

HIGH PRESSURE CONNECTORS

03 SERIES



 **LEMO**

Precision modular connectors to suit your application

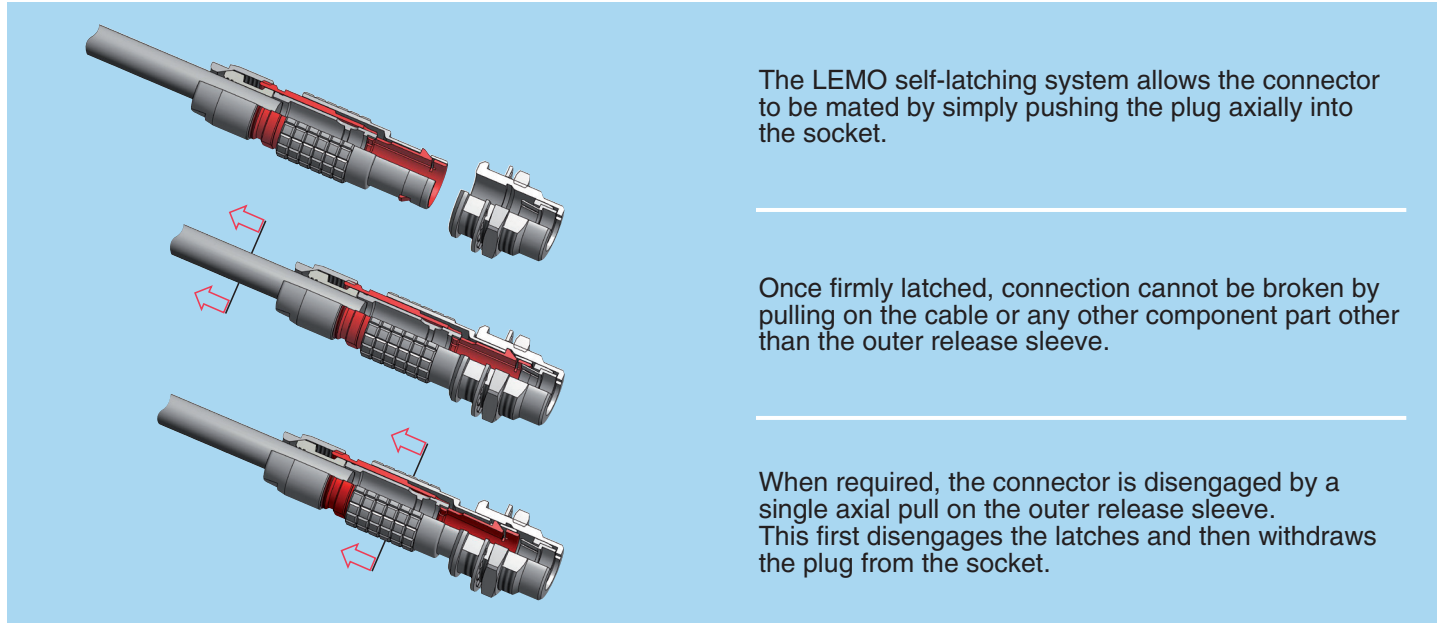
Since its creation in Switzerland in 1946 the LEMO Group has been recognized as a global leader of circular Push-Pull connectors and connector solutions. Today LEMO and its affiliated companies, REDEL and COELVER, are active in more than 80 countries with the help of over 40 subsidiaries and distributors.

Over 75000 connectors

The modular design of the LEMO range provides over 75000 connectors from miniature \varnothing 3 mm to \varnothing 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.



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

Product safety notice & disclaimers

Please read and follow all instructions specified on the last page or on our [website](http://www.lemo.com) carefully and consult all relevant national and international safety regulations for your application. Improper handling, cable assembly, or wrong use of connectors can result in hazardous situations.

LEMO products and services are provided "as is." LEMO makes no warranties or representations with regard to LEMO product & services or use of them, express, implied or statutory, including for accuracy, completeness, or security.

In no event shall LEMO be liable for any direct, indirect, punitive, incidental, special consequential damages, to property or life, whatsoever arising out of or connected with the use or misuse of LEMO's products.

03 Series

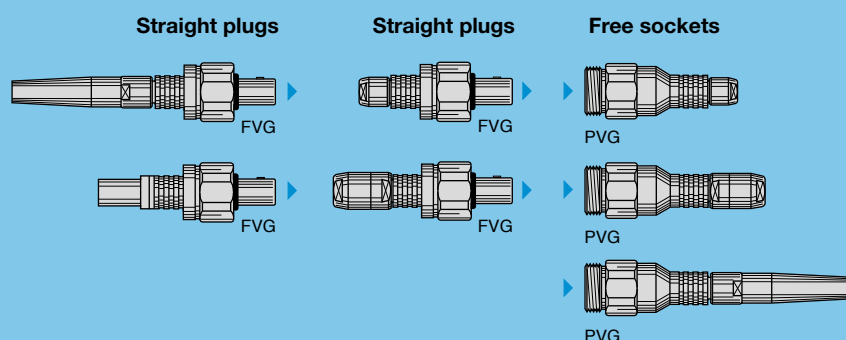
This series of connectors stems from the series 00 and has been specifically developed for applications where the connection must be guaranteed under very high pressure. The push-pull latching system has been replaced by a screw coupling system with watertightness maintained by compression of an O-ring in FPM (Viton®) according to the triangular shaped cavity principle. There are multiple application possibilities, from aerospace to the petroleum industry.

