

HERMAPHRODITIC PUSH-PULL CONNECTORS

H SERIES



LEMO

Precision modular connectors to suit your application

Since its creation in Switzerland in 1946 the LEMO Group has been recognized as a global leader of circular Push-Pull connectors and connector solutions. Today LEMO and its affiliated companies, REDEL and COELVER, are active in more than 80 countries with the help of over 40 subsidiaries and distributors.

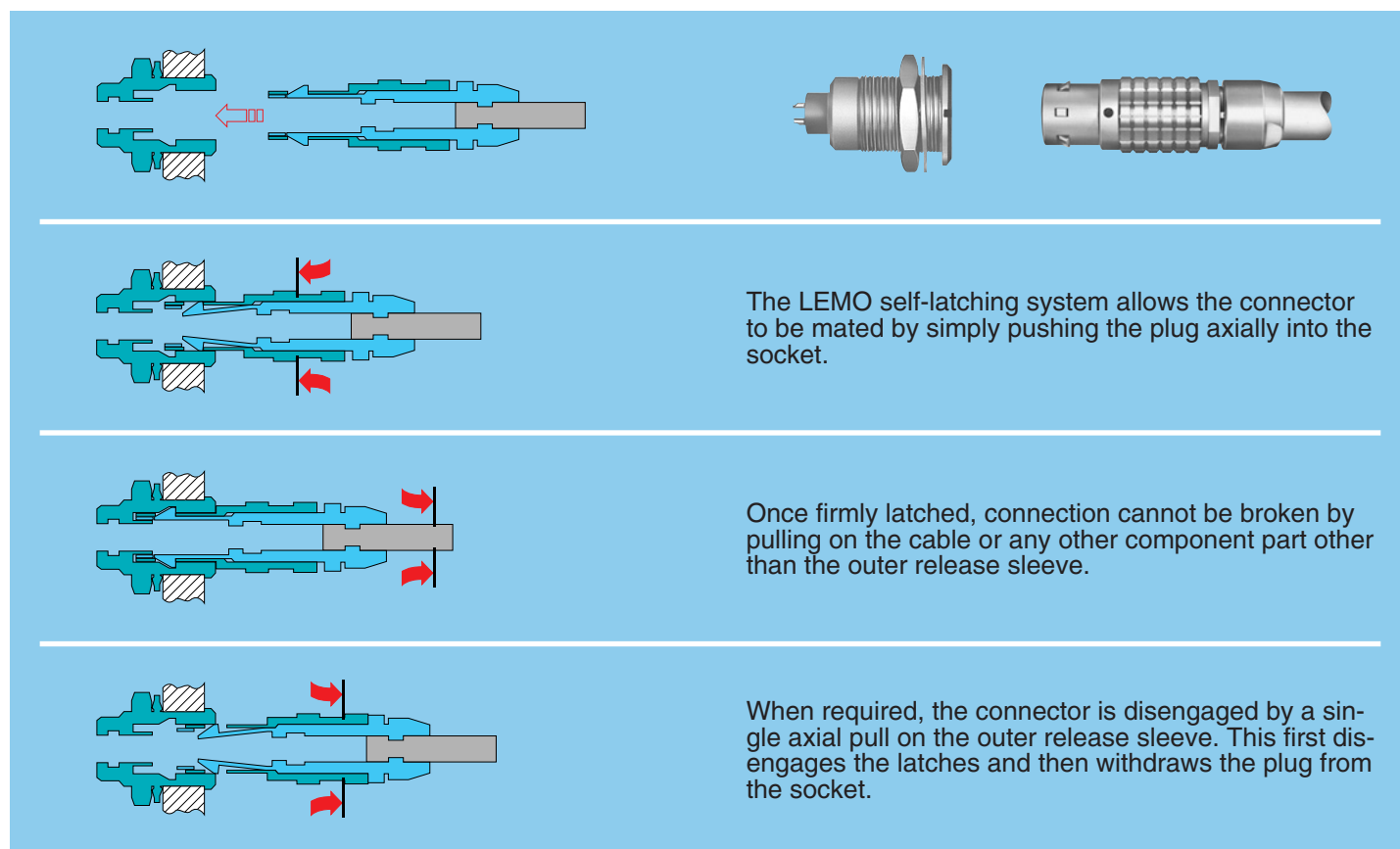
Over 50'000 connectors

The modular design of the LEMO range provides over 50'000 connectors from miniature \varnothing 3 mm to \varnothing 50 mm, capable of handling cable diameters up to 30 mm and for up to 106 contacts.

