

LC Connector Product Specification

Section 1: Connectors

LC Connector Product Specification

General Definition:

The LC Connector Product is a robust optical connector designed to support Telecom and Datacom networks. The connector family includes but not limited to Jumper Connectors, Behind the Wall connectors (BTW), Adapters, Attenuators, Jumpers and an assortment of connector modules and panels. The connector is defined as the plug portion equipped with a tunable cylindrical ferrule while incorporating unique trigger and latch features. The LC Connector family provides a size reduction relative to traditional connectors, which has coined the term Small Form Factor connectors (SFF). SFF connectors are typically 50% smaller than standard SC and ST fiber products. The LC was designed to be a high performance SFF incorporating traditional technology, advances in latching systems, and versatile enough for both singlemode and multimode fiber applications.

Terms of Specification:

The specification document is intended to provide users of Yazaki LC Connector products a level of confidence and means of understanding the characteristics of purchased product. The product is designed and intended to be manufactured according to the specification document. The product specification is a fluid document, which is only a guideline as to the features and performance of the product, which are subject to change without notice.

Definition of Products:

LC 1.5 to 2.0 mm Unibody Connectors for jumpers: Robust connectors designed to mount onto 1.5 to 2.0 mm fiber cordage and intended to meet the Telcordia specification GR326 Type I Media (~3.0mm). Note that exceptions are made based on smaller size and future changes within GR326 for SFF connectors; however, the Unibody connector was designed to meet Section 4.3.5 Transmission with Applied Load for 3.0 mm cord. Simplex and duplex are available.

LC 3.0 mm Unibody Connectors for jumpers: Robust connectors designed to mount onto 3.0 mm fiber cordage and intended to meet the Bellcore/Telcordia specification GR326 Type I Media (~3.0mm). Note that exceptions are made based on smaller size and future changes within GR326 for SFF connectors; however, the Unibody connector was designed to meet Section 4.3.5 Transmission with Applied Load for 3.0 mm cord. Simplex and duplex are available.

LC BTW Connectors: Shorter LC connectors designed for 0.9 mm buffered fiber. This product is intended to meet Telcordia specification GR326 Type II Media (0.9 mm).

LC BTW Unibody Connectors: Robust connectors based on the Unibody connector and equipped to mount onto 0.9 mm buffered fiber and intended to meet the Telcordia specification GR326 Type II Media (0.9 mm). A unique feature; this simplex BTW connector is duplexable!

LC Patchcords (Jumpers): Connectorized with 1.5, 1.6, 2.0 or 3.0 mm cordage in various lengths and fiber counts. Jumpers are produced in a vast array of hybrid configurations allowing interconnection between LC based product and other connector styles. These products are intended to meet Telcordia specification GR326 Type I Media.

LC Adapters: Two sided port configuration, which holds two LC connectors while providing the alignment mechanism for the cylindrical ferrules. Adapters are designed in simplex, duplex and can be ganged for higher density configurations based on application needs.

LC Attenuators: Fixed plug-in style optical attenuators are available in 1-dB steps from 0 to 20 dB, plus 25-dB. These doped-fiber based attenuators are spectrally flat over the 1260 to 1610 nm wavelength range and have precise values. Special values and tolerancing are available on request. Attenuator products are designed to plug into any standard LC adapter. The design is structured from a connector front and a simplex receptacle rear portion, and they are capable of +30 dBm (1W).

Product Identification:

LC products are easy to identify in accordance with industry standard colors:

- Blue represents Singlemode
- Beige represents Multimode
- Green represents Singlemode 8° Angled End Faces
- Our LC Products meet these Standards:
 - ⇒ TIA 568 for A & B port identification on duplex adapters and connectors
 - ⇒ TIA/EIA-604-10A, FOCIS 10 Fiber Optic Connector Intermateability Standard – Type LC
 - ⇒ Fibre Channel Physical Interfaces (Physical Interface 11) for LC
 - ⇒ IEC 61754-20 (2002-08) Fibre Optic Connector Interfaces – Part 20: Type LC Connector Family

