



03 Series & V Series  
UNDERWATER  
CONNECTORS

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The Quality Choice™

# LEMO's Family of Quality Connectors

LEMO manufactures precision engineered circular self-latching quick connect-disconnect electronic connectors for a wide variety of applications.

## Keyed Connectors (multi and mixed contact configurations)

### B Series Features:

- Contact arrangements from 2-64 pins and mixed configurations including coaxial, triaxial, fiber optic, fluidic/pneumatic and high voltage
- Wire gauges range from 8-30 AWG.
- Vacuum sealed shells
- Alignment key on the shell which prevents errors in alignment.
- Polarized keying system which enables keying exclusivity and prevents accidental cross mating of similar connectors.
- High contact density in a small amount of space.
- Contact terminations in either solder, crimp, or printed circuit.
- [UL Recognition](#)

### S Series Features:

- Contact arrangements from 1-106 pins and mixed configurations including coaxial, triaxial, fluidic/pneumatic and high voltage.
- Wire gauges from 4-26 AWG.
- Hermaphroditic inserts which assure proper contact alignment and quick-disconnect design.
- Contact terminations in solder or printed circuit.
- Vacuum sealed shells.

**C & G Series (compact) Connectors:** Multiple and coaxial contact connectors in a specially designed short shell for space saving applications.

## Environmentally Sealed Keyed Connectors

### K Series Features:

- Environmental connectors with triple wall construction to provide water and dust resistance.
- Mechanically keyed.
- Contact configurations identical to the B series connectors.

### E Series Features:

- Environmental connectors with triple wall construction to provide water and dust resistance.
- Hermaphroditic inserts.
- Contact configurations identical to the S series connectors.

## NIM-CAMAC Coaxial Miniature Connectors

**00-NIM-CAMAC - 50 ohm:** (Nuclear Instrumentation Module, Computer Automated Measurement and Control).

Recommended cables:

RG.58C/U	RG.180B/U	RG.316/U
RG.174A/U	RG.187A/U	CCE.99.281.505
RG.178B/U	RG.188A/U	CCH.99.281.505
RG.179B/U	RG.196A/U	HF-2114 Dätwyler

## Other Coaxial/Triaxial Connectors

**01-MINAX Series - 50 ohm:** LEMO's smallest coaxial connectors. Recommended cables:

RG.174A/U	RG.316 /U
RG.178B/U	CCE.99.281.505
RG.188A/U	CCH.99.281.505
RG.196A/U	

**0A-Telecommunications Series 50 & 75 ohm:** Designed with contacts to accommodate the following cables:

RG.58C/U	RG.316/U	2YCCY (0.4/2.5) Siemens
RG.59B/U	CCE.99.281.505	LEMO 0722 102 11 001 Philips
RG.174A/U	CCH.99.281.505	LEMO 0722 102 29 011 Philips
RG.179B/U	2YCY (0.4/2.5)	Siemens HF-5408/1 Dätwyler

**Standard Series Coaxial and Triaxial Connectors:** Other 50 and 75 ohm coaxial and triaxial connectors are available to accommodate cables up to .886"/22.0mm. These are also available in an environmentally sealed design.

**Video Triax Connectors:** LEMO's triaxial series is designed for video camera applications. Recommended cables:

8232-Belden	10069-C-G20-BIW	9232-Belden
HF-2426-Dätwyler	12766400-F&G	10070-C-G14-BIW
12765700-F&G	12766601-F&G	12766700-F&G
9267-Belden	8233-Belden	4.6/1.0EFTX-Fujikura

## Other LEMO Connectors

**Underwater Connectors - 03 Series and V Series:**

- Available in 50 ohm coaxial, triaxial, mixed and multicontact configurations up to 48 pins.
- Accommodates a maximum cable of 23.5mm.
- O-ring seals and locking nut to assure against water penetration and accidental unmating.
- Watertightness and stability guaranteed for up to 870 psi or severe vibration conditions.

**High Voltage Series:**

- S Series High Voltage Connectors available in a large range of sizes featuring PTFE inserts and a time proven design.
- Y Series High Voltage Connector in a long shell design ensuring mechanical mating prior to contact engagement.
- 0S and 1S Series High Voltage Connectors distinguished by their favorable size to voltage relationship.
- Multi High Voltage Connectors in sizes 4B and 5B for applications where multiple high voltage contacts are desired.

**Fiber Optic Connectors:** LEMO's fiber optic connectors are designed for single mode and multimode transmission on single or multi-fibers. Terminations are made by the cut and epoxy/polish method. A full range of fiber sizes can be accommodated.

**Plastic Connectors:** Plastic connectors in PSU or autoclaveable PEI shells ranging in contact arrangements from 2-26 contacts accommodating a cable Ø of 2.7-9mm.

**Fluidic Connectors:** Available in single or multiple tubes as well as mixed with electrical contacts with working pressure up to 2 bar (29 psi).

**Thermocouple Series:** LEMO's Thermocouple connectors are designed to ensure continuous and accurate monitoring of hostile environments where extreme surface or ambient temperatures, gases or liquids must be controlled.

**Cable Assemblies:** LEMO manufactures complete cable assemblies with both coaxial and multi-conductor cables. Assemblies can be fabricated from customer-owned cables or LEMO can provide all materials. LEMO capabilities include cable assembly design, fabrication, continuity and capacitance testing, and heat stamped cable or shrink marker identification.

**Custom Designs:** For more information please contact LEMO or feel free to complete and return the Application Data Request Form in the back of this catalog.



Data Subject to Change

**Keyed Connectors (Contact LEMO for catalog)**

Type	B Series								S Series																
	00	0B	1B	2B	2G	3B	4B	5B	01	00	0A	0S	1D	1S	2C	2S	3S	4A	4S	5S	6S	1Y	3Y	6Y	
Single Contact										✓			✓		✓		✓	✓		✓	✓				
Coaxial									✓	✓	✓	✓		✓		✓	✓		✓	✓					
Multicontact	✓	✓	✓	✓	✓	✓	✓	✓				✓		✓	✓	✓	✓		✓	✓	✓				
High Voltage								✓	✓			✓		✓		✓	✓		✓	✓		✓	✓	✓	
Triaxial									✓			✓		✓		✓	✓	✓	✓						
Quadrax												✓													
Mixed (HV+LV)			✓	✓		✓											✓		✓	✓					
Mixed (Coax+LV)				✓		✓	✓	✓								✓	✓		✓	✓	✓				
Thermocouples	✓	✓	✓	✓								✓		✓		✓									
Fluidics		✓		✓		✓	✓			✓															
Fiber Optics		✓		✓		✓	✓	✓																	
Mixed (Fiber Op+LV)				✓		✓	✓	✓																	

**Environmentally Sealed Connectors (Contact LEMO for catalog)**

Type	K Series						E Series								
	0K	1K	2K	3K	4K	5K	0E	1E	2E	3E	3T	4E	4M	5E	6E
Single Contact							✓	✓	✓	✓		✓		✓	
Coaxial							✓	✓	✓	✓	✓	✓		✓	
Multicontact	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
High Voltage							✓	✓	✓	✓					
Triaxial							✓	✓	✓	✓	✓		✓		
Quadrax															
Mixed (HV+LV)		✓	✓	✓						✓		✓		✓	
Mixed (Coax+LV)			✓	✓	✓	✓				✓		✓		✓	✓
Thermocouples															
Fluidics	✓		✓	✓	✓										
Fiber Optics			✓	✓	✓	✓									
Mixed (Fiber Op+LV)			✓	✓	✓	✓									

**Plastic Connectors (Contact LEMO for catalog)**

Type	Series	
	3P	Redel
Multicontact	✓	✓
Mixed (HV+LV)	✓	
Mixed (Fiber Optic+LV)	✓	

**Threaded Mating Connectors (Highlighted types included in this catalog)**

Type	Series		
	03*	EA	V*
Coaxial	✓		✓
Multicontact	✓		✓
Fiber Optics		✓	✓

\*underwater connectors

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# General Characteristics

## Inserts: Material and Characteristics

Material	Symbol	Standard	Single Contact	Coax	Multiple		High Voltage		Triaxial	Mixed				
			Series								main insert		second ins.	
			S	S	S	B	S	B	S	S	B	Coax	HT	
Hard polyethylene	PEhd													
Polyamid (loaded)	PA 66				●									
Polyether Etherketone	PEEK	MIL-P-46183			●	●	●	●		●	●		●	
Polytetrafluorethylene	PTFE	ASTM D 1710	●	●			●		●			●	●	
Ethylene-Propylene (Fluor.)	FEP	ASTM D 2116-81												
Poly(amide-imide)	PA-imide													
Polyimide	SP1 M													
Silicone rubber		ASTM D 200											●	

● Standard, typically 0-6 weeks delivery for quantities of 250 or less.

○ Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less.

○ Non-standard product is defined as any product which contains 1 or more components which are not standard.

