

High-speed Data transfer Twisted pairs connectors



Precision modular connectors to suit your application

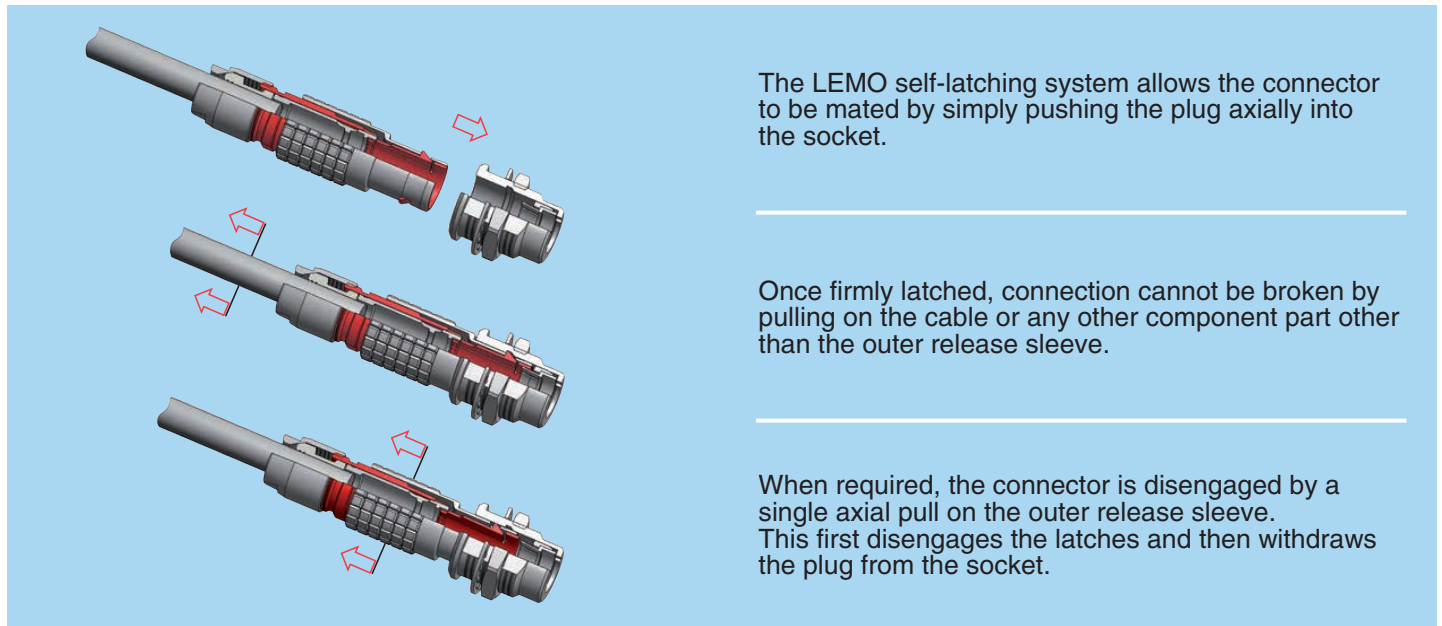
Since its creation in Switzerland in 1946 the LEMO Group has been recognized as a global leader of circular Push-Pull connectors and connectivity solutions. Today LEMO Group is active in more than 80 countries with the help of over 40 subsidiaries and distributors.

Over 90000 connectors

The modular design of the LEMO range provides over 90000 connectors from miniature $\varnothing$ 3 mm to large size $\varnothing$ 50 mm, handling cable diameters up to 30 mm and for up to 114 contacts in a single connector. 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, industrial and machinery, audio video broadcast, semi conductor, energy, telecommunications, motorsport, security and defence.

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

Product safety notice & disclaimers

Please read and follow all instructions specified on the last page or on our [website](#) 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.

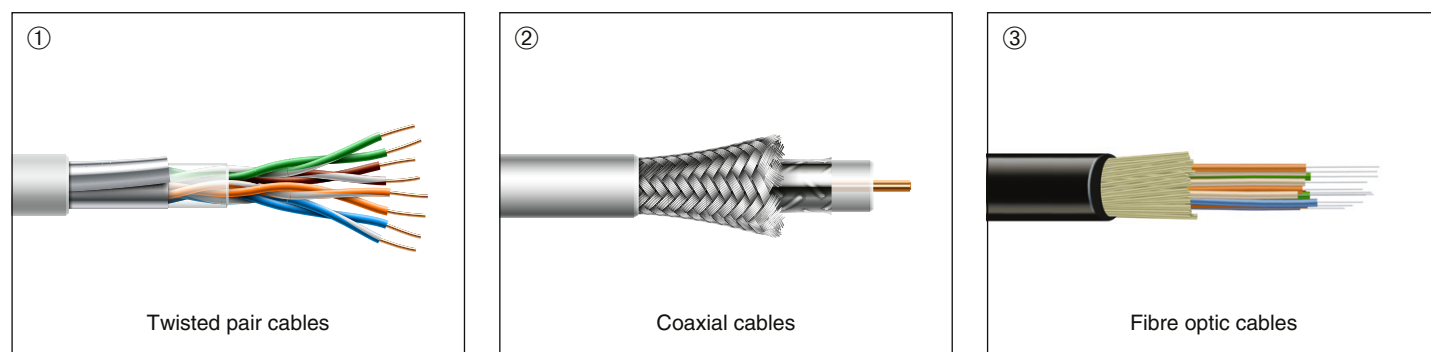
LEMO products and services are provided "as is." LEMO makes no warranties or representations with regard to LEMO product & services or use of them, express, implied or statutory, including for accuracy, completeness, or security.

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.

High-speed data transfer introduction

Equipped with more and more sensors, objects, vehicles and machines are more and more communicating with each other and with the outside world thanks to the emergence of the Internet of Things (IoT). The reliable transfer of more and more data in the shortest possible time is becoming increasingly important.

High-speed data transfer can be achieved with different cable technologies, mainly twisted pairs ①, coaxial ② and fibre optic ③ cables. Environmental conditions, distance, cost and application are key decision criteria to select the appropriate cable technology; twisted pairs being by far the most commonly used one.



Data protocols such as Ethernet, USB, are providing the normative framework defining key parameters of the data transmission channel (e.g. Insertion Loss, Return Loss, Crosstalk, Noise). Specific limits to these parameters are defined for each element / component of a transmission line (connector, cable, cable lengths etc...). This ultimately ensures that, when parameters are respected, the transmission line can perform to its maximum specified data transfer speed (in Mb/s or Gb/s).

Over time connector designs have been standardized for each data transmission protocol (e.g. RJ45, USB 2.0 Type A, etc.). These standard connectors are widely used in many applications but are often not robust and durable enough when subjected to demanding conditions. LEMO recognized this gap and developed specific inserts matching the electrical parameters required by the various high-speed norms, while leveraging its high quality and environmental resistant optimized housing designs.

Over the years data transfer protocols have continually progressed in speed, security and quality to meet evolving network requirements. LEMO has been providing reliable high-speed proprietary connectors for twisted pairs since early 2000s complying with the various evolutions of both Ethernet and USB protocols. Many of these connectors are included in this catalogue, but LEMO is also providing custom high-speed solutions, combining high-speed data transfer with other signal or power requirements. LEMO also has a broad range of connectors for coaxial and fiber optics cables, though not included in this catalogue.

Cable assembly High-speed

While connectors are playing a key role in securing data integrity and transfer speed, related cables also must comply to the same protocols, and last but not least cable assembly have to be properly executed. Interconnect solutions should then be tested and certified to guarantee full compliancy. LEMO is fully equipped to perform all these steps including performance testing and can thus provide full end to end solutions.



LEMO High-speed data transfer connectors

USB 			
USB 2.0			USB 3.2
304	307	U2A	U32
			
Series	B, D, K, T, W		M
Sizes	0 & 1	0	L
Insert configuration	Proprietary interface		Type A
Maximum data transfer speed	480 Mb/s		
Contacts	–		
	1 High speed pair		
	2 Low Voltage	5 Low Voltage	2 Low Voltage

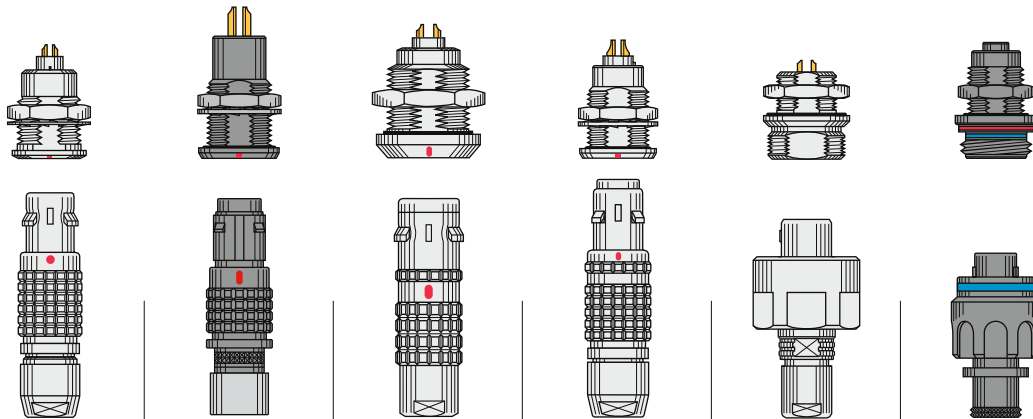
Ethernet 					
1000 Base-T1	1000 Base-T4	2.5G Base-T1	5G Base-T4	10G Base-T1	10G Base-T4
512 (2x SPE)	308	511 (SPE)	514	511 (SPE)	514
					
Series	B, D, T	B, D, T	M	M	B, D, T
Sizes	1	1	0	2	0
IEEE standard	IEEE 802.3bp	IEEE 802.3ab	IEEE 802.3ch	IEEE 802.3ab	IEEE 802.3ch
Maximum data transfer speed	1 Gb/s ¹⁾	1 Gb/s	2.5 Gb/s	5 Gb/s	10 Gb/s
Number of twisted pairs	2	4	1	4	1
Cable specification	SPE	CAT 5e	SPE	CAT 6	SPE

Note: ¹⁾ up to 10 Gb/s per twisted pair when used individually (not simultaneously).

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Technical characteristics

																	
Series	B			D		K	T			W			M				
Sizes	0 1 2			0 1		0 1 2	0 1 2			0 1 2			0 2 L				
Plug ø (mm)	9.5 12.0 15.0			9.5 12.0		11.0 13.0 16.0			9.5 12.0 15.0			17.2 19.3 23.5			14.4 18.9 29.4		
Socket ø (mm)	12.5 16.0 20.0			12.0 15.5		18.0 20.0 25.0			12.0 16.0 20.0			16.2 19.5 22.5			12.7 17.2 28.0		
Shell material	Stainless steel or brass			Brass		Stainless steel or brass									Aluminium or brass		
Shell plating	Chrome or black chrome			Anthracite nickel		Chrome or black chrome						Chrome			Anthracite nickel or chrome		
Insulator material	PEEK / FEP																
Male contact material	Brass																
Female contact material	Bronze or Cu-Be																
Locking mechanism	Push-Pull									Screw locking			Ratchet 3/4 turn locking				
Mating cycles	> 5000						> 3000			> 1000			> 3000				
Operating temperatures (Standard)	-55°C to 250°C			–		-55°C to 200°C						-20°C to 200°C			-55°C to 200°C		
Operating temperature (Watertight or vacuumtight)	-20°C to 80°C			-55°C to 150°C		-20°C to 80°C									-20°C to 80°C		
Ingress protection (mated)	IP50 (vacuumtight socket available)			IP68		IP66 to IP68						IP68 30 bars			IP68		
Environment	Indoor			Outdoor or harsh environment													

Electrical performance

Characteristics	B, D, K, T, W Series	M Series
Data protocols / Standard	USB 2.0 / USB 3.2 / Eth Cat6a / SPE	USB 2.0 / Eth Cat6
Test voltage / Rated current	See tables pages 9, 12, 15, 19, 24, 27, 29, 34 and 39	

Note: to take advantage of the increased bandwidth the data protocols provide, all components must be compatible with the respective data protocol. The bandwidth performance is determined by the lowest rated component, i.e. wiring an Ethernet 10000 Base T4 connector to a CAT 5 cable will only provide a data speed of 1 Gb/s.

For more detailed technical characteristics, please contact LEMO or refer to the following catalogues:

- https://www.lemo.com/catalog/ROW/UK_English/BKT_series.pdf
- https://www.lemo.com/catalog/ROW/UK_English/D_series.pdf
- https://www.lemo.com/catalog/ROW/UK_English/W_series_en.pdf
- https://www.lemo.com/catalog/ROW/UK_English/M_series.pdf



(304)

High-speed USB 2.0 (480 Mb/s)

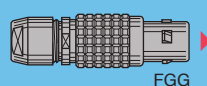
(307)



Each protocol requires a specific design rules for the connector. For instance, the LEMO connectors have a specific insert configurations that deliver USB 2.0 speeds (up to 480 Mb/s). The proprietary 4 pins interface allow to reduce the size of the physical connector while delivering the data speed demanded by several markets.