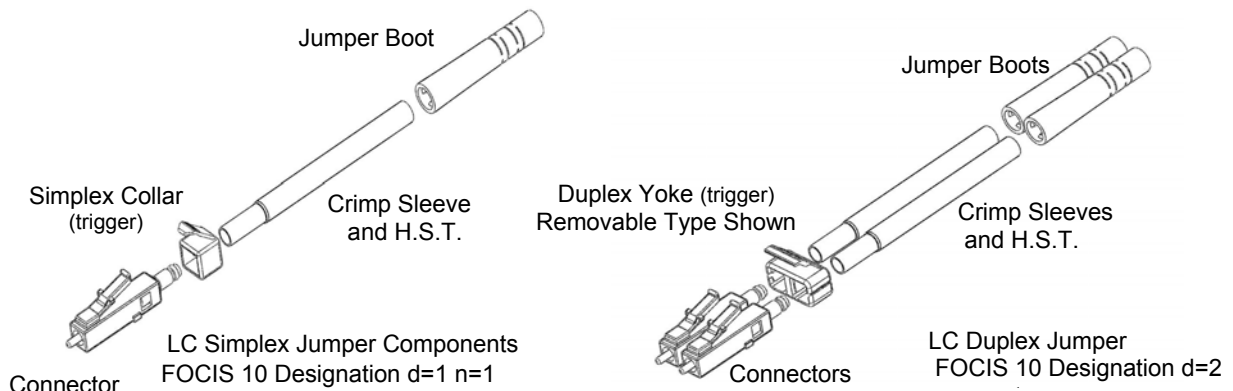
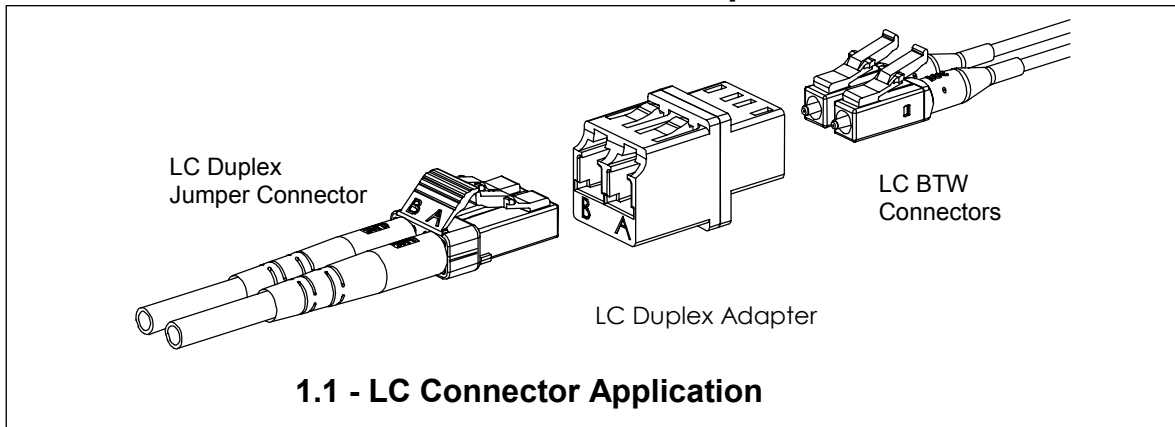
Additional Sections of LC Product Specification:

- Adapters: Section 2, Doc. No. OCD-EE-401-2
- Patchcords: Section 3, Doc. No. OCD-EE-401-3 (insertion/removal tool)
- Attenuators: Section 4, Doc. No. OCD-EE-401-4
- Environmental & Physical Performance Results: Section 5, Doc. No. OCD-EE-401-5

