0S.240.LC          |
| DCH.91.181.PA | 0K     | 18.1            | 22.8 | 129 | 53.1 | GEG.0E.240.LC          |
| DCH.91.201.PA | 2B     | 20.1            | 22.8 | 129 | 53.5 | GEG.2S.240.LC          |
| DCH.91.251.PA | 2K     | 25.1            | 32.8 | 134 | 55.5 | GEG.2E.240.LC          |

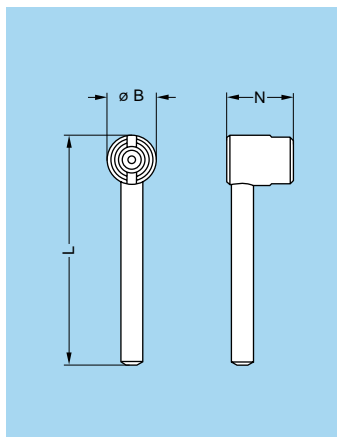
- Material: Blue polyurethane



### DCP Spanners for tightening collet nut

| Part number   | Series | Dimensions (mm) |     |    |      |      |
|---------------|--------|-----------------|-----|----|------|------|
|               |        | L               | M   | N  | S1   | S2   |
| DCP.91.001.TN | 0B     | 95              | 2.5 | 21 | 8.1  | 7.1  |
| DCP.91.023.TN | 2B-2K  | 115             | 3.0 | 30 | 13.1 | 12.1 |
|               | 3B-3K  | 115             | 3.0 | 35 | 15.1 | 14.1 |
| DCP.91.045.TN | 4B     | 130             | 3.5 | 40 | 21.2 | 20.2 |
|               | 5B     | 130             | 3.5 | 45 | 31.2 | 30.2 |

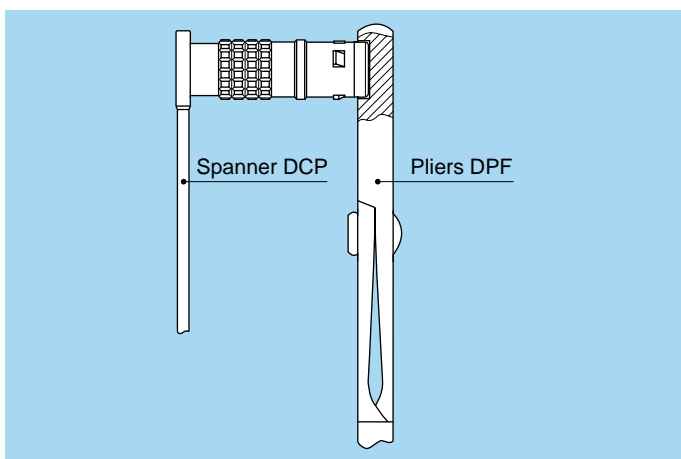
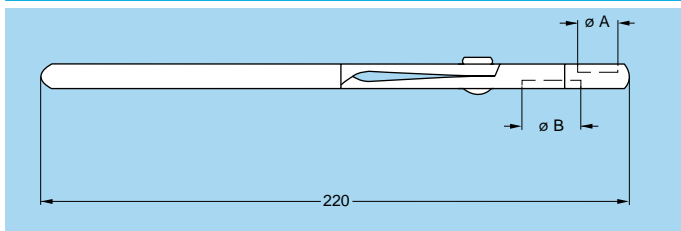
- Material: Blackened steel



### DCL Spanners for securing straight plug with two latching tabs while tightening collet nut

| Part number    | Series | Dimensions (mm) |    |      |
|----------------|--------|-----------------|----|------|
|                |        | B               | L  | N    |
| DCL.91.105.0TK | 00     | 10              | 45 | 13.5 |

- Material: Blackened steel

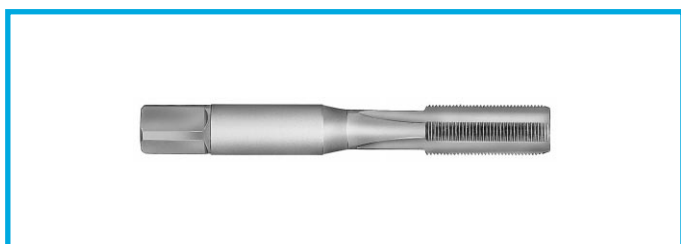


### DPF Pliers for assembling plugs (series K)

| Part number   | Series | Dimensions (mm) |    |
|---------------|--------|-----------------|----|
|               |        | A               | B  |
| DPF.91.001.TA | 0K     | 10              | –  |
| DPF.91.023.TA | 2K     | 15              | –  |
|               | 3K     | –               | 18 |

### Example for use

The plug end must be held in the pliers while the nut is tightened with the spanner.



### DTA Taps

| Part number   | Series | Thread   |
|---------------|--------|----------|
| DTA.99.700.5Z | 00     | M7 x 0.5 |
| DTA.99.900.6Z | 0B     | M9 x 0.6 |

Fig. 1

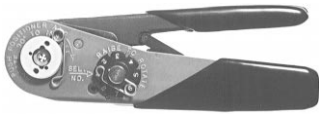
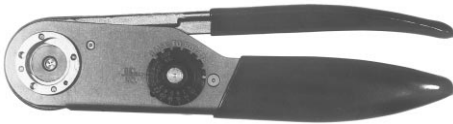


Fig. 2



## Manual crimping tools

| Supplier | Part number                                |  |
|----------|--|--|
|          | contact $\varnothing$ 0.7-0.9-1.3 (Fig. 1) | contact $\varnothing$ 1.6-2.0 (Fig. 2) |
| LEMO     | DPC.91.701.V <sup>1)</sup>                 | DPC.91.101.A <sup>2)</sup>             |
| DANIELS  | MH860 <sup>1)</sup>                        | AF8 <sup>2)</sup>                      |
| BALMAR   | 23-000                                     | 55-000                                 |
| BUCHANAN | 616336 <sup>1)</sup>                       | 615708 <sup>2)</sup>                   |

<sup>1)</sup> According to specification MIL-C-22520/7-01.

<sup>2)</sup> According to specification MIL-C-22520/1-01.



male



female

These positioners are suitable for use with manual crimping tool according to the MIL-C-22520/7-01 standard.

## DCE Positioners for crimp contacts $\varnothing$ 0.7, 0.9 and 1.3 mm

|                  | Connector |     |                       |                   | Positioners part number |                    |
|------------------|-----------|-----|-----------------------|-------------------|-------------------------|--------------------|
|                  | Type      |     | $\varnothing$ Contact | Conductor AWG     | For male contact        | For female contact |
|                  | F1        | F2  |                       |                   |                         |                    |
| <b>2B<br/>2K</b> | 96A       | 92A | 0.9                   | 20-22-24          | DCE.91.092.BVC          | DCE.91.092.BVM     |
|                  | 96C       | 92C |                       |                   |                         |                    |
|                  | 96E       | 92E | 0.7                   | 22-24-26          | DCE.91.072.BVC          | DCE.91.072.BVM     |
|                  | 96J       | 92J |                       |                   |                         |                    |
| <b>3B<br/>3K</b> | 97C       | 93B | 0.9                   | 20-22-24          | DCE.91.093.BVC          | DCE.91.093.BVM     |
|                  | 97E       | 93E |                       |                   |                         |                    |
|                  | -         | 87E | 0.7                   | 22-24-26          | DCE.91.073.BVC          | DCE.91.073.BVM     |
|                  | 97J       | 93J |                       |                   |                         |                    |
|                  | 97R       | 93R |                       |                   |                         |                    |
|                  | 96X       | 92X |                       |                   |                         |                    |
| -                | 87R       |     |                       |                   |                         |                    |
| <b>4B<br/>4K</b> | -         | 95D | 1.3                   | 18-20             | DCE.91.134.BVC          | DCE.91.134.BVM     |
|                  | -         | 93E |                       | 1.3 <sup>1)</sup> | 18-20                   | DCE.91.133.BVCY    |
|                  | -         | -   | 0.9                   | 20-22-24          | DCE.91.094.BVC          | DCE.91.094.BVM     |
|                  | 97F       | -   |                       |                   |                         |                    |
|                  | -         | -   | 1.3                   | 18-20             | DCE.91.134.BVC          | DCE.91.134.BVM     |
|                  | -         | -   |                       |                   |                         |                    |
|                  | -         | -   | 0.9                   | 20-22-24          | DCE.91.094.BVC          | DCE.91.094.BVM     |
|                  | 97R       | 93R |                       |                   |                         |                    |
|                  | 97L       | 93L | 0.9                   | 20-22-24          | DCE.91.094.BVC          | DCE.91.094.BVM     |
|                  | 98L       | 94L |                       |                   |                         |                    |
|                  | 97T       | 93T | 0.7                   | 22-24-26          | DCE.91.074.BVC          | DCE.91.074.BVM     |
|                  | -         | 88E |                       |                   |                         |                    |
| 99H              | -         |     |                       |                   |                         |                    |
| 98E              | 94E       |     |                       |                   |                         |                    |

**Note:** <sup>1)</sup> Arrangement with special contact length, special positioners are required.



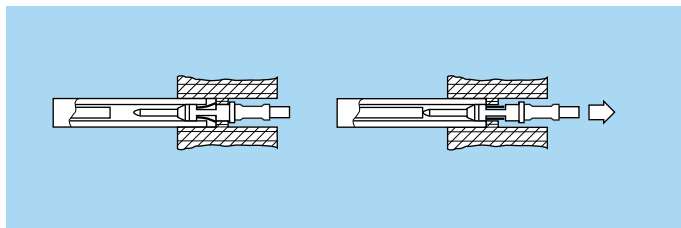
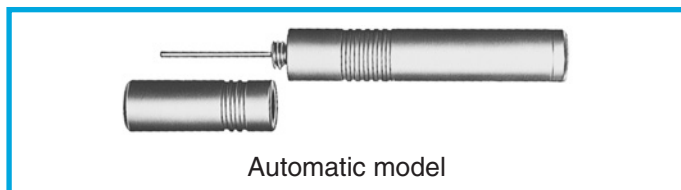
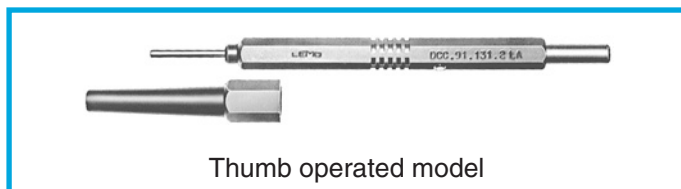
These turrets are suitable for use with manual crimping tool according to the MIL-C-22520/1-01 standard.