After cable assembly, the rear part must be covered with an adhesive heatshrink boot in order to ensure watertightness on the cable side. 03 series connectors provide the following main features:

- coaxial 50 Ω type
- multipole with 2, 3, 4 or 6 contacts
- 360° screening for full EMC shielding
- rugged housing for extreme working conditions
- working pressure that can exceed 60 bars in mated conditions

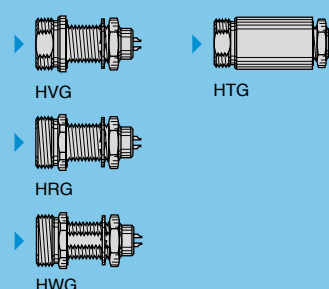
Multipole Type (302, 303, 304, 306)

Models (page 3)



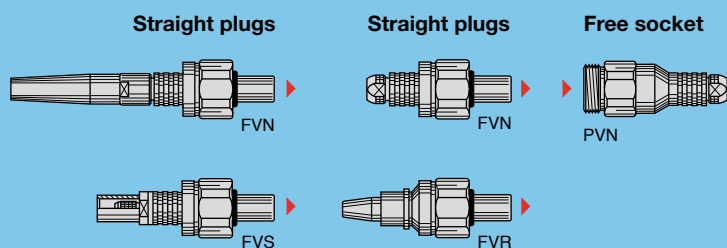
Vacuumtight models (page 5)

Fixed sockets



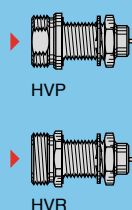
Coaxial Type (50 Ω)

Models (page 6)

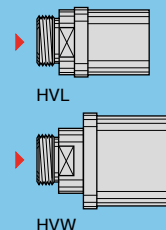


Vacuumtight models (page 8)