0B-1B Series models

Straight plug

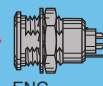


FGG

Sockets

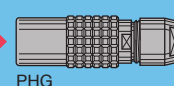


EAG



ENG

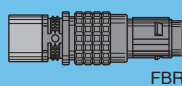
Free cable socket



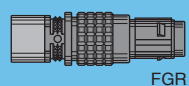
PHG

0D-1D Series models

Straight plugs

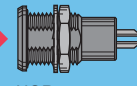


FBR

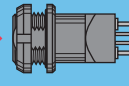


FGR

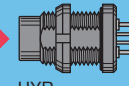
Sockets



HGR

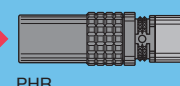


HXR



HYR

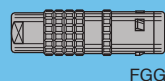
Free cable socket



PHR

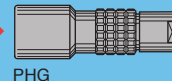
0K-1K Series models

Straight plug



FGG

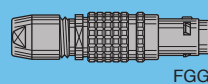
Free cable socket



PHG

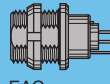
0T-1T Series models

Straight plug



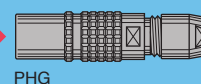
FGG

Socket



EAG

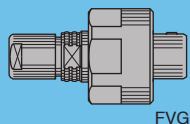
Free cable socket



PHG

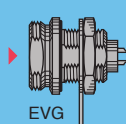
0W-1W Series models

Straight plug



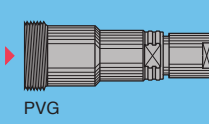
FVG

Socket



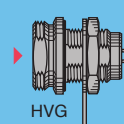
EVG

Free cable socket



PVG

Vacuumtight socket



HVG

Model description

EAG Socket with earthing tag, nut fixing, key (G) (back panel mounting)

ENG Socket with earthing tag, nut fixing, key (G)

EVG Socket with earthing washer, nut fixing, key (G)

FBR Straight plug, break-away latching, key (R), for overmolding

FGG Straight plug, key (G), cable collet

FGR Straight plug, push-pull latching, key (R), for overmolding

FVG Straight plug, key (G), cable collet

HGR Socket, nut fixing, key (R) (front panel mounting)

HVG Socket with earthing washer, nut fixing, key (G), vacuumtight

HXR Socket, nut fixing, key (R), for printed circuit (back panel mounting)

HYR Socket, nut fixing, key (R), for printed circuit (back panel mounting)

PHG Free cable socket, key (G), cable collet

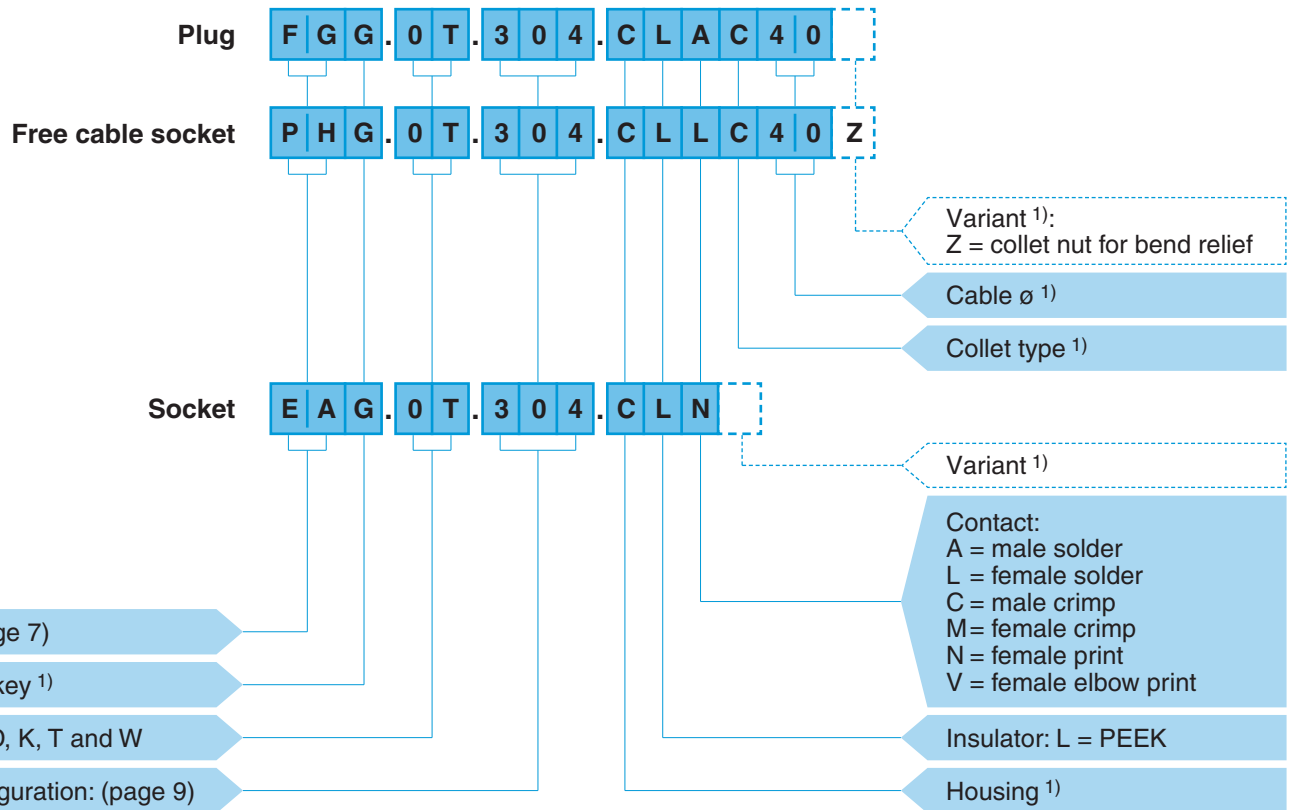
PHR Free cable socket, key (R), for overmolding

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

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See BKT series, D series and W series catalogues for connectors dimensions.

Part numbering system

Part numbering system (e.g. 0T series)



FGG.0T.304.CLAC40 = straight plug with key (G) and cable collet, 0T Series, USB 2.0 type, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, C type collet for 4.0 mm diameter cable.

PHG.0T.304.CLLC40Z = free cable socket with key (G) and cable collet, 0T Series, USB 2.0 type, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, C type collet for 4.0 mm diameter cable and nut for fitting a bend relief.

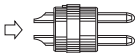
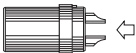
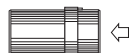
EAG.0T.304.CLN = socket, nut fixing, with key (G), 0T Series, USB 2.0 type, outer shell in chrome-plated brass, PEEK insulator, female print contacts.

Note: ¹⁾ see BKT series, D series and W series catalogues for alternatives.



Insert configuration

USB 2.0

Solder contacts    Crimp contacts   		Reference	Series	Protocol	Max data transfer speed	Contact ø (mm)	Contact type				AWG			Test voltage (kV DC) ¹⁾ Contact-contact (solder)	Test voltage (kV DC) ¹⁾ Contact-contact (crimp)	Rated current (A) ¹⁾
							Solder	Crimp	Print (straight)	Print (elbow)	Solder (max.)	Crimp				
												min.	max.			
		304	0B-0D 0K-0T 0W	USB 2.0	480 Mb/s	0.7	●	●	●	●	22	32	22	0.60	0.95	7.0
			1B-1D 1K-1T 1W	USB 2.0	480 Mb/s	0.9	●	●	●	●	22	32	20	0.95	1.20	10.0
		307 ³⁾	0B-0D 0K-0T 0W	USB 2.0	480 Mb/s	5x0.5 2x0.7	●	—	●	—	28 22	—	—	1.10	—	0.5 8.0

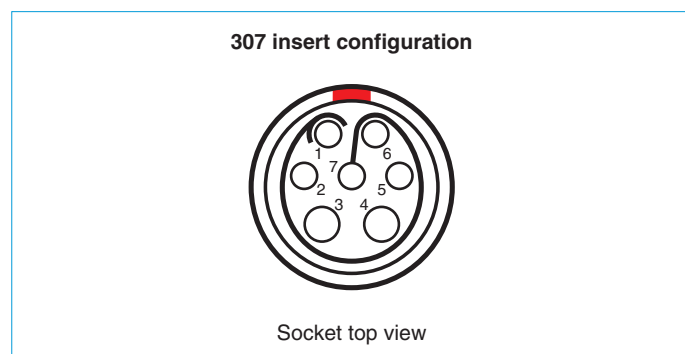
Note:

¹⁾ see calculation method, caution and suggested standard on BKT series catalogue.

²⁾ test voltage (kV) contact-shell is slightly lower for T series (values here are for B series).

³⁾ configuration not available with keying F for 0B series.

USB 2.0 recommended layout for Nett Warrior / STANAG 4695 protocol compatibility

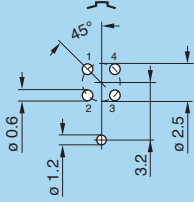


Pin ID	Power ports	PAN / EUD ports
1	USB- / SM Bus Clock	USB-
2	Not connected	CC line
3	Power (10-20 VDC, 10A peak)	Power (10-20 VDC, 10A peak)
4	Ground	Ground
5	Power (5 VDC)	Power (5 VDC)
6	USB+ / SM Bus Data	USB+
7	NC / USB drain wire / Ground	NC / USB drain wire / Ground

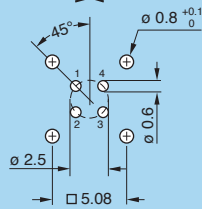
PCB drilling pattern

Socket with straight print contact

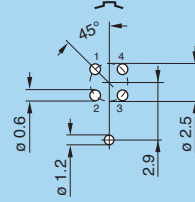
0B.304 (EA●)



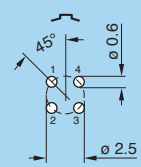
0D.304 (HX●/HY●)



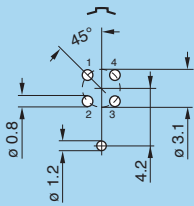
0T.304 (EA●)



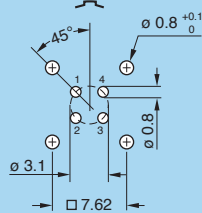
0W.304 (HV●)



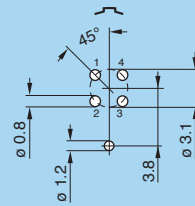
1B.304 (EA●)



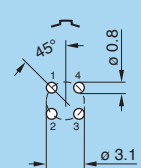
1D.304 (HX●/HY●)



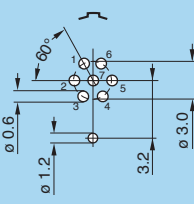
1T.304 (EA●)



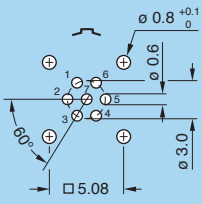
1W.304 (HV●)



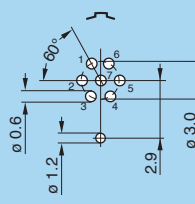
0B.307 (EA●)



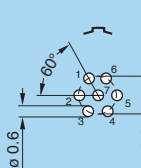
0D.307 (HX●/HY●)



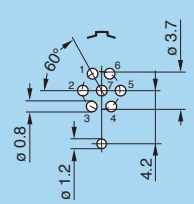
0T.307 (EA●)



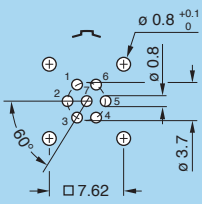
0W.307 (HV●)



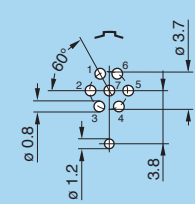
1B.307 (EA●)



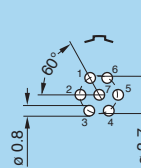
1D.307 (HX●/HY●)



1T.307 (EA●)



1W.307 (HV●)



Note: contact numbering is for female contact version only.

High-speed USB 2.0 (480 Mb/s)

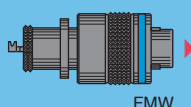
(U2A)



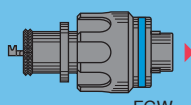
A USB type A connector encapsulated into a ratchet coupling M series product offers a robust solution for harsh environments meeting the IP68 rating when mated. This connector is designed for outdoor utilization in Defense, Oil & Gas or Automotive industries to name a few, essential applications requiring a standard USB interface in a protective casing. The complete product line includes straight plugs, panel mounted sockets and watertight caps.

LM Series models

Straight plugs

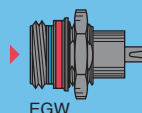


FMW

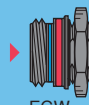


FGW

Sockets



EGW



EGW

Model description

EGW Socket, female to female, nut fixing, key (W)

EGW Socket, nut fixing, key (W)

FMW Straight plug, key (W) with knurled grip and mold stop

FGW Straight plug, key (W) with arctic grip and mold stop

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See M series catalogue for connectors dimensions.

Plug

F	M	W	L	M	U	2	A	X	P	A	T
---	---	---	---	---	---	---	---	---	---	---	---

Socket

E	G	W	L	M	U	2	A	X	P	L
---	---	---	---	---	---	---	---	---	---	---

Model: (page 11)

Alignment key: W

Series: M

Insert configuration: (page 12)

Housing:
X = Nickel-plated aluminium alloy

Backshell option:
T = Mold stop

Contact:
A = male solder
L = female solder

Insulator: P = PE

EGW.LM.U2A.XPL = socket, nut fixing, with key (W), LM series, USB 2.0 type, outer shell in anthracite nickel-plated aluminium alloy, female insert.