**Note:** A wide variation of strand number and diameter combinations are quoted as being AWG, some of which do not have a large enough cross section to guarantee a crimp as per either MIL-C-22520/1 or /7-01. Our technical department is at your disposal to study and propose a solution to all your specific problems.

## DCE Turrets for crimp contacts $\varnothing$ 1.6 and 2.0 mm

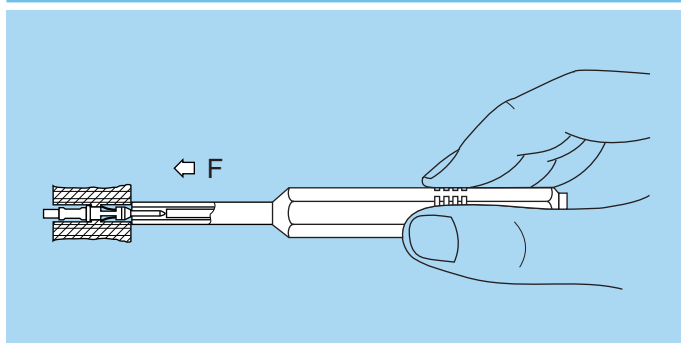
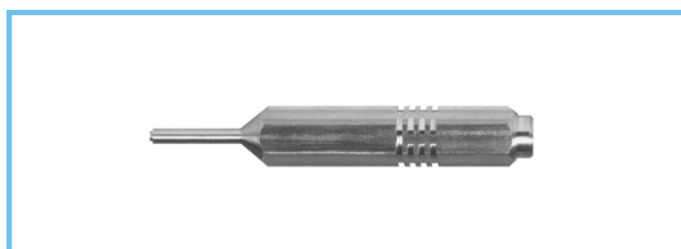
|                  | Connector |     |                       |                   | Turret part number |                    |
|------------------|-----------|-----|-----------------------|-------------------|--------------------|--------------------|
|                  | Type      |     | $\varnothing$ Contact | Conductor AWG     | For male contact   | For female contact |
|                  | F1        | F2  |                       |                   |                    |                    |
| <b>5B<br/>5K</b> | -         | 94B | 2.0                   | 12-14-16          | DCE.91.205.BVCM    | DCE.91.205.BVCM    |
|                  | -         | 956 |                       | 2.0 <sup>1)</sup> | 12-14-16           | DCE.91.203.BVCM    |
|                  | -         | 90C | 1.6 <sup>1)</sup>     | 14-16-18          | DCE.91.164.BVCM    | DCE.91.162.BVCM    |

**Note:** <sup>1)</sup> Arrangement with special contact length, turret from another series are required.



### DCC Extraction tools for crimp contacts

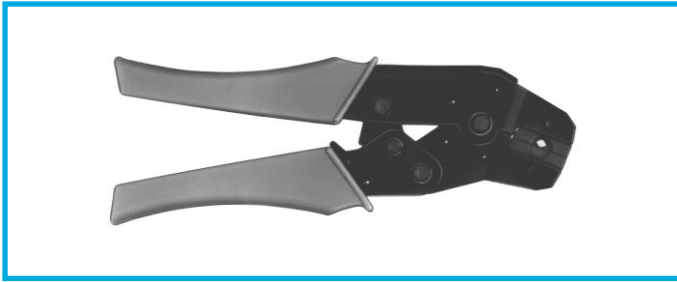
|                  | FO Contact |     | ø A Contact | Extractor            |                 |
|------------------|------------|-----|-------------|----------------------|-----------------|
|                  | Types      |     |             | Thumb operated model | Automatic model |
|                  | F1         | F2  |             |                      |                 |
| <b>2B<br/>2K</b> | 96A        | 92A | 0.9         | DCC.91.090.5LA       | DCF.91.090.2LT  |
|                  | 96C        | 92C | 0.7         | DCC.91.070.5LA       | DCF.91.070.2LT  |
|                  | 96E        | 92E |             |                      |                 |
|                  | 96J        | 92J |             |                      |                 |
| <b>3B<br/>3K</b> | 97C        | 93B | 0.9         | DCC.91.090.5LA       | DCF.91.093.5LT  |
|                  | 97E        | 93E | -           | DCC.91.070.5LA       | DCF.91.073.5LT  |
|                  | -          | 87E |             |                      |                 |
|                  | 97J        | 93J | 0.7         | DCC.91.070.5LA       | DCF.91.073.5LT  |
|                  | 97R        | 93R |             |                      |                 |
|                  | 96X        | 92X |             |                      |                 |
| -                | 87R        |     |             |                      |                 |
| <b>4B<br/>4K</b> | -          | 95D | 1.3         | DCC.91.131.5LA       | DCF.91.133.5LT  |
|                  | -          | 93E | 1.3         | DCC.91.131.5LA       | DCF.91.133.5LT  |
|                  |            |     | 0.9         | DCC.91.090.5LA       | DCF.91.093.5LT  |
|                  |            |     | 1.3         | DCC.91.131.5LA       | DCF.91.133.5LT  |
|                  | 97F        | -   | 0.9         | DCC.91.090.5LA       | DCF.91.093.5LT  |
|                  | 97R        | 93R | 0.9         | DCC.91.090.5LA       | DCF.91.093.5LT  |
|                  | 97L        | 93L |             |                      |                 |
|                  | 98L        | 94L | 0.7         | DCC.91.070.5LA       | DCF.91.073.5LT  |
|                  | 97T        | 93T |             |                      |                 |
|                  | -          | 88E |             |                      |                 |
|                  | 99H        | -   |             |                      |                 |
|                  | 98E        | 94E |             |                      |                 |
| <b>5B<br/>5K</b> | -          | 94B | 2.0         | DCC.91.202.5LA       | DCF.91.203.5LT  |
|                  | -          | 956 | 2.0         | DCC.91.202.5LA       | DCF.91.203.5LT  |
|                  |            |     | 1.6         | DCC.91.162.5LA       | DCF.91.163.5LT  |
|                  |            |     | 1.6         | DCC.91.162.5LA       | DCF.91.163.5LT  |



### DCK Retention testing tools for crimp contacts ø 0.7, 0.9 and 1.3 mm

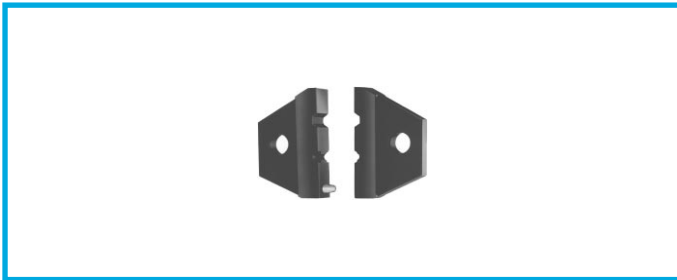
| Contact ø A | Test force (N) | Testing tool part number |                    |
|-------------|----------------|--------------------------|--------------------|
|             |                | For male contact         | For female contact |
| 0.7         | 10             | DCK.91.071.0LRC          | DCK.91.071.0LRM    |
| 0.9         | 14             | DCK.91.091.4LRC          | DCK.91.091.4LRM    |
| 1.3         | 25             | DCK.91.132.5LRC          | DCK.91.132.5LRM    |

## Tools for type C Coaxial Contacts



### DPE Crimping tool with die

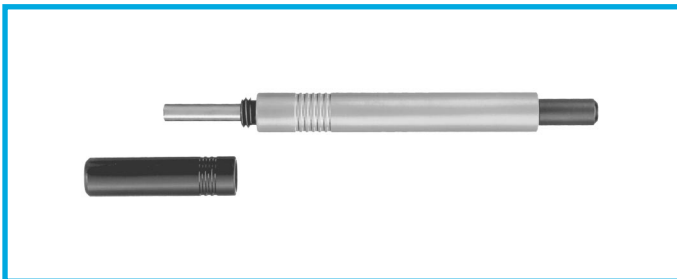
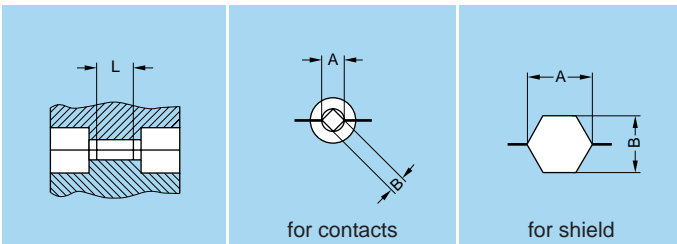
| Part number   | Cable group |
|---------------|-------------|
| DPE.99.103.1K | 2           |
| DPE.99.103.8K | 1, 3        |



### DPN Dies

| Part number   | Cable group | Die dimensions |      |     |            |      |  |
|---------------|-------------|----------------|------|-----|------------|------|--|
|               |             | For contacts   |      |     | For shield |      |  |
|               |             | A              | B    | L   | A          | B    |  |
| DPN.99.103.1K | 2           | 1.09           | 0.77 | 2.0 | 3.10       | 2.70 |  |
| DPN.99.103.8K | 1, 3        | 1.09           | 0.77 | 2.0 | 3.80       | 3.30 |  |

- Die material: Blackened steel



### DCC Extractors

| Part number    | Cable group |
|----------------|-------------|
| DCC.91.384.5LA | 1, 2, 3     |



# Fibre Optic Tooling

We propose a complete range of tools for fibre optic connector cable assembly. Some tools are specific to each fibre optic contact type. When selecting necessary tooling, make sure you identify correctly the contact type used in the selected product.