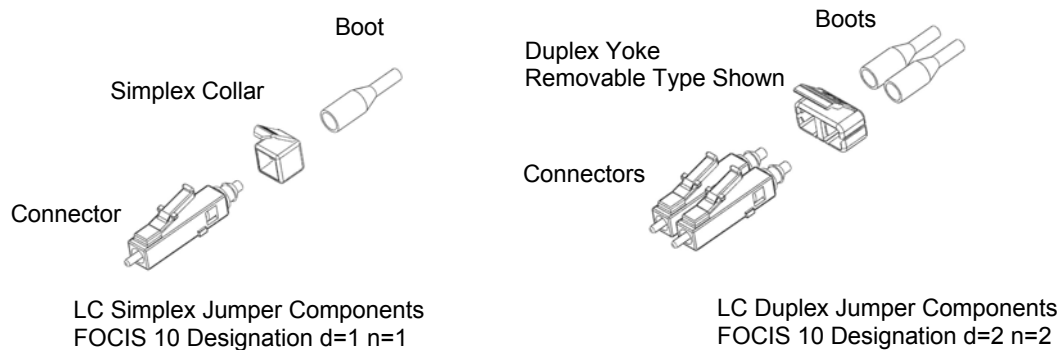
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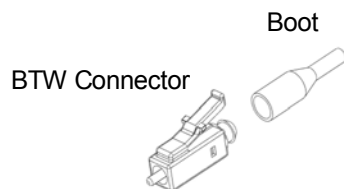
1.0 - LC Connector Product Specification