 Insert configuration

Male insert front view	Female insert front view	Reference	Series	Protocol	Max data transfer speed	Number of contacts	Solder contact	Test voltage (kV DC) ¹⁾ Contact-contact	Rated current (A)
		U2A	LM	USB 2.0	480 Mb/s	4		0.85	n.a.

www.lemo.com

High-speed USB 3.2 (10 Gb/s)

(U32)



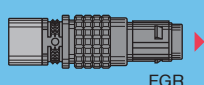
LEMO's USB 3.2 connectors are meeting the stringent requirements of the USB protocol for High-speed data transfer up to 10 Gb/s. These products are specifically designed to work in demanding environments (e.g. extreme temperature, high humidity, vibration) for applications such as industry, food processing, industrial automation, technical equipment in buildings, data communication, defence and instrumentation.

While using a proprietary interface guaranteeing high quality signal within a very robust casing, the LEMO connectors can be used in conjunction with standard USB type interfaces (e.g. Type-C) in a cable assembly.

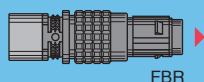
This new USB 3.2 contact configuration can be built into various LEMO product lines with metal housing, including B Series and T Series.

1D Series models

Straight plugs

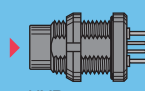


FGR

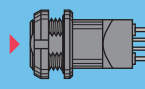


FBR

Sockets



HYR



HXR

Free cable socket



PHR

Model description

FBR Straight plug, break-away latching, key (R), for overmolding

FGR Straight plug, push-pull latching, key (R), for overmolding

HXR Socket, nut fixing, key (R), for printed circuit (back panel mounting)

HYR Socket, nut fixing, key (R), for printed circuit (back panel mounting)

PHR Free cable socket, key (R), for overmolding

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See D series catalogues for connectors dimensions.

Plug and free cable socket

Socket

Model: (page 13)

Alignment key ¹⁾

Series: D

Insert configuration: (page 15)

Housing:
Anthracite nickel-plated brass

Cable code

E = overmolded collet

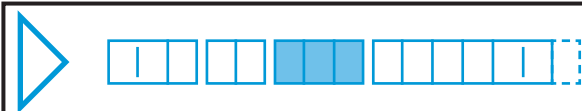
Potting: R = Silicone

Contact:
A = male solder
N = female print

Insulator: L = PEEK

HYR.1D.U32.FLNR = socket, nut fixing, with key (R), 1D series, USB 3.2, outer shell in anthracite nickel-plated brass, PEEK insulator, female print contacts, potted.

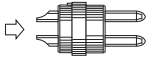
www.lemo.com



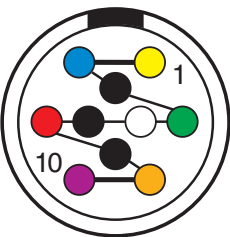
Insert configuration

USB and ethernet configuration allows high speed data transfer over twisted pair cable harnesses up to 10 Gb/s.

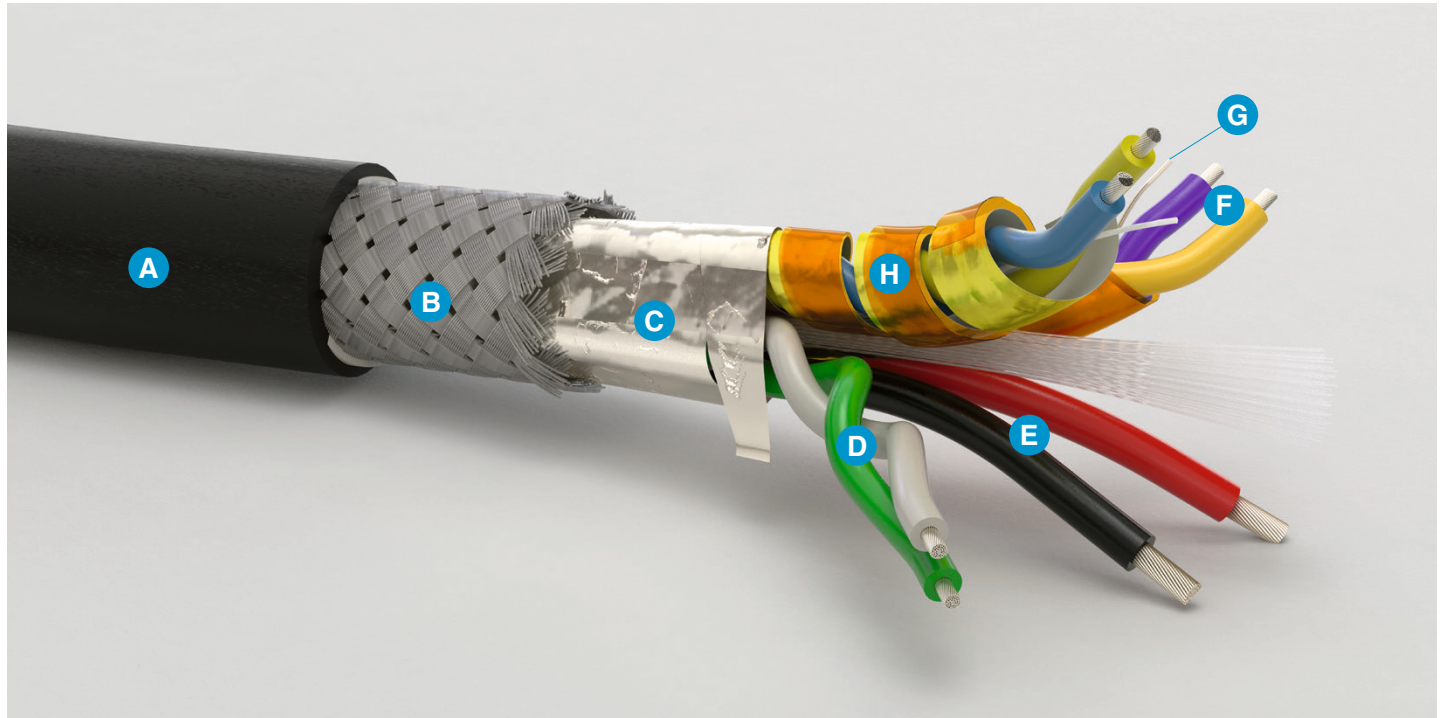
USB 3.2

Male solder contacts rear view	Reference	Series	Protocol	Max data transfer speed	Number of twisted pair	Number of contacts	Contact ø (mm)	Contact type		AWG solder (max.) ¹⁾	Test voltage (kV DC) ¹⁾ Contact-contact	Rated current (A) ¹⁾
								Solder	Print (straight)			
												
	U32	1D	USB 3.2	10 Gb/s	3	10	0.5	●	●	28	0.50	3

Note: ¹⁾ see calculation method, caution and suggested standard on BKT series catalogue.

USB Signal name	
	1) SS TX+ 2) SS TX- 3) GND 4) USB 2.0 D+ 5) USB 2.0 D- 6) VBUS GND 7) VBUS 5V (PWR) 8) GND 9) SS RX+ 10) SS RX-

Cable construction and recommended cable



A: Jacket
B: Braided shield
C: Cable foil shield

D: High-speed wires (2x)
E: Low voltage wires (PWR + GND)
F: SuperSpeed wires (4x)

G: Drain wire (2x)
H: SuperSpeed wires foil shield (mandatory)

For details on recommended USB 3.2 cables, please refer to the respective series catalogues.

The LEMO proprietary interface is compliant with the Universal Serial Bus specification 3.2 and can be used for 10 Gb/s applications with cables up to 1.5 m.

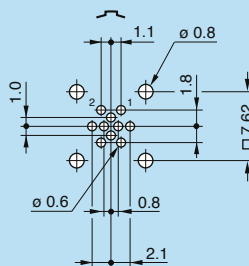
To take advantage of the increased bandwidth the data protocols provide; all components must be compatible with the respective data protocol. The bandwidth performance is determined by the lowest rated component, i.e. wiring a USB 3.2 connector to a USB 2.0 cable will only give USB 2.0 speeds.

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. LEMO is specialized in cable assemblies and is available to provide wired and certified solutions. Please don't hesitate to contact us for quotes.

PCB drilling pattern

Fixed socket with straight print contact

1D.U32 (HX●/HY●)



Note: contact numbering is for female contact version only.

Ethernet 1000 Base-T1

(512)

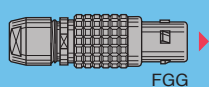


1000 Base-T1 (2 x SPE - 512)

The Ethernet 1000 Base-T1 protocol (IEEE 802.3bp standard), allows High-speed traffic over 2 pairs cable harnesses up to 1 Gb/s.

1B Series models

Straight plug



FGG

Sockets

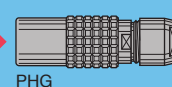


EAG



ENG

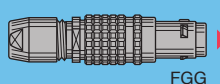
Free cable socket



PHG

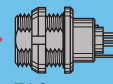
1T Series models

Straight plug

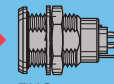


FGG

Sockets

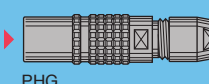


EAG



ENG

Free cable socket



PHG

Model description

EAG Socket with earthing tag, nut fixing, key (G) (back panel mounting)

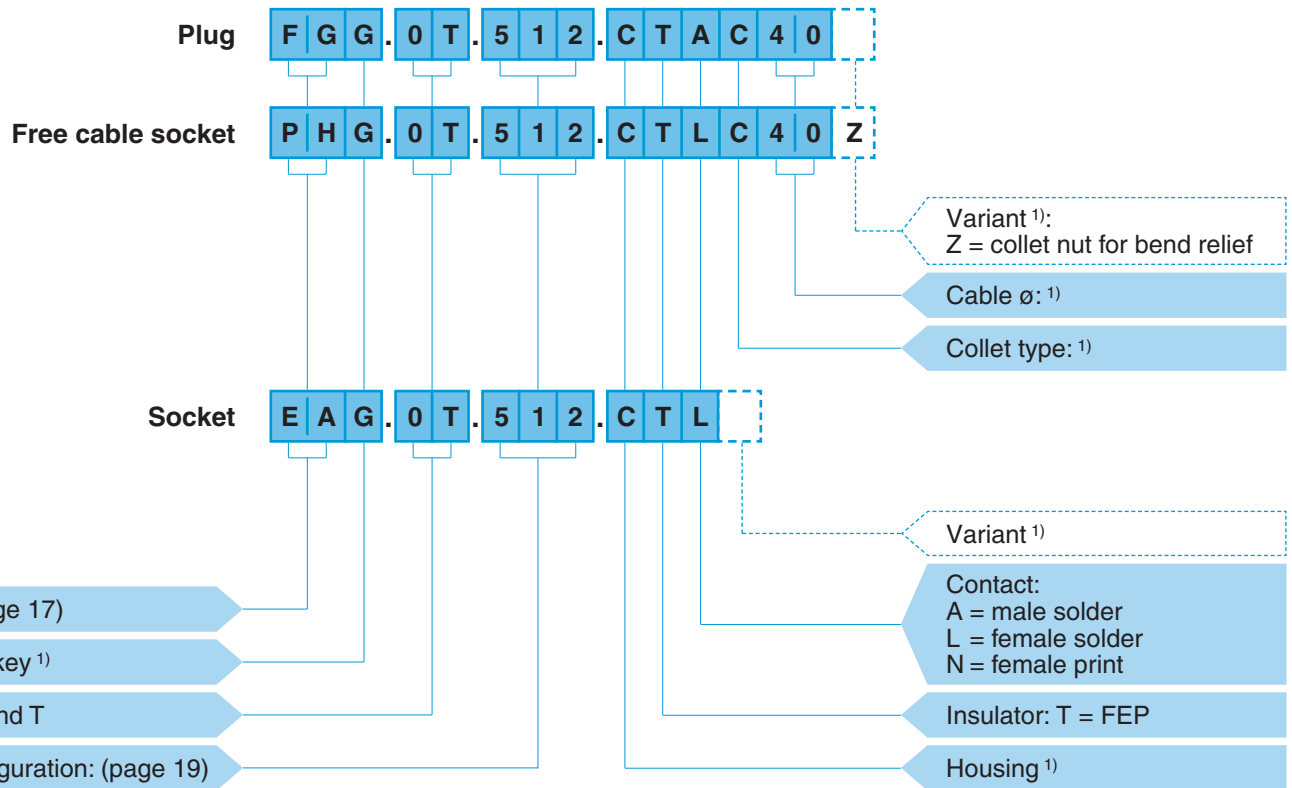
ENG Socket with earthing tag, nut fixing, key (G)
FGG Straight plug, key (G), cable collet

PHG Free cable socket, key (G), cable collet

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See BKT series catalogue for connectors dimensions.

Part numbering system

Part numbering system (e.g. 0T series)



FGG.0T.512.CTAC40 = straight plug with key (G) and cable collet, 0T Series, Ethernet type, outer shell in chrome-plated brass, FEP insulator, male solder contacts, C type collet for 4.0 mm diameter cable.

PHG.0T.512.CTLC40Z = free cable socket with key (G) and cable collet, 0T Series, Ethernet type, outer shell in chrome-plated brass, FEP insulator, female solder contacts, C type collet for 4.0 mm diameter cable and nut for fitting a bend relief.

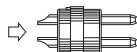
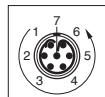
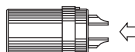
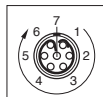
EAG.0T.512.CTL = socket, nut fixing, with key (G), 0T Series, Ethernet type, outer shell in chrome-plated brass, FEP insulator, female solder contacts.

Note: ¹⁾ see BKT series catalogue for alternatives.