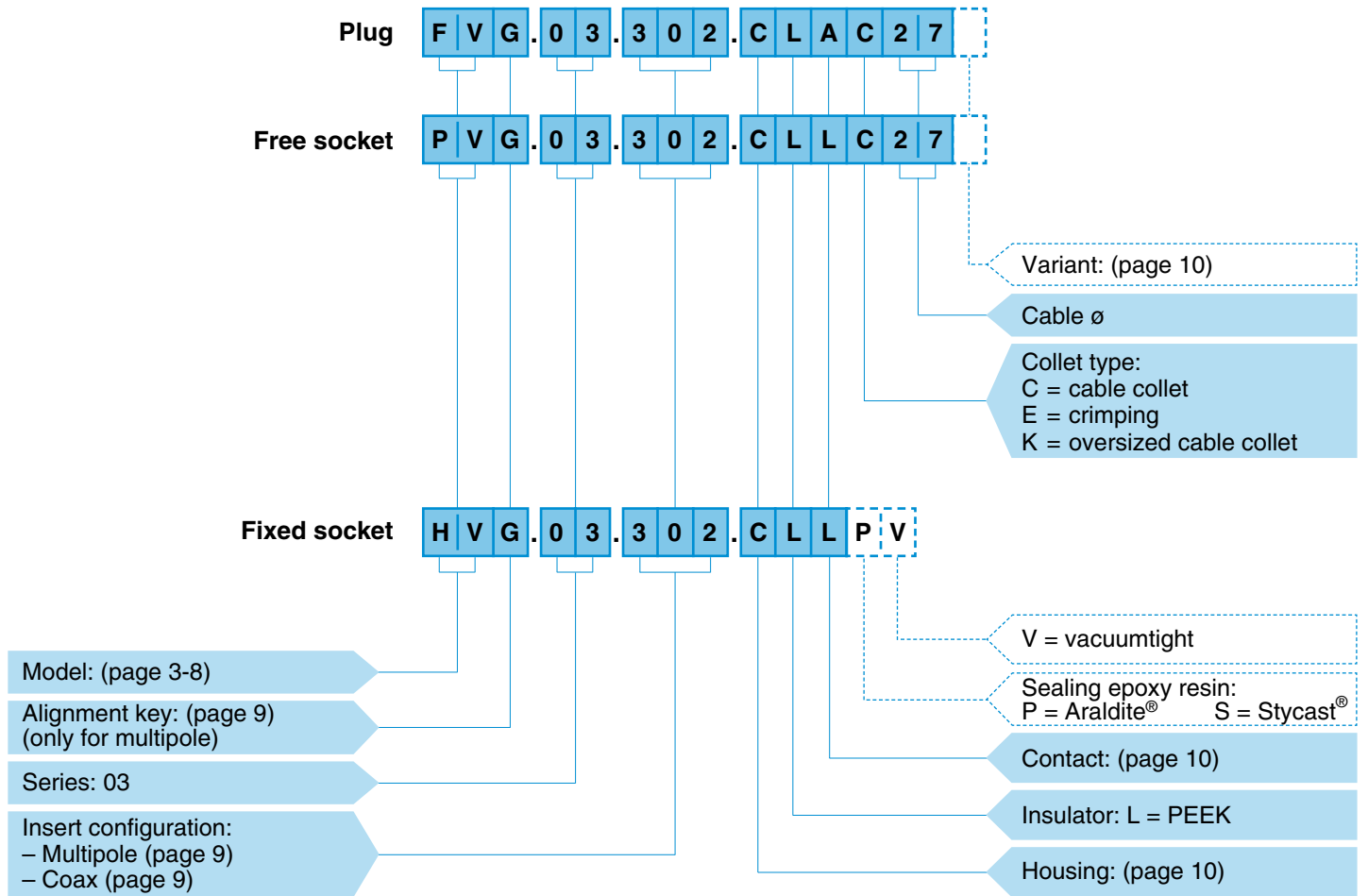
Fixed sockets



Free sockets



Part Numbering System

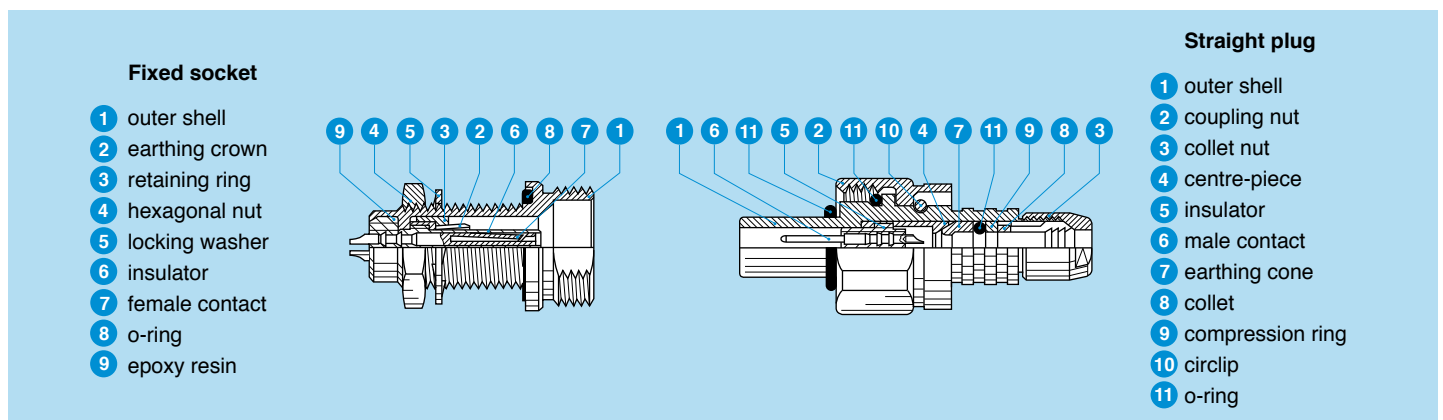


FVG.03.302.CLAC27 = straight plug with key (G) and cable collet, 03 series, multipole type with 2 contacts, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, C type collet for 2.7 mm diameter cable.

PVG.03.302.CLLC27 = free socket with key (G) and cable collet, 03 series, multipole type with 2 contacts, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, C type collet for 2.7 mm diameter cable.

HVG.03.302.CLLPV = fixed socket, nut fixing, with key (G), 03 series, multipole type with 2 contacts, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, sealed with Araldite® epoxy resin.

Part Section Showing Internal Components (multipole)





Models (multipole type)

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 ⁶⁾	-20° C, +200° C	
Salt spray corrosion test ⁵⁾	> 1000 h	IEC 60512-6 test 11f
Protection index ²⁾	> IP68	IEC 60529
Resistance to hydrostatic pressure ²⁾	~ 60 bars ¹⁾	IEC 60512-7 test 14d
Climatical category	20/200/21	IEC 60068-1

Note:

- ¹⁾ in order to perform correctly and withstand the pressure, cable assembly shall be made according to instruction we recommend. See page 12.
²⁾ For mated plug and socket.
³⁾ after humidity test: 21 days at 95% RH according to IEC 60068-2.

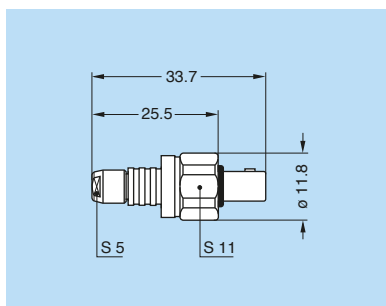
Electrical

Characteristics	Value	Standard	Section
Insulation resistance (new)	> 10 ¹² Ω	IEC 60512-2	test 3a
Insulation resistance ³⁾	> 10 ¹⁰ Ω	IEC 60512-2	test 3a
Shell electrical continuity	5.0 mΩ	IEC 60512-2	test 2f
Shielding efficiency	at 10 MHz	> 100 dB	IEC 60169-1-3
	at 1 GHz	> 80 dB	IEC 60169-1-3
Contact resistance ⁴⁾	ø A = 0.5 mm	≤ 8.7 mΩ	IEC 60512-2 test 2a
	ø A = 0.7 mm	≤ 6.1 mΩ	IEC 60512-2 test 2a

Note:

- ⁴⁾ after 5000 mating cycles and the salt spray test according to IEC 60512-6 test 11 f.
⁵⁾ for chrome plated product (« C » material code).
⁶⁾ maximum temperature valid for short periods of use.