### DRV Complete workstation for fibre optic contact

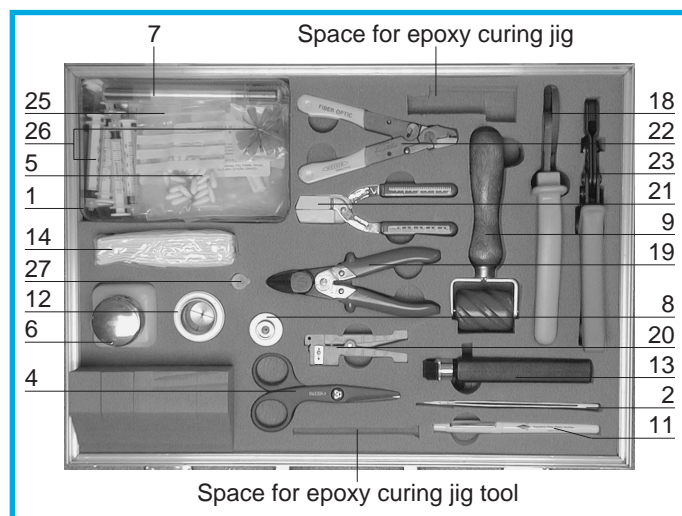
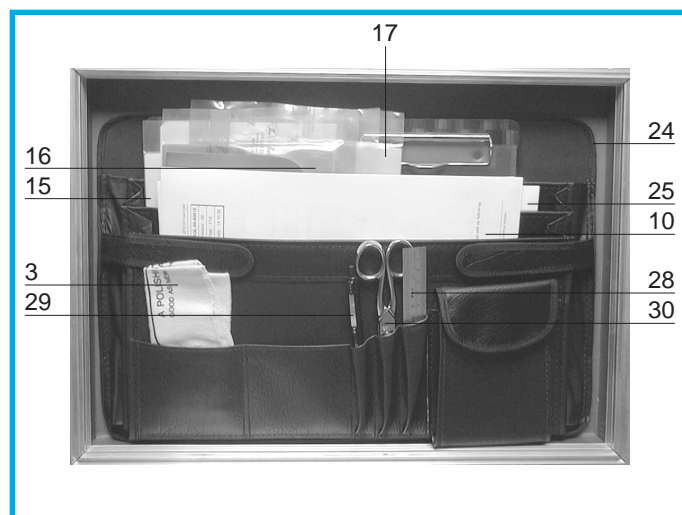
#### Description

Comprehensive range of tools for terminating both single-mode and multi-mode fibres. Includes specific tools for F2 and F4 fibre optic contacts. Detachable termination case lid for use as polishing platform during field termination. Rugged but aesthetically pleasing termination case which is ideal for field use or in-house terminations. Curing oven and inspection microscope shall be ordered separately.

| Part number   | Contact type |
|---------------|--------------|
| DRV.91.CF2.PN | F2, F4       |

### Workstation Contents

| Part Number     | Description                              | Quantity | Number |
|-----------------|--|----------|--------|
| WST.BT.175.55PT | Plastic box                              | 1        | 1      |
| WST.BR.150.8AC  | Tweezers                                 | 1        | 2      |
| WST.CH.252.5SR  | Lint-free Cloth                          | 1        | 3      |
| WST.CS.125.CE   | Kevlar cutters                           | 1        | 4      |
| WST.CO.020.52   | Cotton bud (sachet of 20 pcs)            | 1        | 5      |
| WST.DS.290.PT   | Alcohol dispenser (supplied empty)       | 1        | 6      |
| DCC.91.312.5LA  | Extraction tool for F1 and F2 contacts   | 1        | 7      |
| DCS.91.G20.0C   | Microscope adapter for F2 and F4 cont.   | 1        | 8      |
| WST.ME.354.8R   | Epoxy mixer and pad                      | 1        | 9      |
| DOC.FO.CF2.0000 | Terminating instructions for F2 contacts | 1        | 10     |
| WST.OU.135.10SZ | Fibre scribe                             | 1        | 11     |
| DCS.91.F24.LC   | Polishing tool for F2 and F4 contacts    | 1        | 12     |
| WST.OU.452.5MN  | Large cable stripper                     | 1        | 13     |
| WST.PA.105.5525 | Cleaning tissues                         | 1        | 14     |
| WST.PA.012.AOJ  | Lapping film 12µm (yellow)               | 20       | 15     |
| WST.PA.005.AOM  | Lapping film 5µm (brown)                 | 20       | 16     |
| WST.PA.001.AOV  | Lapping film 1µm (green)                 | 20       | 17     |
| WST.PN.210.AS   | Armoured cable cutter                    | 1        | 18     |
| WST.PN.145.AR   | Cable cutter                             | 1        | 19     |
| WST.PN.103.0PG  | Outer jacket stripper                    | 1        | 20     |
| WST.PN.203.CR   | Buffer coating stripping tool            | 1        | 21     |
| WST.PN.102.3CR  | Primary coat stripper                    | 1        | 22     |
| DPE.99.524.337K | Crimp tool                               | 1        | 23     |
| WST.PL.322.5PT  | Polishing platform                       | 1        | 24     |
| WST.RE.353.EPO  | Epoxy resin + safety instructions        | 10       | 25     |
| WST.SE.305.8PH  | Syringe with needle                      | 10       | 26     |
| WST.TU.191.LN   | Fibre shield for F2 and F4 contacts      | 4        | 27     |
| WST.RG.150.AZ   | Steel rule 6"                            | 1        | 28     |
| WST.SY.135.PA   | Fibre length marking pen                 | 1        | 29     |
| WST.CS.155.AZ   | Scissors                                 | 1        | 30     |



**Note:** The interior of the case is fitted with pre-formed plastic foam to provide secure storage of the tools.



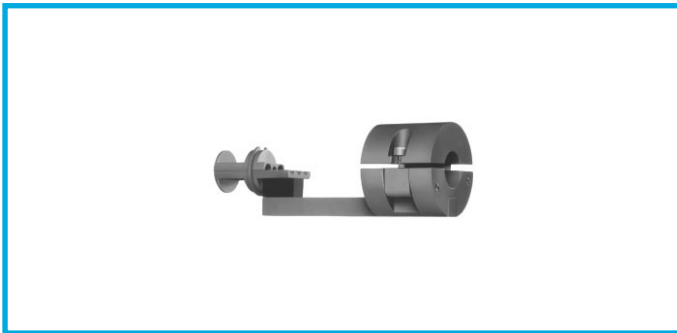
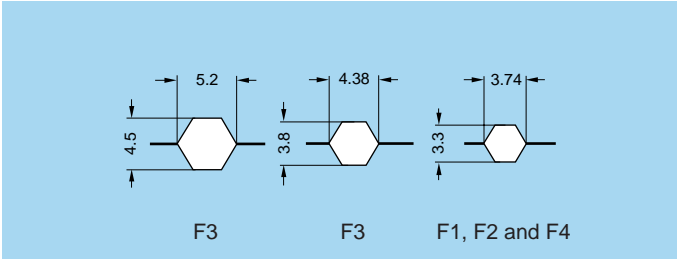
### DPE Crimping tool for fibre optic contact

#### Description

Crimping tool for capturing KEVLAR® strand on contact body

| Part number                   | Contact type   |
|-------------------------------|----------------|
| DPE.99.524.337K <sup>1)</sup> | F1, F2, F3, F4 |

**Note:** <sup>1)</sup> Included in the LEMO F2 workstation.



### DCS Epoxy curing jig

#### Description

Curing positioning jig specifically designed to ease assembly of the 3K.93C series with associated camera cable

| Part number    | Contact type |
|----------------|--------------|
| DCS.91.F12.3LA | F2           |



### WST Epoxy curing oven

#### Description

Oven for assisting in curing epoxy

| Part number   | Voltage   | Contact type   |
|---------------|-----------|----------------|
| WST.FR.220.VA | 220 volts | F1, F2, F3, F4 |
| WST.FR.110.VA | 110 volts |                |



### DCS Polishing tool for fibre optic contacts

#### Description

Precision spring loaded tool for polishing terminated fibre optic contacts.

| Part number                 | Contact type |
|-----------------------------|--------------|
| DCS.91.F13.LC               | F1, F3       |
| DCS.91.F24.LC <sup>1)</sup> | F2, F4       |

**Note:** <sup>1)</sup> Included in the LEMO F2 workstation.

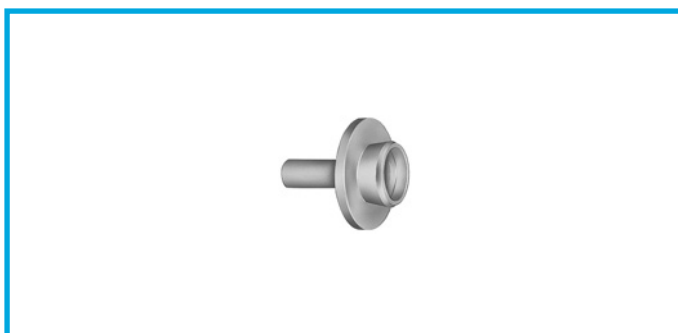


### WST Fibre Inspection Microscope

#### Description

Microscope to assist in viewing termination operations and verifying fibre end finish.  
See adaptor below.

| Part number   | Contact type   |
|---------------|----------------|
| WST.FB.G10.4N | F1, F2, F3, F4 |



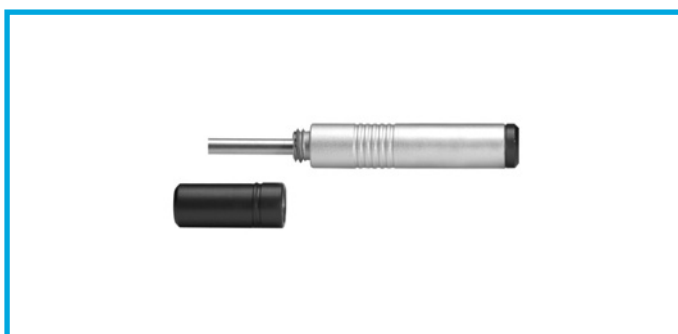
### DCS Microscope adaptor for fibre optic contacts

#### Description

Adaptor for final inspection of fibre optic contacts.  
To be used with microscope WST.FB.G10.4N

| Part number                 | Contact type |
|-----------------------------|--------------|
| DCS.91.G24.0C               | F1, F3       |
| DCS.91.G20.0C <sup>1)</sup> | F2, F4       |

**Note:** <sup>1)</sup> Included in the LEMO F2 workstation.



### DCC Extractor for fibre optic contact

#### Description

Tool for extracting the F1 or F2 contact.

| Part number                  | Contact type |
|------------------------------|--------------|
| DCC.91.312.5LA <sup>1)</sup> | F1, F2       |