Insert configuration

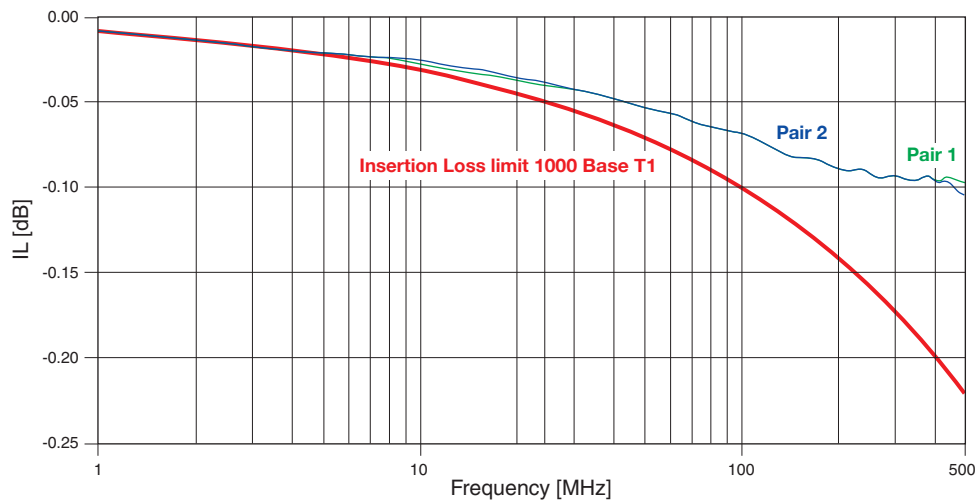
Ethernet

Male solder contacts	Female solder contacts	Reference	Series	Protocol	Max data transfer speed	Number of contacts	Contact ø (mm)	Solder contact	Print contact	AWG			Test voltage (kV DC) contact-contact	Rated current (A) ¹⁾
 	 									Wire section (mm ²)	Solder			
											min.	max.		
		512	1B-1T	1000 Base-T1	1 Gb/s ²⁾	4	0.5	●	●	0.14	30	26 ¹⁾	1.5	3

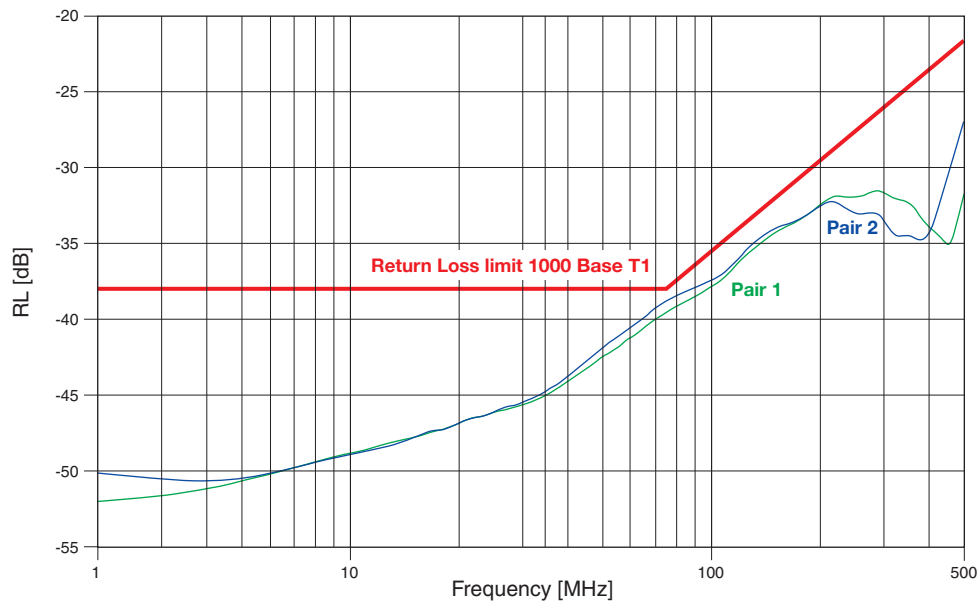
Note: ¹⁾ see calculation method, caution and suggested standard on BKT series catalogue.
 AWG 26, please check wire construction, wire section should be less than 0.14 mm².
²⁾ up to 10 Gb/s per twisted pair when used individually (not simultaneously).

Recommended cable for configuration 512: KRO.2X013.PP.SW (Kroschu).

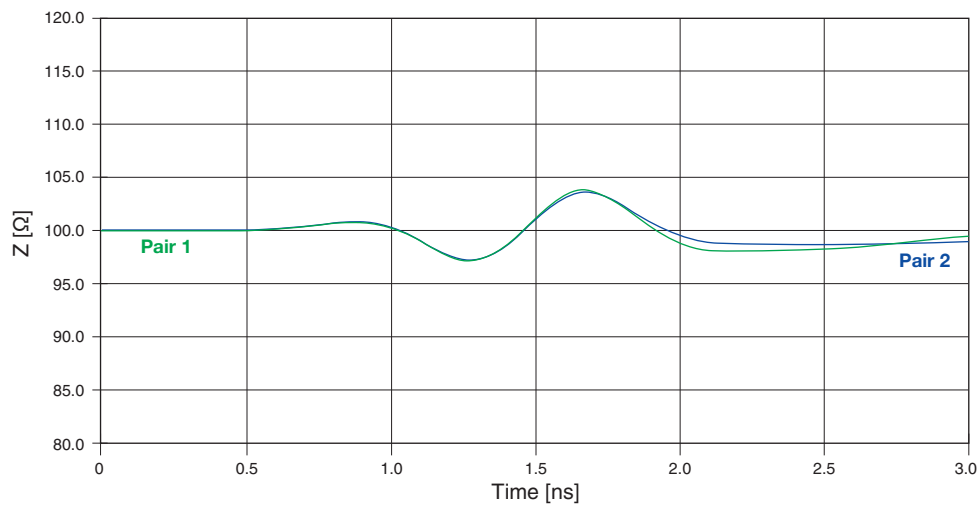
Insertion Loss 1B.512



Return Loss 1B.512



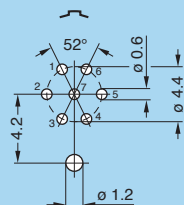
TDR Impedance 1B.512



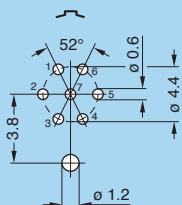
PCB drilling pattern

Socket with straight print contact

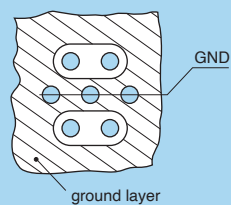
1B.512 (EA●)



1T.512 (EA●)



1B/1T.512



Note: contact numbering is for female contact version only.

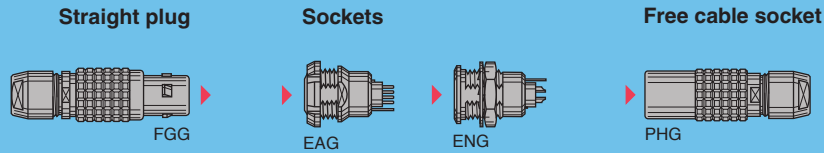
Ethernet 1000 Base-T4

(308)

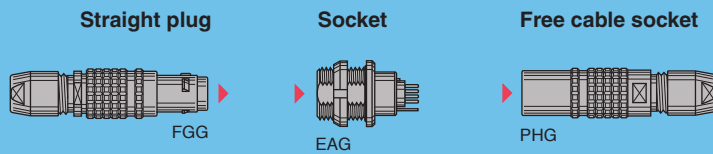


Push-Pull Ethernet 1000 Base-T4 connectors (protocol IEEE 802.3ab) enable High-speed data traffic over 4 wire pairs cable harnesses up to 1 Gb/s. They are designed to operate with CAT 5e cables. Each of the four pairs supports an effective data rate of 250 Mb/s in each direction simultaneously. In addition to the well-known latching system, the proprietary interface makes them safer and lasting longer mating cycles.

1B Series models



1T Series models



Model description

EAG Socket with earthing tag, nut fixing, key (G) (back panel mounting)

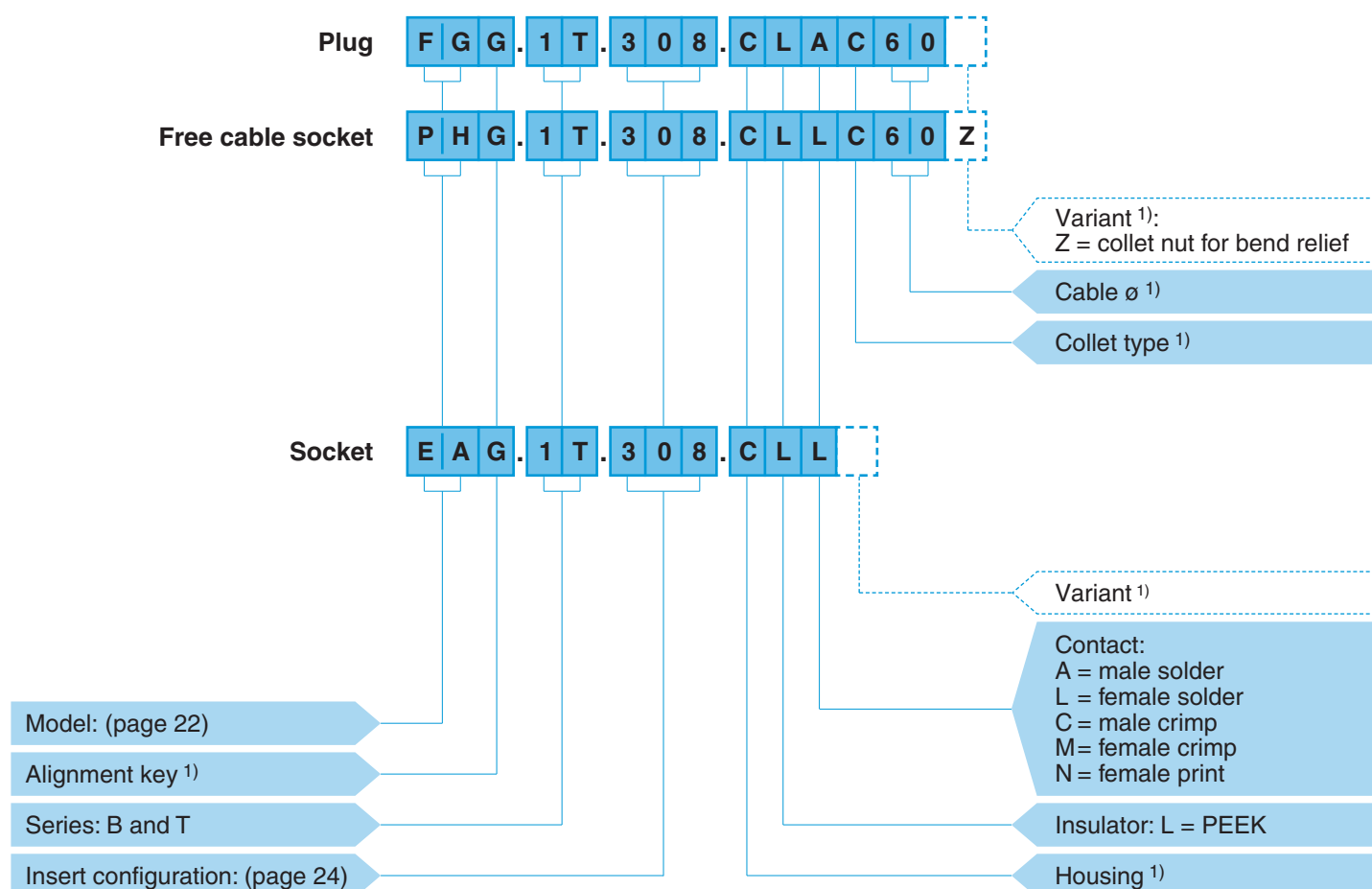
ENG Socket with earthing tag, nut fixing, key (G)
FGG Straight plug, key (G), cable collet

PHG Free cable socket, key (G), cable collet

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See BKT series catalogue for connectors dimensions.

Part numbering system

Part numbering system (e.g. 1T series)

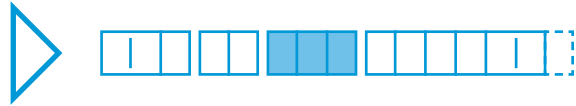


FGG.1T.308.CLAC60 = straight plug with key (G) and cable collet, 1T Series, multipole type with 8 contacts, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, C type collet for 6.0 mm diameter cable.

PHG.1T.308.CLLC60Z = free cable socket with key (G) and cable collet, 1T Series, multipole type with 8 contacts, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, C type collet for 6.0 mm diameter cable and nut for fitting a bend relief.

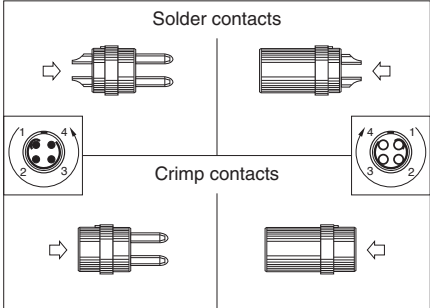
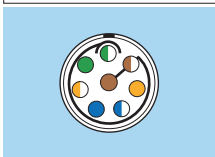
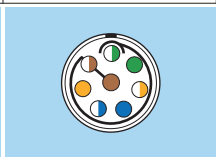
EAG.1T.308.CLL = socket, nut fixing, with key (G), 1T Series, multipole type with 8 contacts, outer shell in chrome-plated brass, PEEK insulator, female solder contacts.

Note: ¹⁾ see BKT series catalogue for alternatives.



