

Design Criteria

During the past few years signal digitalization found its way into the Pro Audio & Entertainment business, revolutionizing equipment and applications.

Nowadays one fiber optic cable can transmit hundreds of channels, is light and easy to pass, and avoids grounding problems or noises.

The weak spot has been again the connector. Fragile fiber optic network connectors like the ST, SC, LC etc. are optimized for a one time permanent connection but can not meet the rough requirements of the entertainment industry. Military extended beam lens coupling connectors are very expensive and have the disadvantage of an extensive attenuation increase.

Neutrik®, as Pro Audio & Video technology leader when it comes to connectors, kept up with the time and developed a suitable fiber optic connection system - the OpticalCon®.

The system is based on a standardized optical LC-Duplex connection but eliminates its weakness and guarantees a safe and rugged connection.

Because of the compatibility with conventional LC connectors it offers the choice of using a cost effective LC connector as a permanent connection (e.g. patch cable) or our rugged OpticalCon® cable connector for mobile applications. The system enables a run of up to 4 copper wires for power supply or any data signal, a special SMPTE-version has been optimized for broadcast applications and offers an additional ground-shell contact. The chassis connector acts as "feed through" and guarantees a simple installation by simply connecting a conventional LC-Duplex connector (e.g. with a permanent installation cable) on the rear.

The cable connector comes pre-assembled onto a choice of mobile field cables, currently 5 types and their variations (Multimode, Singlemode, APC) can be offered in any length.



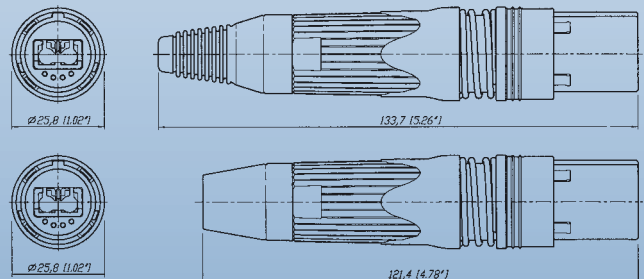
Cable Connector Assembly



NK02M-4S75

- Ruggedized and dirt protected fiber optic connection system
- Cable connector comes pre-assembled with a choice of five mobile field cables
- Range of cables include rugged hybrid (fiber + 4 copper wires), robust and lightweight mobile field cable with 2 multi- or singlemode fibers, a 4 pole Y-split and a SMPTE type cable
- Accommodates standard optical LC-Duplex connectors
- Cable connector features rugged all metal housing and heavy duty cable retention
- Excellent dust and dirt protection due to automatic sealing shutter with silicone gasket
- Reliable Push-Pull locking mechanism
- Easy to clean, no tools required
- Cable packed in case, on drum or air spool
- Field repairable

NK02M-4S75*





Chassis Connector

Coupler



NO2-4FD-R



NO2-4FD

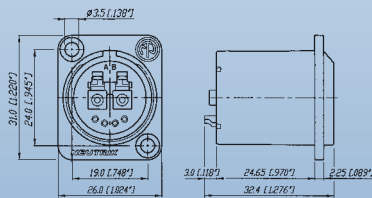


NAO2M-4S75

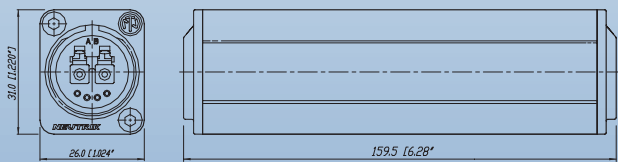
- Designed as feedthrough with automatic sealing shutter
- Shutter with silicone gasket protects optical connection from dust and dirt
- Accommodates standard LC connectors on the rear for simple installation
- Connection on the front side either by rugged OpticalCon® or standard LC connector
- Colour coding to identify fiber mode
 - Multimode – black
 - Singlemode PC – blue
 - Singlemode APC – green