**Note:** <sup>1)</sup> Included in the LEMO F2 workstation.

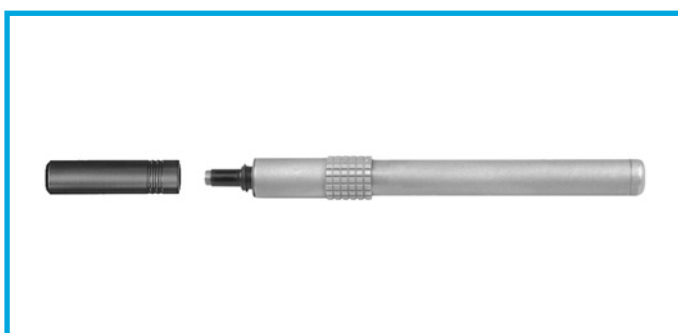


### DCS F2 contact alignment device installation/extraction tool

#### Description

Simple tool with two threaded end for installation/extraction of the F2 contact alignment device

| Part number   | Contact type |
|---------------|--------------|
| DCS.F2.035.PN | F2           |

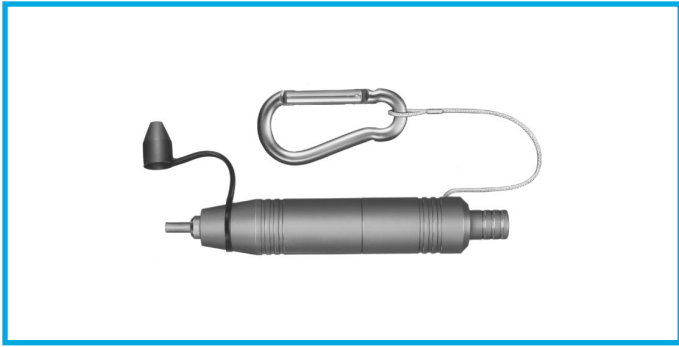


### DCC F4 contact alignment device extraction tool

#### Description

This tool is for extraction/reinstallation of the F4 contact alignment device. It is necessary for contact cleaning only

| Part number    | Contact type |
|----------------|--------------|
| DCC.F4.125.7LA | F4           |



### DCS Cleaning tool

#### Description

Used for maintenance cleaning. The tool is made with an alcohol spongy reservoir (supplied empty). 16 dry cotton buds are included. The threaded end allows extraction/reinstallation of the F2 contact alignment device.

| Part number   | Contact type |
|---------------|--------------|
| DCS.91.F23.LA | F2           |



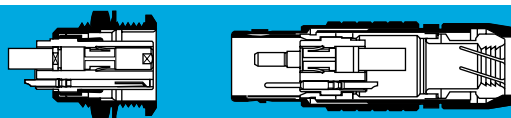
### WST Cleaning kit

#### Description

Kit that includes 2 cotton buds one of them moistened with alcohol

| Part number   | Contact type   |
|---------------|----------------|
| WST.KI.125.34 | F1, F2, F3, F4 |

## Technical characteristics



### Outer shell

#### Brass

In most cases, LEMO connectors have a brass outer shell which is suitable for most general purpose applications, including civilian and military. The brass outer shells have a chrome nickel-plated surface which ensures very good protection against industrial atmosphere, salt air and most corrosive agents.

Alternative protective coatings are available to satisfy other specific environmental conditions:

- electrolytic nickel
- nickel-black chrome. After the black chrome treatment, the part is coated with a protective organic film.

#### Stainless steel

For applications where there are severe environmental conditions that may rapidly damage the surface finish, we recommend using stainless steel. The AISI 303 stainless steel is a material for general use adapted to most applications requiring a product made entirely of stainless metal.

For the broadcasting industry the heavy duty line with shell in stainless steel offers more resistance to heavy wear conditions.

#### Aluminium alloy

The aluminium alloy outer shells find numerous applications where light weight is a predominant factor, such as in the aeronautics and space industries, and for portable and mobile equipment.

These materials have high mechanical strength and excellent resistance to corrosion.

The shell surface is protected by anodizing which is available in six colours: blue, yellow, black, red, green, and natural.

Depending on the application, other surface finish is also available (electrolytic nickel-plating, black nickel plating).

#### Plastic materials

Some connector model shells of the 2B-4B series can be made of plastic. This solution offers optimum electrical insulating properties particularly suitable for medical applications.

Grey or white polysulfone (PSU) and beige PEEK offer excellent mechanical properties and is suitable for gas or vapour sterilization.

Some models are also available with an outer shell of cream-coloured polyphenylsulfone (PPSU). We recommend this material particularly for applications where products are to withstand hundreds of vapour sterilization cycles.

#### Other metallic components

In general, most metallic components are manufactured in brass. However, bronze or beryllium copper are used where good elasticity is required (for example: grounding crown). Depending on the application, these parts have electrolytic nickel or nickel-gold plating. These parts can also be manufactured in stainless steel (AISI 416).

#### Gasket and O-rings

In general, gaskets and O-rings are made of silicone rubber MQ/MVQ. However, for some products they are made of fluorosilicone rubber (FPM).

### Technical characteristics of plastic materials

| Type                                 | Norme                | Units                      | PEEK      | PSU                | PPSU    | Silicone  | FPM             |
|--------------------------------------|----------------------|----------------------------|-----------|--------------------|---------|-----------|-----------------|
| Density                              | ASTM D 792           | –                          | 1.3-1.4   | 1.24               | 1.3     | ~1.2      | ~1.9            |
| Tensile strength (at 23°C)           | ASTM D 638/ ISO R527 | MPa                        | 92-142    | 70                 | 70      | > 9       | > 12            |
| Flexural strength (at 23°C)          | ASTM D 790/ ISO R178 | MPa                        | 170       | 106                | 91      | –         | –               |
| Dielectric strength                  | ASTM D 149/IEC 60243 | kV/mm                      | 19-25     | 17-20              | 15      | 18-30     | –               |
| Volume resis. at 50% HR and 23°C     | ASTM D 257/IEC 60093 | $\Omega \bullet \text{cm}$ | $10^{16}$ | $5 \times 10^{16}$ | –       | $10^{14}$ | –               |
| Surface resistivity                  | ASTM D 257           | $\Omega$                   | $10^{15}$ | –                  | –       | –         | –               |
| Thermal conductivity                 | ASTM C 177           | W/K $\bullet$ m            | 0.25      | 0.26               | –       | –         | –               |
| Comparative tracking index           | IEC 60112            | V                          | CTI 150   | CTI 150            | –       | –         | –               |
| Maxi. continuous service temperature | UL 746               | °C                         | 250       | 140                | 180     | 200       | 200             |
| Min. continuous service temperature  | UL 746               | °C                         | -55       | -60                | -50     | -50       | -20             |
| Max. short-time service temperature  | –                    | °C                         | 300       | 160                | 200     | > 250     | 300             |
| Water absorption in 24h at 23°C      | ASTM D 570/ISO R62A  | %                          | 0.12      | 0.3                | 0.37    | –         | –               |
| Radiation resistance                 | –                    | Gy <sup>1)</sup>           | $10^7$    | $10^5$             | –       | $10^5$    | $8 \times 10^4$ |
| Flammability rating                  | ASTM D 635/UL 94     | –                          | V-0/3.2   | V-0/4.4            | V-0/1.6 | –         | –               |
| Resistance to steam sterilization    | –                    | –                          | excel.    | good               | excel.  | good      | good            |

ASTM = American Society for Testing & Materials  
 ISO = International Standards Organization  
 UL = Underwriters Laboratories  
 IEC = International Electrotechnical Commission

**Note:** <sup>1)</sup> 1 Gy (Gray) = 100 rad

## Materials and Treatments

| Component   | Material (Standard)                     | Surface treatment (µm) |    |     |        |    |    |            |  | Notes |
|---|---|------------------------|----|-----|--------|----|----|------------|--|-------|
|   |   | chrome                 |    |     | nickel |    |    | black chr. |  |       |
|   |   | Cu                     | Ni | Cr  | Cu     | Ni | Ni | Cr         |  |       |
| Outer shell, collet nut, conical nut or notched nut | Brass (UNS C 38500)                     | 0.5                    | 3  | 0.3 | 0.5    | 3  | 1  | 2          |  |       |
|   | Stainless steel (AISI 303 or 304)       | without treatment      |    |     |        |    |    |            |  |       |
|   | Aluminium alloy (AA 6262A or AA 6023)   | anodized               |    |     |        |    |    |            |  |       |
|   | PEEK, Polyether EtherKetone, beige      | -                      |    |     |        |    |    |            |  | 1)    |
|   | PSU (Udel®), Polysulfone, grey or white | -                      |    |     |        |    |    |            |  | 2)    |
| Grounding crown                                     | PPSU (Radel®), Polyphenylsulfone, cream | -                      |    |     |        |    |    |            |  | 2)    |
|   | Bronze (UNS C 54400) or special brass   | -                      | -  | -   | 0.5    | 3  | -  | -          |  |       |
| Latch sleeve  | Stainless steel (AISI 416)              | without treatment      |    |     |        |    |    |            |  | 3)    |
|   | Special brass                           | 0.5                    | 3  | 0.3 | 0.5    | 3  | -  | -          |  |       |
| Locking washer                                      | Stainless steel (AISI 416)              | without treatment      |    |     |        |    |    |            |  | 3)    |
|   | Bronze (UNS C 52100)                    | -                      | -  | -   | 0.5    | 3  | -  | -          |  |       |
| Hexagonal or round nut                              | Brass (UNS C 38500)                     | -                      | -  | -   | 0.5    | 3  | -  | -          |  |       |
|   | Stainless steel (AISI 303 or 304)       | without treatment      |    |     |        |    |    |            |  | 4)    |
|   | Aluminium alloy (AA 6262A or AA 6023)   | anodized natural       |    |     |        |    |    |            |  | 4)    |
| Other metallic components                           | Brass (UNS C 38500)                     | -                      | -  | -   | 0.5    | 3  | -  | -          |  |       |
|   | Stainless steel (AISI 303 or 304)       | without treatment      |    |     |        |    |    |            |  |       |
| O-ring and gaskets                                  | Silicone MQ/MVQ or FPM/FKM (Viton®)     | -                      |    |     |        |    |    |            |  |       |

### Notes:

standards for surface treatment are as follows:

Chrome-plated: FS QQ-C-320B;

Nickel-plated: FS QQ-N-290A, or MIL-C-26074C;

Gold-plated: ISO 4523; and

Black chrome: MIL-C-14538C with a minimum of 10 µm of lacquer protection.

