

FC/PC and FC/APC Single-Mode, PM Patch Cables and Cable Assemblies

Many devices used in data transmission, sensor technology, medical technology, control tasks, and industrial applications are equipped with FC-type connectors – either with a physical contact (PC) or angled physical contact (APC) polish – for the interconnection of optical fiber components or devices.

LASER COMPONENTS manufactures FC/PC and FC/APC connectors in house in Olching for single-mode fibers, multi-mode fibers, or polarization-maintaining (PM) fibers. This is a unique feature because it allows not only fibers in the standard telecommunications range (1310 nm and 1550 nm), but also fibers at wavelengths of 450 nm – and thus correspondingly small fiber cores of 3 μm – to be assembled. It also makes it possible to assemble patch cables (SM/PM) and to connect fiber assemblies to modules and components. All valid OEC norms are used in the technical specifications.

In the area of PM fibers, assembly can be carried out at two possible quality levels, either – at a lower cost – with an exclusively passive orientation at an extinction ratio of a maximum of 20 dB or with an active orientation at an extinction ratio of 25-30 dB or better (the achievable value depends on the fiber used and wavelength applied). PANDA fibers are processed on a standard basis for this purpose.

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Specifications of Patch Cables and Assemblies for 1310 nm and 1550 nm

SM/PC

Singlemode – Patchcord specifications

	1310 nm	1550 nm
Alignment wavelength	1310 nm	1550 nm
Max. insertion loss*	0,3 dB	0,3 dB
Typical optical insertion loss*	0,14 dB	0,1 dB
Typical optical return loss*	>50 dB	>50 dB
Connector type	FC/PC	FC/PC
Key width	narrow (2.0 mm) or wide (2.2mm)	narrow (2.0 mm) or wide (2.2 mm)
Operating temperature °C	0 °C to 70 °C	0 °C to 70 °C
Storage temperature °C	-45 °C to 85 °C	-45 °C to 85 °C

*Each cable includes individual test data

SM/APC

Singlemode – Patchcord specifications

	1310 nm	1550 nm
Alignment wavelength	1310 nm	1550 nm
Max. insertion loss*	0,3 dB	0,3 dB
Typical optical insertion loss*	0,16 dB	0,15 dB
Optical return loss*	>75 dB	>75 dB
Connector type	FC/APC	FC/APC
Key width	Narrow (2.0 mm) or Wide (2.2 mm)	Narrow (2.0 mm) or Wide (2.2 mm)
Operating temperature °C	0 °C to 70 °C	0 °C to 70 °C
Storage temperature °C	-45 °C to 85 °C	-45 °C to 85 °C

At smaller wavelengths, supporting wavelengths are available for the measurement of fibers at 488, 630, 780, 980, 1300, 1310, 1550 nm. (Other wavelengths are available upon request.)

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The following PM PANDA fibers (available upon request) can be processed for PM patch cables. All fibers can be aligned passively. At a higher level of quality, we use active alignment at supporting wavelengths (e.g., at 488 nm). (Other wavelengths and fibers are available upon request).

