

# SMPTE 304 HDTV CONNECTION SYSTEM 3K.93C.Y SERIES



## New design, less components

The FS contact used in the 3K.93C.Y series is a re-design of the original F2 contact developed in 1992. The new FS has a reduced number of components and fits into a new designed connector.

This new product line has less components and makes no compromise on quality and the new version is still fully SMPTE 304 interface compatible. The insulator is now made in two parts with sideways insertion of the FS optical contact meaning a dedicated contact extraction tool is no longer required.

### Advantages:

- New design allows easy fibre length adjustment
- No half-shells are required
- Increased internal space for the fibres and electrical conductors
- Epoxy curing time for the optical contacts halved to 20 minutes.



## Precision modular connectors to suit your application

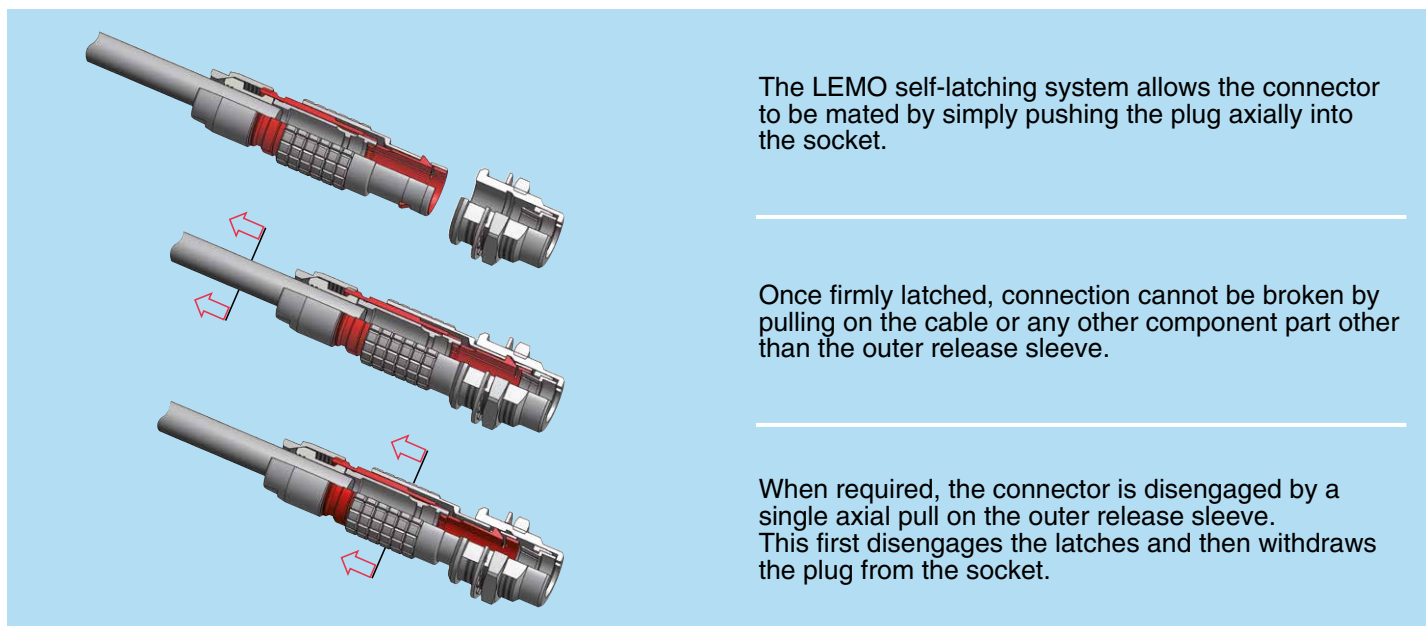
Since its creation in Switzerland in 1946 the LEMO Group has been recognized as a global leader of circular Push-Pull connectors and connector solutions. Today LEMO and its affiliated companies, REDEL and COELVER, are active in more than 80 countries with the help of over 40 subsidiaries and distributors.

## Over 75000 connectors

The modular design of the LEMO range provides over 75000 connectors from miniature  $\varnothing$  3 mm to  $\varnothing$  50 mm, capable of handling cable diameters up to 30 mm and for up to 114 contacts. This vast portfolio enables you to select the ideal connector configuration to suit almost any specific requirement in most markets, including medical devices, test and measurement instruments, machinery, audio video broadcast, telecommunications and military.

## LEMO's Push-Pull Self-Latching Connection System



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



## UL Recognition

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

## CE marking

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

## RoHS

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

## Product safety notice & disclaimers

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

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

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

## 3K.93C.Y Series

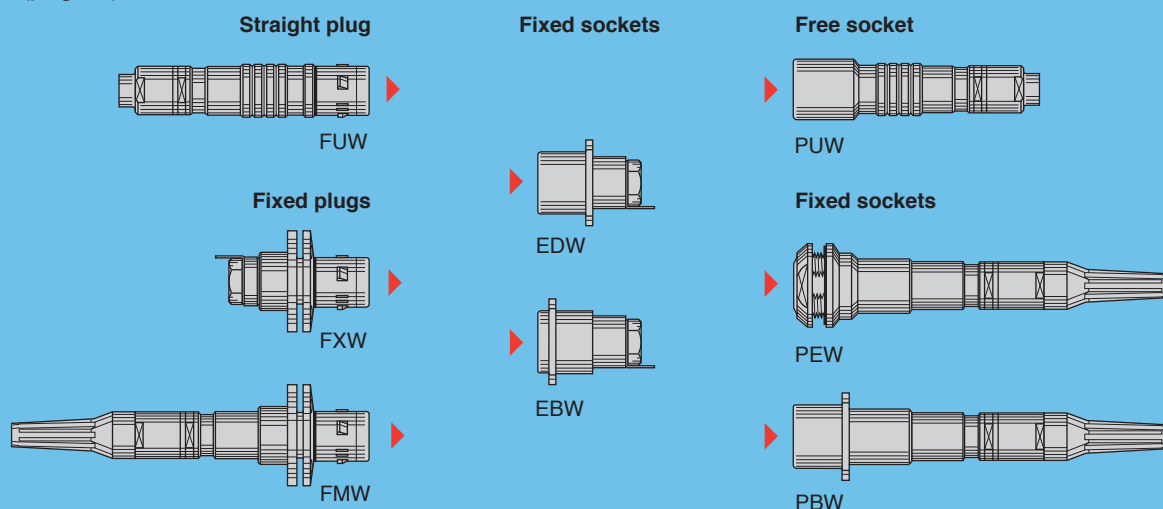
The LEMO 3K.93C.Y connectors with keys (W), ideal for blind mating, were developed to meet the critical requirements of the new generation of digital HDTV cameras.

