Unipole & Multipole Connectors

2

Dear Customers,

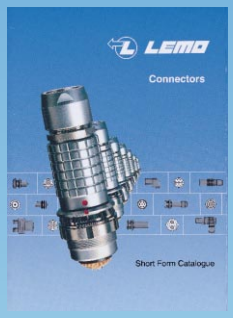
For more than 50 years the LEMO Group has been dedicated to bringing technical excellence to connection technology. Our range of models, numbering more than 55'000, are used in a multitude of applications. From medical devices to satellites, from oil exploration to precision measurement, engineers turn to LEMO to solve their most demanding connection needs. This catalogue documents a multitude of different product references… but the most important thing about LEMO is not printed on the page: it is the knowledge and expertise that is required to design and manufacture the world's best connectors.

At LEMO, all we do is connectors. Starting with raw materials and using our own factories, we control each step in the manufacturing process in order to guarantee quality at every level. We use only machined contacts, because only machining will provide the tight tolerances and high quality surface finish we require. Our commitment to quality is your guarantee of reliability. In the case you don't find exactly the product you require, don't despair ! Our engineers will work with you to design a product customized for your application. Our philosophy is to develop exactly what the application requires; our customers are the force that drives LEMO's engineers to develop new and useful products.

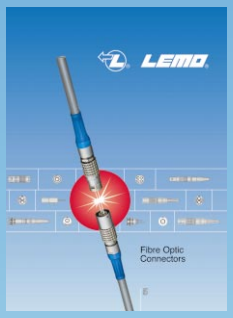
I hope this catalogue becomes a useful reference for all of the engineers, scientists, designers and inventors that regularly call on us for excellence in connection solutions. All of us at LEMO look forward to developing new models for use in tomorrow's machines, systems, and devices.

Alexandre Pesci
Corporate CEO
LEMO SA

Certified Quality System
SQS
ISO 9001
Reg. No. 10472 - 03



Short Form
Catalogue



Fiber Optic
Connectors

Audio-Vidéo
Catalogue

1 Coaxial Series 00
Connectors

© 2000 Reproduction or use of editorial and//or pictorial content without express permission is strictly prohibited.
LEMO SA reserves the right to modify and//or improve product specifications at any time without notification.

Table of Contents

General Production Programme ..... **page 3**
Main Characteristics and Types **3**
Series and Types **4**
LEMO's Push-Pull Self-Latching Connection System **5**
Unipole and Multipole Connectors Production Programme **5**
Series and Contact configuration **6**
Introduction **7**

General Characteristics
Selection of watertight connectors 8
IP68 watertight assembly, Definition of degree of protection (IP code) 8
Selection of contact types (solder, crimp, print) 9
Acceptable cable diameters 10
Part Numbering System 11

B Series
Interconnections 15
Model Description 16
Part Section Showing Internal Components 17
Technical Characteristics 17
Available Models (series and type) 17
Alignment Key and Polarized Keying System 18
Part Number Example 19
Models - Series 20

K Series
Interconnections 41
Model Description, Part Section Showing Internal Components 42
Technical Characteristics 42
Available Models (series and type) 43
Alignment Key and Polarized Keying System 43
Part Number Example 44
Models - Series 45

Type (B and K series) 55
Housings, Insulators, Contacts (B and K series) 60
Collets (B and K series) 61
Variant (B and K series) 66

S Series
Interconnections 69
Model Description, Part Section Showing Internal Components 70
Technical Characteristics 70
Available Models (series and type) 71
Part Number Example 72
Models - Series 73

E Series
Interconnections 91
Model Description 91
Part Section Showing Internal Components 92
Technical Characteristics 92
Available Models (series and type) 92
Part Number Example 93
Models - Series 94

Type (S and E series) 103
Housings, Insulators, Contacts (S and E series) 111
Contact configuration for RMA, RAD and SWH fixed couplers 112
Collets (S and E series) 113
Variant (S and E series) 124

F Series
Interconnections, Model Description and Part Section Showing Internal Components 127
Technical Characteristics 128
Available Models (series and type) 128
Polarized Keying System 128
Part Number Example 129
Models - Series 130
Type 133
Accessories 134
Tooling 136
Panel cut-outs 138

Table of Contents

2C Series
Interconnections, Model Description and Part Section Showing Internal Components 143
Technical Characteristics 143
Part Number Example 144
Models - Series 145
Type, Housings, Contact 148
Collets, Variant 149
Accessories and Tooling 149
Panel cut-outs 150

2G Series
Interconnections, Model Description and Part Section Showing Internal Components 151
Technical Characteristics 151
Part Number Example 152
Models - Series 153
Type, Housings, Contact 154
Collets, Accessories 155
Tooling, Panel cut-outs 156

1D Series
Interconnections, Model Description and Part Section Showing Internal Components 159
Technical Characteristics 159
Part Number Example 160
Models - Series 161
Type, Collets, Variant 163
Accessories and Tooling 164
Panel cut-outs 164

Patch Panels
Patch Panel for audio application 165

Accessories
Insulators for crimp contacts 169
Crimp contacts 170
Caps 171
Bend relief 175
Insulating washers and double panel washers 178
Locking washers, tapered washers and nuts 179
Earthing washer and lead-through with cable collet 181

Tooling
Spanners 183
Assembly tools, pliers for assembling plugs, taps 185
Manual and pneumatic crimping tools, positioners 186
Extraction tools 188

Panel Cut-Outs
B and S series 189
K and E series 190

PCB Drilling Pattern
Fixed socket with straight print contact (B and K series) 191
Length of straight print contacts (B and K series) 192
Fixed socket for printed circuit (B series) 193
Fixed socket with elbow print contact (B and K series) 193
Elbow socket (90°) for printed circuit (B series) 194
Fixed socket with straight print contact (S and E series) 194
Length of straight print contacts (S and E series) 195
Elbow socket (90°) for printed circuit (S series) 195
Fixed socket with elbow print contact (S and E series) 196

Technical Characteristics
Outer shell 197
Insulator 201
Electrical contact 202
Test voltage, rated current 204
Cable fixing 205
Maximum collet nut tightening torque 208
Technical tables 209

General Production Programme

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 (HV) + Low Voltage (LV)
  Mixed: Coax + LV
  Mixed: Triax + LV
  Thermocouple
  Multithermocouple
  Fibre optic singlemode
  Fibre optic multimode
  Mixed: fibre optic + LV
  Mixed: fibre optic + coax + LV
  Fibre optic singlemode OPTABALL®
  Fluidic
  Multifluidic
  Mixed: fluidic + LV
  Subminiature
- Miniature
  Plastic
- 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 relief
- 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

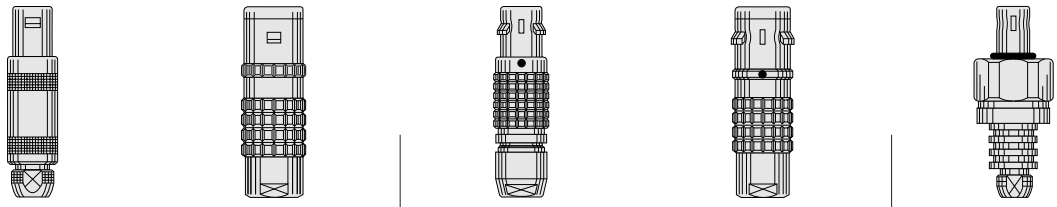
Filtered connectors

- 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	3N 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 insert (Half-Moon)		Key (G) or other key-way code		Key (G) or stepped insert (Half-Moon)
Shell	Metal or plastic				Metal
Insert	Hermaphroditic or cylindrical		Cylindrical		Hermaphroditic or cylindrical
Contact	Solder or print		Solder, crimp or print		Solder (crimp or print)

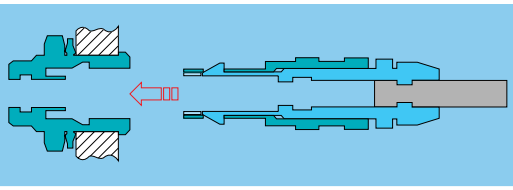
Series and Types

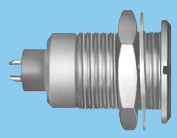
	Series	Types																			
		Unipole	Coaxial 50 Ω	Coaxial 75 Ω	Multipole	High Voltage	Triaxial 50 Ω	Triaxial 75 Ω	Quadrax	Multi HV	Multi Coaxial	Mixed HV+LV	Mixed Coax+LV	Mixed Triax+LV	Fibre Optic	Multi FO	Mixed FO+LV	Fluidic	Multi fluidic	Mixed fluidic+LV	Thermocouple
Standard	01		●																		
	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				●																
	3N to 5N				●																
Screw	03		●		●																
	0V	●	●		●		●													●	
	1V	●	●	●	●		●													●	
	2V	●	●	●	●		●	●				●								●	
	3V	●	●	●	●		●	●		●		●	●								
	4V	●	●	●	●		●	●				●	●								
	5V	●			●					●	●	●	●								
	0W to 5W				●						●	●	●	●			●			●	●
	2U to 5U				●										●	●	●				

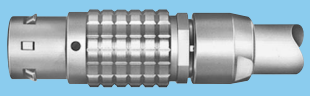
Note: ● = included in this catalogue, ● = available but not included in this catalogue.

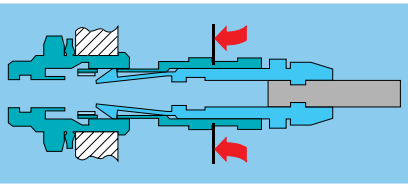
LEMO's Push-Pull Self-Latching Connection System

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.

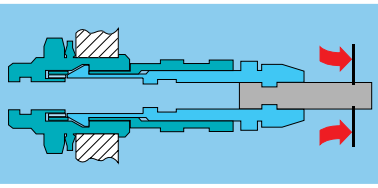




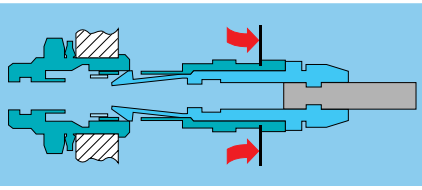




The LEMO self-latching system allows the connector to be mated by simply pushing the plug axially into socket.



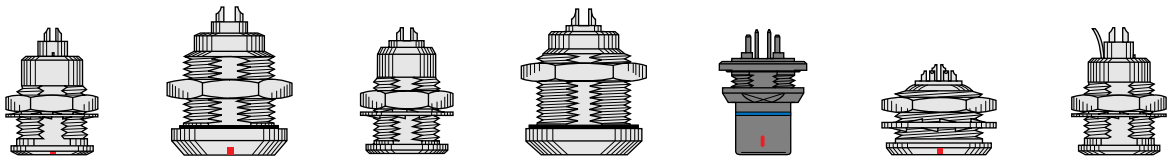
Once firmly latched, connection cannot be broken by pulling on the cable or any other component part other than the outer release sleeve.

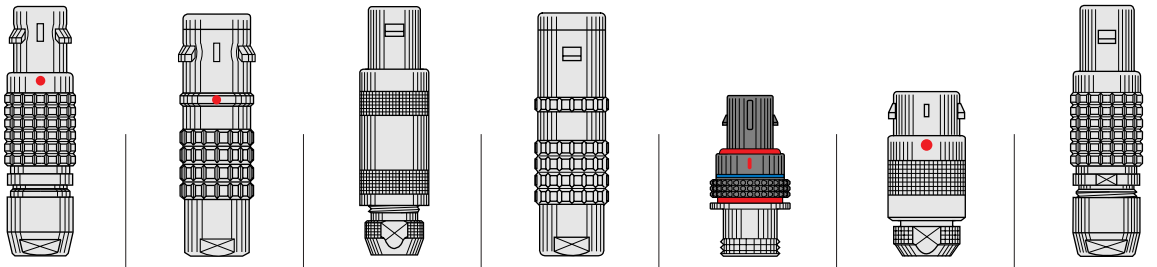


When required, the connector is disengaged by a single axial pull on the outer release sleeve. This first disengages the latches and then withdraws the plug from the socket.

Unipole and Multipole Connectors Production Programme

The production programme is divided into 7 families of connectors. Their main characteristics and features are shown below.

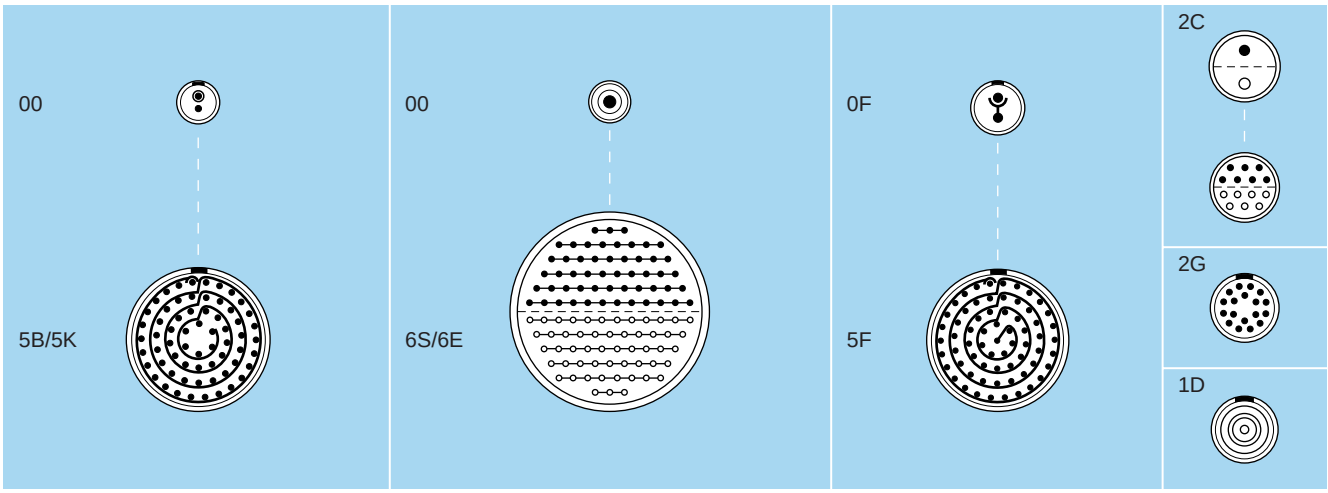




Series	00 multipole 0B to 5B	0K to 5K	00 unipole 0S to 6S	0E to 6E	0F to 5F	2C/2G	1D
Latching	Push-Pull						
Shell	Metal or plastic	Metal	Metal or plastic	Metal	Metal		
Feature	Keyed	Keyed watertight	Hermaphroditic insert	Watertight hermaphroditic	Light compact	Shortened version	4 concentric contacts
Insulator type	Multipole		Multipole or unipole		Multipole		Quadrax
Contact type	Solder, crimp or print		Solder or print		Crimp or print	Solder or print	Solder
Page	13 to 40	41 to 54	67 to 90	91 to 102	125 to 140	141 to 156	157 to 164

Series and contact configurations

Number of contacts	Series																								
	00	0B-0K	1B-1K	2B-2K	3B-3K	4B-4K	5B-5K	00	0S-0E	1S-1E	2S-2E	3S-3E	4S-4E	5S-5E	6S-6E	0F	1F	2F	3F	4F	5F	2C	2G	1D
1								●	●	●	●	●	●	●										
2	●	●	●	●	●		●		●	●	●	●	●	●		●						●		
3	●	●	●	●	●				●	●	●	●	●	●	●	●	●					●		
4	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●						●		●
5		●	●	●	●					●	●	●	●	●		●	●							
6		●	●	●	●	●				●	●	●	●	●								●		
7		●	●	●	●	●					●	●	●				●							
8			●	●	●						●	●	●	●			●	●				●		
9		●			●								●											
10			●	●	●	●	●				●	●	●	●				●				●		
12				●	●	●						●	●	●	●			●				●		
13												●	●											
14			●	●	●		●					●	●	●								●		
16			●	●	●	●	●					●	●	●	●									
18				●	●							●	●	●	●								●	
19				●														●						
20					●	●	●						●	●	●									
22					●								●	●					●					
24					●	●							●	●	●									
26				●	●																			
28					●																			
30					●	●	●							●	●				●					
32				●										●	●									
36														●	●									
40						●	●							●	●					●				
44														●										
48							●							●	●									
50							●														●			
54							●														●			
55																					●			
60															●									
62															●									
64							●								●						●			
66																					●			
72															●									
106															●									



Note: ● = available contact configuration

Introduction

This catalogue gives the complete description of LEMO unipole and multipole type connectors. Our manufacturing programme has been extended to almost 40 series divided into 7 product families, each product with specific mating and environmental characteristics.
Each series includes a wide variety of plug, socket, coupler and bridge plug models, available in contact configurations adapted to all round cables, including up to 106 conductors, and a maximum diameter of 30 mm. Vacuumtight models are also available.
Since LEMO connectors are perfectly screened and designed to guarantee very low resistance to shell electrical continuity, they are particularly adapted to applications where electromagnetic compatibility (EMC) is important.
A large number of accessories as well as tooling for cable assembly are available.

The Standard Series

The characteristic feature of these connector series is the hermaphroditic insulator in the multipole version.
They include principally the 0S and 6S series, as well as the 00 unipole series. The following series, explained in a separate chapter, also belong to this group:
– the 1D quadrax type, with 4 concentric contacts used for audio-stereo applications.
– the 2C multipole type, shortened version of connector for space saving.

The Watertight Series

These series are watertight (IEC 60529/IP 68) when mated and assembled to an appropriate cable. They include the 0E to 6E series and are available in the same types as the S series.

The Keyed Series

Compared to previous series, keyed connectors offer a variety of new features :
– alignment key preventing all errors in alignment,
– polarized keying system, the various keying alternatives preventing unwanted cross mating of otherwise similar connectors,
– higher contact density,
– possible use of crimp contacts to reduce cable assembly time.
These connector series, also including some vacuumtight models, range from 0B to 5B.
The 00 multipole and 2G (shortened version of the 2B series) for space saving also belong to these series.

The Watertight Keyed Series

These connector series combine the characteristics of The **Watertight Series** and the technical features of the keyed series.
This product family includes the 0K to 5K series (IEC 60529/IP 68), available in the same types as the 0B to 5B series and the 0F to 5F series (IP 67), specially designed for applications requiring minimum weight, small size and splash-proofness.

Patch Panels

LEMO patch panels have been specifically developed to meet the requirements of radio and television broadcasting companies to facilitate the switching of large numbers of audio mono signals (0B series multipole 3 contacts) or audio stereo (1B series multipole 6 contacts and 1D series quadrax type) on 19'' panels. On the front side connection is made either by LEMO bridge plugs with or without a monitoring output. On the rear side connection onto the panel is either by plugs specific to the existing system or permanent cable assemblies.

UL Recognition

Many of our connectors are recognized by the Underwriters Laboratories (UL). This recognition is the result of tests carried out on products (product standards) according to the safety hazards for human life and property.
Our products are tested principally for certain properties with regard to flammability and toxicity.
This marking is only used for components incorporated in a complete product or equipment. The approval of the complete equipment is easier if the component bears the Recognized Component Mark.
The listed connectors are subject to a follow-up procedure carried out under the responsibility of UL. The Follow-up is carried out by sampling.
The recognition and the follow-up apply to the insulator raw material (PEEK) as much as the actual connectors.

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**.

General Characteristics

Selection of watertight connectors

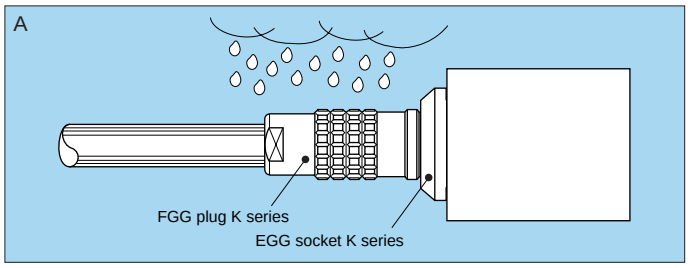
For the selection of watertight connector series or watertight (or vacuumtight) socket models, the conditions and the environment specific to the application should be carefully considered.

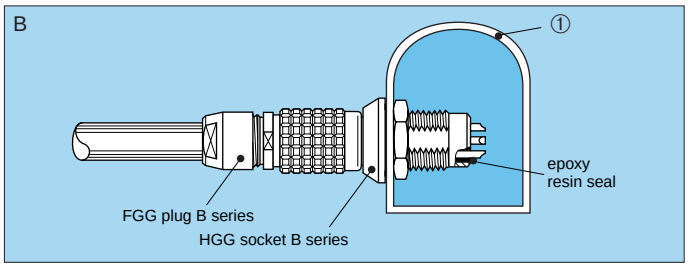
Two typical situations may occur:

A) Connectors are either used for outdoor applications or in an environment exposed to splashing water.
The selected **series** must be **watertight when mated**.
The K or E series should be selected. For example an FGG plug and an EGG socket of the K series or an FFA plug and an ERA socket of the E series.

B) The inside of the container ① is under vacuum or filled with pressurized gas. No leakage is allowed between the outside and the inside of this container.
A **watertight or vacuumtight** socket should be selected, depending on the requirements. To give you an example: an FGG plug and a HGG socket of the B series or an FFA plug and a HGP socket of the S series. Watertight sockets are guaranteed to IP 68 protection index. They allow the device on which they are fitted to reach the specified protection index. Measurements are carried out unmated **without electrical power**.
Vacuumtight sockets are assembled according to a special assembly procedure and are fully tested with a helium leakage detector.

A and B situations may be simultaneously present. In this case, an FGG plug and an HGG socket of the K series or an FFA plug and an HGP socket of the E series should be selected.





IP 68 watertight cable assembly

All E and K series models with cable collet can be made watertight to IP 68 protection index for applications requiring up to 10 bars if assembled onto appropriate cable. Please consult us for instructions.

Definition of degree of protection (IP code)

IEC 60529 outlines an international classification system for the sealing effectiveness of enclosures of electrical equipment against the intrusion into the equipment of foreign bodies (i.e., tools, dust, fingers) and moisture. This classification system utilizes the letters «IP» (Ingress Protection) followed by two digits.

Example: IP 64 = IP 6 4

IP letter code
1st digit
2nd digit

Degree of protection - First digit

The first digit of the IP code indicates the degree that persons are protected against contact with moving parts and the degree that equipment is protected against solid foreign bodies intruding into an enclosure.

0 No special protection
1 Protection from a large part of the body such as hand or from solid objects greater than 50 mm in diameter
2 Protection against objects not greater than 80 mm in length and 12 mm in diameter
3 Protection from entry by tools, wires, etc., with a diameter or thickness greater than 2.5 mm
4 Protection from entry by solid objects with a diameter or thickness greater than 1.0 mm
5 Protection from the amount of dust that would interfere with the operation of the equipment
6 Dust-tight

Degree of protection - Second digit

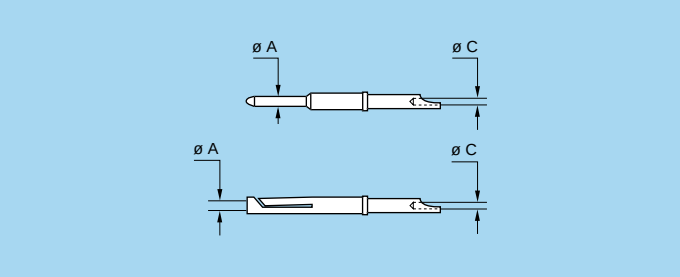
Second digit indicates the degree of protection of the equipment inside the enclosure against the harmful entry of various forms of moisture (e.g. dripping, spraying, submersion, etc.)

0 No special protection
1 Protection from vertically dripping water
2 Protection from dripping water when tilted up to 15°
3 Protection from sprayed water
4 Protection from splashed water
5 Protection from water projected from a nozzle
6 Protection against heavy seas, or powerful jets of water
7 Protection against temporary immersion
8 Protection against complete continuous submersion in water

Selection of 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			
		Solid		Stranded	
ø A (mm)	ø C (mm)	AWG max.	Section max (mm²)	AWG max.	Section max (mm²)
0.5[2]	0.40[2]	28	0.09	30	0.05
0.5	0.45	28	0.09	28	0.09
0.7[1]	0.60[1]	24	0.25	26	0.14
0.7	0.80	22	0.34	22[3]	0.34
0.9	0.80	22	0.34	22[3]	0.34
1.3	1.00	20	0.50	20[3]	0.50
1.6	1.40	16	1.00	18	1.00
2.0	1.80	14	1.50	16	1.50
3.0	2.70	10	4.00	12	4.00
4.0	3.70	10	6.00	10	6.00
5.0	5.20	–	–	8	10.00
6.0	5.20	–	–	8	10.00
8.0	7.00	–	–	4	16.00
12.0	6.20	–	–	6	16.00

Note:
1) for S, E, 2C, 2G and 1D series
2) for 00 multipole series
3) 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 ø 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.

Contacts are provided in two forms: with a standard crimp barrel for large conductors (see fig. 1), or with a reduced crimp barrel for smaller conductors (see fig. 2).

Fig. 1

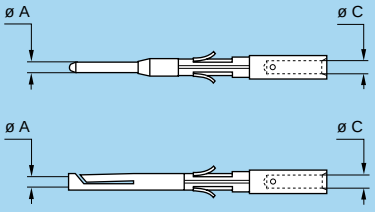
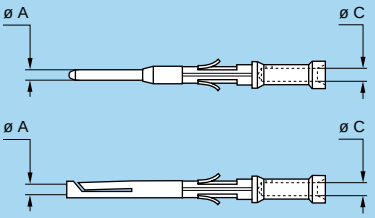


Fig. 2



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 ø C.

A detailed range of conductor dimensions that can be crimped into our contacts is given on the table at right. See also the section on tooling (pages 183 to 188).