1) for FGG and ENG models of the 3B and 4B series

2) for the FGY and ENY models of the 2B, 3B and 4B series

3) AISI 416 steel is used with shells made of AISI 303 or 304

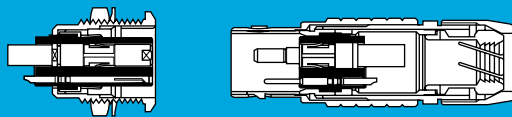
4) delivered with free and fixed sockets with aluminium alloy or stainless steel shell

## Shell electrical continuity:

(measured according to IEC 60512-2 test 2f)

- Test current: 1A

|        | Series |     |     |     |     |     |     |     |
|--------|--------|-----|-----|-----|-----|-----|-----|-----|
|        | 2B     | 3B  | 4B  | 5B  | 2K  | 3K  | 4K  | 5K  |
| R (mΩ) | 2.2    | 2.2 | 1.5 | 1.5 | 1.8 | 1.6 | 1.4 | 1.4 |

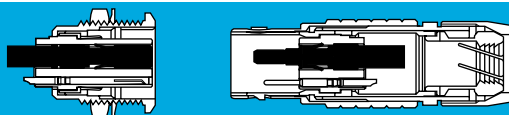


## Insulator

LEMO uses PEEK (Polyether Etherketone) for the insulator material. The performance of this thermoplastic material is enhanced by the addition of glass fibres in the resin to achieve very high mechanical strength, to

increase dielectric strength and to reduce water absorption rate. The above features of PEEK plus its excellent radiation resistance makes it ideal for most applications. (See technical characteristics on page 107)



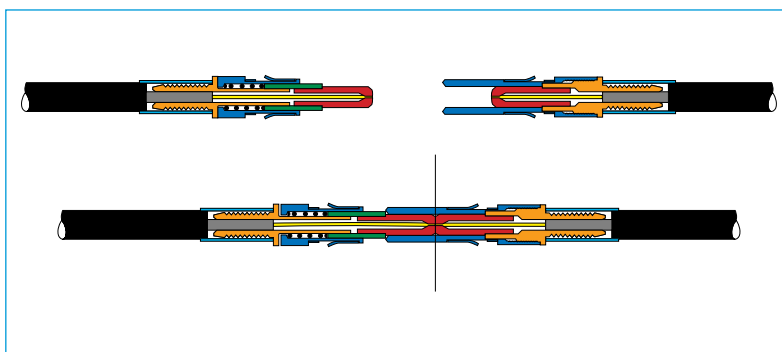


## Fibre Optic Contacts

In order to ensure the highest technical performance and to provide the optimal solution for a diversity of applications, LEMO has developed the 4 types of fibre optic contacts designated F1, F2, F3, and F4.

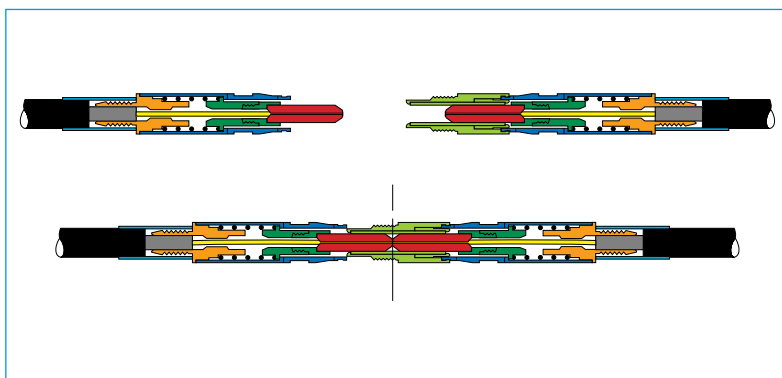
F2 and F4 contacts are designed with fully floating pre-domed ceramic ferrule. Such contacts are mainly designed to operate with single-mode and multi-mode fibres with small core dimensions.

F1 and F3 contacts are using floating metallic or ceramic ferrules. They are ideal for use with multi-mode, silica or plastic fibres with large core diameters.



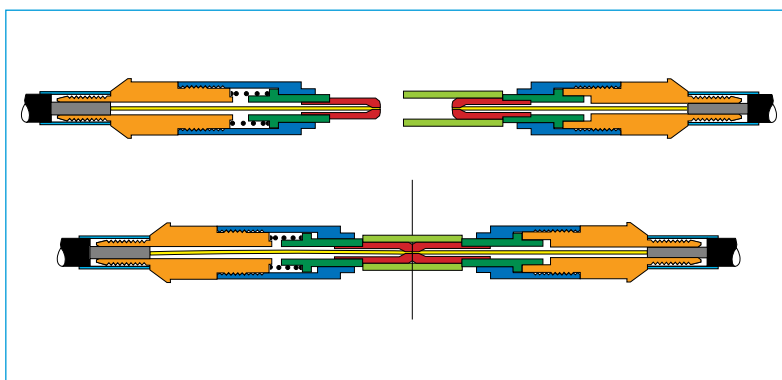
### Contact F1

- Contact body: part ensuring the alignment of the two ferrules and retention of the contact into the insulator, made of rust-proof alloy. Clips is made of Cu-Be
- Crimp holder: provided for cable fixing, made of rustproof alloy
- Ferrule made of rustproof alloy or ceramic depending on the fibre diameter
- Ferrule holder made of rustproof alloy
- Stainless steel spring to guarantee mating precision of the two ferrules lengthwise
- Crimp ferrule made of Nickel-plated copper for fixing the cable onto the crimp holder
- Fibre
- Buffer
- Cable



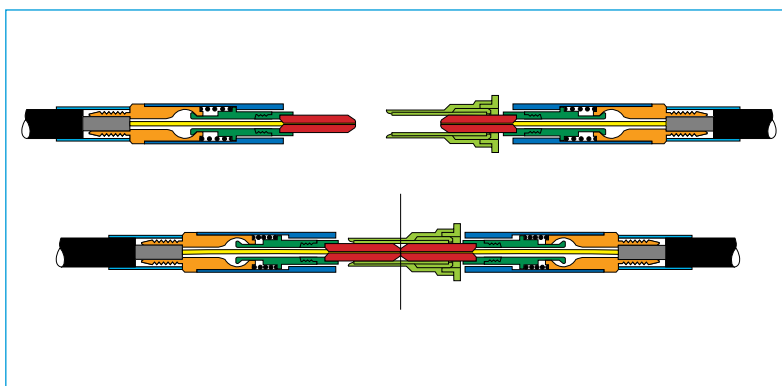
### Contact F2

- Contact body: part ensuring the retention of the contact into the insulator, made of PEEK
- Crimp holder: provided for cable fixing, made of Nickel-plated brass
- Ferrule made of ceramic
- Ferrule holder made of rustproof alloy
- Stainless steel spring to guarantee physical contact of the two ferrules with correct pressure
- Crimp ferrule made of Nickel-plated copper for fixing the cable onto the crimp holder
- Alignment tube to guarantee the alignment of the two ferrules when mated, made of ceramic and rustproof alloy
- Fibre
- Buffer
- Cable



### Contact F3

- Contact body: part ensuring the alignment of the contact into connector shell, made of Nickel-plated brass
- Crimp holder: provided for cable fixing, made of Nickel-plated brass
- Ferrule made of rustproof alloy or ceramic depending on the fibre diameter
- Ferrule holder made of rustproof alloy
- Stainless steel spring to guarantee mating precision of the two ferrules lengthwise
- Crimp ferrule made of Nickel-plated copper for fixing the cable onto the crimp holder
- Alignment tube to guarantee the alignment of the two ferrules when mated, made of rustproof alloy
- Fibre
- Buffer
- Cable



### Contact F4

- Contact body: part ensuring the alignment of the contact into connector shell, made of rustproof alloy
- Crimp holder: provided for cable fixing made of Nickel-plated brass
- Ferrule made of ceramic
- Ferrule holder made of rustproof alloy
- Stainless steel spring to guarantee physical contact of the two ferrules with correct pressure
- Crimp ferrule made of Nickel-plated copper for fixing the cable onto the crimp holder
- Alignment tube to guarantee the alignment of the two ferrules when mated (always fitted into the fixed or free socket) made of ceramic and rustproof alloy
- Fibre
- Buffer
- Cable

## Optical Performance for F1, F2, F3, and F4 Type Contacts

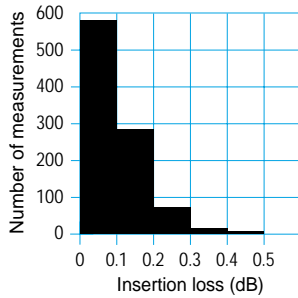
The optical performance for the fibre optic contacts relates to the insertion and return losses measured at the junction of the fibre to fibre interface. These losses are caused mainly by minute geometrical effects of the critical alignment components and deviations in the fibre core and cladding dimensions.

The insertion loss results for multi-mode and single-mode fibres are given whereas the return loss values are provided for single-mode fibres only.

Insertion and return losses are expressed in decibels (dB). The data shown in the diagrams below correspond to numerous matings using various batches of optical fibres and connectors.

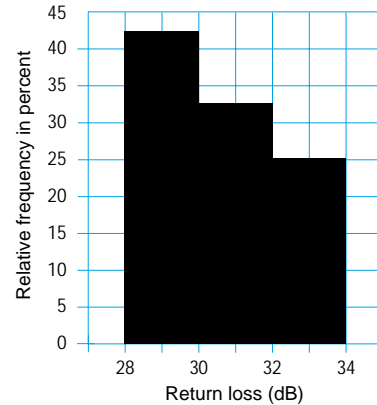
### Measurements with Single-mode Fibre for F2 and F4 Contacts.

Insertion loss



Mean = 0.10 dB  
 Tested at 1300 nm  
 Tested according to the standard IEC 61300-03-04,  
 Insertion Method B.  
 Fibre = 9/125  $\mu\text{m}$   
 Ferrule bore diameter = 125  $\mu\text{m}$

Return loss

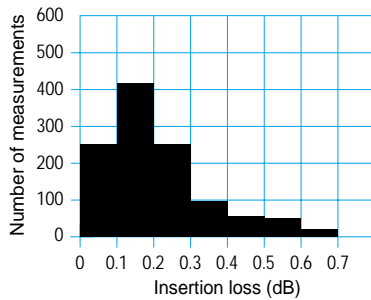


Mean = 30.42 dB  
 Tested at 1300 nm  
 Tested according to the standard IEC 61300-03-06,  
 Branching Device Method  
 Fibre = 9/125  $\mu\text{m}$ , Hand Polishing

**Note:** It is possible to obtain return losses better than 45 dB with UPC polishing techniques. Please consult LEMO for more detailed information.

