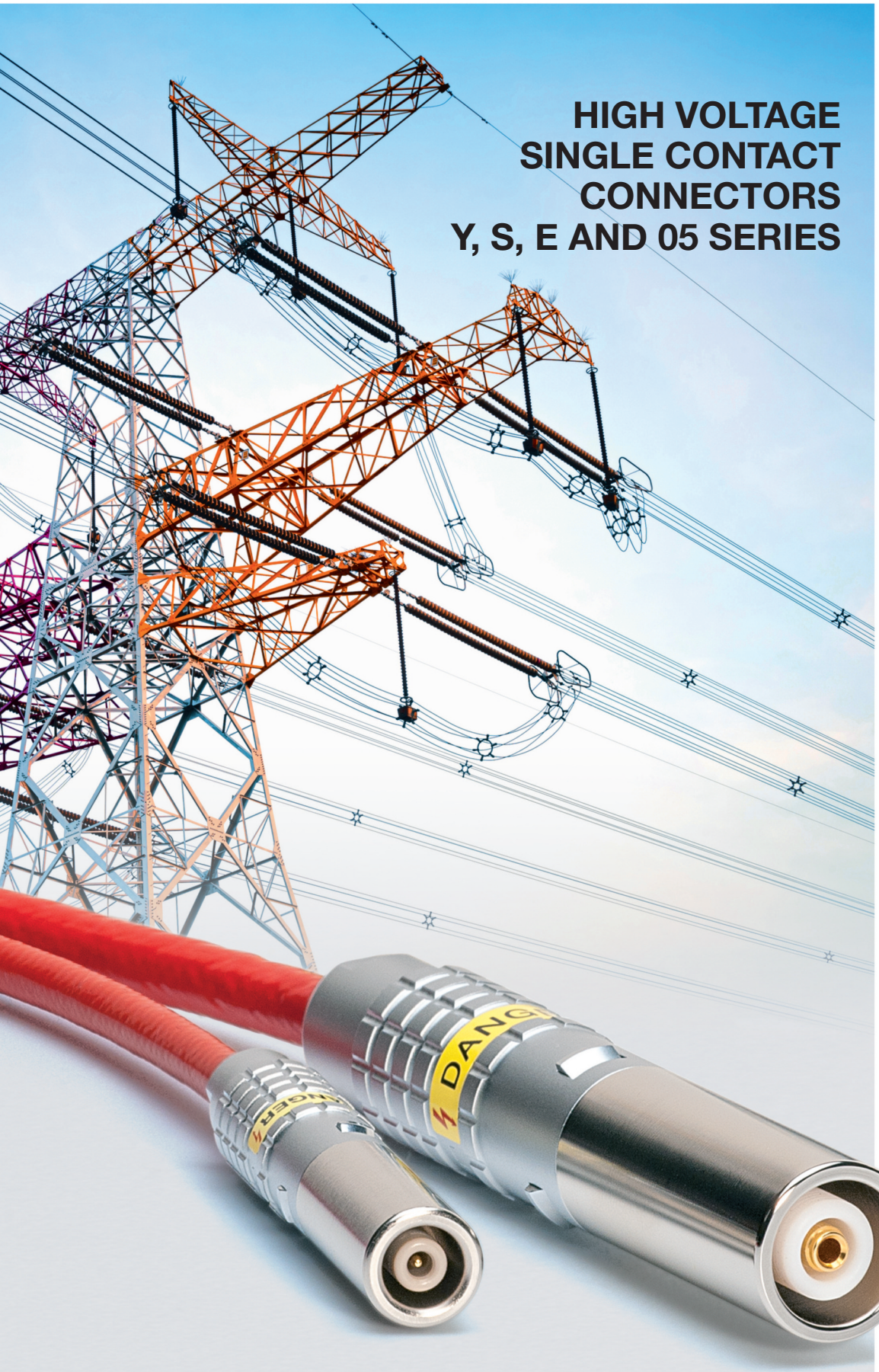
HIGH VOLTAGE SINGLE CONTACT CONNECTORS Y, S, E AND 05 SERIES



LEMO®

Precision modular connectors to suit your application

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

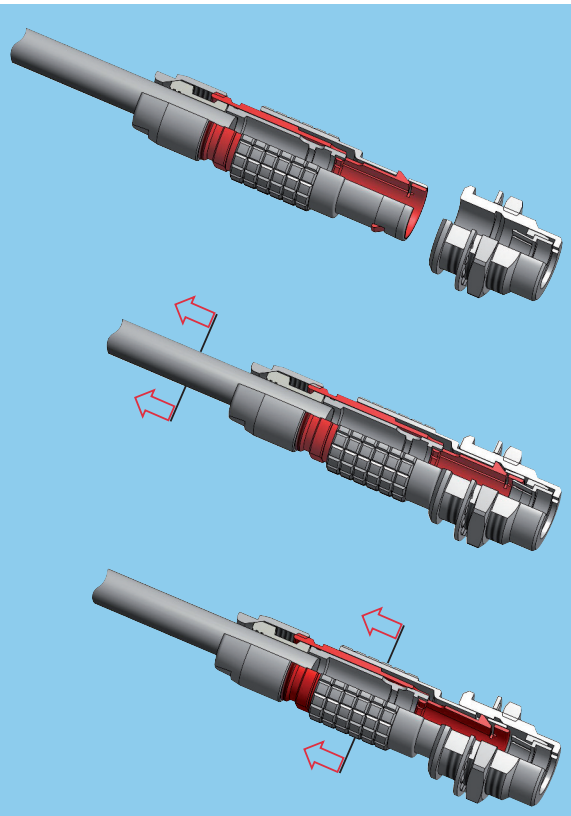
Over 75000 connectors

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

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

LEMO's Push-Pull Self-Latching Connection System

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



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

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

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

UL Recognition

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

CE marking

CE marking means that the appliance or equipment bearing it complies with the protection requirements of one or several European safety directives. CE marking applies to complete products or equipment, **but not to electromechanical components, such as connectors**.

RoHS

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

LEMO high voltage connectors (single contact)

LEMO's High Voltage Y series connector have been designed in the 70's for the CERN, European Organization for Nuclear Research, one of the largest and most respected centers for scientific research.

All the series presented in this catalogue (S series, E series, Y series and 05 series) are Push-Pull connectors that offer reliable construction, made of high grade materials. The design of these product increases the creepage distance of the interconnection enabling to guarantee high voltage working conditions

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Y series (HV single contact)

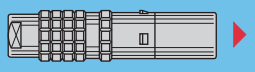
This family of single contact connectors are high voltage connectors designed for operating voltages ranging from 5 to 50 kV. They offer a great deal of security.
The long housing permits a mechanical mating long before the contacts are engaged, thus ensuring safe mating. Furthermore, the socket in the series 3Y can be provided with a microswitch to prevent power from being turned on before the plug is mated.

Models without safety locking ring

405-410 type

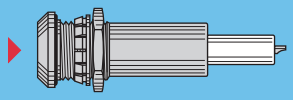
Models (page 9)

Straight plugs

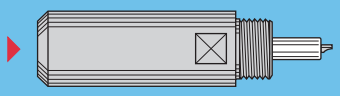


FFA.1Y

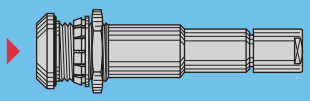
Fixed sockets



ERA.1Y



ERY.1Y

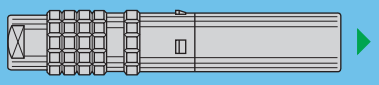


PSA.1Y

415-430 type

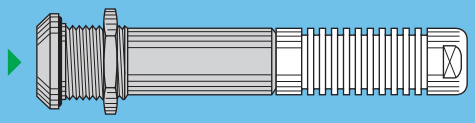
Models (page 9)

Straight plugs

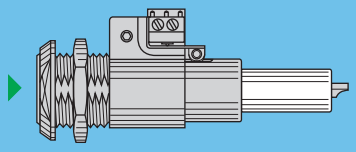


FFA.3Y

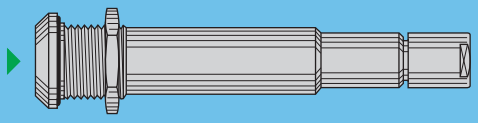
Fixed sockets



ERA.3Y



ERD.3Y

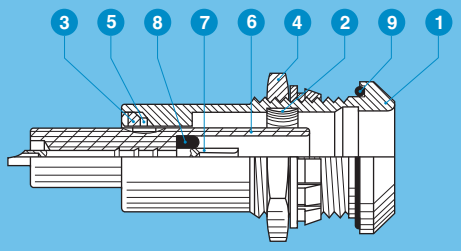


PSA.3Y

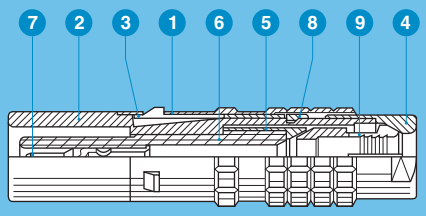
Part Section Showing Internal Components

Fixed socket

1. shell
2. earthing crown
3. castellated nut
4. hexagonal ring
5. circlip
6. insulator
7. female contact
8. silicone ring
9. o-ring



ERA.1Y



FFA.1Y

Straight plug

1. outer shell
2. inner shell
3. latch sleeve
4. collet nut
5. centre-piece
6. insulator
7. male contact
8. circlip
9. collet

Note: other connector shells are available on request.

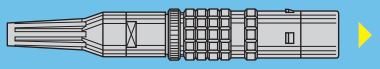
Requirements in the field of nuclear research have given LEMO the opportunity to design a new generation of high voltage unipole connector in this Y series.
They are mainly characterized by their extremely favourable size/test voltage ratio.
The use of insulating material such as PEEK and silicone rubber in a new design of insulators allows to propose connectors withstanding up to 52 kVDC in the 3Y series.

Models with safety locking ring

416-425 type

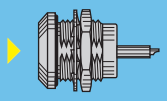
Models (page 13)

Straight plug

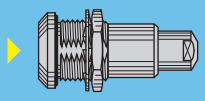


FFR.1Y/3Y

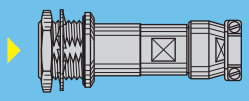
Fixed sockets



ERA.1Y/3Y



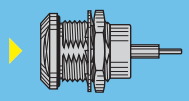
ERA.1Y/3Y



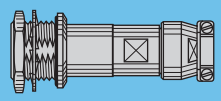
PEP.1Y/3Y

Watertight or vacuumtight models (page 15)

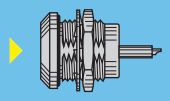
Fixed sockets



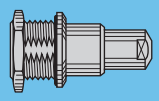
EWB.1Y



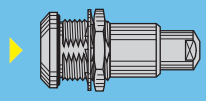
VPP.1Y/3Y



HGP.1Y/3Y



VCP.3Y

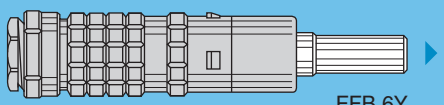


HGP.1Y

450 type

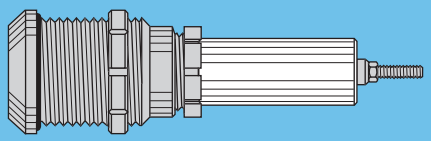
Models (page 14)

Straight plug



FFB.6Y

Fixed socket

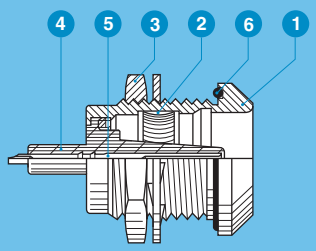


ERA.6Y

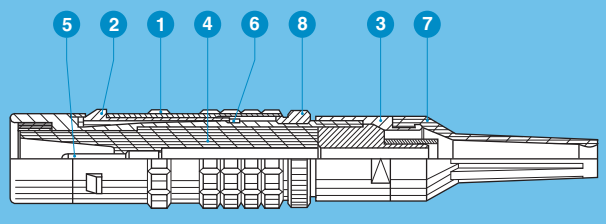
Part Section Showing Internal Components

Fixed socket

1. shell
2. earthing crown
3. hexagonal ring
4. insulator
5. female contact
6. o-ring



ERA.1Y



FFR.1Y

Straight plug

1. outer shell
2. latch sleeve
3. collet nut
4. insulator
5. male contact
6. circlip
7. bend relief
8. safety locking ring

Note: other connector shells are available on request.

Technical characteristics

Materials and treatments

Component	Material (Standard)	Thickness of surface treatment (µm)							
		chrome			nickel		gold		
		Cu	Ni	Cr	Cu	Ni	Cu	Ni	Au
Outer shell, collet nut, conical nut	Brass (UNS C 38500)	0.5	3	0.3					
Innershell	Brass (UNS C 38500)				0.5	3			
Earthing crown	Beryllium Copper (UNS C 17300)							2	0.1
Latch sleeve	Special bronze/brass	0.5	3	0.3					
Locking washer	Bronze (UNS C 52100)				0.5	3			
Hexagonal nut	Brass (UNS C 38500)				0.5	3			
Other metallic components	Brass (UNS C 38500)				0.5	3			
Male contact	Brass (UNS C 34500)						0.5	3	1.0
Female contact	Bronze (UNS C 54400) or Cu-Be (UNS C 17300)						0.5	3	1.5
Clips	Cu-Be or special steel	without treatment							
Insulator	PTFE, PEEK								
	Silicone rubber (LSR)								
O-ring and gaskets	Silicone MQ/MVQ								

Mechanical and Climatical

Characteristics	Value	Standard
Endurance	> 1000 cycles	IEC 60512-5 test 9a
Humidity	up to 95% at 60° C	
Operating temperature	- 40° C to +80° C [1]	
	- 55° C to +230° C [2]	
Salt spray corrosion test	1000 h	IEC 60512-6 test 11f
Protection index (mated)	IP 50	IEC 60529
Climatical category		IEC 60068-1

Notes: [1] with «F» silicone insulator. [2] with «L» PEEK insulator or «T» Teflon insulator (PTFE).

Electrical

Characteristics		Value	Standard
Test voltage		See page 17	
Shell electrical continuity	1Y	1.0 mΩ	IEC 60512-2 test 2f
	3Y	0.7 mΩ	IEC 60512-2 test 2f
	6Y	0.1 mΩ	IEC 60512-2 test 2f
Contact resistance [1]	ø 0.9 mm	< 4.5 mΩ	IEC 60512-2 test 2a
	ø 1.3 mm	< 3.5 mΩ	IEC 60512-2 test 2a
	ø 1.6 mm	< 3.5 mΩ	IEC 60512-2 test 2a
	ø 4.5 mm	< 2 mΩ	IEC 60512-2 test 2a
	ø 7.0 mm	< 0.4 mΩ	IEC 60512-2 test 2a

Notes: Insulation resistance > 10^{12} Ω IEC 60512-2 test 3a. [1] after 1000 mating cycles and the salt spray test according to IEC 60512-6 test 11 f.

Maximum operating voltage

	5kV	10kV	15kV	16kV [1]	25kV [1]	30kV	50kV [1]
1Y series	●	●		●			
3Y series			●		●	●	
6Y series							●

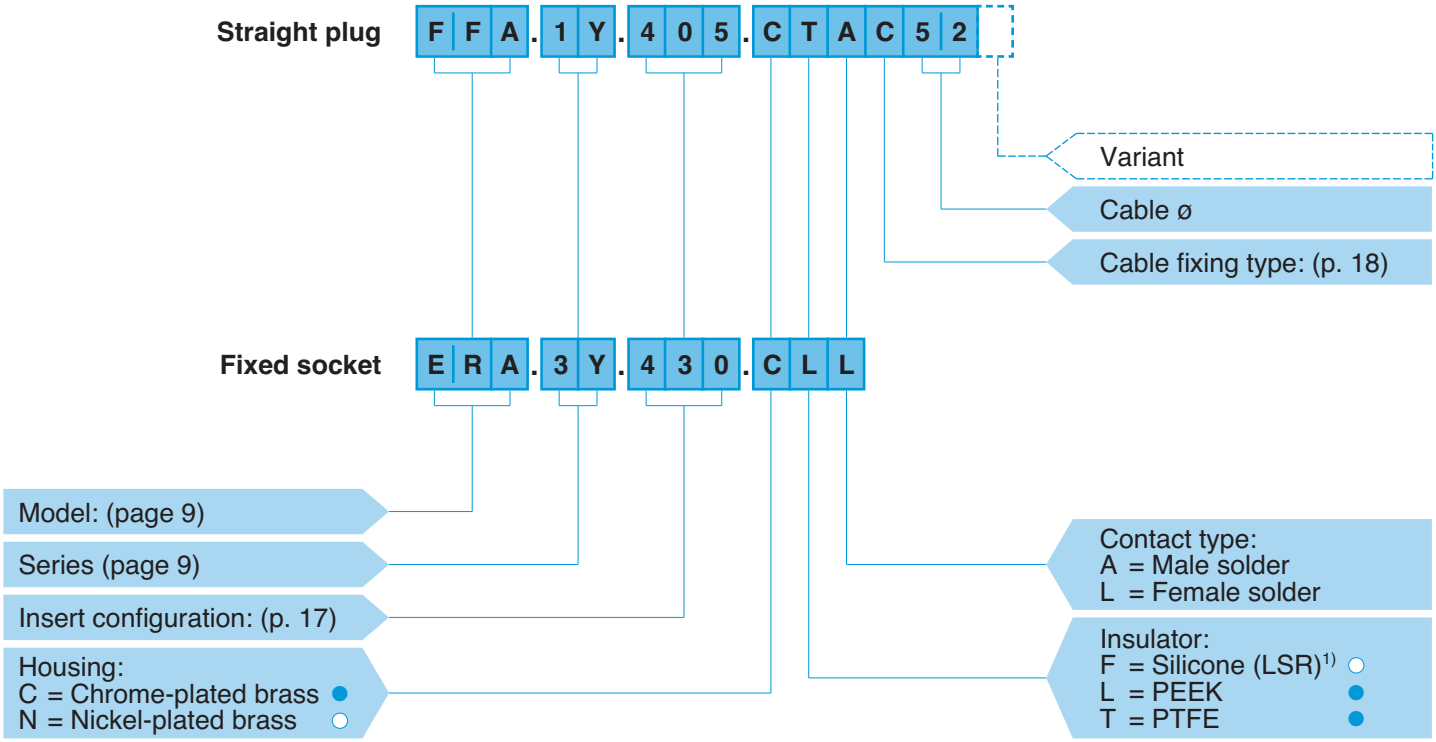
Notes: [1] with safety locking ring.