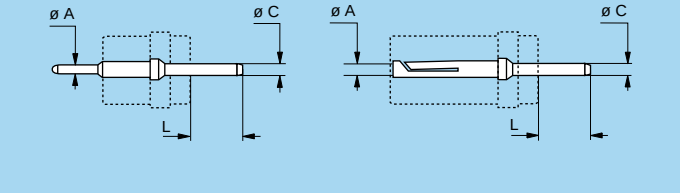
Contact			Conductor stranded				F_r (N)
			AWG stranded		Section (mm²)		
ø A (mm)	ø C (mm)	Form per fig.	min.	max.	min.	max.	
0.5	0.45	1	32	28	0.035	0.09	12
0.7	0.80	1	26	22[1]	0.140	0.34	22
	0.45	2	32	28	0.035	0.09	
0.9	1.10	1	24	20	0.250	0.50	30
	0.80	2	26	22[1]	0.140	0.34	
	0.45	2	32	28	0.035	0.09	
1.3	1.40	1	20	18	0.500	1.00	40
	1.10	2	24	20	0.250	0.50	
	0.80	2	26	22[1]	0.140	0.34	
1.6	1.90	1	18	14[1]	1.000	1.50	50
	1.40	2	22	18	0.340	1.00	
2.0	2.40	1	16	12[1]	1.500	2.50	65
	1.90	2	18	14	1.000	1.50	
3.0	2.90	1	14	10[1]	2.500	4.00	75
4.0	4.00	1	12	10	4.000	6.00	90

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

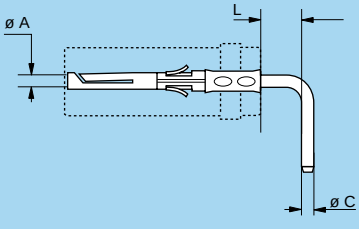
Print contacts

Print contacts are available in straight or elbow versions for certain connector types. Connection is possible by soldering on flexible or rigid printed circuit boards.
Straight print contacts are gold-plated which guarantees optimum soldering, even after longterm storage.
Print elbow contacts include a tinned copper wire crimped into a contact. L dimensions and C ø are detailed in the section on PCB drilling patterns.

straight



elbow



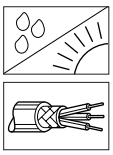
Acceptable cable diameters

Series	Cable diameter range (mm)											
	C type collet		D type collet		K type collet		L type collet		M type collet		With heatshrink boot	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
00[1)]	–	–	1.1	3.4	–	–	–	–	–	–	–	–
0B	–	–	1.5	5.5	–	–	–	–	–	–	–	–
1B	–	–	3.1	7.5	–	–	–	–	2.2	3.0	–	–
2B	–	–	4.1	9.7	–	–	–	–	1.5	4.0	–	–
3B	–	–	5.1	11.7	–	–	–	–	4.1	5.0	–	–
4B	–	–	9.1	16.0	–	–	–	–	5.1	9.0	–	–
5B	–	–	9.6	25.0	–	–	–	–	–	–	–	–
0K	1.0	5.0	–	–	–	–	–	–	–	–	–	–
1K	1.3	6.5	–	–	6.6	8.5	–	–	–	–	–	–
2K	1.3	8.5	–	–	8.6	11.0	–	–	–	–	–	–
3K	2.6	10.5	–	–	10.6	15.0	–	–	–	–	–	–
4K	4.8	15.0	–	–	15.6	23.5	–	–	–	–	–	–
5K	9.6	23.5	–	–	–	–	–	–	–	–	–	–
00[2)]	1.1	3.0	–	–	3.0	4.1	1.3	3.0	–	–	–	–
0S	1.3	4.3	–	–	3.8	6.7	1.3	4.3	–	–	–	–
1S	1.3	6.7	–	–	6.1	8.5	1.3	6.5	–	–	–	–
2S	1.3	8.5	–	–	8.1	10.5	1.7	8.5	–	–	–	–
3S	2.5	10.5	–	–	11.1	13.0	3.1	10.5	–	–	–	–
4S	4.1	13.0	–	–	13.1	22.0	4.1	13.0	–	–	–	–
5S	6.1	22.0	–	–	22.1	30.0	8.1	21.0	–	–	–	–
6S	11.1	30.0	–	–	–	–	11.1	30.0	–	–	–	–
0E	1.0	5.0	–	–	–	–	–	–	–	–	–	–
1E	1.3	6.5	–	–	6.6	8.5	–	–	–	–	–	–
2E	1.3	8.5	–	–	8.6	11.0	–	–	–	–	–	–
3E	2.6	10.5	–	–	10.6	15.0	–	–	–	–	–	–
4E	4.8	15.0	–	–	15.6	23.5	–	–	–	–	–	–
5E	9.6	23.5	–	–	–	–	–	–	–	–	–	–
6E	13.0	30.0	–	–	–	–	–	–	–	–	–	–
0F	–	–	–	–	–	–	–	–	–	–	3.8	11
1F	–	–	–	–	–	–	–	–	–	–	3.8	13
2F	–	–	–	–	–	–	–	–	–	–	3.8	16
3F	–	–	–	–	–	–	–	–	–	–	3.8	18
4F	–	–	–	–	–	–	–	–	–	–	5.3	25
5F	–	–	–	–	–	–	–	–	–	–	7.4	34
2C	2.2	7.9	–	–	–	–	0.8	8.1	–	–	–	–
2G	–	–	4.5	7.9	–	–	–	–	–	–	–	–
1D	–	–	3.1	7.5	–	–	–	–	–	–	–	–

Note:
[1)] for multipole only
[2)] for unipole only, crimping (type E) is also available for cables from 1.8 to 3.0 mm.

Part Numbering System

Series

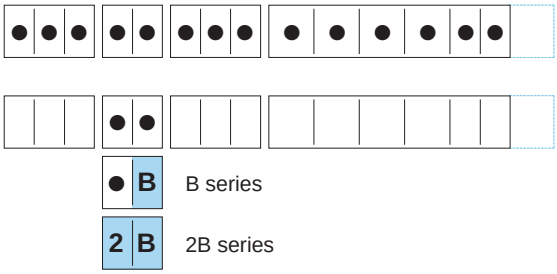


Connectors series can be selected according to environmental requirements or depending on the particular characteristics of each application, such as indoor or outdoor applications, etc...

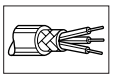
See table on p. 5 (unipole and multipole connectors production progr.) and p. 8 (selection of watertight connectors)

The size of the series can be defined by the number of conductors, the conductor diameter and the cable jacket diameter.

See table on p. 6 (series and contact configurations) and p. 10 (acceptable cable diameters)

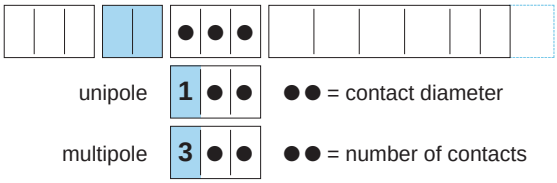


Type

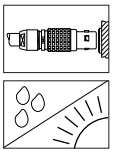


Contact arrangements (type) within a given size can be defined according to the cable design (unipole or multipole) and the required electrical characteristics (rated current).

See type tables in each series



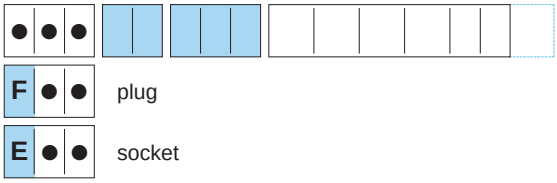
Model



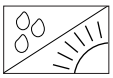
Models within a given series can be selected according to the application and the panel mounting conditions.

See models available in each series

When available make the right key-way selection

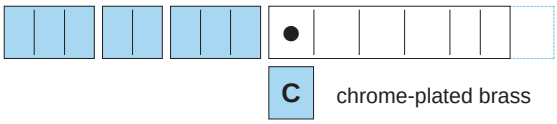


Housing material



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

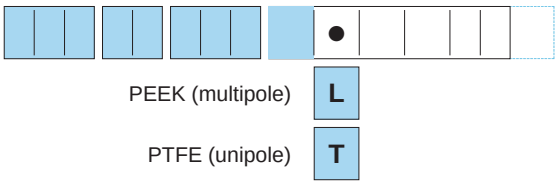
See material available in each series



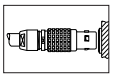
Insulator material

The insulator material should be selected according to the insulator type.

See material available in each series



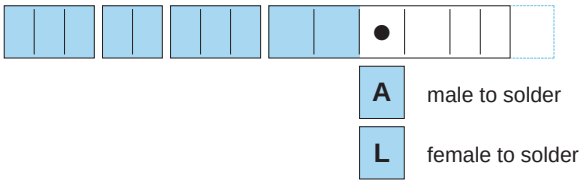
Contact



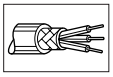
The contact type can be selected according to the model (male or female), conductor retention (solder or crimp) or the application (straight or elbow print).

See contact available in each series

Verify again the contact size matches with the conductor diameter



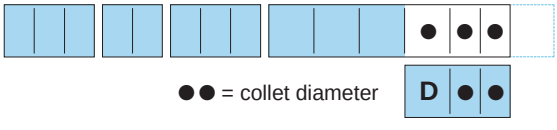
Collet



Different clamping systems are proposed in various diameters for screened or unscreened cables.

See collets type of each series and p. 10 (acceptable cable diameter)

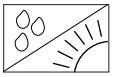
Not applicable for sockets E●● or H●●

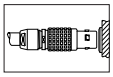


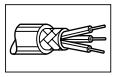
Variant

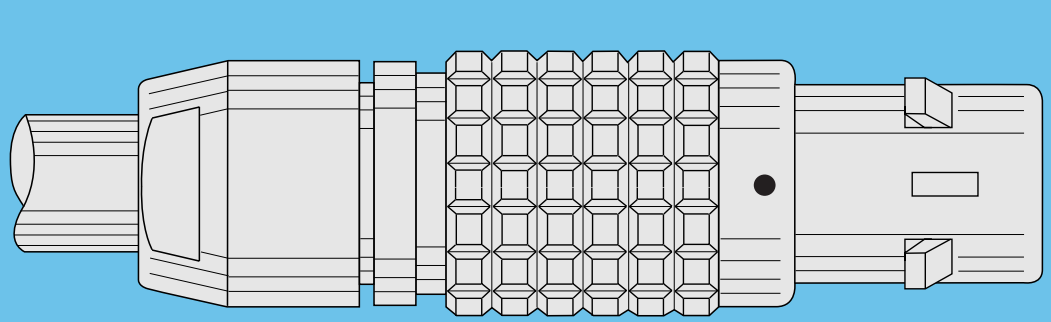
Several variants are available according to special requirements of the application (bend relief backnut, etc.)

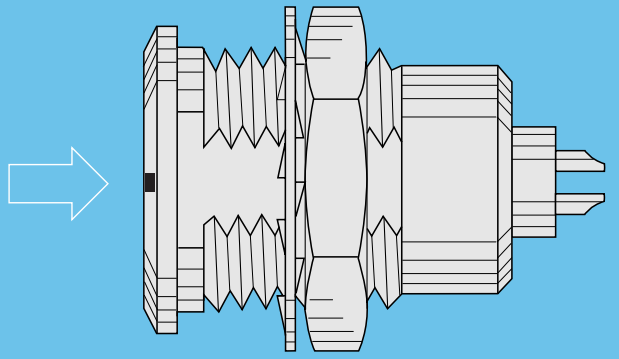
See variant in each series

 = Environment

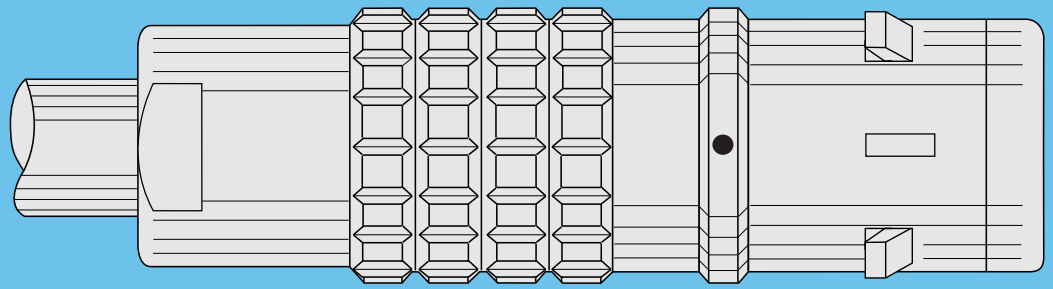
 = Application

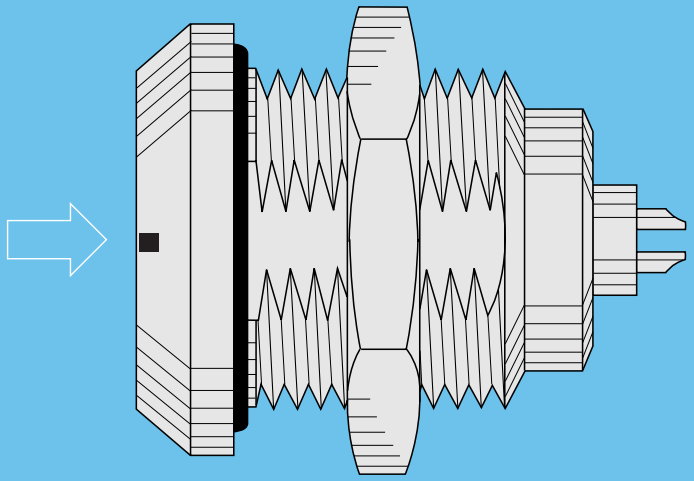
 = Cable





B SERIES



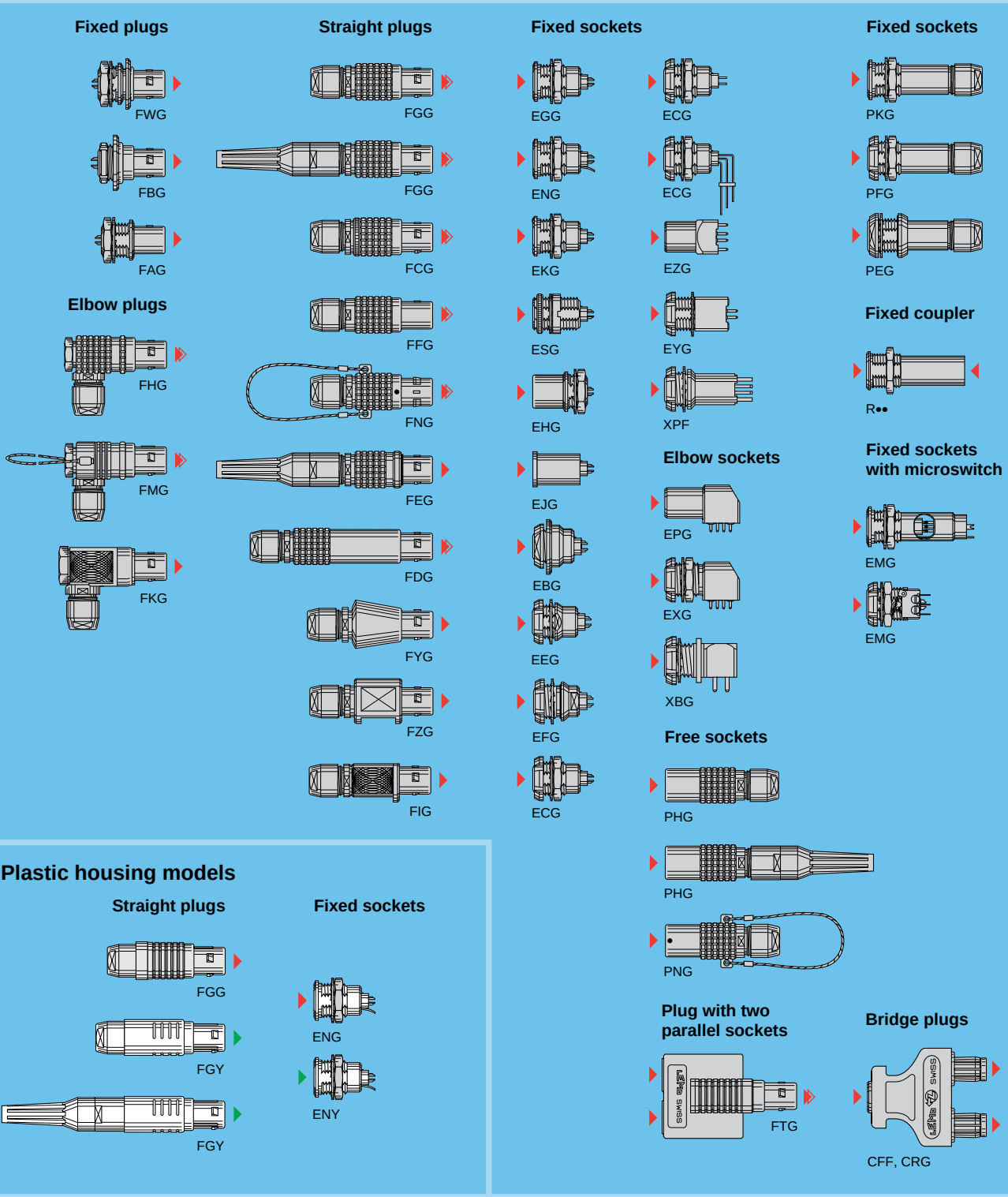


K SERIES (watertight)

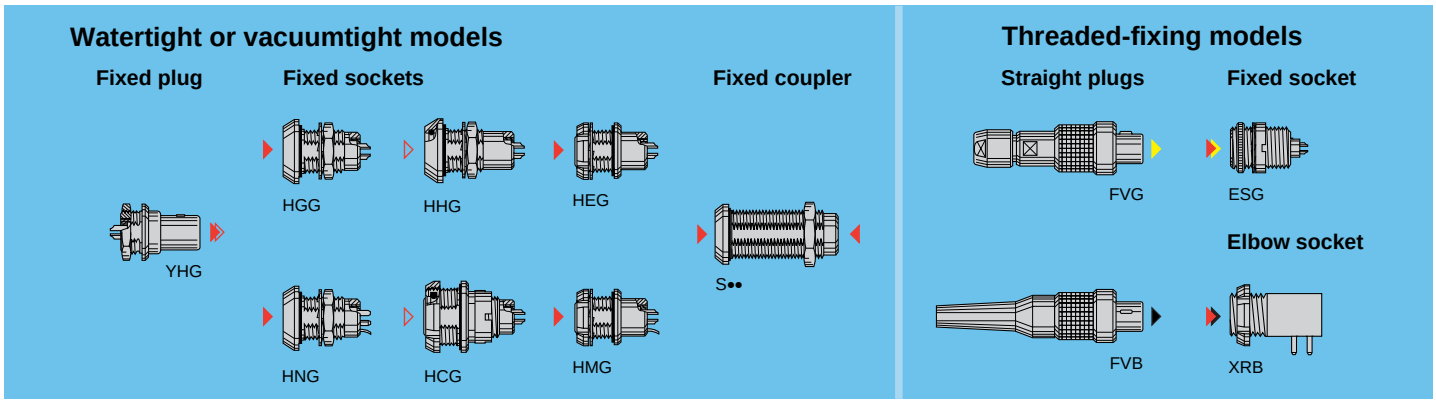
B Series

B series connectors provide the following main features:
– security of the Push-Pull self-latching system
– multipole types 2 to 64 contacts
– solder, crimp or print contacts (straight or elbow)
– keying system («G» key standard) for connector alignment
– multiple key options to avoid cross mating of similar connectors
– high packing density for space savings
– 360° screening for full EMC shielding.

Interconnections



Interconnections



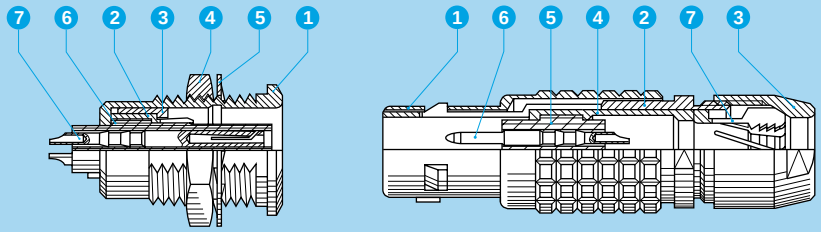
Model Description

CFF Bridge plug with two non-latching plugs
CRG Bridge plug with two non-latching plugs, and monitoring socket and key (G) or keys (A…M)
EBG Fixed socket, nut fixing, round flange, key (G) or keys (A…L and R), screw fixing (back panel mounting)
ECG Fixed socket with two nuts, key (G) or keys (A…M and R) (back panel mounting)
ECG Fixed socket with two nuts, key (G) or keys (A…F and R) and straight contact for printed circuit (back panel mounting)
ECG Fixed socket with two nuts, key (G) or keys (A…F) with elbow (90°) contact for printed circuit (back panel mounting)
EEG Fixed socket, nut fixing, key (G) or keys (A…M and R) (back panel mounting)
EFG Fixed socket, nut fixing, key (G) or keys (A…M), with two flats on the shell and O-ring (back panel mounting)
EGG Fixed socket, nut fixing, key (G) or keys (A…M and R)
EHG Fixed socket, nut fixing, key (G) or keys (A…M and R), and protruding shell
EJG Fixed socket, press or adhesive fit, key (G) or keys (A…M)
EKG Fixed socket, nut fixing, key (G) or keys (A…L and R), special alignment mark on the front
EMG Fixed socket, nut fixing, microswitch, key (G) or keys (A…L)
EMG Fixed socket, with two nuts, microswitch, key (G) or keys (A…L)
ENG Fixed socket with earthing tag, nut fixing, with key (G) or keys (A…M)
ENG Fixed socket with earthing tag, nut fixing, key (G or J), PEEK outer shell
ENY Fixed socket with earthing tag, nut fixing, keys (Y), PSU or PPSU outer shell
EPG Elbow (90°) socket for printed circuit, key (G) or keys (A…F) (solder or screw fixing)
ESG Fixed socket with two round nuts, key (G) or keys (A…L), long threaded shell (back panel mounting)
EXG Elbow (90°) socket for printed circuit with two nuts, key (G) or keys (A…F) (solder or screw fixing)
EYG Fixed socket for printed circuit, nut fixing, key (G) or keys (A…F) (back panel mounting)
EZG Straight socket for printed circuit, key (G) or keys (A…F)
FAG Fixed plug, non-latching, nut fixing, key (G) or keys (A…M and R)
FBG Fixed plug, nut fixing, round flange, key (G) or keys (A…L and R), screw fixing
FCG Straight plug, key (G) or keys (A…L and R), cable collet and safety locking ring
FDG Straight plug, long version, key (G) or keys (A…L), cable collet
FEG Straight plug, key (G) or keys (A…L), cable collet, front seal and nut for fitting a bend relief
FFG Straight plug, non-latching, key (G) or keys (A…M), cable collet
FGG Straight plug, key (G) or keys (A…M and R), cable collet
FGG Straight plug, key (G) or keys (A…M), cable collet and nut for fitting a bend relief
FGG Straight plug, key (G or J), cable collet, PEEK outer shell
FGY Straight plug, keys (Y), cable collet and PSU or PPSU outer shell
FGY Straight plug, keys (Y), cable collet and PSU or PPSU outer shell and nut for fitting a bend relief
FHG Elbow (90°) plug, key (G) or keys (A…M and R), cable collet
FIG Straight plug for remote handling, key (G) or keys (A…L and R), special alignment mark, knurled handling surface, cable collet
FKG Elbow (90°) plug for remote handling, key (G) or keys (A…L), special alignment mark, knurled handling surface, cable collet
FMG Elbow (90°) plug, key (G) or keys (A…M), cable collet and lanyard release
FNG Straight plug, key (G) or keys (A…M and R), cable collet and lanyard release
FTG Straight plug, key (G) and two parallel sockets
FYG Straight plug, conical shell, key (G) or keys (A…M), cable collet
FVB Straight plug, keys (B), threaded-fixing for special cable crimping
FVG Straight plug, key (G) or keys (A, B), cable collet, threaded-fixing
FWG Fixed plug, nut fixing, key (G) or keys (A…L)
FZG Straight plug for remote handling, key (G) or keys (A…L and R), cable collet
HCG Fixed socket, nut fixing, key (G) or keys (A…M), watertight or vacuumtight (back panel mounting)
HEG Fixed socket, nut fixing, key (G) or keys (A…M), or vacuumtight (back panel mounting)
HGG Fixed socket, nut fixing, key (G) or keys (A…M and R), watertight or vacuumtight
HHG Fixed socket, nut fixing, key (G) or keys (A…M), watertight or vacuumtight
HMG Fixed socket with earthing tag, nut fixing, key (G) or keys (A…M), watertight or vacuumtight (back panel mounting)
HNG Fixed socket, nut fixing, with earthing tag, key (G) or keys (A…M), watertight or vacuumtight
PEG Fixed socket, nut fixing, key (G) or keys (A…L), cable collet (back panel mounting)
PFG Fixed socket, with two nuts, key (G) or keys (A…M and R), cable collet (back panel mounting)
PHG Free socket, key (G) or keys (A…M and R), cable collet
PHG Free socket, key (G) or keys (A…M), cable collet and nut for fitting a bend relief
PKG Fixed socket, nut fixing, key (G) or keys (A…M and R), cable collet
PNG Free socket, nut fixing, key (G) or keys (A…L and R), cable collet with lanyard release
R•• Fixed coupler, nut fixing, key (G) or keys (A and J) at the flange end and keys (J, K or M) at the other end
S•• Fixed coupler, nut fixing, key (G) or keys (A, B, J, K and L) at the flange end and key (G) or keys (A, B, J, K and L) at the other end, watertight or vacuumtight
XBG Elbow (90°) socket fixing nut for printed circuit, key (G) or keys (A, B) (back panel mounting)
XPF Fixed socket, nut fixing, long shell, keys (F) for printed circuit (back panel mounting)
XRB Elbow (90°) socket fixing nut for printed circuit, keys (B), short shell, threaded-fixing (back panel mounting)
YHG Fixed plug, nut fixing, non-latching, key (G) or keys (A…M)

Part Section Showing Internal Components

Fixed socket

1. outer shell
2. earthing crown
3. retaining ring
4. hexagonal nut
5. locking washer
6. insulator
7. female contact



Straight plug

1. outer shell
2. latch sleeve
3. collet nut
4. split insert carrier
5. insulator
6. male contact
7. collet

Technical Characteristics

Mechanical and Climatical

Characteristics	Value	Standard
Endurance	> 5000 cycles	IEC 60512-5 test 9a
Humidity	up 95% to 60° C	
Temperature range[1)]	- 55° C, +250° 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	> 144h	IEC 60512-6 test 11f
Protection index (mated)	IP50	IEC 60529
Climatical category[1)]	55/175/21	IEC 60068-1

Electrical

Characteristics		Value	Standard
Shielding efficiency	at 10 MHz	> 75 dB	IEC 60169-1-3
	at 1 GHz	> 40 dB	IEC 60169-1-3

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 197.
[1)] for watertight or vacuumtight models see page 37.

Available Models (series and types)

Model	Multipole						
	00	0B	1B	2B	3B	4B	5B
CFF		●	●				
CRG		●	●				
EBG							●
ECG	●	●	●	●	●	●	●
ECG [2)]		●	●	●	●		
EEG	●	●	●	●	●		●
EFG		●					
EGG	●	●	●	●	●	●	●
EHG	●	●	●	●	●		●
EJG		●	●	●			
EKG				●	●	●	●
EMG		●	●	●			
ENG		●	●	●	●	●	
ENG [3)]			●		●	●	
ENY [4)]				●	●		
EPG	●	●	●				
ESG	●		●				
EXG		●	●				
EYG		●	●				
EZG	●	●	●	●			

Model	Multipole						
	00	0B	1B	2B	3B	4B	5B
FAG	●	●	●	●	●	●	●
FBG							●
FCG			●			●	●
FDG			●	●			
FEG			●	●	●		
FFG		●	●	●	●	●	
FGG	●	●	●	●	●	●	●
FGG [5)]	●	●	●	●	●	●	
FGG [3)]			●		●	●	
FGY [4) 6)]				●	●		
FGY [4) 5) 6)]				●	●		
FHG	●	●	●	●	●	●	●
FIG				●	●	●	●
FKG					●	●	
FMG		●					
FNG		●	●	●	●	●	●
FTG [1)]		●					
FVB	●						
FVG	●						
FWG			●	●			

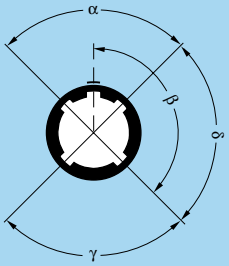
Model	Multipole						
	00	0B	1B	2B	3B	4B	5B
FYG		●					
FZG				●	●	●	●
HCG		●	●	●			
HEG				●			
HGG	●	●	●	●	●	●	●
HHG		●	●	●	●		
HMG		●	●		●		
HNG		●					
PEG					●	●	
PFG	●	●	●	●	●	●	●
PHG	●	●	●	●	●	●	●
PHG [5)]	●	●	●	●	●	●	
PKG	●	●	●	●	●	●	●
PNG			●	●	●	●	●
R●●		●	●	●	●	●	
S●●		●	●	●	●	●	●
XBG	●						
XRB	●						
XPF		●					
YHG		●	●	●	●		

Note:
CFF, CRG, EMG, EPG, EXG and FTG models are not available in all types. Please consult pages corresponding to the models.
[1)] only available with «G» key
[2)] with elbow (90°) print contact
[3)] with PEEK outer shell
[4)] only available with «Y» key
[5)] with nut for fitting a bend relief
[6)] with PSU or PPSU outer shell
● = available models by series and types

Alignment Key and Polarized Keying System

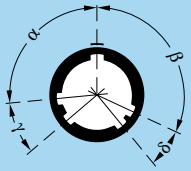
B series connector model part numbers are composed of three letters. The LAST LETTER indicates the key position and the contact type (male or female).
For example, straight plugs with «G» key or A, B, C, D, E, F, R or Y keys, are fitted with male contacts, whereas with J, K, L, M keys, plugs are fitted with female contacts.
Sockets with «G» key or A, B, C, D, E, F, R or Y keys, are fitted with female contacts; whereas with J, K, L, M keys, sockets are fitted with male contacts.