Characteristics	Standard	Units	PEhd	PA6.6	PEEK	PTFE	FEP	PA imide	SP1M
Electrical Rigidity	ASTM D 149	KV/mm	17.6	16.2	19	17.2	24	23.6	22
Volume Resistivity	ASTM D 257	$\Omega \times \text{cm}$	$1.6 \times 10^{15}$	$5.8 \times 10^{15}$	$10^{16}$	$10^{15}$	$2 \times 10^{18}$	$1.2 \times 10^{17}$	$10^{14}$
Surface Resistivity	ASTM D 257	$\Omega$	$>10^{13}$	$>10^{11}$	$>10^{15}$	$>10^{17}$	$>10^{16}$	$>10^{18}$	$>10^{14}$
Thermal Conductivity	ASTM C 177	W/mk	0.38	0.18	0.28	0.23	0.22	0.18	0.346
Arc Resistance	ASTM D 495	s	—	—	—	>300	>300	>125	>230
Dielectric Constant	ASTM D 150	E	2.4	3.4	3.2-3.3	2	2.1	3.5-4	3.62
Maximum Working Temperature		°C (°F)	85 (185)	140 (284)	250 (482)	260 (500)	204 (399)	260 (500)	360 (680)
Water Absorption in 24 hrs. at 23°C (73°F)	ASTM D 570	%	0.01	0.95	0.12	0.005	0.01	0.28	0.24
Radiation Stability		rd	$5 \cdot 10^7$	$10^6$	$10^9$	$2 \cdot 10^4$	$10^6$	$10^9$	$10^9$
% TML	ASTM E 595-84				0.26*				
% CVMC	ASTME-595-84				0.00*				

\*Data was generated by the Goddard Space Center between June 5 and October 17, 1989.

## Contacts: Material and treatment

The secure, reliable electromechanical connection achieved by the LEMO female contacts is mainly due to two important design details.

— The prod proof closed entry to the contact, which ensures perfect concentric mating even with well-used connectors or when handled carelessly.

— The pressure spring which maintains a constant, even force on the male contact when mated. The leading edge on the spring is chamfered to slide smoothly on the male contact, preserving the gold-plated surface and preventing undue wear.

### Solder contacts

The conductor bucket of these contacts is machined at an angle to form a cup into which the solder can flow.

### Crimp contacts (only available in B Series)

The crimp method used for low voltage contacts of multiple and mixed connectors is the standard four indent according to MIL-C-22520F, class 1, type 1.

### Printed Circuit Contacts

Printed Circuit Contacts can be supplied in receptacles without collet. They can easily be connected by soldering to rigid or flexible printed circuits.

Type	Material (standard)	Surface treatment ( $\mu\text{m}$ )			
		Cu	Ni	Au	Note
Male solder	Brass (UNS C 385)	0.5	3	1.5	See Below
Male crimp	Brass (UNS C 345/385)	0.5	3	1.5	
Male print	Brass (UNS C 385)	0.5	3	1.5	
Female solder	Bronze (UNS C 544)	0.5	3	2.0	
Female crimp	Bronze (UNS C 544)	0.5	3	2.0	
Female print	Bronze (UNS C 544)	0.5	3	2.0	
Male sleeve	Brass (UNS C 385)	0.5	3	1.5	
Female sleeve	Bronze (UNS C 544)	0.5	3	1.5	

Notes: The surface treatment standards are the following:

—Nickel FS-QQ-N-290A or MIL-C-26074C grade C;

—Or MIL-G-45204C type 1, class 1.

# IP Codes (Ingress Protection)

IEC 529 outlines an international classification system for the sealing effectiveness of enclosures of electrical equipment against the intrusion into the equipment of foreign bodies (i.e., tools, dust, fingers) and moisture. This classification system utilizes the letters "IP" ("Ingress Protection") followed by two digits. (An "X" is used for one of the digits if there is only one class of protection; i.e., IPX4 which addresses moisture resistance only).

## Degrees of Protection - First Digit

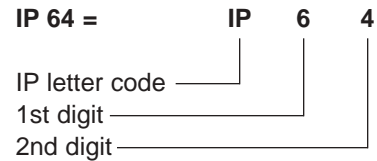
The first digit of the IP code indicates the degree that persons are protected against contact with moving parts (other than smooth rotating shafts, etc.) and the degree that equipment is protected against solid foreign bodies intruding into an enclosure.

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

## Degrees of Protection - Second Digit

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

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



## IP 529 Classification System

1st Digit	Protected From Solid Objects Greater Than	2nd Digit	Protected From Water
0	Not protected	0	Not protected
1	50 mm dia.	1	Dripped vertically
2	12.5 mm dia.	2	Dripped when tilted up to 15°
3	2.5 mm dia.	3	Sprayed
4	1.0 mm dia.	4	Splashed
5	Dust protected	5	Jet spray
6	Dust tight	6	Heavy seas or strong jet spray
		7	Temporarily immersed
		8	Continuously immersed

**Note: IEC 529 does not specify sealing effectiveness against the following: mechanical damage of the equipment; the risk of explosions; certain types of moisture conditions, e.g., those that are produced by condensation; corrosive vapors; fungus; vermin.**

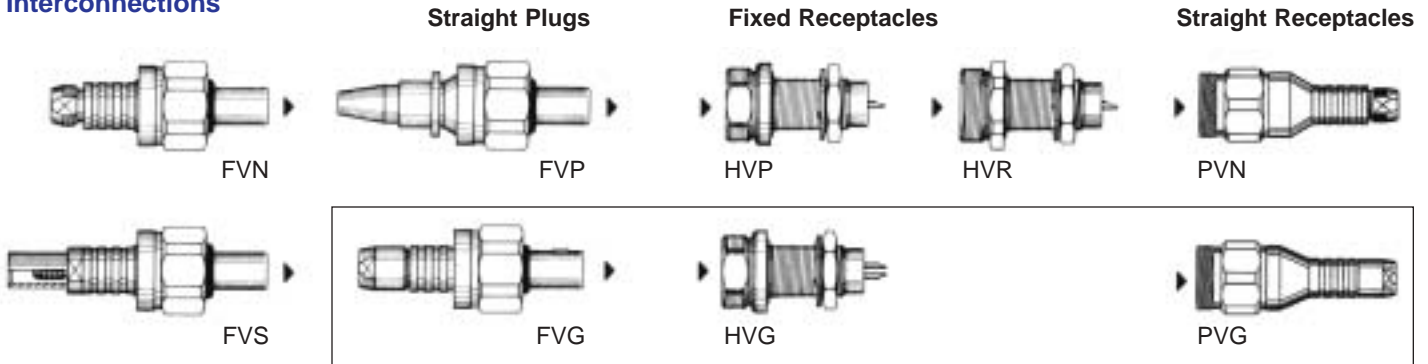
# 03 Series

The 03 series of underwater connectors has been specifically developed for applications where the connection must be guaranteed under very high pressure. The push-pull LEMO self-latching system is replaced by a screw thread connector coupling system which provides very high security, particularly against high vibration. The watertight coupling is achieved by the compression of an O-ring made of Viton. After cable assembly the rear of the plug is covered by a heat shrink tube.

This series is available as 50 Ω coaxial or multipole with 2, 3 or 4 contacts. See V series (pages 7-13) for additional underwater connectors, sizes and inserts.

**LEMO makes a full line of quality connectors. If you would like more information, please contact LEMO for a full line catalog.**

## Interconnections



## Model Description

### Coaxial

- FVN** Straight plug with cable collet
- FVP** Straight plug with brazing ferrule
- FVS** Straight plug with crimp ferrule

- HVP** Fixed receptacle, vacuumtight, with round flange
- HVR** Fixed receptacle, vacuumtight, with hexagonal flange
- PVN** Straight receptacle with cable collet

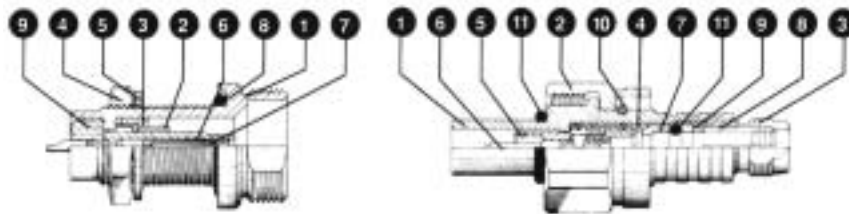
### Multicontacts-Keyed Connectors

- FVG** Straight plug with key (G), and cable collet
- HVG** Fixed receptacle, vacuumtight, with key (G) and round flange
- PVG** Straight receptacle with keyway (G) and cable collet

## Part Section Showing Internal Components

### Fixed Receptacle

- 1 shell
- 2 earthing crown
- 3 retaining ring
- 4 hexagonal nut
- 5 locking washer
- 6 insulator
- 7 female contact
- 8 O-ring
- 9 epoxy shell



### Straight Plug

- 1 outer shell
- 2 coupling nut
- 3 collet nut
- 4 center-piece
- 5 insulator
- 6 male contact
- 7 earthing cone
- 8 collet
- 9 compressed ring
- 0 circlip
- i O-ring

## Technical Characteristics

### Material and Treatment

Component	Material	Surface treatment (µm)			
		Cu	Ni	Cr	Au
Outer shell, nut	Brass (ASTM 385)	0.5	3	0.3	
Collet nut	Stainless st. (AISI 316L)	(Special request)			
Earthing crown	Cu-Be (FS-QQ-C-530)	0.5	3		1.5
Crimp ferrule	Brass (ASTM 385)	0.5	3		
Locking washer	Bronze (ASTM C 521)	0.5	3		
Other metallic parts	Brass (ASTM 385)	0.5	3		
Insulator	PEEK (MIL-P-46183)				
O-ring	FPM (Viton)				
Male contact	Brass (ASTM 385)	0.5	3		1.5
Female contact	Bronze (ASTM C 544)	0.5	3		2.0