- OpticalCon® coupler (adapter) in „D“ size housing for cable extensions
- Available in three versions - LC-Duplex multi and single mode (PC and APC) all with 4 copper wires

NO2-4FD



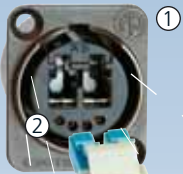
NAO2M-4S75



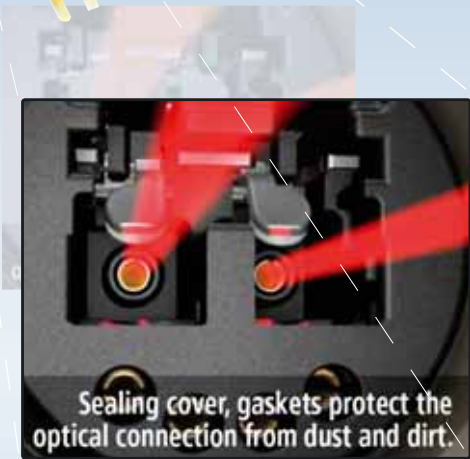
Look for the Logo



Features and Benefits



- ① D-housing
- ② 4 additional female copper contacts
- ③ Mates and locks also with standard LC-Duplex connectors



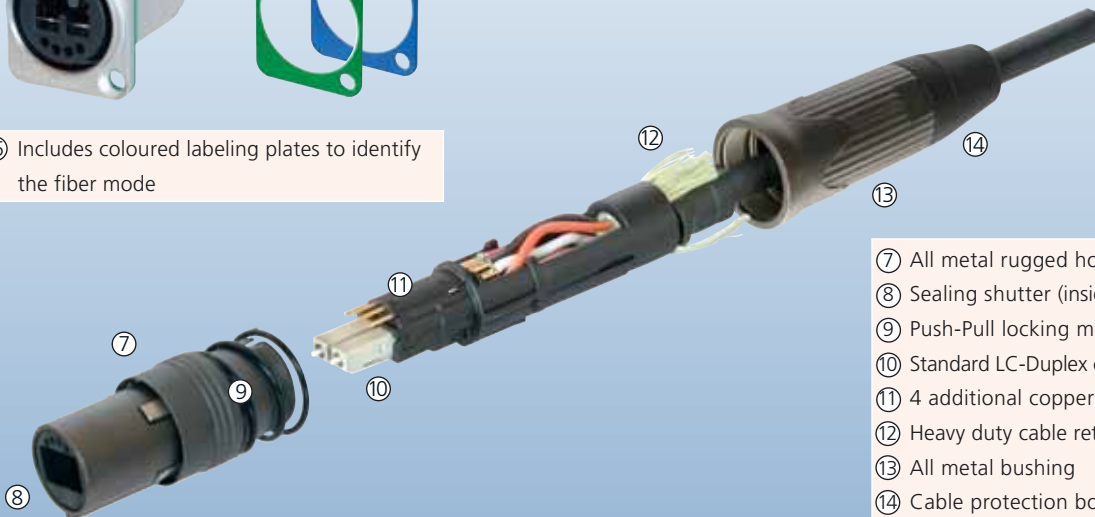
- Wiring:
- ④ Big solder cups (AWG 18)
 - ⑤ Mates with conventional LC-Duplex



- ⑥ Dirtprotection



- ⑮ Includes coloured labeling plates to identify the fiber mode



- ⑦ All metal rugged housing
- ⑧ Sealing shutter (inside)
- ⑨ Push-Pull locking mechanism
- ⑩ Standard LC-Duplex connector, easy to clean
- ⑪ 4 additional copper contacts
- ⑫ Heavy duty cable retention
- ⑬ All metal bushing
- ⑭ Cable protection boot