This vast portfolio enables you to select the ideal connector configuration to suit almost any specific requirement in most markets, including medical devices, test and measurement instruments, machinery, audio video broadcast, telecommunications and military.

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.



UL Recognition

LEMO connectors are recognized by the Underwriters Laboratories (UL). The approval of the complete system (LEMO connector, cable and your equipment) will be easier because LEMO connectors are approved.

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 electromechanical components, such as connectors.**

RoHS

LEMO connectors are in compliance with the RoHS directives (2002/95/EC) of the European Parliament. This directive specifies the restrictions of the use of hazardous substances in electrical and electronic equipment marketed in Europe. LEMO guarantees that its connectors are free of mercury, cadmium, lead, hexavalent chromium and polybromide biphenyl (PBB) or polybromide diphenyl ether (PBDE).

SH-MH Series

The LEMO Hermaphroditic series provide a rugged high performance patented push-pull hermaphroditic interconnection system. These «genderless» connectors combine LEMO's well proven push-pull latching technology and the use of our standard high quality optical and electrical contacts.

The main features of these series are as follow:

- security of a new patented push-pull hermaphroditic self-latching system
- 2 shell sizes, SH and MH series
- compact unsealed version for general purpose applications
- rugged waterproof (IP 68) version for all outdoor applications
- a choice of multifibre or electrical contacts configurations
- lightweight design with shell in anthracite nickel-plated aluminium alloy
- low loss ceramic PC technology in multimode and singlemode
- gold plated electrical contacts.

Each series consists of plug and socket which will accept cable diameter ranging from 3.6 mm to 10 mm. Initial program is giving solutions with 2, 4 or 6 fibre optic channel and 6 or 12 electrical contacts.

Standard version

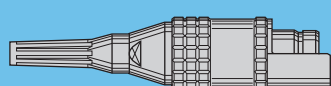
(IP 50 when mated)

Straight plug

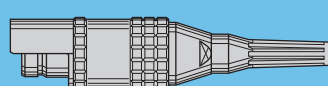
Straight plug

Fixed plug

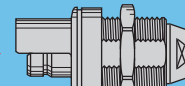
Fixed socket



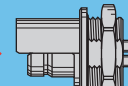
FHA



FHA



FWA



EHA

Sealed version

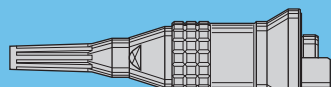
(IP 68 when mated)

Straight plug

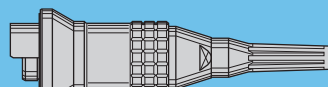
Straight plug

Fixed plug

Fixed socket



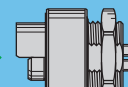
FHE



FHE

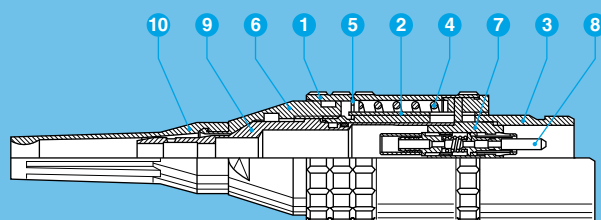


FWE

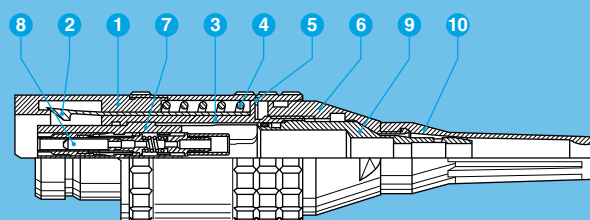


EHE

Part Section Showing Internal Components



- 1 shell
- 2 latch sleeve
- 3 inner shell
- 4 spring
- 5 circlip



- 6 collet nut
- 7 insulator
- 8 optical contact
- 9 cable adapter
- 10 bend relief