Recommended cables

Models	Recommended cables	Colour	Outer diameter (mm)	Standard	Operating voltage (kV DC)
FFA.1Y.410.CTAC57	TV-20 Sumitomo	Red	5.75	UL 3239	
FFA.1Y.410.CTLC57	TV-20 Sumitomo	Red	5.75	UL 3239	
FFR.1Y.416.CFAE55R	CHT.99.574.710				
HGP.1Y.416.CLL37	CHT.99.574.710				
PEP.1Y.416.CLLY10	CHT.99.574.710				
FFR.3Y.425.CFAE55Z	JJC40003 / LEDE cable 130660	Red	5.40	UL 11152	30
FFR.1Y.416.CFAE55Z	JJC40003 / LEDE cable 130660	Red	5.40	UL 11152	30
FFR.1Y.416.CFAE55G	JJC40019 / LEDE cable 130666	Red	6.00		30
FFR.1Y.416.CFAE55B	JJC40003 / LEDE cable 130660	Red	5.40	UL 11152	30
FFR.1Y.416.CFAE63	NEK 20KV (07506)				
FFR.1Y.416.CFAE64	Lynenwerk 2YCH 20KV				
FFR.1Y.416.CFAE67G	HTC 50-5-1	Red	3.20	CERN/DESY	5
FFR.3Y.425.CFAE55G	Belden 8866	Red	5.30	–	40
FFR.3Y.425.CFAE76	Lynenwerk 2YCH 30KV				
FFR.3Y.425.CFAE88	CHH.99.NEK.HTC				
	CHT.99.554.075				
	CHT.02.053.048				
	CHT.40.090.38060RB				40
	CHT.18.150.65088GB / LEDE 315650				18
FFA.1Y.405.C●●C32	LEDE 140470	Red	2.90		3
FFA.1Y.405.C●●C42	CHT.03.075.20040RB / LEDE 150470	Red	4.00		3
FFA.1Y.410.CLLC47	CHT.09.060.28046RB / LEDE 106330		4.60		9

Notes: Outer insulation cable diameter (mm) must be adapted to the inner silicone insulator diameter (mm).

Part Numbering System



Notes: 1) only for the plugs of the 1Y.416 and 3Y.425 series.

● First choice alternative ○ Special order alternative

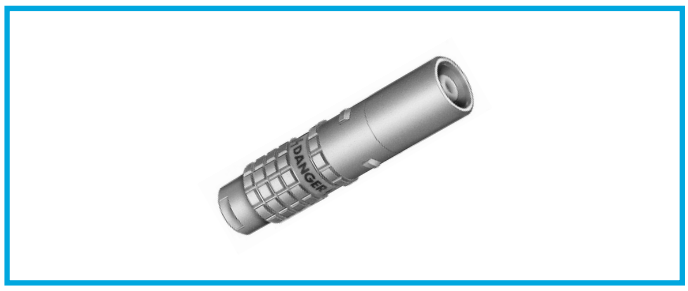
FFA.1Y.405.CTAC52 = straight plug with cable collet, 1Y series, high voltage type, 10.5 kVDC test voltage, chrome-plated brass housing, PTFE insulator, male solder contact, C type collet for 5.2 mm max diameter cable.

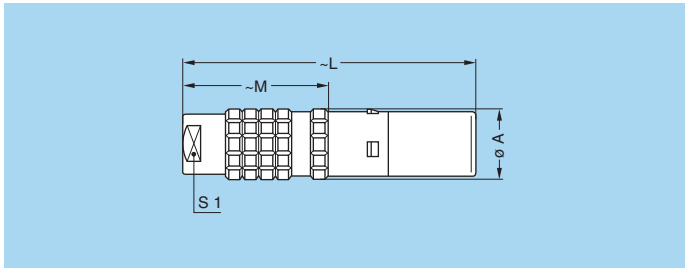
ERA.3Y.430.CLL = fixed socket, nut fixing, 3Y series, high voltage type, 42 kVDC test voltage, chrome-plated brass housing, PEEK insulator, female solder contact.

Note: As standard, plugs are fitted with a male contact and sockets with a female contact. Some of these series Y models can be supplied with a female contact for plugs and a male contact for sockets.

Models without safety locking ring

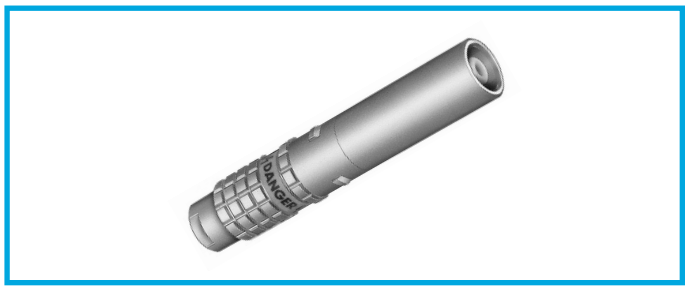
FFA.1Y Straight plug, cable collet

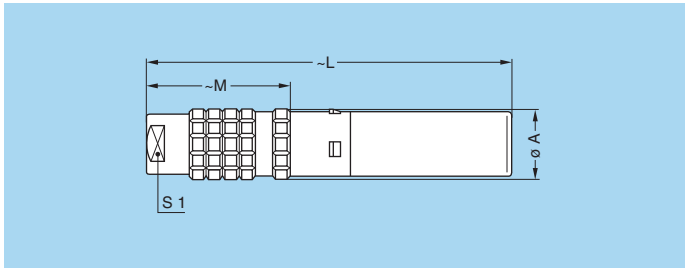




Part number	Dimensions (mm)				Cable ø	
	A	L	M	S1	min.	max.
FFA.1Y.405.C●AC––	13	54.0	27.5	9	1.2	6.8
FFA.1Y.405.C●LC––	13	67.0	30.5	9	1.2	6.8
FFA.1Y.410.C●AC––	13	63.7	27.7	9	1.2	6.8
FFA.1Y.410.C●LC––	13	85.0	39.3	9	1.2	6.8

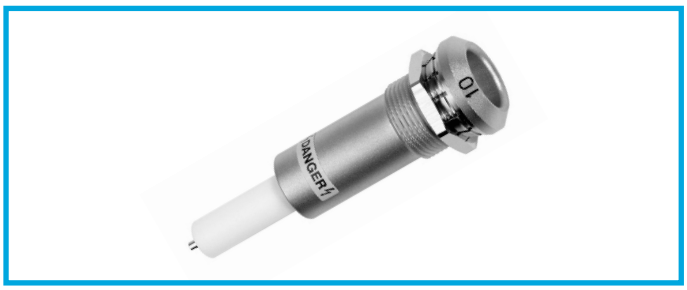
FFA.3Y Straight plug, cable collet

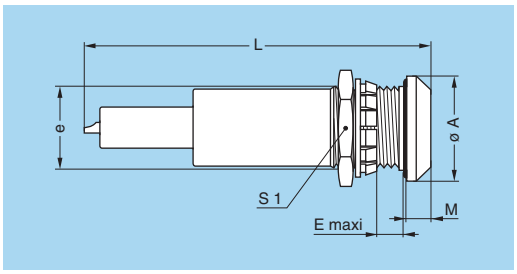


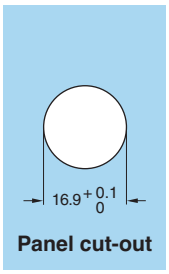


Part number	Dimensions (mm)				Cable ø	
	A	L	M	S1	min.	max.
FFA.3Y.415.C●AC––	19	98	42	15	2.6	10.5
FFA.3Y.415.C●LC––	19	116	52	15	2.6	10.5
FFA.3Y.430.C●AC––	19	115	42	15	2.6	10.5
FFA.3Y.430.C●LC––	19	200	105	15	2.6	10.5

ERA.1Y Fixed socket, nut fixing



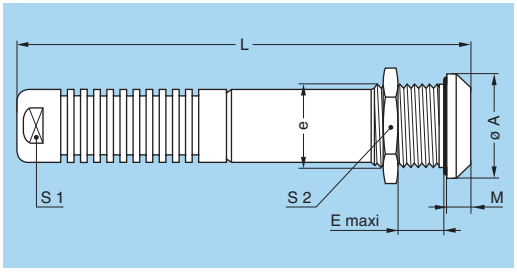


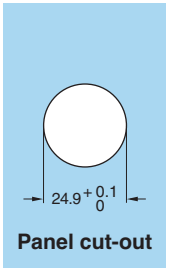


Panel cut-out

Part number	Dimensions (mm)					
	A	e	E	L	M	S1
ERA.1Y.405.C●A	20	M16x1.0	6.5	61.0	4.5	19
ERA.1Y.405.C●L	20	M16x1.0	6.5	51.0	4.5	19
ERA.1Y.410.C●A	20	M16x1.0	6.5	79.5	4.5	19
ERA.1Y.410.C●L	20	M16x1.0	6.5	69.8	4.5	19

ERA.3Y Fixed socket, nut fixing

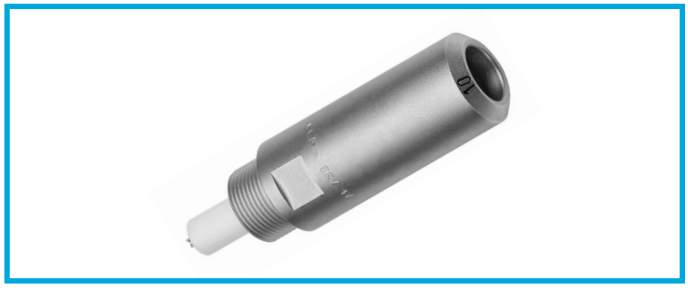


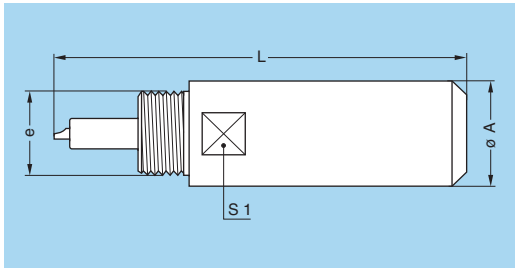


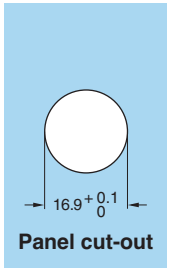
Panel cut-out

Part number	Dimensions (mm)						
	A	e	E	L	M	S1	S2
ERA.3Y.415.C●A	31	M24x1.0	12	77	6.5	20	30
ERA.3Y.415.C●L	31	M24x1.0	12	103	6.5	20	30
ERA.3Y.430.C●A	31	M24x1.0	12	108	6.5	20	30
ERA.3Y.430.C●L	31	M24x1.0	12	151	6.5	20	30

ERY.1Y **Fixed socket, screw fixing, visible shell**



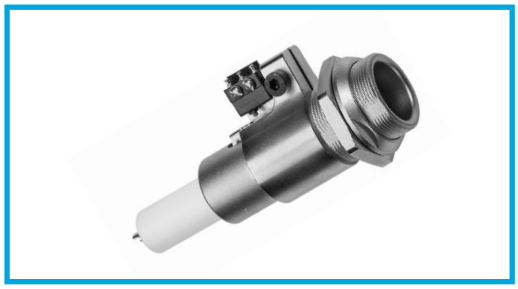


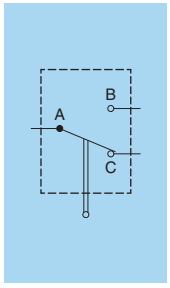


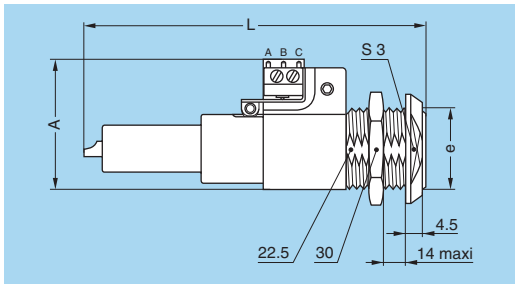
Panel cut-out

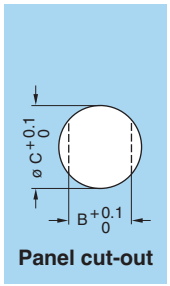
Part number	Dimensions (mm)			
	A	e	L	S1
ERY.1Y.410.CTA	20	M16x1.0	79.5	18

ERD.3Y **Fixed socket with two nuts and microswitch** (back panel mounting)





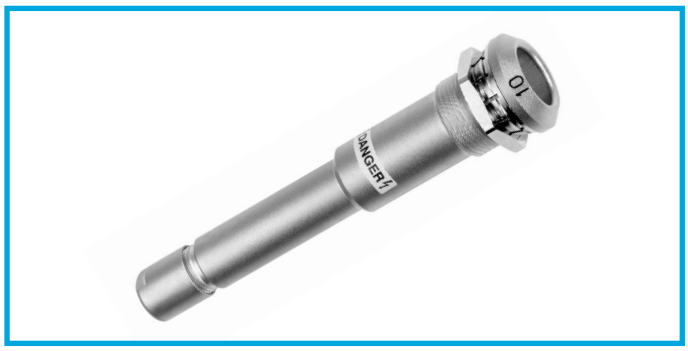


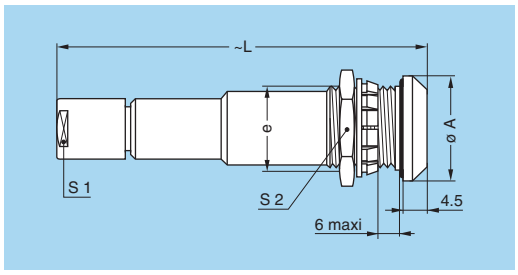


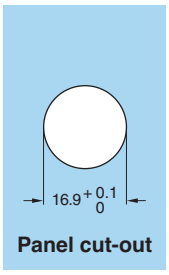
Panel cut-out

Part number	Dimensions (mm)				Panel cut-out	
	A	e	L	S3	B	C
ERD.3Y.415.CTLM	40	M24x1.0	103.5	27	22.6	24.1
ERD.3Y.415.CTYM	40	M24x1.0	77.0	27	22.6	24.1

PSA.1Y Fixed socket, nut fixing, cable collet



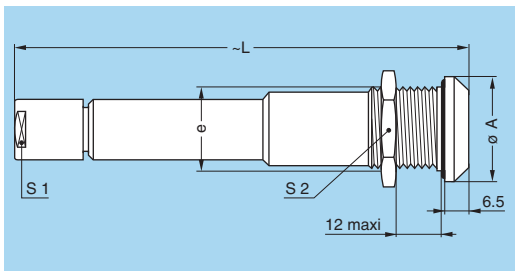


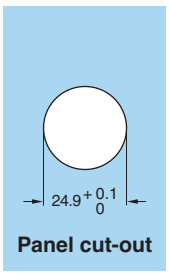


Panel cut-out

Part number	Dimensions (mm)					Cable ø	
	A	e	L	S1	S2	min.	max.
PSA.1Y.405.C●AC––	20	M16x1.0	71	9	19	1.2	6.8
PSA.1Y.405.C●LC––	20	M16x1.0	74	9	19	1.2	6.8
PSA.1Y.410.C●AC––	20	M16x1.0	81	9	19	1.2	6.8
PSA.1Y.410.C●LC––	20	M16x1.0	93	9	19	1.2	6.8

PSA.3Y Fixed socket, nut fixing, cable collet



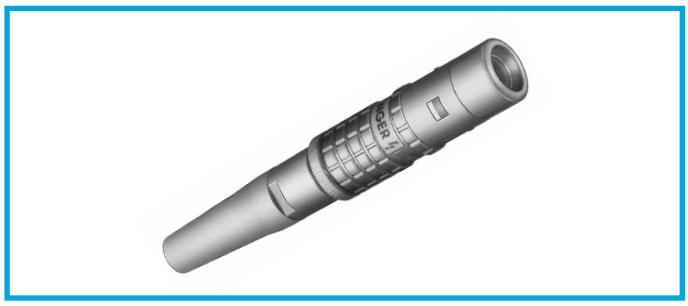


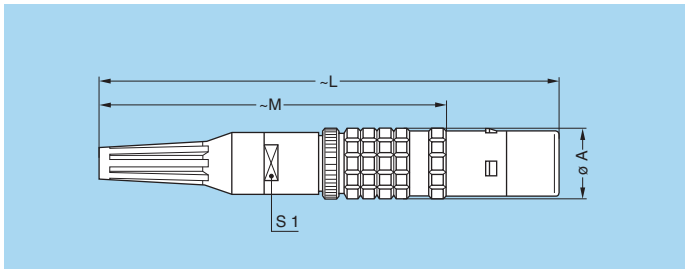
Panel cut-out

Part number	Dimensions (mm)					Cable ø	
	A	e	L	S1	S2	min.	max.
PSA.3Y.430.C●LC––	31	M24x1.0	150	15	30	2.6	10.5

Models with safety locking ring

FFR Straight plug for cable crimping with bend relief and safety locking ring

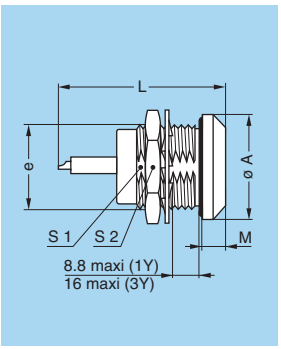


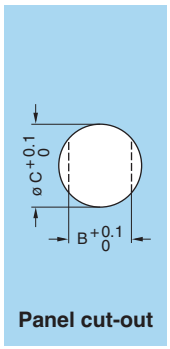


Part number	Dimensions (mm)				Cable ø	
	A	L	M	S1	min.	max.
FFR.1Y.416.CFAE---	13	83	64.7	9	3.3	6.6
FFR.1Y.416.CFAE67G	13	100	82.0	12	–	9.0
FFR.3Y.425.CFAE---	19	120	92.0	15	3.0	10.5

Note: FFR.1Y.416.CFAE52R is delivered with red bend relief (page 18).
Some specific model may accept larger dimensions.

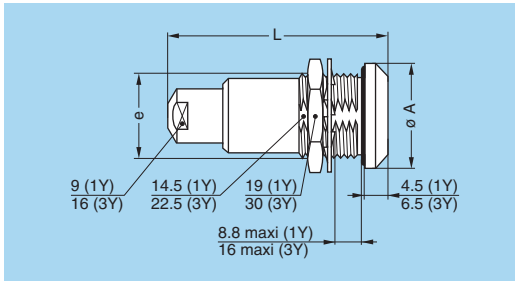
ERA Fixed socket, nut fixing

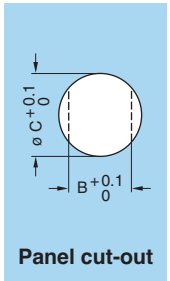




Part number	Dimensions (mm)						Panel cut-out	
	A	e	L	M	S1	S2	B	C
ERA.1Y.416.CLL	20	M16x1.0	34	4.5	14.5	19	14.6	16.9
ERA.3Y.425.CLL	31	M24x1.0	50	6.5	22.5	30	22.6	24.1

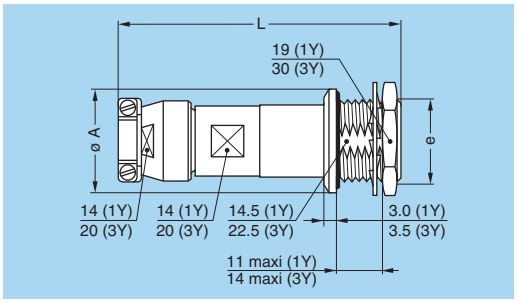
ERA Fixed socket, nut fixing, for non-screened cable

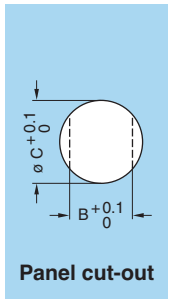




Part number	Dim. (mm)			Panel cut-out		Cable ø
	A	e	L	B	C	
ERA.1Y.416.CLL37	20	M16x1.0	42	14.6	16.9	3.7 ± 0.1
ERA.3Y.425.CLL47	31	M24x1.0	60	22.6	24.1	4.7 ± 0.1

PEP **Fixed socket, nut fixing, with cable clamp nut** (back panel mounting)

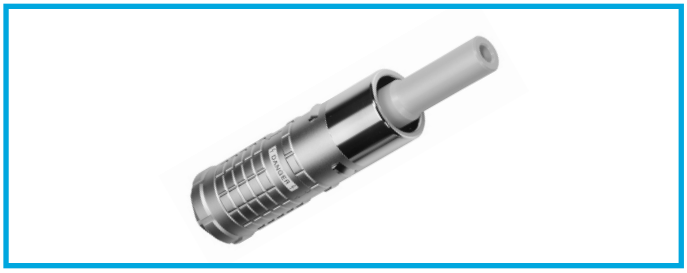


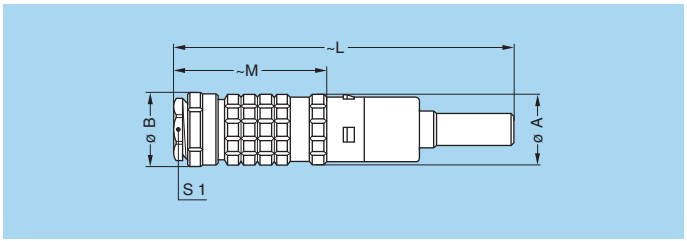


Panel cut-out

Part number	Dimensions (mm)			Panel cut-out		Cable ø	
	A	e	L	B	C	min.	max.
PEP.1Y.416.CLLY--	20	M16x1.0	70.5	14.6	16.9	7	10
PEP.3Y.425.CLLY--	31	M24x1.0	85.0	22.6	24.1	7	15

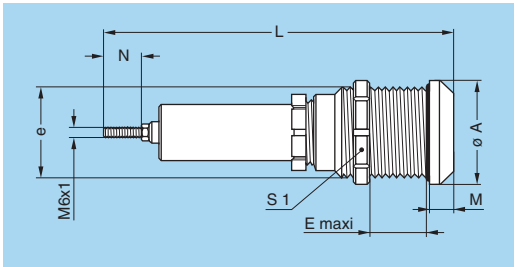
FFB.6Y **Straight plug with cable collet and safety locking ring**

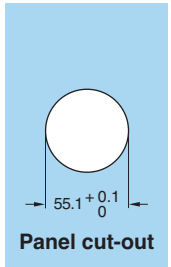




Part number	Dimensions (mm)					Cable ø	
	A	B	L	M	S1	min.	max.
FFB.6Y.450.CLAC--	47	50	215	89.2	36	11.0	31.3

ERA.6Y **Fixed socket, nut fixing**





Panel cut-out

Part number	Dimensions (mm)						
	A	e	E	L	M	N	S1
ERA.6Y.450.CLL	65	M55x2.0	45	206	10	29	65

Watertight or vacuumtight models

HGP, EWB, VPP, VCP socket 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, research institutes, etc.