Front view of a socket



Model	Nb of keys	Angles	Series 00	Series 0B	Series 1B	Angles	Series 2B	Series 3B	Series 4B	Series 5B	Contact type Plug	Contact type Socket	Contact type Coupler 1)	Note
●●G	1		0°	0°	0°		0°	0°	0°	0°	male	female	male-female	●
●●A	2	α	30°	30°	30°	α	30°	30°	30°	30°	male	female	male-female	●
●●B	2	α	60°	60°	60°	α	45°	45°	45°	45°	male	female	male-female	●
●●C	2	α	–	90°	90°	α	60°	60°	60°	60°	male	female	male-female	●
●●D	2	β	–	135°	135°	γ	95°	95°	95°	95°	male	female	male-female	○
●●E	2	β	–	145°	145°	β	120°	120°	120°	120°	male	female	male-female	○
●●F	2	β	–	155°	155°	β	145°	145°	145°	145°	male	female	male-female	○
●●J	2	γ	45°	45°	45°	α	37.5°	37.5°	37.5°	37.5°	female	male	female-male	●
●●K	2	γ	–	70°	70°	α	52.5°	52.5°	52.5°	52.5°	female	male	female-male	○
●●L	2	γ	–	80°	80°	γ	70°	70°	70°	70°	female	male	female-male	○
●●M	2	δ	–	110°	–	–	–	–	–	–	female	male	female-male	○
●●Y	3	–	–	–	–	β	112.5°	126°	–	–	male	female	–	●2)
		–	–	–	–	γ	100°	102°	–	–				

Front view of a socket



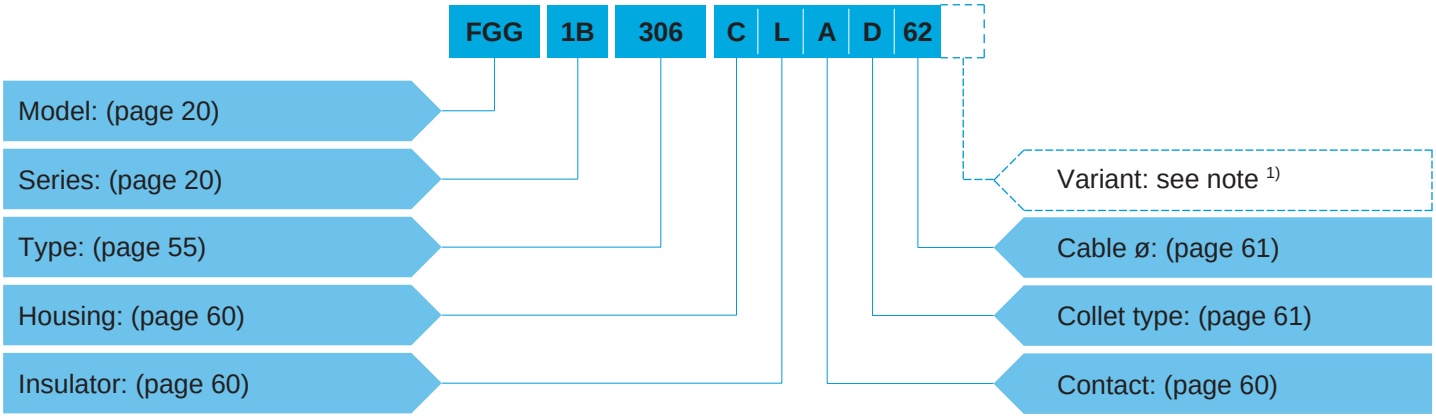
Model	Nb of keys	Angles	Series 00	Series 0B	Series 1B	Angles	Series 2B	Series 3B	Series 4B	Series 5B	Contact type Plug	Contact type Socket	Contact type Coupler 1)	Note
●●R	5	α	–	–	–	α	–	–	–	95°	male	female	male-female	●
		β	–	–	–	β	–	–	–	115°				
		γ	–	–	–	γ	–	–	–	20°				
		δ	–	–	–	δ	–	–	–	30°				

Note:
FTG, FGY, ENY models are not available with all the keys. Please consult pages corresponding to these models.
For R●● models see explanation on page 32 and for S●● models see explanation on page 39.
1) the first contact type mentioned is always the one at the flange end.
2) only FGY and ENY models are available.

● First choice alternative ○ Special order alternative

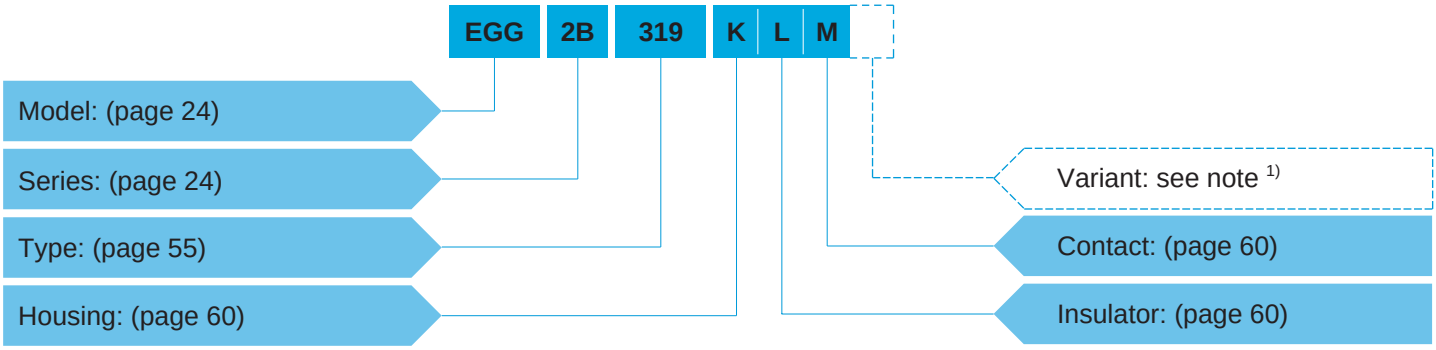
Part Number Example

Straight plug with cable collet



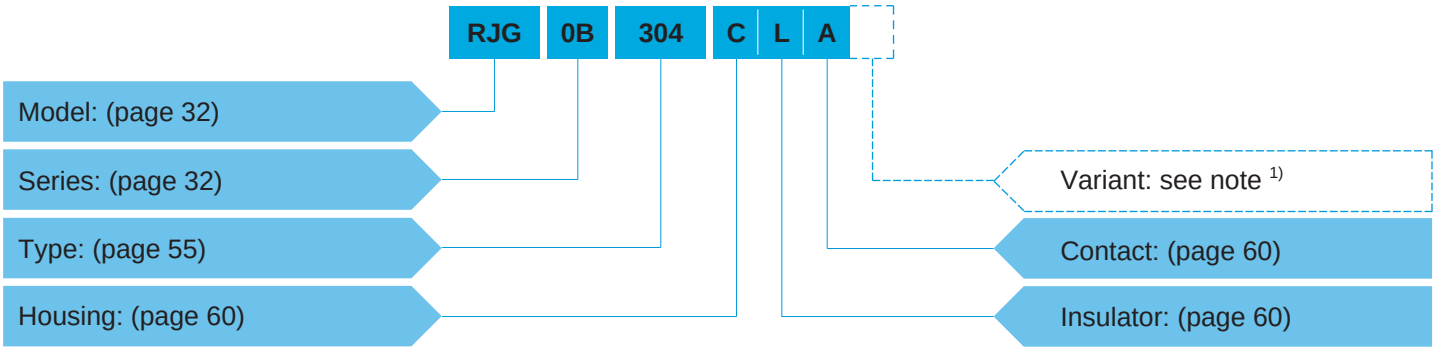
FGG.1B.306.CLAD62 = straight plug with key (G) and cable collet, 1B series, multipole type with 6 contacts, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, D type collet for 6.0 mm diameter cable.

Fixed socket



EGG.2B.319.KLM = fixed socket, nut fixing, with key (G), 2B series, multipole type with 19 contacts, black chrome-plated brass outer shell, PEEK insulator, female crimp contacts.

Fixed coupler

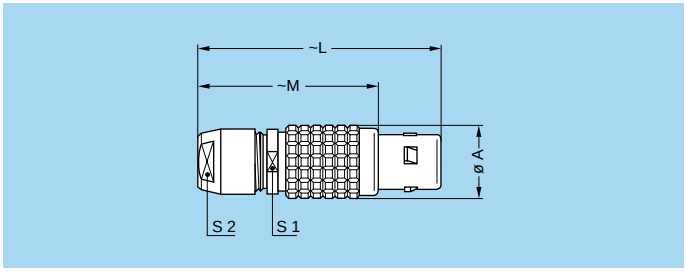


RJG.0B.304.CLA = straight fixed coupler with keys (J) at the flange end and key (G) at the other end, 0B series, multipole type with 4 contacts, chrome-plated brass outer shell, PEEK insulator, male-female contacts.

Note: 1) 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, or the colour of the bridge plug housing.
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 66.
For the watertight models of socket, the letter «P» is used; for the vacuumtight models of socket the letters «PV» shall be indicated.

Models - Series

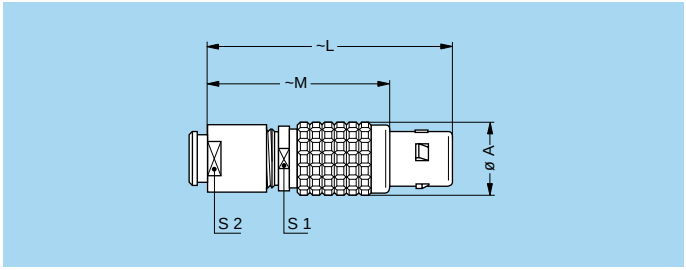
FGG Straight plug, key (G) or keys (A…M and R), cable collet



Reference		Dimensions (mm)				
Model	Series	A	L	M	S1	S2
FGG	00[1)]	6.4	28.5	20.5	5.5	5
FGG	0B	9.5	36.0	26.0	8.0	7
FGG	1B	12.0	43.0	32.0	10.0	9
FGG	2B	15.0	50.0	38.0	13.0	12
FGG	3B	18.0	58.0	43.0	15.0	14
FGG	4B	25.0	75.0	57.0	21.0	20
FGG	5B	35.0	103.0	78.0	31.0	30

Note: [1)] the surface design of the 00 series is different.

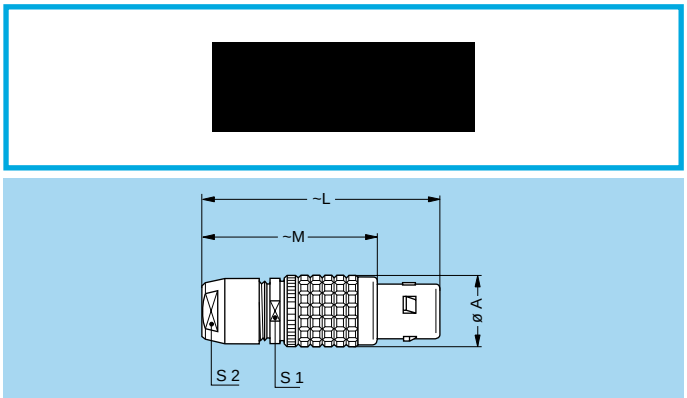
FGG Straight plug, key (G) or keys (A…M), cable collet and nut for fitting a bend relief



Reference		Dimensions (mm)				
Model	Series	A	L	M	S1	S2
FGG	00[1)]	6.4	27.5	18.5	5.5	5
FGG	0B	9.5	35.0	25.0	8.0	7
FGG	1B	12.0	42.0	33.0	10.0	9
FGG	2B	15.0	48.0	36.0	13.0	12
FGG	3B	18.0	56.5	41.5	15.0	15
FGG	4B	25.0	71.0	53.0	21.0	20

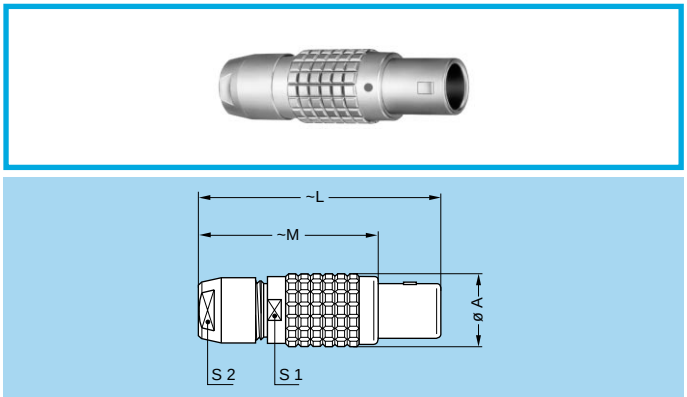
Note: [1)] the surface design of the 00 series is different.
The bend relief must be ordered separately (see page 175).

FCG Straight plug, key (G) or keys (A…L and R), cable collet and safety locking ring



Reference		Dimensions (mm)				
Model	Series	A	L	M	S1	S2
FCG	1B	12	43	32	10	9
FCG	4B	25	75	57	21	20
FCG	5B	35	103	78	31	30

FFG Straight plug, non-latching, key (G) or keys (A…M), cable collet



Reference		Dimensions (mm)				
Model	Series	A	L	M	S1	S2
FFG	0B	9.5	36	26	8	7
FFG	1B	12.0	43	32	10	9
FFG	2B	15.0	49	37	13	12
FFG	3B	18.0	58	43	15	14
FFG	4B	25.0	75	57	21	20

Bridge plug

The LEMO audio-video connector system consists of two sockets, with or without microswitch, a bridge plug with or without output monitoring and a plug with or without bend relief. This system is already widely used in telecommunication equipment and in radio and television broadcasting centres.
The connectors of this system are fully compatible with all other connector models of the same series and type. However, when designing systems it should be considered that the distance between the assembled nut-fixing models should correspond to that between the outputs of the bridge plug. In order to provide the user with a coding system, the bridge plug housing, the double panel washers and the bend reliefs are available in nine colours.

Technical Characteristics

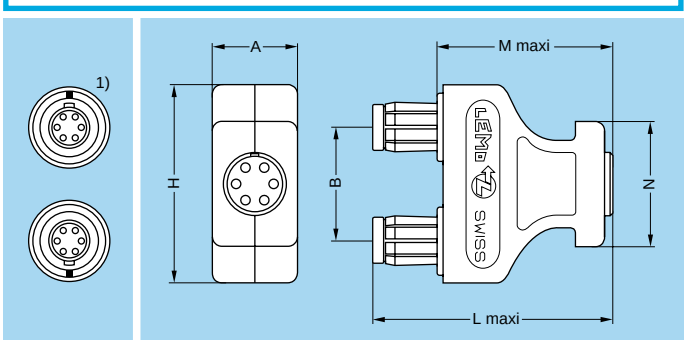
Mechanical and Climatical

Characteristics	Value	Standard
Endurance	> 1000 cycles	IEC 60512-5 test 9a
Working temperature	maximum 90° C	

Materials and Treatment

Component	Material	Surface treat. (µm)			
		Cu	Ni	Cr	Au
Plastic housing	Polyamide	–			
Metallic parts	Brass	0.5	3	–	–
	Brass	0.5	3	0.3	–
Insulator	PEEK	–			
Male contact	Brass	0.5	3	–	1.0
Female contact	Bronze	0.5	3	–	1.5

Note: the surface treatment standards are as follows:
– Nickel: FS QQ-N-290A
– Chrome: FS QQ-C-320B
– Gold: ISO 4523



Electrical

Characteristics	Value	Standard
Contact resistance	< 6 mΩ	IEC 60512-2 test 2a

Characteristics	Series	Audio-Mono	Audio-Stereo	Test voltage (kV rms) 1) 2)	Rated current (A)
CFF.0B.302.PLCG	0B	●	–	1.05	4
CRG.0B.302.PLEG	0B	●	–	1.05	4
CFF.0B.303.PLCG	0B	●	–	0.80	4
CRG.0B.303.PLEG	0B	●	–	0.80	4
CRG.0B.306.PLEG	0B	–	●	0.40	2
CFF.1B.303.PLCG	1B	●	–	1.25	5
CRG.1B.303.PLEG	1B	●	–	1.25	5
CFF.1B.306.PLCG	1B	–	●	0.80	3
CRG.1B.306.PLEG	1B	–	●	0.80	3

Note: the last letter of the part number indicates the colour of the housing. Ex. G (standard) is grey. To obtain another colour, replace this letter by the letter corresponding to the selected colour (see table on page 66).
1) see calculation method, caution and suggested standard on page 204.
2) lowest measured value; contact to contact or contact to shell.

CFF Bridge plug with two non-latching plugs

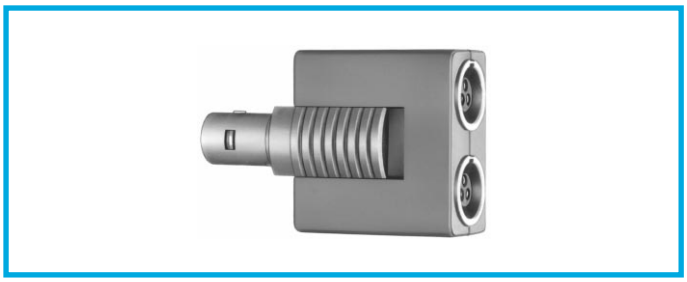
CRG Bridge plug with two non-latching plugs, and monitoring socket, key (G) or keys (A…M)

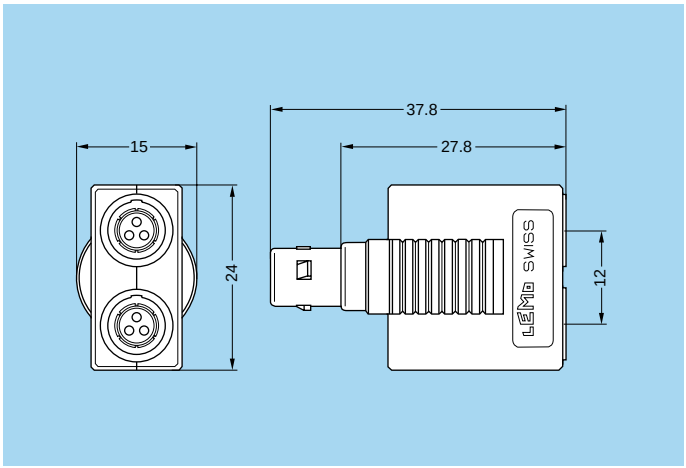
Reference		Dimensions (mm)					
Model	Series	A	B	H	L	M	N
CFF-CRG	0B	13.5	14	27.5	37.2	27.2	22.5
CFF-CRG	1B	15.0	20	35.0	42.0	31.0	22.0

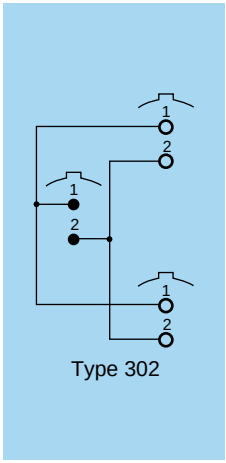
Note:
1) sockets are to be mounted with the keys mounted on the opposite side.

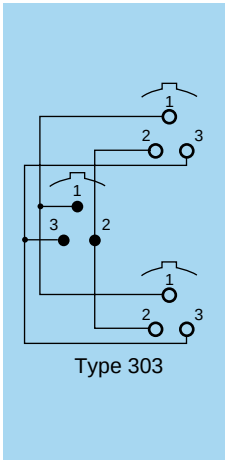
Plugs with parallel sockets

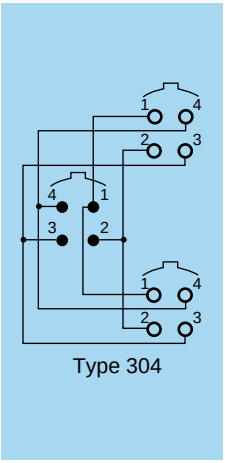
These plug models have been designed to divide one or more signals originating from the same source to two different points. They are used in various fields of application, particularly in audio signal transmission.











FTG Straight plug, key (G) and two parallel sockets

Reference
FTG.0B.302.PLFG
FTG.0B.303.PLFG
FTG.0B.304.PLFG

Technical Characteristics

Electrical

Model	Number of contacts	Test voltage (kV rms) 1) 2)	Nominal current (A)
FTG.0B.302.PLFG	2	1.05	4
FTG.0B.303.PLFG	3	0.80	4
FTG.0B.304.PLFG	4	0.80	3

Materials and Treatment

Component	Material	Surface treat. (µm)			
		Cu	Ni	Cr	Au
Plastic housing	Polyamide	–			
Metallic parts	Brass	0.5	3	–	–
	Special brass	0.5	3	0.3	–
Insulator	PEEK	–			
Male contact	Brass	0.5	3	–	1.0
Female contact	Bronze	0.5	3	–	1.5

Note:
1) see calculation method, caution and suggested standard on page 204.
2) lowest measured value; contact to contact or contact to shell.
The surface treatment standards are as follows:
– Nickel: FS QQ-N-290A
– Chrome: FS QQ-C-320B
– Gold: ISO 4523

Plastic housing models

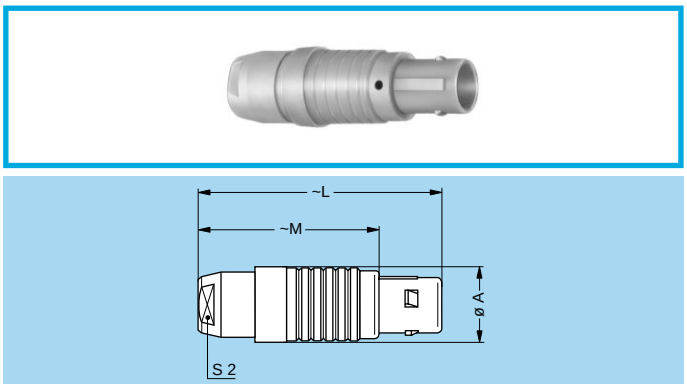
FGG, FGY, ENG and ENY plug and socket models are available with the outer shell and collet nut made with various insulating materials.
These connectors are particularly recommended for all applications requiring maximum electrical insulation when mated. The design, including a latch sleeve and a metal earthing crown, guarantees EMC screening efficiency to meet most requirements.

Technical Characteristics

Mechanical and Climatical

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 [1)]	> 200 cycles	~20 cycles	> 100 cycles	IEC 60601-1 § 44.7
Resistance to solvents	very good	limited	good	–

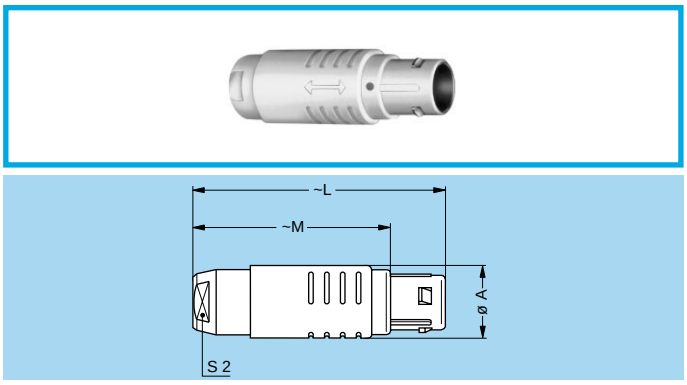
Note: [1)] Steam sterilization



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

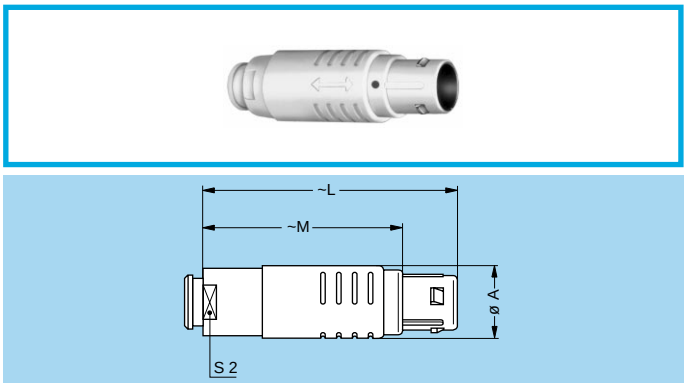
Reference		Dimensions (mm)			
Model	Series	A	L	M	S2
FGG	1B	13.5	43.0	32.0	10
FGG	3B	19.0	62.0	47.0	15
FGG	4B	26.0	78.5	60.5	20

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

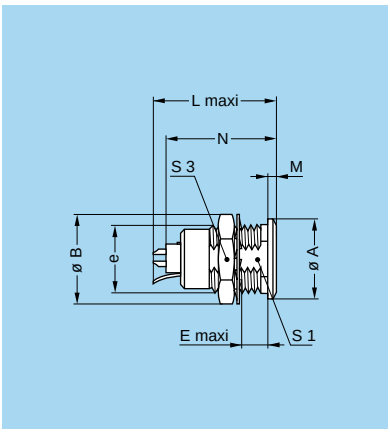
Reference		Dimensions (mm)			
Model	Series	A	L	M	S2
FGY	2B	16.5	50.5	39.5	13
FGY	3B	19.0	58.0	43.0	15



FGY 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	49.5	38.5	13
FGY	3B	19.0	56.5	41.5	15

Note: the bend relief must be ordered separately (see page 175)

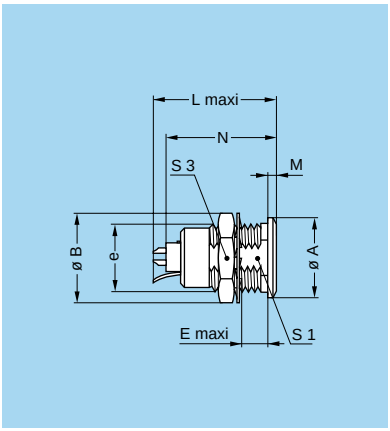


ENG Fixed socket with earthing tag, nut fixing, key (G or J), PEEK outer shell

Reference		Dimensions (mm)								
Model	Series	A	B	e	E	L	M	N[1)]	S1	S3
ENG	1B	14	16.0	M12x1.0	7.5	23.0	1.5	21.1	10.5	14
ENG	3B	22	25.0	M18x1.0	11.5	30.7	2.0	28.1	16.5	22
ENG	4B	28	32.0	M25x1.0	12.0	35.7	2.5	32.6	23.5	30

Panel cut-out: **P1**

Note: [1)] maximum length with crimp contacts.



ENY Fixed socket with earthing tag, nut fixing, keys (Y), PSU or PPSU outer shell

Reference		Dimensions (mm)								
Model	Series	A	B	e	E	L	M	N[1)]	S1	S3
ENY	2B	18	19.5	M15x1.0	8.5	26.7	1.8	24.6	13.5	17
ENY	3B	22	25.0	M18x1.0	11.5	30.7	2.0	28.1	16.5	22

Panel cut-out: **P1**

Note: [1)] maximum length with crimp contacts.

