

## INTRODUCTION TO FIBER POLARITY METHODS

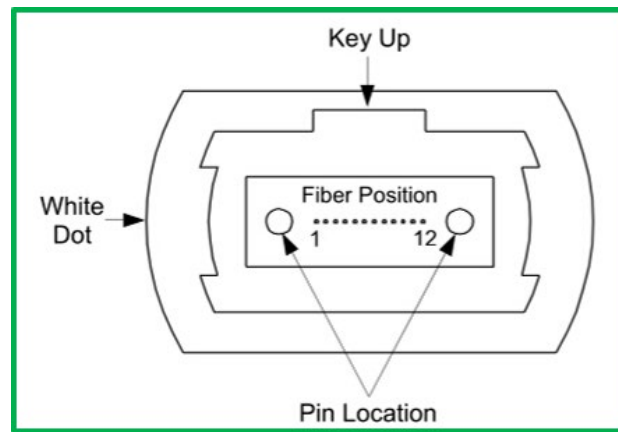
The standards compliant array connector has eased the migration path to 40/100GbE in data centers. By offering high density, flexibility, and reliability with scalable, upgradeable properties, many designers and technicians would prefer to use pre-terminated MPO components designed for an easier installation process. Maintaining the correct polarity across a fiber network ensures that a transmit signal from any type of active equipment will be directed to a receive port of a second piece of active equipment and vice versa. To ensure the MPO cables work with correct polarity, the TIA 568 standard has provided three polarity methods, which will be introduced in this article.

### What Is Polarity?

Polarity is the term used in the ANSI/TIA-568-D standard to explain how to make sure each transmitter is correctly connected to a receiver on the other end of a multi-fiber cable.

### MPO Connector

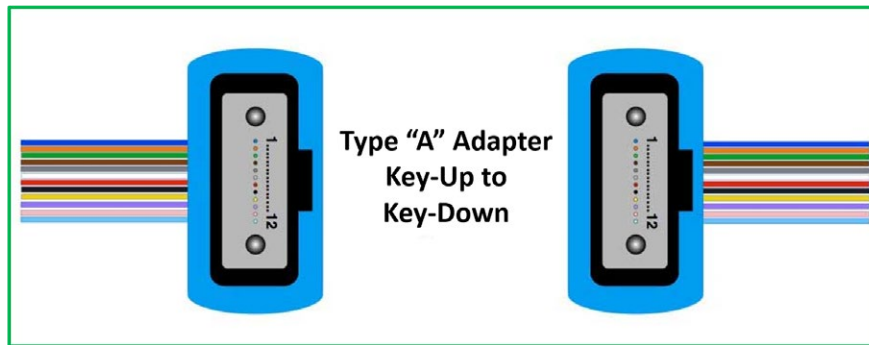
To understand polarity, the MPO connector should be considered first. An MPO connector usually has 12 or 24 fibers. Each MPO connector has a key on one side of the connector body. When the key is on the bottom, this is called key down. When the key is on top, this is referred to as the key up position. In this orientation, when viewed from the endface of the connector, each of the fiber positions in the connector is numbered in sequence from left to right and is referred as P1...P12. A white dot is additionally marked on one side of the connector to denote where the position 1 is. (shown in the



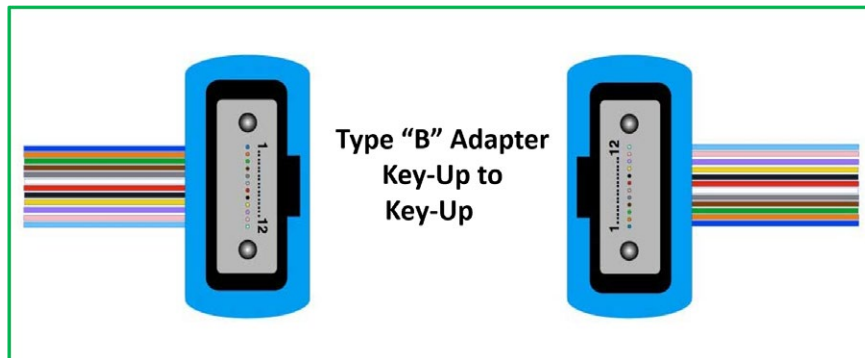
## MPO Adapters

There are two basic types of array adapters, Type A and Type B.