The main features of this series are as follows:

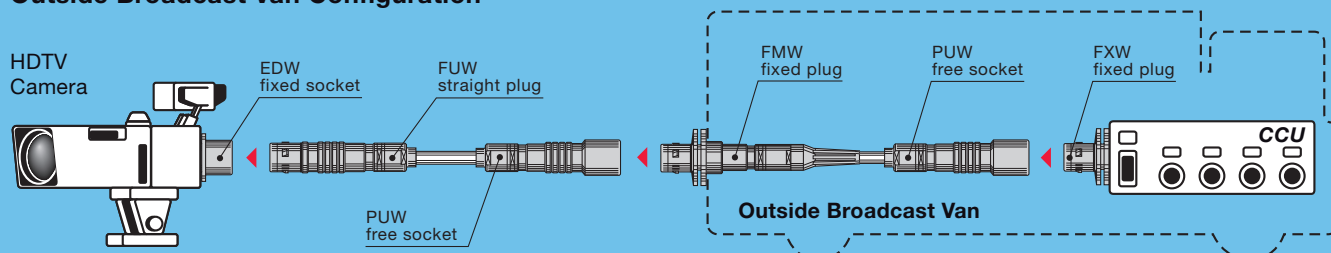
- Security of the LEMO Push-Pull self-latching system
- Fitted with the new LEMO **FS** fibre optic contacts.
- Conforms to the Japanese ARIB technical report BTA S-1005B, to the SMPTE 304 standard and to the European EBU Technical Recommendation R100-1999.
- Qualified for use in UL approved equipment such as those specified in UL 1977 (UL file E119802).
- Cabled connectors have obtained the EC Attestation of conformity No: N8 00 03 39058 001 from the German TÜV Product Service.

The 3K.93C.Y series consists of eight models which will accept cables specific to this application.

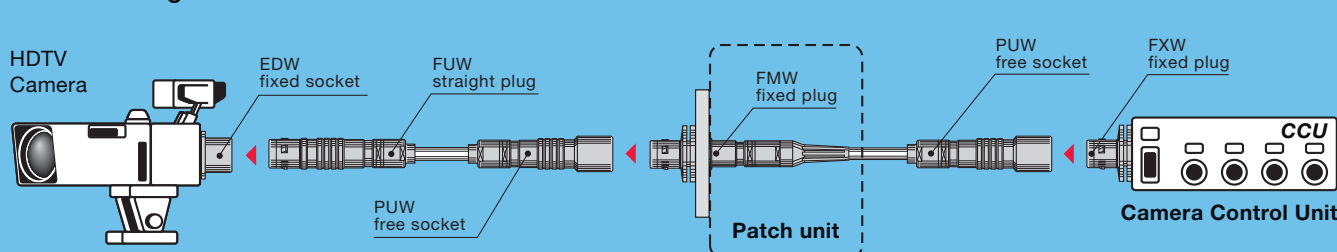
### Models (page 6)



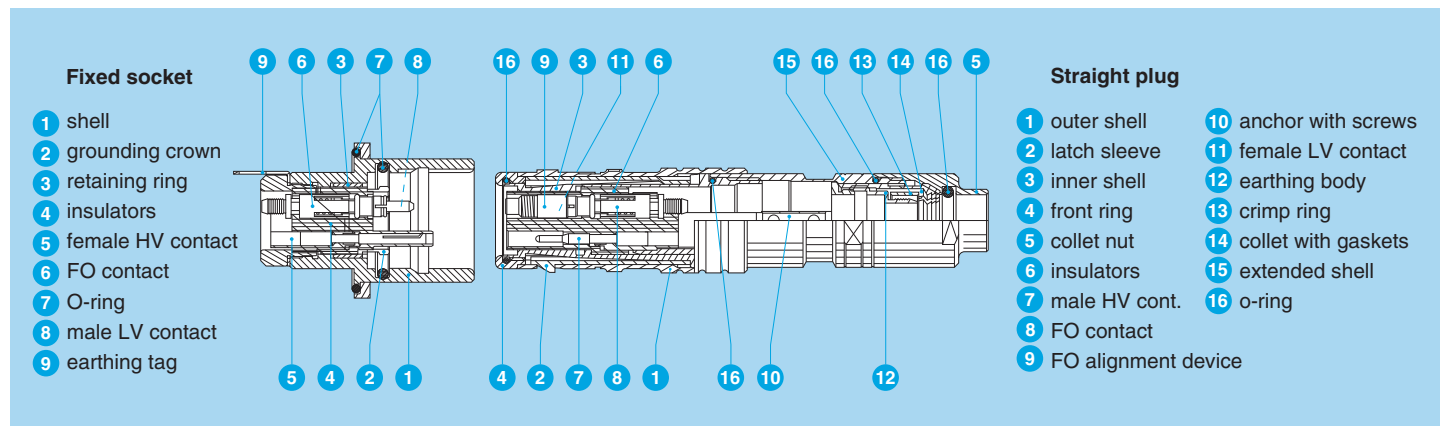
### Outside Broadcast Van Configuration



### Studio Configuration



## Part section showing internal components



## Technical characteristics

### Materials and treatments

Component	Material (Standard)	Surface treatment (µm)								
		chrome			nickel		gold			
		Cu	Ni	Cr	Cu	Ni	Cu	Ni	Au	
Outer shell, collet nut and oversized collet	Brass (UNS C 38500)	0.5	3	0.3						
	Stainless steel (AISI 303)	without treatment								
Grounding crown	Special brass				0.5	3				
Latch sleeve	Stainless steel (AISI 416)	without treatment								
Locking washer	Bronze (UNS C 52100)				0.5	3				
Hexagonal nut or round nut	Brass (UNS C 38500)				0.5	3				
Male crimp contact	Brass (UNS C 34500)						0.5	3	1.0	
Female crimp contact	Bronze (UNS C 54400)						0.5	3	1.5	
Clips	Cu-Be (FS-QQ-C-530)	without treatment								
Insulator	PEEK									
Crimping tube	Copper (UNS C 18700)				0.5	3				
Other metallic components	Brass (UNS C 38500)				0.5	3				
	Stainless steel (AISI 304L)	without treatment								
O-ring and gaskets	Silicone MQ/MVQ, FPM/FKM (Viton®)									

### Electrical

Characteristics	Value	Standard
Insulation resistance	$> 10^{12} \Omega$	IEC 60512-2 test 3a
Shell electrical continuity	$< 1.6 \text{ m}\Omega$	IEC 60512-2 test 2f
Contact resistance (signal)	$< 4.8 \text{ m}\Omega$	IEC 60512-2 test 2a
Contact resistance (power)	$< 3.6 \text{ m}\Omega$	IEC 60512-2 test 2a
Radiated emission	freq. 30-220 MHz	$< 30 \text{ dB}\mu\text{V/m}$ EN 55022 class B
	freq. 220-1000 MHz	$< 37 \text{ dB}\mu\text{V/m}$ EN 55022 class B