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

Watertight or vacuumtight models

YHG, HGG, HCG, HNG, HHG, HMG and S●● plug, socket or coupler models allow the device on which they are fitted to reach a protection index of IP68 as per IEC 60529. They are fully compatible with plugs of the same series and are widely used for portable radios, military, laboratory equipment, aviation, etc.
These models are identified by a letter «P» at the end of the reference.
Most of these models are also available in a vacuumtight version. Such models are identified by an additional letter «V» at the end of the part number (certificate on request).
Epoxy resin is used to seal these models.
Please refer to page 8 to locate the chapter on selecting watertight connectors.

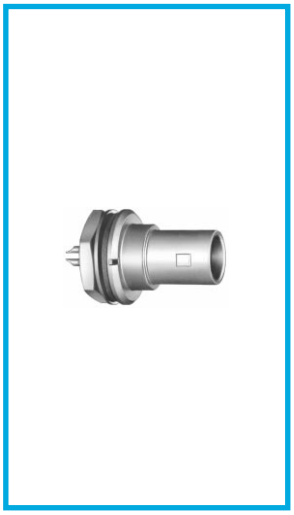
Part number example:
Watertight socket: HGG.1B.306.CLLP
Vacuumtight socket: HGG.1B.306.CLLPV

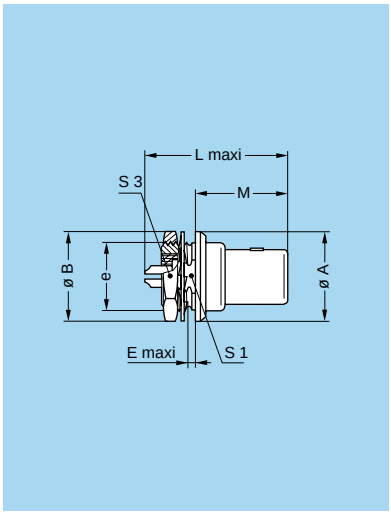
Technical Characteristics

Mechanical and Climatical

Charateristics		Value	Standard
Endurance		> 5000 cycles	IEC 60512-5 test 9a
Humidity		up to 95% at 60° C	
Temperature range		- 20° C/+80° C	
Salt spray corrosion test		> 144h	IEC 60512-6 test 11f
Protection index (mated)		IP 68	IEC 60529
Climatical category		20/80/21	IEC 60068-1
Leakage rate (He)[1)]		< 10^{-6} mbar.l.s^{-1}	IEC 60512-7 test 14b
Maximum operating pressure[2)]	00	60 bars	IEC 60512-7 test 14d
	0B	60 bars	
	1B	60 bars	
	2B	40 bars	
	3B	30 bars	
	4B	15 bars	
	5B	5 bars	

Note:
1) only for vacuumtight models.
2) this value corresponds to the maximum allowed pressure difference for the assembled socket.



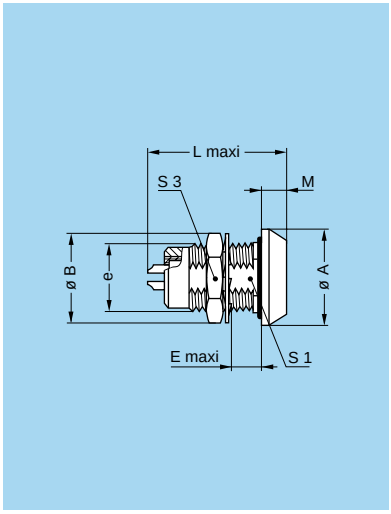


YHG Fixed plug, nut fixing, non-latching, key (G) or keys (A…M)

Reference		Dimensions (mm)							
Model	Series	A	B	e	E	L	M	S1	S3
YHG	0B	14.0	12.5	M9x0.6	2.5	21.2	14.6	8.2	11
YHG	1B	16.0	16.0	M12x1.0	4.5	25.0	16.4	10.2	14
YHG	2B	19.5	19.5	M15x1.0	4.0	31.5	18.2	13.5	17
YHG	3B	22.0	25.2	M18x1.0	5.0	34.0	22.4	16.5	22

Panel cut-out: **P9**

Note: this model does not include an O-ring behind the flange, it ensures only IP61 protection index. Consequently, it is not vacuumtight. Watertightness (when mated) is only ensured with HHG and HCG sockets.

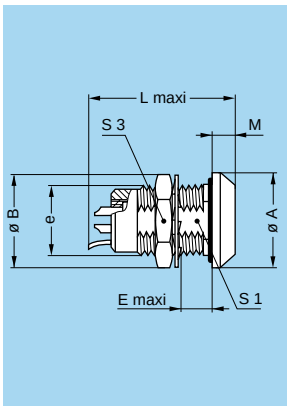


HGG Fixed socket, nut fixing, key (G) or keys (A…M and R), watertight or vacuumtight

Reference		Dimensions (mm)							
Model	Series	A	B	e	E	L	M	S1	S3
HGG	00	11	10.3	M7x0.5	8.0	18.3	1.5	–	9
HGG	0B	13	12.5	M9x0.6	7.0	20.7	3.0	8.2	11
HGG	1B	18	16.0	M12x1.0	7.0	26.0	4.5	10.5	14
HGG	2B	20	19.5	M15x1.0	8.0	29.7	4.0	13.5	17
HGG	3B	25	25.0	M18x1.0	11.5	36.2	4.0	16.5	22
HGG	4B	34	32.0	M25x1.0	11.0	44.7	4.0	23.5	30
HGG	5B	45	40.0	M35x1.0	11.0	51.7	5.0	33.5	–

Panel cut-out: **P9**

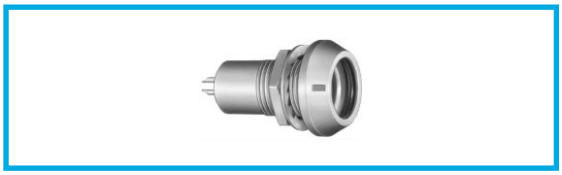
Note: the 5B series is delivered with a tapered washer and a round nut.

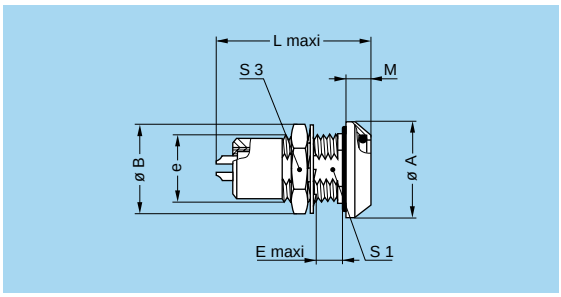


HNG Fixed socket, nut fixing, with earthing tag, key (G) or keys (A…M), watertight or vacuumtight

Reference		Dimensions (mm)							
Model	Series	A	B	e	E	L	M	S1	S3
HNG	0B	13	12.5	M9x0.6	7	20.7	3	8.2	11

Panel cut-out: **P9**

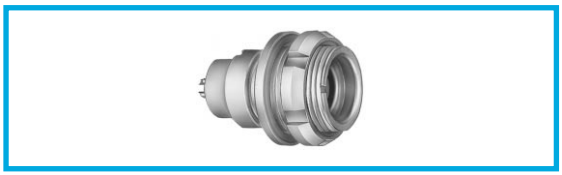


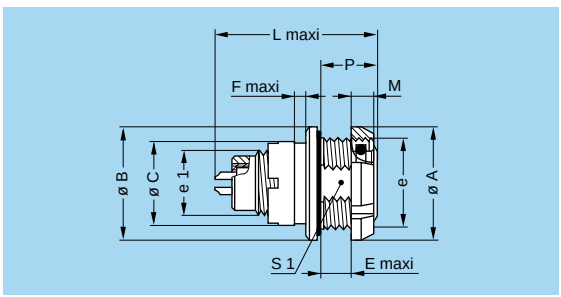


HHG Fixed socket, nut fixing, key (G) or keys (A…M), watertight or vacuumtight (watertight when mated)

Reference		Dimensions (mm)							
Model	Series	A	B	e	E	L	M	S1	S3
HHG	0B	13	12.5	M9x0.6	7.0	23.7	4.8	8.2	11
HHG	1B	18	16.0	M12x1.0	7.0	29.7	5.2	10.5	14
HHG	2B	22	19.5	M15x1.0	8.0	33.7	6.0	13.5	17
HHG	3B	25	25.2	M18x1.0	11.5	41.4	7.2	16.5	22

Panel cut-out: **P9**

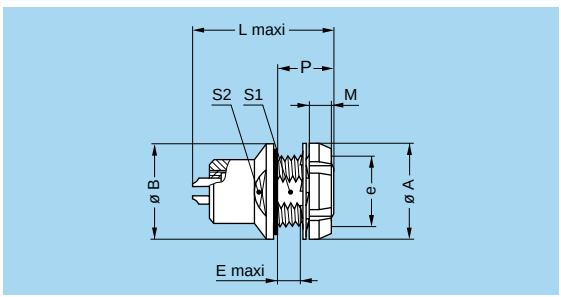




HCG Fixed socket, nut fixing, key (G) or keys (A…M), watertight or vacuumtight (watertight when mated) (back panel mounting)

Reference		Dimensions (mm)									
Model	Series	A	B	C	e	e1	E	F	L	M	P	S1
HCG	0B	18	18	12.0	M14x1.0	M9x0.6	3.9	1.0	23.7	3.5	7.5	12.5
HCG	1B	20	20	14.5	M16x1.0	M12x1.0	6.2	2.0	29.7	3.5	10.0	14.5
HCG	2B	24	24	17.5	M19x1.0	M14x1.0	6.7	1.5	33.7	3.5	11.3	17.0

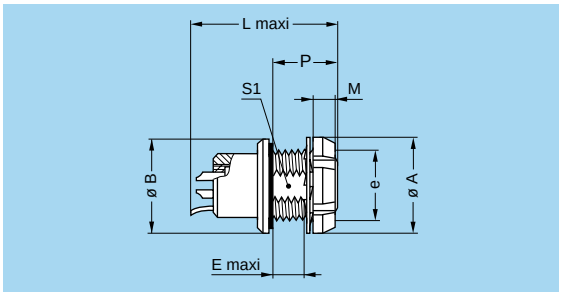
Panel cut-out: **P3**



HEG Fixed socket, nut fixing, key (G) or keys (A…M), watertight or vacuumtight (back panel mounting)

Reference		Dimensions (mm)								
Model	Series	A	B	e	E	L	M	P	S1	S2
HEG	2B	20	20	M15x1.0	5.4	33.7	3.5	9.6	13.5	15

Panel cut-out: **P9**



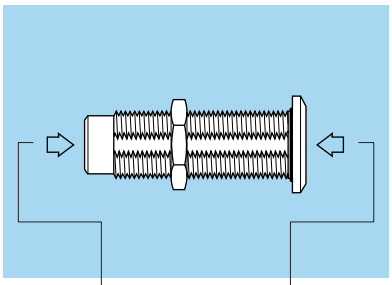
HMG Fixed socket with earthing tag, nut fixing, key (G) or keys (A…M), watertight or vacuumtight
(back panel mounting)

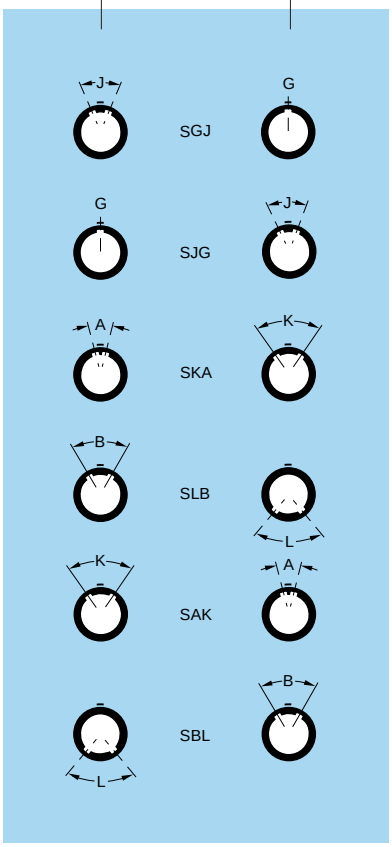
Reference		Dimensions (mm)							
Model	Series	A	B	e	E	L	M	P	S1
HMG	0B	12	13	M9x0.6	4.7	20.7	2.5	9.0	8.2
HMG	1B	16	18	M12x1.0	5.5	26.0	3.5	11.0	10.5
HMG	3B	24	25	M18x1.0	7.5	36.2	4.5	13.6	16.5

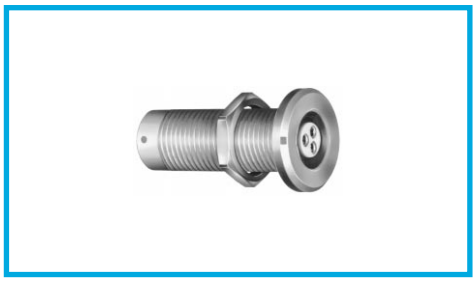
Panel cut-out: **P9**

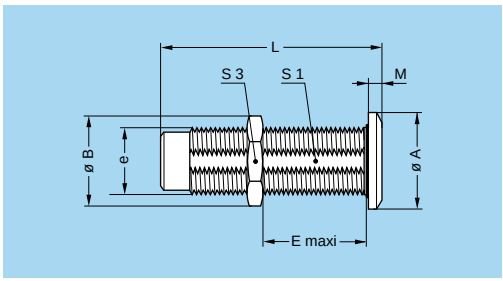
Note: the 3B series is delivered with a conical nut.

S●● Fixed coupler, nut fixing, key (G) or keys (A, B, J, K and L) at the flange end and key (G) or keys (A, B, J, K and L) at the other end, watertight or vacuumtight









Reference		Contacts	Dimensions (mm)							
Model	Series	Type	A	B	e	E	L	M	S1	S3
SGJ	0B	female – male	14	13.8	M10x0.75	17	34	2.0	9.0	12
SJG		male – female								
SGJ	1B	female – male	17	16.0	M12x1.00	28	39	2.5	10.5	14
SJG		male – female								
SGJ	2B	female – male	20	21.8	M16x1.00	25	44	4.0	15.0	19
SJG		male – female								
SGJ	3B	female – male	25	27.1	M20x1.00	30	53	4.0	18.5	24
SJG		male – female								
SAK		female – male								
SBL		female – male								
SAK	4B	female – male	34	32.0	M25x1.00	50	65	4.0	23.5	30
SBL		female – male								
SGJ		female – male								
SJG		male – female								
SGJ	5B	female – male	45	40.0	M35x1.00	58	80	5.0	33.5	–
SJG		male – female								
SKA		male – female								
SLB		male – female								
SAK		female – male								
SBL		female – male								

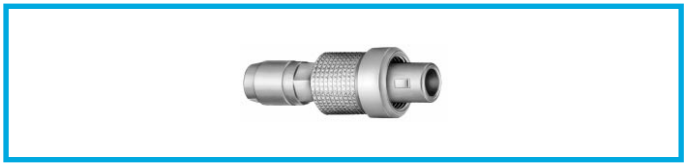
Panel cut-out: **P4**

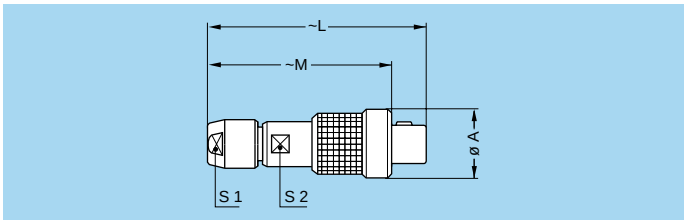
Panel cut-out: **P9** 1B series

Note: for this fixed coupler, the first contact type mentioned is always the one at the flange end.
On request these couplers can be produced in other series, with other keys.
The 5B series is delivered with a round nut.

Threaded-fixing models

The 00 multipole series includes two threaded-fixing plug models. These plugs can be mated with sockets with a threaded front end (XRB or ESG). Plugs include an O-ring guaranteeing an IP64 protection index when mated.

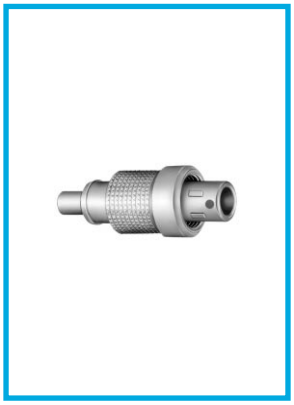


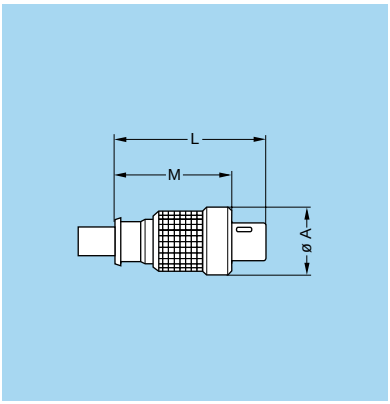


FVG Straight plug, key (G) or keys (A, B), cable collet, threaded-fixing

Reference		Dimensions (mm)				
Model	Series	A	L	M	S1	S2
FVG	00	9	28.5	24	5	5

Note: to be ordered with nut for fitting a bend relief to obtain the rating IP 64.

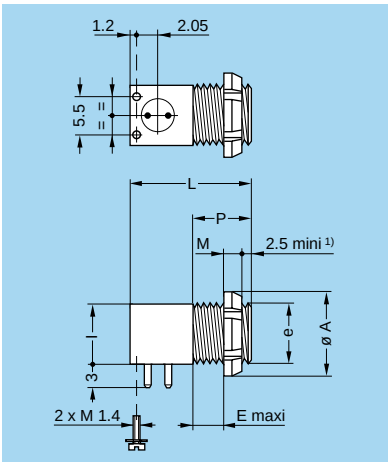




FVB Straight plug, keys (B), threaded-fixing for special cable crimping

Reference		Dimensions (mm)		
Model	Series	A	L	M
FVB	00	9	20	15.4

Note: after assembly the special bend relief GMF.00.018.D● (to be ordered separately) is to be fitted.

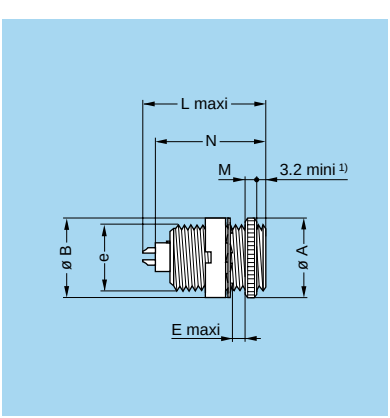


XRB Elbow (90°) socket fixing nut for printed circuit, keys (B), short shell, threaded-fixing
(back panel mounting)

Reference		Dimensions (mm)						
Model	Series	A	e	E	I	L	M	P
XRB	00	10	M7x0.5	1.8	7	14	2.5	7

Panel cut-out: **P2** PCB drilling pattern: **P18** for contact only

Note: 1) minimum length of free thread to ensure mating.



ESG Fixed socket with two round nuts, key (G), or keys (A, B), long threaded shell
(back panel mounting)

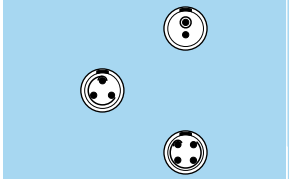
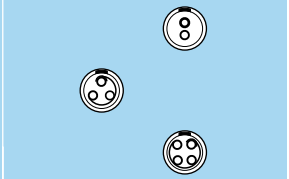
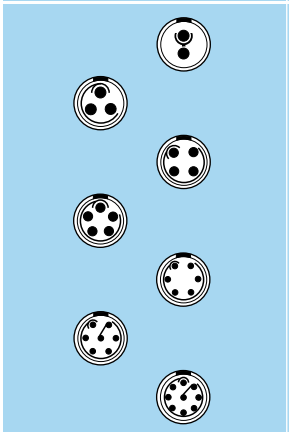
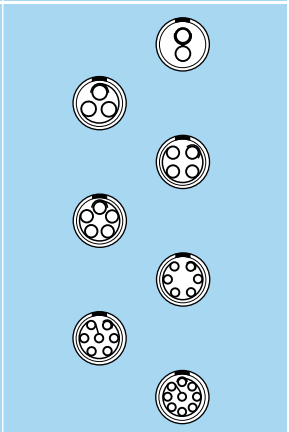
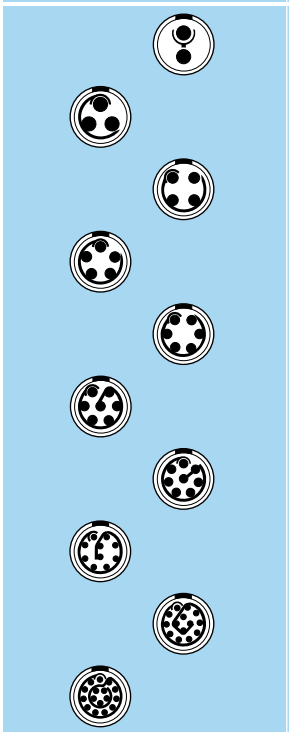
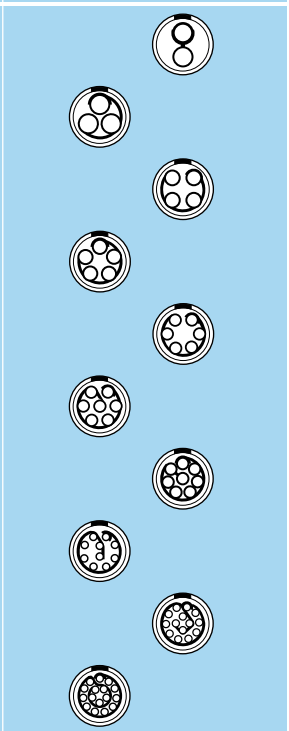
Reference		Dimensions (mm)						
Model	Series	A	B	e	E	L	M	N
ESG	00	9.5	9	M7x0.5	4.2	15.5	2	13.7

Panel cut-out: **P2**

Note: 1) minimum length of free thread to ensure mating.

Type (B and K series)

Multipole

	Male solder contacts	Female solder contacts	Male crimp contacts	Female crimp contacts	Reference	Number of contacts	ø A (mm)	Contact type: Solder	Contact type: Crimp	Contact type: Print (straight)	Contact type: Print (elbow)	Solder contact: Test voltage (kV rms)[1] Contact-contact	Solder contact: Test voltage (kV rms)[1] Contact-shell	Crimp contact: Test voltage (kV rms)[1] Contact-contact	Crimp contact: Test voltage (kV rms)[1] Contact-shell	Rated current (A)[1]
00					302	2	0.5	●	●	●	○	1.00	0.95	1.15	1.20	5.0
					303	3	0.5	●	●	●	○	0.80	0.95	1.35	1.10	3.0
					304	4	0.5	●	●	●	○	0.80	0.65	1.05	1.05	2.0
0B 0K					302	2	0.9	●	●	●	●	1.30	1.05	1.45	1.20	10.0[2]
					303	3	0.9	●	●	●	●	1.20	0.90	1.70	1.60	8.0[2]
					304	4	0.7	●	●	●	●	0.85	0.70	1.35	1.10	7.0[2]
					305	5	0.7	●	●	●	●	1.00	0.70	1.25	1.20	6.5[2]
					306	6	0.5	●	●	●	●	0.85	0.65	1.40	1.20	2.5
					307	7	0.5	●	●	●	●	0.80	0.70	1.40	1.20	2.5
					309	9	0.5	●	●	○	○	0.60	0.50	1.00	0.85	2.0
1B 1K					302	2	1.3	●	●	●	●	1.50	1.35	1.70	1.45	15.0[3]
					303	3	1.3	●	●	●	●	1.30	1.55	1.60	1.85	12.0
					304	4	0.9	●	●	●	●	1.35	1.45	1.70	1.80	10.0[2]
					305	5	0.9	●	●	●	●	1.25	1.15	1.30	1.55	9.0[2]
					306	6	0.7	●	●	●	●	1.05	1.20	1.35	1.45	7.0[2]
					307	7	0.7	●	●	●	●	0.95	1.05	1.45	1.45	7.0[2]
					308	8	0.7	●	●	●	●	0.95	1.15	1.30	1.30	5.0
					310	10	0.5	●	●	●	●	0.90	1.50	1.20	1.80	2.5
					314	14	0.5	●	●	●	●	0.80	1.20	0.95	1.60	2.0
					316	16	0.5	●	●	●	○	0.80	1.25	0.95	1.60	1.5

● First choice alternative ○ Special order alternative

Note: [1] **see calculation method, caution and suggested standard on page 204.**
[2] rated current = 6A for socket with elbow (90°) contact for printed circuit.
[3] rated current = 12A for socket with elbow (90°) contact for printed circuit.

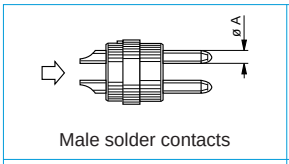
Multipole

Male solder contacts	Female solder contacts	Male crimp contacts	Female crimp contacts	Reference	Number of contacts	ø A (mm)	Contact type: Solder	Contact type: Crimp	Contact type: Print (straight)	Contact type: Print (elbow)	Solder contact: Test voltage (kV rms)[1] Contact-contact	Solder contact: Test voltage (kV rms)[1] Contact-shell	Crimp contact: Test voltage (kV rms)[1] Contact-contact	Crimp contact: Test voltage (kV rms)[1] Contact-shell	Rated current (A)[1]
2B 2K				302	2	2.0	●	●	●	○	2.10	1.75	2.85	2.70	30.0[3]
				303	3	1.6	●	●	●	●	2.40	1.85	1.90	1.90	17.0[3]
				304	4	1.3	●	●	●	●	1.85	1.85	2.20	2.20	15.0[3]
				305	5	1.3	●	●	●	●	1.75	1.60	2.15	2.15	14.0[3]
				306	6	1.3	●	●	●	●	1.35	1.45	2.00	2.35	12.0
				307	7	1.3	●	●	●	●	1.75	1.60	1.95	2.15	11.0
				308	8	0.9	●	●	●	●	1.50	1.25	1.95	1.95	10.0[2]
				310	10	0.9	●	●	●	●	1.45	1.30	1.80	2.10	8.0[2]
				312	12	0.7	●	●	●	●	1.25	1.35	1.65	2.00	7.0[2]
				314	14	0.7	●	●	●	●	1.15	1.35	1.55	1.95	6.5[2]
				316	16	0.7	●	●	●	●	0.95	1.25	1.55	1.75	6.0
				318	18	0.7	●	●	●	●	0.85	1.20	1.45	2.10	5.5
				319	19	0.7	●	●	●	●	0.95	1.25	1.55	1.65	5.0
				326	26	0.5	●	●	○	–	0.95	1.30	1.20	1.80	2.0
				332	32	0.5	●	●	○	–	0.80	1.2	0.95	1.60	1.5

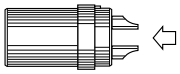
● First choice alternative ○ Special order alternative

Note: [1] **see calculation method, caution and suggested standard on page 204.**
[2] rated current = 6A for socket with elbow (90°) contact for printed circuit.
[3] rated current = 12A for socket with elbow (90°) contact for printed circuit.