1.2a - LC Jumper Connectors: Exploded



1.2b - LC Jumper Connectors for buffered fiber: Exploded View

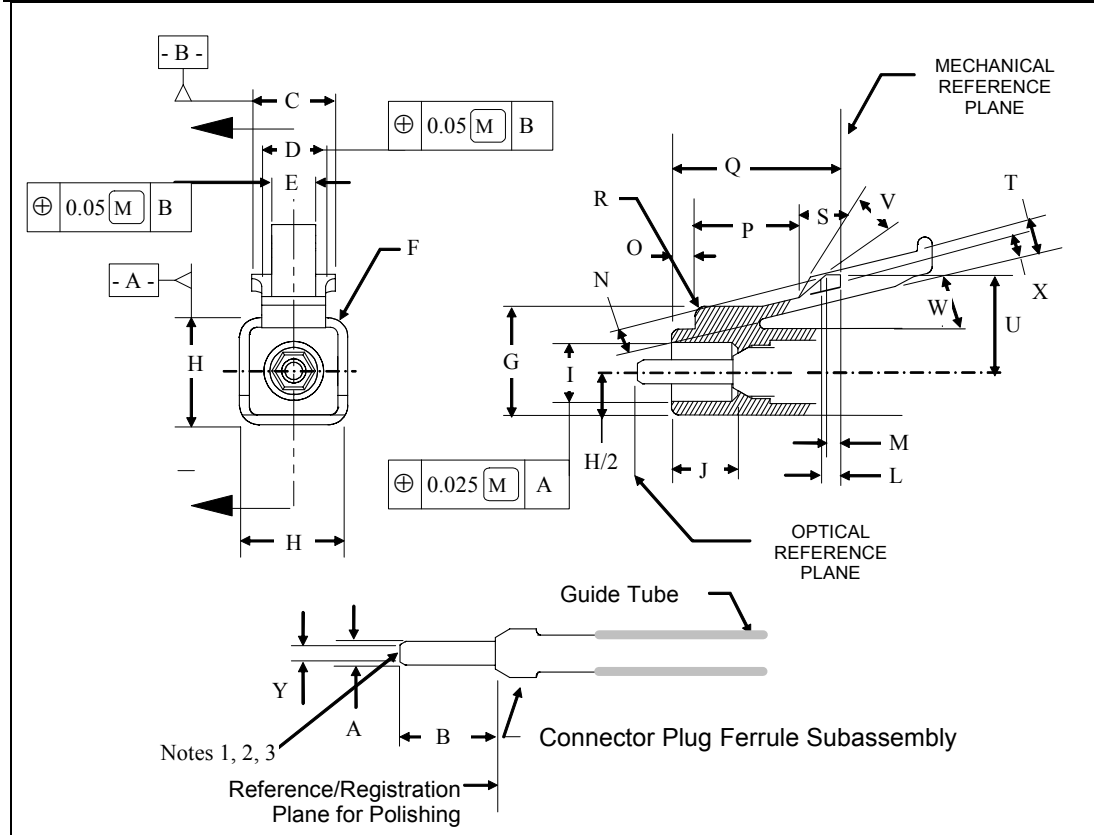


1.2c - LC BTW (Behind the Wall) Connector: Exploded View

1.3 - LC Connector Footprint Dimensions			
<p>BTW Connector</p>		<p>Jumper and Buffered Fiber Connector</p>	
REF.	DIMENSIONS		
	Minimum	mm	Maximum
A	-		30
B	-		32
C	0.7		1.4
D	-		49
E	-		51
F	1.8		3.4
G	35.3		37.3

1.4 - LC Connector Materials UL 94 Rating or equiv.			
Connector Part	Material	UL 94 Rating	Oxygen Index
Connector Housing	Engineering Plastic	V-0	50
Extender Cap	Engineering Plastic	V-0	50
Jumper Boot	TPE	V-0	
Heat Shrink Tubing (H.S.T.)	Polyolefin	UL 224 VW-1	T.B.D.
BTW Boot	TPE	V-0	>28
Simplex Collar	PA	V-0	>28
Duplex Yoke	PA	V-0	>28
Dust Cap	Plastic	V-0	>28
Spring	Metal	-	-
Ferrule	Ceramic	-	-
Crimp Sleeve	Metal	-	-
Strength Member Tube	Metal	-	-
Barrel for Ferrule	Metal	-	-
Guide Tube for Barrel	PTFE	V-0	>28

1.5 LC Simplex Connector Specifications for Intermateability



Dimension	Minimum (mm)	Maximum (mm)	Notes
A	1.25		Reference, Note 1
B	4.92	5.00	Note 3
C	4.2	4.4	
D	3.2	3.35	
E	2.2	2.4	
F	0.3	0.5	radius
G	5.6	5.7	
H	4.42	4.52	square, Note 5
I	3.0	3.2	diameter
J	3.3	3.5	
L	0.8	1.0	
M	0.3	0.5	
N	1.2	1.4	
O	1.1	1.3	
P	5.2	5.4	

1.5 - LC Simplex Connector Specifications for Intermateability cont'd			
Dimension	Minimum (mm)	Maximum (mm)	Notes
Q	8.5	8.7	
R	0.4	0.6	radius
S	30	-	degrees, typical
T	1.4	1.6	
U	5.0	5.1	
V	21	-	degrees, typical
W	14	-	degrees, typical
X	0.5	0.7	
Y	0.6	0.85	

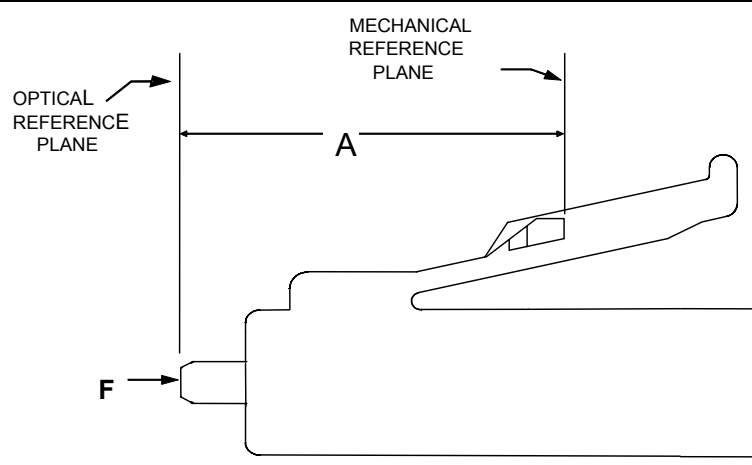
Notes:

