Enika | member of MEDHA group

AUXILIARY CONVERTERS

The history of the company ENIKA is inseparably connected with the production of auxiliary converters of various power ratings for urban public transport vehicles. The first auxiliary converters were manufactured by the company in 1999 and were intended for the legendary Polish Konstal 105Na trams. Since then, hundreds of units have been delivered to the market for various applications, including, for example, a “tropical” version for Manila in the Philippines.

Currently, most auxiliary converters, including those used in modernization projects, are installed in shared enclosures together with traction converters; however, standalone auxiliary converters are also available in the product range. An example of such converters is a pair of standard supplied products listed below, one of which is intended for charging the onboard battery, while the other provides power of up to 40 kVA / 32 kW for the alternating current network. These basic products are still based on IGBT transistors or use a combination of IGBT and SiC MOSFET components.

TYPE	ENI-PT600/24/MR.1	ENI-PT600/24AC/50.1
Rated supply voltage	600 V / 750 V DC	600 V / 750 V DC
Rated control voltage	24 V DC	24 V DC
DC output power	7 kW	10 kW
Rated DC output voltage	27,9 V DC	27,9 V DC
AC output power	-	40 kVA / 32 kW
Rated AC output voltage	-	3 × 400 V AC, no neutral conductor
Output protection	Overload – current source Short circuit – electronic	Overload – current source Short circuit – electronic
Efficiency	> 94 %	≥85 %
Galvanic isolation	YES	YES
User interface	CAN 2.A	CAN 2.0B
Cooling	Natural air cooling (without fan)	Forced air cooling (with fans)
Operating position	Horizontal	Horizontal
Degree of protection	External enclosure: IP65	External enclosure: IP54
Operating temperature	-30 °C ÷ +40 °C	-30 °C ÷ +40 °C
Use of SiC MOSFET components	NO	DC section: NO, AC section: YES
Weight	60 kg	300 kg
Dimensions (L × W × H)	600 mm x 763,3 mm x 423 mm	1201 x 1002 x 450 mm

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MODULAR AUXILIARY CONVERTER USING SiC MOSFET TRANSISTORS

	INPUT HV BLOCK	DC BLOCK	AC BLOCK
Rated supply voltage	600 V / 750 V DC	600 V DC	600 V DC
Rated control voltage	24 V DC	24 V DC	24 V DC
DC output power	32 kW	10 kW	-
Rated DC output voltage	600 V DC	27,9 V DC	-
AC output power	-	-	40 kVA / 32 kW
Rated AC output voltage	-	-	3 × 400 V AC, no neutral conductor
Output protection	Overload – time-limited Short circuit – electronic	Overload – current source Short circuit – electronic	Overload – time-limited Short circuit – electronic
Efficiency	≥95 %	≥95 %	≥95 %
Galvanic isolation	YES	YES	YES
User interface	CANOpen	CANOpen	CAN 2.0B
Cooling	Forced air (with fans)	Forced air (with fans)	Forced air cooling (with fans)
Operating position	Horizontal	Horizontal	Horizontal
Operating temperature	-30 °C ÷ +40 °C	-30 °C ÷ +40 °C	-30 °C ÷ +40 °C
Use of SiC MOSFET transistors	YES	YES	YES
Dimensions (L × W × H), weight and degree of protection	Depends on installation	Depends on installation	Depends on installation

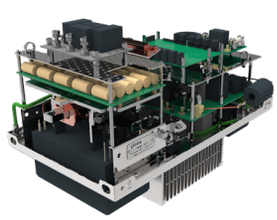
The current production of ENIKA in the field of auxiliary converters is based on a philosophy of using three modular blocks – an input block (HV block), a DC block, and an AC block. The input block is connected to an external voltage source (600/750 V DC) and provides equalization and distribution of direct voltage at the level of 600 V DC to the DC and AC blocks. The DC block provides an output power of 10 kW, and the AC block provides 40 kVA. All of these blocks are now built exclusively using SiC components, which ensures smaller dimensions, lower weight, and significantly higher efficiency at a level exceeding 95%.

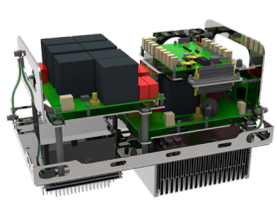
The specified power ratings of the DC and AC blocks are sufficient to cover the energy demand of the vast majority of trams. In cases where the customer requires higher power or only a version with a DC or AC output, the number of blocks (and thus the total power) can be increased, or conversely, the corresponding block can be removed.

The basic idea of the modular design is to provide customers with a standardized solution for which the availability of spare parts is ensured – both in terms of time and cost. The aim is to avoid a situation in which the customer would receive a solution tailored to their needs that would not be sustainable due to the use of entirely specific components.

This does not, however, exclude adapting the final product to various types of installation according to the customer's requirements. The auxiliary converter may be installed in a shared enclosure with the traction inverter, in a separate enclosure on the vehicle roof, or in a version intended for underfloor installation. It may be manufactured in a version with additional double insulation (for trolleybuses) or without the input (HV) block in versions intended for electric buses and hydrogen buses.

At the same time, the blocks can be adapted for installation in older (refurbished) housings, adjusted to previously existing cooling ducts, etc. The range of installation possibilities is therefore very wide, even while maintaining a standardized block solution.





MODULAR DESIGN POSSIBILITIES

	INPUT HV BLOCK	DC BLOCK	AC BLOCK	DOUBLE INSULATION
Trams	YES	YES	YES	-
	YES	-	YES	-
	-	YES	-	-
Trolleybuses	YES	YES	YES	YES
Electric buses / Hydrogen buses	-	YES	YES	-

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