t o i d e n t i f y t h e o r i g i n a l

Technical Data OpticalCon® Connectors

Optical			Cable Connector	Chassis Connector
Optical connector			LC-Duplex	LC-Duplex Feedthrough
Fiber		Multimode, Singlemode PC, Singlemode APC	●	●
Insertion loss		< 0.5 dB / connection	●	●
Mechanical				
Insertion / withdrawal force		< 45 N	●	●
Lifetime		> 1'000 cycles	●	●
Cable retention force	2M-4S75	500 N	●	-
	2S/2M	500 N	●	-
	SMPTE	350 N	●	-
	4 MY	300 N	●	-
Electrical				
Number of electrical contacts			4	4 (5)
Rated current		6 A	NKO2M-4S75*	●
		10 A (contact 1+4)	NKO2S(A)-SMPTE*	●
Contact resistance		< 7 mΩ	●	●
Insulation resistance	- initial:	> 10 GΩ	●	●
	- after damp heat test:	> 1 GΩ	●	●
Dielectric strength		1500 V dc	●	●
Rated voltage		50 V ac	● ¹	● ¹
Material				
Shell	Zinc diecast (ZnAl4Cu1)	(hard Nickel or Ruthenium plating)	●	●
Insert / Insulation		Polyamid PA 6, PBT 30% GR, PBT 50% GR	●	●
Contacts	- male:	Brass (CuZn39Pb3)	●	-
	- female:	Bronze (CuSn6)	-	●
Contact surface		Gold (gal 0.2 μm Au over 2 μm Ni)	●	●
Strain relief		POM (brass)	●	-
Bushing		ZnAl4Cu1	●	-
Boot		EPDM, rubber boot	●	-
Slit sleeve		ceramics	-	●
Environmental				
Operating temperature	-25°C to +75°C	flammability UL94 HB	●	●
Solderability complies with IEC 68-2-20			●	●

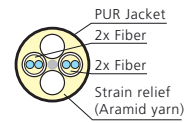
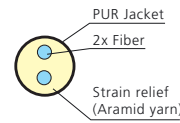
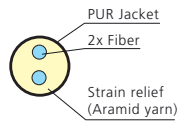
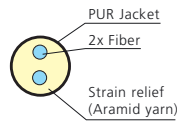
¹ ... Not compatible to the SMPTE standard, suitable for indoor studio applications acc. IEC 60664-1 (pollution degree 1, over voltage category 1)

Technical Data Fiber Cables

		2M	2S	2SA	4MY	2M-4S75	2S-S1	2SA-S1
Attenuation:	@ 850 nm	3 dB/km			3.5 dB/km	2.5 dB/km		
	@ 1300 nm	1 dB/km			1.5 dB/km	0.7 dB/km		
	@ 1310 nm		0.5 dB/km	0.5 dB/km			0.45 dB/km	0.45 dB/km
	@ 1550 nm		0.5 dB/km	0.5 dB/km			0.5 dB/km	0.5 dB/km
Bandwidth:	@ 850 nm	500 MHz-km			500 MHz-km	500 MHz-km		
	@ 1300 nm	500 MHz-km			500 MHz-km	500 MHz-km		
	@ 1310 nm							
	@ 1550 nm							
Refraction index:	@ 850 nm	1.468			1.468	1.482		
	@ 1300 nm	1.468			1.468	1.477		
	@ 1310 nm		1.458	1.458			1.468	1.468
	@ 1550 nm		1.458	1.458			1.468	1.468

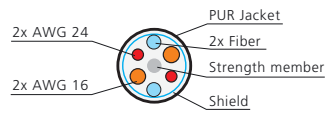
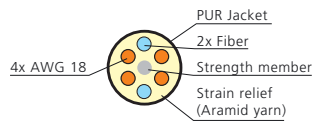
Quality Thinking

