







# Precision modular connectors to suit your application

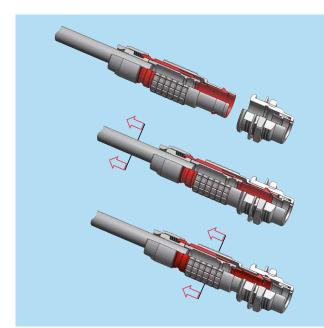
Since its creation in Switzerland in 1946 the LEMO Group has been recognized as a global leader of circular Push-Pull connectors and connector solutions. Today LEMO and its affiliated companies, REDEL and COELVER, are active in more than 80 countries with the help of over 40 subsidiaries and distributors.

### **Over 75000 connectors**

The modular design of the LEMO range provides over 75000 connectors from miniature Ø 3 mm to Ø 50 mm, capable of handling cable diameters up to 30 mm and for up to 114 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.



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

# 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 recognized.

# CE marking C€

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 connector specifications conforms the requirements of the RoHS directive (2011/65/EU) of the European Parliament and the latest amendments. This directive specifies the restrictions of the use of hazardous substances in electrical and electronic equipment marketed in Europe.

# Product safety notice & disclaimers

Please read and follow all instructions specified on the last page or on our <u>website</u> carefully and consult all relevent national and international safety regulations for your application. Improper handling, cable assembly, or wrong use of connectors can result in hazardous situations.

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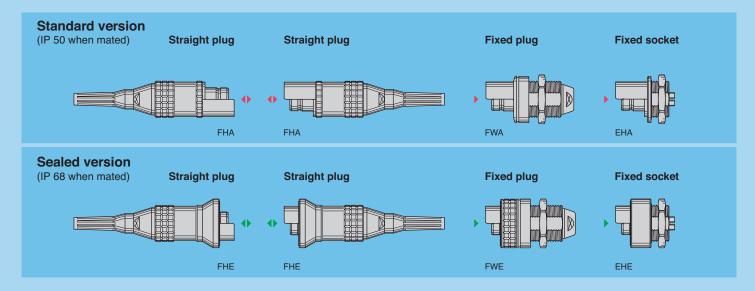
# **SH-MH Series**

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.

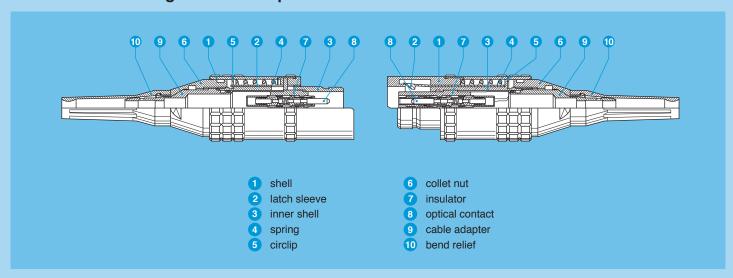
The main features of these series are as follow:

- 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.



# **Part Section Showing Internal Components**





### **Technical Characteristics**

### **Mechanical and Environmental**

Characteristics			Value	Standard	
Mating durability			2000 cycles	IEC 60512-5 test 9a	
Temperat	ure ran	ge	-55°C to +125°C <sup>1)</sup>		
Vibration	resistar	nce	10-2000 Hz, 15 g	IEC 60512-4 test 6d	
Shock res	sistance	)	100 g, 6 ms	IEC 60512-4 test 6c	
Protection	n index	FHE/FHE	IP 68	IEC 60529	
Water imr	mersion	FHE/FHE	up to 2 r	meters depth	
Protection	n index	FHA/FHA	IP 50	IEC 60529	
	SH	plug/plug	600 N	IEC 60512-8 test 15f	
Average latching	series plug/socket		300 N	IEC 60512-8 test 15f	
retention	МН	plug/plug	800 N	IEC 60512-8 test 15f	
	series	plug/socket 400 N		IEC 60512-8 test 15	

### **Electrical**

Characteristics	Value	Standard
Insulation resistance	$> 10^{12} \Omega$	IEC 60512-2 test 3a
Contact resistance	$<$ 3.6 m $\Omega$	IEC 60512-2 test 11f
Shell resistance	$< 10 \text{ m}\Omega$	IEC 60512-2 test 2f