Technical Characteristics

Mechanical and Environmental

| Characteristic | Value | Standard |
|----------------------------|-------------------------------|----------------------|
| Mating durability | 2000 cycles | IEC 60512-5 test 9a |
| Temperature range | -55°C to +125°C ¹⁾ | |
| Vibration resistance | 10-2000 Hz, 15g | IEC 60512-4 test 6d |
| Shock resistance | 100 g, 6 ms | IEC 60512-4 test 6c |
| Protection index FHE/FHE | IP 68 | IEC 60529 |
| Water immersion FHE/FHE | up to 2 meters depth | |
| Protection index FHA/FHA | IP 50 | IEC 60529 |
| Average latching retention | SH series plug/plug | 600 N |
| | SH series plug/socket | 300 N |
| | MH series plug/plug | 800 N |
| | MH series plug/socket | 400 N |
| | | IEC 60512-8 test 15f |

Electrical

| Characteristic | Value | Standard |
|-----------------------|----------------------|----------------------|
| Insulation resistance | > 10 ¹² Ω | IEC 60512-2 test 3a |
| Contact resistance | < 3.6 mΩ | IEC 60512-2 test 11f |
| Shell resistance | < 10 mΩ | IEC 60512-2 test 2f |

Notes: 1) with f.o. contacts temperature range -40°C/+80°C

Optical

| Characteristic | Value | Standard | Method |
|--|---------|-----------------|----------------|
| Average insertion loss fibre 9/125 µm | 0.18 dB | IEC 61300-03-34 | Method 2 |
| Average insertion loss fibre 50/125 µm | 0.25 dB | IEC 61300-03-34 | Method 2 |
| Return loss fibre 9/125 µm (UPC) | ≥45 dB | IEC 61300-03-06 | Coupler Method |
| Return loss fibre 9/125 µm (Hand polish) | >25 dB | IEC 61300-03-06 | Coupler Method |

Materials and Treatments

| Component | Material (Standard) | Surface treat (µm) | | |
|---------------------------------------|------------------------------|--------------------|----|----|
| | | Cu | Ni | Au |
| Outer shell, collet nut ¹⁾ | Alum. (AA 6262A or AA 6023) | – | 5 | – |
| Latch sleeve | Special brass | 0.5 | 3 | – |
| Other metallic parts | Alum. (AA 6262A or AA 6023) | – | 5 | – |
| Spring | Stainless steel | without treatment | | |
| Insulator | PEEK | without treatment | | |
| Electrical contacts | Brass (male)/Bronze (female) | 0.5 | 3 | 1 |
| O-ring and gaskets | Silicone MQ / MVQ | without treatment | | |

Notes: 1) anthracite colour

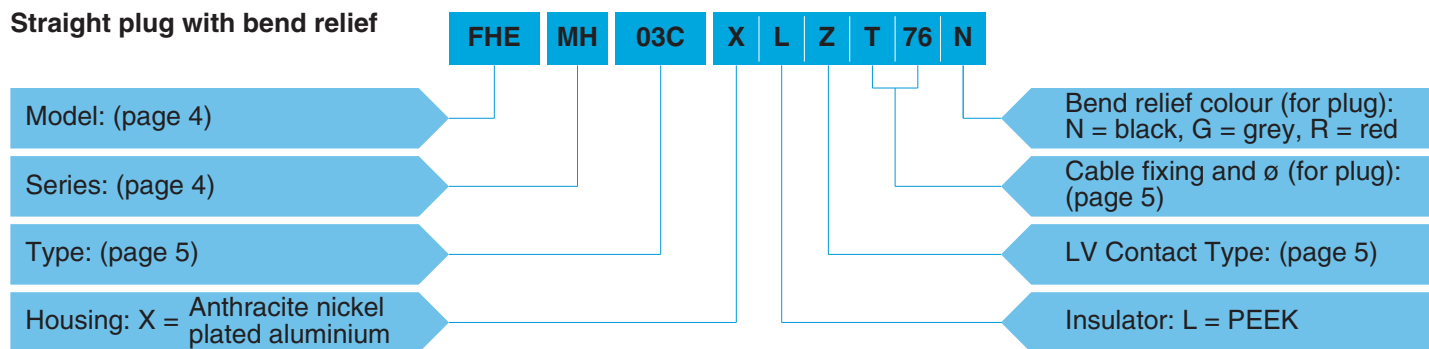
Part Number Example

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

– Plugs and fixed sockets; fibre optic contacts.

