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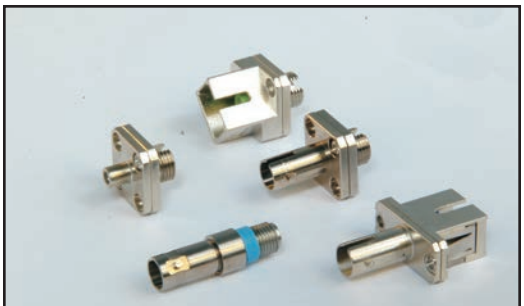
UNIVERSAL CONNECTORS AND HYBRID PATCHCORDS

Features:

- Allows Patchcords With Different Connector Types To Be Mated
- Connectors With Different Ferrule Sizes Supported
- Minimizes Losses Between Fibers With Different Core Sizes And Numerical Apertures
- Male To Female (Hybrid) Connector Versions
- Rugged And Compact Design
- Low Insertion Losses
- Low Return Losses
- Low Cost

Applications:

- Patch panel interconnects
- Fiber Distribution Hubs
- Test And Measurement Stations
- Optical Delivery Systems



Butt Joint Style Universal Connectors

Hybrid Patchcords

Lens Style Universal Connector

Product Description:

Universal connectors are designed to allow one to mate two patchcords that have different connectors on their ends. This is essential when working with components and equipment from different suppliers, which in turn use different connectors.

Universal connectors come in three major variations. The simplest are butt joint style universal connectors. These connectors have different female receptacles on either side. The patchcords are simply plugged into either side, and the fiber ends butt together in the middle. These connectors offer an inexpensive and reliable way to connect matching singlemode, multimode, or polarization maintaining patchcords with differing fiber terminations. They can connect patchcords with either matching PC finishes or matching APC finishes. These adaptors are available in FC to SC, FC to ST, ST to SC, ST to SMA905 and ST to SMA 906 formats. We now also offer connectors with a universal ferrule adaptor design, for connectors that have 2.5mm diameter ferrules, or 1.25mm diameter ferrules. These receptacles are best suited for temporary measurements, and give added flexibility.

Hybrid patchcords are also offered. These connectors have a female receptacle on one side, and a male connector on the other side. A small length of fiber lies within the device to transmit the light. These connectors allow one to convert an output from male connector type to another in as short a time as possible. Male-to-male hybrid patchcords are also available.

Lens style universal connectors are ideal for connecting fibers that have different optical characteristics. They consist of a an input receptacle, a collimating lens, a focusing lens and the output receptacle. Light from the input fiber is first collimated, then focused back into the output fiber. The alignment is precisely controlled using OZ Optics' patentened alignment technique. Lens style universal connectors are normally prealigned for standard applications, such as for standard 9/125 singlemode fibers for telecom applications. However they are tilt adjustable, to enable one to compensate for any offsets between the fiber cores and the connector housings. This is very useful when working with fibers that have concentricity problems, or unusual shapes, such as D shaped polarization maintaing fibers.

Lens style universal connectors are also ideal for connecting fibers that have different optical characteristics. An example would be connecting a singlemode fiber with a high numerical aperture and small core size to one with a lower numerical aperture and large core size. By selecting different focal length lenses for the input and output sides, the focused spot size can be changed to best match the characteristics of the output fiber. The device will work in both directions with low losses. Similarly one can design universal connectors to couple light from low NA, large core multimode fibers into high NA small core multimode mode fibers.

Please note that universal connectors will not couple light efficiently from a multimode fiber into a singlemode fiber. High losses are unavoidable in this situation, since multimode fibers have both larger numerical apertures and larger core sizes.

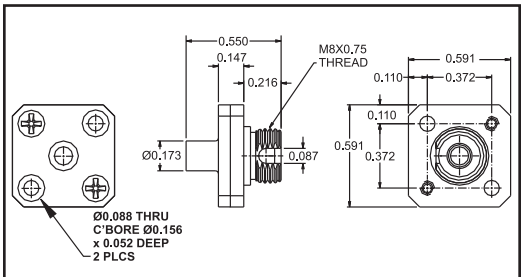


Figure 1: Typical Dimmensions For Butt Joint Style Universal Connector

Ordering Examples For Standard Parts:

Bar Code	Part Number	Description
14854	AA-200-31.25U	Butt joint style style universal connectors with female FC receptacle on one end, and 1.25mm universal adaptor on the other end.
3198	AA-200-32.5U	Butt joint style style universal connectors with female FC receptacle on one end, and 2.5mm universal adaptor on the other end.
1832	AA-200-38	Butt joint style style universal connectors with female FC receptacle on one end, and ST receptacle on the other end.
1831	AA-200-3SC	Butt joint style style universal connectors with female FC receptacle on one end, and SC receptacle on the other end.
1950	AA-200-58	Butt joint style style universal connectors with female SMA 905 receptacle on one end, and ST receptacle on the other end.
1835	AA-200-63	Butt joint style style universal connectors with female SMA 906 receptacle on one end, and FC receptacle on the other end.
2918	AA-200-68	Butt joint style style universal connectors with female SMA 906 receptacle on one end, and ST receptacle on the other end.
2883	AA-200-8SC	Butt joint style style universal connectors with female ST receptacle on one end, and SC receptacle on the other end.