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

# **Optical**

Characteristics	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 $\mu$ m	0.25 dB	IEC 61300-03-34	Method 2
Return loss fibre 9/125 $\mu$ m (UPC)	≥45 dB	IEC 61300-03-06	Coupler Method
Return loss fibre 9/125 $\mu$ m (Hand polish)	>25 dB	IEC 61300-03-06	Coupler Method

### **Materials and Treatments**

		Surface treat (µm)				
Component	Material (Standard)	nickel				
		Cu	Ni	Au		
Outer shell, collet nut1)	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	withou	ut trea	tment		
Insulator	PEEK	withou	ut trea	tment		
Electrical contacts	Brass (male)/Bronze (female)	0.5	3	1		
O-ring and gaskets	Silicone MQ / MVQ	withou	ut trea	tment		

Notes: 1) anthracite colour

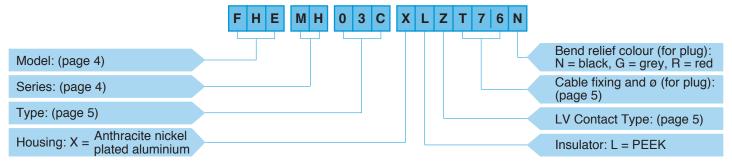
# **Part Number Example**

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

Plugs and fixed sockets; fibre optic contacts.

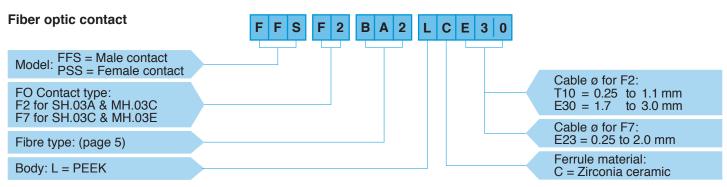
Note: The fibre optic contacts must be ordered separately. An equal number of contacts must be ordered (eg. for MH.03C; 2 x FFS.F2 and 2 x PSS.F2).

### 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.

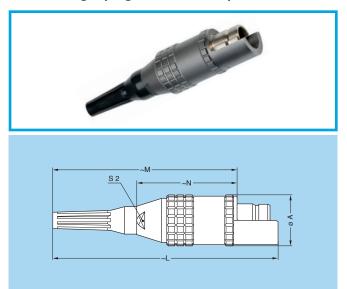




**FFS.F2.BA2.LCE30** = Male F2 type fibre optic contact, ferrule bore diameter of 125  $\mu$ m, PEEK body, Zirconia ceramic ferrule, crimp cable fixing, for tight jacket cable with a diameter between 1.7 to 3.0 mm.

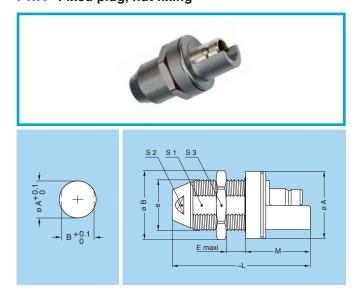


### FHA Straight plug with cable adapter or collet and nut with bend relief



Refe	rence		Dimensions (mm)				
Model	Series	A L M N S2					
FHA	SH	21.8	98.4	82.2	46.2	13	
FHA	МН	25.4	109.3	89.1	47.1	15	

# FWA Fixed plug, nut fixing



Refe	rence	Dimensions (mm)								
Model	Series	Α	В	Ф	Е	L	М	S1	S2	S3
FWA	SH	28.5	28.5	M22x1	14	55.0	26.5	20.5	14	25
FWA	МН	34.0	34.0	M25x1	17	64.5	31.5	23.5	17	30

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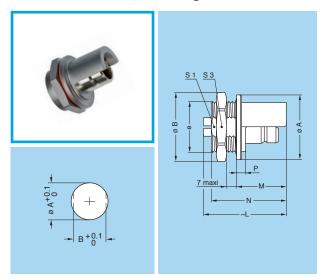
### Panel cut-outs