### Mechanical and Climatical

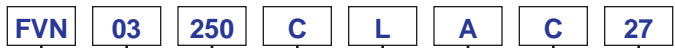
Characteristics	Value	Standard	Method
Cable pull off force <sup>1)</sup>	> 100 N	MIL-STD-1344A	2007.1
Protection index	> IP68	IEC 529	
Acceptable hydrostatic pressure	~ 60 bars	MIL-STD-1344A	1006.1
Endurance	> 1000 cycles	MIL-STD-1344A	2016
Operating temp.	-55°C + 200°C (-67°F + 392°F)		

1) Average value  
1N = 0.102 kg

The surface treatment standards are as follows:  
 - Nickel FS-QQ-N-290A or MIL-C-26074 grade C  
 - Chrome FS-QQ-C-320B  
 - Gold MIL-G-45204C type I, class 1

# 03 Series – Part Numbering System

## Part Number Example



**Model:** see page 4

**Series:** 03

**Type:** see below

**Housing:**

C = chrome plated brass (standard)  
S = stainless steel (on request)

**Insulator:**

L = PEEK

Ø Collet: see below

**Cable fixing type:**

C = cable collet  
E = crimp  
V = braze

**Contact type:**

A = male solder  
C = male crimp  
L = female solder

FVN.03.250.CLAC27 Straight plug with cable collet, series 03, 50 Ω coaxial type, chrome plated brass housing, PEEK insulator, male solder contact, type C collet for a 2.7mm max. OD cable.

**Note:**

1) For fixed receptacle model HV• a 'V' indicates that the model has been subjected to and passed the MIL-STD-1344A method 1008 vacuum test.

## Dimensions (see page 4 for Model Descriptions)

*Note: All dimensions are in millimeters.*

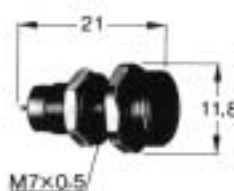
FVN



FVS



HVR



HVG

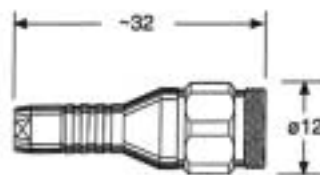


## Inserts

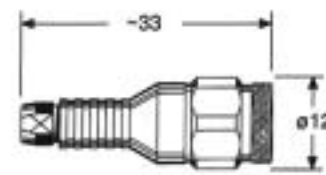


Reference	Series	Impedance (Ω)	Number of Contacts	Contact Ø (mm)	Test Voltage (kV ac)	Test Voltage (kV dc)	Operating Voltage (kV ac)	Operating Voltage (kV dc)	Rated Current (A)	Wire AWG max.
250	03	50	1	0.7	2.1	3.0	0.7	1.0	4	26
302		-	2	0.5	1.0	1.5	0.4	0.5	5	30
303		-	3	0.5	1.0	1.5	0.4	0.5	3	30
304		-	4	0.5	0.8	1.0	0.3	0.5	2	30

PVN



PVG



## Tooling

### Crimping Tool with Dies (E collets)



Part Number	Cable Group
DPA.99.123.1K	1
DPB.99.123.8K	2

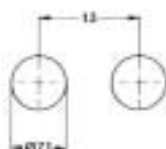
## Collets



Reference Type	Ø	Series	Cable OD		
			min.	max.	
C	27 <sup>1</sup>	03	2.2	2.6	
C	31 <sup>1</sup>		2.8	3.0	
K	40 <sup>3</sup>		3.6	4.0	
K	45 <sup>3</sup>		4.1	5.0	
E	24 <sup>2</sup>		Group 1		
E	31 <sup>2</sup>		Group 2		

1) Coax and Multicontact  
2) Coax only 3) Multicontact only

## Panel Cut-out



Other collet diameters available on request

1) Group 1 includes RG.178 B/U and RG.196 A/U cables  
Group 2 includes RG.174 A/U, RG.188 A/U, RG.316/U and Dätwyler HF 2114.1 cables

Torque: 2.5 Nm  
1N = 0.102 Kg

Data Subject to Change

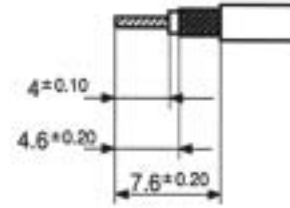


# 03 Series – Assembly Instructions

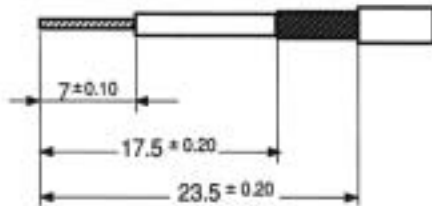
## Assembly Instructions for FVN

1. Strip cable according to the given lengths.
2. Slide collet nut, collet washer, gasket and earthing cone over the cable.
3. Fold screen back over earthing cone.
4. Introduce conductor into contact and solder.
5. Push contact assembly into connector housing.
6. Tighten collet nut.

## Cable Stripping



## Cable Stripping



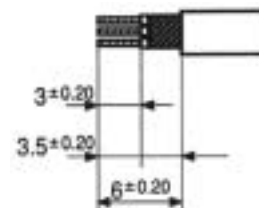
## Assembly Instructions for FVS

1. Slide the heat shrink tubing and the crimp ferrule over cable.
2. Strip the cable according to the given lengths.
3. Widen the screen braiding by twisting it.
4. Introduce dielectric of the cable first into the crimping collet nut then into the male contact.
5. Crimp the central wire into the male contact with the appropriate tool.
6. Slide the crimping ferrule over the screen, and crimp with the appropriate tool.
7. Push this assembly into connector housing and tighten crimping collet nut on.
8. Slide the heat shrink tubing over the outer shell. Starting at one end, shrink the tubing with a heating device.

## Assembly Instructions for FVG

1. Strip the cable according to the given lengths.
2. Slide collet nut, collet, washer, gasket and earthing cone over the cable.
3. Fold screen back over earthing cone.
4. Introduce conductor into contact and solder.
5. Mount the two halves earthing sleeve around the insulator.
6. Push contact assembly into connector housing.
7. Tighten collet nut.

## Cable Stripping



Note: All dimensions are in millimeters.

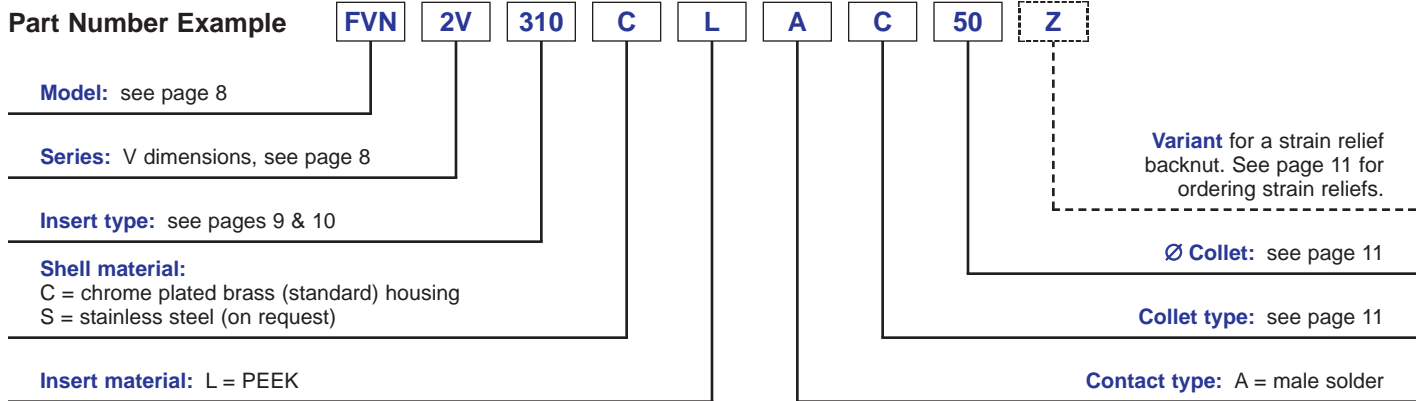


# V Series – Part Number Specifying

LEMO's V Series connectors are ideal for watertight and airtight environments where connections must be guaranteed under very high pressure. The push-pull self-latching system has been replaced by a screw type method which includes a locking nut to assure against water penetration and accidental unmating. The watertight coupling is achieved by the compression of an O-ring made of Viton. After cable assembly, the rear of the plug is covered by a heat shrink tube.

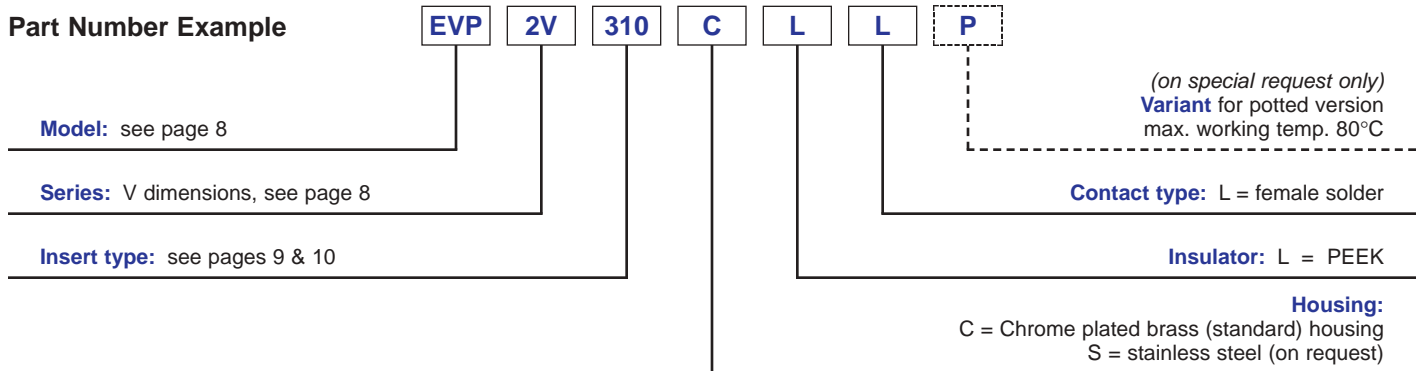
Larger in size than the 03 Underwater Connectors, these connectors are available in a variety of insert configurations to 18 pins and cable diameters up to 15 mm.