### Optical

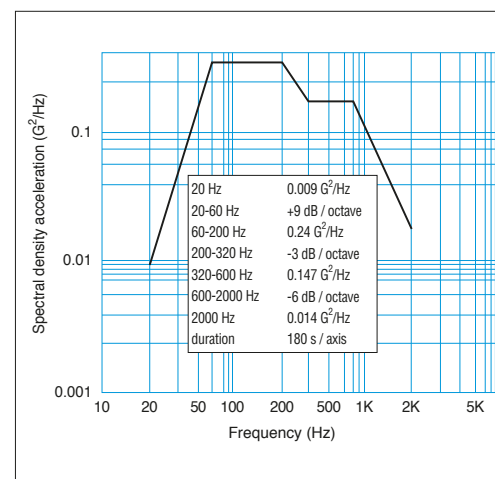
Characteristics	Value	Standard	Method
Average insertion loss fibre 9/125 µm	0.10 dB	IEC 61300-03-04	Insertion Method B
Return loss fibre 9/125 µm (UPC)	$\geq 45 \text{ dB}$	IEC 61300-03-06	Branching Device Met.

## Mechanical and environmental

Characteristics	Value	Standard
Mating durability (Stainless steel+St. steel)	20000 cycles	IEC 61300-02-02
Damp heat steady state	up to 95% at 60°C	IEC 61300-02-19
High temperature	+80°C	IEC 61300-02-18
Low temperature	-40°C	IEC 61300-02-17
Temperature cycling	-55°C + 90°C	
Cable retention	1000 N	IEC 61300-02-04
Impact (Method A)	2 m onto concrete floor	IEC 61300-02-12
Shock (3 cycles in 2 directions)	100 g, 10-50 ms; 20 g 6-9 ms	IEC 61300-02-09
Water resistance (Depth of 1.8 for 48 h)	IP 68 <sup>1)</sup>	IEC 60529
Salt spray corrosion test <sup>2)</sup>	> 1000 h	IEC 60512-6 test 11f

**Note:** <sup>1)</sup> except FX● and FM● models.  
<sup>2)</sup> for chrome plated product (« C » material code).

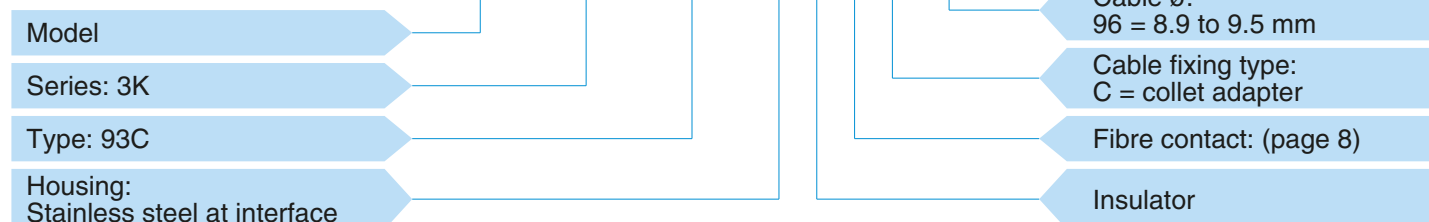
## Vibration



## Part number example

### Straight plug and free socket

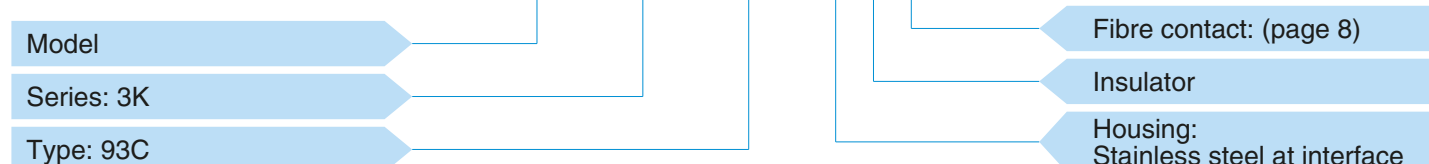
**F U W . 3 K . 9 3 C . Y S K C 9 6**



**FUW.3K.93C.YSKC96** = Straight plug with keys (W), 3K series, hybrid type to accept 2 FS type fibre optic contacts, 2 power and 2 signal electrical contacts, stainless steel housing, PEEK insulator, female crimp signal contacts, cable fixing type C for 9.2 mm diameter cable.

### Fixed socket

**E D W . 3 K . 9 3 C . Y S E**



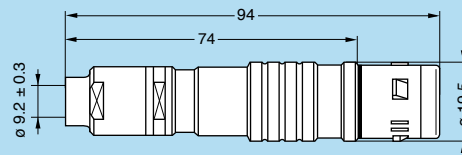
**EDW.3K.93C.YSE** = Fixed socket with rear square flange, keys (W), 3K series, hybrid type to accept 2 FS type fibre optic contacts, 2 power and 2 signal electrical contacts, stainless steel housing, PEEK insulator, male crimp signal contacts.



3 K 9 3 C Y

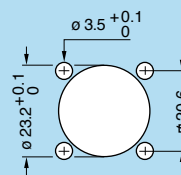
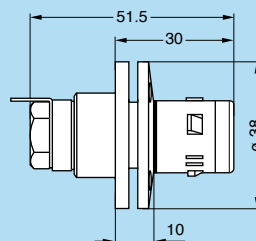
## Models

### FUW.3K.93C.YSKC96 Straight plug, cable collet adapter and long shell for fitting a bend relief with cap



**Note:** The bend relief must be ordered separately (see page 9).

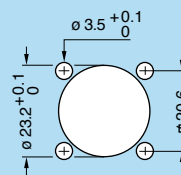
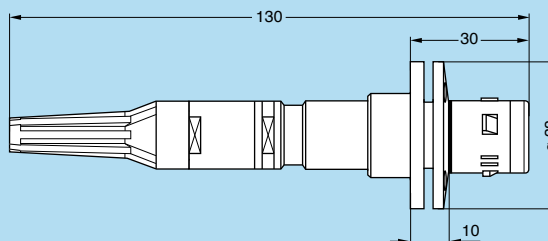
### FXW.3K.93C.YSE Fixed plug, round flange (4 holes mounting), without collet



Panel cut-out

**Note:** Only available for IP 50 in mated condition.

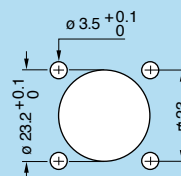
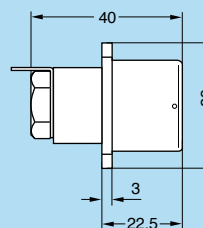
### FMW.3K.93C.YSKC96Z Fixed plug, round flange (4 holes mounting), cable adapter, for bend relief



