

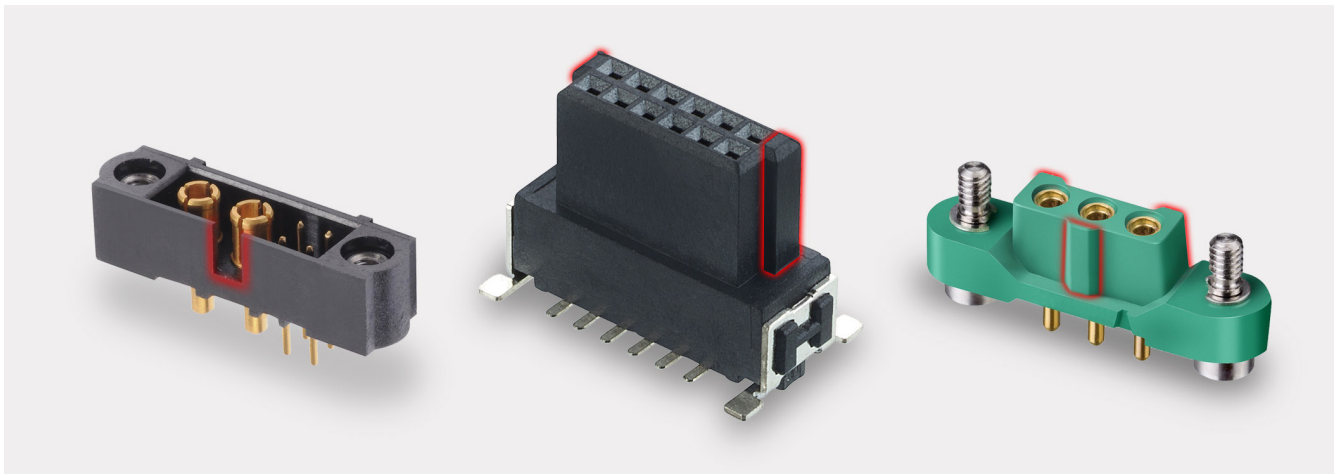


What are Polarization and Keying in Connectors?

Polarization and keying are very similar elements on connectors, and are often mistaken for each other. When choosing a connector for your application, it's important to understand the differences and choose the right option – or neither, or both!

What is Polarization?

Polarization is one or more features on a connector pair that makes it impossible to mate incorrectly. Polarizing will allow mating in the correct orientation but prevent mating in any other manner. The most common mis-mating prevented with polarization is when one of the connectors is rotated by 180°.



If the connectors do not have polarization, then other indicators are sometimes used, such as identifying marks or work instructions. However, these rely on the assembly operator looking out for this guidance and following it. By adding polarization, it is simply not possible to mate the pair any other way.

If connectors are being blind-mated (the operator can't even see the connectors during mating), polarization is particularly useful to guide assembly.

What is Keying?

Keying is used in an assembly where more than one connector pair is required, and the connectors are the same (or visually similar). For instance, you might have a build where you have connector pair A and B. Male connector A must mate with female connector A, not female connector B. However, because both pairs A and B use the same connector design, an assembly operator could easily mate the wrong pair. Keying added to one or both pairs makes it physically impossible to mate them incorrectly.

It sometimes looks like polarization, and it may even work as polarization, which is why these two get mistaken. It might be an additional feature added to the connector, rather than built into the design. Some connectors are designed specifically to incorporate keying and may have multiple keying options built in. Other systems may require a bit of manual intervention.



Why use Polarization or Keying?

These features are useful options when following Design For Manufacturing (DFM) techniques. Polarization is helpful in all situations. Keying is only required if there is more than one similar/identical connector. The aim is to enable the assembly operator to mate quickly and error-free. No need to stop and check for identifying marks, and no way of assembling incorrectly.

Are there disadvantages?

Depending on the connector range chosen, polarizing and keying features can add bulk to the connector. This will take up PCB footprint space, and potentially space above the PCB. It may also add cost to the basic connector, or require switching to a more expensive style that has these features.

Certain keying techniques may also require manual preparation on the connectors. A common method used on basic pin headers and sockets is the use of a blanking pin. The blanking pins are relatively easy to assemble into the female connector, normally just pressed into one of the female socket openings. However, on the mating male connector, the corresponding pin will need to be cropped off, or pulled out. This adds processing time and cost.



Connectors designed for keying will have ready-made accessories that are easy to assemble to both halves of the connector system, but these can be more expensive connector types. You'll need to balance the cost of the connector and keying assembly against the potential expense of slower assembly and mis-assembled connections.

Conclusion

When you are specifying connectors and whether you need polarizing or keying features, make sure you understand the risks behind incorrect assembly to your product. Weigh up the potential for rework, slower assembly and missed mistakes against potentially higher connector costs or additional keying processes.

If you would like to talk to someone about Harwin's product, technical knowledge or documentation, contact one of our Experts for assistance.

If you need more help choosing the right connector for your product, our Experts are waiting to advise you.