## Plug



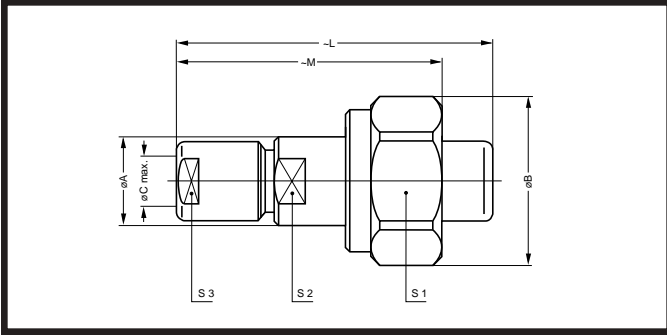
Plug with a screw latching system, Series 2V, PEEK insulator (10 contacts), chrome plated brass outer shell, collet of approximately 5.0 mm for screened cable.

## Receptacle



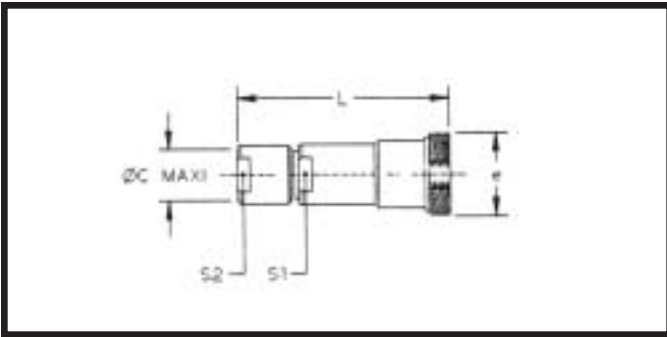
Fixed receptacle, Series 2V, PEEK insulator (10 contacts), potted with epoxy, chrome plated brass outer shell.

# V Series – Models / Panel Cut-Out



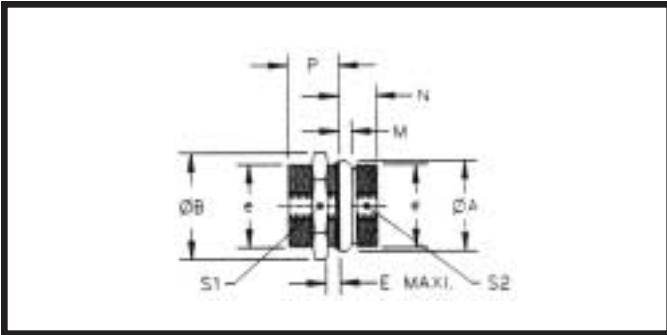
## Straight Sealed Plug with Cable Collet

Reference		Dimensions (mm)								Avail.
Type	Series	A	B	C	L	M	S1	S2	S3	
FVN	0V	10	19	6.2	34	29.0	17	9	8	○
FVN	1V	12	21	7.1	42	34.0	19	10	9	○
FVN	2V	16	26	9.2	52	42.0	24	14	12	○
FVN	3V	18	32	10.5	61	47.0	30	16	15	○
FVN	4V	24	38	14.0	71	57.0	36	22	19	○
FVN	5V	36	56	23.5	94	78.0	54	36	32	○



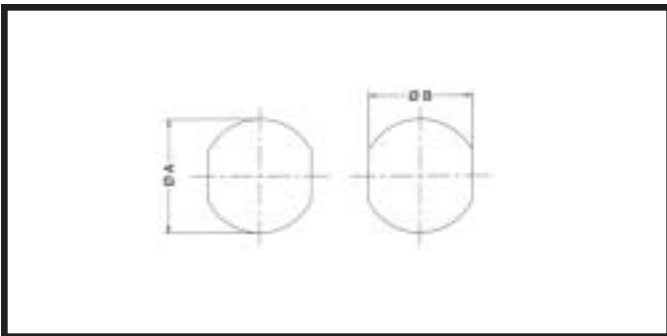
## Straight Sealed Receptacle with Cable Collet

Reference		Dimensions (mm)					Avail.
Type	Series	C	e	L	S1	S2	
PVP	0V	6.2	M14×1	34	9	8	○
PVP	1V	7.1	M16×1	45	10	9	○
PVP	2V	9.2	M20×1	54	14	12	○
PVP	3V	10.5	M24×1	65	16	15	○



## Sealed Receptacle, Round Flange

Reference		Dimensions (mm)										Avail.
Type	Series	A	B	e	L	M	N	P	S1	S2	E	
EVP	0V	19	19.6	M14×1	19.0	2.0	8.0	8.0	17	12.5	5.5	○
EVP	1V	21	21.8	M16×1	26.0	2.0	8.0	13.5	19	14.5	10.5	○
EVP	2V	26	27.5	M20×1	29.0	2.5	9.0	15.0	24	18.5	11.0	○
EVP	3V	32	34.5	M24×1	34.5	3.0	9.5	20.0	30	22.5	15.0	○



## Panel Cut-Out

Series	ØA	ØB
0V	14.1	12.6
1V	16.1	14.6
2V	20.1	18.6
3V	24.1	22.6

- Standard, typically 0-6 weeks delivery for quantities of 250 or less.
  - Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less.
- Non-standard is defined as a product which contains 1 or more component which is not standard.

## Torquing

Size	0V	1V	2V	3V
Collet nut torque in-lbs.	6	7	18	27
Plug coupling nut torque in-lbs.	6	7	18	27

# V Series – Inserts

## Single Contact

Reference	Series	Contact Ø (mm)	Operating Voltage (kV ac)	Operating Voltage (kV dc)	Test Voltage (kV ac)	Test Voltage (kV dc)	Rated Current (A)	Availability
116	0V	1.6	0.5	0.7	1.5	2.1	12	o
120	1V	2.0	0.6	0.9	1.8	2.7	18	o
130	2V	3.0	0.5	0.7	1.5	2.1	25	o
140	2V	4.0	0.7	1.0	2.1	3.0	30	o
140	3V	4.0	0.8	1.1	2.4	3.3	43	o
160	3V	6.0	0.6	0.8	1.8	2.4	65	o

## Coaxial

Reference	Series	Impedance (Ω)	Contact Ø (mm)	Cable Group	VSWR (f=GHz)	Operating Voltage (kV ac)	Test Voltage (kV ac)	Rated Current (A)	Availability
250	0V	50	0.9	1-2-3-4	1.02 +0.25f	1.0	3.0	6	o
250	1V	50	1.6	1-2-3-4	1.01 +0.23f	1.0	3.0	12	o
275	1V	75	1.3	5-6-7	1.02 +0.08f	0.8	2.4	10	o
250	2V	50	3.0	6-7	1.01 +0.95f	1.0	3.0	15	o
275	2V	75	1.6	6-7	1.02 +0.03f	0.5	1.5	12	o
250	3V	50	3.0	8	1.06 +0.5f	1.0	3.0	26	o
275	3V	75	2.0	8	1.04 +0.05f	0.9	2.7	15	o

## Mixed Coax + LV, Multi-coax



Reference	Series	Coaxial					Low Voltage					Availability			
		Number of Contacts	Impedance (Ω)	Working Voltage (kV rms)	Rated Current (A)	Type <sup>1)</sup>	Cable group <sup>2)</sup>	Number of Contacts	Contact Ø (mm)	Working Voltage (kV rms)	Working Voltage (kV dc)		Test Voltage (kV rms)	Test Voltage (kV dc)	Rated Current (A)
801	3V	1	50	0.7	5	A1	1-2-3	1	1.3	0.90	1.3	2.7	3.9	14	o
802	3V	1	50	0.7	5	A1	1-2-3	2	1.3	0.40	0.6	1.2	1.8	14	o
803	3V	1	50	0.7	5	A1	1-2-3	3	1.3	0.90	1.3	2.7	3.9	14	o
804	3V	1	50	0.7	5	A1	1-2-3	4	1.3	0.40	0.6	1.2	1.8	10	o
805	3V	1	50	0.7	5	A1	1-2-3	5	0.9	0.60	0.8	1.8	2.4	8	o
806	3V	1	50	0.7	5	A1	1-2-3	6	1.3	0.25	0.4	0.8	1.2	8	o
807	3V	1	50	0.7	5	A1	1-2-3	7	0.9	0.25	0.4	0.8	1.2	7	o

- Standard, typically 0-6 weeks delivery for quantities of 250 or less.
  - Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less.
- Non-standard is defined as a product which contains 1 or more component which is not standard.