Panel cut-out

**Note:** Only available for IP 50 in mated condition.  
The bend relief must be ordered separately (see page 9).

### EDW.3K.93C.YSE Fixed socket with rear square flange, (4 holes mounting), and earthing tag

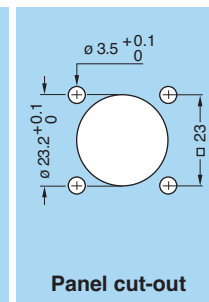
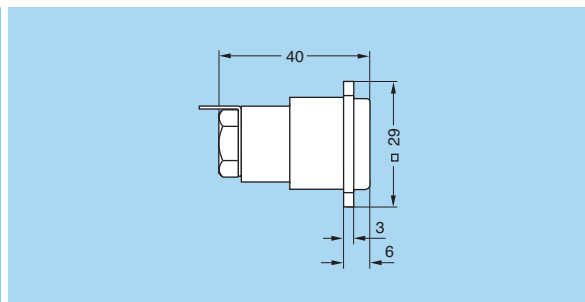


Panel cut-out



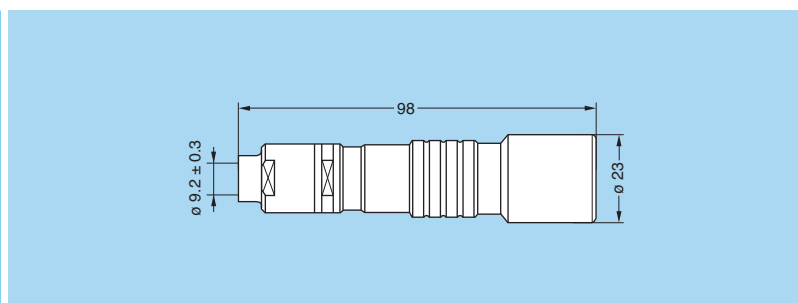
## EBW.3K.93C.YSE

### Fixed socket with front square flange, (4 holes mounting)



## PUW.3K.93C.YSKC96

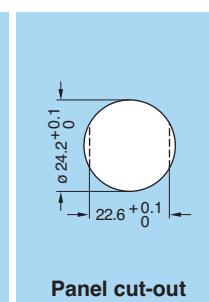
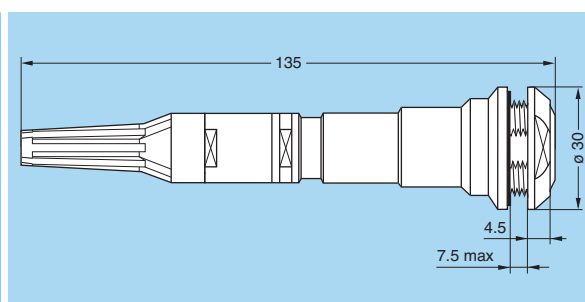
### Free socket, cable collet adapter and long shell for fitting a bend relief with cap



**Note:** The bend relief must be ordered separately (see page 9).

## PEW.3K.93C.YSKC96Z

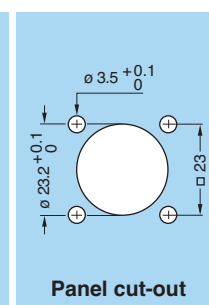
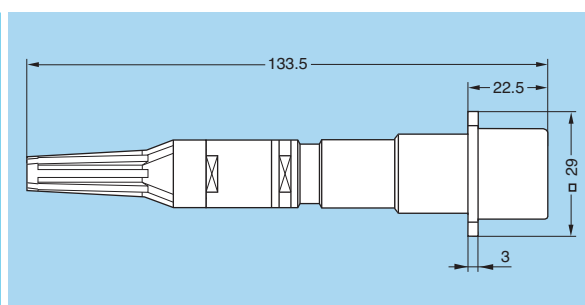
### Fixed socket, nut fixing, cable adapter, for bend relief (back panel mounting)



**Note:** The bend relief must be ordered separately (see page 9).

## PBW.3K.93C.YSKC96Z

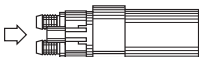
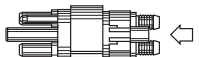
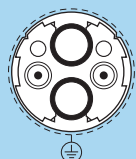
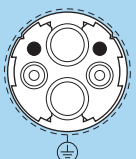
### Fixed socket with rear square flange, (4 holes mounting), cable adapter, for bend relief



**Note:** The bend relief must be ordered separately (see page 9).



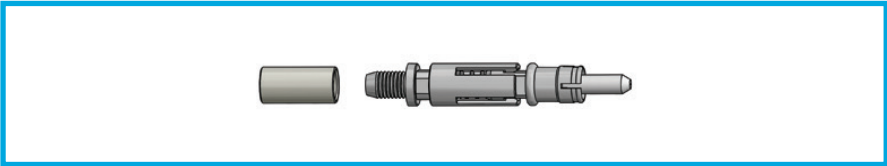
Insert configurations

Number of fibre optic contacts			Reference	Fibre optic contact			Electrical crimp contact								
	Plug insulator	Socket insulator		Contact type for plug	Fibre core/cladding (μm)	Ferrule bore inside ø (μm)	Number of contacts	Contact function	Contact type for plug	Contact ø (mm)	AWG range	Creepage distance and air clearance (mm)	Working voltage (V rms)	Test voltage (V rms)	Rated current (A)
2			93C	fem.	9/125	125	2	signal	LV male	0.9	20-24		≤ 42	1000	3
							2	power	HV male	1.3	14-18	> 6.5	≤ 600	2250	10



Fibre optic contact

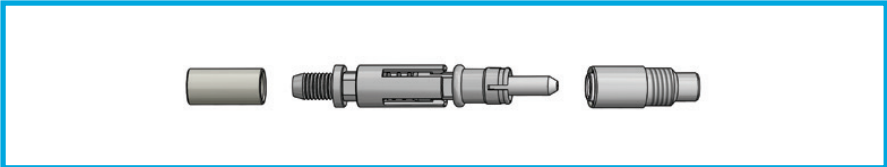
FFS.FS Male FS Fibre Optic Contact



Ref.	Contact	Ferrule hole	Model	Gender	Note
E	FFS.FS.BA2.YCE30	125 µm	EDW / EBW	Male	●
K	FFS.FS.BA2.YCT10	125 µm	PUW / PEW / PBW	Male	●
X	FFS.FS.BX2.YCE30	125.5 µm	EDW / EBW	Male	●
V	FFS.FS.BX2.YCT10	125.5 µm	PUW / PEW / PBW	Male	●

● First choice - highest performance

PSS.FS Female FS Fibre Optic Contact



Ref.	Contact	Ferrule hole	Model	Gender	Note
E	PSS.FS.BA2.YCE30	125 µm	FXW	Female	●
K	PSS.FS.BA2.YCT10	125 µm	FUW / FMW	Female	●
X	PSS.FS.BX2.YCE30	125.5 µm	FXW	Female	○
V	PSS.FS.BX2.YCT10	125.5 µm	FUW / FMW	Female	○