### Measurements with Multi-mode Fibre for F2 and F4 Contacts

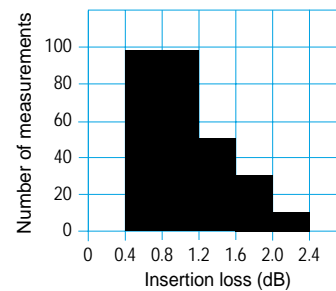
Insertion loss



Mean = 0.25 dB  
 Tested at 1300 nm  
 Tested according to the standard IEC 61300-03-04,  
 Insertion Method B.  
 Fibre = 50/125  $\mu\text{m}$   
 Ferrule bore diameter = 126  $\mu\text{m}$

### Measurements with Multi-mode Fibre for F1 and F3 Contacts

Insertion loss



Mean = 1.13 dB  
 Tested at 850 nm  
 Tested according to the standard IEC 61300-03-04,  
 Insertion Method B.  
 Fibre = 200/230  $\mu\text{m}$   
 Ferrule bore diameter = 235  $\mu\text{m}$



## Change in attenuation vs. environmental and mechanical conditions

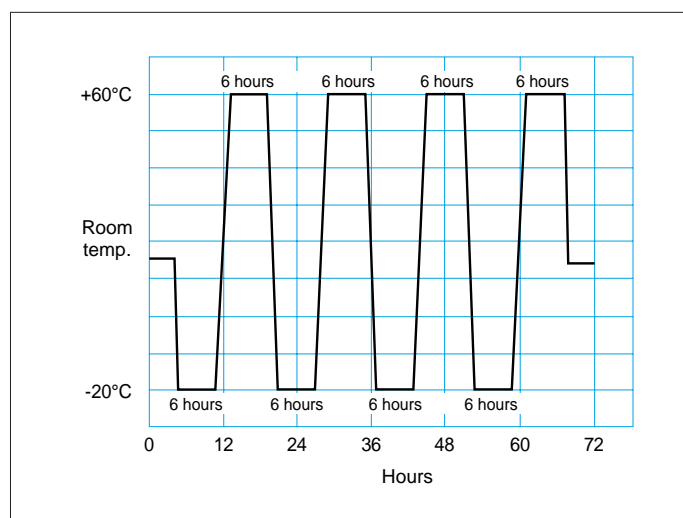
| Characteristic                     | Value                         | Standard        | Change in attenuation <sup>1)</sup> |                |
|------------------------------------|-------------------------------|-----------------|-------------------------------------|----------------|
|                                    |                               |                 | F2-F4 Contacts                      | F1-F3 Contacts |
| High temperature                   | + 80°C                        | IEC 61300-02-18 | < 0.20 dB                           | < 0.20 dB      |
| Low temperature                    | - 40°C                        | IEC 61300-02-17 | < 0.20 dB                           | < 0.20 dB      |
| Change of temperature (7 cycles)   | Diagram 1 below               | IEC 61300-02-22 | < 0.20 dB                           | < 0.20 dB      |
| Damp heat steady state             | Up to 95 % RH, 60°C           | IEC 61300-02-19 | < 0.20 dB                           | < 0.15 dB      |
| Mating cycles (contact F1; F2; F3) | 1000                          | IEC 61300-02-02 | < 0.15 dB                           | < 0.15 dB      |
| Mating cycles (contact F4)         | 500                           | IEC 61300-02-02 | < 0.15 dB                           | –              |
| Cable retention <sup>2)</sup>      | 100 N                         | IEC 61300-02-04 | < 0.10 dB                           | –              |
| Impact (Method A)                  | 1 m onto concrete floor       | IEC 61300-02-12 | < 0.10 dB                           | < 0.15 dB      |
| Shock (3 cycles in 2 directions)   | 100 g, 10-50 ms; 20 g, 6-9 ms | IEC 61300-02-09 | < 0.10 dB                           | < 0.20 dB      |
| Vibration (7 cycles)               | Diagram 2 below               | IEC 61300-02-01 | < 0.20 dB                           | < 0.25 dB      |

### Note:

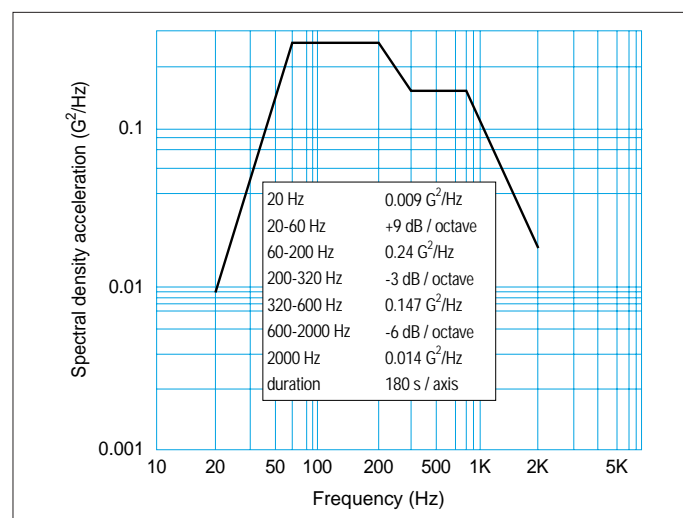
<sup>1)</sup> The insertion loss variations were measured during the entire environmental and mechanical tests respectively.

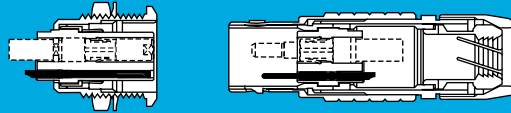
<sup>2)</sup> Value quoted is for 2.5 mm tight jacket cable. In practice the cable retention depends on many factors including the cable construction.

### Diagram 1: Temperature cycles



### Diagram 2: Vibration



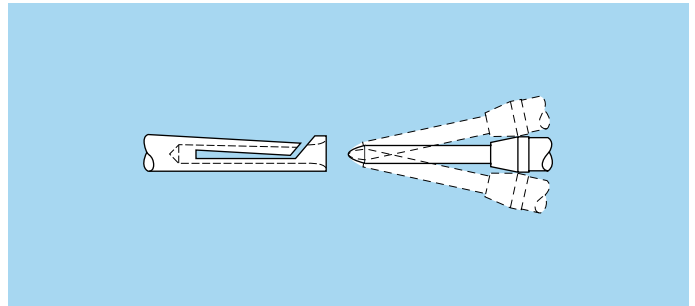


## Electrical Contact

### Technical description

The secure reliable electromechanical connection achieved with LEMO female cylindrical contacts is mainly due to two important design features:

1. *Prod proof entry* on the mating side which ensures perfect concentric mating even with carelessly handled connectors; and
2. *The pressure spring*, with good elasticity, maintains a constant even force on the male contact when mated. The leading edge of the pressure spring preserves the surface treatment (gold-plated) and prevents undue wear.



### Contact material and treatment

LEMO female contacts are made of bronze (UNS C 54400). This material is chosen because of its high modulus of elasticity, its excellent electrical conductivity and a high mechanical strength.

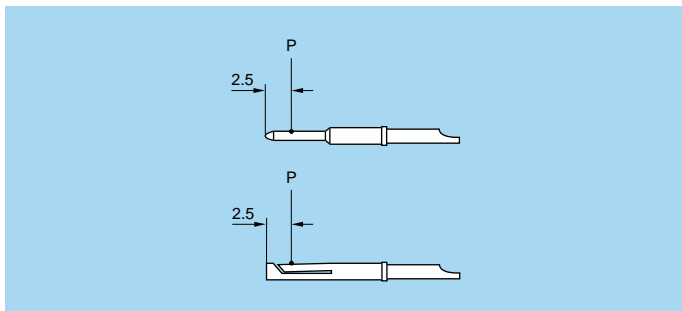


LEMO male solder contacts are made of brass (UNS C 38500). Male crimp contacts are made of brass (UNS C 34500) or annealed brass (UNS C 38500) with optimum hardness (HV) for crimping onto the wire.

| Type          | Material (standard)  | Surf. treatment (µm) |    |                  |
|---------------|----------------------|----------------------|----|------------------|
|               |                      | Cu                   | Ni | Au <sup>1)</sup> |
| Male crimp    | Brass (UNS C 34500)  | 0.5                  | 3  | 1.0              |
|               | Brass (UNS C 38500)  |                      |    |                  |
| Male solder   | Brass (UNS C 38500)  |                      |    |                  |
| Female crimp  | Bronze (UNS C 54400) | 0.5                  | 3  | 1.5              |
| Female solder |                      |                      |    |                  |
| Clips         | Cu-Be (FS QQ-C-530)  | -                    | -  | -                |
|               | Stainless steel      |                      |    |                  |

**Notes:** The standard surface treatment are as follows:  
 Nickel: FS QQ-N-290A or MIL-C-26074C; and Gold: ISO 4523.  
<sup>1)</sup> Minimum value.

### Thickness comparison between the outside and the inside of female contacts



| Contact<br>ø A<br>(mm) | Gold thickness |                 |               |
|------------------------|----------------|-----------------|---------------|
|                        | male<br>(µm)   | female          |               |
|                        |                | outside<br>(µm) | inside<br>(%) |
| 0.7                    | 1.0            | 1.5             | 70            |
| 0.9                    | 1.0            | 1.5             | 75            |
| 1.3                    | 1.0            | 1.5             | 75            |
| 1.6                    | 1.0            | 1.5             | 75            |
| 2.0                    | 1.0            | 1.5             | 75            |
| 4.0                    | 1.0            | 1.5             | 75            |

**Note:** P = inspection point

### Contact resistance with relation to the number of mating cycles

(measured according to IEC 60512-2 test 2a)

Maximum values measured after the mating cycles and the salt spray test according to IEC 60512-6 test 11f.

| ø A<br>(mm) | Contact resistance (mΩ) |                |                | ø A<br>(mm) | Contact resistance (mΩ) |                |                |
|-------------|-------------------------|----------------|----------------|-------------|-------------------------|----------------|----------------|
|             | 1000<br>cycles          | 3000<br>cycles | 5000<br>cycles |             | 1000<br>cycles          | 3000<br>cycles | 5000<br>cycles |
| 0.7         | 5.6                     | 5.7            | 6.1            | 1.6         | 2.6                     | 2.7            | 3.5            |
| 0.9         | 4.1                     | 4.2            | 4.8            | 2.0         | 2.9                     | 3.1            | 3.3            |
| 1.3         | 2.8                     | 2.9            | 3.6            | 4.0         | 1.6                     | 2.0            | 2.8            |

### Insulation resistance between the contacts and contact/shell

(measured according to IEC 60512-2 test 3a)

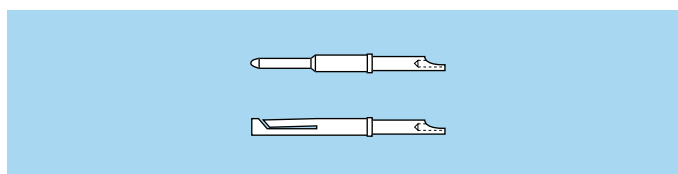
| Insulating material               | PEEK                 |
|-----------------------------------|----------------------|
| new                               | > 10 <sup>12</sup> Ω |
| after humidity test <sup>1)</sup> | > 10 <sup>10</sup> Ω |

**Note:** <sup>1)</sup> 21 days at 95% RH according to IEC 60068-2-3.

## Solder contacts

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

See page 9 for the range of cable dimensions that can be soldered.