1. Ferrule Diameter: SM 1.2485-1.2495mm, MM 1.2463-1.2495mm.
2. Final dimensions for the ferrule end face are shown in LC Patchcord Specification OCD-EE-401-3 Sections 3.8 & 3.9
3. Dimension B is for ferrule before polishing. After polish 4.88 to 4.98 mm, typical.
4. See Section 1.7 LC Connector Ferrule Extension and Contact Force.
5. Dimension H refers to the front portion of the connector housing. Tapered 0.2°


1.6 - LC Duplex Connector Specifications for Intermateability	
Dimension	Basic (mm)
A	6.25


Notes:

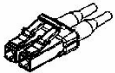
1. Each of the units in the duplex plug shall comply with all of dimensions of the LC Simplex Connector Specification for Intermateability.
2. The duplex connector ferrules must be free to float to any position within the geometric tolerance.

1.7 - LC Connector Ferrule Extension and Contact Force		
 <p>The diagram shows a cross-section of an LC connector ferrule. Two vertical lines indicate the 'OPTICAL REFERENCE PLANE' on the left and the 'MECHANICAL REFERENCE PLANE' on the right. A horizontal double-headed arrow labeled 'A' spans the distance between these two planes. A force vector 'F' is shown acting on the left side of the ferrule.</p>		
Requirements for ferrule travel and contact force:		
	IF	THEN
1	$A \leq 10.0 \text{ mm}$	$F \geq 5 \text{ N (510 gf)}$
2	$A \geq 9.8 \text{ mm}$	$F \leq 6 \text{ N (612 gf)}$

Note: Dimension A is for finished ends after all polishing has been completed. Forces shown are for unterminated connectors or buffered fiber only. Different cord constructions can result in higher forces than those shown in the table above.

1.8 - LC Connector Part Identification							
Common Connector Part Numbers are listed below in Tables 1.8a-c. Select: Hole Size, Cable Diameter & Colors options from Tables 1.8d-f on the following page(s).							
1.8a LC Unibody Connectors for Jacketed Cable			Please see tables (1.8) indicated in each column for all the available size and color options				
		Typical Part Numbers	Hole Size (see 1.8d)	Cable Dia. (see 1.8e)	Connector Color (see 1.8f)	Boot Color (see 1.8f)	H.S.T. Color (see 1.8f)
Simplex OG1LS1	MM	OG1LS1 – E1EWW	127 µm	2mm	Beige	White	White
	SM	OG1LS1 – A1BWY	125.5 µm	2mm	Blue	White	Yellow
	APC	OG1LS1 – B1GGY	125 µm	2mm	Green	Green	Yellow
Duplex w/ *Removable Yoke OG1LY1	MM	OG1LY1 – E1EWH	127 µm	2mm	Beige	White-2	White-1 Yellow-1
	SM	OG1LY1 – C1BWH	126 µm	2mm	Blue	White-2	White-1 Yellow-1

1.8b LC BTW Connectors for 0.9-mm Ø Buffered Fiber		Please see tables (1.8) indicated in each column for all the available size and color options.				
		Typical Part Numbers	Hole Size (see 1.8d)	Cable Dia. (see 1.8e)	Connector Color (see 1.8f)	Boot Color (see 1.8f)
Simplex OG1LC2	MM	OG1LC2 – E4EW	127 µm	0.9mm	Beige	White
	SM	OG1LC2 – A4BW	125.5 µm	0.9mm	Blue	White
	APC	OG1LC2 – B4GG	125 µm	0.9mm	Green	Green

1.8c LC Unibody Connectors for 0.9-mm Ø Buffered Fiber		Please see tables (1.8) indicated in each column for all the available size and color options.				
		Typical Part Numbers	Hole Size (see 1.8d)	Cable Dia. (see 1.8e)	Connector Color (see 1.8f)	Boot Color (see 1.8f)
**Duplex w/ *Removable Yoke OG1LY5	MM	OG1LY5 – E4EW	127 µm	0.9mm	Beige	White-2
	SM	OG1LY5 – C4BW	126 µm	0.9mm	Blue	White-2

* Connectors also available with non-removable yokes.
** Simplex Unibody Connectors for 0.9mm fiber also available