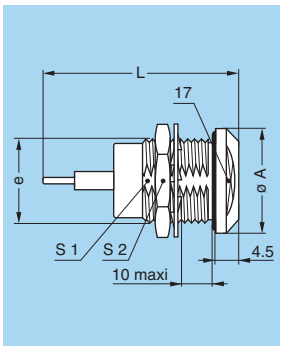
Note: 1) only for vacuumtight models.

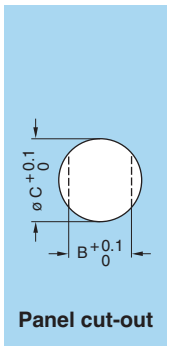
Technical Characteristics

Mechanical and Climatical

Characteristics	Value	Standard
Endurance	> 1000 cycles	IEC 60512-5 test 9a
Humidity	up to 95% at 60°C	
Temperature range	-40°C to +80°C	
Salt spray corrosion test	1000 h	IEC 60512-6 test 11f
Climatical category	20/80/21	IEC 60068-1
Leakage rate (He)[1)]	< 10^{-7} mbar.l.s^{-1}	IEC 60512-7 test 14b

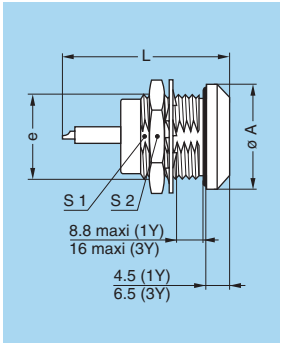
EWB.1Y Fixed socket, nut fixing, vacuumtight, for print

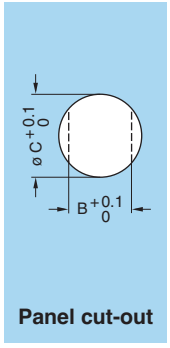




Part number	Dimensions (mm)					Panel cut-out	
	A	e	L	S1	S2	B	C
EWB.1Y.416.CLN	20	M16x1.0	37.5	14.5	19	14.6	16.9

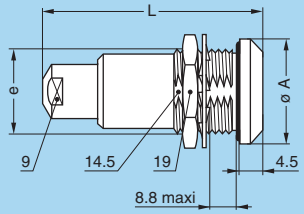
HGP Fixed socket, nut fixing, vacuumtight

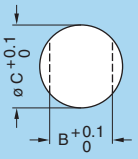




Part number	Dimensions (mm)					Panel cut-out	
	A	e	L	S1	S2	B	C
HGP.1Y.416.CLL	20	M16x1.0	34	14.5	19	14.6	16.9
HGP.3Y.425.CLL	31	M24x1.0	50	22.5	30	22.6	24.1

HGP Fixed socket, nut fixing, vacuumtight

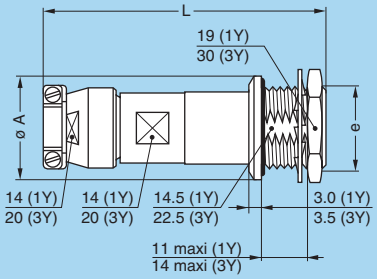


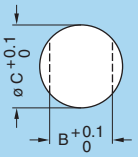


Panel cut-out

Part number	Dim. (mm)			Panel cut-out		Cable ø
	A	e	L	B	C	
HGP.1Y.416.CLL37	20	M16x1.0	42	14.6	16.9	3.7 ± 0.1

VPP Fixed socket, nut fixing, with cable clamp nut, vacuumtight (back panel mounting)

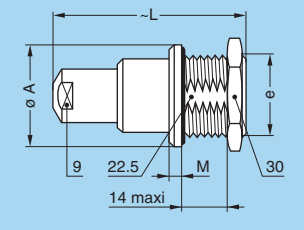


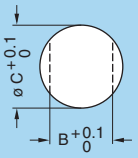


Panel cut-out

Part number	Dimensions (mm)			Panel cut-out		Cable ø	
	A	e	L	B	C	min.	max.
VPP.1Y.416.CLLY10	20	M16x1.0	70.5	14.6	16.9	7	10
VPP.3Y.425.CLLY––	31	M24x1.0	85.0	22.6	24.1	7	15

VCP.3Y Fixed socket, nut fixing, vacuumtight, for non-screened cable (back panel mounting)



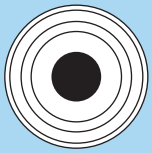
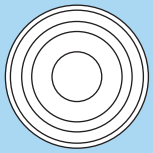


Panel cut-out

Part number	Dimensions (mm)				Panel cut-out		Cable ø
	A	e	L	M	B	C	
VCP.3Y.425.CLL47	31	M24x1	59	3.5	22.6	24.1	4.7 ± 0.1

Insert configuration

Single High Voltage

Male solder contacts / Female solder contacts	Reference	Series	Contact ø (mm)	Contact gender for plug	Conductor ø maxi (mm)[1]	Dielectric ø maxi (mm)[1]	Cable sheath ø maxi (mm)[1]	Standard insulator material	Creepage distance min. (mm)[3]	Test voltage Ue (kV DC)[2]	Test voltage Ue (kV rms)[2]	Rated current (A)
	405	1Y	1.3	A/L	1.45	3.2	6.7	T	16.0	10.5	7.5	8.0
	410	1Y	1.3	A/L	1.45	4.1	6.7	T	24.5	15.0	10.5	8.0
	415	3Y	4.5	A/L	2.45	7.3	10.5	T	40.0	22.5	16.0	15.0
	416	1Y	0.9	A	0.75	4.5	6.6	F/L	14.0	35.0	25.0	6.0
	425	3Y	1.6	A	1.35	5.5	10.5	F/L	25.5	52.0	37.0	8.0
	430	3Y	4.5	A/L	2.45	7.3	10.5	T	58.0	42.0[4]	29.0[4]	15.0
 	**450**	6Y	7.0	A	6.60	23.0	31.3	L	86.4	tbd	70.0[5]	25.0

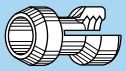
WARNING: Depending on the application specific safety standard apply regarding determination of the operating voltage Us. That shall be considered carefully when selecting connectors. In low duty operations operating voltage Us can be as high as Us = $\frac{Ue}{1.5}$. For severe applications operating voltage can be as low as Us = $\frac{Ue}{3}$.

Note: [1] some specific model may accept larger dimensions, please contact us. [2] test voltage Ue is measured according to IEC 60512-2 test 4a, in mated condition and at see level. [3] creepage distance is measured in the mated condition. [4] value for male contact plug mated with female contact socket. [5] peak value for 1.2/50μs normalized voltage shock.

Collets

Type C collets

C



1Y.405 / 3Y.410

Type	Cable ø	
	min.	max.
C22	1.2	2.2
C32	2.3	3.2
C42	3.5	4.2
C52	4.2	5.2
C62	5.4	6.2
C66	6.5	6.6
C68	6.7	6.8

3Y.415 / 3Y.430

Type	Cable ø	
	min.	max.
C42	2.6	4.2
C57	4.2	5.7
C72	5.7	7.2
C87	7.2	8.7
C97	8.5	9.7
C10	9.7	10.5

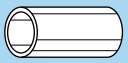
6Y.450

Type	Cable ø	
	min.	max.
C12	11.0	12.0
C21	20.0	21.0
C29	27.9	28.8
C30	29.0	30.0
C31	30.3	31.3

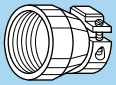
Fixing system type E or Y

(1Y.416 and 3Y.425, for FFR, PEP and VPP models)

E



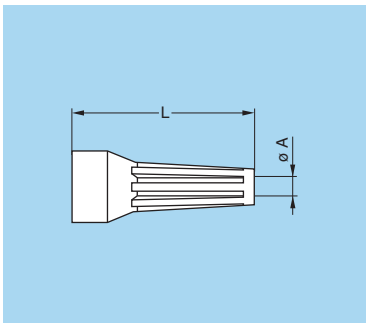
Y



	Type	Cable dimension			
		Sheath ø		Max. dielec. ø (±0.1)	Max. cond. ø
		Min.	Max.		
1Y	E52	–	6.6	3.6	0.75
	E55	–	6.0	3.9	0.75
	E63	–	6.6	3.6	0.75
	E64	–	6.6	3.6	1.35
	E67	–	9.0	4.5	1.35
	Y10	7.0	10.0	–	0.75
3Y	E55	–	6.0	4.0	1.65
	E76	–	8.0	4.6	1.65
	E88	–	9.0	5.5	1.65
	E10	–	10.5	4.6	1.65
	Y90	7.0	9.0	–	1.35
	Y15	12.0	15.0	–	1.35

Accessories

GMA Bend relief (TPU)



A bend relief made from thermoplastic polyurethane elastomer can be fitted over LEMO plugs and sockets that are supplied with nut for fitting such bend relief.
Use the part numbers shown below to order this accessory separately.

Main characteristics

- Material: TPU (Thermoplastic Polyurethane)
- Temperature range in dry atmosphere: -40°C +80°C

Part number	Bend relief		Cable ø	
	A	L	min.	max.
GMA.1B.054.DG	5.4	30	5.4	6.0
GMA.1B.065.DG [1)]	6.5	30	6.5	7.0
GMA.1Y.087.DG	8.7	30	8.7	9.0

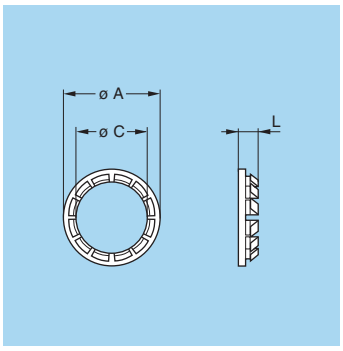
Ref.	Colour
A	blue
B	white
G	grey

Ref.	Colour
J	yellow
M	brown
N	black

Ref.	Colour
R	red
S	orange
V	green

Note: All dimensions are in millimetres. [1)] Design may differ from other bend relief, model without stripes.
The last letter «G» of the part number indicates the grey colour of the bend relief. For ordering a bend relief with another colour, see table below and replace the letter «G» by the letter of the required colour.

GBB Tapered washers



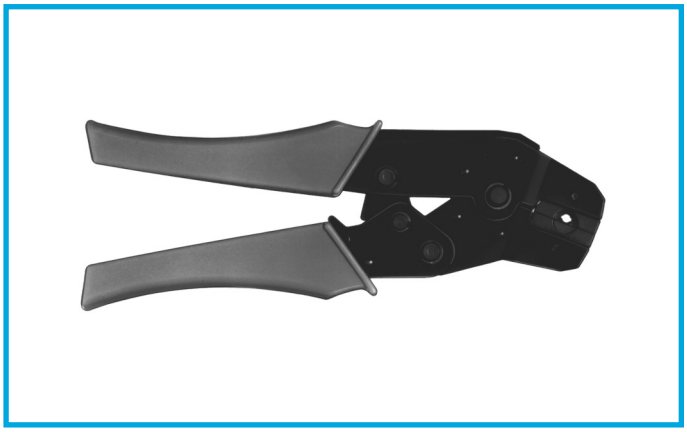
Part number	Dimensions (mm)		
	A	C	L
GBB.1E.250.LN	19	16.2	4

- Material: Nickel-plated brass (3 μm)

Note: To order this accessory separately, use the above part numbers. The panel cut out diameter is larger when using tapered washer.

Tooling

DP● Crimping tool with die

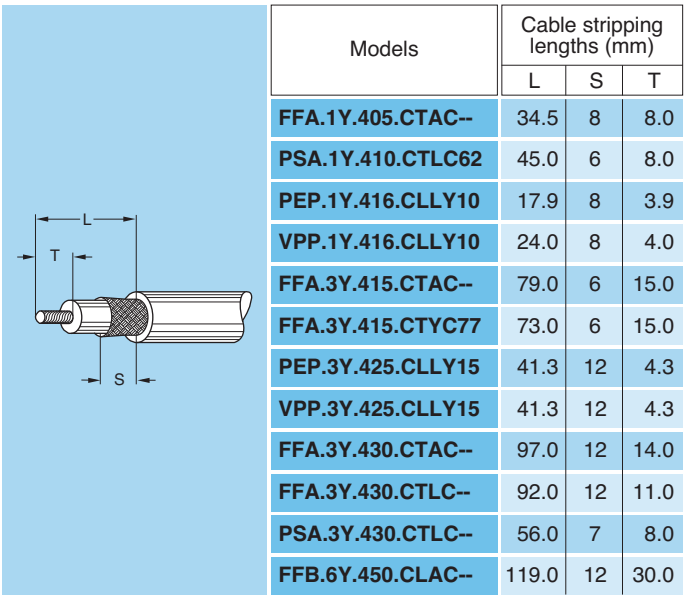


This tool is needed for the termination of the cable, (crimping over the screen) of the plug FFR.

Part number	Series	Crimp collet ref.
DPE.99.007.0K	1Y.416	E55
DPE.99.127.4K	1Y. 416	E52, E63, E64, E67
DPE.99.007.0K	3Y.425	E55
DPA.99.209.5K	3Y.425	E76
DPA.99.011.6K	3Y.425	E10
DPD.91.010.5K	3Y.425	E88

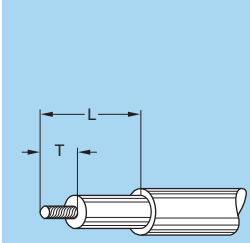
Cable assembly

Cable stripping lengths for shielded cable



Models	Cable stripping lengths (mm)		
	L	S	T
FFA.1Y.405.CTAC--	34.5	8	8.0
PSA.1Y.410.CTLC62	45.0	6	8.0
PEP.1Y.416.CLLY10	17.9	8	3.9
VPP.1Y.416.CLLY10	24.0	8	4.0
FFA.3Y.415.CTAC--	79.0	6	15.0
FFA.3Y.415.CTYC77	73.0	6	15.0
PEP.3Y.425.CLLY15	41.3	12	4.3
VPP.3Y.425.CLLY15	41.3	12	4.3
FFA.3Y.430.CTAC--	97.0	12	14.0
FFA.3Y.430.CTLC--	92.0	12	11.0
PSA.3Y.430.CTLC--	56.0	7	8.0
FFB.6Y.450.CLAC--	119.0	12	30.0

Cable stripping lengths for non shielded cable



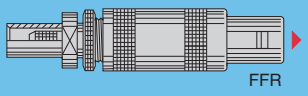
Models	Cable stripping lengths (mm)	
	L	T
ERD.1Y.416.CLL	33.9	3.9
ERA.3Y.425.CLL	32.0	4.5
HGP.3Y.425.CLL	32.0	4.5
ERA.3Y.430.CTA	85.5	14.5
ERA.3Y.430.CLL	–	6.5
ERA.3Y.430.CTL	–	6.5

S series (HV single contact)

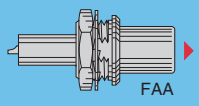
S series connectors have main features as follows:
– security of the Push-Pull self-latching system
– solder contacts
– 360° screening for full EMC shielding
– wide range of models satisfying most applications.

Models (page 23)

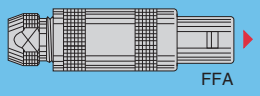
Straight plug

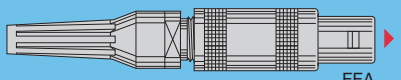


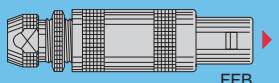
Fixed plug



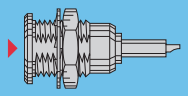
Straight plugs

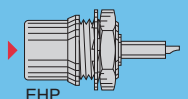


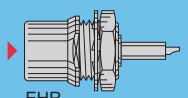


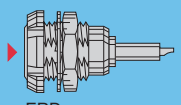


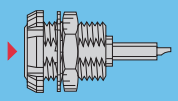
Fixed sockets



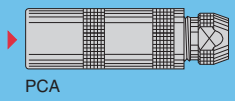


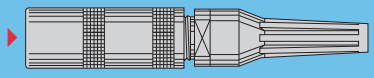


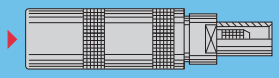




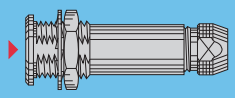
Free sockets

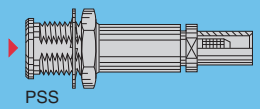




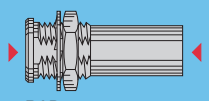


Fixed sockets



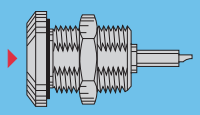


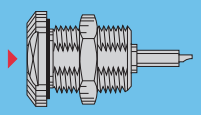
Fixed coupler

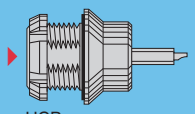


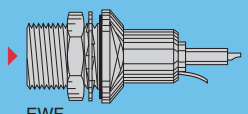
Watertight or vacuumtight model (page 28)

Fixed sockets

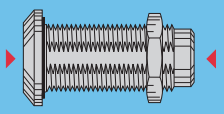








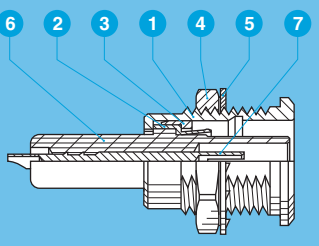
Fixed coupler

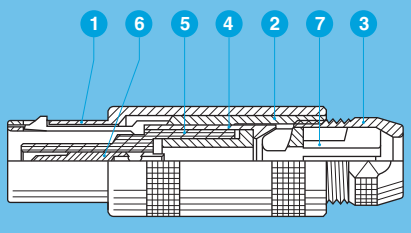


Part Section Showing Internal Components

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. centre-piece
5. insulator
6. male contact
7. collet

Note: other connector shells are available on request.