PANDA Fiber Specifications

Fiber Type	λ_0	MF diameter	Concentricity error	Cladding major diameter	Attn.	Cut-off wavelength	Polarization Crosstalk	Beat Length	Coating Structure	Coating diameter
	μm	μm	Max. μm	μm	Max. dB/km	μm	Max. dB/100m	mm		μm
SC40-PX-H90D-H (RBB)	0.405 -	3.8 ± 1.0 (**), 2.3 ± 0.6 (**)	0.5	125 ± 1	50	≤ 0.40	-30(**) dB/ 10 turns Bending dia. at 60 mm	≤ 2.0 (**)	Urethane acrylate/ Polyester-elastomer (Black)	900 ± 100
SC40-PX-U40D-H (RBB)									Urethane acrylate	400 ± 15
SC40-PX-U25D-H (RBB)									Urethane acrylate	245 ± 15
SC40-PSJ20D	0.41	3.5 (*)	0.5	125 ± 1	50	0.33 -	0.40	≤ 1.7	Urethane acrylate/ Polyester-elastomer (Black)/ Polyolefin (Gray)	2000 ± 200
SC40-PSH90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ± 100
SC40-PSU40D									Urethane acrylate	400 ± 5
SC40-PS-U25D									Urethane acrylate	245 ± 15
SC48-PSJ20D	0.48	4.0 (*)	0.5	125 ± 1	30	0.40 -	0.47	≤ 2.0	Urethane acrylate/ Polyester-elastomer (Black)/ Polyolefin (Gray)	2000 ± 200
SC48-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ± 100
SC48-PS-U40D									Urethane acrylate	400 ± 15
SC48-PS-U25D									Urethane acrylate	245 ± 15
SC53-PS-U40D	0.53	5.2 (*) (**)	0.5	125 ± 1	20	≤ 0.52	-30(**)	≤ 2.0 (**)	Urethane acrylate	400 ± 15

Fiber Type	λ_0	MF diameter	Concentricity error	Cladding major diameter	Attn.	Cut-off wavelength	Polarization Crosstalk	Beat Length	Coating Structure	Coating diameter
	μm	μm	Max. μm	μm	Max. dB/km	μm	Max. dB/100m	mm		μm
SM53-PSJ20D	0.53	4.2 (*) (**)	0.5	125±1	15 (**)	0.45 - 0.53	-30(**)	≤2.0 (**)	Urethane acrylate/ Polyester-elastomer (Black) Polyoleffin (Gray)	2000 ±200
SM53-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM53-PS-U40D									Urethane acrylate	400 ±15
SM63-PSJ20D	0.63	4.5 (*)	0.5	125±1	12	0.52 - 0.62	-30		Urethane acrylate/ Polyester-elastomer (Black) Polyoleffin (Gray)	2000 ±200
SM63-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM63-PS-U40D									Urethane acrylate	400 ±15
SM63-PS-U25D										245 ±15
SM63-PR-U25D-H										1.5-3.5
SM85-PSJ20D	0.85	5.5 (*)	0.5	80±1	3.0	0.65 - 0.80	-30	1.0-2.0	Urethane acrylate/ Polyester-elastomer (Black) Polyoleffin (Gray)	2000 ±200
SM85-PSH90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM85-PS-U40D									Urethane acrylate	400 ±15
SM85-PS-U25D										245 ±15
RCHA85-PSU17C		3.5 (*)								≤2.0

Fiber Type	λ_0	MF diameter	Concentricity error	Cladding major diameter	Attn.	Cut-off wavelength	Polarization Crosstalk	Beat Length	Coating Structure	Coating diameter
	μm	μm	Max. μm	μm	Max. dB/km	μm	Max. dB/100m	mm		μm
SM98-PS-J20D	0.98	6.6 (*)	0.5	125±1	2.5	0.87 - 0.95	-30	1.5 - 2.7	Urethane acrylate/ Polyester-elastomer (Green)/ Polyolefin (Gray)	2000 ±200
SM98-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM98-PS-U40D									Urethane acrylate	400 ±15
SM98-PS-U25D										245 ±15
SM98-PS-Y15					Polyimide	145 ±10				
SM98-PS-U25D-H					Urethane acrylate	245 ±15				
RCSM98-PS-U17C						165 ±10				
SM13-PS-J20D	1.30	9.0 (*)	0.5	125±1	1.0	1.13 - 1.27	-30	2.5 - 4.0	Urethane acrylate/ Polyester-elastomer (Black)/ Polyolefin (Gray)	2000 ±200
SM13-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM13-PS-U40D									Urethane acrylate	400 ±15
SM13-PS-U25D										245 ±15
HA13-PS-U25D					≤2.5	245 ±15				
SM13-PR-U25D-H					-25	3.8 - 5.6				
RCSM13-PS-U17C						2.0 - 3.5	165 ±10			