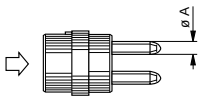
Multipole



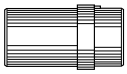
Male solder contacts



Female solder contacts

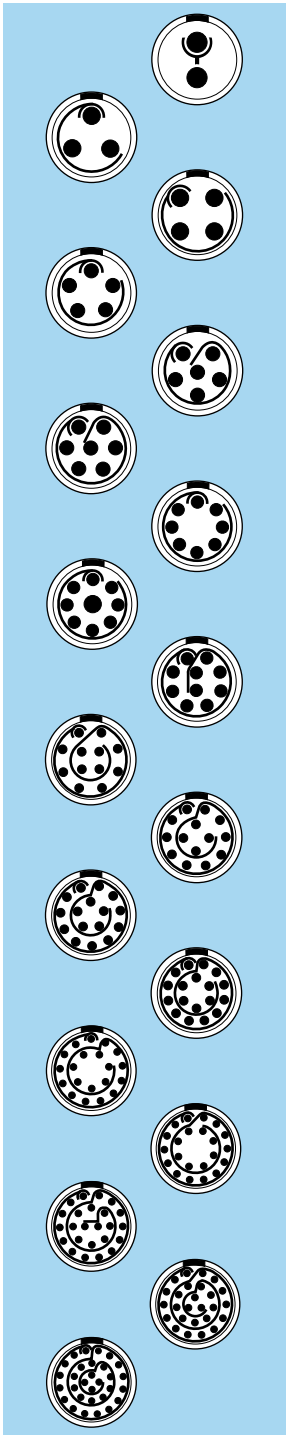


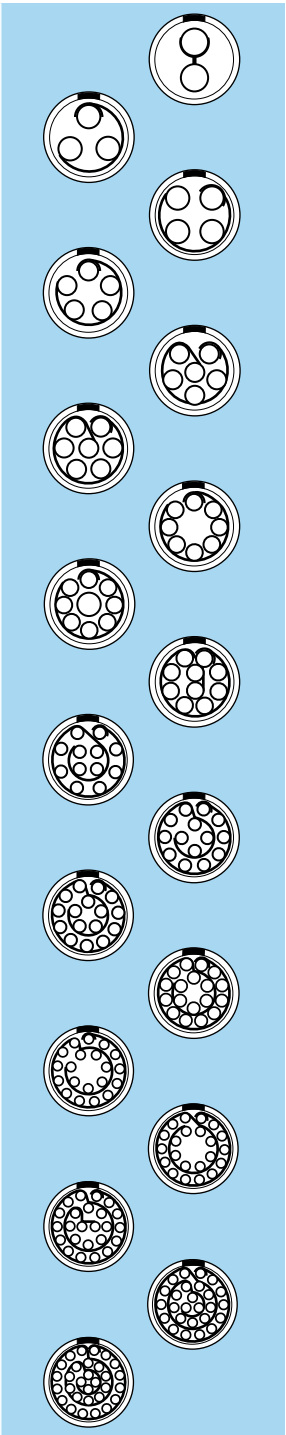
Male crimp contacts



Female crimp contacts

3B
3K



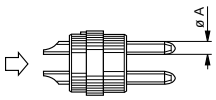


Reference	Number of contacts	ø A (mm)	Contact type				Solder contact		Crimp contact		Rated current (A)[1]
			Solder	Crimp	Print (straight)	Print (elbow)	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	
302	2	3.0	●	●	○	–	2.10	1.55	2.30	1.80	50.0
303	3	2.0	●	●	●	–	1.90	1.50	3.20	2.65	25.0
304	4	2.0	●	●	●	–	1.45	1.25	2.50	2.20	19.0
305	5	1.6	●	●	○	–	1.90	1.25	2.40	1.75	19.0
306	6	1.6	●	●	○	–	1.60	1.15	1.90	1.80	17.0
307	7	1.6	●	●	○	–	1.70	1.25	2.00	2.05	15.0
308	8	1.3	●	●	●	○	1.65	1.15	1.85	1.75	13.0
309	8 1	1.3 2.0	●	●	●	–	1.35 1.35	1.05 1.05	1.10 1.10	1.05 1.05	6.0 15.0
310	10	1.3	●	●	●	○	1.25	0.90	1.50	1.80	12.0
312	12	0.9	●	●	●	○	1.45	1.00	1.65	1.85	9.0
314	14	0.9	●	●	●	●	1.20	1.20	1.80	1.65	9.0[2]
316	16	0.9	●	●	●	●	1.20	0.85	1.80	1.50	8.0
318	18	0.9	●	●	●	●	1.20	1.05	1.85	1.60	7.0
320	20	0.7	●	●	●	●	1.00	0.90	1.35	1.55	6.0
322	22	0.7	●	●	●	○	1.00	0.90	1.70	1.45	5.5
324	24	0.7	●	●	●	●	0.95	0.80	1.35	1.35	4.0
326	26	0.7	●	●	●	○	0.95	0.70	1.50	1.30	4.0
330	30	0.7	●	●	●	●	0.80	0.70	1.35	1.20	3.5

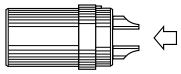
● First choice alternative ○ Special order alternative

Note: [1] **see calculation method, caution and suggested standard on page 204.**
[2] rated current = 6A for socket with elbow (90°) contact for printed circuit.

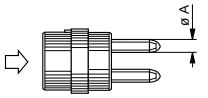
Multipole



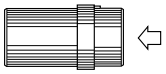
Male solder contacts



Female solder contacts

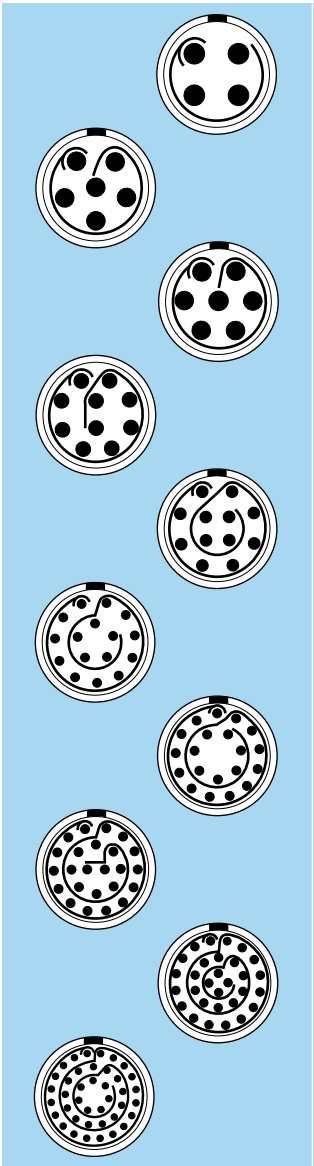


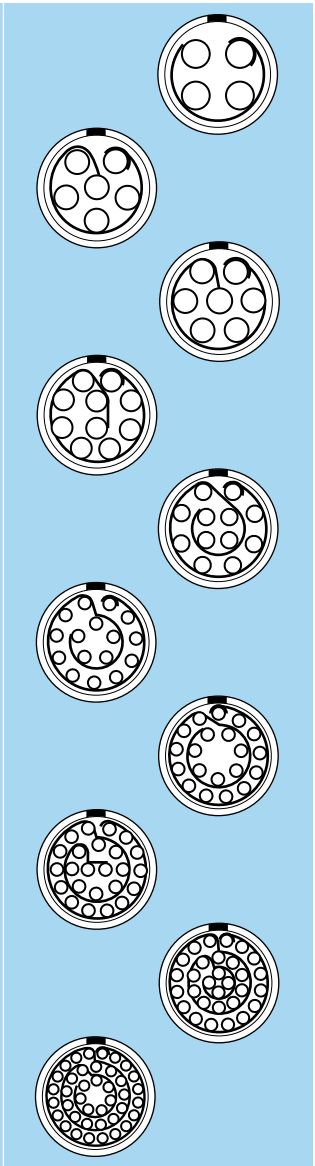
Male crimp contacts



Female crimp contacts

4B
4K

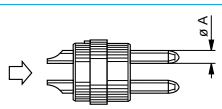




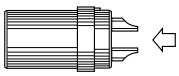
Reference	Number of contacts	ø A (mm)	Contact type			Solder contact		Crimp contact		Rated current (A)[1]
			Solder	Crimp	Print (straight)	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	
304	4	3.0	●	●	○	2.10	1.50	1.80	1.20	30.0
306	6	2.0	●	●	○	2.00	1.75	2.75	2.40	24.0
307	7	2.0	●	●	○	2.00	1.80	1.50	1.35	20.0
310	10	1.6	●	●	○	1.85	1.30	1.90	1.95	17.0
312	12	1.3	●	●	○	1.45	1.60	1.90	1.85	12.0
316	16	0.9	●	●	●	1.35	1.50	2.30	2.10	10.0
320	20	0.9	●	●	●	1.35	1.00	1.05	0.95	8.0
324	24	0.9	●	●	●	1.20	1.45	1.80	2.05	7.0
330	30	0.9	●	●	●	0.95	0.85	1.75	1.45	5.0
340	40	0.7	●	●	●	0.95	1.00	1.35	1.30	2.0

● First choice alternative ○ Special order alternative **Note: [1] see calculation method, caution and suggested standard on page 204.**

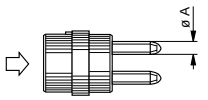
Multipole



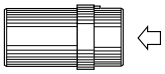
Male solder contacts



Female solder contacts

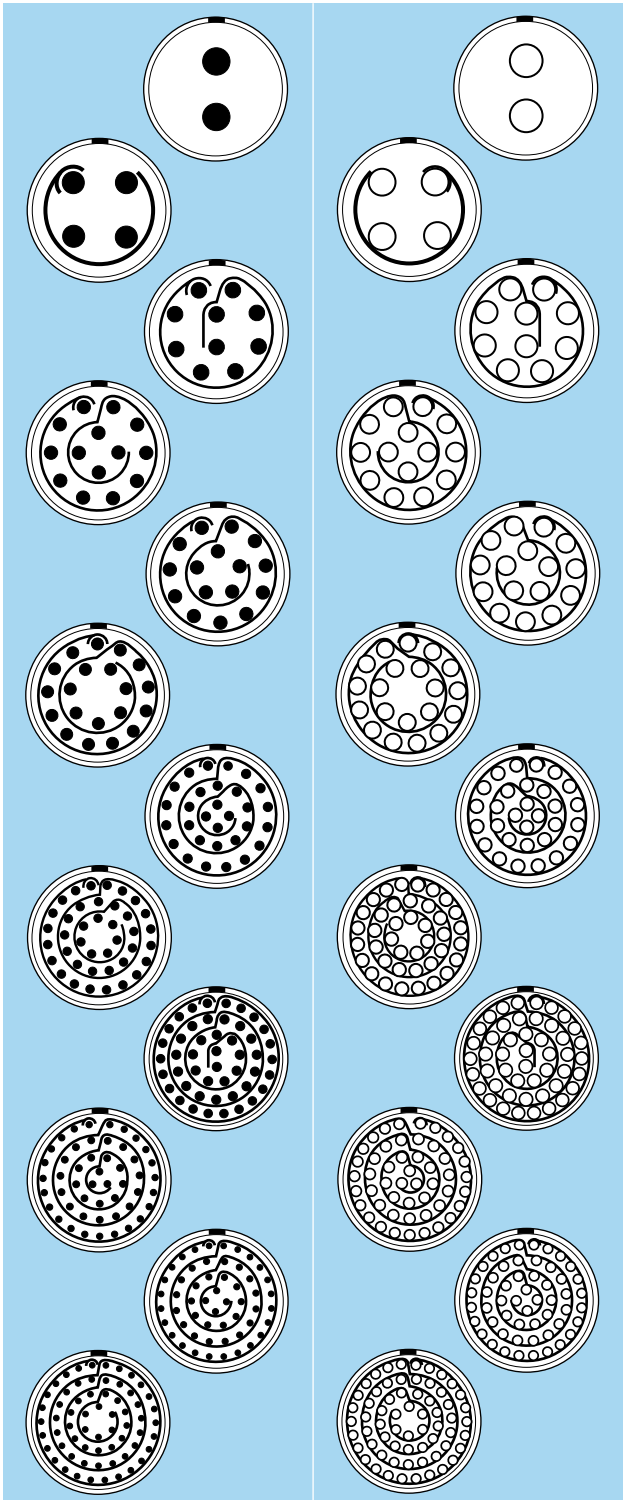


Male crimp contacts



Female crimp contacts

5B
5K



Reference	Number of contacts	ø A (mm)	Contact type			Solder contact		Crimp contact		Rated current (A)[1]
			Solder	Crimp	Print (straight)	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	Test voltage (kV rms)[1] Contact-contact	Test voltage (kV rms)[1] Contact-shell	
302	2	6.0	●	–	–	3.60	2.95	–	–	50.0
304	4	4.0	●	●	○	2.95	2.65	3.20	2.40	35.0
310	10	3.0	●	●	○	2.35	2.30	2.65	3.20	20.0
314	14	2.0	●	●	○	2.35	2.00	2.85	2.95	18.0
316	16	2.0	●	●	○	1.85	1.95	2.45	3.05	12.0
320	20	1.6	●	●	○	1.90	1.70	2.20	2.40	10.0
330	30	1.3	●	●	○	1.45	1.60	2.05	2.45	8.0
340	40	1.3	●	●	○	1.30	1.45	2.00	1.95	7.0
348	48	1.3	●	●	○	1.20	1.10	2.00	1.55	6.0
350	50	0.9	●	●	●	1.30	1.60	1.20	1.45	6.0
354	54	0.9	●	●	●	1.15	1.55	2.00	2.10	5.0
364	64	0.9	●	●	●	1.30	1.55	1.35	1.85	3.0

● First choice alternative ○ Special order alternative **Note: [1] see calculation method, caution and suggested standard on page 204.**

Housings (B and K series)

Ref.	Material	Surface treatment		Note
		Outer shell and collet nut	Latch sleeve and earthing crown	
C	Brass	chrome	nickel	●
N	Brass	nickel	nickel	○
K	Brass	black chrome	nickel	●
S	Stainless steel	without treatment	nickel-plated brass	●
T	Stainless steel	without treatment	stainless steel	○
U	Stainless steel[1)]	without treatment	stainless steel	○
L	Aluminium alloy[2)]	anodized	nickel-plated brass	○
H	PPS[3)]/brass	without treat./Ni	nickel-plated brass	●
G	PEEK[4)]	without treatment	nickel-plated brass	●
P	PA.6[5)]	without treatment	nickel-plated brass	●
P	PSU[6)]	without treatment	nickel-plated brass	●
R	PPSU[7)]	without treatment	nickel-plated brass	●
X	Avional[8)]	nickel	nickel-plated brass	●

Note: detailed characteristics of these materials and treatments are presented on page 198.
1) the other metallic parts are in stainless steel.
2) the «variant» position of the reference is used to specify the anodized colour.
3) only available for elbow (90°) sockets for printed circuit of the B and S series.
4) only available for FGG and ENG models of the B series.
5) only for CFF and CRG bridge plugs.
6) only available for ENY and FGY models of the B series. For the colour, see the «variant» position.
7) only available for ENY and FGY models of the B series.
8) anthracite colour.

● First choice alternative ○ Special order alternative

Insulators (B and K series)

Ref.	Material	Note
L	PEEK	1)
Y	PEEK	2)

Note: detailed characteristics of these materials are presented on page 201.
1) for solder or print contacts.
2) only for crimp contacts. For the type 3B.309; 4B.304; 4B.307; 4B.320; 5B.304 and 5B.350 the reference shall be «L» instead of «Y».

Contacts (B and K series)

Contacts for plugs, free or fixed sockets

Ref.	Contact type
A	Male solder
C	Male crimp (fig. 1)[1)]
B	Male crimp (fig. 2)[1)]
G	Male crimp (fig. 2)[1)]
L	Female solder

Ref.	Contact type
M	Female crimp (fig. 1)[1)]
P	Female crimp (fig. 2)[1)]
U	Female crimp (fig. 2)[1)]
N	Female straight print
V	Female elbow print

Note: 1) there are two forms of crimp barrels. Please consult adjacent table for contact selection and the page 9.

Contacts for couplers, plug with socket and bridge plug

Ref.	Contact type
A	Male - Female
C	Male - Male
E	Male - Male - Female

Ref.	Contact type
F	Female - Female - Male
L	Female - Male

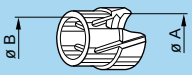
Note: the first contact type mentioned is always the one at the flange end.

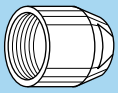
Dimension of crimp barrels

Contact			Ref. contact type		Conductor			
ø A (mm)	ø C (mm)	Form per fig.	Male	Female	AWG min.	AWG max.	Section (mm²) min.	Section (mm²) max.
0.5	0.45	1	C	M	32	28	0.035	0.09
0.7	0.80	1	C	M	26	22	0.140	0.34
	0.45	2	B	P	32	28	0.035	0.09
0.9	1.10	1	C	M	24	20	0.250	0.50
	0.80	2	B	P	26	22	0.140	0.34
	0.45	2	G	U	32	28	0.035	0.09
1.3	1.40	1	C	M	20	18	0.500	1.00
	1.10	2	B	P	24	20	0.250	0.50
	0.80	2	G	U	26	22	0.140	0.34
1.6	1.90	1	C	M	18	14	1.000	1.50
	1.40	2	B	P	22	18	0.340	1.00
2.0	2.40	1	C	M	16	12	1.500	2.50
	1.90	2	B	P	18	14	1.000	1.50
3.0	2.90	1	C	M	14	10	2.500	4.00
4.0	4.00	1	C	M	12	10	4.000	6.00

Collets (B and K series)

D and M type collets



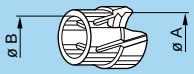


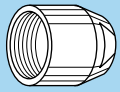
	Reference		Collet ø		Cable ø		Part number of the collet 1)	Part number of the reducer 2)	Part number of the reducing cone 2)	Part number of the collet nut
	Type	ø	ø A	ø B	max.	min.				
00	D	17	1.7	–	1.6	1.1	FGG.00.717.DN	–	–	FGG.00.130.LC
	D	22	2.2	–	2.1	1.6	FGG.00.722.DN	–	–	FGG.00.130.LC
	D	27	2.7	–	2.6	2.1	FGG.00.727.DN	–	–	FGG.00.130.LC
	D	30	3.1	2.8	3.0	2.5	FGG.00.730.DN	–	–	FGG.00.130.LC
	D	35	3.5	2.8	3.4	2.9	FGG.00.735.DN	–	–	FGG.00.130.LC
0B	D	21	2.1	–	2.0	1.5	FGG.0B.721.DN	–	–	FGG.0B.130.LC
	D	31	3.1	–	3.0	2.1	FGG.0B.731.DN	–	–	FGG.0B.130.LC
	D	42	4.2	–	4.0	3.1	FGG.0B.742.DN	–	–	FGG.0B.130.LC
	D	52	5.2	4.7	5.0	4.1	FGG.0B.752.DN	–	–	FGG.0B.130.LC
	D	56	5.6	4.7	5.5	5.1	FGG.0B.756.DN 3)	–	–	FGG.0B.132.LC
1B	M	27	2.7	–	2.6	2.2	FFC.00.727.CN	FGG.1B.138.LN	FGG.1B.158.LN	FGG.1B.130.LC
	M	31	3.1	–	3.0	2.6	FFC.00.731.CN	FGG.1B.138.LN	FGG.1B.158.LN	FGG.1B.130.LC
	D	42	4.2	–	4.0	3.1	FGG.1B.742.DN	–	–	FGG.1B.130.LC
	D	52	5.2	–	5.0	4.1	FGG.1B.752.DN	–	–	FGG.1B.130.LC
	D	62	6.2	–	6.0	5.1	FGG.1B.762.DN	–	–	FGG.1B.130.LC
	D	72	7.2	6.7	7.0	6.1	FGG.1B.772.DN	–	–	FGG.1B.130.LC
	D	76	7.6	6.7	7.5	7.1	FGG.1B.776.DN 3)	–	–	FGG.1B.132.LC
2B	M	21	2.1	–	2.0	1.5	FGG.0B.721.DN	FGG.2B.138.LN	FGG.2B.158.LN	FGG.2B.130.LC
	M	31	3.1	–	3.0	2.1	FGG.0B.731.DN	FGG.2B.138.LN	FGG.2B.158.LN	FGG.2B.130.LC
	M	42	4.2	–	4.0	3.1	FGG.0B.742.DN	FGG.2B.138.LN	FGG.2B.158.LN	FGG.2B.130.LC
	D	52	5.2	–	5.0	4.1	FGG.2B.752.DN	–	–	FGG.2B.130.LC
	D	62	6.2	–	6.0	5.1	FGG.2B.762.DN	–	–	FGG.2B.130.LC
	D	72	7.2	–	7.0	6.1	FGG.2B.772.DN	–	–	FGG.2B.130.LC
	D	82	8.2	–	8.0	7.1	FGG.2B.782.DN	–	–	FGG.2B.130.LC
	D	92	9.2	8.6	9.0	8.1	FGG.2B.792.DN	–	–	FGG.2B.130.LC
	D	99	9.9	8.6	9.7	9.1	FGG.2B.799.DN 3)	–	–	FGG.2B.132.LC
3B	M	52	5.2	–	5.0	4.1	FGG.1B.752.DN	FGG.3B.138.LN	FGG.3B.158.LN	FGG.3B.130.LC
	D	62	6.2	–	6.0	5.1	FGG.3B.762.DN	–	–	FGG.3B.130.LC
	D	72	7.2	–	7.0	6.1	FGG.3B.772.DN	–	–	FGG.3B.130.LC
	D	82	8.2	–	8.0	7.1	FGG.3B.782.DN	–	–	FGG.3B.130.LC
	D	92	9.2	–	9.0	8.1	FGG.3B.792.DN	–	–	FGG.3B.130.LC
	D	10	10.2	–	10.0	9.1	FGG.3B.710.DN	–	–	FGG.3B.130.LC
	D	11	11.2	10.2	11.0	10.1	FGG.3B.711.DN	–	–	FGG.3B.130.LC
	D	12	11.9	10.2	11.7	11.1	FGG.3B.712.DN 3)	–	–	FGG.3B.132.LC

Note:
1) for ordering collets separately.
2) for ordering an M type collet, a reducer and its reducing cone should also be ordered.
3) these collets cannot be used for connector models with nut for fitting a bend relief.

All dimensions are in millimetres.

D and M type collets

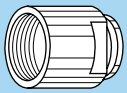
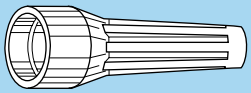




	Reference		Collet ø		Cable ø		Part number of the collet [1]	Part number of the reducer [2]	Part number of the reducing cone [2]	Part number of the collet nut
	Type	ø	ø A	ø B	max.	min.				
4B	M	62	6.2	–	6.0	5.1	FGG.2B.762.DN	FGG.4B.138.LN	FGG.4B.158.LN	FGG.4B.130.LC
	M	72	7.2	–	7.0	6.1	FGG.2B.772.DN	FGG.4B.138.LN	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 [3]	–	–	FGG.4B.132.LC
5B	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 [3]	–	–	FGG.5B.130.LC
	D	19	19.8	–	19.5	17.6	FGG.5B.719.DN [3]	–	–	FGG.5B.130.LC
	D	21	21.8	–	21.5	19.6	FGG.5B.721.DN [3]	–	–	FGG.5B.130.LC
	D	23	23.8	21.8	23.5	21.6	FGG.5B.723.DN [3]	–	–	FGG.5B.130.LC
	D	25	25.3	21.8	25.0	23.6	FGG.5B.725.DN [3]	–	–	FGG.5B.132.LC

Note:
[1] for ordering collet separately.
[2] for ordering an M type collet, a reducer and its reducing cone should also be ordered.
[3] these collets cannot be used for connector models with collet nut for fitting a bend relief.

Bend relief collet nut and bend relief

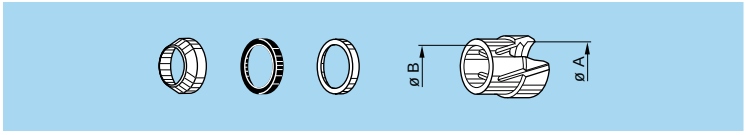



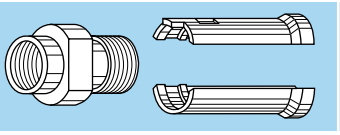
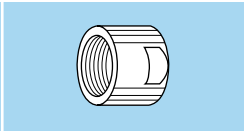
	Reference		Part number of the collet nut	Bend relief to be used [1]
	Type	ø		
00	D	17 to 35	FFM.00.131.LC	GMA.00.●●●.●● GMB.00.●●●.●●
0B	D	21 to 52	FFM.0B.130.LC	GMA.0B.●●●.●●
1B	M	27 and 31	FFM.1B.130.LC	GMA.1B.●●●.●●
	D	42 to 72	FFM.1B.130.LC	GMA.1B.●●●.●●
2B	M	21 and 31	FFM.2B.132.LC	GMA.0B.●●●.●●
	M	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 11	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: [1] the bend relief is to be ordered separately (see pages 175 and 176).

All dimensions are in millimetres.