Insert configuration

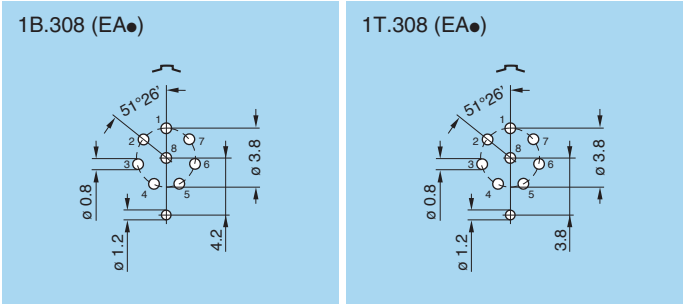
Ethernet

		Reference	Series	Protocol	Max data transfer speed	Contact ø (mm)	Contact type			AWG		Test voltage (kV DC) ¹⁾ Contact-contact (solder)	Test voltage (kV DC) ¹⁾ Contact-contact (crimp)	Rated current (A) ¹⁾	
			1B-1T	1000 Base-T4	1 Gb/s	0.7				22	Crimp				
											min.				max.
		308								22	32	22	0.67	0.92	5.0

Note: 1) see calculation method, caution and suggested standard on BKT series catalogue.
2) test voltage (kV) contact-shell is slightly lower for T series (values here are for B series).

PCB drilling pattern

Socket with straight print contact



Note: contact numbering is for female contact version only.

Ethernet 2.5G Base-T1



(511)

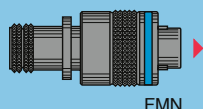


2.5G Base-T1 (SPE - 511)

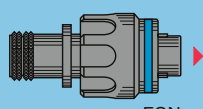
The Ethernet 2.5G Base-T1 protocol (IEEE 802.3ch standard), also better known as Single Pair Ethernet (SPE), allows high speed and bi-directional data traffic over light weight, single pair cable harnesses up to 2.5 Gb/s.

0M Series models

Straight plugs

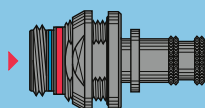


FMN



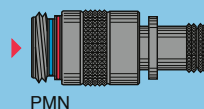
FGN

Fixed cable socket

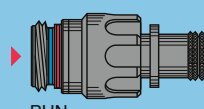


PEN

Free cable sockets

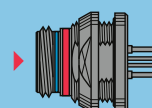


PMN



PHN

Watertight socket



HEN

Model description

FMN Straight plug, key (N) with knurled grip and mold stop

FGN Straight plug, key (N) with arctic grip and mold stop

HEN Socket, nut fixing, key (N), printed circuit, watertight (back panel mounting)

PEN Fixed cable socket, key (N) with mold stop (back panel mounting)

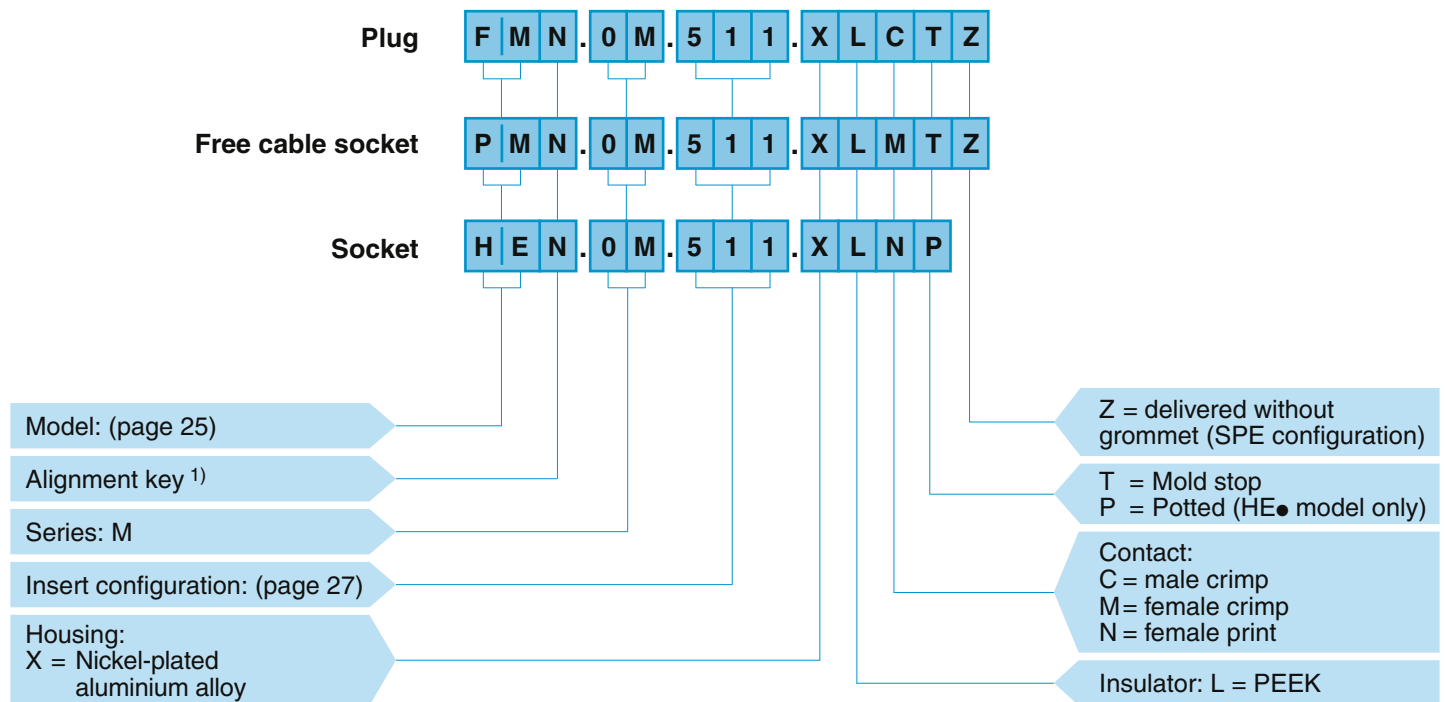
PMN Free cable socket, key (N) with knurled grip and mold stop

PHN Free cable socket, key (N) with arctic grip and mold stop

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See M series catalogue for connectors dimensions.

Part numbering system

Part numbering system (0M series)

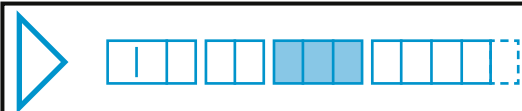


FMN.0M.511.XLCTZ = straight plug with key (N), knurled grip, 0M series, multipole type with 2 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, male crimp contacts.

PMN.0M.511.XLMTZ = free cable socket with key (N), knurled grip, 0M series, multipole type with 2 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, female crimp contacts and mold stop.

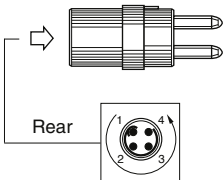
HEN.0M.511.XLNP = socket, nut fixing, with key (N), 0M series, multipole type with 2 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, female print contacts, watertight.

Note: ¹⁾ see M series catalogue for alternatives.



Insert configuration

High Speed

 Male insert Rear	Reference	Series	Protocol	Max data transfer speed	Number of twisted pair	Number of contacts	Contact ø (mm)	Crimp contact	Print (straight)	AWG	Test voltage (kV DC) ¹⁾ Contact-contact	Rated current (A) ²⁾
 PoDL⁴⁾	511 ³⁾	0M	2.5G base-T1	2.5 Gb/s	1	2	0.7	●	●	22-24-26	1.90	9

Note:

¹⁾ test voltage according to IEC 60512-4-1 test 4a. Altitude correction factor is given in IEC 60664-1 § 6.8.

²⁾ the specified rated current can be applied simultaneously to all the contacts. It corresponds to an average temperature rise of 40°C of the connector (measured according to IEC 60512-5-1 test 5a).

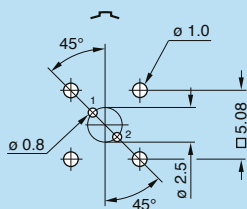
³⁾ plug and free cable socket are delivered without grommet for SI reason.

⁴⁾ Power over Data Line up to 50W according standard 802.3bu.

PCB drilling pattern

Socket with straight print contact

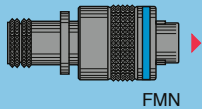
HE●.0M.511



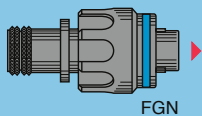
These High-speed connectors meets Category 6 cable specifications (protocol IEEE 802.3ab) up 5 Gigabit Ethernet transmission up to 100 m. They are specifically designed to work in harsh environments, i.e. extreme temperatures, humidity and vibrations. The ratchet coupling M series offers a reliable solution in Defense applications such as data & ground forces tactical communications.

2M Series models

Straight plugs

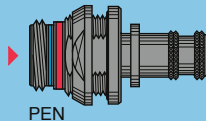


FMN



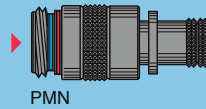
FGN

Fixed cable socket

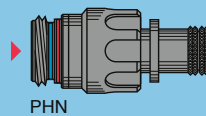


PEN

Free cable sockets

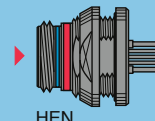


PMN



PHN

Watertight socket



HEN

Model description

FMN Straight plug, key (N) with knurled grip and mold stop

FGN Straight plug, key (N) with arctic grip and mold stop

HEN Socket, nut fixing, key (N), printed circuit, watertight (back panel mounting)

PEN Fixed cable socket, key (N) with mold stop (back panel mounting)

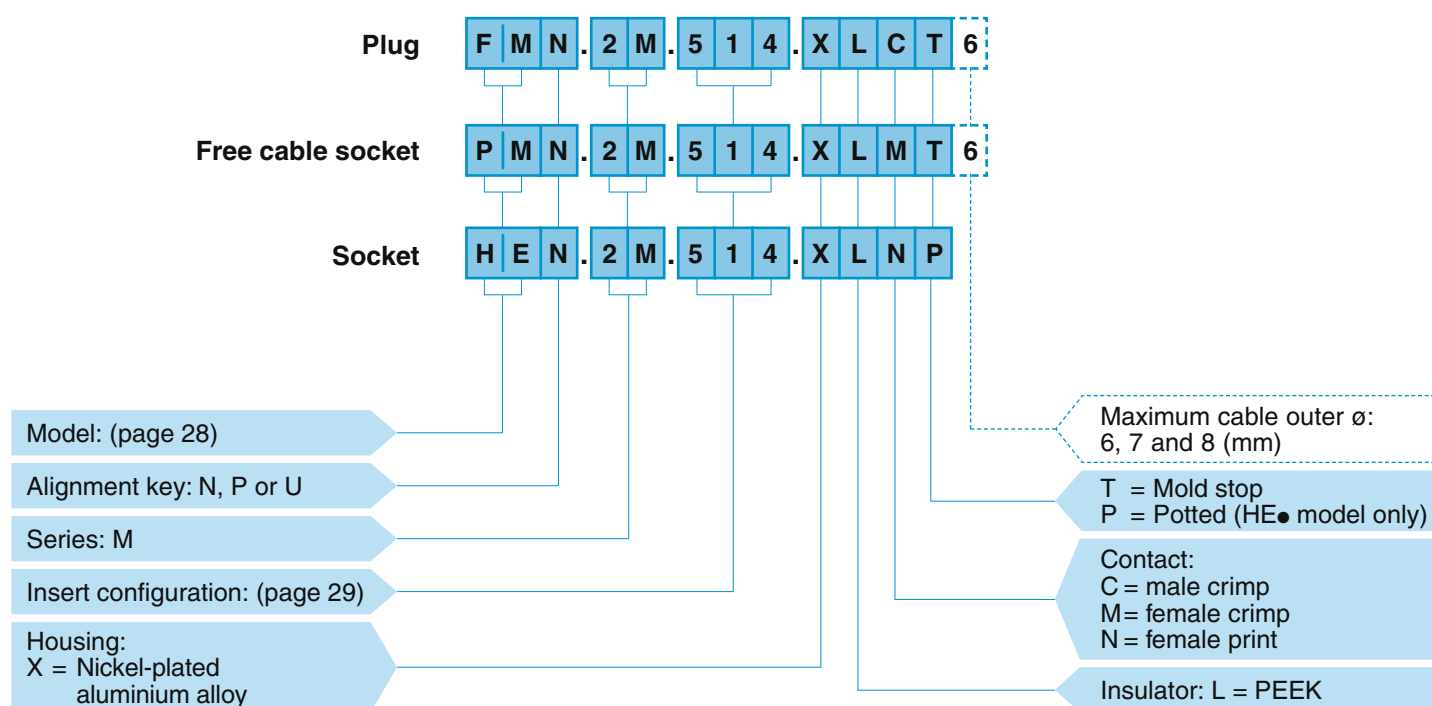
PMN Free cable socket, key (N) with knurled grip and mold stop

PHN Free cable socket, key (N) with arctic grip and mold stop

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See M series catalogue for connectors dimensions.

Part numbering system

Part numbering system (2M series)



FMN.2M.514.XLCT6 = straight plug with key (N), knurled grip, 2M series, multipole type with 8 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, male crimp contacts.

PMN.2M.514.XLMT6 = free cable socket with key (N), knurled grip, 2M series, multipole type with 8 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, female crimp contacts and mold stop.