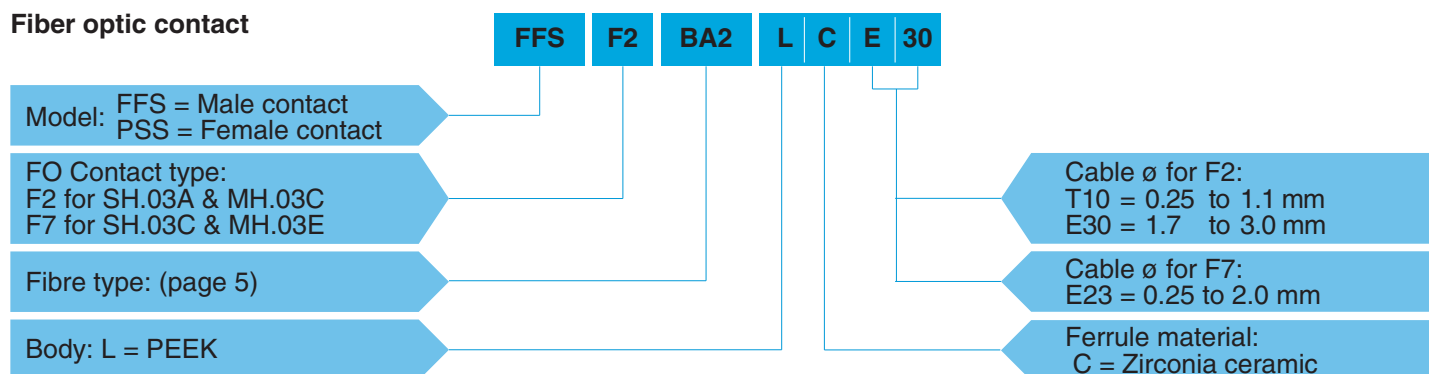
Note: The fibre optic contacts must be ordered separately. An equal number of contacts must be ordered (eg. for MH.03C; 2 x FFS.F2 and 2 x PSS.F2).

Straight plug with bend relief



FHE.MH.03C.XLZT76N = Straight plug (IP 68 when mated), MH series, multifibre to accept 4 F2 type fibre optic contacts, anthracite nickel plated aluminium shell, PEEK insulator, with cable fixing type T for 7.5 to 6.6 mm cable and black bend relief.

Fiber optic contact



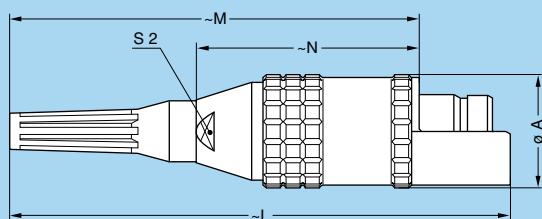
FFS.F2.BA2.LCE30 = Male F2 type fibre optic contact, ferrule bore diameter of 125 µm, PEEK body, Zirconia ceramic ferrule, crimp cable fixing, for tight jacket cable with a diameter between 1.7 to 3.0 mm.



Models - Series



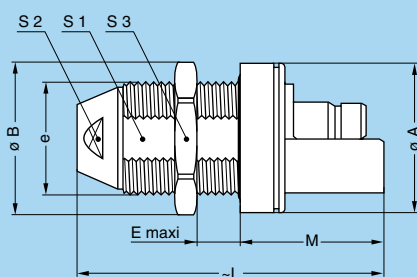
FHA Straight plug with cable adapter or collet and nut with bend relief



| Reference | | Dimensions (mm) | | | | |
|-----------|--------|-----------------|-------|------|------|----|
| Model | Series | A | L | M | N | S2 |
| FHA | SH | 21.8 | 98.4 | 82.2 | 46.2 | 13 |
| FHA | MH | 25.4 | 109.3 | 89.1 | 47.1 | 15 |



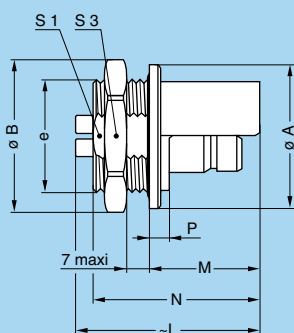
FWA Fixed plug, nut fixing



| Reference | | Dimensions (mm) | | | | | | | | |
|-----------|--------|-----------------|------|-------|----|------|------|------|----|----|
| Model | Series | A | B | e | E | L | M | S1 | S2 | S3 |
| FWA | SH | 28.5 | 28.5 | M22x1 | 14 | 55.0 | 26.5 | 20.5 | 14 | 25 |
| FWA | MH | 34.0 | 34.0 | M25x1 | 17 | 64.5 | 31.5 | 23.5 | 17 | 30 |