Technical characteristics

Materials and treatments

Component	Material (Standard)	Thickness of surface treatment (µm)							
		chrome			nickel		gold		
		Cu	Ni	Cr	Cu	Ni	Cu	Ni	Au
Outer shell, collet nut, conical nut	Brass (UNS C 38500)	0.5	3	0.3					
Innershell	Brass (UNS C 38500)				0.5	3			
Earthing crown	Beryllium Copper (UNS C 17300)						0.5	3	1.0
Latch sleeve	Special bronze/brass	0.5	3	0.3					
Locking washer	Bronze (UNS C 52100)				0.5	3			
Hexagonal nut	Brass (UNS C 38500)				0.5	3			
Other metallic components	Brass (UNS C 38500)				0.5	3			
Male contact	Brass (UNS C 34500)						0.5	3	1.0
Female contact	Bronze (UNS C 54400) or Cu-Be (UNS C 17300)						0.5	3	1.5
Clips	Cu-Be or special steel								
Insulator	PTFE, PEEK								
	Silicone rubber (LSR)								
O-ring and gaskets	Silicone MQ/MVQ								

Mechanical and Climatical

Characteristics	Value	Standard
Endurance	> 1000 cycles	IEC 60512-5 test 9a
Humidity	up to 95% at 60°C	
Temperature range	-55°C +250°C	
Resistance to vibrations	10-2000 Hz, 15 g	IEC 60512-4 test 6d
Shock resistance	100g, 6 ms	IEC 60512-4 test 6c
Salt spray corrosion test	1000 h	IEC 60512-6 test 11f
Protection index (mated)	IP 50	IEC 60529
Climatical category	55/175/21	IEC 60068-1

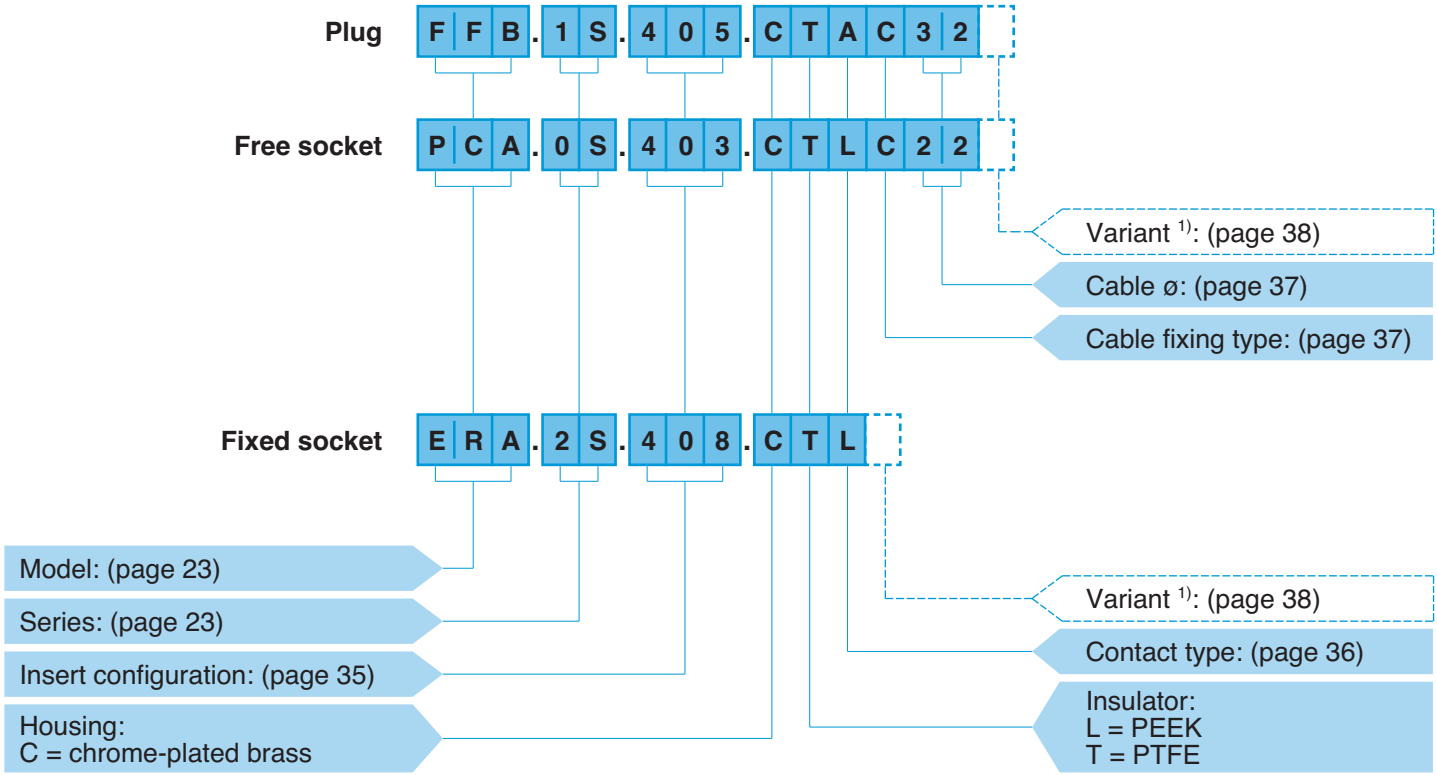
Electrical

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

Recommended cables

Type	Series										Type of cable	Operating voltage
	0S.403	0S.405	1S.405	1S.408	2S.408	3S.405	3S.410	3S.415	3S.460	4S.410		
017420	●	●	●								RG174	depending on manufacturer
140470	●										High voltage cable	3kV
150470	●		●	●	●						High voltage cable	3kV
106330		●			●			●			High voltage cable	9kV
158490											RG58	depending on manufacturer
130666			●			●					High voltage cable	30kV
130660			●			●	●	●			High voltage cable	30kV
213000											RG213	depending on manufacturer

Part Numbering System



FFB.1S.405.CTAC32 = straight plug with cable collet and safety locking ring, 1S series, high voltage, type 10.5 kVDC test voltage, chrome-plated brass housing, PTFE insulator, male solder contact, C type collet for a 3.2 mm diameter cable.

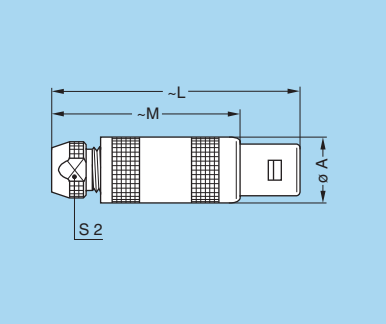
PCA.0S.403.CTLC22 = free socket with cable collet, 0S series, high voltage, type 6 kVDC test voltage, chrome-plated brass housing, PTFE insulator, female solder contact, C type collet for a 2.2 mm diameter cable.

ERA.2S.408.CTL = fixed socket, nut fixing, 2S series, high voltage, type 12 kVDC test voltage, chrome-plated brass housing, PTFE insulator, female solder contact.

Note: 1) the «Variant» position of the part number is used to specify the presence of a nut for fitting a bend relief.
For models with collet nut for fitting a 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.

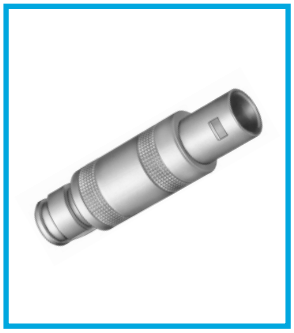
Models

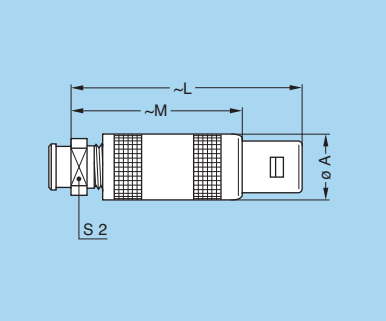
FFA Straight plug, cable collet



Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFA	**0S**	**403**	9	34.7	24.7	6.5	1.3	4.4

FFA Straight plug, cable collet and nut for fitting a bend relief [1)]

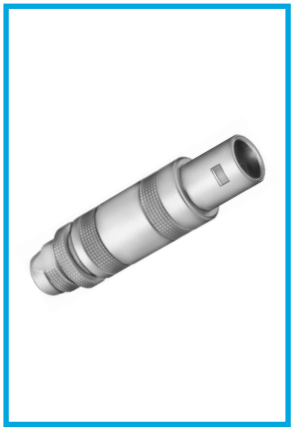


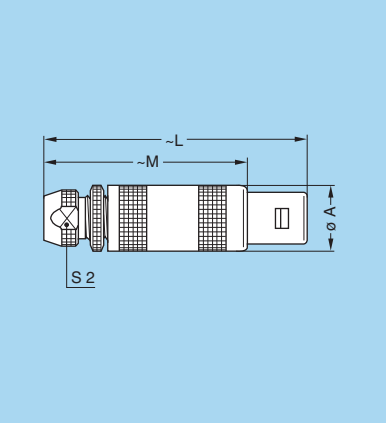


Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFA	**0S**	**403**	9	33.5	23.5	7.0	1.3	4.4

Note: [1)] to order, add a «Z» at the end of the reference.
The bend relief must be ordered separately (see page 39).

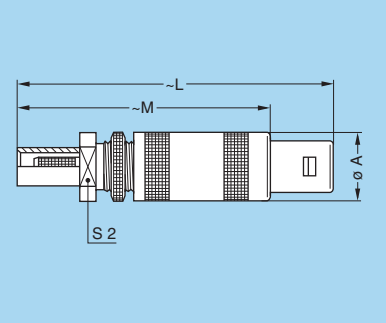
FFB Straight plug with cable collet and safety locking ring





Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFB	**0S**	**403**	9.0	36.8	26.8	6.5	1.3	4.4
FFB	**1S**	**405**	12.0	45.0	34.0	8.5	1.2	6.8
FFB	**2S**	**408**	14.8	55.5	43.5	11.0	1.3	8.7
FFB	**3S**	**405**	17.8	65.0	50.0	14.0	2.7	10.7
FFB	**3S**	**410**	17.8	75.0	60.0	14.0	2.7	10.7
FFB	**3S**	**415**	17.8	75.0	60.0	14.0	2.7	10.7
FFB	**3S**	**460**	17.8	65.0	50.0	14.0	2.7	10.7
FFB	**4S**	**410**	24.8	89.0	71.0	19.0	4.1	13.0

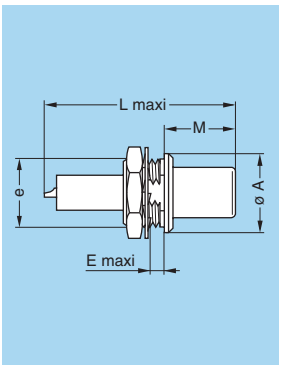
FFR Straight plug, safety locking ring, with cable crimping

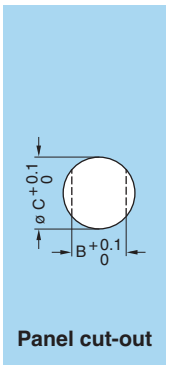


Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFR	**0S**	**405**	9	42	32	6.5	1.3	4.4
FFR	**1S**	**408**	12	53	42	8.5	1.2	6.8

Note: Only available with male contact. For crimp ferrules see page 37.

FAA Fixed plug non-latching, nut fixing



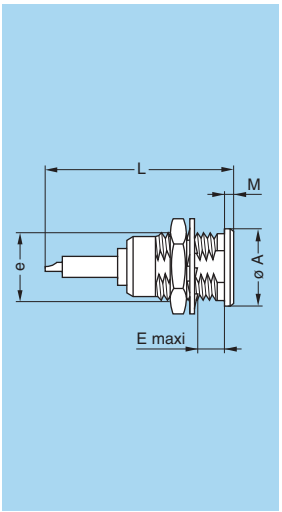


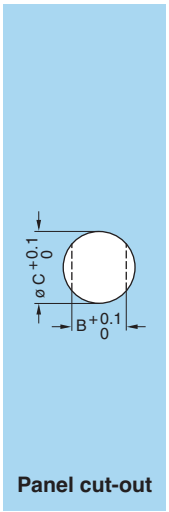
Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
FAA	**0S**	**403**	10	M9x0.6	2.0	27.0	11.2	8.3	9.1
FAA	**1S**	**405**	14	M12x1.0	2.5	34.0	12.5	10.6	12.1
FAA	**3S**	**405**	22	M18x1.0	4.0	44.0	17.0	16.6	18.2
FAA	**3S**	**410**	22	M18x1.0	4.0	44.5	17.0	16.6	18.2
FAA	**3S**	**415**	22	M18x1.0	4.0	45.0	17.0	16.6	18.2

Note: For the 3S.410 and 3S.415, the contact solder pot is inside the rear insulator.

ERA Fixed socket, nut fixing

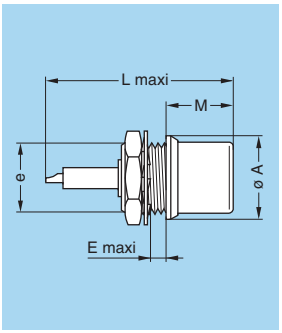


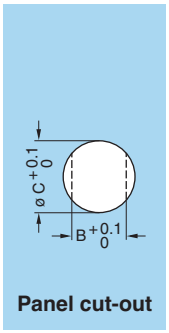


Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
ERA	**0S**	**403**	10	M9x0.6	7.0	24.5	1.2	8.3	9.1
ERA	**0S**	**405**	10	M9x0.6	7.0	24.5	1.2	8.3	9.1
ERA	**1S**	**405**	14	M12x1.0	7.5	31.5	1.5	10.6	12.1
ERA	**1S**	**408**	14	M12x1.0	7.5	30.0	1.5	10.6	12.1
ERA	**2S**	**408**	18	M15x1.0	8.5	41.5	1.8	13.6	15.1
ERA	**3S**	**405**	22	M18x1.0	11.5	41.5	2.0	16.6	18.2
ERA	**3S**	**410**	22	M18x1.0	11.5	46.5	2.0	16.6	18.2
ERA	**3S**	**415**	22	M18x1.0	11.5	52.0	2.0	16.6	18.2
ERA	**3S**	**460**	22	M18x1.0	11.5	38.0	2.0	16.6	18.2
ERA	**4S**	**410**	28	M25x1.0	12.0	56.5	2.5	23.6	25.2

EHP Fixed socket, nut fixing, protruding shell

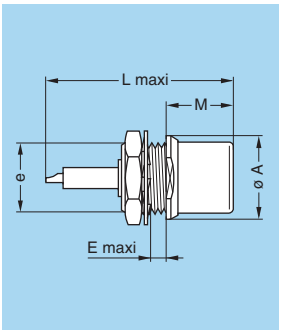


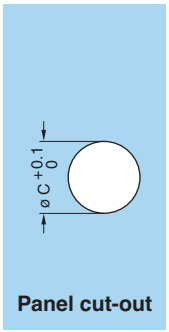


Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
EHP	**0S**	**403**	10	M9x0.6	2.0	25.0	12.5	8.2	9.1
EHP	**1S**	**405**	14	M12x1.0	3.5	31.5	12.0	10.5	12.1
EHP	**3S**	**460**	22	M18x1.0	4.0	38.0	18.7	–	18.2

EHR Fixed socket, nut fixing, protruding shell



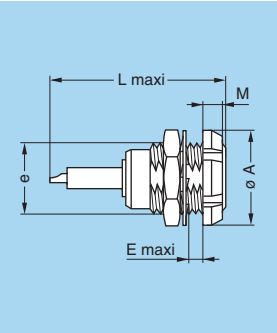


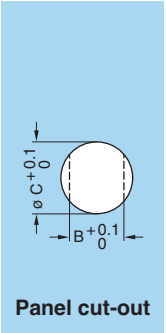
Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
EHR	**3S**	**460**	22	M18x1.0	4.4	43.6	18.7	–	18.2

Note: Only available with female contact.

ERD **Fixed socket with two nuts** (back panel mounting)

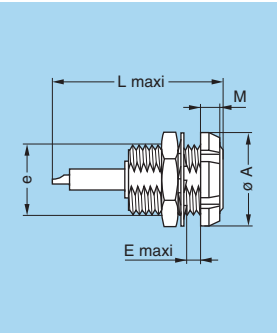


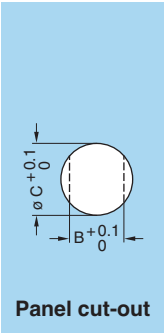


Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
ERD	**0S**	**403**	12	M9x0.6	5.5	25.5	2.5	8.3	9.1
ERD	**1S**	**405**	16	M12x1.0	6.0	31.5	3.5	10.6	12.1
ERD	**1S**	**408**	16	M12x1.0	6.0	30.0	3.5	10.6	12.1
ERD	**2S**	**408**	20	M15x1.0	5.5	41.5	3.5	13.6	15.1
ERD	**3S**	**415**	24	M18x1.0	9.0	48.5	4.5	16.6	18.2

ECP **Fixed socket with two nuts, long threaded shell** (back panel mounting)

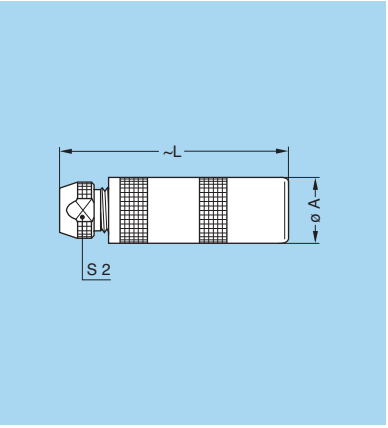




Panel cut-out

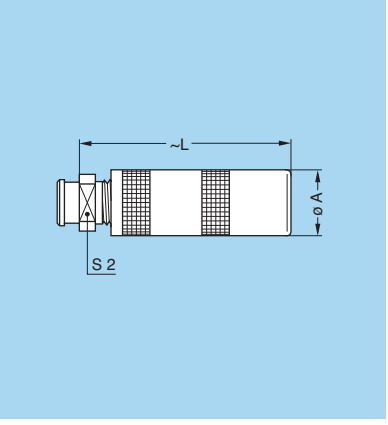
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
ECP	**0S**	**403**	12	M9x0.6	9.0	25.0	2.5	8.3	9.1
ECP	**1S**	**405**	16	M12x1.0	9.5	31.5	3.5	10.6	12.1

PCA **Free socket, cable collet**



Reference			Dimensions (mm)			Cable ø	
Model	Series	Type	A	L	S2	min.	max.
PCA	**0S**	**403**	8.9	33.5	6.5	1.3	4.4
PCA	**1S**	**405**	11.9	41.5	8.5	1.2	6.8
PCA	**2S**	**408**	14.8	54.0	11.0	1.3	8.7
PCA	**3S**	**405**	17.8	59.0	14.0	2.7	10.5
PCA	**3S**	**410**	17.8	64.0	14.0	2.7	10.5
PCA	**3S**	**415**	17.8	73.0	14.0	2.7	10.5
PCA	**3S**	**460**	17.8	65.0	14.0	2.7	10.5
PCA	**4S**	**410**	24.8	78.3	19.0	4.1	13.0

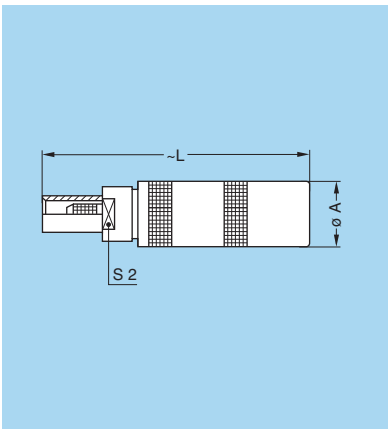
PCA **Free socket, cable collet and nut for fitting a bend relief** [1)]



Reference			Dimensions (mm)			Cable ø	
Model	Series	Type	A	L	S2	min.	max.
PCA	**0S**	**403**	8.9	36	7	1.3	4.4
PCA	**1S**	**405**	11.9	44	9	1.2	6.8

Note: [1)] to order, add a «Z» at the end of the reference.
The bend relief must be ordered separately (see page 39).

