

SHORT MODERUS BETA TRAMS FOR THE KATOWICE AGGLOMERATION



ENIKA develops and manufactures electrical equipment not only for modernization projects but also for completely new trams in various length variants. One interesting example of the use of ENIKA equipment in new vehicles is the supply of equipment for so-called Moderus Beta solo trams, i.e. single-section vehicles with a length of just under 15 meters, which were delivered in three versions to the Katowice agglomeration.

The Katowice region is, due to its industrial history, one of the most densely populated areas in Poland, which places high demands on public transport. Tram lines connect a total of 13 cities, and the total network length is nearly 180 km, making it one of the largest tram systems in the world. The specific operating conditions, together with the effort to make maximum use of the existing infrastructure, led to the decision to procure trams with lower passenger capacity for routes with lower demand, replacing part of the older Konstal 105N(a) single cars.

A specific situation existed in the city of Bytom on local line 38, where – as the last city in Poland – bidirectional two-axle Konstal N trams were still in regular operation. Their design was derived from German wartime KSW vehicles. For this line, the

operator also decided to purchase modern solo vehicles, but due to the absence of a turning loop, in a bidirectional version.

The local operator, Tramwaje Śląskie, initially ordered eight unidirectional and two bidirectional vehicles from Modertrans in 2018. Shortly afterwards, an option for five additional unidirectional and one bidirectional tram was exercised. As a result, a total of thirteen vehicles designated Moderus Beta MF 10 AC (unidirectional) and three vehicles of the Moderus Beta MF 11 AC BD type (bidirectional) were put into service in 2020-2021.

In 2025, another public contract was concluded to expand the fleet of "short" trams, this time for ten vehicles exclusively in the

bidirectional version. Due to technical changes, this variant was designated Moderus Beta MF 30 AC BD.

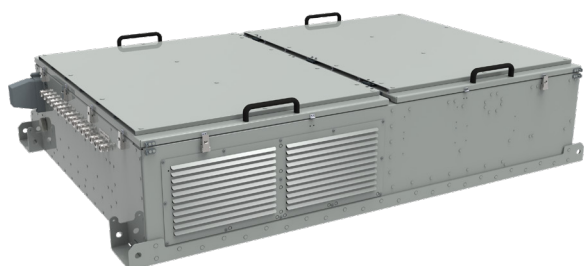
By the end of 2026, a total of 26 of these modern solo vehicles are expected to be in operation in the Katowice agglomeration. Thanks to their distinctive red livery and sharp design lines, they have earned the nickname "tramway Ferrari." The vehicles offer a low-floor share of approximately 35%, with only a single step leading to the raised interior sections above the pivoting bogies.

ENIKA was selected as the supplier of electrical equipment for all three of the mentioned Moderus Beta tram projects (MF 10 AC, MF 11 AC BD, and MF 30 AC BD).

In the case of the earlier MF 10 AC and MF 11 AC BD vehicles, the scope of supply included one traction container of type ENI-FT600/2x2x55, which distributes power to all four traction motors. Each motor is controlled independently, allowing continued operation in emergency mode in the event of a failure of one motor. An auxiliary power converter of type ENI-PT600/24/AC/50 was supplied separately, with a DC output of 10 kW for the onboard network and an AC output of 40 kVA (32 kW) for supplying the vehicle air-conditioning systems.

Other in-house components include, for example, a high-speed circuit breaker (HSCB) ENI-SWN/MF09 and a high-voltage switchgear ENI-RWN/MF10. In the driver's cab, 10.4-inch touch operator panels ENI-PO1024/768/2 were installed, also used for diagnostic purposes. ENIKA also supplied the complete vehicle control system (TCMS) with the main control unit ENI-VCU. The control system is responsible not only for processing and distributing signals related to traction and braking but also for communication with selected peripheral devices (doors, sanders, wipers, etc.). ENIKA was also responsible for the selection and supply of certain additional components from established partners, such as braking resistors and current and temperature sensors for the onboard batteries.

The newer Moderus Beta MF 30 AC BD version, whose deliveries began in 2026, appears very similar in terms of design at first glance. However, significant changes were introduced in the electrical system. In this case, the requirement was to integrate the traction converter and the auxiliary power converter into a single container. ENIKA therefore developed and supplied the integrated container ENI-KFP600/2x2x55/46. It provides identical power parameters as the previous solution with



Integrated container type ENI-FT600/2x2x55/46

Short trams with ENIKA equipment also in Elbląg



In addition to the fleet of short Moderus Beta trams in the Katowice agglomeration, five vehicles designated Moderus Beta MF 09 AC were also delivered to the city of Elbląg between 2019 and 2021.

In this case as well, these are solo trams with a partially low-floor design, manufactured by the Poznań-based company Modertrans. However, their design and bogies are derived from earlier tram modernization projects known in Poland under the trade name Moderus Alfa. This means, among other things, that in Elbląg two steps lead to the raised interior sections, rather than just one. This solution, however, allows all doors to be of a double-leaf design.

The supplier of the complete electrical system was also ENIKA, which delivered the traction converter ENI-FT600/2x2x55, the auxiliary power converter ENI-PT600/24/AC/MF20.1, a high-speed circuit breaker (HSCB) ENI-SWN/MF09, components for the high-voltage switchgear, a touch display in the driver's cab (ENI-PO1024/768/2), and the complete control system (TCMS).

separate units. Independent control of individual motors and the possibility of emergency operation in the event of a failure of one motor or a motor group were also retained. Integrating the equipment into a single container reduced space requirements, decreased the amount of cabling, and simplified maintenance.

The scope of supply remained essentially the same as in the previously implemented projects; however, the type designations of some components were modified. The high-speed circuit breaker (HSCB) was designated ENI-SWN/MF30, the high-voltage switchgear ENI-RWN.1, the main control unit (TCMS) ENI-VCU32, and the driver's display ENI-PO1024/768/4.

The use of ENIKA electrical equipment in the solo tram projects for the Katowice agglomeration demonstrates the company's capability to deliver specific solutions tailored to the requirements of both the vehicle manufacturer and the end operator.