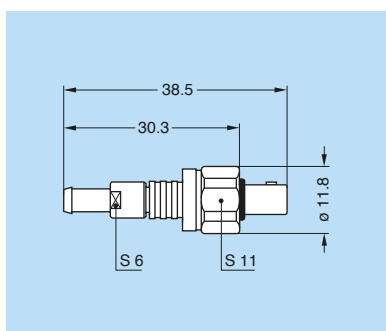
FVG Straight plug, key (G) or key (B), cable collet



Part number	Cable ø (mm)	
	min.	max.
FVG.03.30●.CLAC17	1.5	1.7
FVG.03.30●.CLAC20	1.8	2.0
FVG.03.30●.CLAC23	2.1	2.3
FVG.03.30●.CLAC27	2.4	2.6
FVG.03.30●.CLAC31	2.7	3.0

Note: ● = insert configuration (page 9)

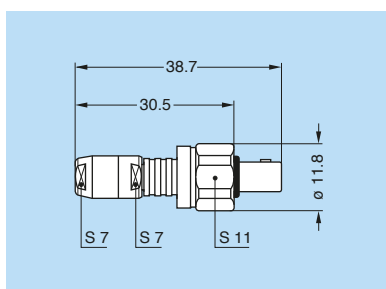
FVG Straight plug, key (G) or key (B), cable collet and nut for fitting a bend relief



Part number	Cable ø (mm)	
	min.	max.
FVG.03.30●.CLAC17Z	1.5	1.7
FVG.03.30●.CLAC20Z	1.8	2.0
FVG.03.30●.CLAC23Z	2.1	2.3
FVG.03.30●.CLAC27Z	2.4	2.6
FVG.03.30●.CLAC31Z	2.7	3.0

Note: ● = insert configuration (page 9).
The bend relief must be ordered separately (page 10)

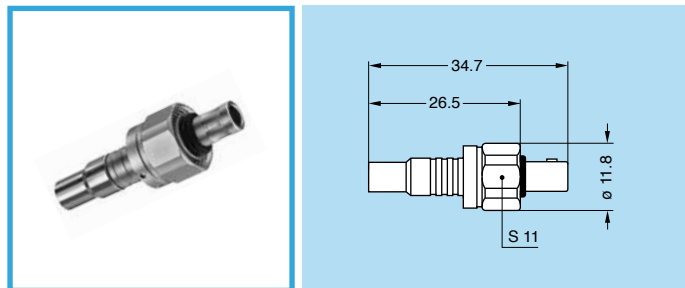
FVG Straight plug, key (G) or key (B) and oversize cable collet



Part number	Cable ø (mm)	
	min.	max.
FVG.03.30●.CLAK35	3.1	3.5
FVG.03.30●.CLAK40	3.6	4.0
FVG.03.30●.CLAK45	4.1	4.5
FVG.03.30●.CLAK50	4.6	5.0

Note: ● = insert configuration (page 9)
Correspond to K type of collet. Also available with nut for fitting a bend relief.

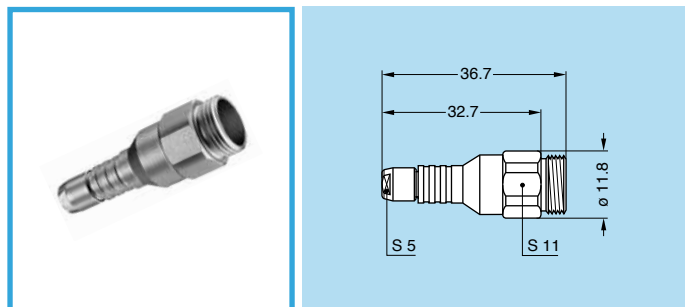
FVG Straight plug, key (G) for cable crimping



Part number	Cable ø (mm)
	max.
FVG.03.30●.CLAE44	4.3
FVG.03.30●.CLAE52	5.1

Note: ● = insert configuration (page 9)

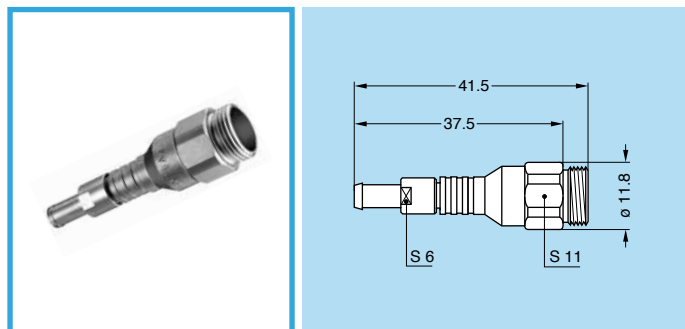
PVG Free socket, key (G) and cable collet



Part number	Cable ø (mm)	
	min.	max.
PVG.03.30●.CLLC17	1.5	1.7
PVG.03.30●.CLLC20	1.8	2.0
PVG.03.30●.CLLC23	2.1	2.3
PVG.03.30●.CLLC27	2.4	2.6
PVG.03.30●.CLLC31	2.7	3.0

Note: ● = insert configuration (page 9)