Technical Data Mobile Fiber Cables



	2M	2S	2SA	4MY
Number of Fibers	2	2	2	4
Fiber type	Multimode	Singlemode	Singlemode	Multimode
Core diameter	50 µm	9 µm	9 µm	50 µm
Cladding diameter	125 µm	125 µm	125 µm	125 µm
Copper wires	-	-	-	-
Outer shield	-	-	-	-
Strength member	-	-	-	-
Cable retention	Aramid yarn	Aramid yarn	Aramid yarn	Aramid yarn
Overall diameter	5 mm	5 mm	5 mm	9.5 mm
Jacket	PUR	PUR	PUR	PUR
Optical connector	LC-Duplex	LC-Duplex	LC-Duplex	2 x LC-Duplex
Type	Multimode	Singlemode PC	Singlemode APC	Multimode
Colour	black, matte	black, matte	black, matte	black, matte
Min. bending radius	4 cm	4 cm	4 cm	10 cm
Weight	23 kg/km	23 kg/km	23 kg/km	103 kg/km
Wiring				

Technical Data Mobile Hybrid Cables



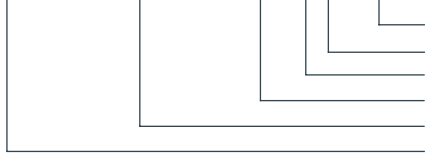
	2M-4S75	2S-S1	2SA-S1
Number of Fibers	2	2	2
Fiber type	Multimode	Singlemode	Singlemode
Core diameter	50 µm	9 µm	9 µm
Cladding diameter	125 µm	125 µm	125 µm
Copper wires	4 x AWG 18 (0.75mm ²)	2 x AWG 24 + AWG 16	2 x AWG 24 + AWG 16
Outer shield	-	Copperbraid-Tinned	Copperbraid-Tinned
Strength member	GFK	Stainless Steel	Stainless Steel
Cable retention	Aramid yarn	Crimp type	Crimp type
Overall diameter	8.9 mm	9.2 mm	9.2 mm
Jacket	PUR	PVC	PVC
Optical connector	LC-Duplex	LC-Duplex	LC-Duplex
Type	Multimode	Singlemode PC	Singlemode APC
Colour	black, matte	black, matte	black, matte
Min. bending radius	10 cm	10 cm	10 cm
Weight	78 kg/km	118 kg/km	118 kg/km
Wiring			

Ordering Information

Coding of Mobile Cables

Find a convenient OpticalCon® part number generator on www.neutrik.com

N K O | 2 M - 4 S 7 5 - | R - | 1 F - | 1 5 0 (Example)



- Length [m]
- Gender: No suffix ... Male-Male; F ... Male-Female
- Packaging 0 to 4
- Plating: No suffix ... hard Nickel; R ... Ruthenium
- Cable (Assembled)
- Neutrik® Optical Cable

Gender

Male-Male



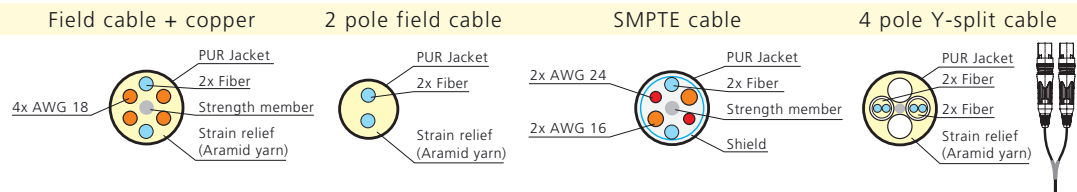
Standard product (two cable ends)

Male-Female



wired chassis connector for cable extension (one cable end)

Cable



	Field cable + copper	2 pole field cable	SMPTE cable	4 pole Y-split cable
Multimode PC (black)	2M-4S75 ²⁾	2M	-	4MY ^{1) 2)}
Singlemode PC (blue)	-	2S	2S-S1 ²⁾	-
Singlemode APC (green)	-	2SA	2SA-S1 ²⁾	-

¹⁾ ...Gender: Male-male only (no suffix)

Packaging

0 ... Airspool



1 ... OpticalCon Case



2 ... Drum Schill GT310



3 ... Drum Schill GT380



4 ... Drum Schill HT582



²⁾ ...Packaging "2" not possible

Chassis Connectors	Colour	Plating	Fiber	Solder contacts	Shell ground contact
NO2-4FD	*	hard Nickel	2 x	4 x	-
NO2-4FD-R	*	Ruthenium	2 x	4 x	-
NO2-4FD-1	*	hard Nickel	2 x	4 x	1 x
NO2-4FD-1-R	*	Ruthenium	2 x	4 x	1 x

* ... Coloured labeling plates to indicate the fiber mode included.

