

# COMBIVERT T6 APD E-MOBILITY

MODULAR AUXILIARY INVERTER SYSTEM - ALL-IN-ONE  
ELECTRIFICATION TECHNOLOGY FOR COMMERCIAL VEHICLES AND MOBILE MACHINERY

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# COMBIVERT T6 APD E-MOBILITY SOLUTIONS

## ELECTRIFICATION TECHNOLOGY FOR COMMERCIAL VEHICLES AND MOBILE MACHINERY MODULAR AUXILIARY INVERTER SYSTEM - T6 APD SERIES ALL-IN-ONE

A modular and scalable multi-inverter system, specifically designed for controlling auxiliary components in commercial vehicle applications. Multiple motor control inverters integrated as an all-in-one system provide significant space, wiring and cost savings.



- MCU → On-board embedded logic control
- DCU → Power modules - AC motor controller
- EMC → Compatibility by Common-Mode-DC-EMC filters
- SCL → Encoderless motor control – Excellent shaft performance



COMBIVERT T6 - APD Series / Size D 4-in-1

### SCALABLE

The KEB T6 APD Series Auxiliary Inverter System can be scaled from 1 to 6 independent motor control outputs.

### MODULAR

Each inverter output has modular rated power options with nominal rated currents of 16.5 A, 33 A and 60 A.

### CONTROL OPTIONS

Each inverter motor control also supports a variety of control options. Supported motor types include: induction, synchronous PM, switched reluctance, IPM or linear motors. KEB's motor control algorithms allow for closed loop speed, torque, and positioning performance without the need for encoder feedback (sensorless closed loop).

### EMBEDDED CONTROL AND J1939 CAN APP

An embedded logic controller supports communication gateways such as CAN J1939 and additionally supports a CODESYS programming environment for intelligent system control and application-specific function block designs.

### INTEGRATED NOISE PROTECTION

The Common-Mode-DC-EMC filters fitted as standard, guarantees high operational reliability in conjunction with other high-voltage components in the vehicle.

### AUTOMOTIVE RATED

The KEB T6 APD Series Auxiliary Inverter System meets all the requirements for an automotive system with regard to mechanical and thermal properties, environmental conditions, EMC, safety and service life. And, with an IP67, IP6K9K housing and connectors, the KEB T6 APD is designed for the harshest environments.

### MAIN CHARACTERISTICS

T6 APD is qualified in terms of mechanical and thermal characteristics, ambient conditions, EMC, safety and life-time.

- IP System protection: IP67, IP6K9K
- Mechanical ambient conditions: ISO 16750-3, Code L
- Climatic environmental conditions: -40 ... +85 °C
- HV\_DC - High DC voltage input range: 200 ... 820 VDC
- LV\_DC - Low DC voltage input range: 9 ... 32 VDC (ISO 16750-2: 36V / 60 min.)
- Output rated currents at fS = 8 kHz: Power module A: 16.5 A / Power module B: 33 A / Power module C: 60 A

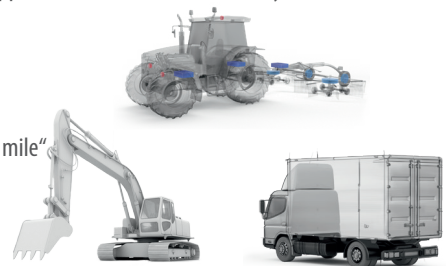
### FIELDS OF APPLICATION

Electrification of auxiliary equipment in electric, hybrid and fuel cell vehicles is a very important approach for sustainable e-mobility.

- Public transport - buses
- Municipal vehicles - street sweepers, refuse collection vehicles
- Agricultural machinery - tractors and implements
- Mobile machinery - construction and mining machinery
- Transport and logistics - transport refrigerating systems, deliveries in urban areas for the "last mile"

### USE CASES

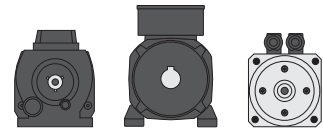
Heating, ventilation and air conditioning, steering pump (hydraulic pump), air compressor, drive solutions from „balance-of-plant“ components cooling pumps, recirculations blowers and tubo compressors in fuel cell application.