**Type A** Adapter mates two array connectors with keys key-up to key-down (opposed keys).



**Type B** Adapter mates two array connectors with the connector keys key-up to key-up (aligned keys).

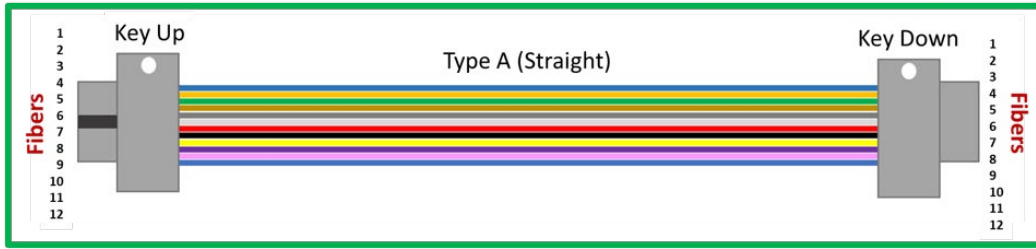


## Polarity Methods

ANSI/TIA 568-D has defined three methods to assure polarity, Method A, Method B and Method C. To enable these methods, three types of MPO trunk cables with different structures named Type A, Type B and Type C are being used for the three connectivity methods respectively.

## Polarity Method A (recommended by Signamax)

### Straight MPO-to-MPO Polarity (Method A)

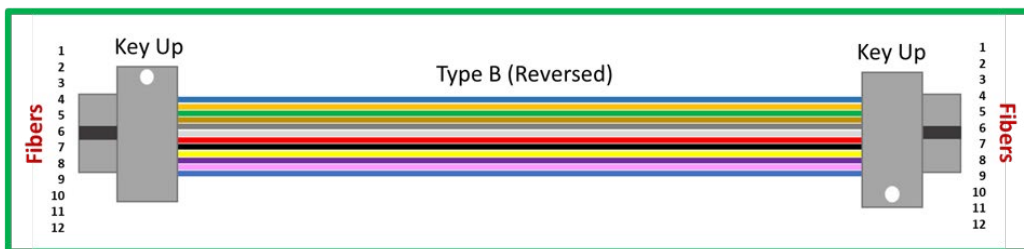


Method A uses key up to key down adaptors to link straight-through backbone cables to modules/cassettes. In this respect, fiber 1 is always in the same position when looking at the array connector end face with the key pointing upwards. The polarity flip is achieved using a duplex patch cord at the end of the link.

Signamax uses and recommends Method A because all the array-based products are straight-through and only the patch cords are flipped.

## Polarity Method B

### Reversed MPO-to-MPO Polarity (Method B)

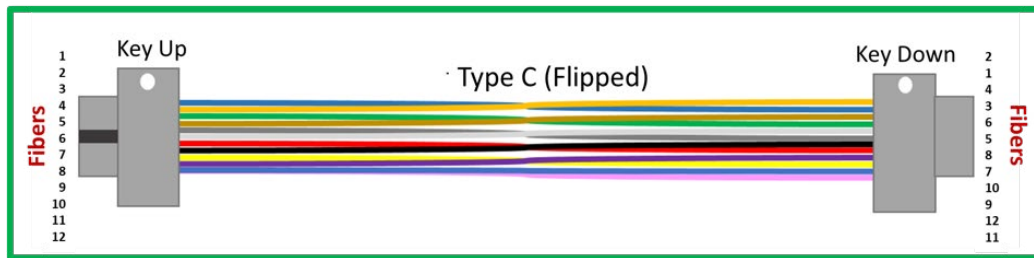


Method B uses key up to key up adaptors to link crossover backbone cables to modules/cassettes. The fiber channel is completed by flipping the second cassette and re-numbering it so that a standard A-B/B-A patch cord can be used to connect them.

This Method is more complex for planners than Method A because fiber numbers no longer correspond with each other (e.g., fiber 1 connects to 12, 2 to 11, 3 to 10 and so on). In addition, Method B does not support single mode installations because the single mode array connector cannot be flipped (due to the angled ferrule).

## Polarity Method C

### Flipped MPO-to-MPO Polarity (Method C)



Method C uses key up to key down adaptors to link modules/cassettes using a special flipped ribbon link assembly. In this configuration, the ribbon cable creates the pair-flip allowing standard patch cords to be used at both ends. On longer channel links where more than one array cable is used, care must be taken to ensure that the flip remains consistent throughout.

## Summary

The use of MPO components by network installers and designers means to satisfy the increasing requirement for higher transmission speeds, during which one of the big problems—polarity, can be solved by selecting the right types of MPO cables, connectors, cassette, and patch cables. The three Polarity Methods can be applied accordingly to satisfy the requirements in different situations. For more information about Polarity in MPO systems please visit us at [www.Signamax.com](http://www.Signamax.com) or call us at 800-446-2377 or +1 305-944-7710.

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