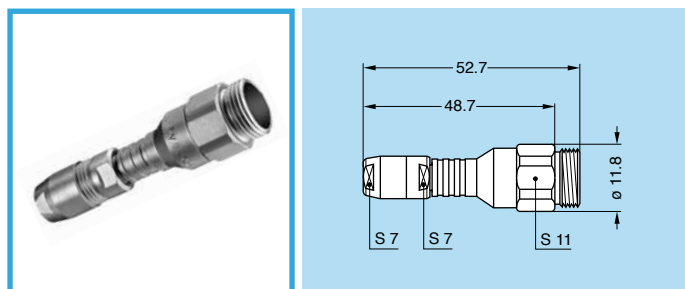
PVG Free socket, key (G), cable collet and nut for fitting a bend relief



Part number	Cable ø (mm)	
	min.	max.
PVG.03.30●.CLLC17Z	1.5	1.7
PVG.03.30●.CLLC20Z	1.8	2.0
PVG.03.30●.CLLC23Z	2.1	2.3
PVG.03.30●.CLLC27Z	2.4	2.6
PVG.03.30●.CLLC31Z	2.7	3.0

Note: ● = insert configuration (page 9).
The bend relief must be ordered separately (page 10)

PVG Free socket, key (G) and oversize cable collet



Part number	Cable ø (mm)	
	min.	max.
PVG.03.30●.CLLK35	3.1	3.5
PVG.03.30●.CLLK40	3.6	4.0
PVG.03.30●.CLLK45	4.1	4.5
PVG.03.30●.CLLK50	4.6	5.0

Note: ● = insert configuration (page 9)
Correspond to K type of collet. Also available with nut for fitting a bend relief.



Vacuumtight models (multipole type)

These sockets 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» or «S» at the last but one character of the reference. The Stycast[®] sealant can be used over a larger temperature range than the Araldite[®] sealant.

Vacuumtight 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.

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, +100° C	
Salt spray corrosion test ³⁾	> 1000 h	IEC 60512-6 test 11f

Characteristics	Value	Standard
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

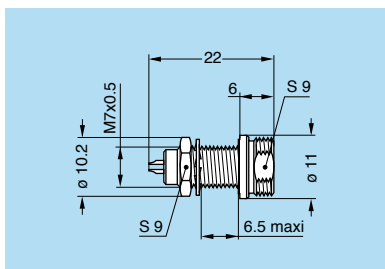
Note:

¹⁾ only for vacuumtight models.

²⁾ this value corresponds to the maximum allowed pressure difference for the assembled socket.

³⁾ for chrome plated product («C» material code).

HVG Fixed socket, key (G) or key (B), round flange, nut fixing, vacuumtight

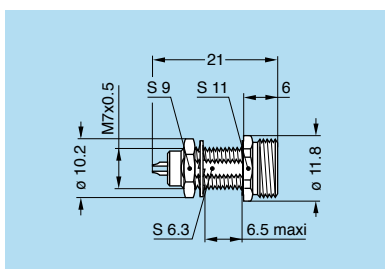


Part number	Sealing resin
HVG.03.30●.CLLPV	Araldite [®]
HVG.03.30●.CLLSV	Stycast [®]

Panel cut-out (page 12)

Note: ● = insert configuration (page 9)

HWG Fixed socket, key (G), hexagonal flange, nut fixing, vacuumtight

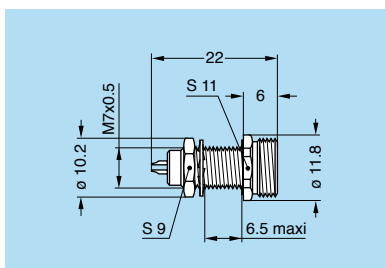


Part number	Sealing resin
HWG.03.30●.CLLPV	Araldite [®]
HWG.03.30●.CLLSV	Stycast [®]

Panel cut-out (page 12)

Note: ● = insert configuration (page 9)

HRG Fixed socket, key (G), hexagonal flange, nut fixing, no flats on fixing thread, vacuumtight

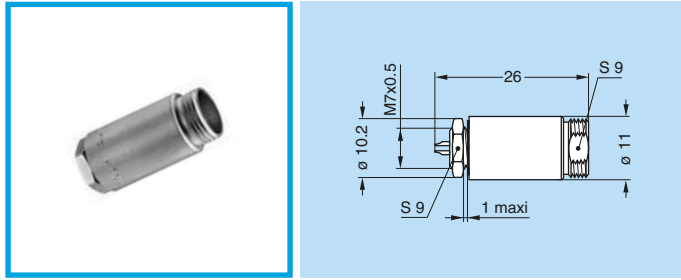


Part number	Sealing resin
HRG.03.30●.CLLPV	Araldite [®]
HRG.03.30●.CLLSV	Stycast [®]

Panel cut-out (page 12)

Note: ● = insert configuration (page 9)

HTG Fixed socket, key (G), nut fixing, long shell



Part number	Sealing resin
HTG.03.30●.CLLSV	Stycast®

Panel cut-out (page 12)

Note: ● = insert configuration (page 9)

Models (coaxial type)

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 ⁶⁾	-20° C, +200° C	
Salt spray corrosion test ⁵⁾	> 1000 h	IEC 60512-6 test 11f
Protection index ²⁾	> IP68	IEC 60529
Resistance to hydrostatic pressure ²⁾	~ 60 bars ¹⁾	IEC 60512-7 test 14d
Climatical category	20/200/21	IEC 60068-1

Note:

¹⁾ in order to perform correctly and withstand the pressure, cable assembly shall be made according to instruction we recommend. See page 12.