## MODULAR AUXILIARY INVERTER - FLEXIBLE SYSTEM CONFIGURATION

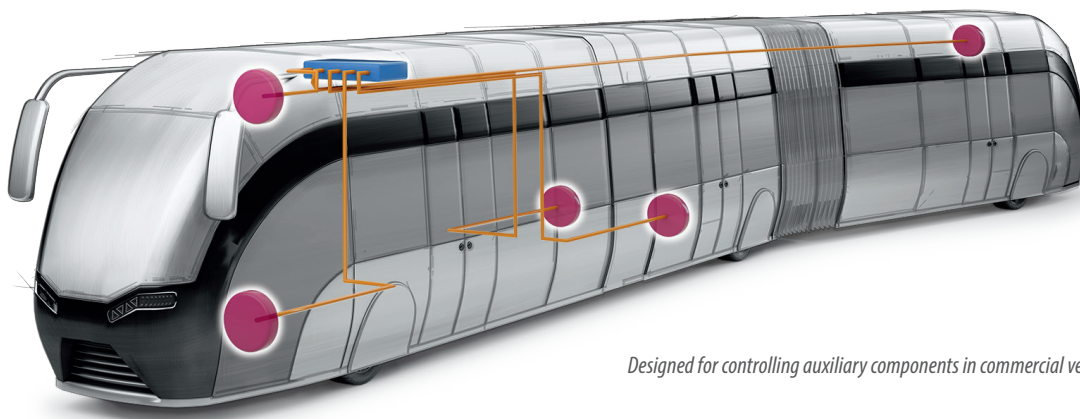
### MCU - ON-BOARD EMBEDDED LOGIC CONTROL

- Smart control, IEC 61131-3 environment, CODESYS based, free programmable via COMBIVIS studio 6
- Variable communication link to vehicle control ECU - e.g. J1939 Gateway: Diagnostic Trouble Codes DM1...DM4
- Implementation of customer and application-specific software solutions
- Commissioning tools in COMBIVIS 6 support parameterization, start-up and diagnostic.



### DCU - POWER MODULE - AC MOTOR CONTROLLER

- Power module A → 16.5 A - rms AC current - 150% overload (60s), fS = 8 kHz
- Power module B → 33 A - rms AC current - 150% overload (60s), fS = 8 kHz
- Power module C → 60 A - rms AC current - 110% overload (60s), fS = 8 kHz
- Motor temperature monitoring – PTC, KTY84, PT1000
- Motor cable lengths up to 30 m for each power module



*Designed for controlling auxiliary components in commercial vehicle applications*

### DRIVE PERFORMANCE - ADVANCED MOTOR CONTROL ALGORITHMS

SCL means Sensorless Closed Loop and describes the encoderless operation of electric motors. The principle is based on a mathematical model of the synchronous motor. With this mathematical model the rotor position can be emulated with known motor data.

- Advanced control algorithms - Dynamic and efficient speed and torque control
- Synchronous-, Asynchronous-, IPM, SRM
- Calibration routines for motor resistance and inductance, rotor position detection
- Easy Start-Up-Wizard for learning motor characteristics
- High-speed application up to 2000 Hz max.

### EMC COMPATIBILITY - HIGH OPERATIONAL RELIABILITY

As vehicles are equipped with more and more electronic systems, so the demands on EMC compatibility increase.

T6 APD guarantees high operational reliability in conjunction with other high-voltage components in the electric vehicle or mobile machinery.

- Verification of Electromagnetic Compatibility (EMC)
- ECR R10: Rev.5, EN61800-3
- Integrated Common-Mode-DC-EMC Filter
- EMC Connectors – optimal shield connection and cable clamping
- In-house EMC automotive testing lab and experts available

**COMBIVERT T6 APD SERIES ALL-IN-ONE  
MODULAR AUXILIARY INVERTER SYSTEM**



**T6 APD SERIES / SIZE A - SINGLE INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 1 DCU - Power module - AC motor controller - EMC Filter
- 3 various system configurations



**T6 APD SERIES / SIZE B - 2-IN-1 INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 2 DCU - Power modules - AC motor controller - EMC Filter
- 6 various system configurations



**T6 APD SERIES / SIZE C - 3-IN-1 INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 3 DCU - Power modules - AC motor controller - EMC Filter
- 10 various system configurations



**T6 APD SERIES / SIZE D - 4-IN-1 INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 4 DCU - Power modules - AC motor controller - EMC Filter
- 15 various system configurations



**T6 APD SERIES / SIZE E - 5-IN-1 INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 5 DCU - Power modules - AC motor controller - EMC Filter
- 21 various system configurations



**T6 APD SERIES / SIZE F - 6-IN-1 INVERTER SYSTEM**

- 1 MCU - On-board embedded logic control
- 6 DCU - Power modules - AC motor controller - EMC Filter
- 28 various system configurations