Series	Dim.	(mm)	
Series	øΑ	В	
SH	22.2	20.6	
МН	25.2	23.6	





# EHA Fixed socket, nut fixing

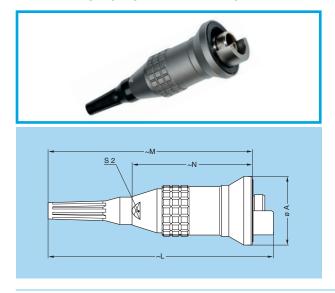


Refe	rence	Dimensions (mm)									
Model	Series	Α	В	е	optic	elect.	М	N	Р	S1	S3
ЕНА	SH	27	28.5	M22x1	38.8	30.5	19.5	30.5	3.3	20.5	25
EHA	МН	32	34.0	M25x1	40.8	37.0	24.5	37.0	4.3	23.5	30

## **Panel cut-outs**

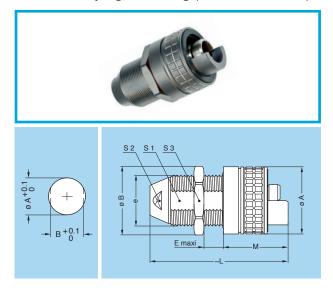
Series	Dim.	(mm)	
Selles	øΑ	В	
SH	22.2	20.6	
МН	25.2	23.6	

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



Refer	rence		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)



Re	efer	ence	Dimensions (mm)								
Mod	el	Series	Α	В	е	Е	L	М	S1	S2	S3
FWI	E	SH	28.5	28.5	M22x1	14	55.0	26.5	20.5	14	25
FWI	E	МН	34.0	34.0	M25x1	17	64.5	31.5	23.5	17	30

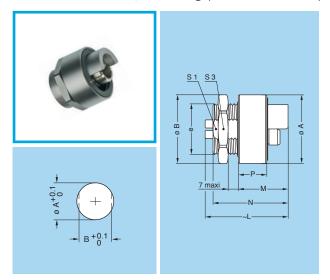
# Panel cut-outs

Carias	Dim. (mm)					
Series	øΑ	В				
SH	22.2	20.6				
МН	25.2	23.6				



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

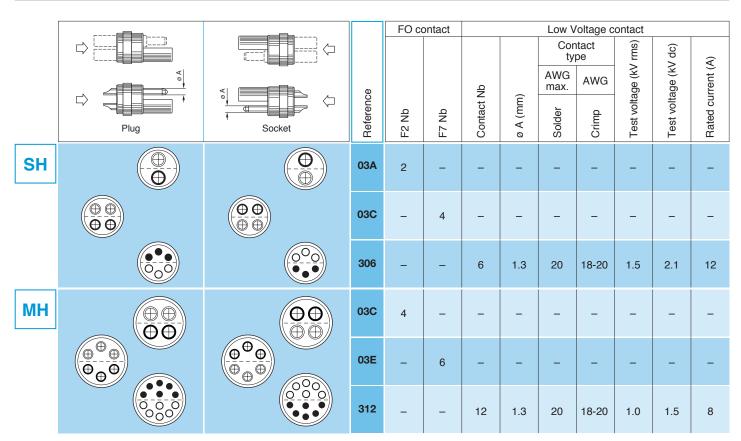


Refe	rence	Dimens					ons (mm)				
Model	Series	Α	В	е	optic	L optic elect.		N	Р	S1	S3
EHE	SH	28.5	28.5	M22x1	38.8	30.5	19.5	30.5	11.1	20.5	25
EHE	МН	34.0	34.0	M25x1	40.8	37.0	24.5	37.0	14.1	23.5	30

### **Panel cut-outs**

Series	Dim. (mm)			
Series	øΑ	В		
SH	22.2	20.6		
МН	25.2	23.6		

	Insert configuration
--	----------------------



**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		
Α	solder for plug		
С	crimp for plug		
L	solder for socket		

Reference	Contact type
M	crimp for socket
Z	no contact

## Fibre type

Ref. for F2 contact	Ref. for F7 contact	ø Core/Cladding (μm)	Ferrule hole ø (µm)	Note
BA2	125	9/125, 50/125, 62.5/125	125	•
BB2	126	9/125, 50/125, 62.5/125	126	•
BD2	128	9/125, 50/125, 62.5/125	128	0