Create a Part by selecting codes to the left of descriptions in tables 18a-f

Part Number format	OG1L	<u>XX</u> ac	-	<u>X</u> d	<u>X</u> e	<u>X</u> f1	<u>X</u> f2	<u>X</u> f3
		Connector group		Hole Size	Cable Diameter	Conn. Color	Boot Color	HST Color
See Table(s):		1.8a-c		1.8d	1.8e	1.8f	1.8f	1.8f

1.8d Hole Size (µm)

<i>(IEC Standard 0.6-mm pedestal)</i>	Application	
B = 125.0 -0,+1	high performance	SM
A = 125.5 -0,+1	standard	
C = 126.0 -0,+1	easy fit	
E = 127.0 -0,+5	standard	MM

1.8e Cable Diameter

1 = 1.5 to 2-mm
3 = 3-mm
4 = 0.9-mm buffered fiber

1.8f Colors

Connector (housing + trigger)	Boot	Heat Shrink Tube (H.S.T.)
B = Blue + Blue	W = White	Y = Yellow (1 for simplex, 2 for duplex)
G = Green + Green	G = Green	W = White (1 for simplex, 2 for duplex)
E = Beige + Beige	B = Blue	H = White & Yellow (1 & 1, duplex only)
P = Beige + Black (duplex only)	K = Black	
U = Beige + Aqua (duplex only)		

1.8g Packaging (please indicate pkg qty to sales associate)

Individual Packaged for 1simplex or 1 duplex connector
100-pc Bulk Pack, components sufficient to assemble 100 finished connectors.
1000-pc Bulk Pack, components sufficient to assemble 1000 finished connectors.

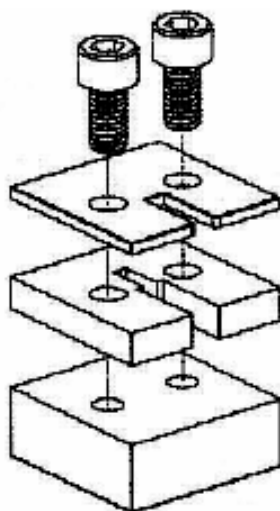
1.9 - LC Connector Color Coding (typical)

Application	Connector (housing + trigger)	Boot
Singlemode, SM	Blue + Blue	White
Singlemode – for Angled APC	Green + Green	Green
Multimode, MM	Beige + Beige	White
Multimode, MM, 50µm	Beige + Black (duplex only)	White
Multimode, MM, Laser Optimized	Beige + Aqua (duplex only)	White

1.10 - LC Connector - Inspection Gauge

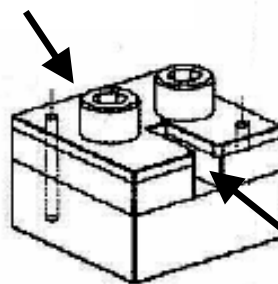
Quantity	Item	Part Number
1	LC Connector Inspection Gauge	OGLGC1-1

- Application:** Precision inspection gauge block for measuring maximum material condition (mmc) of LC connector. Excellent for incoming inspection.
- For LC Connectors:** For use with LC Jumper connector, LC Unibody Connector, and LC BTW connector. Duplex connectors must be measured without the duplex yoke.
- How to Use:** Insert connector into slot in gauge. Connector should fit into gauge without sticking or binding. Ferrule does not contact gauge.
- Material:** Hardened tool steel. **Approx. size:** 16x26x26 mm w/o screws.
- Cleaning and Care:** Use Gauge Block preservative and cleaner. Do not drop.
- Caution:** Do not disassemble.

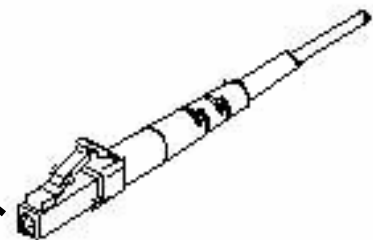


Exploded View
(See Note 6)

16 x 26 x 26 mm



Inspection Gauge for
LC Connector Plug



Example: LC
Jumper Connector