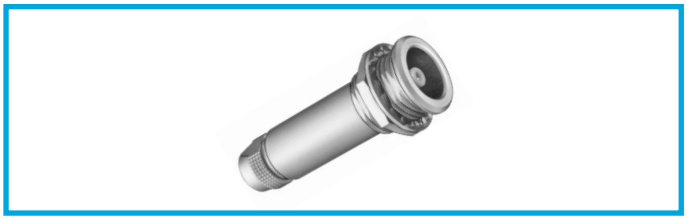
PCS Free socket with cable crimping

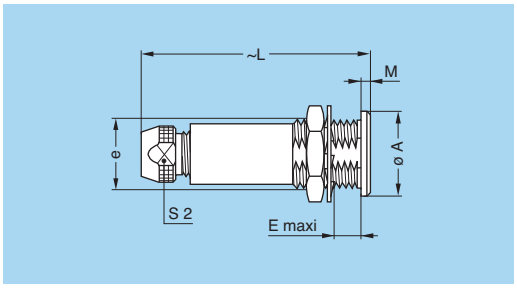


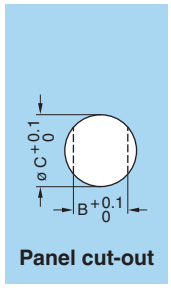
Reference			Dimensions (mm)			Cable ø	
Model	Series	Type	A	L	S2	min.	max.
PCS	**0S**	**405**	9	38	6.5	1.7	3.4
PCS	**1S**	**408**	12	52	8.5	2.3	4.6

Note: Only available with female contact. For crimp ferrules see p. 37.

PSA Fixed socket, nut fixing, cable collet





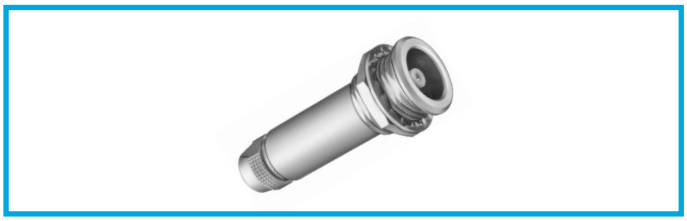


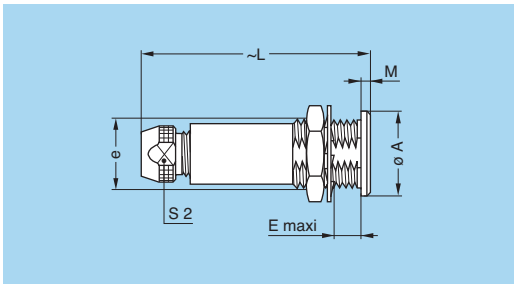
Panel cut-out

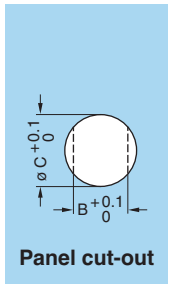
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
PSA	**0S**	**403**	10	M9x0.6	7.0	33.5	1.2	8.3	9.1
PSA	**1S**	**405**	14	M12x1.0	7.5	41.5	1.5	10.6	12.1
PSA	**2S**	**408**	18	M15x1.0	8.5	54.0	1.8	13.6	15.1
PSA	**3S**	**405**	22	M18x1.0	11.5	59.0	2.0	16.6	18.2
PSA	**3S**	**410**	22	M18x1.0	11.5	64.0	2.0	16.6	18.2
PSA	**3S**	**415**	22	M18x1.0	11.5	73.0	2.0	16.6	18.2
PSA	**4S**	**410**	28	M25x1.0	12.0	78.3	2.5	23.6	25.2

Note: The dimension «S2» is the same as the PCA models.

PSP Fixed socket, nut fixing, cable collet and inner anti-rotating device





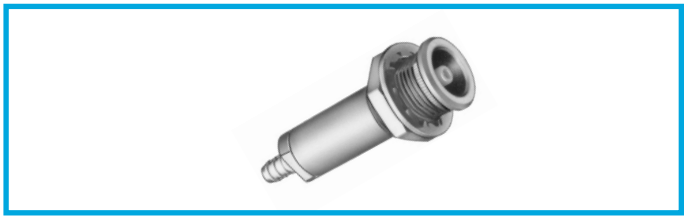


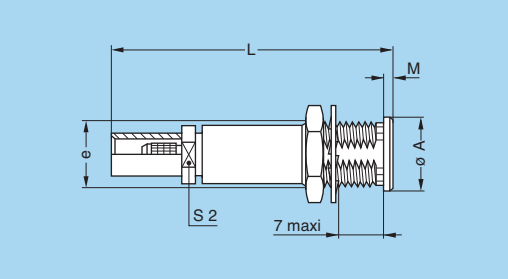
Panel cut-out

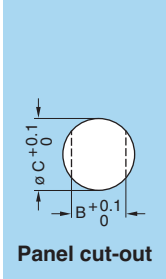
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
PSP	**1S**	**405**	14	M12x1.0	7.5	40.5	1.5	10.6	12.1
PSP	**1S**	**410**	14	M12x1.0	7.5	40.5	1.5	10.6	12.1

Note: The dimension «S2» is the same as the PCA models.

PSS Free socket, nut fixing for cable crimping





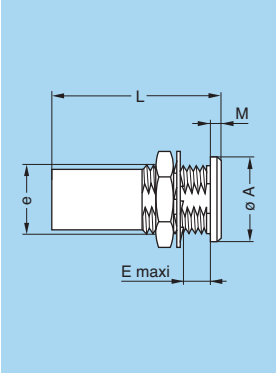


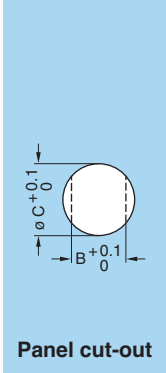
Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	L	M	S2	B	C
PSS	**0S**	**405**	10	M9x0.6	38	1.2	6.5	8.3	9.1
PSS	**1S**	**408**	14	M12x1.0	52	1.5	8.5	10.6	12.1

Note: Only available with female contact. For crimp ferrules see p. 37.

RAD Fixed coupler, nut fixing





Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
RAD	**0S**	**403**	10	M9x0.6	7.0	25.0	1.2	8.3	9.1
RAD	**1S**	**405**	14	M12x1.0	7.5	28.5	1.5	10.6	12.1

Note: see page 36 for the available plug and contact configuration.

Watertight or vacuumtight models

HGP, EWB, EWF, HCP, SWH 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.

Part number example:
Watertight socket: HGP.1S.405.CTLP
Vacuumtight socket: HGP.1S.405.CTLPV

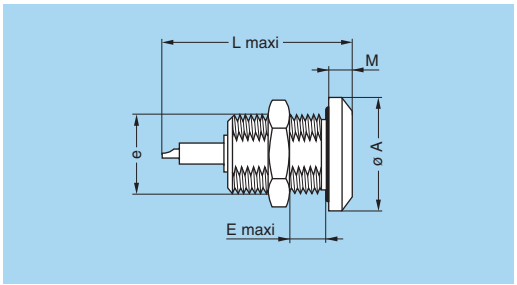
Technical Characteristics

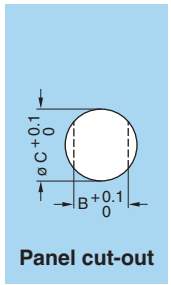
Mechanical and Climatical

Characteristics		Value	Standard
Endurance		> 1000 cycles	IEC 60512-5 test 9a
Humidity		up to 95% at 60°C	
Temperature range		-20°C to +80°C	
Salt spray corrosion test		1000 h	IEC 60512-6 test 11f
Climatical category		20/80/21	IEC 60068-1
Leakage rate (He)[1]		< 10^{-7} mbar.l.s^{-1}	IEC 60512-7 test 14b
Maximum operating pressure[2]	0S	60 bars	IEC 60512-7 test 14d
	1S	60 bars	IEC 60512-7 test 14d
	2S	40 bars	IEC 60512-7 test 14d
	3S	30 bars	IEC 60512-7 test 14d

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

HGP Fixed socket, nut fixing, watertight or vacuumtight

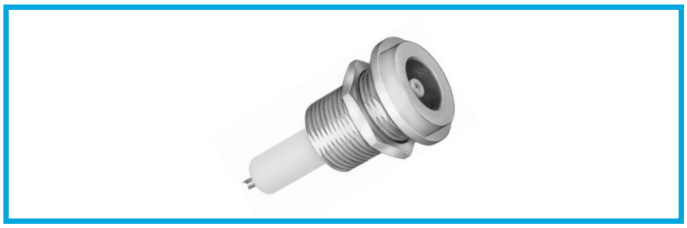


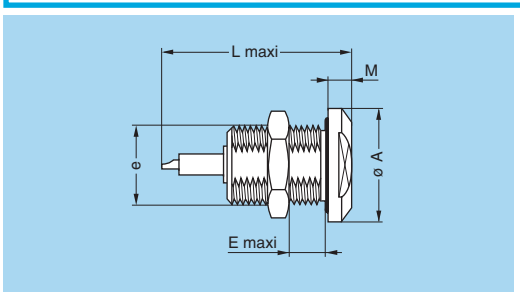


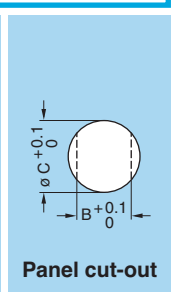
Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
HGP	**0S**	**403**	18	M12x1.0	11.0	25.0	4	10.6	12.1
HGP	**1S**	**405**	20	M14x1.0	15.5	31.5	4	12.6	14.1
HGP	**2S**	**408**	20	M16x1.0	17.0	41.5	4	14.6	16.1
HGP	**3S**	**410**	28	M20x1.0	18.0	54.5	6	18.6	20.2
HGP	**3S**	**415**	28	M20x1.0	18.0	59.0	6	18.6	20.2

EWB Fixed socket, nut fixing, with two flats on the flange, watertight or vacuumtight





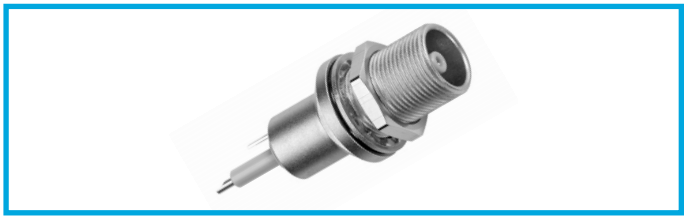


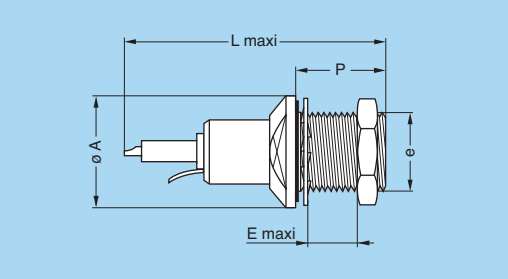
Panel cut-out

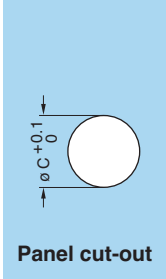
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
EWB	**0S**	**405**	13	M9x0.6	11.0	34.0	3.5	9.1	12.1
EWB	**1S**	**405**	20	M14x1.0	15.5	31.5	4.0	12.6	14.1
EWB	**1S**	**408**	18	M12x1.0	12.5	40.0	4.0	12.1	14.1

Note: Only available with female contact.

EWF **Fixed socket with earthing tag, nut fixing, vacuumtight** (back panel mounting)



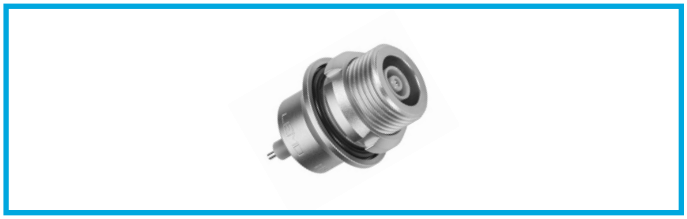


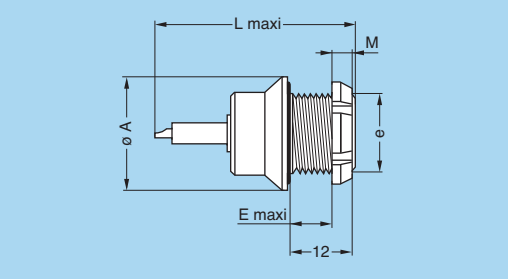


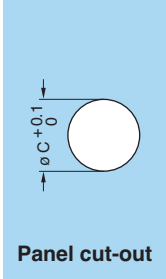
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	P	B	C
EWF	**0S**	**405**	12.5	M12x1.0	10	34	12.5	–	12.1

Note: Only available with female contact.

HCP **Fixed socket, nut fixing, watertight or vacuumtight** (back panel mounting)



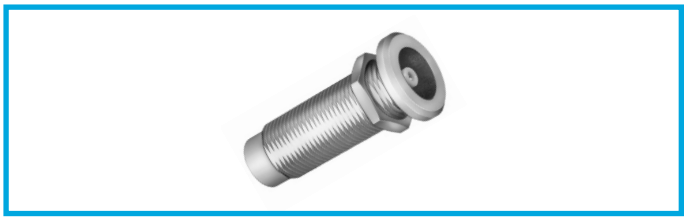


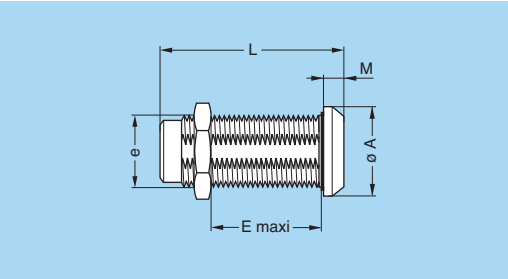


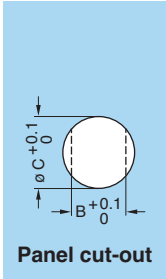
Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
HCP	**1S**	**408**	18	M14x1.0	8.6	32	3.5	–	14.1

Note: Only available with female contact.

SWH **Fixed coupler, nut fixing, watertight or vacuumtight**







Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
SWH	**0S**	**403**	14	M10x0.75	17	34	2.0	9.1	10.1
SWH	**1S**	**405**	17	M12x1.00	28	39	2.5	10.6	12.1
SWH	**1S**	**408**	17	M12x1.00	28	39	2.5	10.6	12.1
SWH	**3S**	**405**	25	M20x1.00	30	53	4.0	18.6	20.2
SWH	**3S**	**410**	25	M20x1.00	30	53	4.0	18.6	20.2

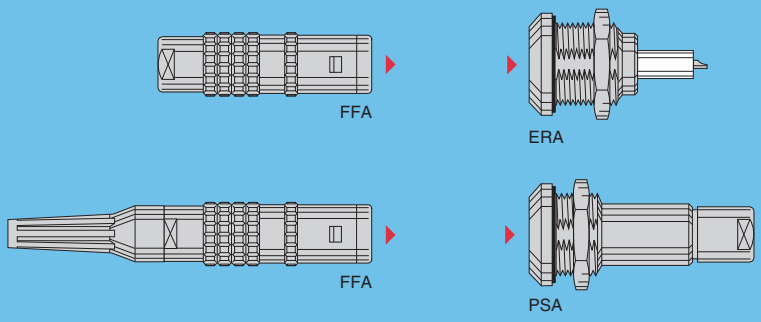
Note: see page 36 for the available plug and contact configuration.

E series (HV single contact)

E series connectors have been specifically designed for outdoor applications.
They include an inner sleeve and two seals to prevent penetration of solids or liquids into the housing formed by the plug, free socket, fixed socket or coupler. All models of these series are watertight when mated and give a protection index of IP 68 as per IEC 60529 standard (in mated condition) when correctly assembled to an appropriate cable (IP 66 otherwise).
– security of the Push-Pull latching system
– watertight connection (IP 68/IP 66)
– wide range of models satisfying most applications
– 360° screening for full EMC shielding
– rugged housing for extreme working condition.

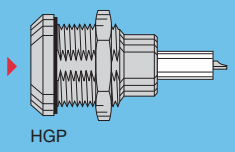
Models (page 33)

Straight plugs **Fixed sockets**



Watertight or vacuumtight model (page 34)

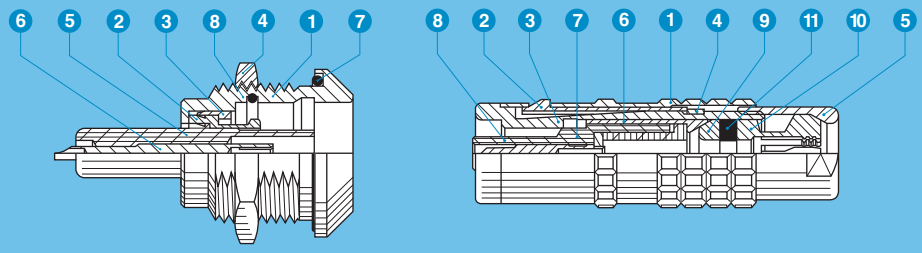
Fixed socket



Part Section Showing Internal Components

Fixed socket

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



Straight plug

1. outer shell
2. latch sleeve
3. inner shell
4. circlip
5. collet nut
6. centre piece
7. insulator
8. male contact
9. earthing cone
10. collet
11. gasket

Note: other connector shells are available on request.