C and K type collets



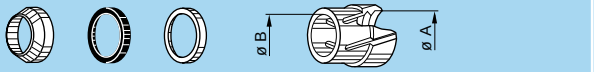



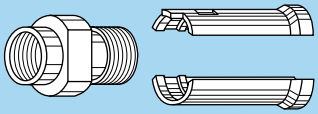
	Reference		Collet ø		Cable ø		Part number of the collet system [1]	Part number of the oversize collet and of the two split centre-pieces [2]	Part number of the collet nut [2]
	Type	ø	ø A	ø B	max.	min.			
0K	C	10	1.6	–	1.2	1.0	FFA.0E.710.CNS	–	FFA.0E.130.LC
	C	15	1.6	–	1.5	1.3	FFA.0E.715.CNS	–	FFA.0E.130.LC
	C	20	2.1	–	2.0	1.6	FFA.0E.720.CNS	–	FFA.0E.130.LC
	C	25	3.1	–	2.5	2.1	FFA.0E.725.CNS	–	FFA.0E.130.LC
	C	30	3.1	–	3.0	2.6	FFA.0E.730.CNS	–	FFA.0E.130.LC
	C	35	4.2	4.2	3.5	3.1	FFA.0E.735.CNS	–	FFA.0E.130.LC
	C	40	4.2	4.2	4.0	3.6	FFA.0E.740.CNS	–	FFA.0E.130.LC
	C	45	5.2	5.2	4.5	4.1	FFA.0E.745.CNS	–	FFA.0E.130.LC
	C	50	5.2	5.2	5.0	4.6	FFA.0E.750.CNS	–	FFA.0E.130.LC
1K	C	15	1.6	–	1.5	1.3	FFA.1E.715.CNS	–	FFA.1E.130.LC
	C	20	2.2	–	2.0	1.6	FFA.1E.720.CNS	–	FFA.1E.130.LC
	C	25	3.2	–	2.5	2.1	FFA.1E.725.CNS	–	FFA.1E.130.LC
	C	30	3.2	–	3.0	2.6	FFA.1E.730.CNS	–	FFA.1E.130.LC
	C	35	4.2	–	3.5	3.1	FFA.1E.735.CNS	–	FFA.1E.130.LC
	C	40	4.2	–	4.0	3.6	FFA.1E.740.CNS	–	FFA.1E.130.LC
	C	45	5.2	–	4.5	4.1	FFA.1E.745.CNS	–	FFA.1E.130.LC
	C	50	5.2	–	5.0	4.6	FFA.1E.750.CNS	–	FFA.1E.130.LC
	C	55	6.2	6.2	5.5	5.1	FFA.1E.755.CNS	–	FFA.1E.130.LC
	C	60	6.2	6.2	6.0	5.6	FFA.1E.760.CNS	–	FFA.1E.130.LC
	C	65	7.2	6.7	6.5	6.1	FFA.1E.765.CNS	–	FFA.1E.130.LC
	K	70	7.2	–	7.0	6.6	FFA.2E.770.CNS	FFA.1K.137.LCN	FFA.2E.130.LC [2]
	K	75	8.2	8.2	7.5	7.1	FFA.2E.775.CNS	FFA.1K.137.LCN	FFA.2E.130.LC [2]
	K	80	8.2	8.2	8.0	7.6	FFA.2E.780.CNS	FFA.1K.137.LCN	FFA.2E.130.LC [2]
	K	85	9.2	8.6	8.5	8.1	FFA.2E.785.CNS	FFA.1K.137.LCN	FFA.2E.130.LC [2]
2K	C	15	2.2	–	1.5	1.3	FFA.2E.715.CNS	–	FFA.2E.130.LC
	C	20	2.2	–	2.0	1.6	FFA.2E.720.CNS	–	FFA.2E.130.LC
	C	25	3.2	–	2.5	2.1	FFA.2E.725.CNS	–	FFA.2E.130.LC
	C	30	3.2	–	3.0	2.6	FFA.2E.730.CNS	–	FFA.2E.130.LC
	C	35	4.2	–	3.5	3.1	FFA.2E.735.CNS	–	FFA.2E.130.LC
	C	40	4.2	–	4.0	3.6	FFA.2E.740.CNS	–	FFA.2E.130.LC
	C	45	5.2	–	4.5	4.1	FFA.2E.745.CNS	–	FFA.2E.130.LC
	C	50	5.2	–	5.0	4.6	FFA.2E.750.CNS	–	FFA.2E.130.LC
	C	55	6.2	–	5.5	5.1	FFA.2E.755.CNS	–	FFA.2E.130.LC
	C	60	6.2	–	6.0	5.6	FFA.2E.760.CNS	–	FFA.2E.130.LC
	C	65	7.2	–	6.5	6.1	FFA.2E.765.CNS	–	FFA.2E.130.LC
	C	70	7.2	–	7.0	6.6	FFA.2E.770.CNS	–	FFA.2E.130.LC
	C	75	8.2	8.2	7.5	7.1	FFA.2E.775.CNS	–	FFA.2E.130.LC
	C	80	8.2	8.2	8.0	7.6	FFA.2E.780.CNS	–	FFA.2E.130.LC
	C	85	9.2	8.6	8.5	8.1	FFA.2E.785.CNS	–	FFA.2E.130.LC
	K	90	9.2	–	9.0	8.6	FFA.3E.790.CNS	FFA.2K.137.LCN	FFA.3E.130.LC [2]
	K	95	10.2	10.2	9.5	9.1	FFA.3E.795.CNS	FFA.2K.137.LCN	FFA.3E.130.LC [2]
	K	10	10.2	10.2	10.0	9.6	FFA.3E.710.CNS	FFA.2K.137.LCN	FFA.3E.130.LC [2]
	K	11	11.2	10.6	11.0	10.1	FFA.3E.711.CNS	FFA.2K.137.LCN	FFA.3E.130.LC [2]

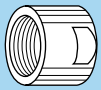
Note:
[1] for ordering the collet system separately.
[2] for ordering the K type collet, the oversize collet and the split centre-pieces, as well as the corresponding collet nut should also be ordered.

All dimensions are in millimetres.

C and K type collets





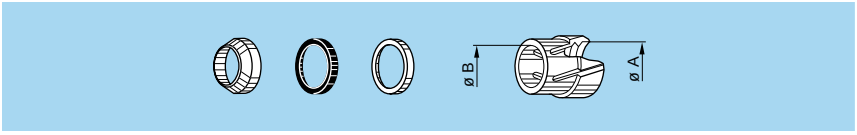


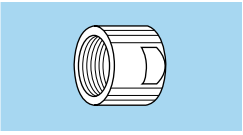
	Reference		Collet ø		Cable ø		Part number of the collet system [1]	Part number of the oversize collet and of the two split centre-pieces [2]	Part number of the collet nut [2]
	Type	ø	ø A	ø B	max.	min.			
3K	C	30	3.2	–	3.0	2.6	FFA.3E.730.CNS	–	FFA.3E.130.LC
	C	35	4.2	–	3.5	3.1	FFA.3E.735.CNS	–	FFA.3E.130.LC
	C	40	4.2	–	4.0	3.6	FFA.3E.740.CNS	–	FFA.3E.130.LC
	C	45	5.2	–	4.5	4.1	FFA.3E.745.CNS	–	FFA.3E.130.LC
	C	50	5.2	–	5.0	4.6	FFA.3E.750.CNS	–	FFA.3E.130.LC
	C	55	6.2	–	5.5	5.1	FFA.3E.755.CNS	–	FFA.3E.130.LC
	C	60	6.2	–	6.0	5.6	FFA.3E.760.CNS	–	FFA.3E.130.LC
	C	65	7.2	–	6.5	6.1	FFA.3E.765.CNS	–	FFA.3E.130.LC
	C	70	7.2	–	7.0	6.6	FFA.3E.770.CNS	–	FFA.3E.130.LC
	C	75	8.2	–	7.5	7.1	FFA.3E.775.CNS	–	FFA.3E.130.LC
	C	80	8.2	–	8.0	7.6	FFA.3E.780.CNS	–	FFA.3E.130.LC
	C	85	9.2	–	8.5	8.1	FFA.3E.785.CNS	–	FFA.3E.130.LC
	C	90	9.2	–	9.0	8.6	FFA.3E.790.CNS	–	FFA.3E.130.LC
	C	95	10.2	10.2	9.5	9.1	FFA.3E.795.CNS	–	FFA.3E.130.LC
	C	10	10.2	10.2	10.0	9.6	FFA.3E.710.CNS	–	FFA.3E.130.LC
	C	11	11.2	11.2	10.5	10.1	FFA.3E.711.CNS	–	FFA.3E.130.LC
	K	11	12.3	–	12.0	10.6	FFA.4E.711.CNS	FFA.3K.137.LCN	FFA.4E.130.LC [2]
	K	12	13.8	13.8	12.8	12.1	FFA.4E.712.CNS	FFA.3K.137.LCN	FFA.4E.130.LC [2]
	K	13	13.8	13.8	13.5	12.9	FFA.4E.713.CNS	FFA.3K.137.LCN	FFA.4E.130.LC [2]
	K	14	15.3	15.3	14.0	13.6	FFA.4E.714.CNS	FFA.3K.137.LCN	FFA.4E.130.LC [2]
	K	15	15.3	15.3	15.0	14.1	FFA.4E.715.CNS	FFA.3K.137.LCN	FFA.4E.130.LC [2]
4K	C	50	6.3	–	5.0	4.8	FFA.4E.750.CNS	–	FFA.4E.130.LC
	C	55	6.3	–	5.5	5.1	FFA.4E.755.CNS	–	FFA.4E.130.LC
	C	60	6.3	–	6.0	5.6	FFA.4E.760.CNS	–	FFA.4E.130.LC
	C	65	7.3	–	6.5	6.1	FFA.4E.765.CNS	–	FFA.4E.130.LC
	C	70	7.3	–	7.0	6.6	FFA.4E.770.CNS	–	FFA.4E.130.LC
	C	75	8.3	–	7.5	7.1	FFA.4E.775.CNS	–	FFA.4E.130.LC
	C	80	8.3	–	8.0	7.6	FFA.4E.780.CNS	–	FFA.4E.130.LC
	C	85	9.3	–	8.5	8.1	FFA.4E.785.CNS	–	FFA.4E.130.LC
	C	90	9.3	–	9.0	8.6	FFA.4E.790.CNS	–	FFA.4E.130.LC
	C	95	10.8	–	9.5	9.1	FFA.4E.795.CNS	–	FFA.4E.130.LC
	C	10	10.8	–	10.5	9.6	FFA.4E.710.CNS	–	FFA.4E.130.LC
	C	11	12.3	–	12.0	10.6	FFA.4E.711.CNS	–	FFA.4E.130.LC
	C	12	13.8	13.8	12.8	12.1	FFA.4E.712.CNS	–	FFA.4E.130.LC
	C	13	13.8	13.8	13.5	12.9	FFA.4E.713.CNS	–	FFA.4E.130.LC
	C	14	15.3	15.3	14.0	13.6	FFA.4E.714.CNS	–	FFA.4E.130.LC
	C	15	15.3	15.3	15.0	14.1	FFA.4E.715.CNS	–	FFA.4E.130.LC
	K	16	17.8	–	16.5	15.6	FFA.4K.716.CNS	FFA.4K.137.LCN [3]	FFA.4K.136.LC [2]
	K	17	17.8	–	17.5	16.6	FFA.4K.717.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	18	19.8	–	18.5	17.6	FFA.4K.718.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	19	19.8	–	19.5	18.6	FFA.4K.719.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	20	21.8	–	20.5	19.6	FFA.4K.720.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	21	21.8	–	21.5	20.6	FFA.4K.721.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	22	23.8	23.8	22.5	21.6	FFA.4K.722.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]
	K	23	23.8	23.8	23.5	22.6	FFA.4K.723.CNS	FFA.4K.137.LCN	FFA.4K.136.LC [2]

Note:
[1] for ordering the collet system separately.
[2] for ordering the K type collet, the oversize collet and the split centre-pieces, as well as the corresponding collet nut should also be ordered.
[3] in 4K series, the centre-piece is made of one piece.

All dimensions are in millimetres.

C type collets

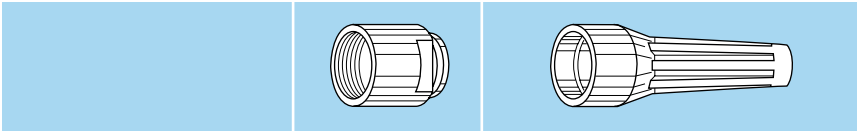




	Reference		Collet ø		Cable ø		Part number of the collet system [1]	Part number of the collet nut
	Type	ø	ø A	ø B	max.	min.		
5K	C	10	11.8	–	10.5	9.6	FFA.5K.710.CNS	FFA.5K.130.LC
	C	11	11.8	–	11.5	10.6	FFA.5K.711.CNS	FFA.5K.130.LC
	C	12	13.8	–	12.5	11.6	FFA.5K.712.CNS	FFA.5K.130.LC
	C	13	13.8	–	13.5	12.6	FFA.5K.713.CNS	FFA.5K.130.LC
	C	14	15.8	–	14.5	13.6	FFA.5K.714.CNS	FFA.5K.130.LC
	C	15	15.8	–	15.5	14.6	FFA.5K.715.CNS	FFA.5K.130.LC
	C	16	17.8	–	16.5	15.6	FFA.5K.716.CNS	FFA.5K.130.LC
	C	17	17.8	–	17.5	16.6	FFA.5K.717.CNS	FFA.5K.130.LC
	C	18	19.8	–	18.5	17.6	FFA.5K.718.CNS	FFA.5K.130.LC
	C	19	19.8	–	19.5	18.6	FFA.5K.719.CNS	FFA.5K.130.LC
	C	20	21.8	–	20.5	19.6	FFA.5K.720.CNS	FFA.5K.130.LC
	C	21	21.8	–	21.5	20.6	FFA.5K.721.CNS	FFA.5K.130.LC
	C	22	23.8	23.8	22.5	21.6	FFA.5K.722.CNS	FFA.5K.130.LC
	C	23	23.8	23.8	23.5	22.6	FFA.5K.723.CNS	FFA.5K.130.LC

Note:
[1] for ordering the collet system separately.

Bend relief collet nut and bend relief



	Reference		Part number of the collet nut	Bend relief to be used [1]
	Type	ø		
0K	C	10 to 50	FFM.0E.130.LC	GMA.0B.●●●.●●
1K	C	15 to 65	FFM.1E.130.LC	GMA.1B.●●●.●●
	K	70 to 85	FFM.2E.130.LC	GMA.2B.●●●.●●
2K	C	15 to 85	FFM.2E.130.LC	GMA.2B.●●●.●●
	K	90 to 11	FFM.3E.130.LC	GMA.3B.●●●.●●
3K	C	30 to 10	FFM.3E.130.LC	GMA.3B.●●●.●●
	K	11 to 15	FFM.4E.130.LC	GMA.4B.●●●.●●
4K	C	50 to 15	FFM.4E.130.LC	GMA.4B.●●●.●●

Note: [1] the bend relief is to be ordered separately (see pages 175 and 176).

All dimensions are in millimetres.

Variant (B and K series)

Colour of the bridge plug shells and connectors shell made of plastic material

The «variant» position of the reference is used to specify the colour of the shell according to the table below.

Ref.	Colour	Ref.	Colour	Ref.	Colour
A	blue	J	yellow	R	red
B[1)]	white	M	brown	S	orange
G[1)]	grey	N	black	V	green

Note: [1)] PSU connector shells are only available in white or grey colours. The variant position is also used to indicate epoxy filling of watertight and vacuumtight socket models, the reference P is used.

Anodized colour

The «variant» position of the reference is used to specify the anodized colour according to the table below.

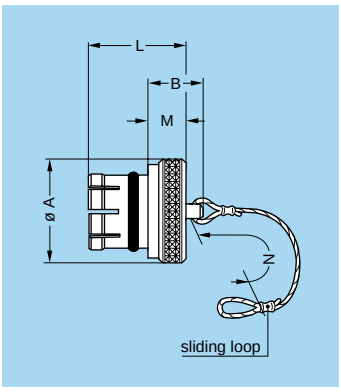
Part number for connector with standard collet nut

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 us.

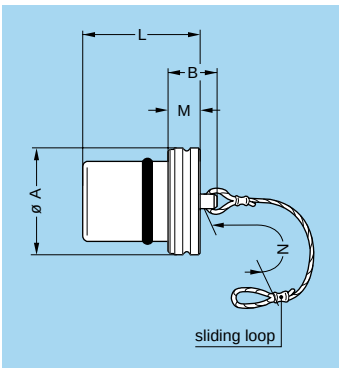


- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM
- Maximum operating temperature: 135°C
- Watertightness: IP61 according to IEC 60529

BRF Blanking caps for free sockets

Part number	Series	Dimensions (mm)				
		A	B	L	M	N
BRF.00.200.NAS	00	8	9.5	8.8	3.5	85
BRF.0S.200.NAS	0S-0B	10	10.5	10.5	4.5	85
BRF.1S.200.NAS	1S-1B 1D	14	11.0	12.5	5.0	85
BRF.2S.200.NAS	2S-2B	18	12.0	14.0	6.0	85
BRF.3S.200.NAS	3S-3B	22	14.0	18.0	8.0	120
BRF.4S.200.NAS	4S-4B	28	20.0	23.0	10.0	120
BRF.5S.200.NAS	5S-5B	40	22.0	30.0	12.0	150
BRF.6S.200.NAS	6S	54	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-ring's made from FPM are also available; if required, replace the letter «S» by «V».



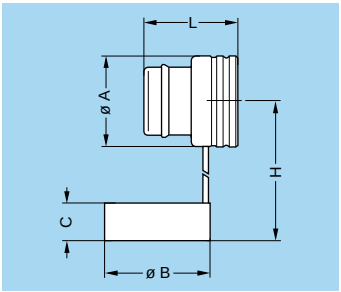
- Body material: Nickel-plated brass (Ni 3 µm)
- Lanyard material: Stainless steel
- Crimp ferrule material: Nickel-plated brass + polyolefin
- O-ring material: Silicone rubber or FPM

BRF Blanking caps for free sockets

Part number	Series	Dimensions (mm)				
		A	B	L	M	N
BRF.0K.200.NAS	0K-0E	15.0	10	15.0	4	85
BRF.1K.200.NAS	1K-1E	17.0	12	20.0	6	85
BRF.2K.200.NAS	2K-2E	20.5	14	24.0	8	85
BRF.3K.200.NAS	3K-3E	24.0	14	28.0	8	120
BRF.4K.200.NAS	4K-4E	30.0	20	30.5	10	120
BRF.5K.200.NAS	5K-5E	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-ring's 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

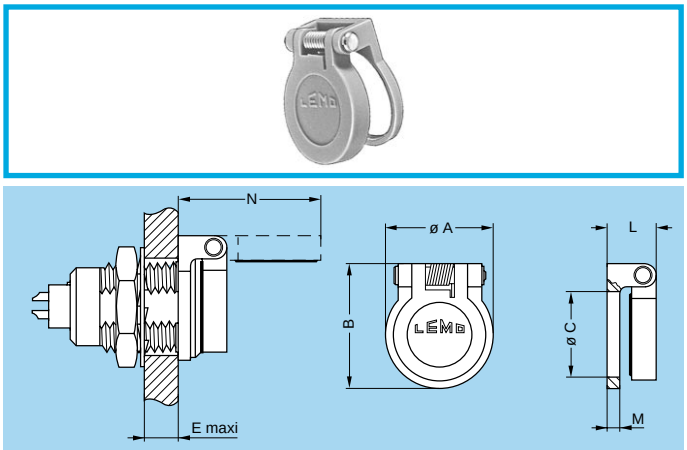


BRD Blanking caps for free sockets

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

- Material: black EPDM

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



- Body material: Polyoxymethylene (POM) grey (or black)
- Gasket material: Silicone rubber

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

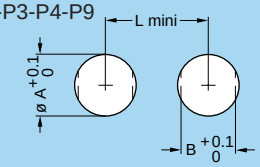
Part number	Series	Dimensions (mm)						
		A	B	C	E	L	M	N
BRR.0S.200.PZSG	0S-0B	11.0	13.3	9.0	5.8	5.0	1.2	15.3
BRR.1S.200.PZSG	1S-1B 1D	14.2	17.1	12.0	6.0	6.3	1.5	20.3
BRR.2S.200.PZSG	2S-2B 2C-2G	18.6	22.4	15.2	6.5	8.2	2.0	26.2
BRR.3S.200.PZSG	3S-3B	22.5	26.5	18.2	9.0	8.8	2.5	30.8
BRR.3K.200.PZSG	3K	29.0	27.5	23.0	9.0	7.7	3.0	29.2

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

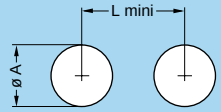
- Spring material: Stainless steel
- Maximum operating temperature: 100°C
- Watertightness: IP61 according to IEC 60529

Panel Cut-outs

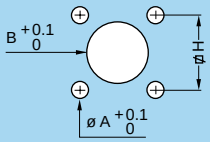
P1-P3-P4-P9



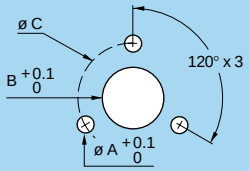
P2-P5-P10-P11



P6-P7



P8



B series

Series	P1			P2		P3			P4			P5		P6			P8			P9			P10	
	ø A	B	L	ø A	L	ø A	B	L	ø A	B	L	ø A[2]	L	ø A	B	H	ø A	B	C	ø A	B	L	ø A	L
00	7.1	6.4	11.5	7.1	11.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7.1	–	12	–	–
0B	9.1	8.3	13.5	9.1	13.5	14.1	12.6	20	10.1	9.1	15.0	8.30	10.5	–	–	–	–	–	–	9.1	8.3	15	–	–
1B	12.1	10.6	19.0	–	–	16.1	14.6	22	14.1	12.6	21.0	11.17	14.0	–	–	–	–	–	–	12.1	10.6	19	11.1	17
2B	15.1	13.6	21.5	–	–	19.2	17.1	28	16.1	15.1	23.0	13.95	18.0	–	–	–	–	–	–	15.1	13.6	23	–	–
3B	18.2	16.6	27.0	–	–	–	–	–	20.2	18.6	29.5	–	–	–	–	–	–	–	–	18.2	16.6	27	–	–
4B	25.2	23.6	34.0	–	–	–	–	–	25.2	23.6	36.1	–	–	–	–	–	–	–	–	25.2	23.6	36	–	–
5B	35.2[1]	33.6	44.0	–	–	–	–	–	35.2	33.6	47.1	–	–	3.3	35.2	34	2.8	35.2	47	35.2	33.6	47	–	–

Note:
[1] for using the tapered washer a round hole ø 36 mm apply. [2] tolerance: $^{+\ 0.02}_{\ 0}$

Cut-out types

Model	Type	Model	Type	Model	Type	Model	Type	Model	Type
EBG	P6	EKG	P1	FAG	P1	HMG	P9	XBG	P2
ECG	P1	EMG	P1	FBG	P8	HNG	P9	XPF	P2
EEG	P1	ENG	P1	FWG	P9	PEG	P1	XRB	P2
EGG	P1	ENY	P1	HCG	P3	PFG	P1	YHG	P9
EFG	P2	ESG	P1/P2	HEG	P9	PKG	P1		
EHG	P1	EXG	P2/P10	HGG	P9	R●●	P4		
EJG	P5	EYG	P1/P10	HHG	P9	S●●	P4/P9[3]		

Mounting nut torque

Series	Torque (Nm)	
	Metal shell	Plastic shell[4]
00	1.0	0.4
0B	2.5	0.4
1B	4.5	0.7
2B	6.0	0.8
3B	9.0	1.0
4B	12.0	5.0
5B	17.0	–

Note: [3] in series 1B use P9.

Note: [4] these values apply when metal shell are mounted with insulating washer.

S series

Series	P1			P2		P3			P4			P5		P6			P7			P10		P11	
	ø A	B	L	ø A	L	ø A	B	L	ø A	B	L	ø A[2]	L	ø A	B	H	ø A	B	H	ø A	L	ø A	L
00	7.1	6.4	11.5	7.1	11.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
0S	9.1	8.3	13.5	9.1	13.5	12.1	10.6	19.0	10.1	9.1	15	–	–	–	–	–	–	–	–	–	–	9.1	16
1S	12.1	10.6	19.0	12.1	19.0	14.1	12.6	21.0	12.1	10.6	18	11.92	17.0	3.3	12.1	12.7	2.7	11.1	12.4	11.1	17	12.1	19
2S	15.1	13.6	21.5	15.1	21.5	16.2	14.6	22.0	16.1	15.1	23	–	–	3.3	15.1	15.5	–	–	–	–	–	–	–
3S	18.2	16.6	27.0	18.2	27.0	20.2	18.6	30.0	20.2	18.6	29	–	–	3.3	18.2	18.0	–	–	–	–	–	–	–
4S	25.2	23.6	34.0	25.2	34.0	25.2	23.6	36.0	25.2	23.6	36	–	–	–	–	–	–	–	–	–	–	–	–
5S	35.2[1]	33.6	44.0	35.2	44.0	35.2	33.6	47.0	35.2	33.6	47	–	–	4.4	35.2	36.8	–	–	–	–	–	–	–
6S	48.3	45.6	58.0	48.3	58.0	48.3	45.6	60.0	48.3	45.6	60	–	–	–	–	–	–	–	–	–	–	–	–

Note:
[1] for using the tapered washer a round hole ø 36 mm apply. [2] tolerance: $^{+\ 0.02}_{\ 0}$

Cut-out types

Model	Type	Model	Type	Model	Type	Model	Type	Model	Type
EBC	P6	EMD	P1	ERS	P2	FAA	P1/P2[3]	PSS	P1
EBD	P6	ERA	P1	ERT	P5	HCP	P3[4]	RAD	P1/P2[5]
EBS	P7	ERC	P1	ERY	P1	HGP	P3	SWH	P4
ECP	P1	ERD	P1	ERZ	P1	HGW	P11		
EEP	P1	ERM	P1	EXP	P2/P10	PSA	P1		
EHP	P2/P1	ERN	P1	EWB	P3	PSP	P1		

1 N = 0.102 kg

Mounting nut torque

Series	Torque (Nm)	
	Metal shell	Plastic shell[6]
0S	2.5	0.4
1S	4.5	0.7
2S	6.0	0.8
3S	9.0	1.0
4S	12.0	5.0
5S	17.0	–
6S	22.0	–

Note: [3] in series 6S use P2. [4] use only ø A in 1S series.
[5] in series 4S and 5S use P2.

Note: [6] these values apply when metal shell are mounted with insulating washer.

K series

Series	P1			P6			P7		
	ø A	B	L	ø A	B	H	ø A	B	H
0K	14.1	12.6	20.5	–	–	–	–	–	–
1K	16.1	14.6	22.5	–	–	–	–	–	–
2K	20.2	18.6	29.0	–	–	–	–	–	–
3K	24.2	22.6	35.5	3.5	22.6	20.6	3.5	23.1	23.0
4K	30.2	28.6	43.0	3.5	28.6	27.0	3.5	30.1	29.0
5K	45.2	42.6	57.0	4.5	42.6	38.0	4.5	45.1	44.0

Cut-out types

Model	Type	Model	Type	Model	Type
EBG	P7	ENG	P1	PBG	P7[3)]
EDG	P7[2)]	EVG	P1	PEG	P1
EEG	P1	FAG	P1	PKG	P1
EGG	P1	FXG	P6	S●●	P1
EHG	P1	HEG	P1		
EMG	P1	HGG	P1		

Mounting nut torque

Series	Torque (Nm)
0K	5
1K	7
2K	9
3K	12
4K	17
5K	22

1 N = 0.102 kg

Note: [2)] for this model dimension B = 18.1. [3)] for this model dimension B = 19.1.

E series

Series	P1			P6		
	ø A	B	L	ø A	B	H
0E	14.1	12.6	20.5	–	–	–
1E	16.1	14.6	22.5	–	–	–
2E	20.2	18.6	29.0	2.9	19.1	11.8x20.4
3E	24.2	22.6	35.5	–	–	–
4E	30.2	28.6	43.0	–	–	–
5E	45.2	42.6	57.0	–	–	–
6E	55.3	52.1	68.0	–	–	–

Cut-out types

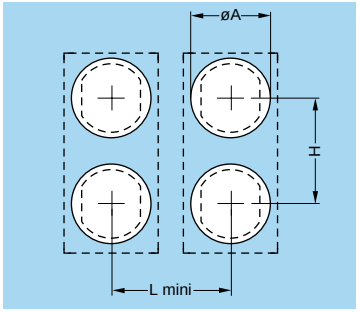
Model	Type	Model	Type	Model	Type
EBR	P6	ERB	P1	PSA	P1
EEP	P1	ERC	P1	PSP	P1
EHP	P1	FAA	P1	SWH	P1
ERA	P1	HGP	P1		

Mounting nut torque

Series	Torque (Nm)
0E	5
1E	7
2E	9
3E	12
4E	17
5E	22
6E	27

1 N = 0.102 kg

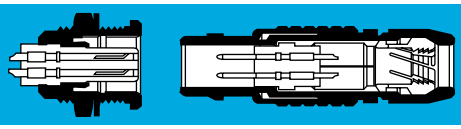
Panel cut-out for mounting with insulating washer or double panel washer (S-B series)



Series	Dimensions (mm)		
	ø A	H	L
0S-0B	11	14	13.5
1S-1B	14	20	17.0

Note: for nut tightening torques please refer to the corresponding series in the table on page 189.

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-gold
– 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 nuclear industry where elements are subject to radiation and to vaporous nitric acid, we offer AISI 304 stainless steel.

Grade AISI 316L is recommended for medical applications, highly demanding with regard to non-corrosiveness. This material is also used for connector shells soldered by electronic beam onto a device made of the same stainless steel.
These parts have no surface treatment.

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.

For connector series used for highly demanding applications (F series), shells are made of high mechanical strength alloys (Avional). Connector shells are protected by a conductive anthracite grey coloured nickel finish.
Depending on the application, other surface finish is also available (electrolytic nickel-plating, black nickel plating).

Plastic materials

Some connector model shells can be made of plastic. This solution offers optimum electrical insulating properties particularly suitable for medical applications. Black Polyoxymethylene (POM) is particularly adapted to products of the 00 or S series.
Grey or white polysulfone (PSU) and beige PEEK offers excellent mechanical properties and is suitable for gas or vapour sterilization.
Some models of the 2B and 3B series are 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.