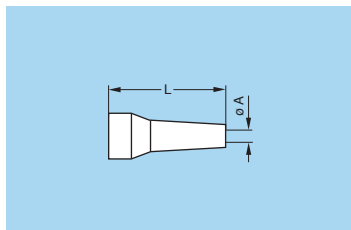
● First choice - highest performance  
○ Alternative - tight-fitting fibre





## Accessories

### GMA Bend relief



Part number	Dim. (mm)	
	A	L
<b>GMA.3B.090.DN</b>	9	42

**Note:** Other diameters and colours available upon request.

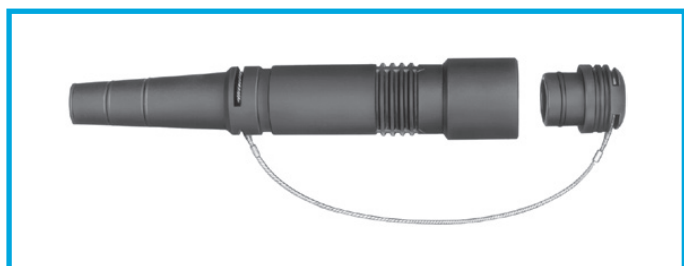
### GMF Bend relief with cap for FUW plug



Part number
<b>GMF.3K.085.EANZ</b>

● Material: black ALCRYN®

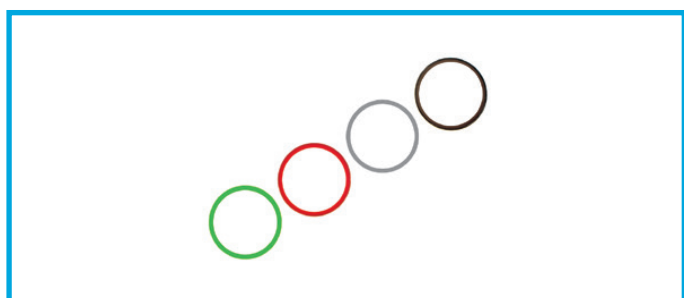
### GMP Bend relief with cap for PUW free socket



Part number
<b>GMP.3K.085.EANZ</b>

● Material: black ALCRYN®

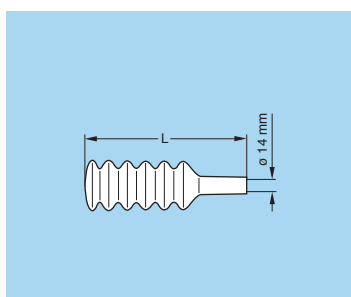
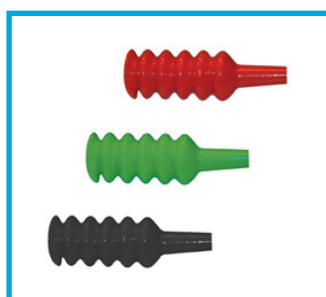
### GMF Coloured ring for bend relief with cap



Part number	Colour
<b>GMF.3K.265.RG</b>	grey
<b>GMF.3K.265.RN</b>	black
<b>GMF.3K.265.RR</b>	red
<b>GMF.3K.265.RV</b>	green

● Material: Silicone

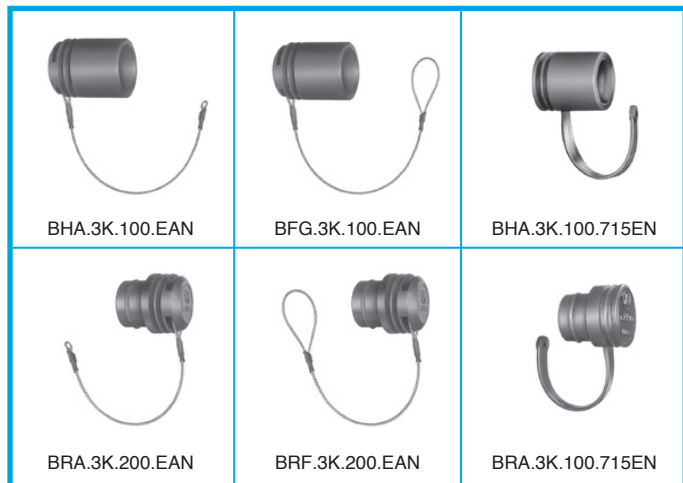
### GM● Gaiters



Part number	Colour	Dimension L (mm)	For connector model
<b>GMP.3K.140.165PER</b>	red	165	PUW
<b>GMP.3K.140.165PEN</b>	black	165	PUW
<b>GMF.3K.140.156PEV</b>	green	156	FUW
<b>GMF.3K.140.156PEN</b>	black	156	FUW

● Material: PVC

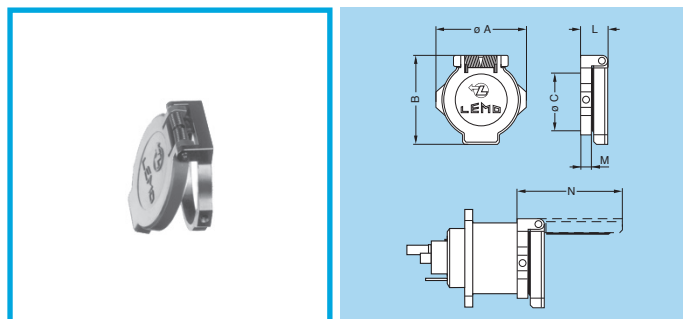
## B●● Blanking caps



Part number	For connector model
<b>BHA.3K.100.EAN</b>	FMW, FXW
<b>BRA.3K.200.EAN</b>	EDW, PEW
<b>BFG.3K.100.EAN</b>	FUW
<b>BRF.3K.200.EAN</b>	PUW
<b>BHA.3K.100.715EN</b>	FMW, FXW
<b>BRA.3K.100.715EN</b>	EBW, EDW, PBW, PEW

● Material: black ALCRYN®

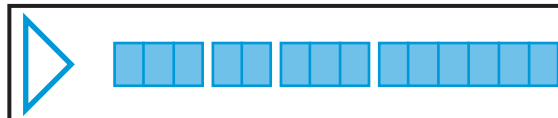
## BRR Spring loaded dust cap for EDW and EBW



Part number	Dimensions (mm)					
	A	B	C	L	M	N
<b>BRR.3K.200.PZSG</b>	29	29	23	8.1	3	33.2

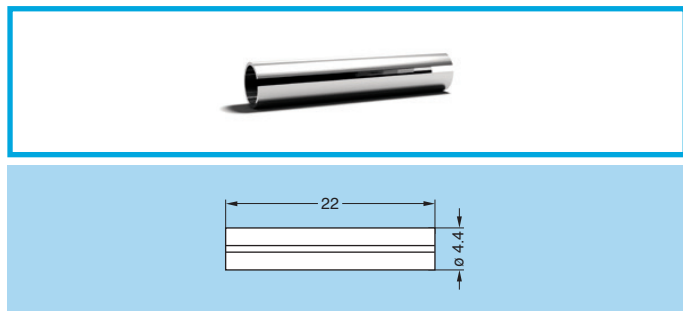
**Note:** On request, this cap is available in black. If so replace the last letter «G» of the part number by «N».