## Recommended Coaxial Cables

Group									Type
1	2	3	4	5	6	7	8	0	
								✓	RG.11A/U
								✓	RG.12A/U
					✓				RG.58C/U
						✓			RG.59B/U
							✓		RG.115A/U
		✓							RG.122/U
				✓					RG.142B/U
							✓		RG.144/U
							✓		RG.165/U
	✓								RG.174A/U
									RG.178B/U
					✓				RG.179B/U
					✓				RG.187A/U
	✓								RG.188A/U

Group									Type
1	2	3	6	7	8	9			
✓									RG.196A/U
							✓		RG.213/U
								✓	RG.214/U
								✓	RG.216/U
								✓	RG.223/U
								✓	RG.225/U
								✓	RG.302/U
								✓	RG.316/U
	✓								RG.400/U
									HF-2114 Dätwyler
									HF-5408/1 Dätwyler
									2YCCY 0.4/2.5 Siemens
									CCE.99.281.505 LEMO
									CCH.99.281.505 LEMO

Data Subject to Change



# V Series – Inserts (continued)

## Triaxial

Reference	Series	Impedance (Ω)	Contact Ø (mm)	Cable Group	VSWR (f=GHz)*	Operating Voltage (kV ac)	Operating Voltage (kV dc)	Test Voltage (kV ac)	Test Voltage (kV dc)	Rated Current (A)	Availability
650	0V	50	0.9	1-2	1.03 +0.34f	0.35	0.4	1.0	1.2	6	○
650	1V	50	0.9	1-2-3	1.01 +0.17f	0.35	0.4	1.0	1.2	6	○
650	2V	50	1.6	2-3-4	1.01 +0.3f	0.50	0.4	1.5	1.2	12	○
675	2V	75	0.9	4-6	1.01 +0.07f	0.50	0.4	1.5	1.2	6	○
650	3V	50	2.0	3-4-5	1.01 +0.27f	0.80	0.4	2.4	1.2	15	○
675	3V	75	0.9	4-5	1.02 +0.05f	0.60	0.4	1.8	1.2	6	○

\*1.5 GHz maximum.

## Mixed HV + LV, Multi High Voltage

Reference	Series	High Voltage						Low Voltage						Availability	
		No. of Contacts	Cont. Ø (mm)	AWG max.	Working Voltage (kV rms)	Working Voltage (kV dc)	No. of Contacts	Cont. Ø (mm)	Operating Voltage (kV ac)	Operating Voltage (kV dc)	Test Voltage (kV ac)	Test Voltage (kV dc)	Rated Current (A)		
702	3V	1	1.3	20	20	2.1	3	2	2.0	0.50	0.7	1.5	2.1	18	○
703	3V	1	1.3	20	20	2.1	3	3	1.3	0.70	1.0	2.1	3.0	12	○
704	3V	1	1.3	20	20	2.1	3	4	1.3	0.35	0.5	1.0	1.5	10	○
705	3V	1	1.3	20	20	2.1	3	5	1.3	0.35	0.5	1.0	1.5	9	○
706	3V	1	1.3	20	20	2.1	3	6	1.3	0.35	0.5	1.0	1.5	8	○
707	3V		1.3	20	20	2.1	3	7	1.3	0.35	0.5	1.0	1.5	8	○
708	3V	1	1.3	20	20	2.1	3	4	1.3	0.35	0.5	1.0	1.5	8	○
								4	0.9	0.25	0.4	0.8	1.2	6	○
709	3V	1	1.3	20	20	2.1	3	9	0.9	0.25	0.4	0.8	1.2	6	○
711	3V	1	1.3	20	20	2.1	3	11	0.9	0.25	0.4	0.8	1.2	6	○
432	3V	2	1.3	20	20	2.1	3	-	-	-	-	-	-	-	○
732	3V	2	1.3	20	20	2.1	3	2	1.3	0.70	1.0	2.1	3.0	14	○
734	3V	2	1.3	20	20	2.1	3	4	1.3	0.70	1.0	2.1	3.0	10	○

## Recommended Triaxial Cables

Group					Type
1	2	3	4	5	
✓					CTA.99.290.803 LEMO
	✓				CTD.99.391.505 LEMO
		✓			9222 Belden
			✓		21.738 Amphenol
				✓	118202 Filotex
				✓	21.204 Amphenol
				✓	HF-2318 Dätwyler
				✓	8215 Belden
				✓	8232 Belden

Group				Type
4	5	6	7	
✓				HF-2426 Dätwyler
		✓		CTC.99.371.603 LEMO
✓				12765700 F&G
		✓		9267 Belden
			✓	10069-C-G20 BIW
			✓	12766400 F&G
			✓	12766601 F&G
			✓	8233 Belden
			✓	9888 Belden

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  - Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less.
- Non-standard is defined as a product which contains 1 or more component which is not standard.

## Multi Contact

Reference	Series	No. of Contacts	Contact Ø (mm)	Operating Voltage (kV ac)	Operating Voltage (kV dc)	Test Voltage (kV ac)	Test Voltage (kV dc)	Rated Current (A)	Availability
302	0V	2	0.9	0.50	0.7	1.5	2.1	10	○
303	0V	3	0.7	0.35	0.5	1.0	1.5	7	○
304	0V	4	0.7	0.35	0.5	1.0	1.5	7	○
302	1V	2	1.3	0.40	0.6	1.2	1.8	15	○
303	1V	3	0.9	0.40	0.6	1.2	1.8	10	○
304	1V	4	0.9	0.40	0.6	1.2	1.8	10	○
305	1V	2	0.9	0.50	0.7	1.5	2.1	10	○
		3	0.7	0.50	0.7	1.5	2.1	7	○
306	1V	6	0.7	0.50	0.7	1.5	2.1	7	○
302	2V	2	1.6	0.60	0.8	1.8	2.4	20	○
303	2V	3	1.3	0.50	0.7	1.5	2.1	15	○
304	2V	4	1.3	0.60	0.8	1.8	2.4	15	○
305	2V	5	1.3	0.50	0.7	1.5	2.1	13	○
306	2V	6	1.3	0.50	0.7	1.5	2.1	12	○
		3	1.3	0.25	0.4	0.8	1.2	12	○
		4	0.9	0.25	0.4	0.8	1.2	9	○
308	2V	8	0.9	0.25	0.4	0.8	1.2	9	○
310	2V	10	0.9	0.25	0.4	0.8	1.2	7	○
302	3V	2	2.0	1.00	1.4	3.0	4.2	23	○
303	3V	3	2.0	0.50	0.7	1.5	2.1	20	○
304	3V	4	2.0	0.50	0.7	1.5	2.1	18	○
		2	2.0	0.50	0.7	1.5	2.1	18	○
		3	1.3	0.50	0.7	1.5	2.1	14	○
306	3V	6	1.3	0.70	1.0	2.1	3.0	14	○
307	3V	7	1.3	0.35	0.5	1.0	1.5	12	○
308	3V	8	1.3	0.35	0.5	1.0	1.5	10	○
310	3V	10	1.3	0.70	1.0	2.1	1.5	9	○
312	3V	12	0.9	0.50	0.7	1.5	2.1	8	○
313	3V	13	0.9	0.50	0.7	1.5	2.1	8	○
314	3V	14	0.9	0.50	0.7	1.5	2.1	7	○
316	3V	16	0.9	0.35	0.5	1.0	1.5	7	○
318	3V	18	0.9	0.35	0.5	1.0	1.5	6	○

# V Series – Collets

Reference		Series	Cable OD		Avail.
Type	Ø		max.	min.	
C	10	0V	1.2	1.0	o
C	15		1.5	1.3	o
C	20		2.0	1.6	o
C	25		2.5	2.1	o
C	30		3.0	2.6	o
C	35		3.5	3.1	o
C	40		4.0	3.6	o
C	45		5.0	4.1	o
C	15		1V	1.5	1.0
C	20	2.0		1.6	o
C	25	2.5		2.1	o
C	30	3.0		2.6	o
C	35	3.5		3.1	o
C	40	4.0		3.6	o
C	45	4.5		4.1	o
C	50	5.0		4.6	o
C	55	5.5		5.1	o
C	60	6.0		5.6	o
C	65	6.5		6.1	o
K	70	7.0		6.6	o
K	75	7.5		7.1	o
K	80	8.0		7.6	o
K	85	8.5		8.1	o

**C = Shielded collet**  
**K = Oversized collet**

Reference		Series	Cable OD		Avail.
Type	Ø		max.	min.	
C	15	2V	1.7	1.5	o
C	20		2.0	1.8	o
C	25		2.5	2.1	o
C	30		3.0	2.6	o
C	35		3.5	3.1	o
C	40		4.0	3.6	o
C	45		4.5	4.1	o
C	50		5.0	4.6	o
C	55		5.5	5.1	o
C	60		6.0	5.6	o
C	65		6.5	6.1	o
C	70		7.0	6.6	o
C	75		7.5	7.1	o
C	80		8.0	7.6	o
C	85		8.5	8.1	o
K	90		9.0	8.6	o
K	95		9.5	9.1	o
K	10		10.0	9.6	o
K	11		11.0	10.1	o
C	30		3V	3.0	2.1
C	35	3.5		3.1	o
C	40	4.0		3.6	o
C	45	4.5		4.1	o
C	50	5.0		4.6	o
C	55	5.5		5.1	o
C	60	6.0		5.6	o
C	65	6.5		6.1	o
C	70	7.0		6.6	o
C	75	7.5		7.1	o
C	80	8.0		7.6	o
C	85	8.5		8.1	o
C	90	9.0		8.6	o
C	95	9.5		9.1	o
C	10	10.0		9.6	o
C	11	11.0	10.1	o	
K	11	11.7	10.6	o	
K	12	12.8	12.1	o	
K	13	13.5	12.9	o	
K	14	14.3	13.6	o	
K	15	15.0	14.4	o	

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- Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less. Non-standard is defined as a product which contains 1 or more component which is not standard.