Panel cut-outs

| Series | Dim. (mm) | |
|--------|-----------|------|
| | ø A | B |
| SH | 22.2 | 20.6 |
| MH | 25.2 | 23.6 |

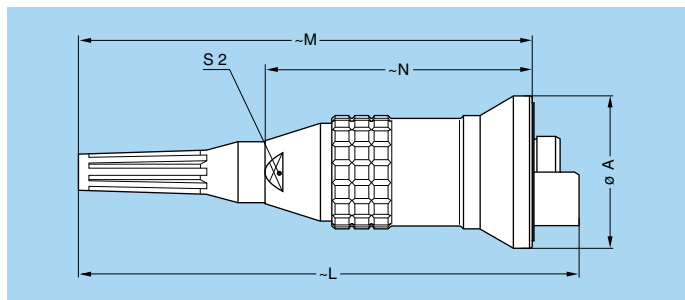


EHA Fixed socket, nut fixing

| Reference | | Dimensions (mm) | | | | | | | | | |
|-----------|--------|-----------------|------|-------|-------|--------|------|------|-----|------|----|
| Model | Series | A | B | e | L | | M | N | P | S1 | S3 |
| | | | | | optic | elect. | | | | | |
| EHA | SH | 27 | 28.5 | M22x1 | 38.8 | 30.5 | 19.5 | 30.5 | 3.3 | 20.5 | 25 |
| EHA | MH | 32 | 34.0 | M25x1 | 40.8 | 37.0 | 24.5 | 37.0 | 4.3 | 23.5 | 30 |

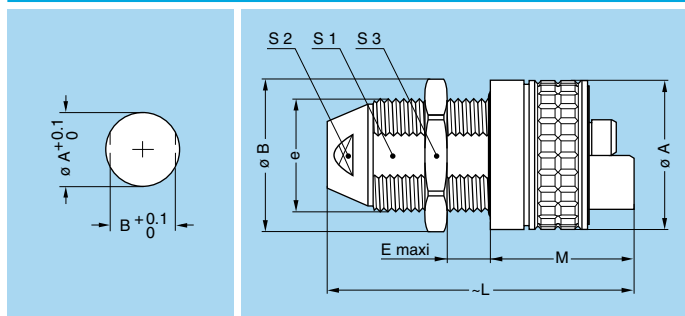
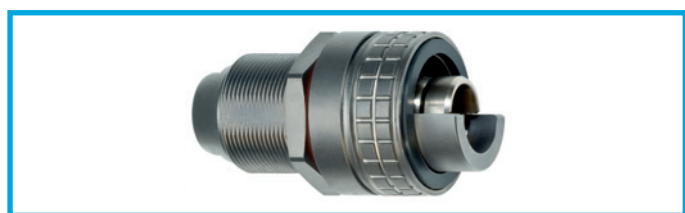
Panel cut-outs

| Series | Dim. (mm) | |
|--------|-----------|------|
| | ø A | B |
| SH | 22.2 | 20.6 |
| MH | 25.2 | 23.6 |



FHE Straight plug with cable adapter or collet and nut with bend relief (IP 68 when mated)

| Reference | | Dimensions (mm) | | | | |
|-----------|--------|-----------------|-------|------|------|----|
| Model | Series | A | L | M | N | S2 |
| FHE | SH | 28.5 | 98.4 | 90.0 | 54.0 | 13 |
| FHE | MH | 34.0 | 109.3 | 98.9 | 56.9 | 15 |

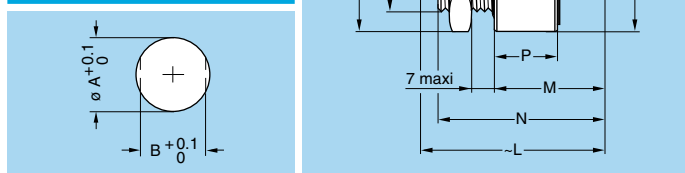
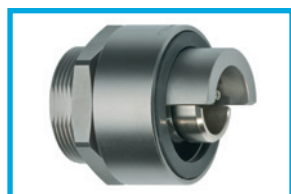