Technical characteristics

Materials and treatments

Component	Material (Standard)	Thickness of surface treatment (µm)							
		chrome			nickel		gold		
		Cu	Ni	Cr	Cu	Ni	Cu	Ni	Au
Outer shell, collet nut, conical nut	Brass (UNS C 38500)	0.5	3	0.3					
Innershell	Brass (UNS C 38500)				0.5	3			
Earthing crown	Beryllium Copper (UNS C 17300)						0.5	3	1.0
Latch sleeve	Special bronze/brass	0.5	3	0.3					
Locking washer	Bronze (UNS C 52100)				0.5	3			
Hexagonal nut	Brass (UNS C 38500)				0.5	3			
Other metallic components	Brass (UNS C 38500)				0.5	3			
Male contact	Brass (UNS C 34500)						0.5	3	1.0
Female contact	Bronze (UNS C 54400) or Cu-Be (UNS C 17300)						0.5	3	1.5
Clips	Cu-Be or special steel								
Insulator	PTFE, PEEK								
	Silicone rubber (LSR)								
O-ring and gaskets	Silicone MQ/MVQ								

Mechanical and Climatical

Characteristics	Value	Standard
Endurance	1000 cycles	IEC 60512-5 test 9a
Humidity	up to 95% at 60°C	
Temperature range	-55°C +200°C	
Resistance to vibrations	10-2000 Hz, 15 g	IEC 60512-4 test 6d
Shock resistance	100g, 6 ms	IEC 60512-4 test 6c
Salt spray corrosion test	1000 h	IEC 60512-6 test 11f
Protection index (mated)	IP 68 / IP 66	IEC 60529
Climatical category	50/175/21	IEC 60068-1

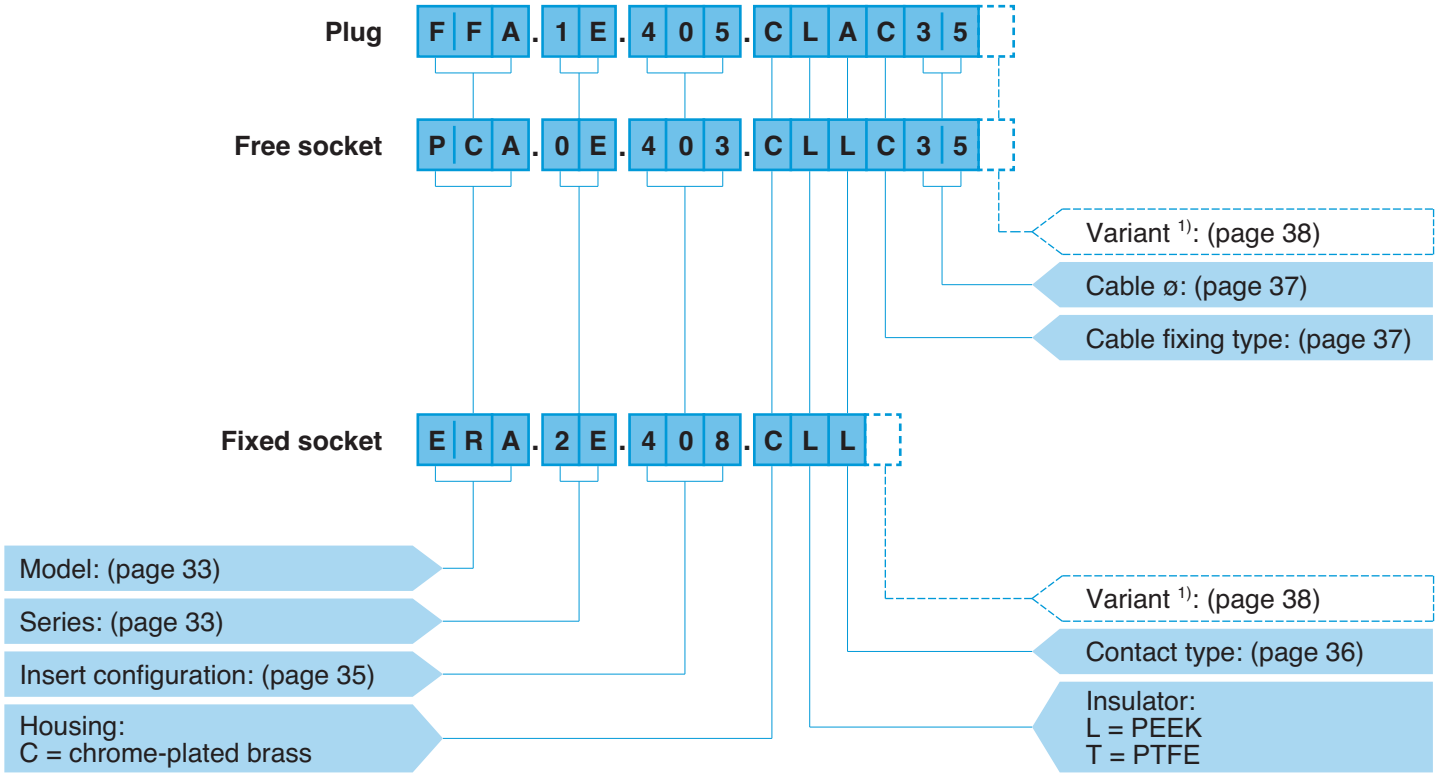
Electrical

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

Recommended cables

Type	Series					Type of cable	Operating voltage
	0E.403	1E.405	2E.408	3E.405	3E.410		
017420	●	●				RG174	depending on manufacturer
140470	●					High voltage cable	3kV
150470	●	●	●			High voltage cable	3kV
106330			●			High voltage cable	9kV
158490						RG58	depending on manufacturer
130666		●		●		High voltage cable	30kV
130660		●		●	●	High voltage cable	30kV
213000						RG213	depending on manufacturer

Part Numbering System



FFA.1E.405.CLAC35 = straight plug with cable collet, 1E series, high voltage, type 10.5 kVDC test voltage, chrome-plated brass housing, PEEK insulator, male solder contact, C type collet for a 3.5 mm diameter cable.

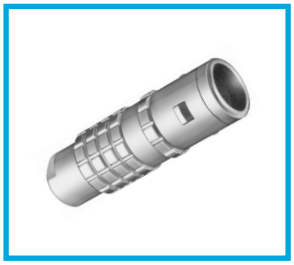
PCA.0E.403.CLLC35 = free socket with cable collet, 0E series, high voltage, type 6 kVDC test voltage, chrome-plated brass housing, PEEK insulator, female solder contact, C type collet for a 3.5 mm diameter cable.

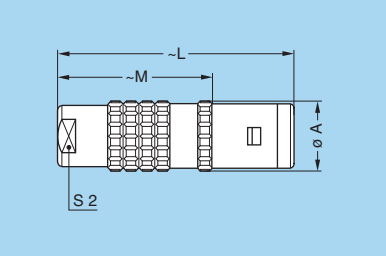
ERA.2E.408.CLL = fixed socket, nut fixing, 2E series, high voltage, type 12 kVDC test voltage, chrome-plated brass housing, PEEK insulator, female solder contact.

Note: 1) the «Variant» position of the part number is used to specify the presence of a nut for fitting a bend relief.
For models with collet nut for fitting a 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.

Models

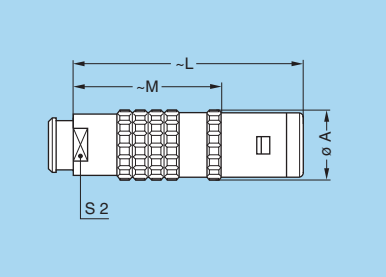
FFA Straight plug, cable collet





Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFA	**0E**	**403**	11	34.0	23.0	8	1.0	5.0
FFA	**1E**	**405**	13	43.0	29.0	9	1.3	6.5
FFA	**2E**	**408**	16	52.5	36.5	12	1.3	8.5
FFA	**3E**	**410**	19	62.5	42.5	15	2.6	10.5

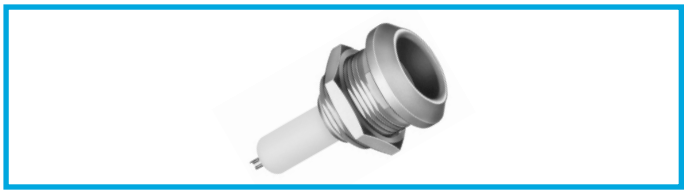
FFA Straight plug, cable collet and nut for fitting a bend relief [1)]

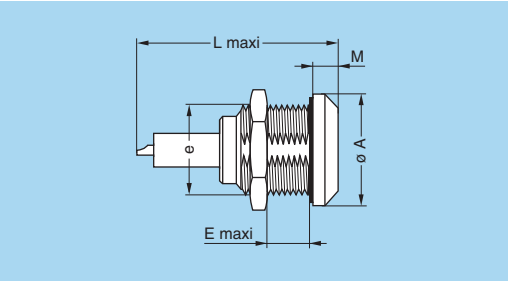


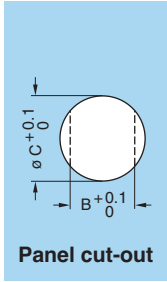
Reference			Dimensions (mm)				Cable ø	
Model	Series	Type	A	L	M	S2	min.	max.
FFA	**0E**	**403**	11	34.0	23.0	7	1.0	5.0
FFA	**1E**	**405**	13	43.0	29.0	9	1.3	6.5
FFA	**3E**	**410**	19	61.5	41.5	15	2.6	10.5

Note: [1)] to order, add a «Z» at the end of the reference.
The bend relief must be ordered separately (see page 39).

ERA Fixed socket, nut fixing



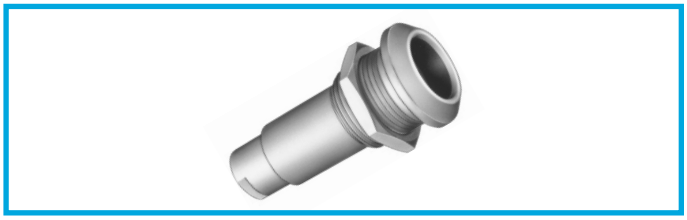


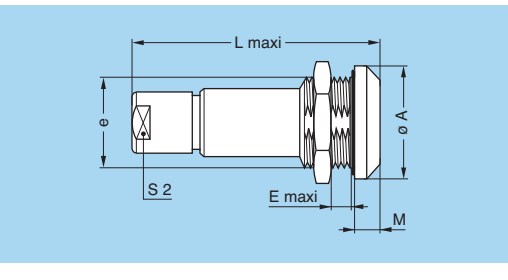


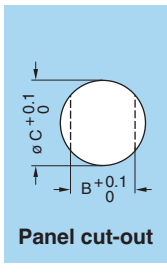
Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
ERA	**0E**	**403**	18	M14x1.0	5.5	26.5	4.0	12.6	14.1
ERA	**1E**	**405**	20	M16x1.0	9.0	35.5	4.5	14.6	16.1
ERA	**2E**	**408**	25	M20x1.0	9.0	45.5	5.0	18.6	20.2
ERA	**3E**	**410**	31	M24x1.0	11.0	52.0	6.0	22.6	24.2

PSA Fixed socket, nut fixing, cable collet







Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
PSA	**1E**	**405**	20	M16x1.0	9.0	46.0	4.5	14.6	16.1
PSA	**3E**	**410**	31	M24x1.0	11.5	67.7	6.0	22.6	24.2

Note: The dimension «S2» is the same as the FFA models.

Watertight or vacuumtight models

HGP and SWH socket or coupler models allow the device on which they are fitted to reach a protection index of IP 68 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.

Part number example:
Watertight socket: HGP.0E.403.CTLP
Vacuumtight socket: HGP.0E.403.CTLPV

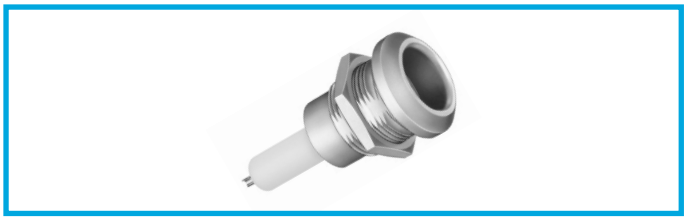
Technical Characteristics

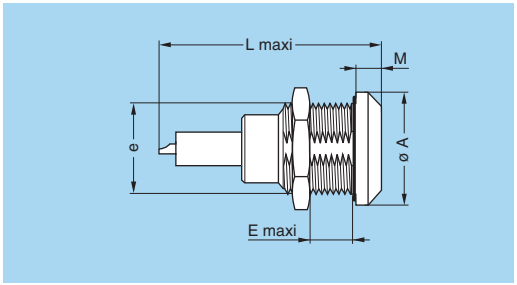
Mechanical and Climatical

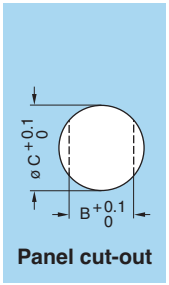
Characteristics	Value	Standard
Endurance	> 1000 cycles	IEC 60512-5 test 9a
Humidity	up to 95% at 60°C	
Temperature range	-20°C to +80°C	
Salt spray corrosion test	1000 h	IEC 60512-6 test 11f
Climatical category	20/80/21	IEC 60068-1
Leakage rate (He)[1)]	< 10^{-7} mbar.l.s^{-1}	IEC 60512-7 test 14b
Max. operating pressure[2)]	60 bars	IEC 60512-7 test 14d

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

HGP Fixed socket, nut fixing, watertight or vacuumtight





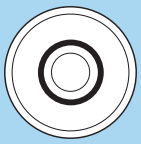
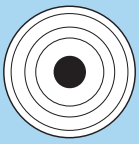
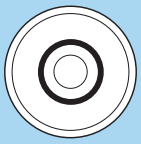
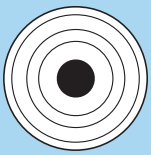
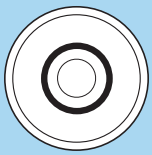


Panel cut-out

Reference			Dimensions (mm)					Panel cut-out	
Model	Series	Type	A	e	E	L	M	B	C
HGP	**0E**	**403**	18	M14x1.0	5.5	24.5	4	12.6	14.1

Insert configuration (S and E series)

High Voltage (single contact)

Male solder contacts	Female solder contacts	Reference	Series		Contact ø (mm)	Contact gender for plug	Conductor ø maxi (mm)[1]	Dielectric ø maxi (mm)[1]	Cable sheath ø maxi (mm)[1]	Standard insulator material	Creepage dist. min. (mm)[3]	Test voltage Ue (kV DC)[2]	Test voltage Ue (kV rms)[2]	Rated current (A)
			Standard	Watertight										
		403	0S	0E	0.9	A/L	0.75	2.9	5.0	T	7.0	6.0	4.2	4
		405	0S	–	0.7	A	1.05	2.9	4.7	L	13.5	12.0	8.4	4
			1S	1E	1.3	A/L	1.05	4.0	6.5	T	10.5	10.5	7.5	8
			3S	3E	4.0	A/L	2.95	7.5	10.5	T	12.5	10.5	7.5	15
		408	1S	–	0.9	A	0.95	4.0	6.0	L	20.0	18.0	12.7	6
			2S	2E	2.0	A/L	1.75	5.1	8.5	T	11.5	12.0	8.5	10
		**410**	3S	3E	2.0	A/L	2.15	7.3	10.5	T	16.5	15.0	10.5	10
			4S	–	2.5	A	2.95	9.5	13.0	T	tbd	15.0	10.5	12
		**415**	3S	–	1.3	A/L	1.30	7.3	10.5	T	28.5	21.0	15.0	8
		**460**	3S	–	1.4	A	1.05	4.2	10.5	L	1.7 5.5	2.25[4] 7.50	1.6[4] 5.3	10

WARNING: Depending on the application specific safety standard apply regarding determination of the operating voltage Us. That shall be considered carefully when selecting connectors. In low duty operations operating voltage Us can be as high as Us = $\frac{Ue}{1.5}$. For severe applications operating voltage can be as low as Us = $\frac{Ue}{3}$.

Note: [1] some specific model may accept larger dimensions, please contact us. [2] test voltage Ue is measured according to IEC 60512-2 test 4a, in mated condition and at see level. [3] creepage distance is measured in the mated condition. [4] between screen.

Contacts (S and E series)

Contacts for plugs, free or fixed sockets

Ref.	Contact type
A	Male solder
L	Female solder

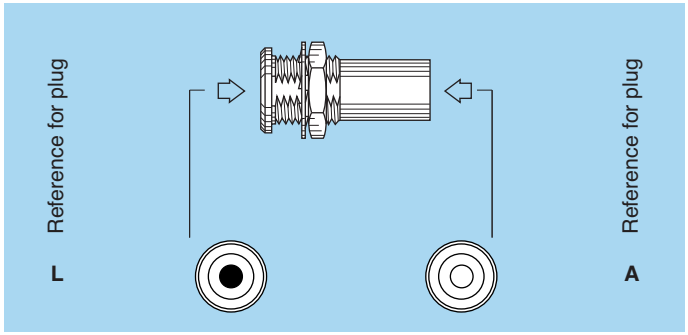
Contacts for couplers

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

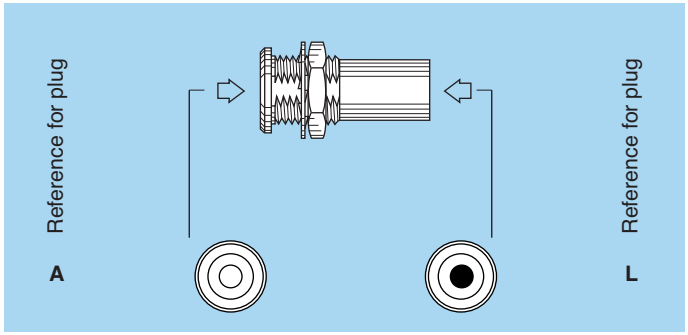
Ref.	Contact type
L	Female - Male
M	Female - Female

Contacts reference for fixed and free couplers RAD and SWH

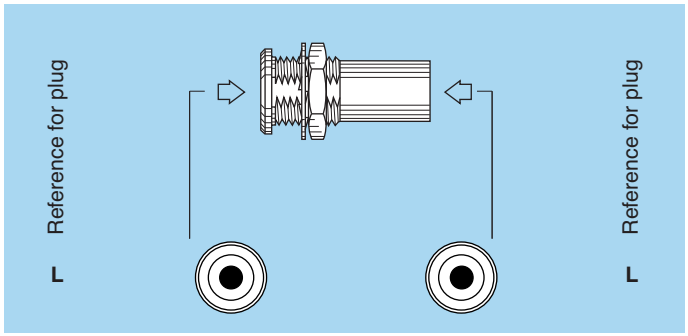
A Male - Female



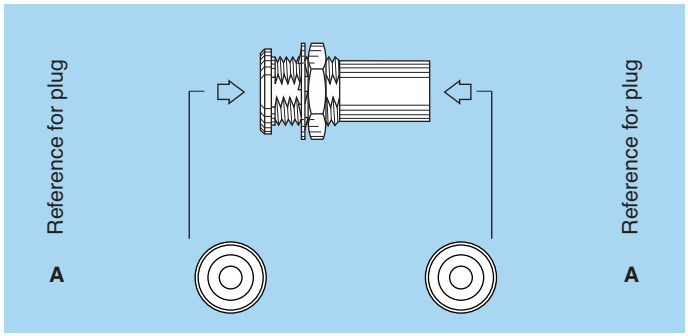
L Female - Male



C Male - Male



M Female - Female

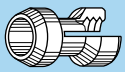


Use of plugs for mating with RAD and SWH couplers

Reference M for coupling two identical plugs fitted with male contact (contact reference A).
Reference L for coupling a plug fitted with male contacts (contact reference A) at the flange end for RAD and SWH and an inverted plug fitted with female contacts (contact reference L) at the other end.
Reference A for the inverted version of code L.
Reference C for the inverted version of code M.

