Datasheet

COMBI ACE1 / ACE1 NEW GENERATION

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DESCRIPTION

COMBIACE1 / ACE1 NG inverter is suitable for controlling several types of motors (IM, SPM, IPM, SRM, SRPM) in the range from 4 kW to 8 kW of nominal power, adopted in battery powered electric and hybrid vehicles.

COMBIACE1 / ACE1 NG is available with 35-poles AMPSEAL connector. The high number of I/O accommodates a wide range of vehicle controls and sensors.

COMBIACE1 / ACE1 NG can easily interface with a wide range of external devices via CAN bus.

APPLICATIONS

Typical applications are:

Stackers, order pickers, aerial lift platform (boom & scissor lift), reach truck, counterbalance truck up to 2t. Furthermore, it may also be suitable for other markets such as E-mobility (e-scooters, light electric vehicles and more).

FEATURES

- Nominal voltage of 36/48 V (24 V, 80 V planned).
- Microcontroller for main functions, 576+ kByte embedded flash memory.
- Microcontroller for safety functions, 320+ kByte embedded flash memory.
- Up to 11 active-high digital inputs (upon hardware configuration).
- Up to 2 active-low digital inputs.
- Up to 4 analog inputs (range 0 V ÷ 10 V) with 10bit resolution.
- Dedicated input for motor thermal sensor.
- Several options available for speed or position sensor interface:
  - Incremental encoder (default).
  - Incremental encoder + index + PWM.
  - Analog Sin/Cos sensor.
  - Set of three Hall sensors.
  - Resolver (with external interface).
- Possible safety configuration with double encoder or Sin/Cos + encoder
- Isolated CAN bus interface up to 1 Mbit/s
- 11-bit and 29-bit communication supported.
- Dual auxiliary supply outputs (factory configurable to 12 V or 5 V; max 200 mA).
- 4 PWM voltage-controlled low-side outputs (dedicated function for Main Contactor and Brake).
- 2 PWM current-controlled low-side outputs (dithering option configurable in amplitude and frequency).
- High-side output driver.
- Built-in freewheeling diodes for all the low-side outputs.
- Protection against overload, short circuit, open load and ESD.
- Ambient temperature:
  - Operating: -40 °C ÷ +40 °C.
  - Storage: -40 °C ÷ +85 °C.
- Ampseal 35-pins sealed connector.
- Access to status and diagnostic information

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MODEL CHART

Nominal voltage	Voltage range [V]	2-min RMS current ratings [A]	S2 60-min RMS current ratings [A]	DC Pump Section [A]
24 V	**11 V ÷ 35 V**	400 (preliminary)	200 (preliminary)	TBD
36/48V	**11 V ÷ 72,5 V**	350	175	300
80 V	**TBD**	250 (preliminary)	125 (preliminary)	TBD

Current ratings are based on an initial heat sink temperature of 40 °C and a maximum heat sink temperature of 85 °C. No additional external heat sink is used for the 2-minute rating test.

Inverter can continuously deliver the rated RMS current only if adequately cooled. When it is equipped with its own finned heat sink, a proper dissipation is obtained by applying a 100 m^3/h airflow. In case the inverter is provided with the base plate, customer is in charge of design an adequate cooling system that can dissipate the heat produced by the inverter, keeping its temperature below 85 °C.

REGULATIONS

UL certificate	UL 583 compliant (AU3503).
Functional safety	Applicable requirements of EN 1175-1:2010 Compliant to upcoming revision of EN 1175 Applicable requirements of EN 280:2015 Functional safety according to EN ISO 13849:2015
EMC	Applicable requirements of EN 12895:2015.
IP code	IP65.

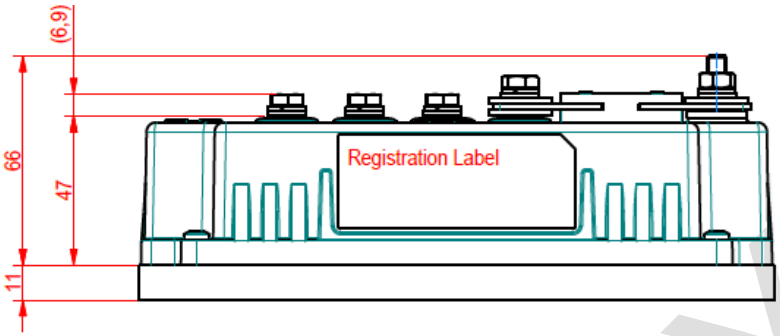
Features and technical information included in this document are preliminary and can be subject to modifications.