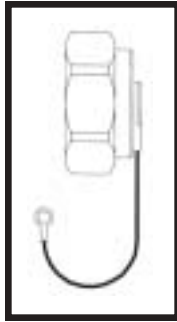
# V Series – Accessories

## \* BRE

### Metal Receptacle Cap

Part Number	Series	Avail.
BRE.0V.200.NAV	<b>0V</b>	○
BRE.1V.200.NAV	<b>1V</b>	○
BRE.2V.200.NAV	<b>2V</b>	○
BRE.3V.200.NAV	<b>3V</b>	○

• Other series available upon request.



## \* BFA

### Metal Plug Cap

Part Number	Series	Avail.
BFA.0V.100.NAV	<b>0V</b>	○
BFA.1V.100.NAV	<b>1V</b>	○
BFA.2V.100.NAV	<b>2V</b>	○
BFA.3V.100.NAV	<b>3V</b>	○

- Shell Material:  
Brass (UNS C 385)  
Nickel plate (3 μm)
- Lanyard Material: Stainless Steel
- Material of the O-ring: FPM (Viton)
- Maximum temperature: 100°C (212°F)
- Environmental Seal: IP68, IEC 529

\*Contact LEMO for dimensions.

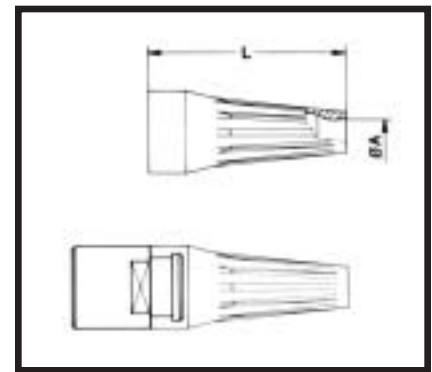


## GMA / GMB

### Cable Strain Reliefs for V Series Connectors

When ordering separately please specify Collet and Strain Relief numbers.

Part Number	*Color	Series	Suitable Collet Nut (when ordered separately)	Dimensions		Avail.
				A	L	
GMA.0B.025.D	<input type="checkbox"/>	<b>0V</b>	FFM.0E.130.LC	2.5 to 2.9	24	○
GMA.0B.030.D	<input type="checkbox"/>			3.0 to 3.4	24	○
GMA.0B.035.D	<input type="checkbox"/>			3.5 to 4.0	24	○
GMA.0B.040.D	<input type="checkbox"/>			4.0 to 4.4	24	○
GMA.0B.045.D	<input type="checkbox"/>			4.5 to 5.0	24	○
GMA.1B.025.D	<input type="checkbox"/>	<b>1V</b>	FFM.1E.130.LC	2.5 to 2.9	30	○
GMA.1B.030.D	<input type="checkbox"/>			3.0 to 3.4	30	○
GMA.1B.035.D	<input type="checkbox"/>			3.5 to 3.9	30	○
GMA.1B.040.D	<input type="checkbox"/>			4.0 to 4.4	30	○
GMA.1B.045.D	<input type="checkbox"/>			4.5 to 4.9	30	○
GMA.1B.054.D	<input type="checkbox"/>			5.4 to 6.0	30	○
GMA.2B.040.D	<input type="checkbox"/>	<b>2V</b>	FFM.2E.130.LC	4.0 to 4.5	36	○
GMA.2B.045.D	<input type="checkbox"/>			4.0 to 5.0	36	○
GMA.2B.050.D	<input type="checkbox"/>			5.0 to 5.5	36	○
GMA.2B.060.D	<input type="checkbox"/>			6.0 to 6.5	36	○
GMA.2B.070.D	<input type="checkbox"/>			7.0 to 8.0	36	○
GMA.2B.080.D	<input type="checkbox"/>			8.0 to 9.0	36	○
GMA.3B.050.D	<input type="checkbox"/>	<b>3V</b>	FFM.3E.130.LC	4.5 to 5.2	42	○
GMA.3B.070.D	<input type="checkbox"/>			7.0 to 7.9	42	○
GMA.3B.080.D	<input type="checkbox"/>			8.0 to 8.9	42	○
GMA.3B.090.D	<input type="checkbox"/>			9.0 to 10.0	42	○



Color code	Color
A	Blue
B	White
G	Gray
J	Yellow
M	Brown
N	Black
R	Red
S	Orange
V	Green

\*Add color code to part number — see below.

Strain reliefs are made of Desmopan 786

Working temperatures  $-40^{\circ}\text{C}$   $+80^{\circ}\text{C}$  ( $-104^{\circ}\text{F}$   $+176^{\circ}\text{F}$ )

LEMO Strain Reliefs also come in Silicone, up to size 2, which can withstand temperatures from  $-70^{\circ}\text{C}$  to  $250^{\circ}\text{C}$ . To designate this type of strain relief, simply replace the D with an R on the ninth position of the part number.

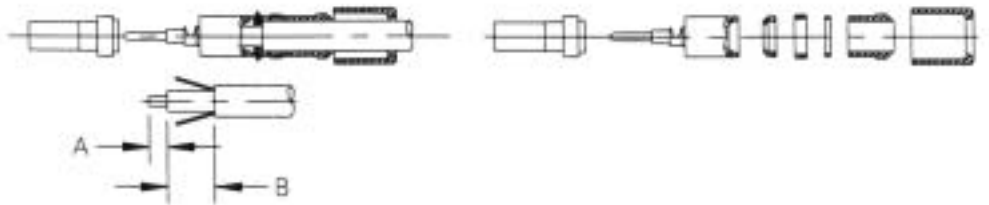
- Standard, typically 0-6 weeks delivery for quantities of 250 or less.
  - Non-standard product, contact LEMO USA, typically 6-12 weeks delivery for quantities of 250 or less.
- Non-standard is defined as a product which contains 1 or more component which is not standard.

# V Series – Assembly Instructions

1. Strip cable according to the given lengths.
2. Slide collet nut, collet, washer, gasket and earthing cone over the cable.
3. Fold screen back over earthing cone, trim excess screen.
4. Introduce conductor into contact and solder.
5. Position midpiece on insert (for multicontact, single contact, and triax inserts only).
6. Push insulator assembly into connector housing.
7. Apply threadlock sparingly to collet nut.
8. Tighten collet nut to specified torque value (page 8).

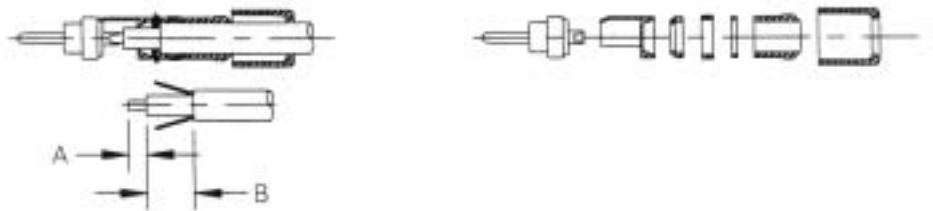
## Single Contact

Size	Dimensions (mm)	
	A	B
0	4	9
1	5	13
2	6	17
3	7	20



## Coaxial

Size	Dimensions (mm)	
	A	B
0	5	11
1	7	15
2	7	19
3	8	22



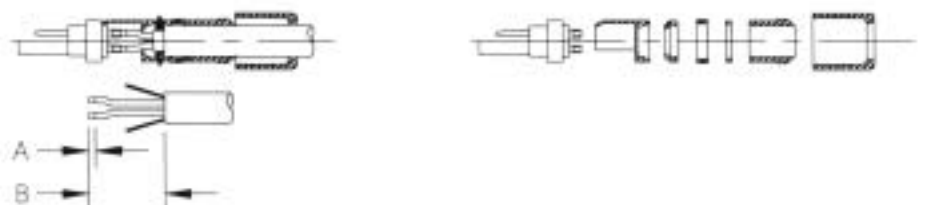
## Triaxial

Size	Dimensions (mm)				
	A	B	C	D	E
0	11.0	6.5	5.5	4.5	3.5
1	12.5	7.0	5.5	4.5	3.5
2	16.5	9.0	7.5	6.0	4.0
3	21.0	12.0	10.0	8.0	6.0



## Multicontact (shielded cable)

Size	Dimensions (mm)	
	A	B
0	3	7
1	3	10
2	4	13
3	4	17



# Connector Specification Request Form

(Please detach and mail or fax to LEMO USA, Inc., Attn. Engineering)

NAME _____	( )	REP. NAME _____	( )
TITLE _____	TELEPHONE _____	FAX NUMBER _____	E-MAIL _____
COMPANY NAME _____	MAIL STATION _____		
STREET _____			
CITY _____	STATE _____	ZIP _____	

## Customer Profile

Application description: \_\_\_\_\_

Budget: Is the project funded?  yes  no Explanation: \_\_\_\_\_

Second source: Does the customer require a second source?  yes  no

Why is LEMO being considered? Do we have a competitive advantage acknowledged by the customer? \_\_\_\_\_

