

Enika test stations as quality assurance tools for power electronics in public transport



For more than 25 years, Enika has been supplying complete electrical and power electronics for new and retrofitted trams of various manufacturers. Thanks to its extensive competences and experience, the company provides high quality equipment with the potential to fully integrate all components on a vehicle.

Reliable and failure-free equipment for public transport, including tramway rolling stock, is a guarantee of safety and satisfaction for all passengers using public transport. To this end, all manufactured equipment must be properly tested to assure its extended service life and that of the vehicles.

In 2020 Enika completed a project to extend its universal test stations located at the production facility in Żłotniki. These test stations are used for the final testing of serially manufactured equipment and as well as prototypes.

The extended test stations in Żłotniki, in combination with the existing test stations in the main facility in Łódź, represent a huge potential for the wide-ranging parallel testing of many devices. Carrying out tests in two locations allows high efficiency to be achieved and flexible responses to customer needs, while offering security in the event of random events related to the company or the customer.

The test stations were designed to:

- obtain a universal and aesthetic form of high-power test stand, allowing regulated power sources of up to 1000 V to be automatically connected to the device under test, with different power and load formats to reflect real working conditions,
- provide additional test stations for type tests and current tests of static converters and traction inverters, for example, with power ratings of up to 200 kW,
- integrate the new test stations with the existing equipment for performing EMC tests of conducted and radiated disturbances under different operating conditions,
- ensure the highest quality thanks to the extended test time for all devices, with reduced operator time along with the automation and optimization of the technical inspection process,
- ensure safe and comfortable work.

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As a result of the project, Enika's infrastructure at the Złotniki branch was enhanced with the following elements:

- a number of convenient, configurable test stations dedicated to device testing,
- a universal load set used to carry out type tests and current tests of inverters, consisting of coupled asynchronous motors, a torque meter, an inertia mass and the ability to connect any motor,
- a separate room containing: contactor switchboards, dedicated load stations for different voltages and powers, sets of motor and resistive loads of different rated power,
- an automatic test stand management system that allows the operator to configure the tests intuitively by means of touch panels at each test station.

The test stations presented in this article have recently been used by Enika's engineers for post-production testing of a number of devices, including traction inverters and converters for trams: MF29, NF6D, N8C, RT6N1, T5B641. They are currently used to test the technical condition of almost every power electronic device manufactured by Enika, before it is sent to the customer.

The effectiveness of the Enika's test stations in checking equipment for tramway rolling stock is demonstrated by the high technical readiness of Enika equipment. In 2020 this rate exceeded 99.6% for all types of tram drive systems under warranty. Nonetheless, a much more important proof of the validity of extending the test stations comes from the customer, reporting high reliability of the vehicles using Enika equipment.

Materials and photos: Enika Sp. z o.o.

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