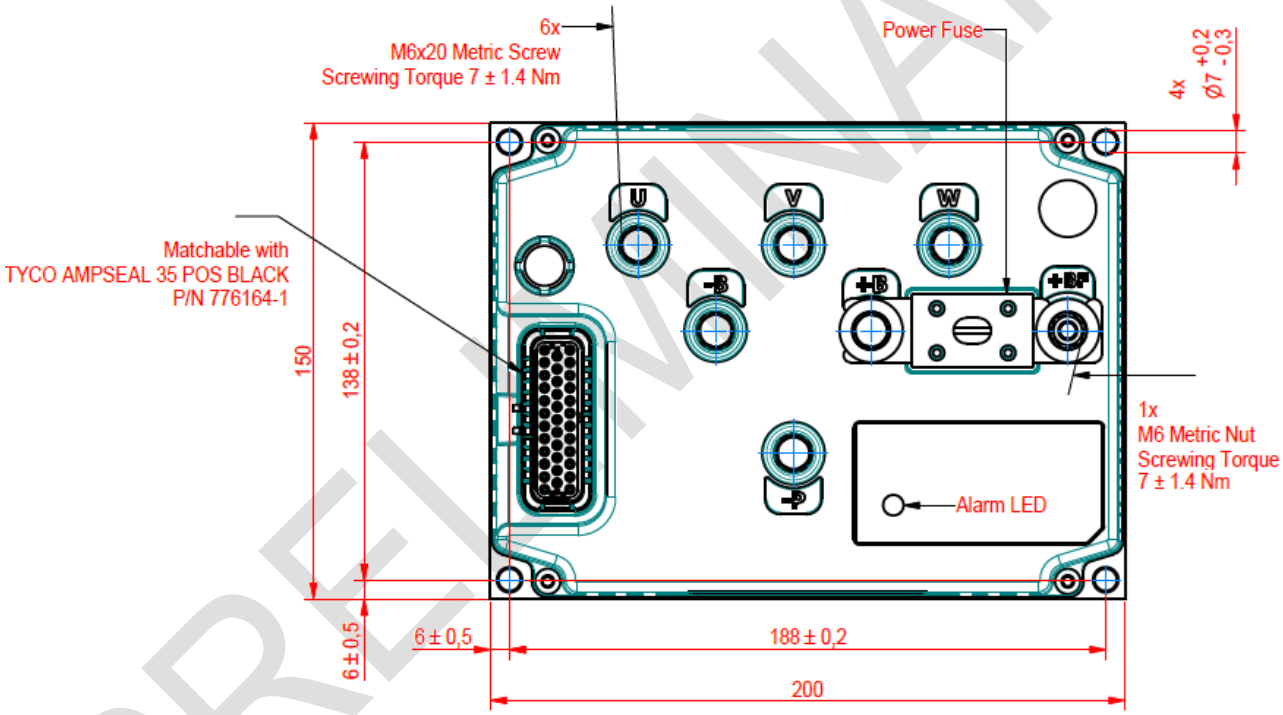
TECHNICAL DATA

Version		STANDARD
Connector		35-pins Ampseal
Digital inputs	active high	9
	active low	2
Analog inputs		4
PWM voltage-controlled outputs		4
High side output		1
PWM current-controlled output		2
Auxiliary supply output (12 V / 5 V)		2 (max 200 mA)
CAN bus interface		1
Input for motor thermal sensor		1
Encoder interface		1 (2 on demand)
Sin-cos / 3-Hall / resolver interface		1 on demand
Memory	Main µC	576+ kB Flash, 48 kB SRAM, 64kB emulated EEPROM
	Supervisor µC	320+ kB Flash, 32 kB SRAM, 64 kB emulated EEPROM

Speed/position sensor interfaces different from single incremental encoder change the number of digital or analog available inputs.

DIMENSIONS





TYPICAL WIRING DIAGRAM – STANDARD VERSION