## Crimp contacts

For multipole or hybrid connectors the standard four-identifier crimp method is used (MIL-C-22520F, class I, type 1).

The crimp method requires a controlled compression to obtain a symmetrical deformation of the conductor strand and of the contact material. The radial hole in the side of the contact makes it possible to check whether the conductor is correctly positioned within the contact. A good crimping is characterized by only slightly reduced conductor section and practically no gap.

For optimum crimping, the bronze or brass contacts are annealed to relieve internal stress and reduce material hardening during the crimping process.

Only the crimping zone is annealed with the help of an induction heating machine designed by the LEMO Research and Development Department.

## Advantages of crimping

- practical, quick contact fixing outside the insulator
- possible use at high temperature
- no risk of heating the insulator during the conductor-contact fixing
- high tensile strength

Crimp contacts are available in standard version for mounting maximum size conductors.

For some dimensions, these crimp contacts can be produced with reduced crimp barrels for mounting reduced size conductors. Consult the factory for information.

The range of cable dimensions that can be crimped into the contacts is indicated on the table on page 9.

## Coaxial contacts type C

The cable fixing is achieved with hexagonal crimping (MIL-C-22520F, type 2). This method guarantees a good electrical continuity of the shield which improves greatly the shielding efficiency of the cable/connector link. The back end of the crimp nut which receives the shield braid, is milled to ensure a good retention of the shield once crimped.

For the center contact, square form crimp method is used (MIL-C-22520F, type 2). The method requires a controlled compression to obtain a symmetrical deformation of the conductor strand and of the contact material.

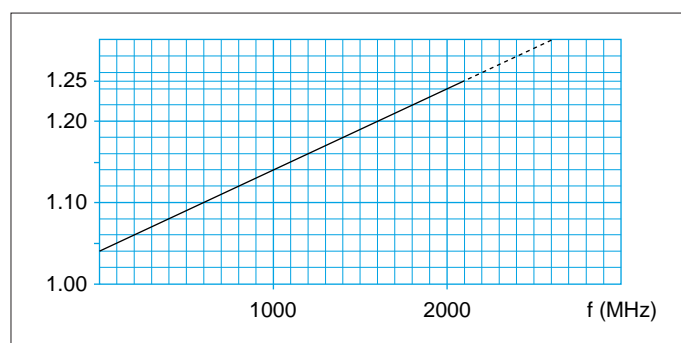
The radial hole in the side of the contact enables correct positioning of the conductor within the contact to be verified. A good crimping is characterized by a small conductor section reduction and by the quite closed free spaces.

The LEMO crimp contacts are factory annealed to relieve internal stresses, and reduce the risk of the material work hardening during the crimping process.

## Technical characteristics

| Characteristics                          | Unit       | Value       |
|--|------------|-------------|
| Impedance                                | $\Omega$   | 50          |
| Operating voltage at 50 Hz <sup>1)</sup> | kV rms     | 0.5         |
| Test voltage at 50 Hz                    | kV rms     | 1.6         |
| Rated current                            | A          | 2           |
| Insulation resistance                    | $\Omega$   | $>10^{12}$  |
| Contact resistance                       | m $\Omega$ | 5.8         |
| Shell to shell resistance                | m $\Omega$ | 3.7         |
| VSWR (f=GHz)                             |            | 1.04 + 0.1f |
| Max. working frequency                   | GHz        | 2.1         |

## Standing wave ratio



The range of coaxial cables that can be crimped into the contacts is indicated on the table on page 9.

### Test voltage

Test voltage ( $U_e$ ):  
(measured according to the IEC 60512-2 test 4a standard).

It corresponds to 75% of the mean breakdown voltage.  
Test voltage is applied at 500 V/s and the test duration is one minute.

This test has been carried out with a mated plug and receptacle, with power supply only on the plug end.

Operating voltage ( $U_s$ ):  
It is proposed according to the following ratio:  $U_s = \frac{U_e}{3}$

**Caution:**  
**For a number of applications, safety requirements for electrical appliances are more severe with regard to operating voltage.**

**In such cases operating voltage is defined according to creepage distance and air clearance between live parts.**

**Please consult the factory for the choice of a connector by indicating the safety standard to be met by the product.**

Voltage values are given in the table on insulator types for each series corresponding with values measured at sea level and are adapted to all applications up to an altitude of 2000 m.

In case a device is used at a higher altitude, air clearance between live parts has to be multiplied by the following coefficients:  
(Test voltage also has to be divided by this coefficient).

| altitude (m) | coefficient |
|--------------|-------------|
| 2000         | 1.00        |
| 3000         | 1.14        |
| 4000         | 1.29        |
| 5000         | 1.48        |

### Rated current

(measured according to IEC 60512-3 test 5a).

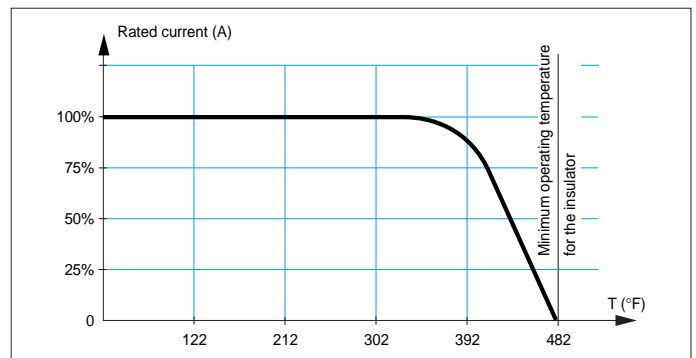
The specified rated current can be applied simultaneously to all the contacts, corresponding with an average temperature rise of 40°C of the connector.

The current values are indicated in the table of insulator types in each series. For use at higher temperatures, acceptable rated current will be lower.  
It tends towards zero as the material is used at the maximum operating temperature accepted for the insulator.

In most cases, the current depends on the conductor dimension.

**Caution: In general, connectors should not be unmated while live.**

For connectors with PEEK insulator, maximum admissible current will follow the curve below depending on the operating temperature T.





## Cable fixing

Cable fixing onto LEMO connectors is determined by the cable characteristics and the connector model. This is achieved either with a cable collet system, by epoxy into a cable adapter or by hexagonal crimping (MIL-C-22520F).

### Material and Treatment

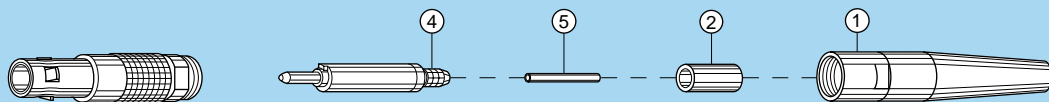
| Component             | Material (Standard)        | Surface Treatment (µm) |    |
|-----------------------|----------------------------|------------------------|----|
|                       |                            | Cu                     | Ni |
| Center piece          | Brass (UNS C 38500)        | 0.5                    | 3  |
| Collet                | Brass (UNS C 38500)        | 0.5                    | 3  |
| Crimp ferrule or ring | Copper (UNS C 18700)       | 0.5                    | 3  |
| Reducer               | Brass (UNS C 38500)        | 0.5                    | 3  |
| Reducing cone         | Brass (UNS C 38500)        | 0.5                    | 3  |
| Earthing cone         | Brass (UNS C 38500)        | 0.5                    | 3  |
| Metal washer          | Brass (UNS C 38500)        | 0.5                    | 3  |
| Cable adapter         | Brass (UNS C 38500)        | 0.5                    | 3  |
| Support tube          | Stainless steel (AISI 304) | -                      |    |
| Anchor                | Stainless steel (AISI 303) | -                      |    |
| Earthing body         | Brass (UNS C 38500)        | 0.5                    | 3  |
| Gasket or o-ring      | Silicone MQ/MVQ            | -                      |    |
|                       | FPM (Viton®)               |                        |    |

**Notes:**  
Standards for surface treatment are as follows: Nickel-plated: FS QQ-N-290A.

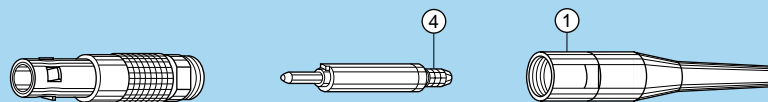
## Cable fixing for 00 and 0B series

In this series of single fibre connectors the fibre optic cables are held onto the contacts using the hexagonal crimping technique. The cable strength member (aramid yarn) is retained between the knurled section of the contact ④ and the crimp ferrule ②. The support tube ⑤ is used to protect the delicate optical fibre from the crimping load. Buffer coated fibres are retained into the fibre optic contact using an epoxy technique (Type T). The fibre optic contact is retained into the connector with the collet nut ①.