● Material: Polyoxymethylene (POM) grey (or black)



## Tooling

## WST Fibre shield for oven curing (only 3K.93C.Y)



Part number
<b>WST.TU.194.LN</b>

● Material: Nickel plated brass

## DCS.F2.035.PN Alignment device tool



Simple tool with two threaded end for installation/extraction of the F2/FS contact alignment device. For use with WST.KI.125.34 kit above.

## WST.KI.125.34 Cleaning kit F2/FS contact



Fibre optic cleaning kit of 2 cotton buds, 1 dry and 1 being soaked in IPA (Isopropyl Alcohol) used for cleaning the fibre optic contacts.

## DCS.F2.N02.PA Fibre Optic one-click cleaner



Insert the one-click cleaner into the insulator and push until an audible "click" is heard. The cleaner uses a mechanical push action to advance an optical grade cleaning tape. More than 500 cleaning per cleaner. Product includes special LEMO F2/FS ferrule adaptor.

## WST.FB.CI1.10US2 Video inspection viewer



A portable fibre optic viewer for F2/FS contact consisting of handset probe, LCD display, ferrule tips for LEMO contacts & software & United States - AC power supply all in a rugged case. European power supply version (WST.FB.CI1.10EU2). An optional USB capture device is also available (part number: WST.FB.CI1.00USB2).

## DCS.3K.175.72LN Cable puller



The LEMO cable puller, is a pull through tool that allows passing the cable through narrow sections and protects the optical fibre during installation.

## WST.TE.HDTV HD cable tester



This cable tester provides a quick and easy means of checking the functionality of HD hybrid fibre cables and cable systems. A laser source checks the fibres giving an indication of the attenuation through the whole cable or cable system, and electrical tests check for continuity of both the power and control conductors.

**Note:** Available on request.

## Repair kit for plug FUW.3K.93C.YSKC96, free socket PUW.3K.93C.YSKC96, fixed plug FXW.3K.93C.YSE and socket EDW.3K.93C.YSE



Repair kit part number  
for FUW plug

**FUW.3K.93C.ZSMY96**

Repair kit part number  
for FXW plug

**FXW.3K.93C.ZSM**



Repair kit part number  
for PUW socket

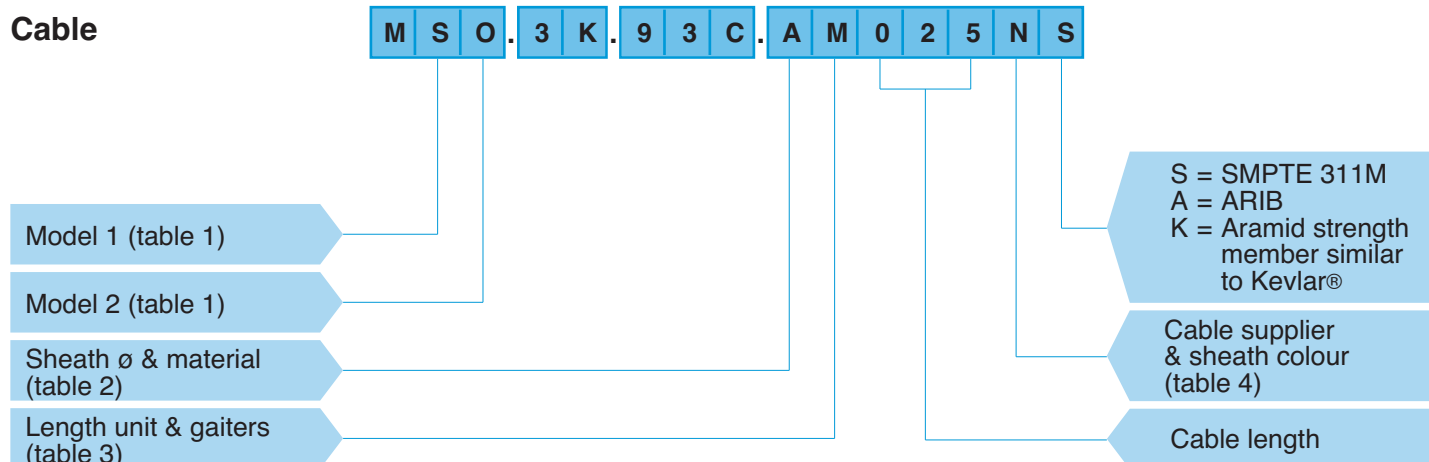
**PUW.3K.93C.ZSCY96**

Repair kit part number  
for EDW socket

**EDW.3K.93C.ZSC**

# Cable assembly

## Part Number Example



**MSO.3K.93C.AM025NS** = 1 FUW plug and 1 PUW socket (key W), 3K.93C.Y series, on a SMPTE 311M screened cable, 25 m length, sheath ø 9.2 mm, black RAL 9005 jacket colour, with GMF/GMP bend relief with cap.

**Table 1**  
Model

Model 1 & 2	Code
FUW	<b>S</b>
FXW	<b>N</b>
PUW	<b>O</b>
EDW	<b>Y</b>
FMW	<b>A</b>
PEW	<b>C</b>
PBW	<b>J</b>

**Table 2**  
Sheath ø & material

Sheath ø (mm)	Code	
	PVC <sup>1)</sup>	PUR
9.2	<b>A</b>	<b>R</b>
4.2	<b>B</b>	<b>S</b>
6.8	<b>C</b>	<b>T</b>
12.0	<b>D</b>	<b>U</b>
16.0	<b>E</b>	<b>V</b>

**Table 3**  
Length unit & gaiters

	No Gaiter	Red gaiter free socket Green gaiter plug	2 black gaiters	2 yellow gaiters
cm	<b>C</b>	E		
dm	<b>D</b>	F		
m	<b>M</b>	G	N	J
km	<b>K</b>	L		
inch	<b>I</b>			
feet	<b>T</b>			