²⁾ for mated plug and socket.

³⁾ after humidity test: 21 days at 95% RH according to IEC 60068-2.

Electrical

Characteristics	Value	Standard	Section
Insulation resistance (new)	> 10 ¹² Ω	IEC 60512-2	test 3a
Insulation resistance ³⁾	> 10 ¹⁰ Ω	IEC 60512-2	test 3a
Shell electrical continuity	5.0 mΩ	IEC 60512-2	test 2f
Shielding efficiency	at 10 MHz	> 100 dB	IEC 60169-1-3
	at 1 GHz	> 80 dB	IEC 60169-1-3
Contact resistance ⁴⁾	ø A = 0.5 mm	≤ 8.7 mΩ	IEC 60512-2
	ø A = 0.7 mm	≤ 6.1 mΩ	IEC 60512-2
Max. working frequency	500 MHz	For coaxial type	

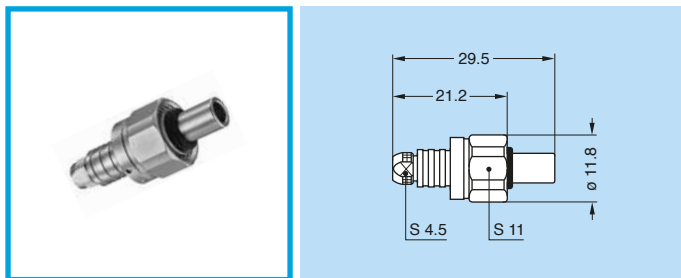
Note:

⁴⁾ after 5000 mating cycles and the salt spray test according to IEC 60512-6 test 11 f.

⁵⁾ for chrome plated product (« C » material code).

⁶⁾ maximum temperature valid for short periods of use.

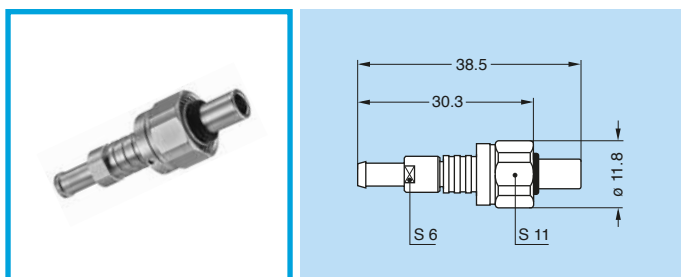
FVN Straight plug, cable collet



Part number	Cable group
FVN.03.250.CLAC27	4
FVN.03.250.CLAC31	3

Cable assembly (page 12)

FVN Straight plug, cable collet and nut for fitting a bend relief



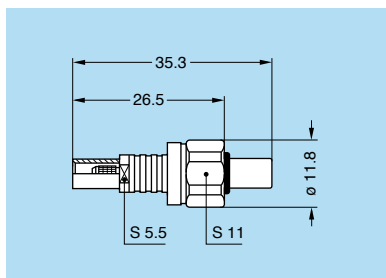
Part number	Cable group
FVN.03.250.CLAC27Z	4
FVN.03.250.CLAC31Z	3

Note: ● = insert configuration (page 9).

The bend relief must be ordered separately (page 10)



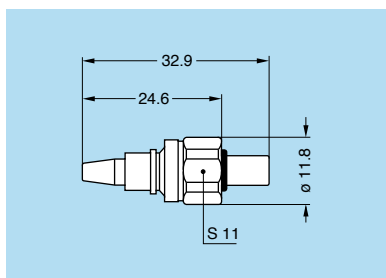
FVS Straight plug for cable crimping



Part number	Cable group
FVS.03.250.CLAE24	1
FVS.03.250.CLCE24	1
FVS.03.250.CLCE31	3-4

Cable assembly (page 12)

FVR Straight plug with brazing ferrule

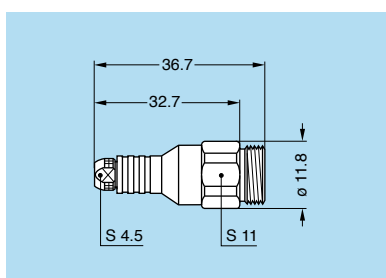


Part number	Cable \varnothing (mm)
	max.
FVR.03.250.SLAV16B	1.55
FVR.03.250.SLAV20B	1.95

Cable assembly (page 12)

Note: The shell of the connector is in stainless steel AISI 316L.

PVN Free socket and cable collet



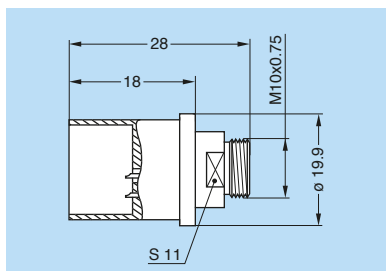
Part number	Cable group
PVN.03.250.CLCC27	4
PVN.03.250.CLCC31	3

Cable assembly (page 12)

Note: Also available with nut for fitting a bend relief (page 10).