Ordering Examples For Standard Parts:

Example 1: A customer needs a butt joint style universal connector to connect two fibers together. One fiber is terminated with an FC connector, while the other end is terminated with an ST connector.

Bar Code	Part Number	Description
1832	AA-200-38	Butt joint style style universal connectors with female FC receptacle on one end, and ST receptacle on the other end.

Example 2: A customer needs a butt joint style universal connector to connect two fibers together. One fiber is terminated with an FC connector, while the other end customer needs a 2.5mm universal adapter.

Bar Code	Part Number	Description
3198	AA-200-32.5U	Butt joint style style universal connectors with female FC receptacle on one end, and 2.5mm universal adaptor on the other end.

Ordering Information For Custom Parts:

OZ Optics welcomes the opportunity to provide custom designed products to meet your application needs. As with most manufacturers, customized products do take additional effort so please expect some differences in the pricing compared to our standard parts list. In particular, we will need additional time to prepare a comprehensive quotation, and lead times will be longer than normal. In most cases non-recurring engineering (NRE) charges, lot charges, and a XX piece minimum order will be necessary. These points will be carefully explained in your quotation, so your decision will be as well-informed as possible. We strongly recommend buying our standard products.

Questionnaire For Custom Parts:

1. What kind of connectors do you have to be connected to each other?
2. What type of fiber will you use?
3. What is the worst acceptable return loss?
4. What environmental requirements do you need to meet?
5. Are there any special performance requirements that you need to meet?

Description

Butt joint style universal connectors

Part Number

AA-200-*XY*

XY Input and output connector codes:
3 = NTT-FC/PC, Super NTT-FC/PC, ULTRA NTT-FC/PC
5 = SMA 905
6 = SMA 906
8 = AT&T-ST
SC = SC
1.25U = 1.25mm Universal adaptor
2.5U = 2.5mm universal adaptor

Description

Hybrid patchcord with a male connector input and female receptacle output

Part Number

AA-200-11-*a/b*- *XY*

a/b = Fiber core/cladding sizes, in microns
9/125 for 1300/1550nm SM fiber,
See standard tables for other standard fiber sizes

X = Input connector code:
Y = Output female receptacle code
3S = Super NTT-FC/PC
3U = Ultra NTT-FC/PC
3A = Angled NTT-FC/PC
5 = SMA 905
6 = SMA 906
8 = AT & T-ST
SC = SC
SCA = Angled SC

Description

Hybrid patchcord with a male connectors

Part Number

AA-200-1*X*-*a/b*- *Y*

a/b = Fiber core/cladding sizes, in microns
9/125 for 1300/1550nm SM fiber,
See standard tables for other standard fiber sizes

X = Input connector code:
Y = Output connector code
3S = Super NTT-FC/PC
3U = Ultra NTT-FC/PC
3A = Angled NTT-FC/PC
5 = SMA 905
6 = SMA 906
8 = AT & T-ST
SC = SC
SCA = Angled SC

Description

Lens style universal connector

Part Number

AA-300- *XY* -*W*-*F*

X, Y = Input and output receptacle or connector code:
3 = NTT-FC/PC, Super NTT-FC/PC, Ultra NTT-PC/PC or Angled NTT-FC/PC
5 = SMA 905
8 = AT & T-ST
SC = SC
SCA = Angled SC

F = Fiber type: S = Singlemode Fiber
M = Multimode Fiber

W = Wavelength: Specify in nanometers:
Example: 1300/1550 for telecommunication wavelengths

Ordering Examples For Standard Parts:

Example 1: A customer wants to use a lens universal connector in order to connect two singlemode fibers at 1300nm. The input fiber is terminated with an FC connector, while the output is terminated with a ST connector. OZ Optics part number will be: **AA-300-38-1300-S**

Example 2: A customer needs a hybrid patchcord with a SC male connector on input end and a super NTT-FC female receptacle on the output end using 9/125 micron singlemode fiber for 1550nm. OZ Optic part number will be: **AA-200-11-9/125-3SC**

Frequently Asked Questions:

Q: What will the losses be from the input fiber to the output fiber?

A: For an input fiber with a core size a_i, and a numerical aperture NA_i, and an output fiber with a core size a_o and a numerical aperture NA_o, the minimum possible losses can be calculated as:

$$IL = -10 \log \left(\frac{(NA_o * a_o)^2}{(NA_i * a_i)^2} \right)$$

If the calculated IL is a negative value, then the losses will be zero. However there will be losses in the reverse direction. Note also that due to tolerances and internal reflections, the actual losses will be about 0.8dB higher than the theoretical minimum.

Q: Can I couple light from a multimode fiber to a singlemode fiber?

A: Not without incurring high losses. For instance, the typical losses from a 50/125, 0.22 NA fiber to a 9/125, 0.1NA singlemode fiber is typically around 20dB. This cannot be avoided. Any attempt to reduce the spot size from 50 to 9 microns will increase the NA by the same ratio. Thus the losses stay the same.