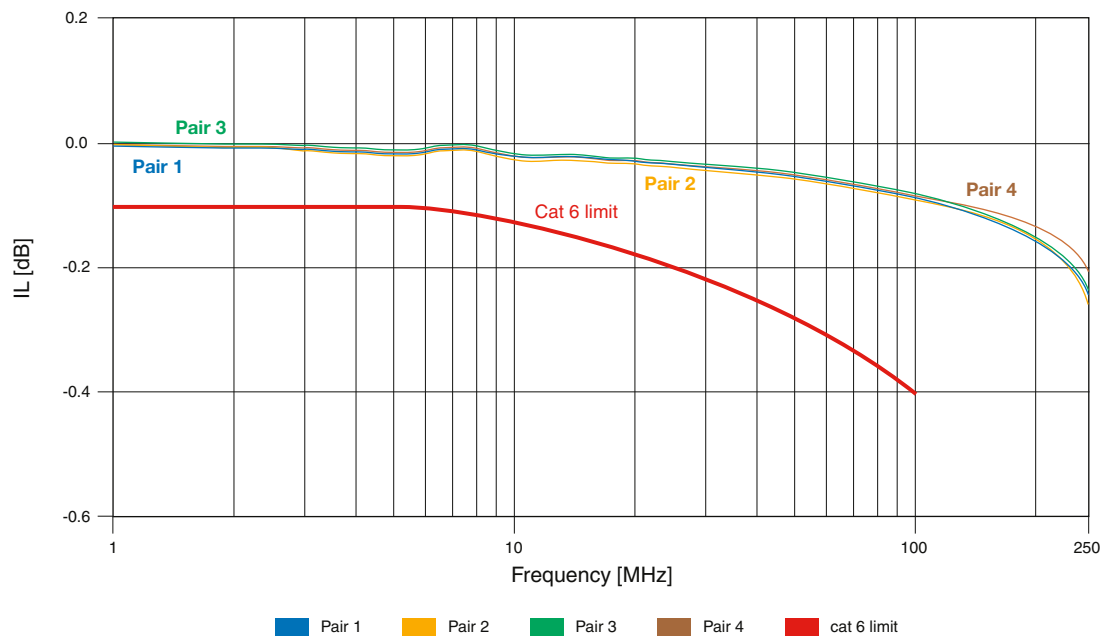
HEN.2M.514.XLNP = socket, nut fixing, with key (N), 2M series, multipole type with 8 contacts, outer shell in anthracite nickel-plated aluminium alloy, PEEK insulator, female print contacts, watertight.

Insert configuration

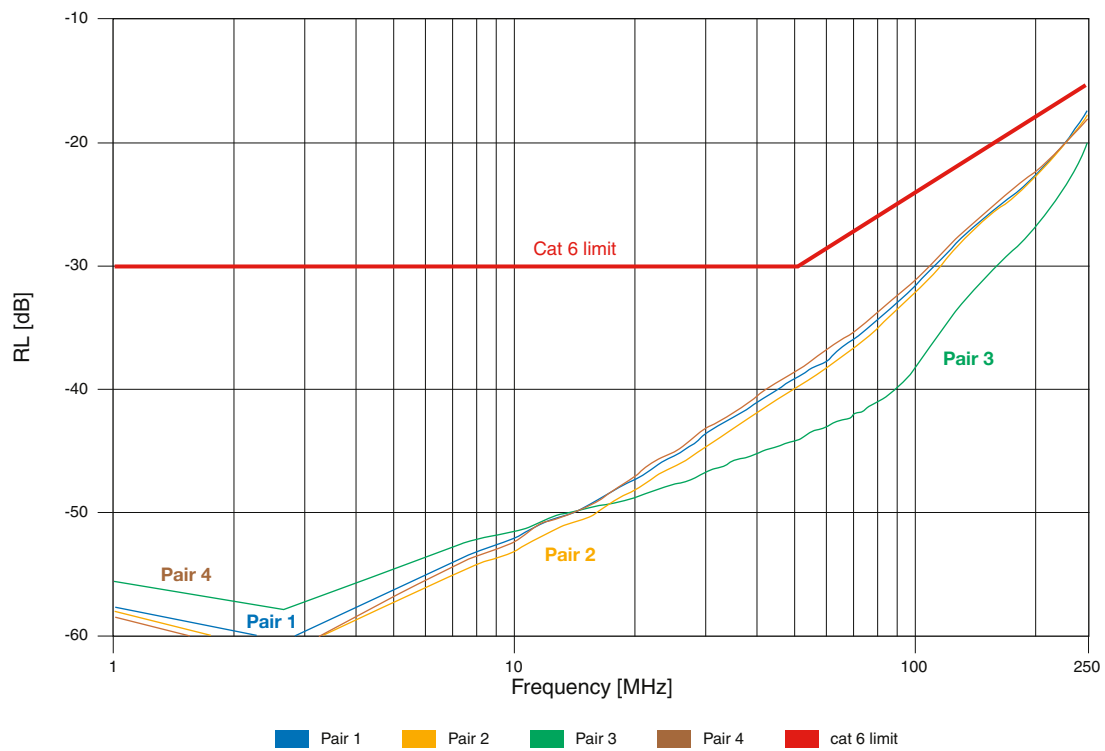
Ethernet

Male crimp contacts	Female crimp contacts	Reference	Series	Protocol	Max data transfer speed	Number of contacts	Contact $\varnothing$ (mm)	Crimp	Print	Test voltage (kV DC) Contact-contact	Rated current (A)
		514	2M	5G Base-T4	5 Gb/s	8	0.7	●	●	1.13	8

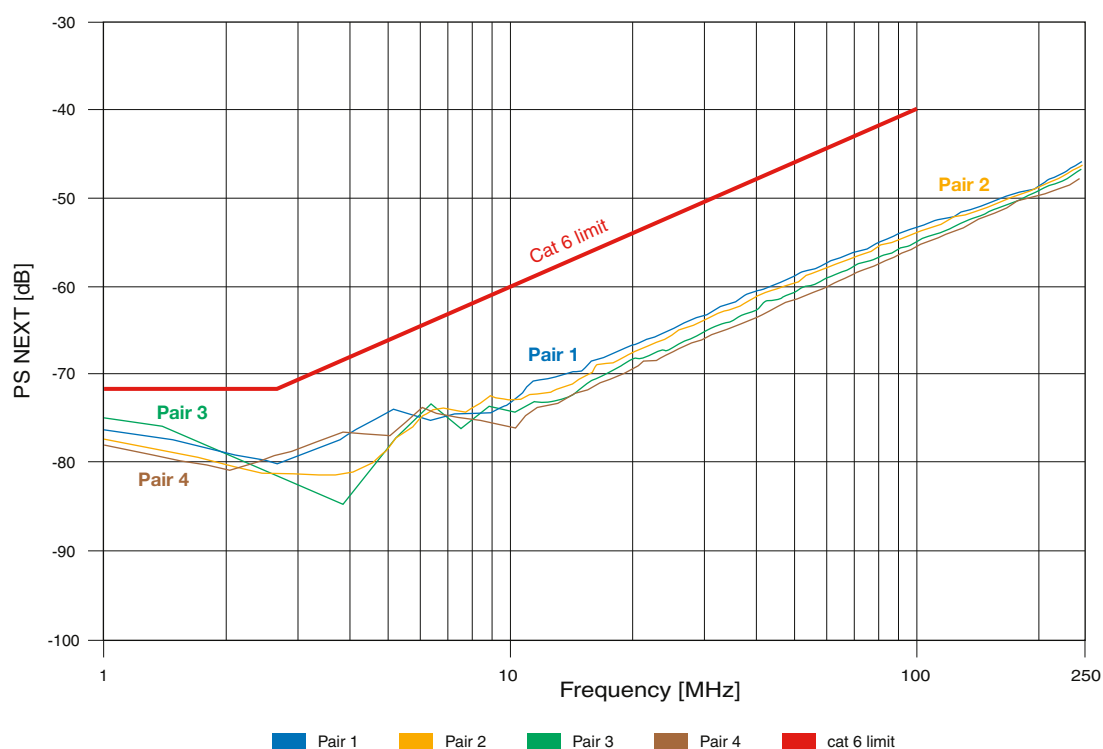
Insertion Loss 2M.514



Return Loss 2M.514



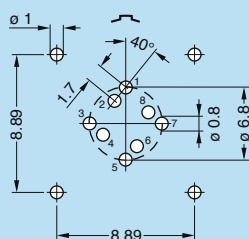
Power Sum Next (PS NEXT) 2M.514



PCB drilling pattern

Socket with straight print contact

2M.514 (HE●) (top view)



Note: contact numbering is for female contact version only.

Ethernet 10G Base-T1



(511)

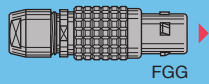


10G Base-T1 (SPE - 511)

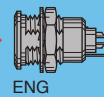
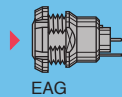
The Ethernet 10G Base-T1 protocol (IEEE 802.3ch standard), also better known as Single Pair Ethernet (SPE), allows high speed and bi-directional data traffic over light weight, single pair cable harnesses up to 10 Gb/s.

0B Series models

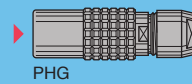
Straight plug



Sockets

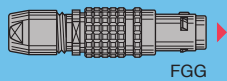


Free cable socket

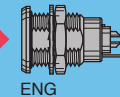
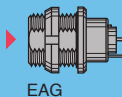


0T Series models

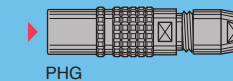
Straight plug



Sockets



Free cable socket



Model description

EAG Socket with earthing tag, nut fixing, key (G) (back panel mounting)

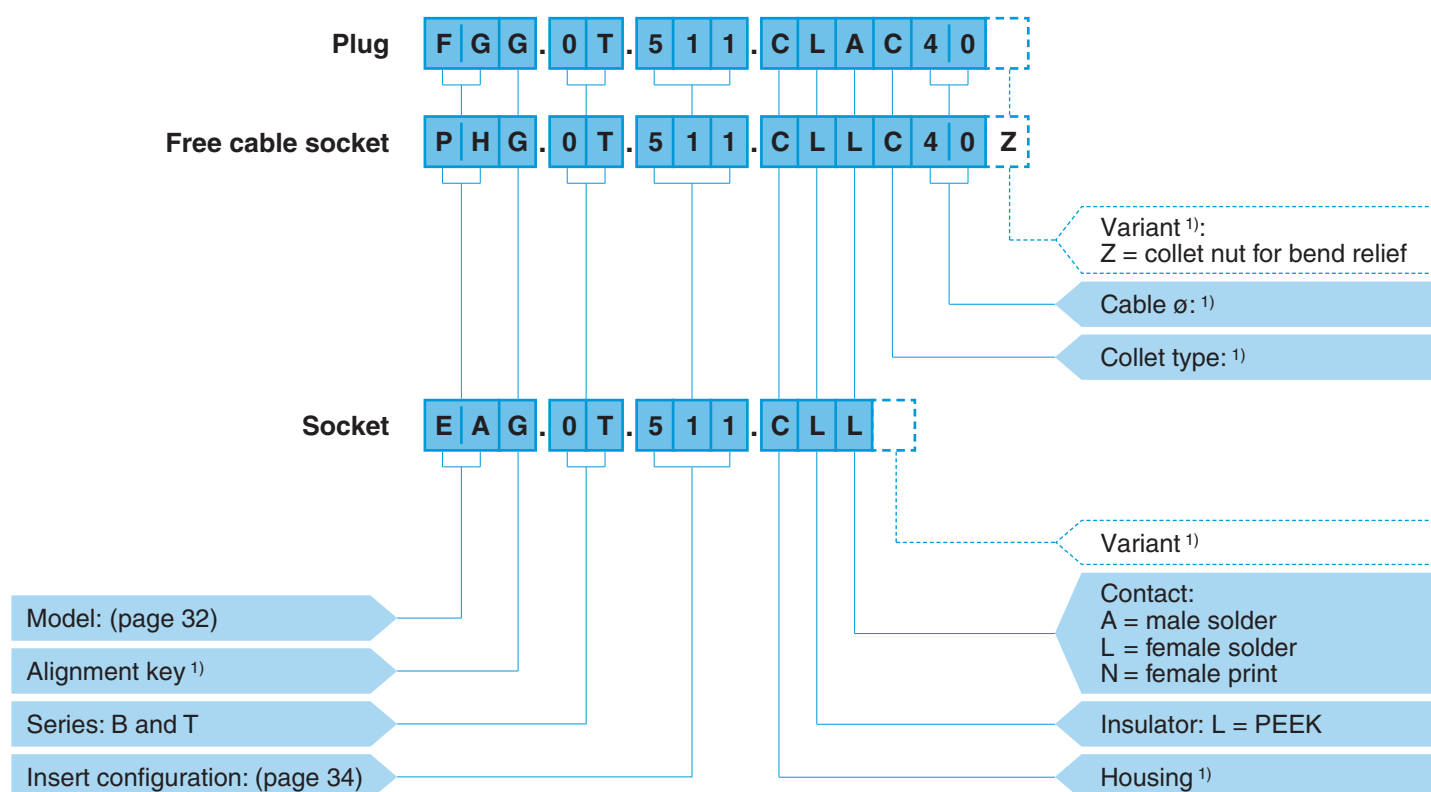
ENG Socket with earthing tag, nut fixing, key (G)
FGG Straight plug, key (G), cable collet

PHG Free cable socket, key (G), cable collet

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See BKT series catalogue for connectors dimensions.

Part numbering system

Part numbering system (e.g. 0T series)



FGG.0T.511.CLAC40 = straight plug with key (G) and cable collet, 0T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, C type collet for 4.0 mm diameter cable.

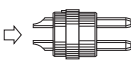
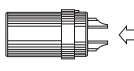
PHG.0T.511.CLLC40Z = free cable socket with key (G) and cable collet, 0T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, C type collet for 4.0 mm diameter cable and nut for fitting a bend relief.