Bridge plug or plugs with parallel sockets are made of polyamide (PA.6) available in 9 colours: blue, white, grey, yellow, brown, black, red, orange and green.

Some elbow socket shells for printed circuits are overmoulded in polyphenilene sulfide (PPS).

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: earthing crown). Depending on the application, these parts have electrolytic nickel or nickel-gold plating.
These parts can also be manufactured in stainless steel.

Sealing gasket

In general, sealing gaskets are made of silicone rubber MQ/MVQ. However, for vacuumtight sockets and couplers, gaskets are made of fluorosilicone rubber (FPM).

Sealing resin

An epoxy resin is used to seal both watertight and vacuumtight socket and coupler models.

Materials and Treatments

Component	Material (Standard)	Surface treatment (µm)										Notes
		chrome			nickel		gold			black chr.		
		Cu	Ni	Cr	Cu	Ni	Cu	Ni	Au	Ni	Cr	
Outer shell, collet nut, conical nut or notched nut and oversized collet	Brass (UNS C 38500)	0.5	3	0.3	0.5	3	0.5	3	0.5	1	2	
	Stainless steel (AISI 303, 304 or 316L)	without treatment										
	Avional (AA 2007)	–	–	–	–	5	–	–	–	–	–	1)
	Aluminium alloy (AA 6012)	anodized										
	POM (Delrin® or Ertacetal®), Polyoxymethylene, black	–										2)
	PEEK, Polyether ethercetone, beige	–										3)
	PSU (Udel®), Polysulfone, grey or white	–										4)
	PPSU (Radel®), Polyphenylsulfone, cream	–										4)
	PA.6 (Grilon®), Polyamid	–										5)
	PPS (Ryton®), Polyphenilene sulfide, brown	–										6)
Earthing crown	Bronze (UNS C 54400) or special brass	–	–	–	0.5	3	0.5	3	1.0	–	–	7)
	Beryllium Copper (UNS C 17300)	–	–	–	0.5	3	0.5	3	1.0	–	–	8)
	Stainless steel (AISI 416 or 316L)	without treatment										9)
Latch sleeve	Special brass	0.5	3	0.3	0.5	3	0.5	3	0.5	–	–	
	Stainless steel (AISI 416 or 316L)	without treatment										9)
Locking washer	Bronze (UNS C 52100)	–	–	–	0.5	3	0.5	3	0.5	–	–	
Hexagonal or round nut	Brass (UNS C 38500)											
	Stainless steel (AISI 303, 304 or 316L)	without treatment										10)
	Aluminium alloy (AA 6012)	anodized natural										10)
Other metallic components	Brass (UNS C 38500)	–	–	–	0.5	3	0.5	3	0.5	–	–	
	Stainless steel (AISI 303, 304 or 316L)	without treatment										
O-ring and gaskets	Silicone MQ/MVQ or FPM/FKM (Viton®)	–										11)
Sealing resin	Epoxy (Araldite® or Stycast®)	–										

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
– black chrome: MIL-C-14538C with a minimum of 10 µm of lacquer protection
1) anthracite colour (other colours upon request)
2) for FFP, PCP and ERN models of the 0S to 3S series
3) for FFP, PCP and ERN models of the 0S to 3S series and FGG and ENG models of the 1B, 3B and 4B series
4) for the FGY and ENY models of the 2B and 3B series
5) for bridge plugs of the B series
6) for S and B series elbow sockets for printed circuits
7) gold-plating for unipole types
8) used in 00 series free and fixed sockets and couplers
9) AISI 416 steel is used with shells made of AISI 303 or 304
10) delivered with free and fixed sockets with aluminium alloy or stainless steel shell
11) FKM is used for F series

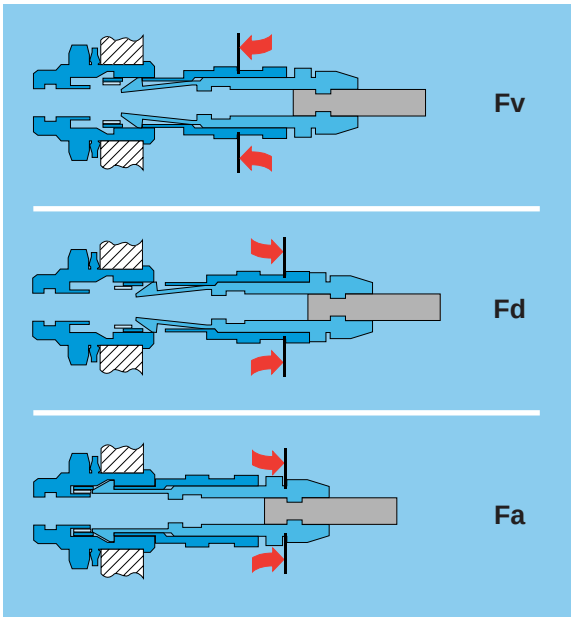
Technical characteristics of plastic materials

Type	Norme	Units	POM	PEEK	PSU	PPSU	PPS	PA.6	Silicone	FPM	Epoxy
Density	ASTM D 792	–	1.4	1.3-1.4	1.24	1.3	1.67	1.14	~1.2	~1.9	1.58
Tensile strength (at 23°C)	ASTM D 638/ ISO R527	MPa	70-80	92-142	70	70	121	55	> 9	> 12	16
Flexurale strength (at 23°C)	ASTM D 790/ ISO R178	MPA	–	170	106	91	179	75	–	–	24
Dielectric strength	ASTM D 149/IEC 60243	kV/mm	60	19-25	17-20	15	17	35	18-30	–	15
Volume resis. at 50% HR and 23°C	ASTM D 257/IEC 60093	Ω • cm	10^{15}	10^{16}	$5x10^{16}$	–	10^{16}	10^{15}	10^{14}	–	10^{14}
Surface resistivity	ASTM D 257	Ω	10^{13}	10^{15}	–	–	–	–	–	–	–
Thermal conductivity	ASTM C 177	W/K • m	0.31	0.25	0.26	–	0.3	–	–	–	0.8
Comparative tracking index	IEC 60112	V	CTI 600	CTI 150	CTI 150	–	CTI 200	CTI 600	–	–	CTI>600
Maxi. continuous service temperature	UL 746	°C	90	250	140	180	220	80	200	200	80
Min. continuous service temperature	UL 746	°C	-50	-55	-60	-50	-60	-40	-50	-20	-20
Max. short-time service temperature	–	°C	140	300	160	200	250	150	> 250	300	120
Water absorption in 24h at 23°C	ASTM D 570/ISO R62A	%	0.85	0.12	0.3	0.37	< 0.05	> 3	–	–	0.25
Radiation resistance	–	Gy[1)]	$8x10^3$	10^7	10^5	–	$> 10^7$	$5x10^3$	10^5	$8x10^4$	$2x10^6$
Flammability rating	ASTM D 635/UL 94	–	HB	V-0/3.2	V-0/4.4	V-0/1.6	V-0/5V	V-2	–	–	V-0/4
Resistance to steam sterilization	–	°C	bad	excel.	good	excel.	excel.	bad	good	good	bad

Notes: 1) 1 Gy (Gray) = 100 rad

ASTM = American Society for Testing Material
ISO = International Standards Organisation
UL = Underwriters Laboratories
IEC = International Electrotechnical Commission

Mechanical latching characteristics



F_v: average latching force.

F_d: average unmating force with axial pull on the outer shell.

F_a: average pull force with axial pull on the collet nut

Standard series

Force (N)	Series									
	00	0S	1D	1S	2C	2S	3S	4S	5S	6S
Fv	9	14	14	15	12	17	20	40	60	70
Fd	7	9	11	10	12	11	14	25	40	55
Fa	120	140	300	250	400	350	500	650	750	900

Watertight series

Force (N)	Series						
	0E	1E	2E	3E	4E	5E	6E
Fv	14	16	20	32	65	85	100
Fd	9	10	13	25	40	60	75
Fa	250	300	400	550	700	800	900

Keyed series

Force (N)	Series							
	00	0B	1B	2B	2G	3B	4B	5B
Fv	9	10	14	15	12	17	39	48
Fd	7	8	11	12	12	14	38	38
Fa	120	250	300	400	400	550	700	800

Keyed watertight series

Force (N)	Series						Series					
	0K	1K	2K	3K	4K	5K	0F	1F	2F	3F	4F	5F
Fv	14	16	20	32	65	85	6	6	8	9	14	21
Fd	9	10	13	25	40	60	8	8	9	11	16	24
Fa	250	300	400	550	700	800	150	150	150	150	150	150

Notes: forces were measured on outer shells **not fitted with contacts**.
Mechanical endurance: 5000 cycles.
Mechanical endurance represents the number of cycles after which the latching system is still effective (1 cycle = 1 latching/unlatching at 300 cycles per hour). The values were measured according to the standard IEC 60512-7 test 13a.

1N = 0.102 kg.

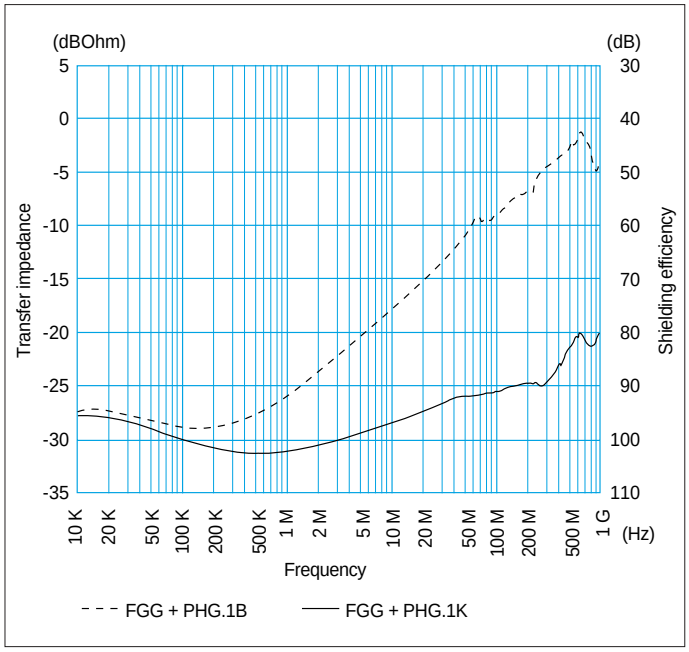
Electromagnetic compatibility (EMC) and shielding efficiency

The electromagnetic compatibility of a device can only be ensured by meeting a number of basic rules with the design of the device and by carefully selecting components, cables and connectors.

Electrical and electronic devices are to be designed to ensure the following:

a) reduce the emission of generated electromagnetic disturbance to a level where radios and telecommunication and other devices can properly function;
b) electromagnetic immunity against electromagnetic disturbance so that they can properly function.

When selecting a connector, screen or shielding efficiency and low resistance to electric continuity between the cable and the connector should be considered.
The design of LEMO connectors with metal shell and earthing crown guarantee optimum shielding efficiency in all applications where electromagnetic compatibility (EMC) is critical.
The performance of a connector is measured through shielding efficiency, a value that represents the ratio between the electromagnetic field on the outside and the inside of the shell. Our measurements are carried out according to the IEC 60169-1-3 standard.



The performance of S and B series connectors is comparable to the results of measurements carried out on a pair of FGG + PHG.1B connectors.

The performance of E and K series connectors is comparable to the results of measurements carried out on a pair of FGG + PHG.1K connectors.

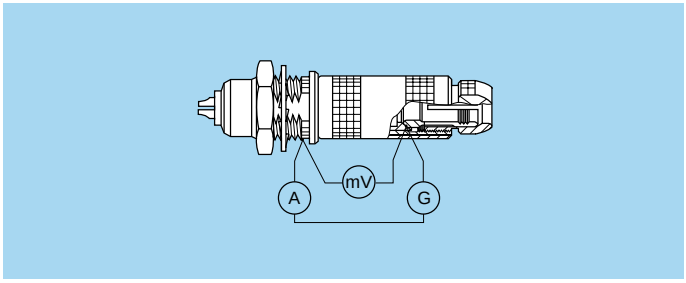
Shell electrical continuity:
(measured according to IEC 60512-2 test 2f)

Test current: 1A
A = Ammeter
mV = Millivoltmeter
G = Generator

R_1 Values with earthing crown and latch sleeve or inner-sleeve nickel-plated.

R_2 Values with gold-plated earthing crown and nickel-plated latch sleeve or inner sleeve.

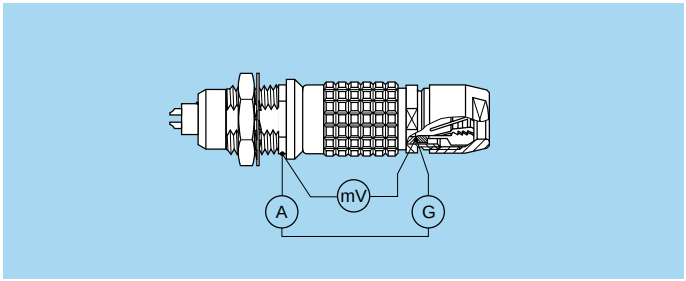
Standard series



Series	R_1 (mΩ)	R_2 (mΩ)
00	3.5	2.8
0S	2.8	1.6
1D	2.5	1.1
1S	2.2	1.5
2C	–	–

Series	R_1 (mΩ)	R_2 (mΩ)
2S	1.8	1.2
3S	1.6	1.2
4S	1.4	1.0
5S	1.4	1.0
6S	1.0	0.5

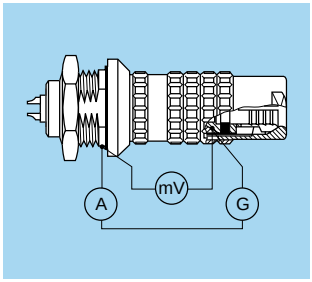
Keyed series



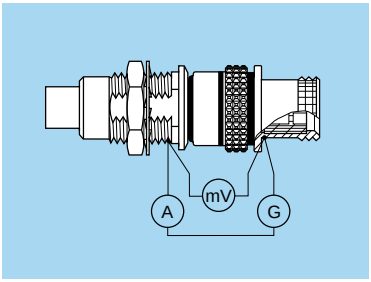
Series	R_1 (mΩ)	R_2 (mΩ)
00	3.5	2.8
0B	3.5	1.3
1B	2.5	1.1
2B	2.2	0.9

Series	R_1 (mΩ)	R_2 (mΩ)
2G	–	–
3B	2.2	0.7
4B	1.5	0.5
5B	1.5	0.3

Watertight series
Keyed watertight series

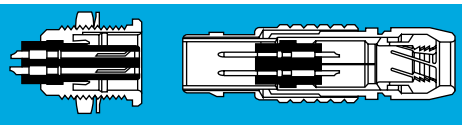


F series



Series	R_1 (mΩ)	R_2 (mΩ)
0E-0K	2.8	1.6
1E-1K	2.2	1.5
2E-2K	1.8	1.2
3E-3K	1.6	1.2
4E-4K	1.4	1.0
5E-5K	1.4	1.0
6E	1.0	0.5

Series	R_1 (mΩ)
0F	5.0
1F	3.0
2F	2.5
3F	2.5
4F	2.0
5F	1.5



Insulator

Plastic material used by LEMO for manufacturing insulators is selected according to the electric and thermal properties required for the various connector types. Characteristics examined for the two connector types are:
– Dielectric strength;
– Comparative tracking index;
– Surface and volume resistivity;
– Continuous service temperature;
– Water absorption;
– Radiation resistance;
– Flammability rating
– Resistance to hydrocarbon.

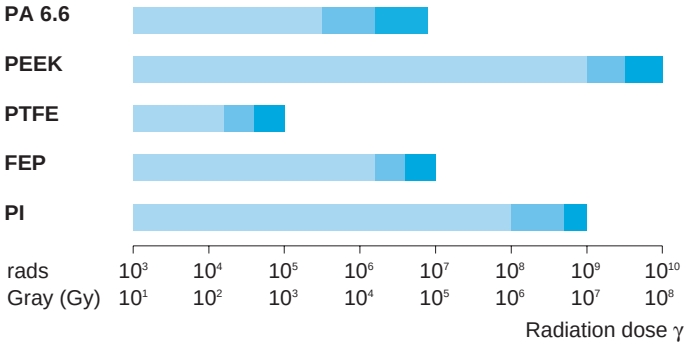
Mechanical and Electrical Properties

Mechanical characteristics of thermoplastics, such as PA 6.6, and PEEK, are improved by the addition of glass fibres. By adding glass fibres in the resin the performance of this material (mechanical strength and radiation resistance) is enhanced and water absorption rate is reduced. From an electric point of view, the addition of glass fibres improves dielectric strength.

Selection of the insulator

A number of thermoplastics have common characteristics, some of them are identical with other insulating materials. In this case, the insulator material is selected according to the specific difference in features to provide all the required parameters for the given type.

Radiation resistance



Note: technical data in this chapter provide general information on plastics used by LEMO as electrical insulators. LEMO reserves the right to propose new materials with better technical characteristics, and to withdraw, without notice, any material mentioned in the present catalogue or any other publications edited by LEMO S.A. and/or its subsidiaries. LEMO SA and its subsidiaries use only plastic granules, powder or bars supplied by specialized companies, and thus cannot in any case take responsibility with regard to this material.

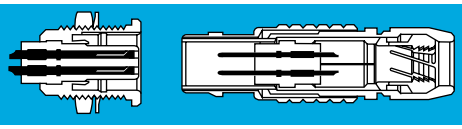
Technical characteristics

Type	Standard	Units	PA6.6	PEEK	PTFE	FEP	PI
Dielectric strength	ASTM D 149 / IEC 60243	kV/mm	15-17	19-25	17.2-24	20	22
Volume resistivity at 50% RH and 23°C	ASTM D 257 / IEC 60093	Ω • cm	$5.8x10^{15}$	10^{16}	10^{18}	$> 10^{16}$	$> 10^{16}$
Surface resistivity	ASTM D 257 / IEC 60093	Ω	10^{12}	10^{15}	10^{17}	$> 10^{16}$	$> 10^{15}$
Thermal conductivity	ASTM C 177	W/K • m	0.21	0.25	0.23	0.24	0.35
Comparative tracking index	IEC 60112	V	CTI 600	CTI 150	CTI 500	–	–
Dielectric constant (10^6 Hz)	ASTM D 150 / IEC 60250	–	4	3.2-3.5	2-2.1	2.1	3.6
Dissipation factor (10^6 Hz)	ASTM D 150 / IEC 60250	–	–	< 0.005	< 0.0003	< 0.001	< 0.0034
Maximum continuous service temperature	UL 746	°C	120	250	260	200	350
Maximum short-time service temperature	–	°C	150	300	300	260	480
Minimum continuous service temperature	–	°C	–	-50	-200	-200	–
Water absorption in 24h at 23°C	ASTM D 570 / ISO R624	%	< 0.7	< 0.3	< 0.01	< 0.01	0.24
Radiation resistance	–	Gy	$5x10^3$	10^7	$2x10^2$	$2x10^4$	10^6
Flammability rating	ASTM D 635 / UL 94	–	–	V-0/3.2	V-0	V-0	–

Note: values of insulation resistance between contacts are given on page 203.

Designation		Symbol	Standard	Unipole			Multipole								
chemical	commercial			00	S	E	00	S	E	B	K	F	2C	2G	1D
Polyamide (glass fitted)	Nylatron®	PA 6.6	–					●	●						●
Polyether Ethercetone	Peek®	PEEK	–	○	○	○	●	●	●	●	●	●	●	●	
Polytetrafluorethylene	–	PTFE	ASTM D 1457-83	●	●	●									
Tetrafluorethylene	–	FEP	ASTM D 2116-81					○	○						
Polyimide	Vespel®	PI	–					○	○						

● First choice alternative ○ Special order alternative

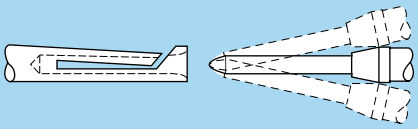


Electrical contact

Technical description

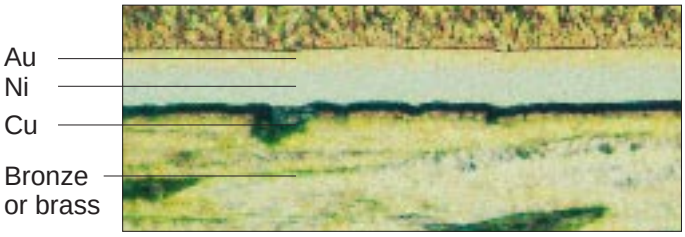
The secure reliable electromechanical connection achieved with LEMO female cylindrical contacts is mainly due to two important design features :

1. *Prod proof entry* on the mating side which ensures perfect concentric mating even with carelessly handled connectors.
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 beryllium (QQ-C-530) or bronze (UNS C 54400). These materials are chosen because of their high modulus of elasticity, their excellent electrical conductivity and a high mechanical strength.

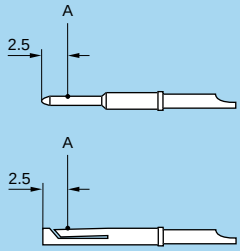


LEMO male solder and print contacts are made of brass (UNS C 38500). Male crimp contacts are made of brass (UNS C 34500) or annealed brass (UNS C 38500) with optimum hardness (HV) for crimping onto the wire.

Type	Material (standard)	Surf. treatment (µm)		
		Cu	Ni	Au[1)]
Male crimp	Brass (UNS C 34500)	0.5	3	1.0
	Brass (UNS C 38500)			
Male print	Brass (UNS C 38500)			
Femalle crimp	Bronze (UNS C 54400) Cu-Be (FS QQ-C-530)	0.5	3	1.5
Female print				
Clips	Cu-Be (FS QQ-C-530)	–	–	–
	Stainless steel			
Wire[2)]	Brass	–	3[3)]	–

Notes: the standard surface treatment are as follows:
– nickel: FS QQ-N-290A or MIL-C-26074C
– gold: ISO 4523.
[1)] minimum value
[2)] for elbow print contacts
[3)] treatment completed by 6 µm Sn-Pb tin-plating

Thickness comparison between the outside and the inside of female contacts



Note: A = inspection point

Contact ø A (mm)	Gold thickness		
	male (µm)	female	
		outside (µm)	inside (%)
0.5	1.0	1.5	65
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
3.0	1.0	1.5	75
4.0	1.0	1.5	75
5.0	1.0	1.5	75
6.0	1.0	1.5	75
8.0	1.0	1.5	75
12.0[1)]	–	–	–

Notes: [1)] contacts are silver plated

Contact resistance with relation to the number of mating cyles

(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.

A ø (mm)	Contact resistance (mΩ)			A ø (mm)	Contact resistance (mΩ)		
	1000 cycles	3000 cycles	5000 cycles		1000 cycles	3000 cycles	5000 cycles
0.5	7.5	8.3	8.7	3.0	2.0	2.2	3.1
0.7	5.6	5.7	6.1	4.0	1.6	2.0	2.8
0.9	4.1	4.2	4.8	5.0	1.4	–	–
1.3	2.8	2.9	3.6	6.0	1.2	–	–
1.6	2.6	2.7	3.5	8.0	0.8	–	–
2.0	2.9	3.1	3.3	12.0	0.7	–	–

Insulation resistance between the contacts and contact/shell

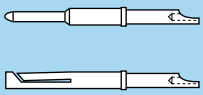
(measured according to IEC 60512-2 test 3a)

Insulating material	Multipole	Unipole
	PEEK	PTFE
new	> 10^{12} Ω	> 10^{12} Ω
after humidity test[1)]	> 10^{10} Ω	> 10^{10} Ω

Note:
[1)] 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

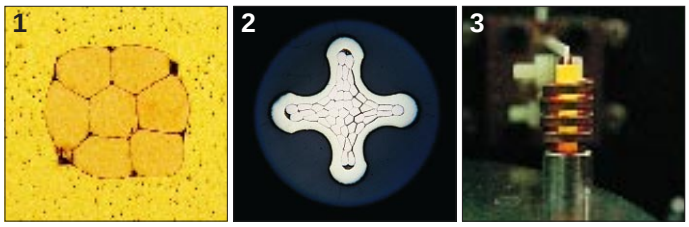
The square form crimp method is used (MIL-C-22520F, class I, type 2) photo 1 for unipole contacts.

For multipole contacts the standard four identer crimp method is used, MIL-C-22520F, class I, type 1), photo 2.
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 of bronze or brass contacts they 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 (see photo 3).

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 (form 1) for mounting maximum size conductors.
For some dimensions, these crimp contacts can be produced with reduced crimp barrels (form 2) for mounting reduced size conductors.



Crimp contacts

The crimp contacts can be with two forms: a standard crimp barrel for large conductors (see fig. 1) or with a reduced crimp barrel for smaller conductors (see fig. 2).

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

Fig. 1

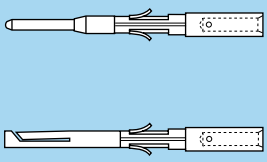
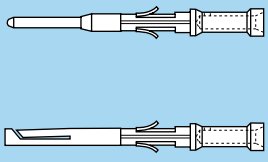


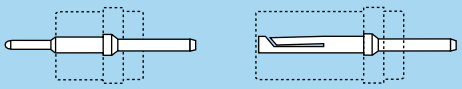
Fig. 2



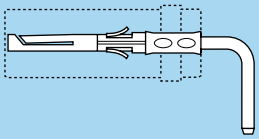
Print contacts

Print contacts are available in straight or elbow versions for certain connector types, mostly for straight and elbow socket models. Connection is made on flexible or rigid printed circuits by soldering.
Straight print contacts are gold-plated which guarantees optimum soldering, even after long-term storage. However for wave soldering, we recommend removal the gold-plating from the contact end on the printed circuit side before soldering according to the assembly procedures.
Print elbow contacts include a tinned brass wire crimped into a crimp contact.

straight



elbow



Test voltage

Test voltage (Ue) :
(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 1 minute.

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

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

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 us 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.
They correspond with values measured at sea level. They 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.
It means also that test voltage 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)

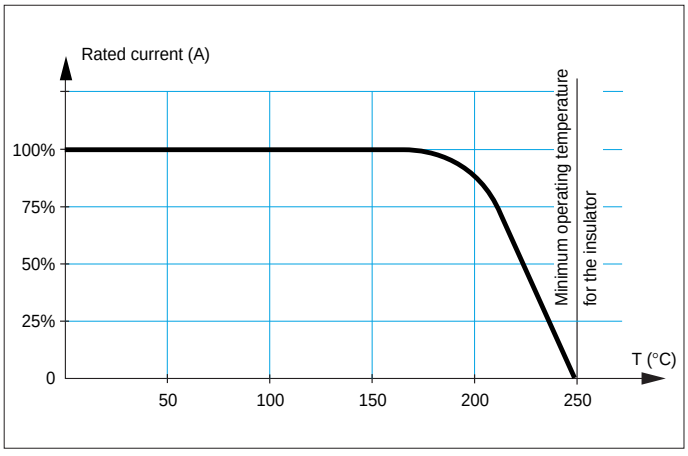
The specified rated current can be applied simultaneously to all the contacts.
It corresponds with an average temperature rise of 40°C of the connector.

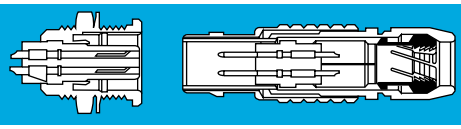
The current values are indicated in the table of insulator types in each series.
For use at higher temperatures acceptable rated current will be lower. It tends towards zero as the material is used at the maximum operating temperature accepted for the insulator.