## Connector Description

Shell configuration \_\_\_\_\_  Number of contacts \_\_\_\_\_

Series/Size \_\_\_\_\_  Is Bend Relief Required: Yes \_\_\_\_ No \_\_\_\_

Type of termination preferred:  solder  crimp  printed circuit  other \_\_\_\_\_

Jacket O.D. of the cable and type of material \_\_\_\_\_

Conductor diameter of the cable (AWG) \_\_\_\_\_  If coax, cable type \_\_\_\_\_

## Electrical Characteristics

Working voltage (AC/DC) \_\_\_\_\_ Peak \_\_\_\_\_  Current (amps) \_\_\_\_\_

Impedance (ohms) \_\_\_\_\_  Max. VSWR at maximum frequency \_\_\_\_\_

Working frequency: Normal \_\_\_\_\_ Maximum \_\_\_\_\_

Number of insertion cycles (1 cycle = 1 insertion + 1 withdrawal:) \_\_\_\_\_

## Environment

Operating temperatures: \_\_\_\_\_

Environment:  clean  wash down or splash  salt water spray  underwater

dirt  fluids \_\_\_\_\_  dust  gases \_\_\_\_\_

chemicals  IP rating \_\_\_\_\_  explosives  radiation

Sterilization:  yes  no method \_\_\_\_\_ cycles \_\_\_\_\_ temp \_\_\_\_\_

## Purchase Projections

Prototype order quantity (3 or less) \_\_\_\_\_  Delivery date \_\_\_\_\_

Preproduction order quantity \_\_\_\_\_  Delivery date \_\_\_\_\_

Production order quantity \_\_\_\_\_  Delivery date \_\_\_\_\_

Expected quantity involved each year \_\_\_\_\_ Target Pricing \$ \_\_\_\_\_

Applicable Standards:  UL  IEC  Other \_\_\_\_\_

Attached drawing (if necessary): \_\_\_\_\_



Data Subject to Change



# Custom Interconnect Solutions

(Please detach and mail or fax to LEMO USA, Inc., Attn. Engineering)

## Design Engineering Services

LEMO USA creates custom designs to fit your unique application, ranging from connector to multi-component assemblies.

- **Custom Connectors** – Precision designs tested to your specifications
- **Cable Assembly** – Electronic and hybrid fiber optic cable assemblies to meet a wide variety of demanding applications
- **Cable Assembly Integration** – Consultation on routing of cable and connections within your product
- **Rapid Prototyping** – Onsite engineering and rapid prototyping capabilities to assist in the high demands of product development
- **Pro/ENGINEER®** 3-D solid CAD models available

## Manufacturing Services

Outsource your manufacturing challenges. LEMO's capable engineering staff can create solutions for your cable assembly or component sub-assembly designs

- **Cable Assembly** – Expertise in both electronic and fiber optic connector termination
- **Overmolding Design and Manufacture** – Custom overmold designs to enhance aesthetics while providing durability and strength
- **Sub-Assembly Build** – Combine our connectors and cable assemblies with your sub-assemblies to provide a tested and proven module

### I am interested in:

- Design Engineering Services  
 Manufacturing Services

Please give me information on:

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NAME	( )	REP. NAME	( )
TITLE	TELEPHONE	FAX NUMBER	E-MAIL
COMPANY NAME	MAIL STATION		
STREET			
CITY	STATE	ZIP	

Data Subject to Change



# Terms and Conditions

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- 1. Acceptance:** If Buyer's order contains written, printed or stamped provisions or conditions inconsistent with the written, printed or stamped provisions of this agreement, the provisions and conditions of this agreement shall prevail. Buyer must contact LEMO USA within 10 days of receipt of LEMO USA's Terms and Conditions if any objection is raised. If an objection is raised by the Buyer to the LEMO USA Terms and Conditions, the order(s) will not be entered until agreement in writing is reached. All orders are subject to acceptance by Seller. Seller's acceptance is expressly conditional upon Buyer's acceptance of Seller's terms and conditions.
- 2. Pricing:** Prices are based on continuous manufacture rates of delivery specified. Buyer will be charged any additional cost to which Seller is put by reason of any interruption of production due to Buyer's request, act or default.
- 3. Applicable Law:** Purchase order is subject to the applicable provisions of the Uniform Commercial Code, under the laws of the state of California.
- 4. Buyer's Liability:** Buyer is liable for all product on hand, work in process and any consequential damages, for lead time specified in advance of requested date of cancellation.
- 5. License:** The submission of a quotation or order acknowledgment does not grant or imply a license under any patents now owned or controlled by Seller, or which may become owned or controlled by Seller, except to the extent that purchases are made from Seller.
- 6. Buyer's Default:** In the event Buyer cancels the contract embodied by Buyer's order and this acceptance thereof, in whole or in part, or such contract is canceled by Seller because of default by the Buyer, the Buyer shall pay Seller by reason or such cancellation or default for all damages sustained, including completed units shipped or unshipped, labor and materials on work in process and materials specific to their orders and all consequential damages, at the current price applicable to the total quantity completed at the time of default. If item or items ordered are special and/or customer specific, the Buyer shall purchase 100% of quantity ordered.
- 7. Indemnity:** Buyer hereby specifically agrees to save Seller harmless and indemnify Seller against all claims for damage or profits and for all costs and attorney fees incurred by Seller resulting from any suit or suits arising from alleged infringements of patents, design copyrights, or trademarks with respect to all goods manufactured, either in whole or in part, to Buyer's specifications.
- 8. Returns:** If product is returned, a return authorization number is required prior to return shipment and the product may be subjected to a restocking fee. Product must be returned in original packaging and in original condition. Damaged product may not be accepted for credit. All costs for refurbishment of damaged product will be paid by the Buyer. Discovery of product defect and return of product must be made in a reasonable period of time following delivery as noted in the applicable sections of the Uniform Commercial Code. In the event of a return, Seller shall have the right to substitute a conforming tender.
- 9. Changes to Specifications:** Any change in drawings or specifications may be made only upon mutual agreement.
- 10. Payment:** All invoices are delinquent at 30 days past invoice date and will be subject to 1% per month finance charge. Overdue accounts may be placed on credit hold and shipments held. Buyer agrees to pay all reasonable collection charges, including attorney fees, in the event his account is delinquent more than 60 days.
- 11. Payment Taxes:** In the event any sales tax, manufacturer's tax, or other tax is applicable to any shipment made by the Buyer on Buyer's order, such tax shall be added to the selling price and shall be paid by the Buyer.
- 12. Title/Risk of Loss:** All prices are F.O.B. Rohnert Park, California, 1% 10 days/Net 30 days and all Seller obligations hereunder are completed when we deliver the items, properly consigned, to a common carrier, Seller's delivery to such carrier shall constitute delivery thereof to the Buyer.
- 13. Warranties:** Seller warrants to Buyer that the Goods will conform substantially to the applicable drawings or design standards. The express warranty set forth in this agreement is exclusive and is in lieu of all other express or implied warranties, but not limited to, warranties of merchantability and fitness for a particular purpose.
- 14. Arbitration:** Any controversies or disputes arising out of or relating to these Terms & Conditions shall be resolved by binding arbitration in accordance with the then current Commercial Arbitration Rules of the American Arbitration Association. The parties shall endeavor to select a mutually acceptable arbitrator knowledgeable about issues relating to the subject matter. In the event the parties are unable to agree to such a selection, each party will select an arbitrator and the arbitrators in turn shall select a third arbitrator. The arbitration shall take place at a location that is reasonably centrally located between the parties, or otherwise mutually agreed upon by the parties.
- 15. Confidentiality:** Both parties acknowledge that during the course of business, each may obtain confidential information regarding the other party's business. Both parties agree to treat all such information as confidential and to take all reasonable precautions against disclosure of such information to unauthorized third parties during and for five (5) years after the term of all orders. Upon request by an owner, all documents relating to the confidential information will be returned to such owner.
- 16. Assignment:** It is agreed by the parties that there will be no assignment or transfer of any order nor any interest in any orders. Action by a party in violation of this provision will dismiss the other party from any further obligations arising from any orders.
- 17. Entire Terms & Conditions:** These Terms & Conditions contain the entire agreement of the parties and there are no other promises or conditions in any other agreements whether oral or written. This document supersedes any prior written or oral agreements between the parties.
- 18. Amendment:** These Terms & Conditions may be modified or amended if the amendment is made in writing and is signed by both parties.
- 19. Severability:** If any provision of these Terms & Conditions shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision is invalid or unenforceable, but that by limiting such provision it would become valid and enforceable, then such provision shall be deemed to be written, construed and enforced as so limited.
- 20. Waiver of Contractual Right:** The failure of either party to enforce any provision of these Terms & Conditions shall not be construed as a waiver or limitation of that party's right to subsequently enforce and compel strict compliance with every provision of this Contract.
- 21. Limitation on Damages:** Buyer's consequential or incidental damages for any breach of the contract by Seller will be limited to the purchase price. Seller will have no liability to Buyer for any damages, losses, liabilities, injuries, claims, demands or expenses arising out of or directly or indirectly connected with the use of the product. Seller shall not be liable for any exemplary, indirect, incidental, or consequential damages sustained or incurred in connection with the use of the product regardless of the product regardless of the form of action, whether in contract, tort (including negligence) or strict liability.