● First choice alternative ○ Special order alternative

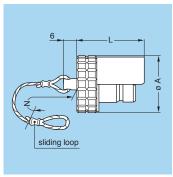
### Cable diameter

	Ar for fibre	dapter «T» optic conr	nectors		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	
ЭП	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	
МН	T56	5.5	4.6	C62	6.0	5.1	
IVIII	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)





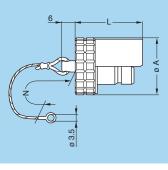
Dowt musele on	Dimensions (mm)			
Part number	Α	L	N <sup>1)</sup>	
BFA.SH.100.XAZ	21.8	23.5	120	
BFA.MH.100.XAZ	25.4	30.0	120	

Note: 1) the tolerance on this dimension is  $\pm 5$  mm.

- 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

## Cap (for FHA and FWA plugs)





- 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

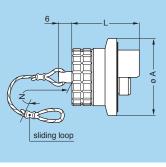
Part number	Dimensions (mm)			
Part number	Α	L	N <sup>1)</sup>	
BHA.SH.100.XAZ	21.8	23.5	120	
BHA.MH.100.XAZ	25.4	30.0	120	

**Note:** 1) the tolerance on this dimension is  $\pm 5$  mm.



# Cap (for FHE and FWE plugs)





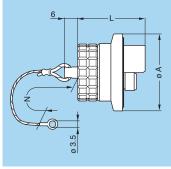
Part number	Dimensions (mm)			
Part number	Α	L	N <sup>1)</sup>	
BFE.SH.100.XAS	28.5	23.5	120	
BFE.MH.100.XAS	34.0	30.0	120	

**Note:** 1) the tolerance on this dimension is  $\pm 5$  mm.

- 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

## Cap (for FHE and FWE plugs)





Pody motorial:	Anthropita	niokol	plotod	aluminium	allov

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

Part number	Dimensions (mm)				
i ait iiuiiibei	Α	L	N <sup>1)</sup>		
BHE.SH.100.XAS	28.5	23.5	120		
BHE.MH.100.XAS	34.0	30.0	120		

**Note:** 1) the tolerance on this dimension is  $\pm 5$  mm.



# **Tooling**

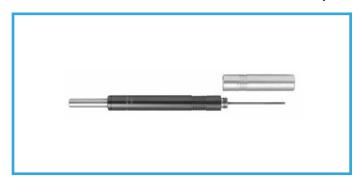
### WST.KI.125.34 Cleaning kit for F2 fibre optic contact



## **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.F12.LAG Manual extractor for F2 fibre optic contact



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



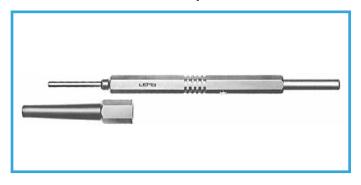
### **Description**

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 INSTUCTIONS CAREFULLY AND CONSULT ALL RELEVENT 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

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

CE marking ( capplies to complete products or equipment, but not 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.

# ✓ WARNING (Prop 65 State of California)

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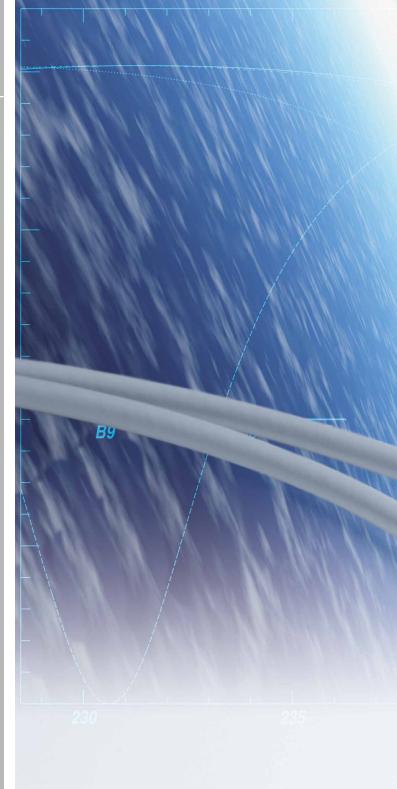
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