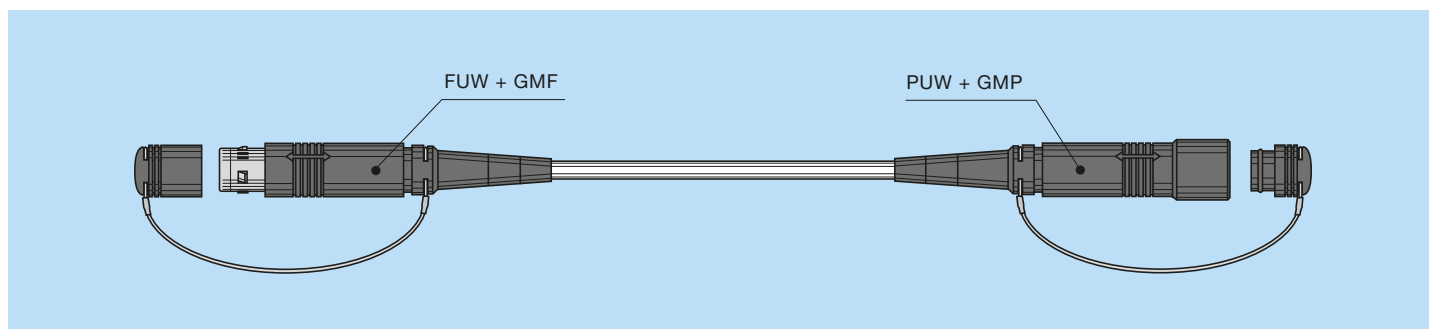
**Table 4**  
Cable supplier & sheath colour

Code	Cable supplier & sheath colour
<b>N</b>	Northwire Black
<b>G</b>	Northwire Grey
<b>A</b>	Northwire Blue
<b>F</b>	Furukawa Black
<b>B</b>	Belden Black

**Note:** <sup>1)</sup> PVC not recommended for temperatures below -20°C.

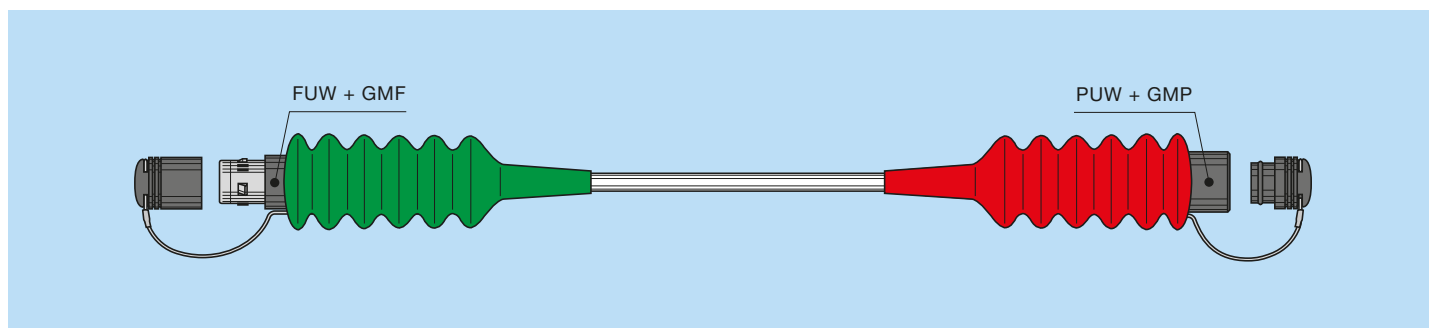
### MSO Outside broadcast cable assembly

Cable assembly with one straight plug (FUW) and one straight socket (receptacle) (PUW), both complete with GMF/GMP bend relief with cap.



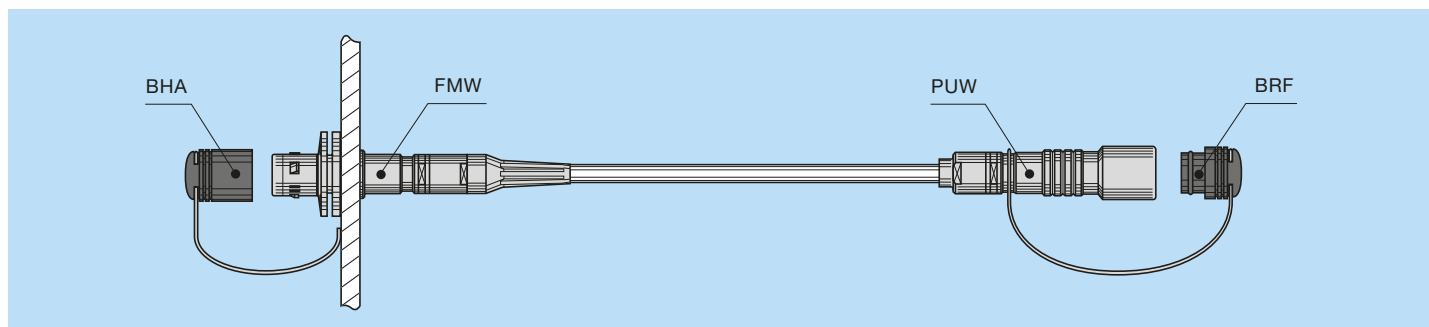
### MSO Outside broadcast cable assembly

Cable assembly with one straight plug (FUW) and one straight socket (receptacle) (PUW), both complete with GMF/GMP bend relief with cap and gaiters.



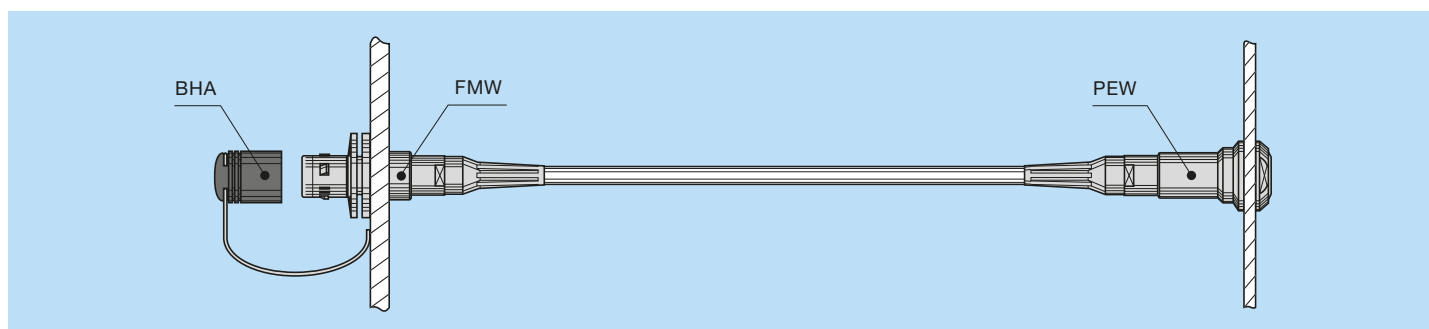
### MAO Internal OB van cable assembly

Cable assembly with one fixed plug (FMW) and one straight socket (receptacle) (PUW), both complete with BHA/BRF caps.