# Conversion Table

## Millimeters/Inches

(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
0.15	0.0059	3.40	0.1338	9.00	0.3543	17.0	0.6692	25.5	1.0039	37.9	1.4291	67.0	2.6377
0.16	0.0062	3.50	0.1377	9.10	0.3582	17.1	0.6732	25.7	1.0118	38.0	1.4960	67.5	2.6574
0.18	0.0070	3.60	0.1417	9.20	0.3622	17.3	0.6811	26.0	1.0236	38.5	1.5157	68.0	2.6771
0.20	0.0078	3.70	0.1456	9.50	0.3740	17.4	0.6850	26.2	1.0314	39.0	1.5354	69.0	2.7165
0.23	0.0090	3.80	0.1496	9.60	0.3780	17.5	0.6889	26.3	1.0354	39.3	1.5472	69.5	2.7362
0.25	0.0098	3.90	0.1535	9.70	0.3818	17.6	0.6929	26.5	1.0433	39.5	1.5551	70.0	2.7559
0.28	0.0110	4.00	0.1574	9.90	0.3897	17.8	0.7007	26.8	1.0551	40.0	1.5748	71.0	2.7952
0.30	0.0118	4.10	0.1614	10.0	0.3937	17.9	0.7042	27.0	1.0629	40.3	1.5866	72.0	2.8346
0.32	0.0125	4.20	0.1653	10.1	0.3976	18.0	0.7086	27.2	1.0708	40.6	1.5984	73.0	2.8740
0.40	0.0157	4.30	0.1693	10.2	0.4015	18.1	0.7125	27.3	1.0748	41.0	1.6141	73.5	2.8936
0.48	0.0188	4.50	0.1771	10.3	0.4055	18.2	0.7156	27.5	1.0826	41.2	1.6220	74.0	2.9133
0.50	0.0196	4.52	0.1780	10.5	0.4133	18.5	0.7283	27.7	1.0905	41.4	1.6299	75.0	2.9527
0.51	0.0200	4.60	0.1811	10.6	0.4173	18.7	0.7362	27.8	1.0944	41.5	1.6338	75.5	2.9724
0.54	0.0212	4.70	0.1850	10.7	0.4212	18.8	0.7401	28.0	1.1023	41.7	1.6417	76.0	2.9921
0.57	0.0224	4.77	0.1877	10.8	0.4251	18.9	0.7440	28.2	1.1102	41.8	1.5456	76.5	3.0118
0.60	0.0236	4.80	0.1889	10.9	0.4291	19.0	0.7480	28.3	1.1141	42.0	1.6535	77.0	3.0314
0.64	0.0251	4.85	0.1909	11.0	0.4330	19.1	0.7519	28.5	1.1220	42.3	1.6653	78.0	3.0708
0.70	0.0275	4.90	0.1929	11.1	0.4370	19.3	0.7598	28.8	1.1338	42.5	1.6732	79.5	3.1299
0.72	0.0283	5.00	0.1968	11.2	0.4409	19.5	0.7677	28.9	1.1377	43.0	1.6924	80.0	3.1496
0.75	0.0295	5.08	0.2000	11.3	0.4448	19.6	0.7716	29.0	1.1417	43.2	1.7007	81.0	3.1889
0.80	0.0314	5.20	0.2047	11.5	0.4527	19.8	0.7795	29.5	1.1614	43.5	1.7125	81.5	3.2086
0.87	0.0342	5.30	0.2086	11.6	0.4566	19.9	0.7834	29.8	1.1732	44.0	1.7322	82.0	3.2283
0.90	0.0354	5.38	0.2118	11.7	0.4606	20.0	0.7874	30.0	1.1811	44.5	1.7519	83.0	3.2677
0.91	0.0358	5.40	0.2125	11.9	0.4685	20.1	0.7913	30.2	1.1889	45.0	1.7716	84.0	3.3070
1.00	0.0393	5.50	0.2165	12.0	0.4724	20.2	0.7952	30.5	1.2007	45.5	1.7913	85.0	3.3464
1.02	0.0401	5.60	0.2204	12.1	0.4763	20.3	0.7992	31.0	1.2204	46.0	1.8110	86.0	3.3858
1.05	0.0413	5.70	0.2244	12.2	0.4803	20.5	0.8070	31.4	1.2362	46.5	1.8307	89.0	3.5039
1.10	0.0433	5.80	0.2283	12.3	0.4842	20.6	0.8110	31.5	1.2401	46.6	1.8350	90.0	3.5433
1.15	0.0452	6.00	0.2362	12.4	0.4881	20.7	0.8149	31.6	1.2440	47.0	1.8503	91.0	3.5826
1.20	0.0472	6.10	0.2401	12.5	0.4921	21.0	0.8267	31.7	1.2480	48.0	1.8897	92.0	3.6220
1.29	0.0508	6.20	0.2440	12.6	0.4960	21.2	0.8346	31.8	1.2519	49.0	1.9291	93.0	3.6614
1.37	0.0539	6.30	0.2480	12.9	0.5089	21.3	0.8385	31.9	1.2559	50.0	1.9685	94.0	3.7007
1.40	0.0551	6.35	0.2500	13.0	0.5118	21.4	0.8425	32.0	1.2598	50.5	1.9881	95.0	3.7401
1.45	0.0570	6.40	0.2519	13.1	0.5157	21.5	0.8464	32.2	1.2677	51.0	2.0078	96.0	3.7795
1.50	0.0590	6.50	0.2559	13.2	0.5196	21.6	0.8503	32.3	1.2716	51.7	2.0354	98.0	3.8582
1.55	0.0610	6.55	0.2578	13.3	0.5236	21.7	0.8543	32.5	1.2795	52.0	2.0472	99.0	3.8976
1.57	0.0618	6.60	0.2598	13.5	0.5314	21.8	0.8582	33.0	1.2992	52.5	2.0669	100	3.9370
1.60	0.0629	6.70	0.2637	13.6	0.5354	22.0	0.8661	33.5	1.3188	53.0	2.0866	102	4.0157
1.63	0.0641	6.90	0.2716	13.7	0.5393	22.1	0.8700	33.6	1.3228	53.2	2.0944	103	4.0551
1.70	0.0669	7.00	0.2755	13.8	0.5433	22.4	0.8818	33.7	1.3267	54.0	2.1259	105	4.1338
1.80	0.0708	7.10	0.2795	13.9	0.5472	22.5	0.8858	33.9	1.3346	54.5	2.1456	106	4.1732
1.90	0.0748	7.20	0.2834	14.0	0.5511	22.7	0.8936	34.0	1.3385	55.0	2.1653	106.5	4.1929
2.00	0.0787	7.30	0.2874	14.1	0.5551	23.0	0.9055	34.2	1.3464	55.5	2.1850	107	4.2125
2.05	0.0807	7.40	0.2913	14.2	0.5590	23.2	0.9133	34.5	1.3582	56.0	2.2047	108	4.2519
2.10	0.0826	7.50	0.2952	14.5	0.5708	23.5	0.9251	34.6	1.3622	56.5	2.2244	109	4.2913
2.20	0.0866	7.60	0.2992	14.8	0.5826	23.6	0.9291	34.7	1.3661	57.0	2.2440	112	4.4094
2.40	0.0944	7.62	0.3000	14.9	0.5866	23.7	0.9330	35.0	1.3779	58.0	2.2834	112.5	4.4291
2.50	0.0984	7.70	0.3031	15.0	0.5905	24.0	0.9448	35.1	1.3818	58.7	2.3110	113	4.4488
2.54	0.1000	7.80	0.3070	15.1	0.5944	24.1	0.9488	35.2	1.3858	59.0	2.3228	118	4.6456
2.58	0.1015	7.90	0.3110	15.2	0.5984	24.2	0.9527	35.5	1.3976	59.7	2.3503	120	4.7244
2.60	0.1023	8.00	0.3149	15.3	0.6023	24.3	0.9566	35.7	1.4055	60.0	2.3622	123.5	4.8622
2.70	0.1062	8.05	0.3169	15.5	0.6102	24.4	0.9606	35.8	1.4094	60.5	2.3818	125	4.9212
2.80	0.1102	8.10	0.3188	15.6	0.6141	24.5	0.9645	36.0	1.4173	61.0	2.4015	129	5.0787
2.90	0.1141	8.20	0.3228	15.8	0.6220	24.6	0.9685	36.1	1.4212	61.5	2.4212	130	5.1181
2.95	0.1161	8.30	0.3267	16.0	0.6229	24.7	0.9724	36.3	1.4291	62.0	2.4409	131.5	5.1771
3.00	0.1181	8.45	0.3326	16.1	0.6338	24.8	0.9763	36.5	1.4370	62.5	2.4606	135	5.3149
3.10	0.1220	8.50	0.3346	16.2	0.6377	25.0	0.9842	36.8	1.4488	63.0	2.4803	138	5.4330
3.17	0.1248	8.60	0.3385	16.5	0.6496	25.1	0.9881	37.0	1.4566	64.0	2.5196	145	5.7086
3.20	0.1259	8.70	0.3425	16.7	0.6574	25.2	0.9921	37.5	1.4763	64.7	2.5472	146	5.7480
3.25	0.1279	8.80	0.3464	16.8	0.6614	25.3	0.9960	37.6	1.4803	65.0	2.5590	150	5.9055
3.30	0.1299	8.90	0.3503	16.9	0.6653	25.4	0.9999	37.8	1.4881	66.0	2.5984	198	7.7952

Values relating to LEMO connectors are highlighted.

Data Subject to Change



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