EAG.0T.511.CLL = socket, nut fixing, with key (G), 0T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, female solder contacts.

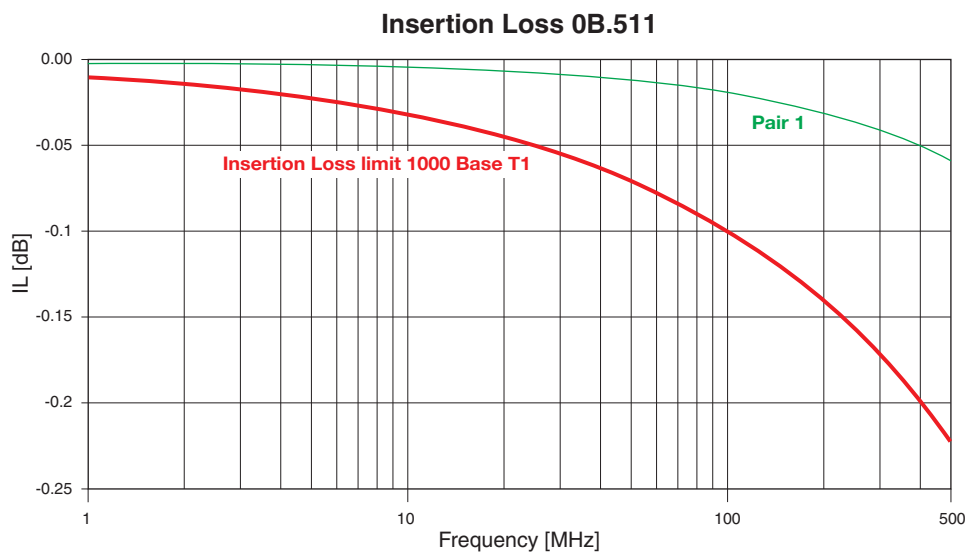
Note: ¹⁾ see BKT series catalogue for alternatives.



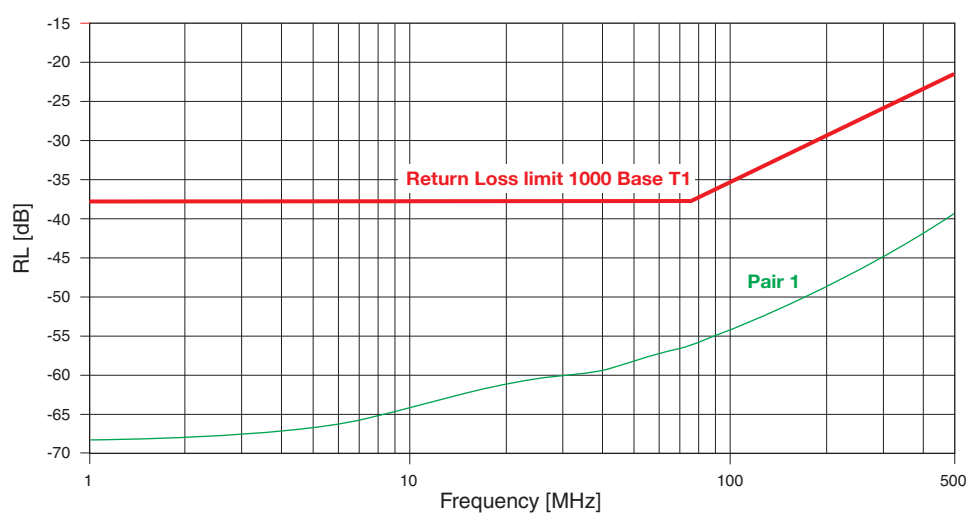
Ethernet

Male solder contacts	Female solder contacts										AWG				
		Reference	Series	Protocol	Max data transfer speed	Number of contacts	Contact ø (mm)	Solder contact	Print contact	Wire section (mm²)	Solder		Test voltage (kV DC) contact-contact	Rated current (A) ¹⁾	
										min.	max.				
		511	0B-0T	10G Base-T1	10 Gb/s	2	0.5	●	●	0.14	30	26 ¹⁾	2.2	5	

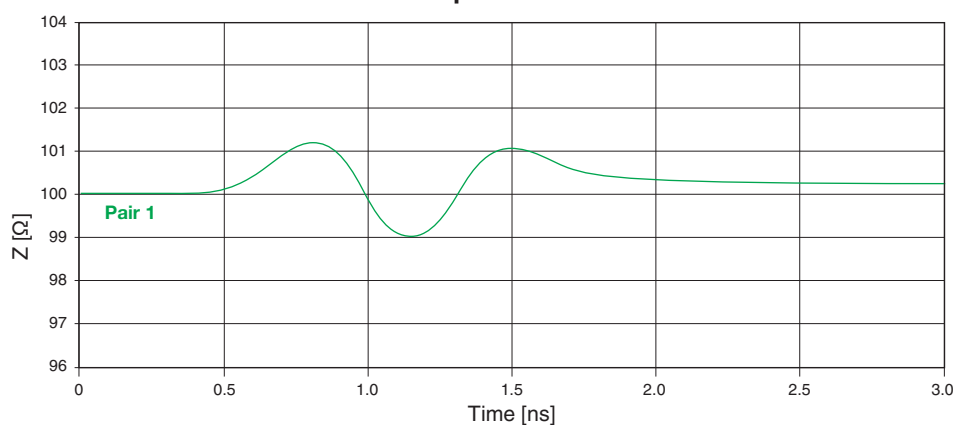
Recommended cable for configuration 512: KRO.2X013.PP.SW (Kroschu).



Return Loss 0B.511



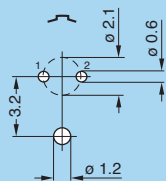
TDR Impedance 0B.511



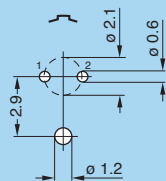
PCB drilling pattern

Socket with straight print contact

0B.511 (EA●)



0T.511 (EA●)



Note: contact numbering is for female contact version only.

Ethernet 10G Base-T4

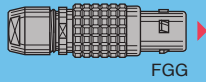
(514)



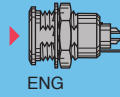
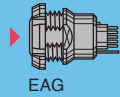
The Ethernet 10G Base-T4 protocol (IEEE 802.3an standard), allows High-speed data traffic over 4 pairs cable harnesses up to 10 Gb/s.

2B Series models

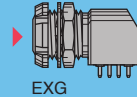
Straight plug



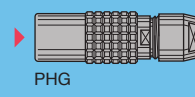
Sockets



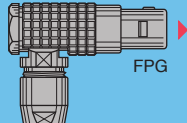
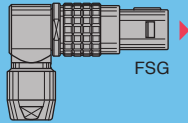
Elbow socket



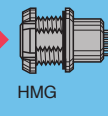
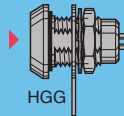
Free cable socket



Elbow plugs

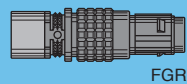
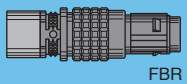


Watertight or vacuumtight sockets

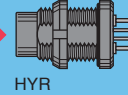
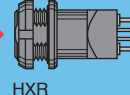
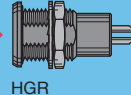


2D Series models

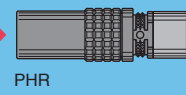
Straight plugs



Sockets

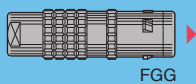


Free cable socket

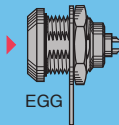
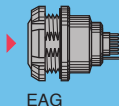


2K Series models

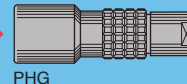
Straight plug



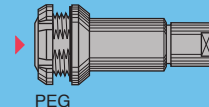
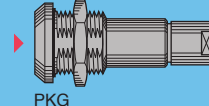
Sockets



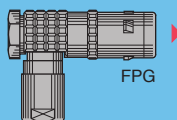
Free cable socket



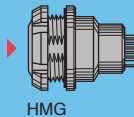
Fixed cable sockets



Elbow plug



Watertight or vacuumtight socket



Ethernet 10G Base-T4

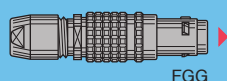
(514)



The Ethernet 10G Base-T4 protocol (IEEE 802.3an standard), allows High-speed data traffic over 4 pairs cable harnesses up to 10 Gb/s.

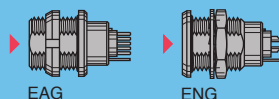
2T Series models

Straight plug



FGG

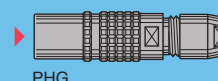
Sockets



EAG

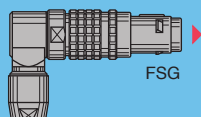
ENG

Free cable socket



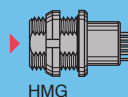
PHG

Elbow plug



FSG

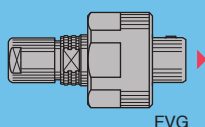
Watertight or vacuumtight socket



HMG

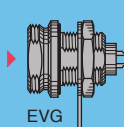
2W Series models

Straight plug



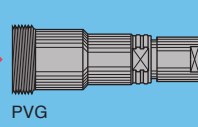
FVG

Socket



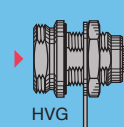
EVG

Free cable socket



PVG

Vacuumtight socket



HVG

Model description

EAG Socket with earthing tag, nut fixing, key (G) (back panel mounting)
EGG Socket with earthing washer, nut fixing, key (G)
ENG Socket with earthing tag, nut fixing, key (G)
EVG Socket with earthing washer, nut fixing, key (G)
EXG Elbow (90°) socket for printed circuit with two nuts, key (G)
FBR Straight plug, break-away latching, key (R), for overmolding
FGG Straight plug, key (G), cable collet
FGR Straight plug, push-pull latching, key (R), for overmolding
FPG Elbow (90°) plug, key (G), cable collet
FSG Anglissimo right angle plug, key (G), cable collet

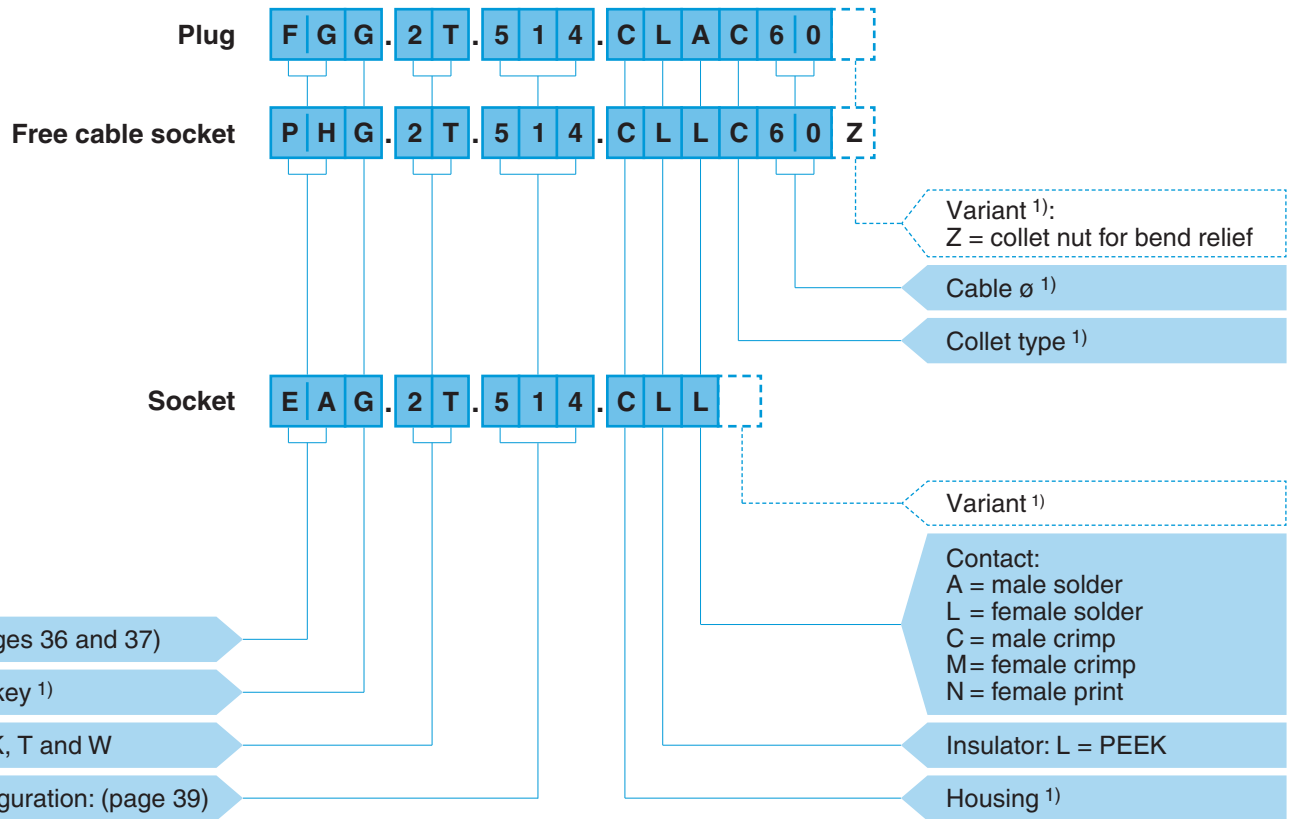
FVG Straight plug, key (G), cable collet
HGG Socket with earthing washer, nut fixing, key (G), watertight or vacuumtight
HGR Socket, nut fixing, key (R) (front panel mounting)
HMG Socket with earthing tag, nut fixing, key (G), watertight or vacuumtight
HVG Socket with earthing washer, nut fixing, key (G), vacuumtight
HXR Socket, nut fixing, key (R), for printed circuit (back panel mounting)
HYR Socket, nut fixing, key (R), for printed circuit (back panel mounting)
PEG Fixed cable socket, nut fixing, key (G), cable collet (back panel mounting)
PHG Free cable socket, key (G), cable collet
PHR Free cable socket, key (R), for overmolding

PKG Fixed cable socket, nut fixing, key (G), cable collet
PVG Free cable socket, key (G), cable collet

Note: for others models please reach out to LEMO. Print contact are highly recommended to limit risk of signal deterioration. See BKT series, D series and W series catalogues for connectors dimensions.

