Turntide Gen6 Low Voltage Inverters - Standard

Gen6 is an exceptional range of air-cooled inverters claiming one of the highest power densities of its type on the market today.



Capable of supporting all Permanent Magnet Synchronous Machines and AC Induction motors, it's a first choice for all low-voltage electrification applications below 63V in an extremely small footprint.

Turntide User Code (TUC) is an advanced feature-rich development environment for customised logical and algorithmic functions; provided by an integrated auxiliary microprocessor and fully capable API to interface to the primary motor controller.

An extensive library of validated motors is available to download to the inverter via the intuitive user interface and vehicle setup is quickly facilitated.

Features

- Highly Configurable
- Extensive OEM Specific Customisation via User Code
- Accurate torque and speed control of IMPM, SPM and IM
- Maximum torque per amp algorithms for interior permanent and surface magnets
- Max motor speeds up to 20kRPM (Assuming 4 Pole Pair machine)
- Variable PWM frequency up to 12kHz
- Fan PWM control and speed tacho read back (or wheel speed sensor)
- Reliable operation in Field Weakening
- Physics-based vehicle control and setup
- Hill-hold, anti-jerk, active damping
- Secondary CAN bus for baud rate bridging
- Optional finger guard for protection around the terminals to IPXXB

Applications

Suitable for electric traction and ancillaries control on mobile equipment applications. These include 2 and 3 wheel mobility, last-mile delivery, golf buggies, autonomous guided vehicles, other material handling equipment, airport ground support equipment, aerial platforms, and construction machinery.



TURNTIDE ELECTRIFICATION

Turntide Technologies designs and manufactures breakthrough electric motors, power electronics and energy storage solutions that optimize performance, reliability, and efficiency in all things that move.

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Details are correct at time of publishing

TTD-MAN-006
V10.0 – 21/05/2026

Specification

Key Features		
Nominal Vdc	**Size 4-S 48V 450A**	**Size 6-S 48V 650A**
Working Voltage Range (V)	20 - 63	20-63
10s Boost Current (A_{rms})	600	800
2min Peak Current (A_{rms})	450	650
60min Current (A_{rms})	190	250
10s Boost Motor Power (kW)	33†	43†
2min Peak Motor Power (kW)	24†	35†
60min Motor Power (kW)	10†	14†
Max Fundamental Output Frequency	599Hz††	

†Assuming a PF of 0.95. Mount Motor Controller with thermal paste to a 330x200 mm @ 25 °C ambient, 0.3 °C/W finned heatsink.

††Higher frequencies available on request, contact Turntide for details.

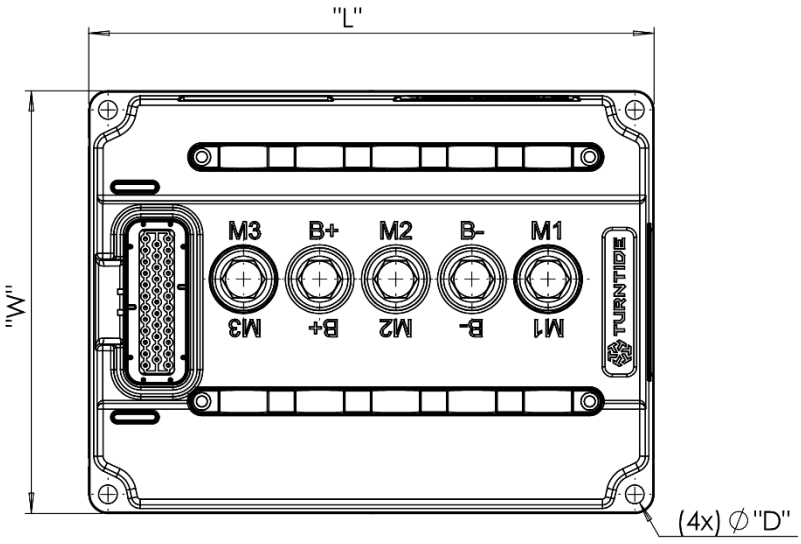
Control Interfaces	• Remote Torque Actuator • Integrated Vehicle Control • Intelligent Torque Modulation • Line Contactor Control • User defined behaviours via TUC • Wake on CAN • Active Short Circuit • Programmable Fault Reactions • Customisable Data Feedback to CAN	**Comms Protocols**	• CAN 2.0A + CAN2.0B + FD in TUC • User Definable Messages • Custom Protocols via TUC • UDS (ISO 14229) • J1939 – proCAN • J1939 – H-Protocol

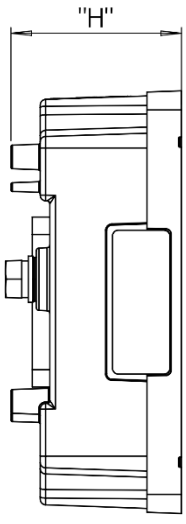
Environmental			
Inverter Cutback (Low) (°C)	-40 to -20	**Inverter Cutback (High) (°C)**	70 - 100††
Ambient Operation (°C)	-30 to 85	**IP Rating**	IP6KX, IPX6 & IPX7. IPXXB capable with additional finger guard.