HVV Free socket, for device overmolding, large shell



Part number

HVV.03.250.NLL

Note: Vacuumtightness is achieved after customer overmolding.



Alignment Key and Polarized Keying System for Multipole Types

03 series connector model part numbers are composed of three letters. The LAST LETTER indicates the key position and the contact type (male or female).

Front view of a socket 	Key	Nb of keys	Angles	Series	Contact type	
				03	Plug	Socket
	G	1		0°	male	female
	B	2	α	60°	male	female



Coaxial, multipole

			Reference	Series	Contact ϕ (mm)	Cable group	AWG max.	Impedance (Ω)	Test voltage (kV rms) ¹⁾ Contact-contact	Test voltage (kV rms) ¹⁾ Contact-shell	Rated current (A) ¹⁾
1	Coaxial 		250	03	0.7	1-3-4	–	50	2.1	2.10	4.0
2	Multipole 		302	03	0.5	–	30	–	1.0	0.95	5.0
3	Multipole 		303	03	0.5	–	30	–	0.8	0.95	3.0
4	Multipole 		304	03	0.5	–	30	–	0.8	0.95	2.0
6	Multipole 		306	03	0.35	–	30	–	0.7	0.95	1.5

Note: ¹⁾ Test voltage measured according to IEC 60512-2 test 4a standard.

Housings

Ref.	Outer shell and collet nut		Latch sleeve + earthing crown		Other metallic components		Remarks	Note
	Material	Surf. treatment	Material	Surf. treatment	Material	Surf. treatment		
C	brass	chrome	brass/bronze	nickel	brass	nickel	for multipole and coaxial	●
S	stainless steel	–	brass/bronze	nickel	brass	nickel	for multipole and coaxial	○

Note: detailed characteristics of these materials and treatments are presented in the Unipole-Multipole catalogue.

● First choice alternative ○ Special order alternative

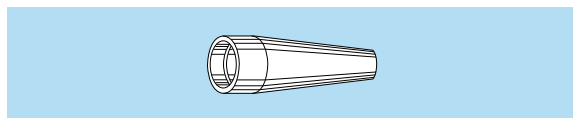
Contacts

Ref.	Contact type	Remarks
A	Male solder	For multipole and coaxial
C	Male crimp	For coaxial

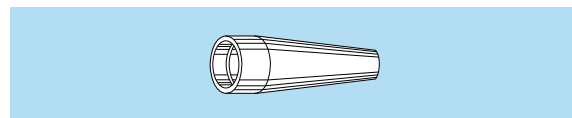
Ref.	Contact type	Remarks
L	Female solder	For multipole or coaxial type sockets

Variant

Bend relief for models with collet (need to be ordered)



Collet type	Need to be ordered separately	Dimensions (mm)	
		Cable ø	
		min.	max.
C	GMA.00.012.DG	1.1	1.4
	GMA.00.018.DG	1.8	2.1
	GMB.00.025.DG	2.5	2.8
	GMB.00.028.DG	2.8	3.1
	GMD.00.025.DG	2.5	2.8
	GMD.00.028.DG	2.8	3.1



Collet type	Need to be ordered separately	Dimensions (mm)	
		Cable ø	
		min.	max.
K	GMA.0B.030.DG	3.0	3.4
	GMA.0B.035.DG	3.5	3.9
	GMA.0B.040.DG	4.0	4.4
	GMA.0B.045.DG	4.5	5.2

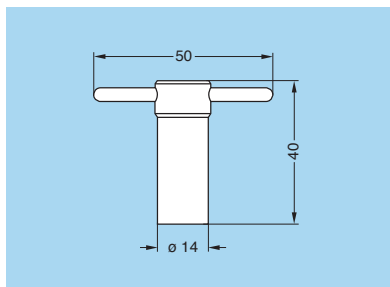
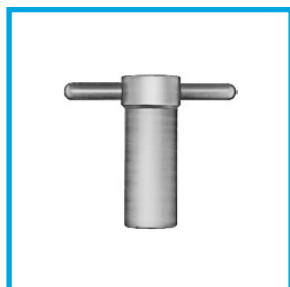
Note: The «GMD» are thin bend reliefs (for very flexible cables).
The last letter «G» of the part number indicates the grey colour of the bend relief.

Accessories

For accessories and tooling, please contact us.

Tooling

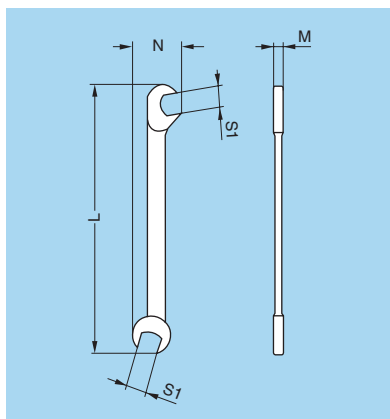
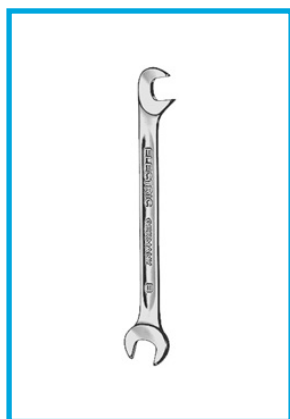
DCG Spanner for hexagonal nut