Collets (S and E series)

Type C collets (S series)



	Type	Cable ø min.	Cable ø max.
0S	C22	1.3	2.2
	C32	> 2.2	3.2
	C37	> 3.2	3.7
	C44	> 3.7	4.4
1S	C22	1.4	2.2
	C32	> 2.2	3.2
	C42	> 3.2	4.2
	C52	> 4.2	5.2
	C57	> 5.2	5.7
	C62	> 5.7	6.2
2S	C27	1.3	2.7
	C32	> 2.5	3.2
	C42	> 3.2	4.2
	C52	> 4.2	5.2
	C62	> 5.2	6.2
	C72	> 6.2	7.2
	C82	> 7.2	8.2
	C87	> 8.2	8.7

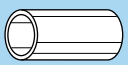
	Type	Cable ø min.	Cable ø max.
3S	C42	2.6	4.2
	C57	4.3	5.7
	C72	5.8	7.2
	C87	7.3	8.7
	C97	8.8	9.7
	C11	9.8	10.5
4S	C52	4.1	5.0
	C62	5.1	6.0
	C72	6.1	7.0
	C82	7.1	8.0
	C92	8.1	9.0
	C10	9.1	10.0
	C11	10.1	11.0
	C12	11.1	12.0
	C13	12.6	13.0

Type C collets (E series)

	Type	Cable ø min.	Cable ø max.
0E	C10	1.0	1.2
	C15	1.3	1.5
	C20	1.6	2.0
	C25	2.1	2.5
	C30	2.6	3.0
	C35	3.1	3.5
	C40	3.6	4.0
	C45	4.1	4.5
	C50	4.6	5.0
1E	C15	1.3	1.5
	C20	1.6	2.0
	C25	2.1	2.5
	C30	2.6	3.0
	C35	3.1	3.5
	C40	3.6	4.0
	C45	4.1	4.5
	C50	4.6	5.0
	C55	5.1	5.5
	C60	5.6	6.0
	C65	6.1	6.5

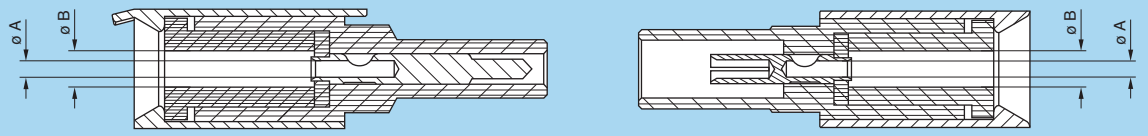
	Type	Cable ø min.	Cable ø max.
2E	C15	1.3	1.5
	C20	1.6	2.0
	C25	2.1	2.5
	C30	2.6	3.0
	C35	3.1	3.5
	C40	3.6	4.0
	C45	4.1	4.5
	C50	4.6	5.0
	C55	5.1	5.5
	C60	5.6	6.0
	C65	6.1	6.5
	C70	6.6	7.0
	C75	7.1	7.5
	C80	7.6	8.0
	C85	8.1	8.5
3E	C30	2.6	3.0
	C35	3.1	3.5
	C40	3.6	4.0
	C45	4.1	4.5
	C50	4.6	5.0
	C55	5.1	5.5
	C60	5.6	6.0
	C65	6.1	6.5
	C70	6.6	7.0
	C75	7.1	7.5
	C80	7.6	8.0
	C85	8.1	8.5
	C90	8.6	9.0
	C95	9.1	9.5
	C10	9.6	10.0
	C11	10.1	10.5

Crimp ferrules (0S.405 and 1S.408 series)



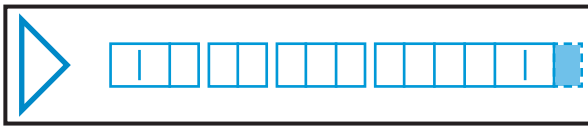
	Type	Cable dimension: Sheath ø Min.	Sheath ø Max.	Max. dielec. ø (± 0.1)	Max. cond. ø
0S	E33	2.6	3.3	1.6	0.55
	E34	2.8	3.3	1.6	0.55
	E43	3.5	4.3	2.1	1.00
	E48	4.2	4.8	3.0	1.00
1S	E46	4.0	4.6	2.3	0.90
	E61	5.2	6.1	4.0	0.90

Barrel contact and dielectric diameter



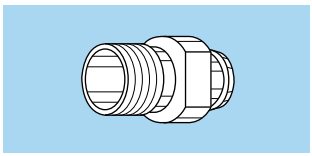
Sub assembly part number	Barrel contact ø A (mm)	Inner insulator ø B (mm)	Delivered with clamping
0S.403	0.8	3.0	C22 to C44
1S.405	1.1	2.4	C22, C32, C42
		3.1	C52
		4.1	C62
2S.408	1.8	3.2	C27, C32
		5.2	C42 to C87

Sub assembly part number	Barrel contact ø A (mm)	Inner insulator ø B (mm)	Delivered with clamping
3S.405	3.0	7.6	C42 to C11
3S.410	2.2	7.4	C42 to C11
3S.415	1.35	4.1	C42 to C57
		4.9	C72 to C87
		6.5	C96 to C11
4S.410	3.0	9.6	C52 to C13

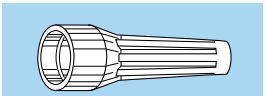


Variant (S and E series)

Bend relief for S series models with collet



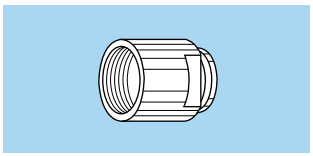
Need to be ordered



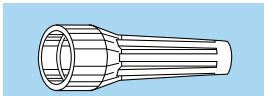
	Ref.	Collet Type	Collet Code	Need to be ordered separately (see page 39)
0S	Z	C	32 to 44	GMA.0B.0●●.D●
1S	Z	C	32 to 62	GMA.1B.0●●.D●

Note: All dimensions are in millimetres.

Bend relief for E series models with collet



Need to be ordered



	Ref.	Collet Type	Collet Code	Need to be ordered separately (see page 39)
0E	Z	C	30 to 50	GMA.0B.●●●.●●
1E	Z	C	30 to 65	GMA.1B.●●●.●●
3E	Z	C	35 to 85	GMA.3B.●●●.●●

Watertight and vacumtight socket and coupler models (S and E series)

	Reference Watertight	Reference Vacuumtight	Model
S	P	PV	EWB, HCP, HGP, EWF, SWH
E	P	PV	HGP

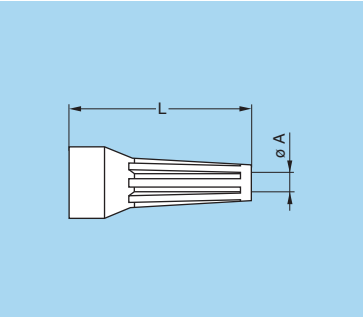
O-ring and gasket material (E series)

Standard connectors are delivered with silicone o-ring and gaskets. The vacuumtight models, identified with the letter «PV», are delivered with Viton® gaskets. Other gaskets material can be delivered upon special request.

Ref.	O-ring material
H	FPM (Viton®)
E	EPDM
D	FPM (Viton®) and collet nut for bend relief

Accessories

GMA Bend relief (TPU)



A bend relief made from thermoplastic polyurethane elastomer can be fitted over LEMO plugs and sockets that are supplied with nut for fitting such bend relief.
Use the part numbers shown below to order this accessory separately.

Main characteristics

- Material: TPU (Thermoplastic Polyurethane)
- Temperature range in dry atmosphere: -40°C +80°C

Part number	Series	Bend relief		Cable ø	
		A	L	min.	max.
GMA.0B.025.DG	0S-0E	2.5	24	2.5	2.9
GMA.0B.030.DG		3.0	24	3.0	3.4
GMA.0B.035.DG		3.5	24	3.5	3.9
GMA.0B.040.DG [1]		4.0	24	4.0	4.4
GMA.0B.045.DG [1]		4.5	24	4.5	5.2
GMA.1B.025.DG	1S-1E	2.5	30	2.5	2.9
GMA.1B.030.DG		3.0	30	3.0	3.4
GMA.1B.035.DG		3.5	30	3.5	3.9
GMA.1B.040.DG		4.0	30	4.0	4.4
GMA.1B.045.DG		4.5	30	4.5	4.9
GMA.1B.054.DG		5.4	30	5.4	6.0
GMA.1B.065.DG [1]		6.5	30	6.5	7.0

Part number	Series	Bend relief		Cable ø	
		A	L	min.	max.
GMA.3B.050.DG [1]	3E	4.5	42	4.5	5.2
GMA.3B.060.DG		6.0	42	6.0	6.9
GMA.3B.070.DG		7.0	42	7.0	7.9
GMA.3B.080.DG		8.0	42	8.0	8.9
GMA.3B.090.DG		9.0	42	9.0	10.0

Note: all dimensions are in millimetres.

Ref.	Colour
A	blue
B	white
G	grey

Ref.	Colour
J	yellow
M	brown
N	black

Ref.	Colour
R	red
S	orange
V	green

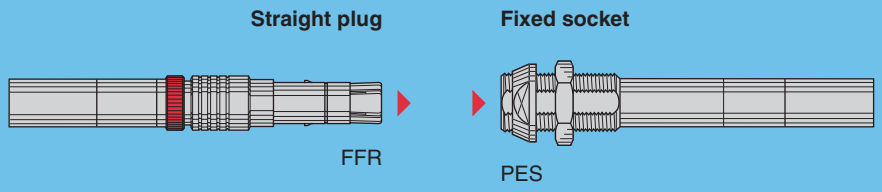
Note: [1] Design may differ from other bend relief, model without stripes.
The last letter «G» of the part number indicates the grey colour of the bend relief. For ordering a bend relief with another colour, see table above and replace the letter «G» by the letter of the required colour.

05 series (HV single contact)

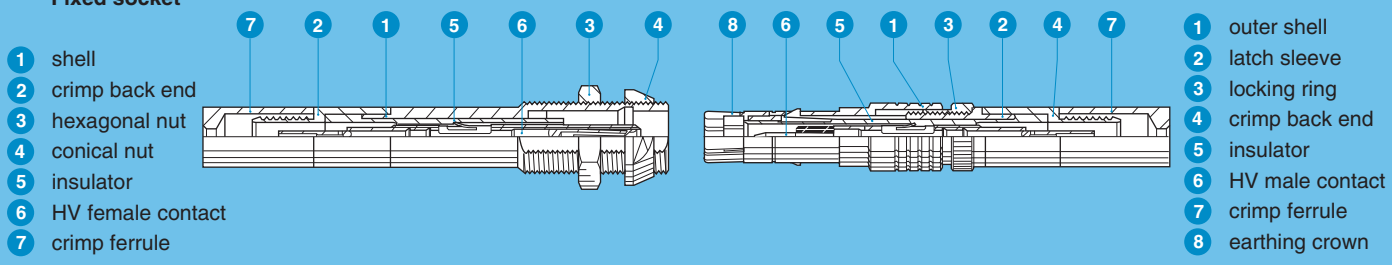
High voltage connectors of the new 05 miniature series have been specifically developed to meet the requirements of experimental nuclear research programme.
The 05 series contains a miniature HV 12kV DC (test voltage) contacts. This crimp contact is removable from the shell and is inserted in a PEEK insulator. The actual mating is provided by the LEMO Push-Pull system, renowned for its reliability worldwide and a red locking ring to secure the connection.
The compact design of these connectors makes them ideal for applications where minimal mass and space saving are critical factors.

Interconnections

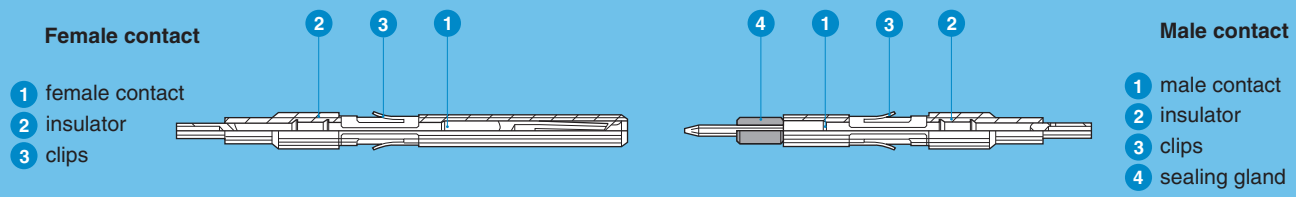
Models (page 42)



Part Section Showing Internal Components



HV Contact



Technical Characteristics

Materials and Treatments – Connector

Component	Material (Standard)	Surface treat. (µm)
Outer shell + crimpend	Aluminium (AA 6262A)	5
Safety nut	Aluminium (AA 6262A)	Anodized red
Earthing crown	Aluminium special	5
Latch sleeve	Aluminium special	5
Hexagonal and conical nut	Aluminium (AA 6262A)	Anodized natural
Insulator	PEEK	–
Crimp ferrule	Aluminium (AA 6262A)	5

Contact

Component	Material (Standard)	Surface treat. (µm)		
		Cu	Ni	Au
Male contact	Brass (UNS C38500)	0.5	3	1.0
Female contact	Bronze (UNS C54400)	0.5	3	1.5
Contact clips	Cu-Be (QQ-C-530)	–		
Insulator	PEEK	–		
Sealing gland	Silicone PVMQ	–		

Mechanical and Environmental

Characteristics	Value	Standard
Contact retention force	40 N	IEC 60512-8 test 15a
Working temperature	-20°C +125°C	
Mechanical life	> 200 cycles	IEC 60512-5 test 9a
Climatic class	20/125/21	IEC 60068-1
Radiation resistance	$> 10^6$ Gy	

Electrical

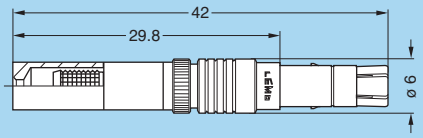
Characteristics	Value	Standard
Test voltage DC	12 kV (1 min.)	IEC 60512-2 test 4a
Rated current	4 A	IEC 60512-3 test 5a
Contact resistance	≤ 8 mΩ	IEC 60512-2 test 2a
Screen resistance	≤ 150 mΩ	IEC 60512-2 test 2f
Insulation resistance	≥ 10^{12} mΩ	IEC 60512-2 test 3a

Recommended cables

Cable group	Manufacturer part number	CERN type	Construction and dimensions								
			Conductor			Dielectric		Screen	Sheath		Corona screen
			Constr.	Mat.	ø	Mat.	ø	Mat.	Mat.	ø	
1	ABBNK - 45/94	HTC 50-1-1	7x0.17	CuSn	0.51	PE solid	1.5	CuSn 16x4x0.1	Polyolefine	3.30	yes
2	HABIA 31789-004-001	HFI 150 mini coax	Mono	Cu	0.16	HFI150	0.5	Drain 2x0.1 + Alu polyester	HFI150	1.15	no

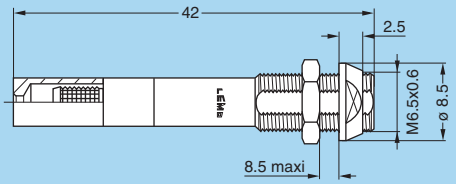
Models

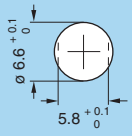
FFR.05 Straight plug for cable crimping with locking ring



Part number	Cable group
FFR.05.403.LLAE141	1
FFR.05.403.LLAE142	2

PES.05 Fixed socket, with two nuts, for cable crimping





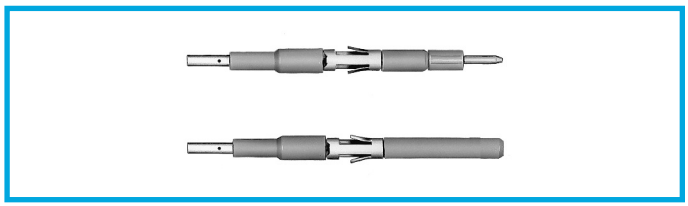
Panel cut-out

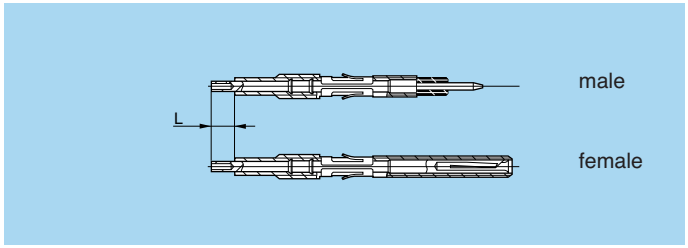
Part number	Cable group
PES.05.403.LLLE141	1
PES.05.403.LLLE142	2

Recommended mounting nut torque: 0.8 Nm.

Accessories

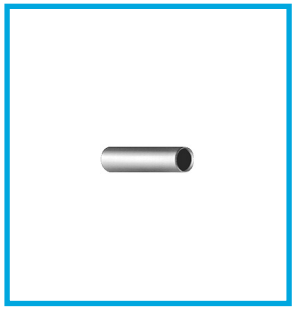
FFA-ERA High voltage contacts

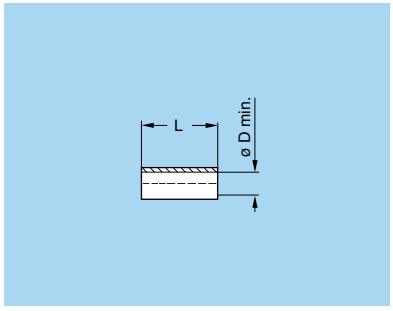




Contact part number		Cable group	L (mm)
Male contact	Female contact		
FFA.05.403.ZLA1	**ERA.05.403.ZLL1**	1	4
FFA.05.403.ZLA2	**ERA.05.403.ZLL2**	2	6

GMA Heatshrink tube



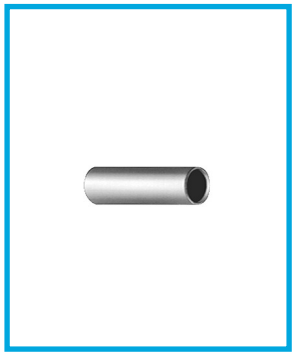


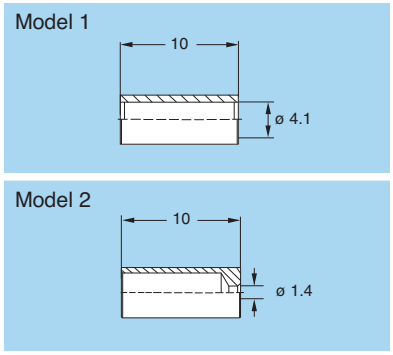
Part number	Cable group	Supplier		ø D	L
		Name	Product ref.		
GMA.30.010.ST	1-2	RAYCHEM®	RNF 3000 3/1	3.0	13
GMA.15.010.ST	2	RAYCHEM®	RNF 3000 1.5/0.5	1.5	9

Note: All dimensions are in millimetres. Shall be ordered separately.
For cable group 2, the two heatshrink tubes are necessary.

- Material: Polyolefin transparent

FFS Crimp ferrule

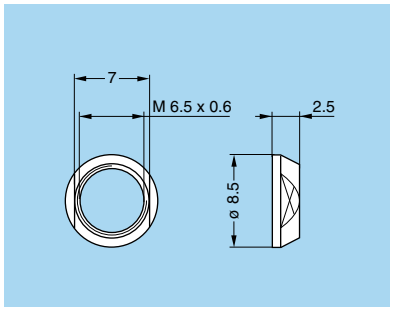




Part number	Cable group	Model
FFS.05.160.PM	1	1
FFS.05.161.PM	2	2

- Material: Aluminium alloy (AA 6262A) nickel plated

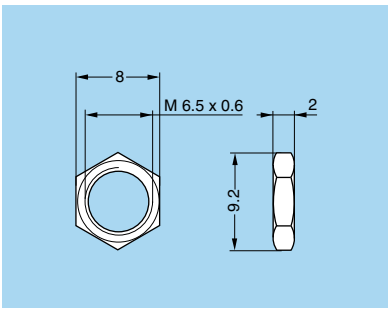
GEC Conical nut



Part number
GEC.05.241.PT

- Material: Aluminium alloy (AA 6262A) natural anodized.

