



Fact sheet Hybrid connectors

Keying guide for correct use

A hybrid connector combines power, signal, and data transmission in one connector. This saves space, time, and money, as cable routing and thus the complexity of the entire cabling process are significantly reduced. Mechanical interlocks and keying play a crucial role in ensuring secure and reliable connection.

Meaning of the keys

Keying is necessary to ensure that the connectors can only be used in the intended manner. Thanks to the modularity of the connectors, a large number of combinations of different voltages are possible. However, this also carries risks, especially when it comes to mismatching. Mechanical keying serves as an interlock against mismatching and ensures that only compatible parts can be connected to each other. It enables devices that have an identical

mating face but use different voltages to be protected against mismatching.

Incorrect keying and the resulting incorrect assignment can be potentially dangerous and pose a risk to life. Additional measures must therefore be taken at the machine to protect against these risks. As a result, mechanical keying is hugely important, as it ensures the safety and reliability of the hybrid connectors.



Mechanical keying and color coding of hybrid connectors

Mechanical keying uses defined keyways that only allow insertion and subsequent locking rotation when correctly aligned.

In addition to mechanical keying, the keys are visually marked with color coding rings.

	ENP	ECP
Key 1	Yellow	Red
Key 2	Green	Blue
Key 3	Orange	Gray
Key 4	Red	Yellow
Key 5	Blue	Green
Key 6	Gray	Orange

Refer to the table below to determine the correct keying:

(Note: Keying is independent of the data core assignment!)

Voltage class	Protective extra-low voltage <60 V DC / 50 V AC	Low voltage >60 V DC / 50 V AC	Mixed voltages of protective extra-low voltage and low voltage (e.g., 24 V DC and 400 V AC or customer-specific applications) <60 V DC / 50 V AC and low voltages >60 V DC / 50 V AC
Mixed voltages within the protective extra-low voltage class (e.g., 24 V DC and 48 V DC)	Mixed voltages within the low voltage class (e.g., 400 V AC and 600 V DC or 230 V AC and 300 V DC)		
Protective conductor necessary?	No	Yes	Yes
Key	1	2	3

Exceptions:

- Key 3: low voltage type DC with 3 power pins, e.g., 300 V DC
- Key 3: protective extra-low voltage type mixed voltage for XTS with special assignment
- Key 3: low voltage type AC for AMP supply line with special assignment

The purpose of keying

- #1 Avoidance of incorrect connections:** Different keys ensure that only the matching plugs and sockets can be connected to each other. This minimizes the risk of incorrect connections.
- #2 Safety:** Keying prevents incompatible connectors from being plugged together, as this could lead to short circuits or personal injury.
- #3 Device protection:** Keying ensures that the electrical parameters (e.g., voltage and current) of the connected components are compatible, guaranteeing the protection of the devices.
- #4 Clarity:** Keying enables clear assignment of connectors to specific voltage classes and applications.

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