FWE Fixed plug, nut fixing (IP 68 when mated)

| Reference | | Dimensions (mm) | | | | | | | | |
|-----------|--------|-----------------|------|-------|----|------|------|------|----|----|
| Model | Series | A | B | e | E | L | M | S1 | S2 | S3 |
| FWE | SH | 28.5 | 28.5 | M22x1 | 14 | 55.0 | 26.5 | 20.5 | 14 | 25 |
| FWE | MH | 34.0 | 34.0 | M25x1 | 17 | 64.5 | 31.5 | 23.5 | 17 | 30 |

Panel cut-outs

| Series | Dim. (mm) | |
|--------|-----------|------|
| | Ø A | B |
| SH | 22.2 | 20.6 |
| MH | 25.2 | 23.6 |



EHE Fixed socket, nut fixing (IP 68 when mated)

| Reference | | Dimensions (mm) | | | | | | | | | |
|-----------|--------|-----------------|------|-------|-------|--------|------|------|------|------|----|
| Model | Series | A | B | e | L | | M | N | P | S1 | S3 |
| | | | | | optic | elect. | | | | | |
| EHE | SH | 28.5 | 28.5 | M22x1 | 38.8 | 30.5 | 19.5 | 30.5 | 11.1 | 20.5 | 25 |
| EHE | MH | 34.0 | 34.0 | M25x1 | 40.8 | 37.0 | 24.5 | 37.0 | 14.1 | 23.5 | 30 |

Panel cut-outs

| Series | Dim. (mm) | |
|--------|-----------|------|
| | Ø A | B |
| SH | 22.2 | 20.6 |
| MH | 25.2 | 23.6 |

Insert configuration

| | | | Reference | FO contact | | Low Voltage contact | | | | | |
|----|--|--|-----------|------------|-------|---------------------|----------|--------------|-------|-----------------------|----------------------|
| | | | | F2 Nb | F7 Nb | Contact Nb | ø A (mm) | Contact type | | Test voltage (kV rms) | Test voltage (kV dc) |
| | | | | | | | | AWG max | AWG | | |
| | | | | Solder | Crimp | | | | | | |
| SH | | | 03A | 2 | - | - | - | - | - | - | - |
| | | | 03C | - | 4 | - | - | - | - | - | - |
| | | | 306 | - | - | 6 | 1.3 | 20 | 18-20 | 1.5 | 2.1 |
| MH | | | 03C | 4 | - | - | - | - | - | - | - |
| | | | 03E | - | 6 | - | - | - | - | - | - |
| | | | 312 | - | - | 12 | 1.3 | 20 | 18-20 | 1.0 | 1.5 |

Note: Other arrangement, optical, electrical or mixed optical-electrical can be made available upon request.

WARNING: There is no contact number on the insulator. When wiring one hermaphroditic connector, one should terminate each contact to its mirror image number of the other connector.

Electrical contact

| Reference | Contact type | Reference | Contact type |
|-----------|-------------------|-----------|------------------|
| A | solder for plug | M | crimp for socket |
| C | crimp for plug | Z | no contact |
| L | solder for socket | | |

Fibre type

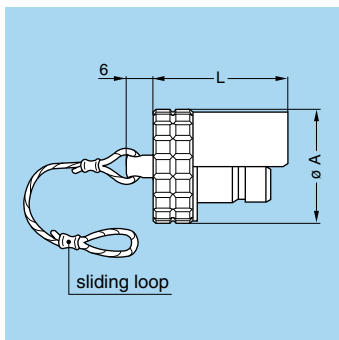
| Reference for F2 contact | Reference for F7 contact | ø Core/Cladding (µm) | Ferrule hole ø (µm) | Note |
|--------------------------|--------------------------|----------------------|---------------------|------|
| BA2 | 125 | 9/125 | 125 | ● |
| BB2 | 126 | 50/125 | 126 | ● |
| BD2 | 128 | 62.5/125 | 128 | ○ |

