

REFERENCES

## Autonomous at an interval of seconds

ABB technology keeps the underground train running without a driver



Tourists entering the underground train of line 3 at the main railway station in Nuremberg are amazed: they can't see a train driver. The line is one of two fully automatic underground trains of the Franconian metropolis. ABB products have ensured the smooth function of the operation for over ten years.

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O1 Transported with the underground train without driver and fully autonomous. SMISSLINE TP has lent support for over 10 years in the smooth operation.

Nuremberg is expert in the innovations of railway traffic - from here the first railway in Germany travelled in 1835. And so, in 2008, it seemed obvious that traditionally the first underground train without a driver would also start operating in Nuremberg.

### Open view ahead

Starting as project RUBIN (implementation of an automated underground train in Nuremberg) at the end of the 1990s, Nuremberg's underground train lines U2 and U3 are up to the present the only fully automated underground trains in Germany. What becomes obvious right from the start: To go without the cabin of the driver makes possible a totally unusual experience, an unobstructed view in the direction of travel. The seats in the front section of the passenger train are very popular – even when there is not much to see in the dark underground railway tunnel.

### SMISSLINE TP scores twice

Also SMISSLINE TP was installed in the systems. As the first plug-in base system it globally allows the load-free plugging in and unplugging of devices and components without additional personal safety equipment. "It greatly simplifies all activities on the systems", says Walter Schrödel, Project Manager at M-T-N. For example, the engineers can only maintain the switching systems during the standstill periods between one and four o'clock during the night. "When every minute counts, the colleagues of the VAG greatly appreciate the advantage of working with voltage", according to Schrödel. Also the minimal requirement of space for the SMISSLINE TP products has very positive advantages. The switching systems are often installed in extremely confined spaces.

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Since the SMISSLINE TP can be installed both vertical and horizontal, it requires up to 20 % less space for the installation.

### **M-T-N relies on ABB**

Aside from the complex control and safety systems, also the lighting, ventilation, heating and additional systems must be safely supplied with power. This requires an absolutely reliable and continuously available distribution of energy - even more so than with conventional trains. In the event of a power failure, for example, the uninterruptible power supply (UPS) must immediately make sufficient energy available for the operation of all systems. The M-T-N Elektrotechnik GmbH from the nearby Sulzbach-Rosenberg has planned and implemented the switching systems. And integrated ABB at its own initiative.

"We are proud that we could introduce our own expertise in this showpiece project", explains Flierl.

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In the meantime we can look back on many years of excellent cooperation with ABB, such as in the equipping of computing centres, for example", says Leonhard Flierl, Manager of M-T-N. "That is why we made the recommendation to the VAG to decide on ABB products for the switching systems."

### **The most modern safety systems**

Numerous safety systems are necessary to do without the human control supervision in the cabin of the driver. For example, the underground train has intelligent doors and an automated processing system for getting on or off the train. The most modern monitoring technology ensures that every train stops automatically before entering the station if a person or an object of a certain size is located on the rails. The following trains are also stopped in the event of an emergency, preferably at a station. In the case of such stops, the control centre immediately receives notification from the platform safety system and can then inform itself via the video camera about the situation.

### **High frequency possible**

The advantages of fully automated trains are numerous: The innovative system reduces personnel costs and the energy is used more efficiently due to an optimized method of travel. According to the information of the VAG Verkehrs-Aktiengesellschaft Nürnberg (VAG Traffic Public Limited Company Nuremberg), the underground trains without driver are also more punctual and technically more reliable than lines with a driver. Especially important for the VAG: The trains can follow each other closer than in conventional operation. The computers in the trains permanently exchange data with the central control system. This prevents a train from getting too close to the train travelling ahead. The trains without driver can therefore be sent on the routes at short distances – either as short train every 100 seconds or as long train at a 150-second cycle, depending on the expected number of passengers. This clearly raised the transport capacity on the routes and shortened the waiting time correspondingly.