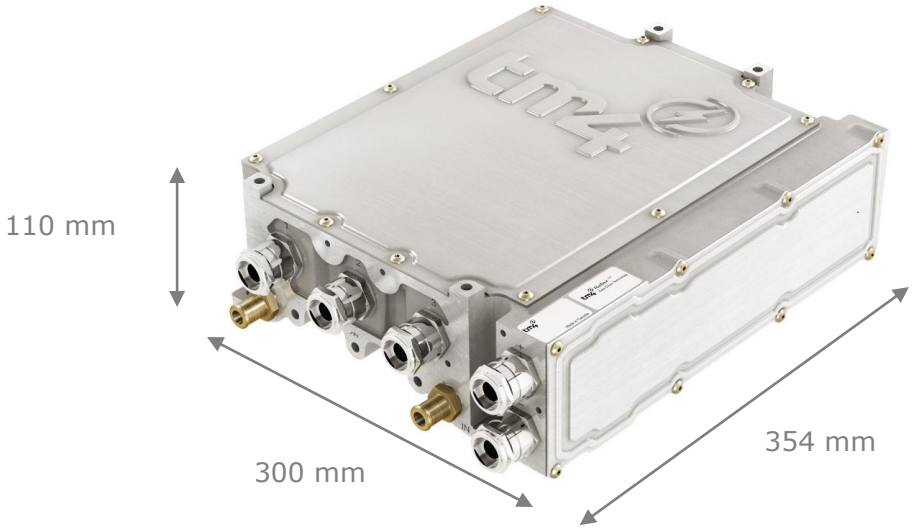
CO150 Inverter/Controller



Introduction

Introducing the new TM4 inverter designed for electric and hybrid vehicle applications. This inverter utilizes the latest technology of automotive grade insulated-gate bipolar transistors (IGBT) to deliver the industry's highest specific power and current densities. It is embedded with advanced control algorithms for optimal power module usage and efficiency. Combining hardware and software innovations, the new ReflexTM gate driver technology anticipates a voltage peak on the IGBT, and it ensures that it never reaches the voltage limit. This new feature is an active mechanism that uses the stray inductance of the IGBT to control the current during the turn-off process, without slowing down the rate of voltage change.

System features

Inverter features

- High power and current density
- Uses Reflex^{TM} gate driver technology
- Multiple resolver/encoder compatibility
- Four-quadrant operation
- High efficiency
- Variable switching frequency
- Compatible with Tamagawa resolvers or Timken-based TM4 proprietary encoders

Software features

- Sinusoidal motor current
- Temperature sensing for system derating and alarms
- Advanced diagnostic capabilities (TM4 ΦDIN)
- Communication fault detection
- CAN 2.0b communication interface
- Torque or speed control
- Advanced control algorithm for optimal power module usage and efficiency

Preliminary specification - This datasheet contains preliminary data subject to changes and additions

Characteristics

Main Features	CO150[1]	CO150-HV[2]
Maximum Rating		
Maximum electrical output power [3]	150 kW	170 kW
Maximum output current	575 Arms	350 Arms
Maximum blocked wheel current [4]	650 A_{dc}	375 A_{dc}
Maximum electrical frequency	1.25 kHz	750 Hz
Efficiency	97.5%	
Continuous Rating		
Continuous electrical output power	100 kW	
Continuous output current	350 Arms	220 Arms
Efficiency	97.5%	

Electrical Parameters	CO150	CO150-HV
Operating battery voltage	130-450 Vdc	200-750 Vdc
Performance battery voltage [5]	320-450 Vdc	500-750 Vdc
Non-operating battery voltage	600 Vdc	775 Vdc
Maximum battery current [6]	500 A_{dc}	400 A_{dc}
Continuous battery current [6]	350 A_{dc}	210 A_{dc}
Diagnostic	TM4 ODIN diagnostic interface	
Switching frequency	Up to 20 kHz	Up to 12 kHz
CAN interface version	2.0b	
Short-circuit protection (IEC 947-4-1)	Type 1 & 2	
Over-current protection	Yes	

Environmental and Cooling Features	Value
Liquid temperature	-40°C to 75 °C
Ambient temperature (continuous at 75°C)	-40°C to 85 °C
Storage temperature	-40°C to 85°C
Ingress protection [7]	IP6K5/ IP6K9K
Cooling system	Water/Glycol
Shock & vibration standards [8]	GMW3172

[1] 450 V system figures are given for a coolant temperature of 55 °C

[2] 750 V system figures are given for a coolant temperature of 65 °C

[3] For a maximum duration of 30 seconds.

[4] For 5 seconds. Worst case at highest voltage in the performance battery voltage range. Increases to maximum output current at 30 Hz.

[5] Based on motor Cosφ >= 0.8.

[6] At 320 Vdc and 500 Vdc for 750 V system.

[7] This excludes phase cable glands (IP68) and signal connectors (IP67) which should be protected against high pressure jets at system integration level.

[8] Random – Sprung masses and mechanical shock-pothole.

Mechanical Parameters	standard	With strait terminal box option (DS)	With down-angled terminal box option (DD)
Length	354 mm	416 mm	416 mm
Width	300 mm	300 mm	300 mm
Height	110 mm	110 mm	110 mm
Weight	11 kg	11.5 kg	11.5 kg