In most case the current depend on the conductor dimension (see table on page 210) or on the printed circuit 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

Cables are fixed into LEMO connectors with cable collet systems. These collets with latches have a design which is very similar to those used for tool machines. This solution guarantees excellent cable retention and ensures perfectly symmetrical deformation of the cable.
The 00 multipole series is also available with hexagonal crimping (MIL-C-22520F).
In the F series cable fixing is ensured by " tie-wrap " junction of the cable screen on the connector outer shell and a thermofit jacket.

Material and treatment

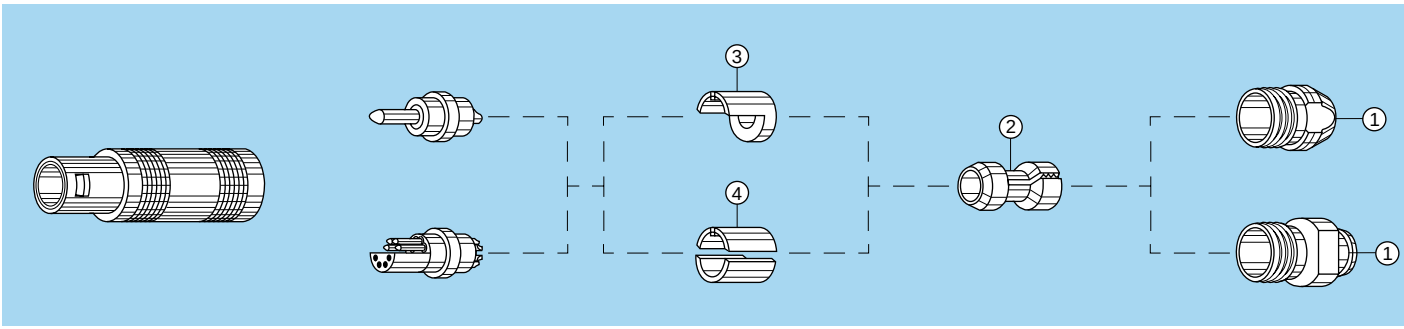
Component	Material (standard)	Surface treatment (µm)				
		Nickel		Gold		
		Cu	Ni	Cu	Ni	Au
Center piece	Brass (UNS C 38500)	0.5	3	–	–	–
Collet	Brass (UNS C 38500)	0.5	3	–	–	–
Crimp ferrule	Copper (UNS C 18700)	0.5	3	0.5	3	0.5
Reducer	Brass (UNS C 38500)	0.5	3	–	–	–
Reducing cone	Brass (UNS C 38500)	0.5	3	–	–	–
Earthing cone	Brass (UNS C 38500)	0.5	3	–	–	–
Metal washer	Brass (UNS C 38500)	0.5	3	–	–	–
Gasket	Silicone MQ/MVQ	–				
	FPM (Viton®)					

Notes:
standards for surface treatment are as follows:
– nickel-plated: FS QQ-N-290A

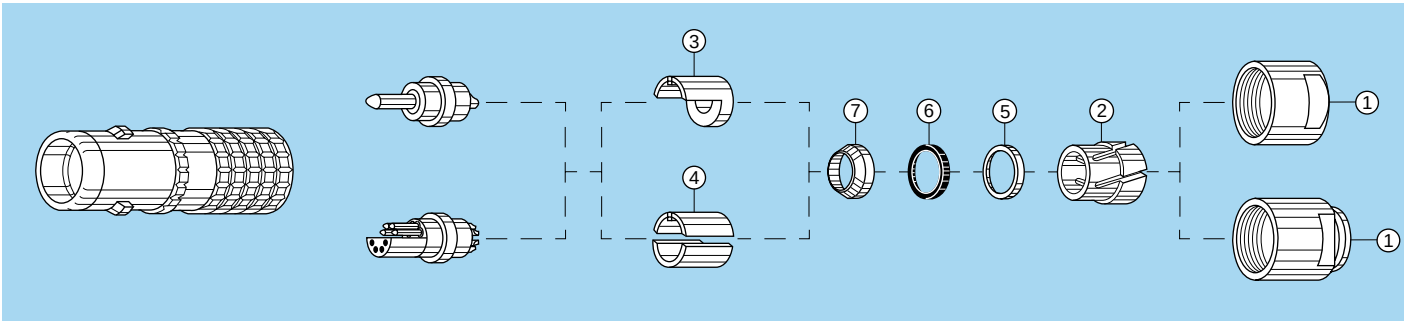
Cable clamping

Type C cable clamping (S, E and 2C series)

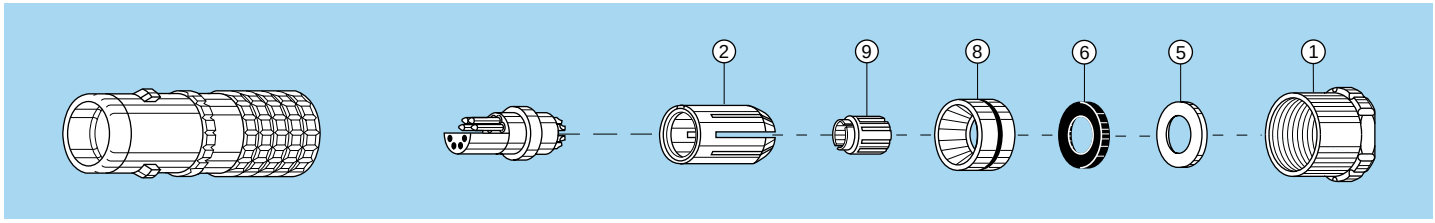
This system includes an earthing centre-piece ③ or ④ and a collet ② which is compressed by the collet nut ① to ensure a good clamping to the cable. When assembling the cable, the cable shield is gripped between the earthing centre-piece and the collet. The earthing centre-piece design depends on the connector type. It is:
– in one single part with opening ③ for S and E series unipole and multipole series with contacts only on the circumference of the insulator;
– in two parts ④ for multipole type connectors with contacts on the circumference and the centre of the insulator.



In standard watertight series (0E to 5E), C type clamping is completed by a flexible gasket ⑥ providing for watertightness on the cable end, by a metal washer ⑤ which prevents the gasket from rotating during the clamping; and by an earthing cone ⑦ which tightens the screen onto the earthing centre-piece ③ or ④.



The clamping system for 6E series connectors has been slightly modified as far as its dimensions are concerned. It includes a long collet ②, an earthing collet ⑨, a counter-cone ⑧, a flexible gasket ⑥ and a metal washer ⑤ which prevents the gasket from rotating during the clamping. When mating the assembly, the earthing collet is positioned onto the outer jacket. The cable screen is folded back around the collet extremity and then soldered. The collet is closed with the help of the counter-cone which is pressed against the collet when tightening the collet nut ①. For assembling unscreened cables, the collet ⑨ nut is not used.

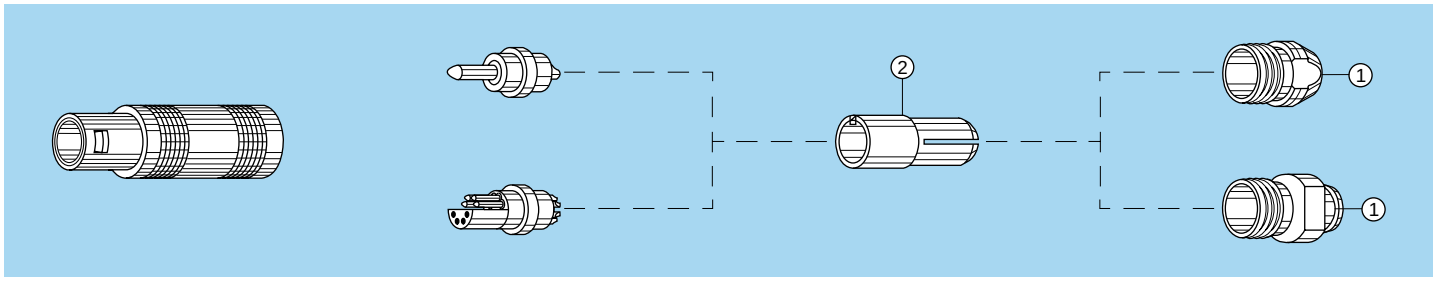


Type D cable clamping (FFL model 2S series)

This clamping system is assembled onto FFL plugs designed for crimp contacts. It includes the same components as the B series, see page 207.

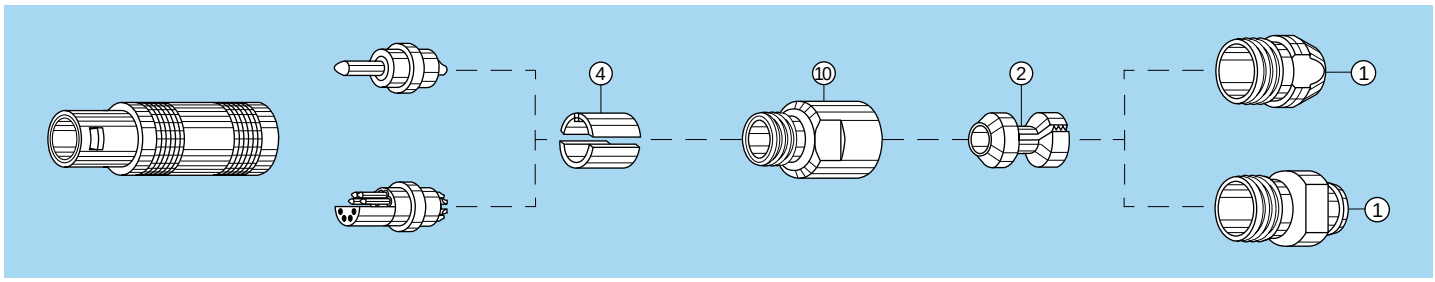
Type L cable clamping (S and 2C series)

This clamping system which includes in one part ② the centre-piece and the collet, does not make it possible to connect the cable shield to the connector shell. It is delivered only upon request and can only be assembled onto unipole or multipole type connectors. This is the only possible clamping type for the 5S.112 type.

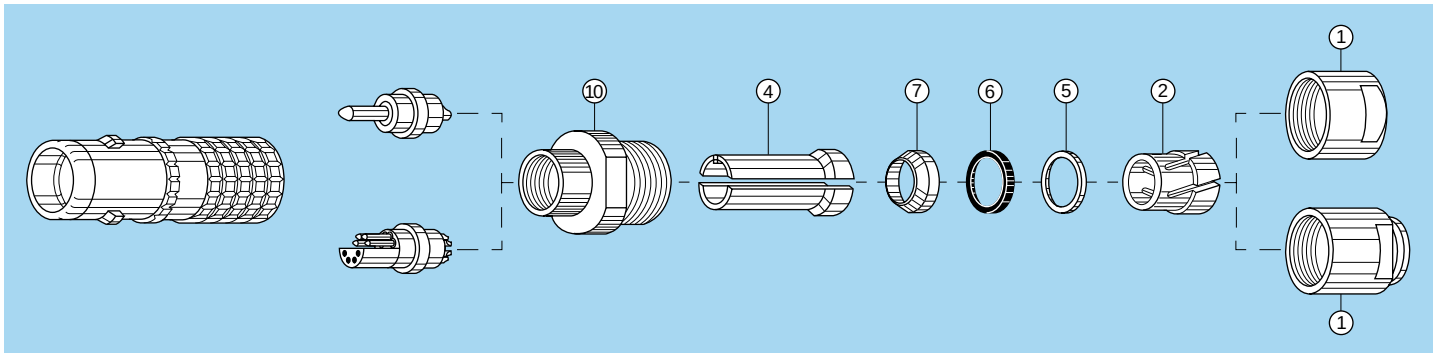


Type K cable clamping (S and E series)

This clamping system provides for screened or unscreened cables with diameters larger than maximum specified for each series. It includes an oversize collet housing ⑩, the collet ② and the collet nut ① of the next series size up. It requires a longer split centre-piece ④.

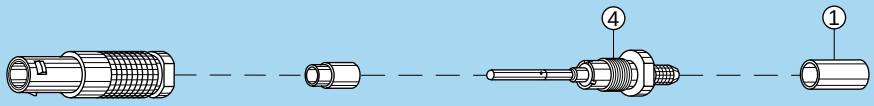


In standard watertight series (E series), the K type clamping type is completed by the flexible gasket ⑥ providing for watertightness on the cable end, by the metal washer ⑤ which prevents the gasket from rotating during the clamping ① and the earthing cone ⑦ of the next series size up which clamps the shield onto the longer split centre-pieces ④.



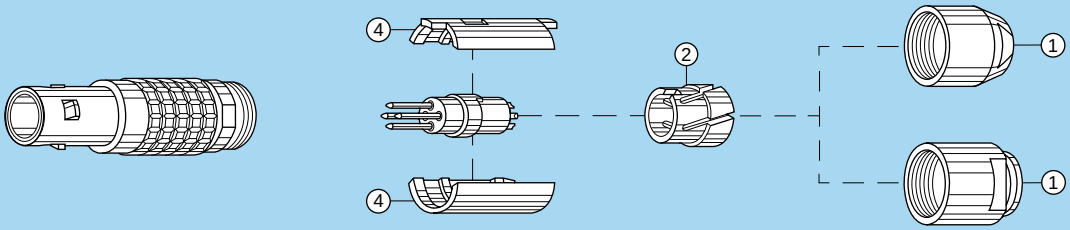
Type E cable clamping (00 unipole series)

This clamping type is specified only for the unipole 00 series. The rear end of the crimp backnut ④ which receives the shield braid is knurled to ensure a good retention of the shield once crimped under the crimp ferrule ①.



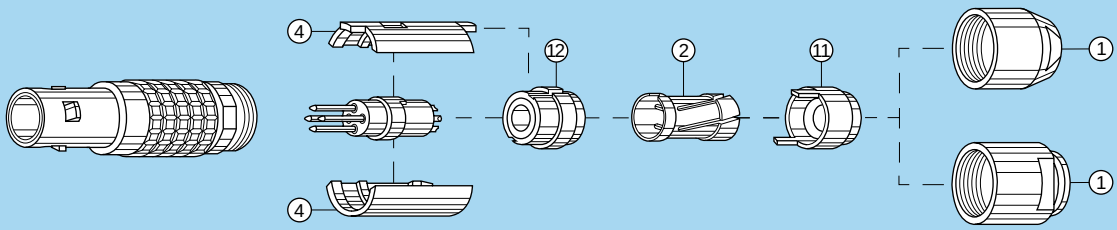
Type D cable clamping (B, 2G and 1D series)

This clamping system includes two split insert carrier ④ which position the insulator into the connector and a collet ② which is compressed by the collet nut ① ensuring the cable clamping. When assembling the connector, the cable shield is clamped between the split insert carrier and the collet.



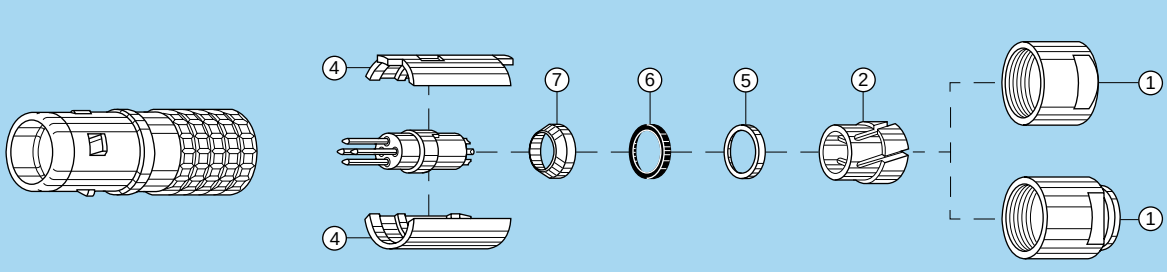
Type M cable clamping (B series)

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.



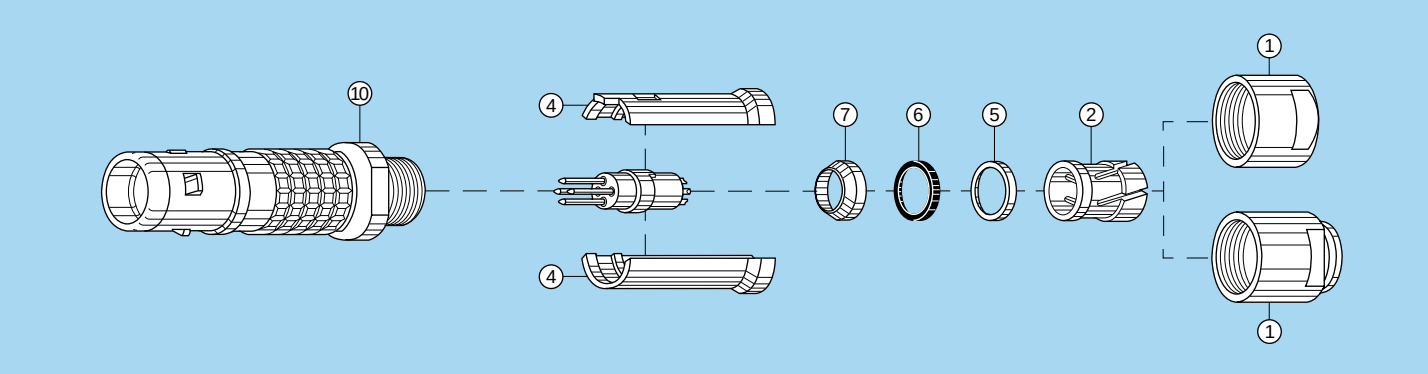
Type C cable clamping (K series)

In the watertight series (K series), the C type clamping system is completed by a flexible gasket ⑥ providing for watertightness on the cable end, by a metal washer ⑤ preventing the gasket from rotating when the collet nut is clamped and an earthing cone ⑦ which clamps the shield onto the split insert carrier ④.



Type K cable clamping (K series)

In the watertight keyed series (K series), the clamping system provides for using screened or unscreened cables, with a diameter larger than the maximum specified for each series. The shell is completed by an oversize collet housing ⑩. The collet ② and watertightness on the cable end are identical to type C cable clamping but are of the next series size up. The earthing cone ⑦ clamps the shield onto the longer split centre-pieces ④.



Maximum metal collet nut tightening torque

Standard series

	Series									
	00	0S	1D	1S	2C	2S	3S	4S	5S	6S
Torque (Nm)	0.25	0.5	1.5	1.5	2.5	2.5	6	8	10	12

Watertight series

	Series						
	0E	1E	2E	3E	4E	5E	6E
Torque (Nm)	0.7	0.8	2	3	5	8	12

Keyed series

	Series							
	00	0B	1B	2B	2G	3B	4B	5B
Torque (Nm)	0.25	0.5	1.5	2.5	2.5	4	7	10

Watertight keyed series

	Series					
	0K	1K	2K	3K	4K	5K
Torque (Nm)	0.7	0.8	2	3	5	8

1N = 0.102 kg

Maximum plastic collet nut tightening torque [1)]

	Series								
	00	0S	1S	2S	3S	1B	2B	3B	4B
Torque (Nm)	0.15	0.45	0.50	0.50	1.00	0.50	0.50	1.00	1.50

Note:
[1)] for applications subject to strong vibration, we recommend fixing the collet nut with epoxy resin.

Technical tables

Table of American Wire Gauge

AWG	Construction		ø wire max		Wire section	
	Strand nb	AWG/ strand	(mm)	(in)	(mm^2)	(sq in)
4	133	25	6.9596	0.274	21.5925	0.0335
6	133	27	5.5118	0.217	13.5885	0.0211
8	168	30	4.4450	0.175	8.5127	0.0132
8	133	29	4.3942	0.173	8.6053	0.0133
10	105	30	3.3020	0.13	5.3204	0.0082
10	37	26	2.9210	0.115	4.7397	0.0073
10	1	10	2.6162	0.103	5.2614	0.0082
12	65	30	2.5146	0.099	3.2936	0.0051
12	37	28	2.3114	0.091	2.9765	0.0046
12	19	25	2.3622	0.093	3.0847	0.0048
12 [1)]	7	20	2.5400	0.1	3.6321	0.0056
12	1	12	2.0828	0.082	3.3081	0.0051
14	41	30	2.0574	0.081	2.0775	0.0032
14	19	27	1.8542	0.073	1.9413	0.0030
14 [1)]	7	22	2.0828	0.082	2.2704	0.0035
14	1	14	1.6510	0.065	2.0820	0.0032
16 [1)]	65	34	1.5748	0.062	1.3072	0.0020
16	26	30	1.5748	0.062	1.3174	0.0020
16	19	29	1.4986	0.059	1.2293	0.0019
16 [1)]	7	24	1.5494	0.061	1.4330	0.0022
16	1	16	1.3208	0.052	1.3076	0.0020
18 [1)]	65	36	1.2700	0.05	0.8234	0.0013
18 [1)]	42	34	1.2700	0.05	0.8447	0.0013
18	19	30	1.3208	0.052	0.9627	0.0015
18	16	30	1.2954	0.051	0.8107	0.0013
18	7	26	1.2700	0.05	0.8967	0.0014
18	1	18	1.0414	0.041	0.8229	0.0013
20 [1)]	42	36	1.0160	0.04	0.5320	$8.2x10^{-4}$
20	19	32	1.0414	0.041	0.6162	0.0010
20	10	30	1.0160	0.04	0.5067	$7.9x10^{-4}$
20	7	28	0.9906	0.039	0.5631	$8.7x10^{-4}$
20	1	20	0.8382	0.033	0.5189	$8.0x10^{-4}$
22	19	34	0.8382	0.033	0.3821	$5.9x10^{-4}$
22	7	30	0.7874	0.031	0.3547	$5.5x10^{-4}$
22	1	22	0.6604	0.026	0.3243	$5.0x10^{-4}$
24 [1)]	42	40	0.6604	0.026	0.2045	$3.2x10^{-4}$
24	19	36	0.6858	0.027	0.2407	$3.7x10^{-4}$
24	7	32	0.6350	0.025	0.2270	$3.5x10^{-4}$
24	1	24	0.5588	0.022	0.2047	$3.2x10^{-4}$
26	19	38	0.5588	0.022	0.1540	$2.4x10^{-4}$
26	7	34	0.5080	0.02	0.1408	$2.2x10^{-4}$
26	1	26	0.4318	0.017	0.1281	$2.0x10^{-4}$
28 [1)]	19	40	0.4318	0.017	0.0925	$1.4x10^{-4}$
28	7	36	0.4064	0.016	0.0887	$1.4x10^{-4}$
28	1	28	0.3302	0.013	0.0804	$1.2x10^{-4}$
30	7	38	0.3302	0.013	0.0568	$8.8x10^{-5}$
30	1	30	0.2794	0.011	0.0507	$7.9x10^{-5}$
32	7	40	0.2794	0.011	0.0341	$5.3x10^{-5}$
32	1	32	0.2286	0.009	0.0324	$5.0x10^{-5}$
34	1	34	0.1693	0.007	0.0201	$3.1x10^{-5}$
36	1	36	0.127	0.005	0.0127	$2.0x10^{-5}$
38	1	38	0.1016	0.004	0.0081	$1.3x10^{-5}$
40	1	40	0.078	0.003	0.0049	$7.5x10^{-6}$

Note: [1)] not included in the standard

Table of wire gauges according to IEC-228 standard

Conductor no x Ø (mm)	Max Ø (mm)	Max Ø (in)	Section (mm^2)	Section (sq in)
196x0.40	7.50	0.295	25.00	0.0387
7x2.14	6.10	0.240	25.00	0.0387
125x0.40	6.00	0.236	16.00	0.0248
7x1.72	4.90	0.192	16.00	0.0248
1x4.50	4.50	0.177	16.00	0.0248
80x0.40	4.70	0.155	10.00	0.0155
7x1.38	3.95	0.155	10.00	0.0155
1x3.60	3.60	0.141	10.00	0.0155
84x0.30	3.70	0.145	6.00	0.0093
7x1.50	3.15	0.124	6.00	0.0093
1x2.76	2.76	0.108	6.00	0.0093
56x0.30	2.80	0.110	4.00	0.0062
7x0.86	2.58	0.098	4.00	0.0062
1x2.25	2.25	0.082	4.00	0.0062
50x0.25	2.15	0.084	2.50	0.0038
7x0.68	2.04	0.080	2.50	0.0038
1x1.78	1.78	0.070	2.50	0.0038
30x0.25	1.60	0.062	1.50	0.0023
7x0.52	1.56	0.061	1.50	0.0023
1x1.14	1.40	0.055	1.50	0.0023
32x0.20	1.35	0.053	1.00	0.0015
7x0.43	1.29	0.050	1.00	0.0015
1x1.15	1.15	0.045	1.00	0.0015
42x0.15	1.20	0.047	0.75	0.0011
28x0.20	1.15	0.045	0.75	0.0011
1x1.0	1.00	0.039	0.75	0.0011
28x0.15	0.95	0.037	0.50	$7.7x10^{-4}$
16x0.20	0.90	0.035	0.50	$7.7x10^{-4}$
1x0.80	0.80	0.031	0.50	$7.7x10^{-4}$
7x0.25	0.75	0.029	0.34	$5.2x10^{-4}$
1x0.60	0.60	0.023	0.28	$4.3x10^{-4}$
14x0.15	0.75	0.029	0.25	$3.8x10^{-4}$
7x0.20	0.65	0.023	0.22	$3.4x10^{-4}$
18x0.10	0.50	0.019	0.14	$2.1x10^{-4}$
14x0.10	0.40	0.015	0.11	$1.7x10^{-4}$
21x0.07	0.40	0.015	0.09	$1.3x10^{-4}$
14x0.10	0.40	0.015	0.09	$1.3x10^{-4}$

Maximum current rating for conductor

Maximum current on insulated conductors up to an ambiant temperature of 30° C (from VDE 0100, parts 430 and 532 as well as other VDE regulations).

Nominal section mm^2	Group 2 Intens. max. A	Group 3 Intens. max. A
0.08	1.0	1.5
0.14	2.0	3.0
0.25	4.0	5.0
0.34	6.0	8.0
0.50	9.0	12.0
0.75	12.0	15.0
1.00	15.0	19.0
1.50	18.0	24.0
2.50	26.0	32.0

Group 2 Multi-conductor, e. g. solid cable under sheath, shielded cable, lead-sheath cables, …
Group 3 Single conductor and single conductor cable laid on open air in a way to leave at least a space between them equal to their diameter

Some formulae

Resistance R of a conductor: $R = \rho \bullet \frac{l}{A} [\Omega]$

Where: ρ = conductor resistivity
l = conductor length
A = conductor cross-section

Impedance of coaxial line: $Z = \frac{138}{\sqrt{\varepsilon_r}} \bullet \log \frac{D}{d} [\Omega]$

ε_r = dielectric constant
D = dielectric outer diameter
d = center conductor outer diameter

Signal attenuation: $\text{Attenuation} = 20 \bullet \log \frac{U_1}{U_2}$ [dB]

U_1 = input signal voltage
U_2 = output signal voltage

Conversion of some units:

millimeter into inches:	1 mm = 0.0394 in
inches into millimeter:	1 in = 25.4 mm
centimeters into feet:	1 cm = 0.0328 ft
feet (12 in) into centimeters:	1 ft = 30.48 cm
square centimeters into square inches:	1 cm^2 = 0.155 sq in
square inches into square centimeters:	1 sq in = 6.4516 cm^2
bar into psi (pounds per square inch):	1 bar = 14.51 psi
bar into Pascal:	1 bar = 10^5 Pa
°C into °F:	°F = °C•1.8 + 32
newtonmeter (Nm) into inch pound (in•lb)	1 Nm = 8.85 in•lb
mbar•l•s^{-1} into Torr•l•s^{-1}	1 mbar•l•s^{-1} = 1.33 Torr•l•s^{-1}