### MAC Studio/Infrastructure cable assembly

Assembly cable with one fixed plug (FMW) and one straight socket (receptacle) (PEW).



## Part Number Example

### Duplex pigtails

M	N	T	3	K	9	3	C	Y	Z	Z	C	0	5	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Model  
N = FXW  
Y = EDW

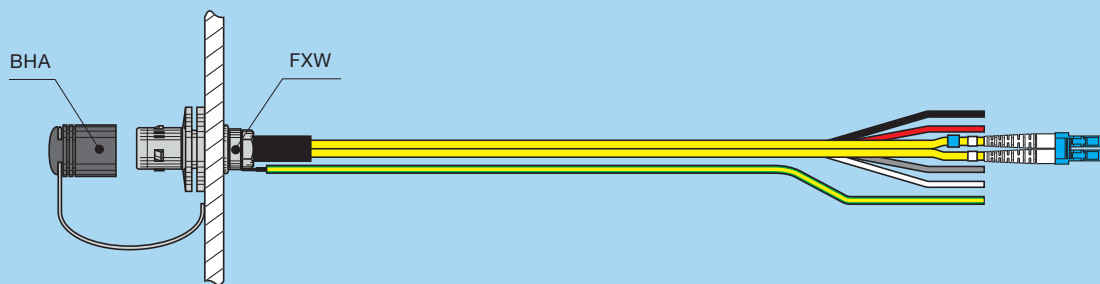
T = Pigtail (LC)  
S = Pigtail (ST)  
C = Pigtail (SC)

Cable length (cm)

**MNT.3K.93C.YZZC050** = 1 FXW plug (key W), 3K.93C.Y series and two pigtails (LC) on the other side, 50 cm length.

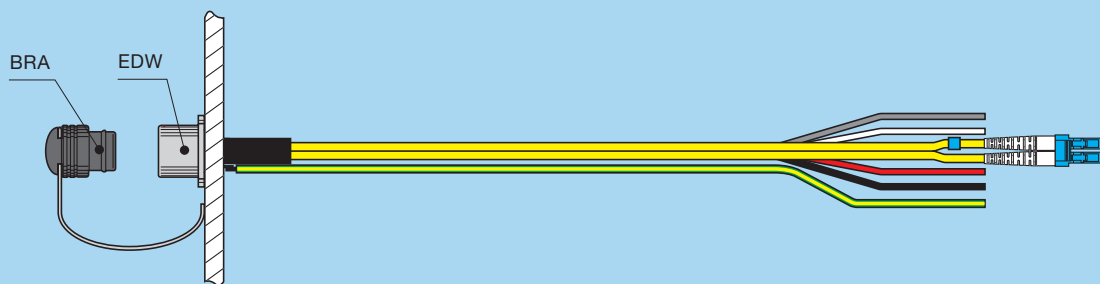
### MNT ECU side duplex pigtails

Assembly cable with one fixed plug (FXW) and two pigtails (LC) complete with BHA cap.



### MYT Camera side duplex pigtails

Assembly cable with one fixed socket (EDW) and two pigtails (LC) complete with BRA cap.





## SMPTE 311 standard cable assemblies

### Outside Broadcast FUW-PUW

Part number	Description
<b>MSO.3K.93C.AM025NS</b>	25 metre length
<b>MSO.3K.93C.AM050NS</b>	50 metre length
<b>MSO.3K.93C.AM100NS</b>	100 metre length
<b>MSO.3K.93C.AM200NS</b>	200 metre length
<b>MSO.3K.93C.AM300NS</b>	300 metre length
<b>MSO.3K.93C.AM400NS</b>	400 metre length
<b>MSO.3K.93C.AM500NS</b>	500 metre length

### Internal OB van

Part number	Description
<b>MNO.3K.93C.AM003NS</b>	3 metre length
<b>MNO.3K.93C.AM005NS</b>	5 metre length
<b>MNO.3K.93C.AM010NS</b>	10 metre length
<b>MNO.3K.93C.AM015NS</b>	15 metre length
<b>MNO.3K.93C.AM020NS</b>	20 metre length

### Studio/Infrastructure

Part number	Description
<b>MNY.3K.93C.AM020NS</b>	20 metre length
<b>MNY.3K.93C.AM050NS</b>	50 metre length

## ARIB standard cable assemblies

### Outside Broadcast FUW-PUW

Part number	Description
<b>MSO.3K.93C.AM025NA</b>	25 metre length
<b>MSO.3K.93C.AM050NA</b>	50 metre length
<b>MSO.3K.93C.AM100NA</b>	100 metre length
<b>MSO.3K.93C.AM200NA</b>	200 metre length
<b>MSO.3K.93C.AM300NA</b>	300 metre length
<b>MSO.3K.93C.AM400NA</b>	400 metre length
<b>MSO.3K.93C.AM500NA</b>	500 metre length

### Internal OB van

Part number	Description
<b>MNO.3K.93C.AM003NA</b>	3 metre length
<b>MNO.3K.93C.AM005NA</b>	5 metre length
<b>MNO.3K.93C.AM010NA</b>	10 metre length
<b>MNO.3K.93C.AM015NA</b>	15 metre length
<b>MNO.3K.93C.AM020NA</b>	20 metre length

### Studio/Infrastructure

Part number	Description
<b>MNY.3K.93C.AM020NA</b>	20 metre length
<b>MNY.3K.93C.AM050NA</b>	50 metre length

Other cable assemblies, patch cords and pigtails available on request.

## Notes

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## Notes

## Product safety notice

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

### 1. SHOCK AND FIRE HAZARD

Incorrect wiring, the use of damaged components, presence of foreign objects (such as metal debris), and / or residue (such as cleaning fluids), can result in short circuits, overheating, and / or risk of electric shock.

Mated components should never be disconnected while live as this may result in an exposed electric arc and local overheating, resulting in possible damage to components.

### 2. HANDLING

Connectors and their components should be visually inspected for damage prior to installation and assembly. Suspect components should be rejected or returned to the factory for verification.

Connector assembly and installation should only be carried out by properly trained personnel. Proper tools must be used during installation and / or assembly in order to obtain safe and reliable performance.

### 3. USE


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


### 4. TEST AND OPERATING VOLTAGES

The maximum admissible operating voltage depends upon the national or international standards in force for the application in question. Air and creepage distances impact the operating voltage; reference values are indicated in the catalog however these may be influenced by PC board design and / or wiring harnesses.

The test voltage indicated in the catalog is 75% of the mean breakdown voltage; the test is applied at 500 V/s and the test duration is 1 minute.

### 5. CE MARKING

CE marking  means that the appliance or equipment bearing it complies with the protection requirements of one or several European safety directives.

CE marking  applies to complete products or equipment, **but not to electromechanical components, such as connectors.**

### 6. PRODUCT IMPROVEMENTS

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

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

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

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