Part number	Part number of the nut
DCG.91.149.0TN	GEA.00.240.LN

● Material: Blackened steel

DCP Flat spanners for collet nut



Part number	Dimensions			
	L	M	N	S1
DCP.99.045.TC	70	2	10.5	4.5
DCP.99.050.TC	78	2	12.6	5.0
DCP.99.055.TC	78	2	12.6	5.5
DCP.99.060.TC	78	2	12.6	6.0

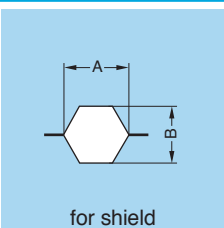
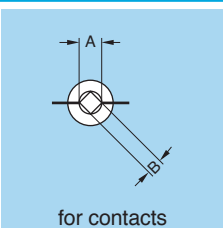
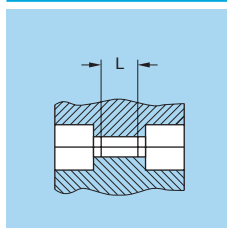
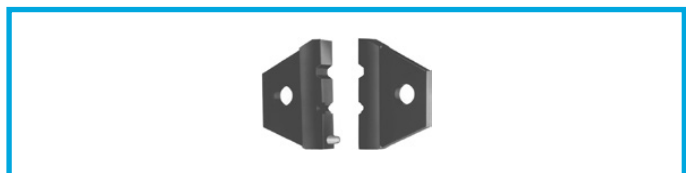
● Material: Chrome-plated steel

DPE Crimping tool with die (coaxial connectors)



Part number	Cable group
DPE.99.123.1K	1
DPE.99.123.8K	2-3-4

DPN Dies



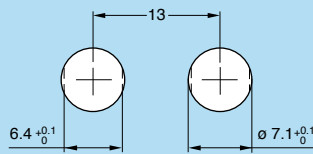
Part number	Cable group	Die dimension					
		For contacts			For shield		
		A	B	L	A	B	
DPN.99.123.1K	1	1.29	0.91	2.0	3.10	2.70	
DPN.99.123.8K	2-3-4	1.29	0.91	2.0	3.80	3.30	

● Dies material: Blackened steel

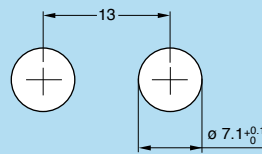
Panel cut-outs

Panel Cut-outs

HWG



HRG, HTG, HVG,
HVP, HVR



Mounting nuts torque

Component	Torque (Nm)
Retaining nut	0.25
Hexagonal nut	2.00
Coupling nut	2.00

1N = 0.102 kg

Cable assembly

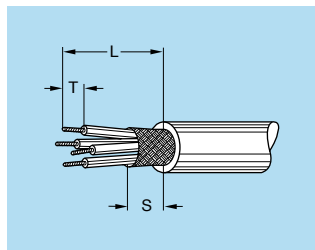
Assembly instructions

In order to ensure the sealing of plugs and sockets on the cable side, it is imperatively necessary to complete their assembly by realizing it with an adapted technique.

We recommend the fitting of an heatshrink boot with inner melting coating of type ATUM (manufactured by the RAYCHEM company) or similar.

This heatshrink boot is not provided with the connector. Please consult us.

Cable stripping lengths



Connector		ø contact A (mm)	Cable stripping lengths (mm)		
Series	Type		L	S	T
03	250	0.7	6	2.5	3
	302/303/304	0.5	6	2.5	3
	302/303/304 ¹⁾	0.5	13.5	–	2.5

Note: the tolerances on these dimensions are:
L: ± 0.5 mm; S: ± 0.5 mm; T: ± 0.2 mm.

¹⁾ for FVG model with cable crimping.

Recommended coaxial cables

Recommended cables for coaxial types

Cable group	Standard			Reference	Imp. (Ω)
	MIL-C-17	IEC 96-2	CCTU 10-01A		
3	RG.174 A/U	50.2.1	KX 3A	CCX.50.RG1.74AU27N	50 ± 2 Ω
			KX 38	CCX.50.RG1.74U25N	
1	RG.178 B/U	50.1.1	KX 21A	CCX.50.RG1.78BU18M	50 ± 2 Ω
4	RG.188 A/U	50.2.3		CCX.50.RG1.88AU24B	50 ± 2 Ω
1	RG.196 A/U	50.1.2		CCX.50.RG1.96AU20B	50 ± 2 Ω
4	RG.316 /U	50.2.2	KX 22A	CCX.50.RG3.16BU26M	50 ± 2 Ω

Product safety notice

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

1. SHOCK AND FIRE HAZARD

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

2. HANDLING

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


3. USE


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

4. TEST AND OPERATING VOLTAGES

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

5. CE MARKING

CE marking  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.**

6. PRODUCT IMPROVEMENTS

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

7. **WARNING (Prop 65 State of California)**

Proposition 65 requires businesses to provide warnings to Californians about significant exposures to chemicals that cause cancer, birth defects or other reproductive harm. LEMO products are exempt from proposition 65 warnings because they are manufactured, marketed, and sold solely for commercial and industrial use. For further information, please visit <https://www.lemo.com/quality/LEMO-Prop-65-compliance-declaration.pdf>.

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