Coupler	Colour (fiber mode)	Plating	Fiber	Copper wire
NAO2M-4S75	black	black	LC-Duplex Multimode PC	4 x 0.75 mm ²
NAO2S-4S75	blue	black	LC-Duplex Singlemode PC	4 x 0.75 mm ²
NAO2SA-4S75	green	black	LC-Duplex Singlemode APC	4 x 0.75 mm ²

Quality Thinking

Accessories



DSS-*



SCDR



SCDX



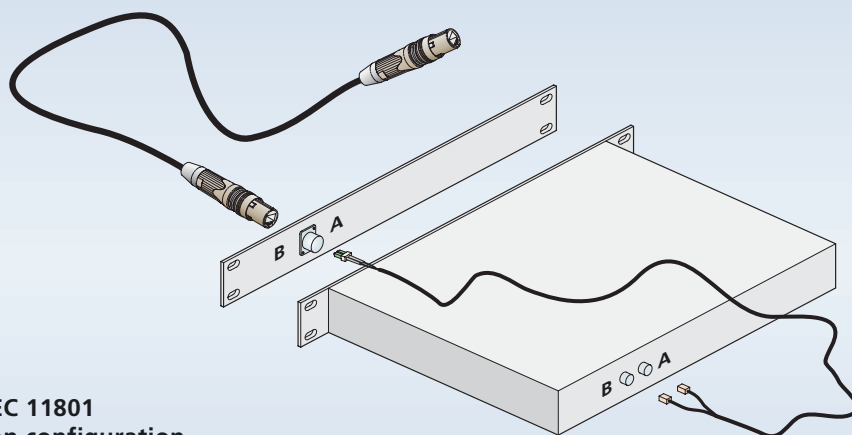
Field repair toolkit

DSS-*	Lettering plate for D series, coloured plastic
SCDR	Rear end protection cover for D-size chassis connectors
SCDX	Hinged cover seals D-size chassis connectors, IP54 rated
Field repair toolkit	find more details on www.neutrik.com

*: 0 - Black, 1 - Brown, 2 - Red, 3 - Orange, 4 - Yellow, 5 - Green, 6 - Blue, 7 - Violet, 8 - Grey, 9 - White

OpticalCon® Wiring and hook up suggestion

In order to achieve uniform and compatible systems we recommend to follow the hook up suggestions of the ISO / IEC 11801 which defines channel A (right) as input and B (left) as output.



Extract of the ISO / IEC 11801 Patch cord termination configuration

It is recommended that connection of patch cords and equipment cords to the duplex adapter be made by means of a duplex connector assembly.

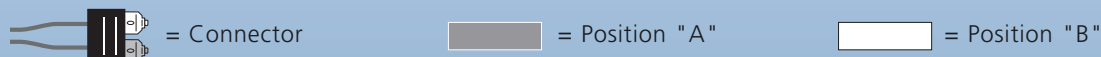
Optical fibre patch cords, whether they are used for cross-connection or interconnection to equipment, shall be of a cross-over orientation such that Position A goes to Position B on one optical fibre, and Position B goes to Position A on the other optical fibre of the optical fibre pair (Figure 17). Each end of the optical fibre patch cord shall be identified to indicate Position A and Position B if the connector can be separated into its simplex components. For alternate connector designs utilising latches, the latch defines the positioning in the same manner as the keys.

For simplex connectors, the connector that plugs into the receiver shall be considered Position A, and the connector that plugs into the transmitter shall be considered Position B.



Figure 17 - Optical

Legend:



Note: Shading for clarification only