● First choice alternative ○ Special order alternative

Cable diameter

| | Adapter «T» for fibre optic connectors | | | Collet «C» for electrical connectors | | |
|----|--|---------|-----|--------------------------------------|---------|-----|
| | Ref. | Cable ø | | Ref. | Cable ø | |
| | | max | min | | max | min |
| SH | T46 | 4.5 | 3.6 | C52 | 5.0 | 4.1 |
| | T56 | 5.5 | 4.6 | C62 | 6.0 | 5.1 |
| | T66 | 6.5 | 5.6 | C72 | 7.0 | 6.1 |
| | T76 | 7.5 | 6.6 | C82 | 8.0 | 7.1 |
| MH | T56 | 5.5 | 4.6 | C62 | 6.0 | 5.1 |
| | T66 | 6.5 | 5.6 | C72 | 7.0 | 6.1 |
| | T76 | 7.5 | 6.6 | C82 | 8.0 | 7.1 |
| | T86 | 8.5 | 7.6 | C92 | 9.0 | 8.1 |
| | T91 | 9.0 | 8.6 | C10 | 10.0 | 9.1 |

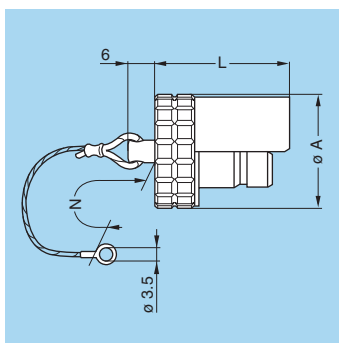
Accessories



BFA Cap (for FHA and FWA plugs)

| Part number | Dim. (mm) | |
|----------------|-----------|------|
| | A | L |
| BFA.SH.100.XAZ | 21.8 | 23.5 |
| BFA.MH.100.XAZ | 25.4 | 30.0 |

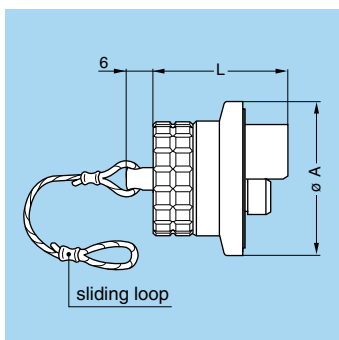
- Body material: Anthracite nickel plated aluminium alloy
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- Maximum operating temperature: 125°C
- Watertightness: IP50 according to IEC 60529



BHA Cap (for FHA and FWA plugs)

| Part number | Dim. (mm) | | |
|----------------|-----------|------|-----|
| | A | L | N |
| BHA.SH.100.XAZ | 21.8 | 23.5 | 120 |
| BHA.MH.100.XAZ | 25.4 | 30.0 | 120 |

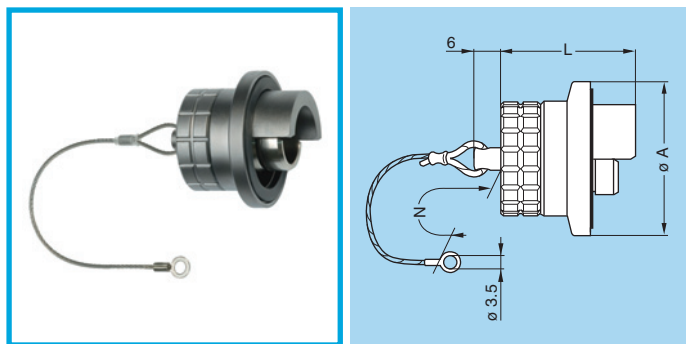
- Body material: Anthracite nickel plated aluminium alloy
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- Maximum operating temperature: 125°C
- Watertightness: IP50 according to IEC 60529



BFE Cap (for FHE and FWE plugs)

| Part number | Dim. (mm) | |
|----------------|-----------|------|
| | A | L |
| BFE.SH.100.XAS | 28.5 | 23.5 |
| BFE.MH.100.XAS | 34.0 | 30.0 |

- Body material: Anthracite nickel plated aluminium alloy
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber
- Maximum operating temperature: 125°C
- Watertightness: IP68 according to IEC 60529



BHE Cap (for FHE and FWE plugs)

| Part number | Dim. (mm) | | |
|----------------|-----------|------|-----|
| | A | L | N |
| BHE.SH.100.XAS | 28.5 | 23.5 | 120 |
| BHE.MH.100.XAS | 34.0 | 30.0 | 120 |

- Body material: Anthracite nickel plated aluminium alloy
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber
- Maximum operating temperature: 125°C
- Watertightness: IP68 according to IEC 60529