Fiber Type	λ_0	MF diameter	Concentricity error	Cladding major diameter	Attn.	Cut-off wavelength	Polarization Cross-talk	Beat Length	Coating Structure	Coating diameter
	μm	μm	Max. μm	μm	Max. dB/km	μm	Max. dB/100m	mm		μm
SM14-PSJ20D	1.40 -1.49	9.8 (*)	0.5	125±1	1.0	1.26 - 1.38	-30	2.8 - 4.7	Urethane acrylate/ Polyester-elastomer (Black)/ Polyolefin (Gray)	2000 ±200
SM14-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM14-PS-U40D									Urethane acrylate	400 ±15
SM14-PS-U25D										245 ±15
SM14-PR-U25D-H										4.1 - 7.3
RCSM14-PS-U17C		9.0 (*)		80±1	2.0	1.20 - 1.38	-25	2.3 - 4.2	165 ±10	
SM15-PSJ20	1.55	10.5 (*)	0.5	125±1	0.5	1.30 - 1.44	-30	3.0 - 5.0	Urethane acrylate/ Polyester-elastomer (Black)/ Polyolefin (Gray)	2000 ±200
SM15-PS-H90D									Urethane acrylate/ Polyester-elastomer (Black)	900 ±100
SM15-PS-U40D									Urethane acrylate	400 ±15
SM15-PS-U25D										245 ±15
SRSM15-PX-H90D-H										Urethane acrylate/ Polyester-elastomer (Black)
SRSM15-PX-U40D-H		9.5 ±0.4		≤1.44	-25	5.0	Urethane acrylate	400 ±15		
SRSM15-PX-H50D-H		Urethane acrylate/ Polyester-elastomer (Black)					500 ±50			
SRSM15-PX-U25D-H		Urethane acrylate					245 ±15			

Fiber Type	λ_0	MF diameter	Concentricity error	Cladding major diameter	Attn.	Cut-off wavelength	Polarization Cross-talk	Beat Length	Coating Structure	Coating diameter	
	μm	μm	Max. μm	μm	Max. dB/km	μm	Max. dB/100m	mm		μm	
<u>BISM15-PX-H50D-H</u>	1.55	9.0 ± 0.4	0.5	125 ± 1	3.0	≤ 1.44	-30	≤ 3.0	Urethane acrylate/ Polyester-elastomer (Black)	500 ± 50	
<u>BISM15-PX-U25D-H</u>									Urethane acrylate	245 ± 15	
DS15-PS-G20A		8.0 ± 1.0	0.7		0.5	0.5	≤ 153	-25	3.0 - 5.0	Urethane acrylate/ Polyamid(Blue)/ Polyoleffin (Gray)	2000 ± 200
DS15-PS-N90A										Urethane acrylate/ Polyamid(Blue)/	900 ± 100
DS15-PS-U40A										Urethane acrylate	400 ± 15
SRSM15-PS-Y15		9.4 ± 1.0	0.5		0.5	2.0	≤ 1.44	-25 dB/ 5m	≤ 4.0	Polyimide	145 ± 10
SM15-PR-U25D-H		10.5 (*)								-25	4.4 - 7.8
RCSM15-PS-U17C	9.5 (*)	80 ± 1		2.0							

(*) Tolerance: $\pm 0.5 \mu\text{m}$

(**) Measuring wavelength at 630 nm

(***) Measuring wavelength at 405 nm. The others are at λ_0 .

- (1) Standard proof test minimum is 1%. 2% proof test fiber is available. (P/N: SM15-PS-U40D-H for example)
- (2) Panda fiber for Erbium-doped (P/N: ED15-PS-U25A or ED98-PS-U25A) are also available.
- (3) Underlined fiber types are new products.
- (4) The exports of these products are controlled under Foreign Exchange and Trade Law of Japan.

Design of a PANDA fiber