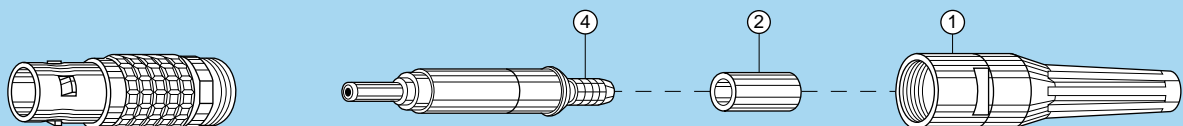
### 00 Series Type E fixing (crimp)



### 00 Series Type T fixing (epoxy)

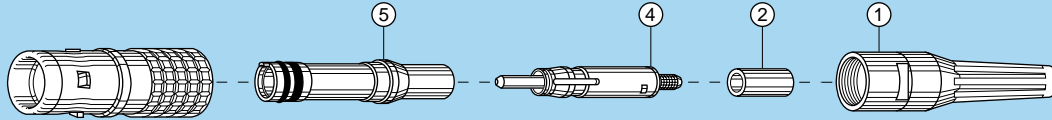


### 0B Series Type E fixing (crimp)



## Cable fixing for 0K series

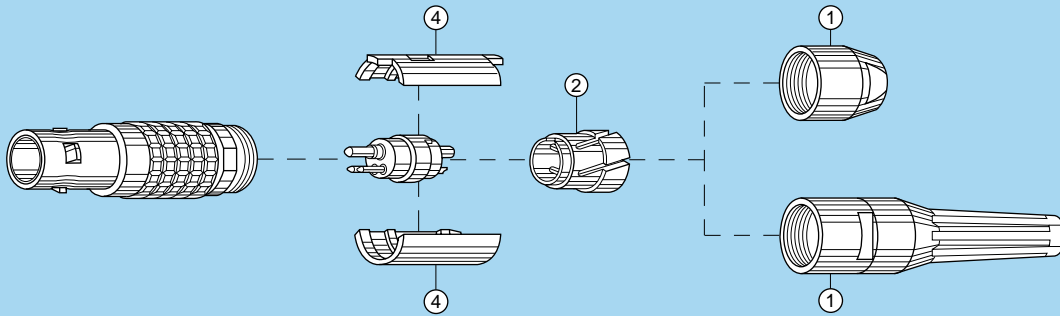
In this series of single fibre the fibre optic cable is held onto the contact using the hexagonal crimping technique. The cable strength member (aramid yarn) is retained between the knurled section of the contact ④ and the crimp ferrule ②. Then the contact is inserted into the adapter ⑤ and is retained because of its special shape. The adapter with its fibre optic contact is retained into the connector with the collet nut ①.



## Cable clamping for 2B-3B-4B and 5B series

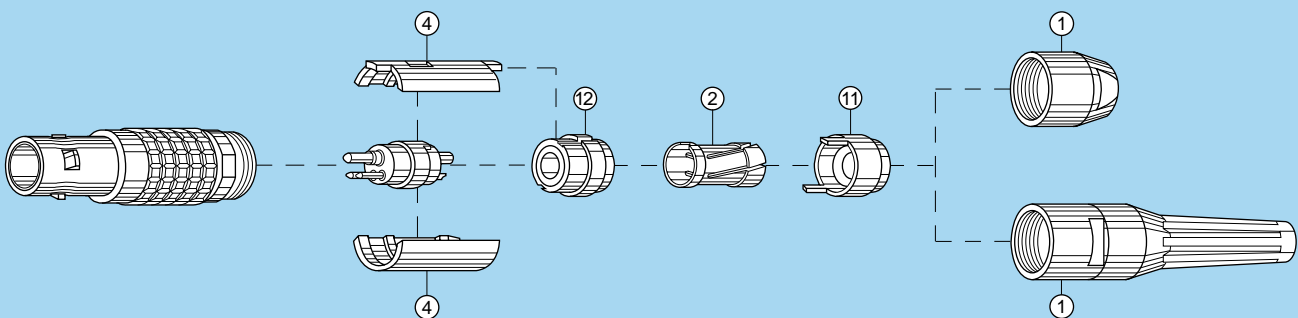
### Type D cable clamping

This is the standard cable clamping for 2B, 3B, 4B, and 5B series. Two split insert carriers ④ position the insulator into the connector and a collet ② which is compressed by the collet nut ① ensures a good grip onto the cable. When assembling the connector, the cable shield is clamped between the split insert carrier and the collet.



### Type M cable clamping

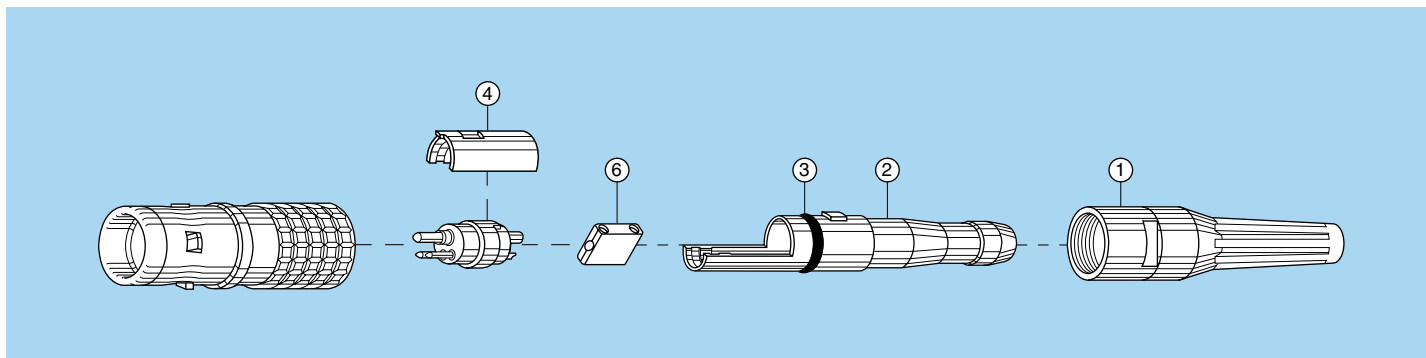
This clamping system is adapted to cables with a diameter smaller than the smallest diameter specified for each series. It includes a reducer ⑫, a collet of a smaller series ② and a reducing cone ⑪. These parts have the same function as the D type collet.



## Cable fixing for 2K-3K-4K and 5K series

### Type T clamping

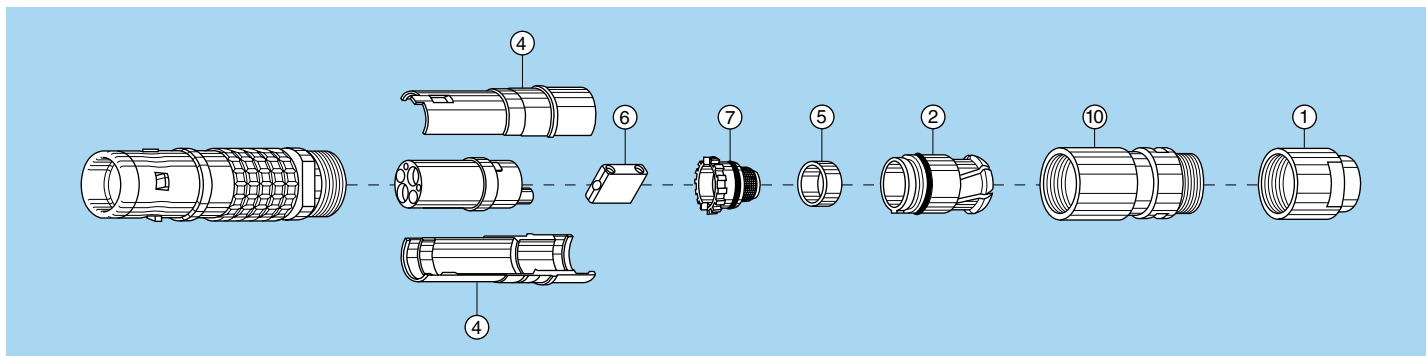
In the watertight series the clamping system is made of a cable adapter ② which is fixed on the cable by epoxy. This solution offers superior captivation of the cable strength member (aramid yarn) and is fully watertight. The adapter is completed by a sealing o-ring ③. The insulator is positioned into the cable adapter and is correctly oriented by the split insert carrier ④. The system is retained into the connector by the collet nut with its bend relief. For some specific cables (3K.93C series) an anchor ⑥ is installed to allow retention of the cable center steel strength member. For screened cable, the shield can be soldered to the cable adapter front section.



## Cable clamping for the model FUW and PUW of the 3K.93C series

### Type C clamping

For these 2 models the clamping is made of a collet ② located into the extender ⑩ and compressed by the collet nut ① to ensure a good grip onto the cable. A gasket, inside of the collet, provides sealing onto cable jacket. Additioned sealing is made with epoxy. To guarantee enhanced screen efficiency the shield of the cable is retained between the knurled section of the earthing body ⑦ and the crimp ring ⑤. The insulator is positioned into the two insert carrier ④. The anchor ⑥ is installed to allow retention of the cable center steel strength member.



### Maximum metal collet nut tightening torque

|             | Series |     |     |     |    |    |    |    |    |    |    |
|-------------|--------|-----|-----|-----|----|----|----|----|----|----|----|
|             | 00     | 0B  | 0K  | 2B  | 3B | 4B | 5B | 2K | 3K | 4K | 5K |
| Torque (Nm) | 0.25   | 0.5 | 0.7 | 2.5 | 4  | 7  | 10 | 2  | 3  | 5  | 8  |

### Maximum plastic collet nut tightening torque <sup>1)</sup>

|             | Series |      |      |
|-------------|--------|------|------|
|             | 2B     | 3B   | 4B   |
| Torque (Nm) | 0.50   | 1.00 | 1.50 |

**Note:** <sup>1)</sup> For applications subject to strong vibration, we recommend fixing the collet nut with epoxy resin.

## Preferred fibre optic cable types

The preferred and very common cable construction for use with LEMO connectors are shown below.

- Simplex semi-tight jacket cables between 2 and 3 mm in diameter and have straight lay Kevlar® reinforcement (see fig. 1).
- 900 micron plastic buffered fibres (see fig. 2).
- Multiway «break-out» cables which have additional overall straight lay Kevlar® to provide cable pull resistance (see fig. 3).
- Multiway «premise» cables with 900 micron plastic buffered fibres and additional overall straight lay Kevlar® to provide cable pull resistance (see fig. 4).

Fig. 1



Fig. 2



Fig. 3

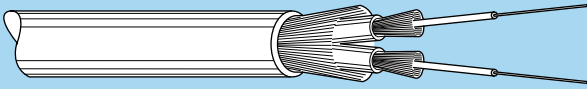
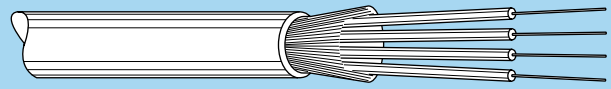


Fig. 4



For other cable construction it is recommended that you contact us directly for advice on their suitability for termination onto LEMO connectors.









Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.