Tooling

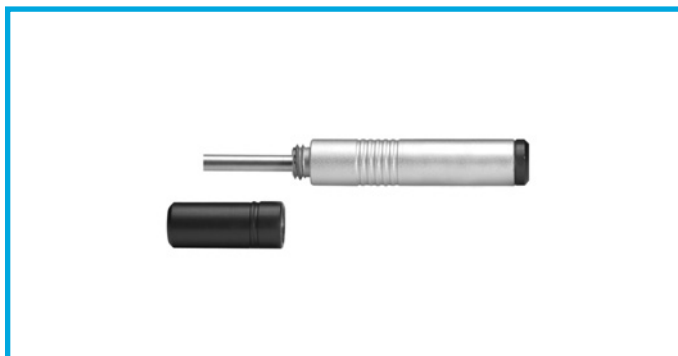
WST.KI.125.34 Cleaning kit for F2 fibre optic contact



Description

Fibre optic cleaning kit of 2 cotton buds, 1 dry and 1 being soaked in IPA (Isopropyl Alcohol) used for cleaning the fibre optic contacts.

DCC.91.312.5LA Extraction/Installation tool for F2 fibre optic contact



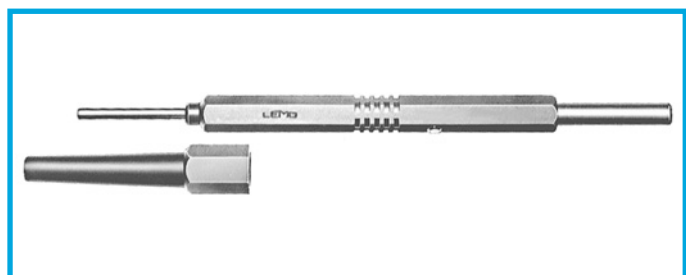
DCS Contact alignment device tool for F2 or F7 fibre optic contact

Description

Simple tool with two threaded end for installation/extraction of the F7 contact alignment device.

| Part number | Contact type |
|-----------------------------|--------------|
| DCS.F2.035.PN | F2 |
| DCS.F7.035.PN ¹⁾ | F7 |

Note: ¹⁾ Included in the LEMO F7 workstation.



DCC Extractor for F7 fibre optic contact

Description

Manual tool for the extraction of the F7 contact.

| Part number |
|------------------------------|
| DCC.91.307.5LA ¹⁾ |

Note: ¹⁾ Included in the LEMO F7 workstation.

Product safety notice

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY AND CONSULT ALL RELEVANT NATIONAL AND INTERNATIONAL SAFETY REGULATIONS FOR YOUR APPLICATION. IMPROPER HANDLING, CABLE ASSEMBLY, OR WRONG USE OF CONNECTORS CAN RESULT IN HAZARDOUS SITUATIONS.

1. SHOCK AND FIRE HAZARD

Incorrect wiring, the use of damaged components, presence of foreign objects (such as metal debris), and / or residue (such as cleaning fluids), can result in short circuits, overheating, and / or risk of electric shock. Mated components should never be disconnected while live as this may result in an exposed electric arc and local overheating, resulting in possible damage to components.

2. HANDLING

Connectors and their components should be visually inspected for damage prior to installation and assembly. Suspect components should be rejected or returned to the factory for verification. Connector assembly and installation should only be carried out by properly trained personnel. Proper tools must be used during installation and / or assembly in order to obtain safe and reliable performance.

3. USE

Connectors with exposed contacts should never be live (or on the current supply side of a circuit). Under general conditions voltages above 30 VAC and 42 VDC are considered hazardous and proper measures should be taken to eliminate all risk of transmission of such voltages to any exposed metal part of the connector.

4. TEST AND OPERATING VOLTAGES

The maximum admissible operating voltage depends upon the national or international standards in force for the application in question. Air and creepage distances impact the operating voltage; reference values are indicated in the catalog however these may be influenced by PC board design and / or wiring harnesses. The test voltage indicated in the catalog is 75% of the mean breakdown voltage; the test is applied at 500 V/s and the test duration is 1 minute.

5. CE MARKING

CE Marking is applied to a complete product or device, and implies that the device complies with one or several European safety directives. CE Marking can not be applied to electromechanical components such as connectors.

6. PRODUCT IMPROVEMENTS

The LEMO Group reserves the right to modify and improve to our products or specifications without providing prior notification.

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