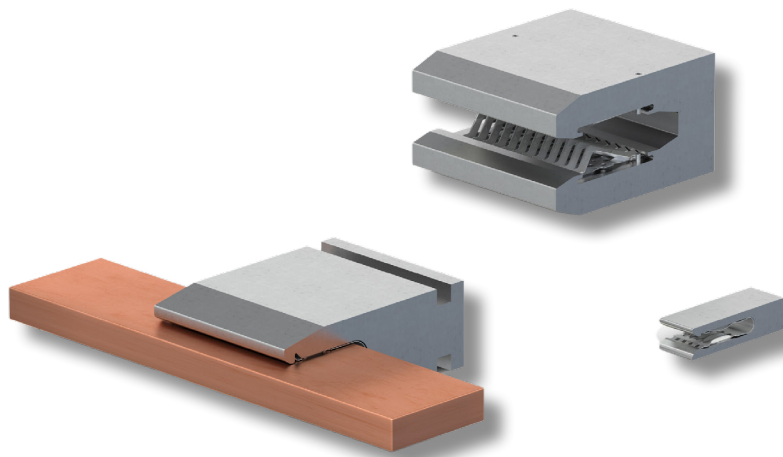


# STÄUBLI

## Fork Plugs in the Railway Industry: The Invisible Heroes of Connection Technology



*Fork connectors for blind mating*

In an era of rising fuel costs and growing concerns about climate change, train travel is becoming increasingly popular among travellers.

This trend is particularly evident in the growing number of high-speed trains operating between major cities. As train speeds increase, the physical requirements exerted on each individual train component also increase. While the focus may not be on the train itself, the importance of the often-overlooked subsystems cannot be overstated. The selection of components for these subsystems is crucial, with factors such as shock and vibration resistance and mechanical stability playing a key role. Fork plugs serve as essential connecting elements, enabling the reliable and efficient transmission of power and signals between the various subsystems. By ensuring a secure connection, fork plugs contribute to the smooth operation of the subsystems,

ultimately enhancing the overall performance of the train – they are the invisible heroes.

### Subsystems – Little Space for Important Components

High-speed railroads have been built and continuously developed in Europe and Asia since the 1980s. China has established itself as the world market-leader with almost 40,000 kilometres of rail network. However, the European network is also to be expanded in the coming years in order to provide a good alternative to air travel. High-speed trains should not only transport people quickly from A to B but also be safe and offer enough space for passengers. The space for the individual components is therefore becoming smaller and smaller in order to make the interior more spacious. The connecting components in particular, such as connectors to the converters, must therefore

be designed in such a way that they fit into this reduced space. Not only must space be taken into account, so too must ease of installation in order to avoid long downtimes in the event of maintenance. A slide-in blind mating connection is required here. Due to the considerable vibrations and shocks, the connections must have a particularly stable connection and be able to withstand the high electrical currents.

## Fork Plugs – The Real Heroes

Thanks to their compact size and fork shape, fork plugs can be used in confined spaces, as described above. By using fork plugs, electrical connections can be mated and released quickly and easily, which is particularly advantageous for maintenance and repair work. Fork plugs also offer good electrical conductivity and are capable of transmitting high currents. The fork plugs from Stäubli are particularly suitable for these applications thanks to the proven MULTILAM technology, as a continuous current flow is ensured even with high vibrations. The design can be specifically adapted to each customer so that busbars, cables and other components can be installed in the system to save space. The quick assembly and replacement options of Stäubli fork plugs save time and thus increase production or maintenance efficiency and reduce total costs of ownership. They offer the same or higher reliability as bolted connections but enable faster connections.

## Stäubli's Fork Connectors in China

The leading research and development institute China Academy of Railway Sciences (CARS) supported the advanced development of existing traction converters for use in the latest generation of Chinese high-speed trains back in 2010. Thanks to the intensive co-operation between the institute and Stäubli, a custom-fit solution was developed: bipolar high-performance fork connectors were introduced. Mounted on a water-cooled circuit board, the connector connects the IGBT module (insulated gate bipolar transistor)

to the busbars of the converter cabinet. Using an extremely high-performance insulating material meets the demanding industry requirements in terms of aging resistance and mechanical stability. The integrated MULTILAM enables a constant connection. These fork connectors are still in use today and are therefore characterised by their reliability and durability.

As a trusted and experienced industry partner, Stäubli has a deep understanding of the challenges and requirements of its customers in the global railway sector. Stäubli was therefore able to offer the best-fit solution in close co-operation with CARS. All Stäubli solutions are designed to meet specific customer needs and to withstand the most demanding mechanical and climatic conditions, ensuring uninterrupted operation even in extreme weather and under high mechanical stress. Stäubli is a reliable technology partner for customers seeking safe and dependable connections for their innovative railway projects.

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