GEA Hexagonal nut

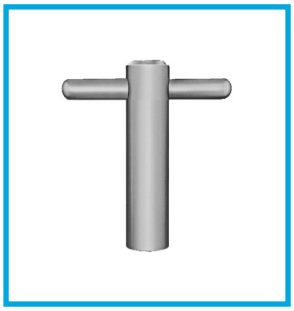


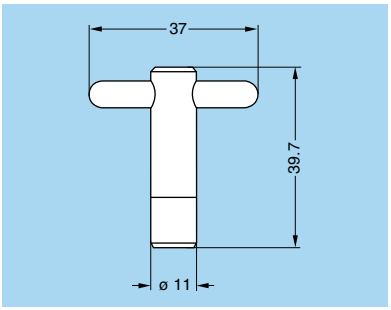
Part number
GEA.05.241.PT

- Material: Aluminium alloy (AA 6262A) natural anodized.

Tooling

DCH Spanner for conical nut

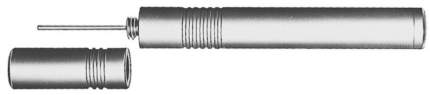




Part number
DCH.91.113.9TN

- Material: Blackened steel.

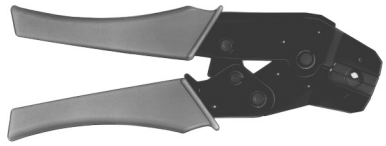
DCF Extraction tools for HV contacts



Automatic model

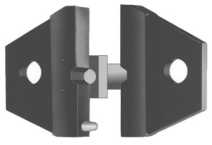
Part number
DCF.91.133.5LT

DPH Crimping tool with die



Part number	Applications	Cable group	Marking on die
DPH.99.005.2K	Shield	1-2	DPH.91.005.2K
DPH.99.060.11K	Centre contact	1	DPH.91.001.16K
DPH.99.065.11K	Centre contact	2	DPK.91.001.16K

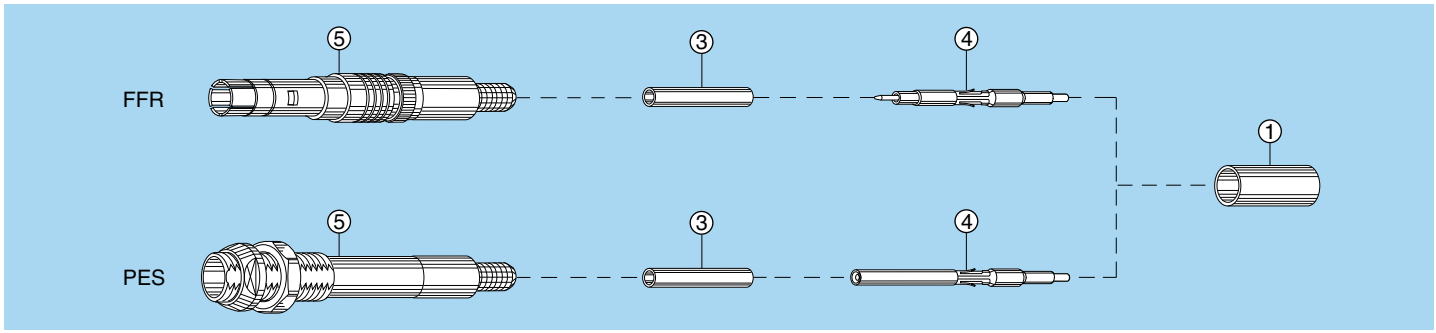
DPN Dies and positioner

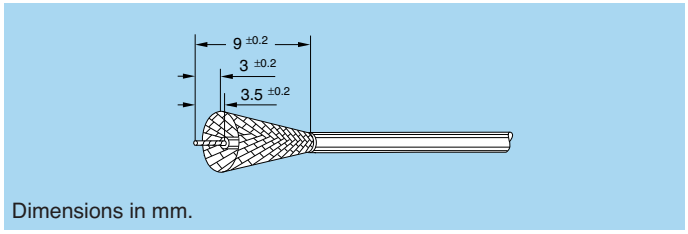


Part number	Applications	Cable group	Marking on die
DPN.99.005.2K	Shield	1-2	DPH.91.005.2K
DPN.99.060.11K	Centre contact	1	DPH.91.001.16K
DPN.99.065.11K	Centre contact	2	DPK.91.001.16K

- Dies material: Blackened steel

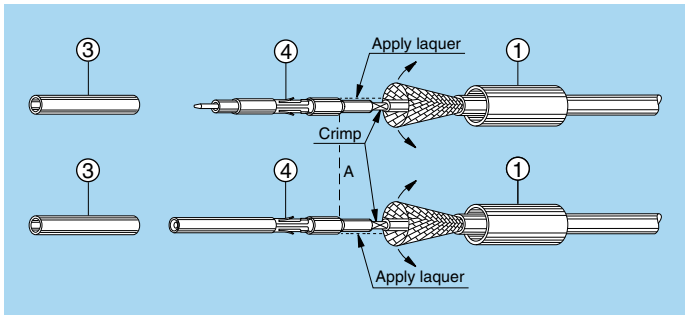
Termination instructions cable group 1



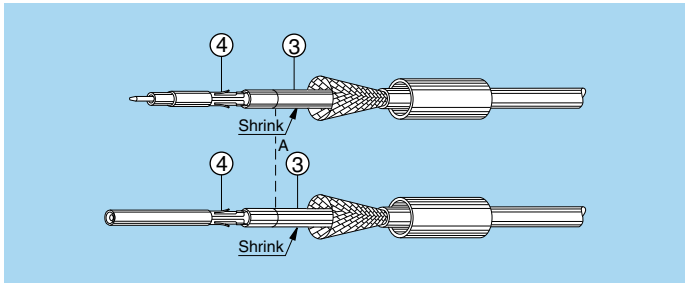


Dimensions in mm.

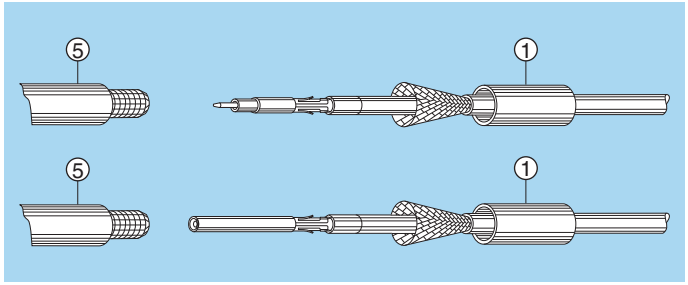
1. Strip the cable according to the given dimensions, remove carefully the cable corona screen, making sure that the cable dielectric is not damaged. Remove also the aluminium foil and the textile tape.
   Clean the dielectric with isopropylic alcool.



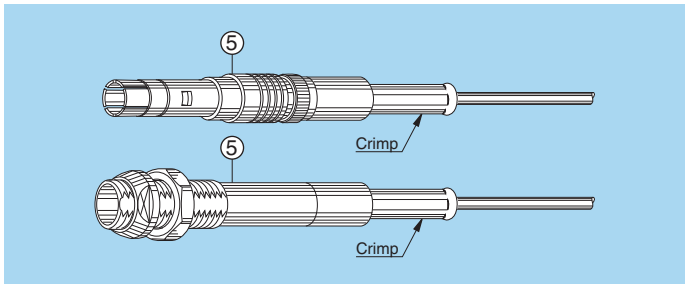
2. Place the crimp ferrule ① on the cable. Widen completely the shield braid and fold it back over the jacket.
   Introduce the cable center conductor into the HV contact ④ until the contact end rests against the dielectric and the conductor is visible through the contact inspection hole. Crimp with the LEMO crimping tool DPH.99.060.11K.
   Cover the crimp section of the contact and the Peek end of the HV contact with a layer of insulating laquer. Let the laquer dry, approx.15 min.
   Note: We recommand the laquer Urethan
   ref: Cellpack n° 912110



3. Slide the heatshrink tube ③ over the HV contact until it rests against the contact insulator.
   One end of the heatshrink tube shall be located at the position A of the HV contact insulator. Shrink the tube.

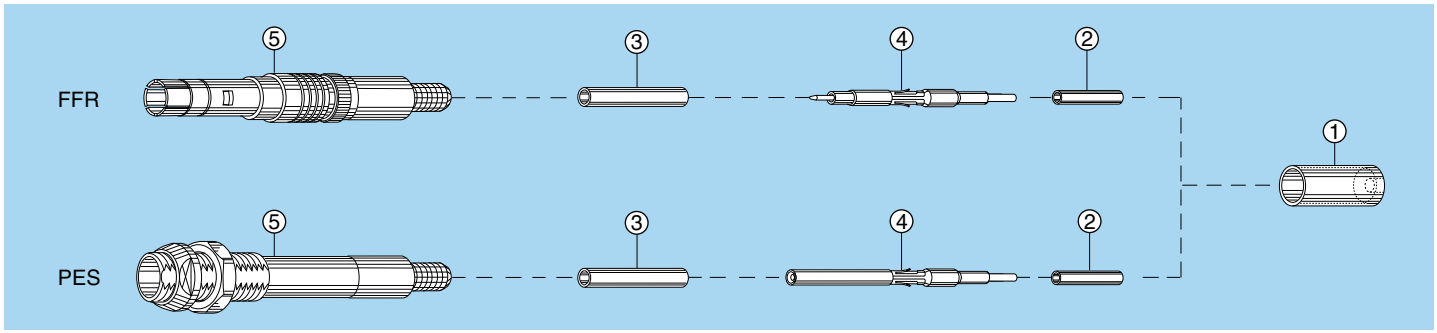


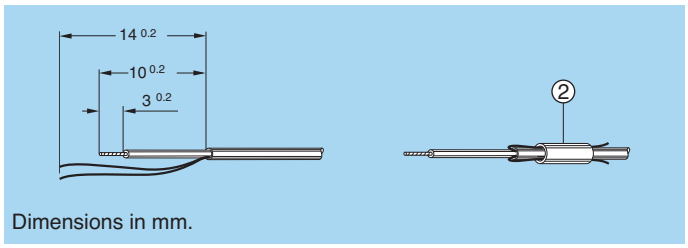
4. Fully introduce the HV contact into the connector shell ⑤. Check that the contact is correctly located and remains in position when given a gentle pull. Place the cable shield braid strand over the shell crimp back end, cut the length of braid in excess.



5. Slide the crimp ferrule over the cable shield until it rests against the connector shell. Crimp with the LEMO crimping tool DPH.99.005.2K.

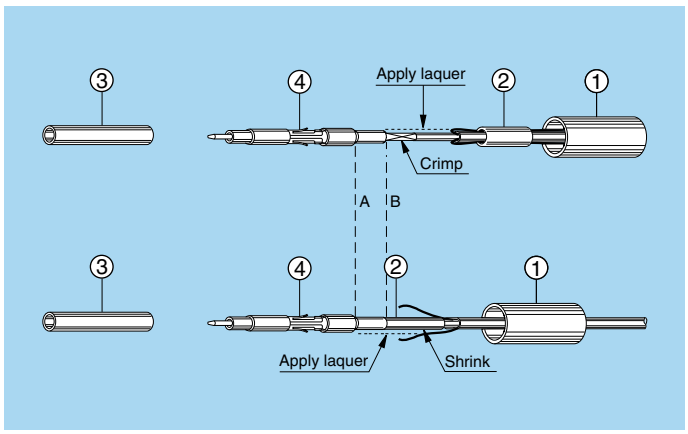
Termination instructions cable group 2



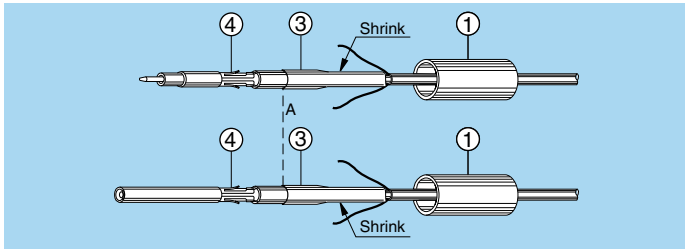


Dimensions in mm.

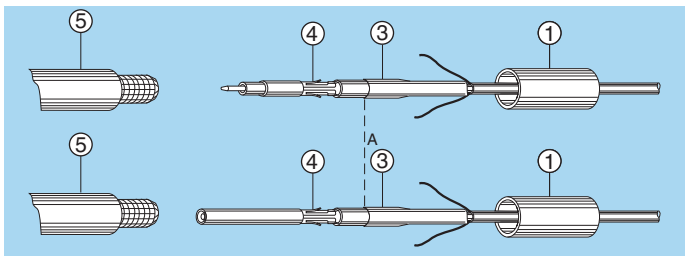
1. Strip the cable according to the given dimensions, cut the aluminium foil making sure that the dielectric is not damaged. Do not damage the 2 drain wires.
   Fold the drain wires back over the outer jacket and slide over the small heatshrink tube ②.
   Clean the dielectric with isopropylic alcool.



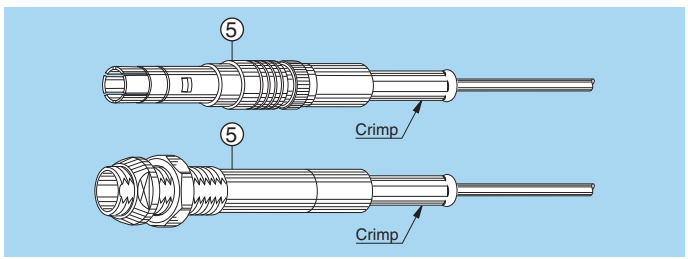
2. Place the crimp ferrule ① introducing first the small diameter on the cable. Introduce the cable center conductor and a part of the dielectric into the HV contact ④ until the conductor is fully visible through the contact inspection hole. Crimp with the LEMO crimping tool DPH.99.065.11K.
   Cover the crimp section of the contact and a short length of the dielectric with a layer of insulating laquer. Let the laquer dry, approx. 15 min.
   Note: We recommand the laquer Urethan
   ref: Cellpack n° 912110
   Slide the heatskrink tube ② over the HV contact until it rests against the contact insulator at the position B. Shrink the tube. Cover the Peek end of the HV contact and the first heatshrink tube with a layer of the insulating laquer. Let the laquer dry, approx. 15 min.



3. Slide the heatshrink tube ③ over the HV contact until it rests against the contact insulator.
   One end of the heatshrink tube shall be located at the position A of the HV contact insulator. Shrink the tube.



4. Fully introduce the HV contact into the connector shell ⑤. Check that the contact is correctly located and remains in position when given a gentle pull. Place the 2 drain wire around the shell crimp back end.



5. Slide the crimp ferrule over the cable shield until it rests against the connector shell. Crimp with the LEMO crimping tool DPH.99.005.2K.

Product safety notice

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

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

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

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

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

5. **CE MARKING** CE
   CE marking CE means that the appliance or equipment bearing it complies with the protection requirements of one or several European safety directives.
   CE marking CE applies to complete products or equipment, **but not to electromechanical components, such as connectors**.

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

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LEMO HEADQUARTERS

SWITZERLAND
LEMO SA
Chemin des Champs-Courbes 28 - P.O. Box 194 - CH-1024 Ecublens
Tel. (+41 21) 695 16 00 - Fax (+41 21) 695 16 02 - e-mail: info@lemo.com

LEMO SUBSIDIARIES

AUSTRIA
LEMO Elektronik GesmbH
Lemböckgasse 49/E6-3
1230 Wien
Tel: (+43 1) 914 23 20 0
Fax:(+43 1) 914 23 20 11
sales@lemo.at

BRAZIL
LEMO Latin America Ltda
Av. José Rocha Bonfim,
214 Salas 224 / 225
Condomínio Praça Capital
Ed. Chicago
Campinas / SP - Brasil 13080-650
Tel: +55 (11) 98689 4736
info-la@lemo.com

CANADA
LEMO Canada Inc
44 East Beaver Creek Road, unit 20
Richmond Hill, Ontario L4B 1G8
Tel: (+1 905) 889 56 78
Fax: (+1 905) 889 49 70
info-canada@lemo.com

CHINA / HONG KONG
LEMO Electronics (Shanghai) Co., Ltd
First Floor, Block E,
18 Jindian Road, Pudong
Shanghai, China, 201206
Tel: (+86 21) 5899 7721
Fax: (+86 21) 5899 7727
cn.sales@lemo.com

DENMARK
LEMO Denmark A/S
Nybrovej # 97
2820 Gentofte
Tel: (+45) 45 20 44 00
Fax: (+45) 45 20 44 01
info-dk@lemo.com

FRANCE
LEMO France Sàrl
24/28 Avenue Graham Bell
Bâtiment Balthus 4
Bussy Saint Georges
77607 Marne la Vallée Cedex 3
Tel: (+33 1) 60 94 60 94
Fax: (+33 1) 60 94 60 90
info-fr@lemo.com

GERMANY
LEMO Elektronik GmbH
Hanns-Schwindt-Str. 6
81829 München
Tel: (+49 89) 42 77 03
Fax: (+49 89) 420 21 92
info@lemo.de

HUNGARY
REDEL Elektronika Kft
Nagysándor József u. 6-12
1201 Budapest
Tel: (+36 1) 421 47 10
Fax: (+36 1) 421 47 57
info-hu@lemo.com

ITALY
LEMO Italia srl
Viale Lunigiana 25
20125 Milano
Tel: (+39 02) 66 71 10 46
Fax: (+39 02) 66 71 10 66
sales.it@lemo.com

JAPAN
LEMO Japan Ltd
2-7-22, Mita,
Minato-ku, Tokyo, 108-0073
Tel: (+81 3) 54 46 55 10
Fax: (+81 3) 54 46 55 11
lemoinfo@lemo.co.jp

MIDDLE EAST
LEMO Middle East Gen. Trad. LLC
Concorde Tower 6th Floor,
Dubai Media City, P.O. Box 126732
Dubai, United Arab Emirates
Tel: +971 55 222 36 77
info-me@lemo.com

NETHERLANDS / BELGIUM
LEMO Connectors Benelux
De Trompet 1060
1967 DA Heemskerk
Tel. (+31) 251 25 78 20
Fax (+31) 251 25 78 21
info@lemo.nl

NORWAY / ICELAND
LEMO Norway A/S
Soerumsandvegen 69,
1920 Soerumsand
Tel: (+47) 22 91 70 40
Fax: (+47) 22 91 70 41
info-no@lemo.com

SINGAPORE
LEMO Asia Pte Ltd
4 Leng Kee Road,
#06-09 SiS Building
Singapore 159088
Tel: (+65) 6476 0672
Fax: (+65) 6474 0672
sg.sales@lemo.com

SPAIN / PORTUGAL
IBERLEMO SAU
Brasil, 45, 08402 Granollers
Barcelona
Tel: (+34 93) 860 44 20
Fax: (+34 93) 879 10 77
info-es@lemo.com

SWEDEN / FINLAND
LEMO Nordic AB
Gunnebogatan 30, Box 8201
163 08 Spånga
Tel: (+46 8) 635 60 60
Fax: (+46 8) 635 60 61
info-se@lemo.com

SWITZERLAND
LEMO Verkauf AG
Grundstrasse 22 B, 6343 Rotkreuz
Tel: (+41 41) 790 49 40
ch.sales@lemo.com

UNITED KINGDOM
LEMO UK Ltd
12-20 North Street, Worthing,
West Sussex, BN11 1DU
Tel: (+44 1903) 23 45 43
lemouk@lemo.com

USA
LEMO USA Inc
P.O. Box 2408
Rohnert Park, CA 94927-2408
Tel: (+1 707) 578 88 11
(+1 800) 444 53 66
Fax:(+1 707) 578 08 69
info-US@lemo.com

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