Part numbering system

Part numbering system (e.g. 2T series)



FGG.2T.514.CLAC60 = straight plug with key (G) and cable collet, 2T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, male solder contacts, C type collet for 6.0 mm diameter cable.

PHG.2T.514.CLLC60Z = free cable socket with key (G) and cable collet, 2T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, female solder contacts, C type collet for 6.0 mm diameter cable and nut for fitting a bend relief.

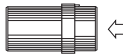
EAG.2T.514.CLL = socket, nut fixing, with key (G), 2T Series, Ethernet type, outer shell in chrome-plated brass, PEEK insulator, female solder contacts.

Note: ¹⁾ see BKT series, D series and W series catalogues for alternatives.

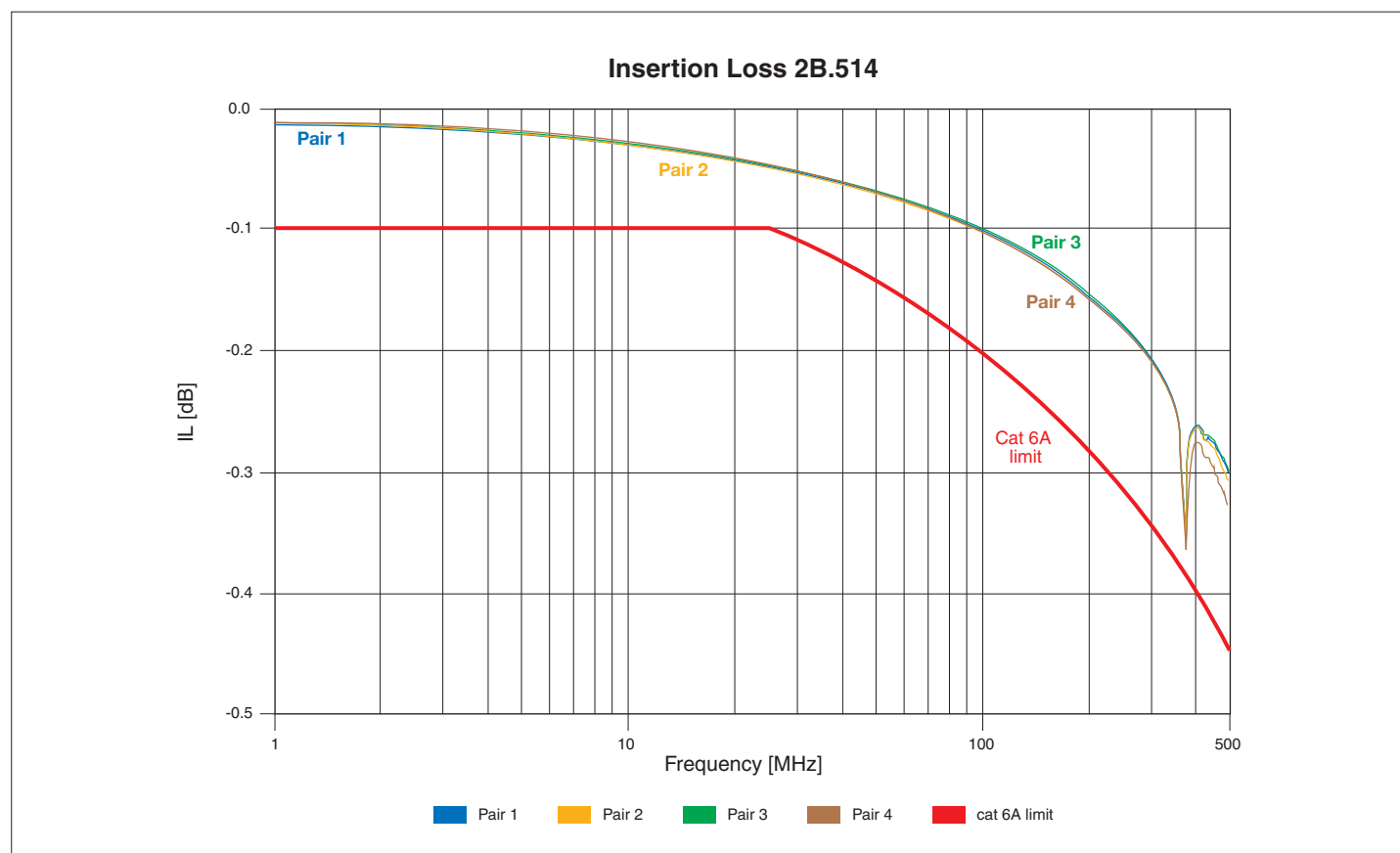


Insert configuration

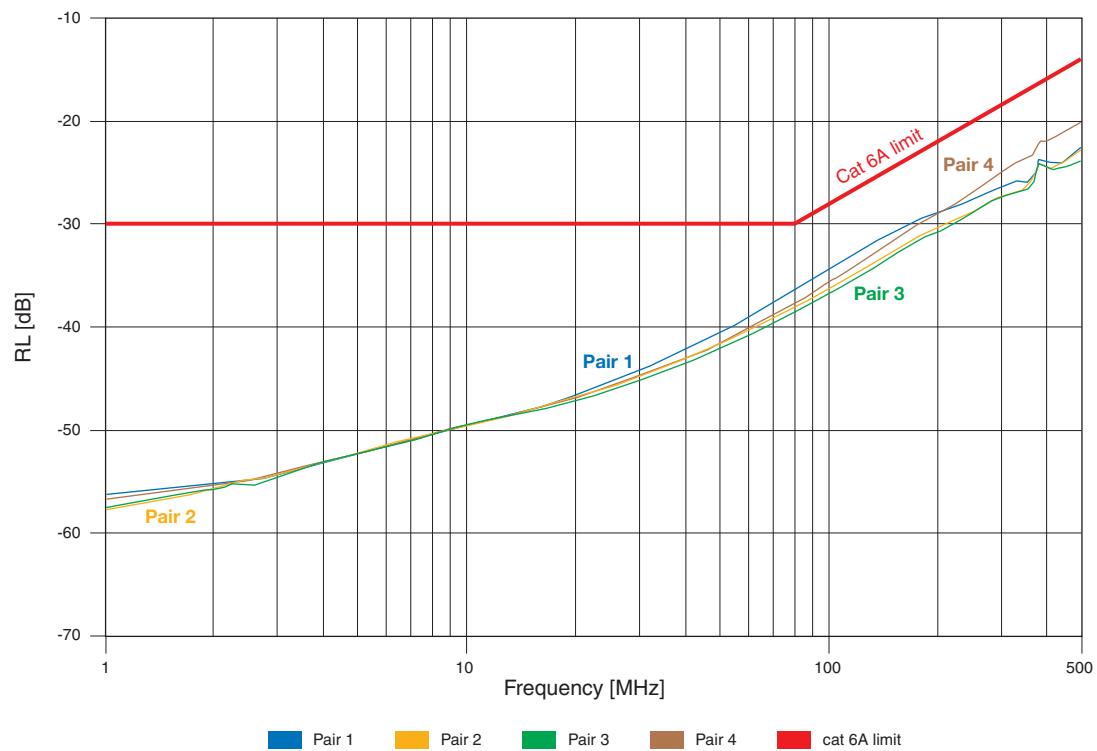
Ethernet

Male crimp contacts	Female crimp contacts	Reference	Series	Protocol	Max data transfer speed	Number of contacts	Contact ø (mm)	Solder	Crimp	Print	Test voltage (kV DC) ¹⁾ Contact-contact	Rated current (A) ¹⁾
		514	2B-2D 2K-2T 2W	10G Base-T4	10 Gb/s	8	0.7	●	●	●	1.13	5

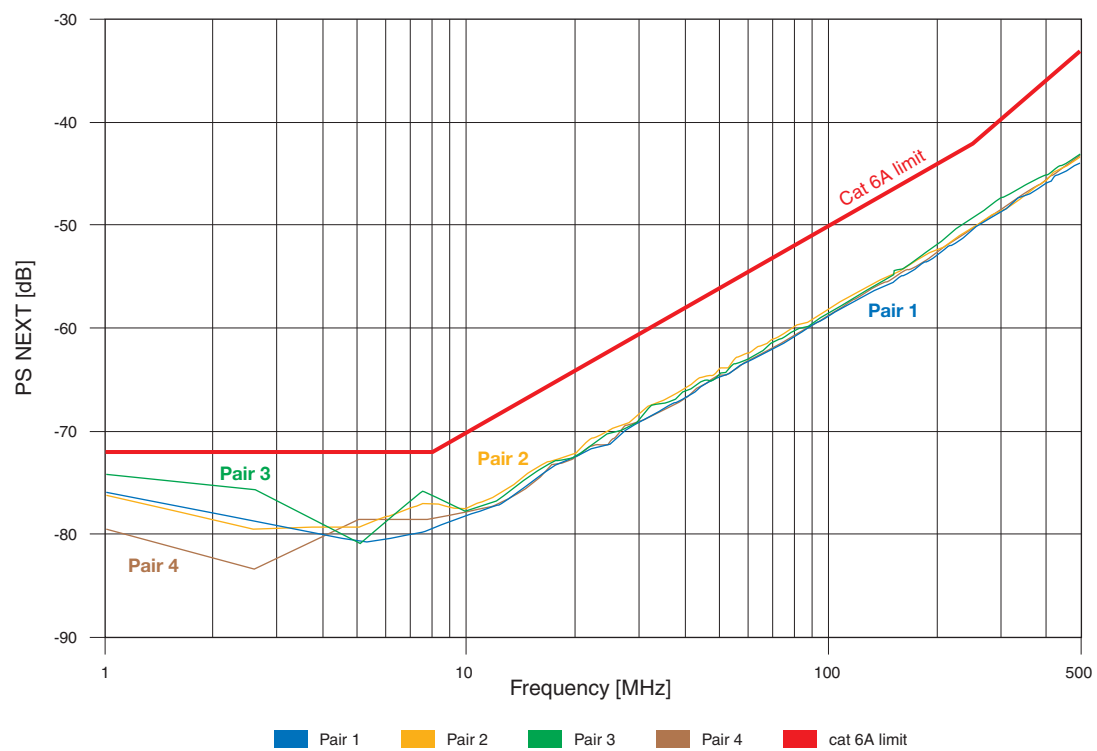
Note: ¹⁾ see calculation method, caution and suggested standard on BKT series catalogue.
²⁾ test voltage (kV) contact-shell is slightly lower for T series (values here are for B series).



Return Loss 2B.514



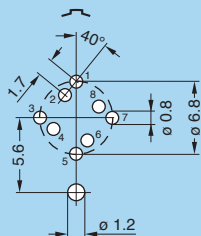
Power Sum Next (PS NEXT) 2B.514



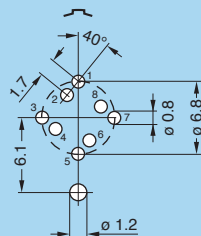
PCB drilling pattern

Socket with straight print contact

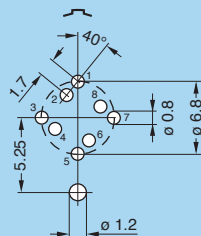
2B.514 (EA●+ HM●)



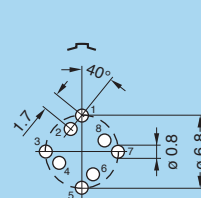
2K.514 (EA●+ HM●)



2T.514 (EA●+ HM●)

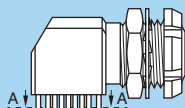


2W.514 (HV●)

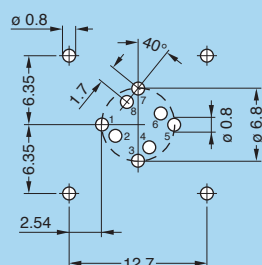


Note: contact numbering is for female contact version only.

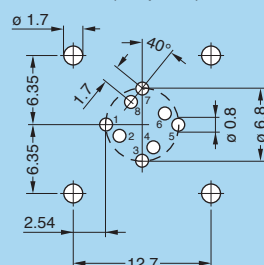
Elbow socket (90°) for printed circuit



EX●.2B.514 (solder mount)



EX●. 2B.514 (screw mount)
(harpoon)



Note: contact numbering is for female contact version only.

Product safety notice & Disclaimers

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://web.lemo.com/img/resources/quality/LEMO-Prop-65-compliance-declaration.pdf>

8. UL RECOGNITION

LEMO connectors are components recognized by the Underwriters Laboratories (UL), facilitating the UL approval of the complete system (including LEMO connector, cable and your equipment).

9. REACH AND ROHS

LEMO connector specifications comply with the requirements of the RoHS directive (2011/65/EU) and REACH regulation (1907/2006/EU) of the European Parliament and latest amendments. These REACH and ROHS regulations specify the restrictions of the use of hazardous substances in LEMO products marketed in Europe.

DISCLAIMERS

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