

## Case Study | S-Bahn Berlin



### A convincing solution

With GIMOTA connectors  
and PMA cable protection products from ABB

The class 480 of the Berliner Verkehrsbetriebe (BVG) for the S-Bahn in Berlin. These trains from 1986 represented a significant technical advance, implemented the latest drive and process control and were characterised by outstanding driving and braking performance.

### Safe connectors for safe connections for the 1.5 million passengers of the Berlin S-Bahn

**GIMOTA AG and the ABB-PMA are helping Berlin's S-Bahn to significantly improve the operational safety and ease of maintenance of its 480 class of vehicles with new solutions.**

The S-Bahn in the cosmopolitan city of Berlin carries around 1.5 million passengers every day. Mobility is written in capital letters. The red-yellow trains belong to the cityscape like the Brandenburg Gate and the television tower. Almost 3000 employees ensure that passengers are offered an attractive range of S-Bahn services around the clock. The 327-kilometre-long network with 166 stations will be served by various vehicle classes on 16 lines with a high frequency of operation. The lines connect the city area with the surrounding countryside. A high level of operational readiness is therefore one of the most important requirements for daily S-Bahn operations in the metropolis of millions.

With 155 quarter multiple unit trains, the vehicle class 480 is a vehicle class of the Berlin S-Bahn that has proven to be successful over many years. In daily operation, however, operating failures due to short circuits have become more frequent in the past. After investigations and analyses it was clear that the problem was in the plug connections of the system cables in the cable junction box. These cable junction boxes under each wagon collect all system cables of the individual wagons and ensure the electrical connection to the couplings, which supply the individual wagons with power and signals.

The Berlin S-Bahn then asked its long-standing partner, the company GIMOTA AG from Geroldswil in Switzerland, to work out a solution to ensure the smooth operation of the class 480 again in the future.

### Problem definition

**How can the class 480 cable connections be better protected?**

The on-site analysis quickly showed that the outdated plug connection solution of a third-party manufacturer in the cable junction box was responsible for the increasing number of power failures in the trains. Despite PMA's existing cable protection, water and dirt could penetrate the old, industry-standard connectors, causing short circuits between the individual railcars.

The challenge in this project was to replace an existing application with a higher quality solution while using as much of the old application as possible. During our analysis, it quickly became clear that water, which accumulated in the cable junction box, ran into the plug connection from behind. On the one hand, the existing system wiring and cable protection had to be retained, and on the other hand, the longitudinal tightness of the connectors had to be guaranteed.



The newly designed GIMOTA Sliding Backshell in different sizes with the PMAFIX-Pro screw connection.

## ABB and GIMOTA AG

ABB and GIMOTA AG have enjoyed a long and successful partnership.

GIMOTA AG specialises in the supply of plugs for use in railway vehicles, especially for high current connections and data transmission.

GIMOTA plugs are used worldwide in the most diverse railway types for practically all occurring applications. For example, in electronic control systems, for analogue and digital data transmission or in wagon gangways and control modules.

GIMOTA AG supplies most of the leading railway manufacturers as well as railway companies worldwide and is today one of the leading suppliers of plugs for railway vehicles in Europe.  
[www.gimota.ch](http://www.gimota.ch)

Since 1975, PMA has been developing, producing and selling cable protection systems of the highest quality. With Swiss quality products, they have made a good name for themselves worldwide within a short time and established themselves as market leaders.

The product range, which today comprises more than 6,500 products, is well established worldwide in railway, mechanical engineering and shipbuilding.

PMA's headquarters are located in Switzerland, in the greater Zurich area. This is where a large part of the products for the world market are manufactured and where intensive research and development work takes place.

PMA is part of the ABB Schweiz AG.  
[www.pma.ch](http://www.pma.ch)

## Solution

### A standard solution was not possible with this challenge

As this was not possible with a standard solution, GIMOTA developed a "sliding backshell" which could be tucked back over the cable protection solution and thus ensured the necessary space for rewiring. Additionally, the receptacles of the plug connections were filled with a sealing compound certified according to EN45545-2 to achieve additional safety.

### A convincing solution with GIMOTA plug connections and PMA cable protection products from ABB

The cable connections of the individual railcars are combined in a cable junction box at an exposed position under the railcars. Moisture and dirt are therefore unavoidable in daily operation, in which up to 8 cars are hung together. GIMOTA developed a connector solution together with a completely new cable junction box, which ensures that the existing system wiring as well as the proven cable protection from ABB can continue to be used. In cooperation with ABB, the existing cable protection solution was revised and modernised.

### A completely sealed solution with reduced maintenance effort

All cable connections are now connected to the new GIMOTA plugs by PCS corrugated pipes from ABB, PMAFIX-Pro-NKNZ screw connections with strain relief IP 69 and a sliding backshell designed by GIMOTA. The big advantage of this solution is that the existing wiring of the cars can still be used. Time-consuming and expensive rewiring of the cars and procurement of the system cables were not necessary.

### Proven partnership in providing system solutions

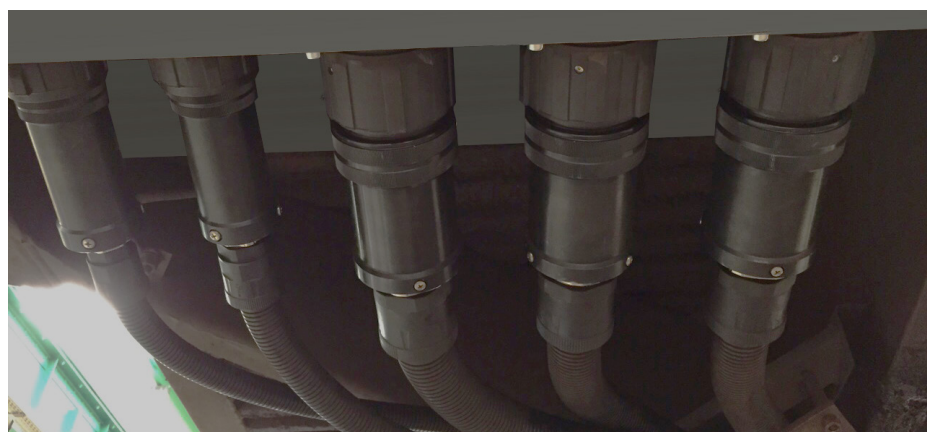
The entire closed system is now also longitudinally sealed and water ingress is no longer possible. Thanks to the newly developed sliding backshell between the screw connection and the plug, it was possible to retain the existing system wiring and to simplify the assembly of the cables to the coupling massively. This also makes future maintenance much easier. The cleaning effort of the newly designed cable junction box could be significantly improved; formerly weekly and now quarterly.

This means that Berlin's S-Bahn will continue to make a safe and reliable contribution to mobility in the global metropolis of Berlin in the future.

## Conclusion

Roger Spuhler, Regional Sales Manager at PMA and Marcel Frey, Sales Manager at GIMOTA AG, take stock of the project:

"Gimota and ABB PMA cable protection have a long-standing proven partnership as suppliers of system solutions consisting of plugs and cable protection. The strengths of this tried and tested partnership have once again been brought to bear for the customer in this project, which makes us very pleased for all those involved."



The fully assembled cable junction box on the underside of the car with the GIMOTA sliding backshell and the PMA screw connections.