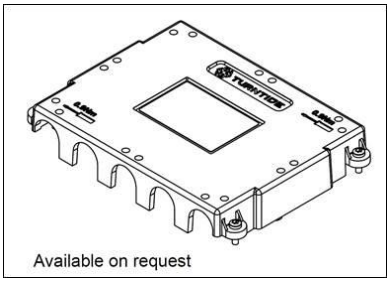
Mass, Dimensions and Drawings			
	Size 4 S 48V 450A	**Size 6-S 48V 650A**	
Mass (g)	1590 [1670]	1890 [1970]	
Length, L (mm)	197	197	
Width, W (mm)	123	147	
Height, H (mm)	59.5 [73]		
Mounting hole Ø, D (mm)	6.5		
Terminal Fastner / Torque	5 x M8 / 11Nm		
Control Interface Header	TE AMPSEAL - 776164-1		

** Values in [Square Brackets] are mass and dimensions with optional finger guard fitted*

†† Depending on ambient, heatsinking and duty



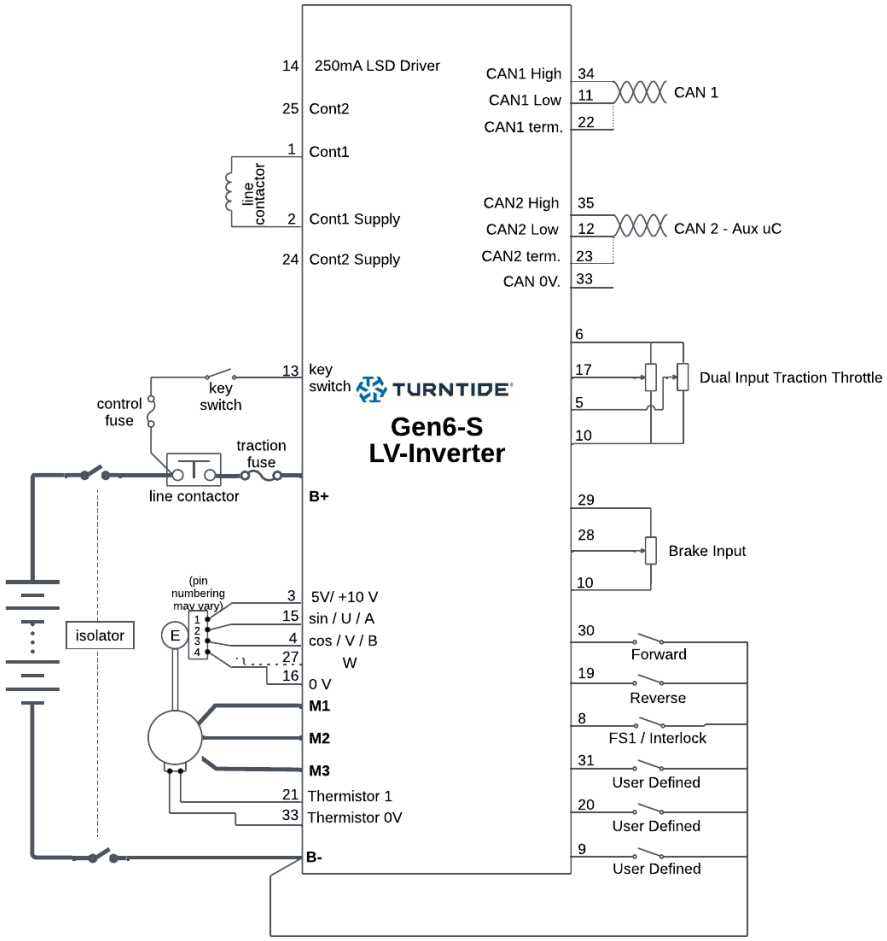


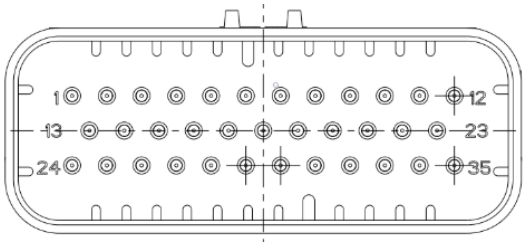


IO

IO	• **5x** Digital inputs†† • **3x** Analogue inputs • **1x** PWM Measure/digital input • **2x** 2A Inductive load voltage driver • **1x** 100mA Digital Output / Fan PWM Ctrl • **2x** PT100/PT1000 thermistor input	**Encoders**	Configurable for one of the following: • **1x** Absolute position SinCos • **1x** Absolute position UVW • **1x** Incremental AB
		Supply	• **2x** Selectable 5V or 10 V / 200mA

†† - *Digital Inputs; 3x Active High, Low or Analogue Inputs: 2x Active Low Only*





PIN	Description	PIN	Description	PIN	Description
1	Low Side Driver 1	13	Key switch	24	Low Side Driver 2
2	Protected Key switch	14	Low Side Driver 3	25	Protected Key switch
3	Encoder Supply	15	Encoder A/U/Sin Input	26	Encoder Supply
4	Encoder B/V/Cos Input	16	Encoder 0V	27	Encoder Z/W Input
5	Analogue Input 2	17	Analogue Input 1	28	Analogue Input 3
6	User Supply 1	18	User Supply 1	29	User Supply 1
7	User Supply 1	19	Digital Input 2	30	Digital Input 1
8	Digital Input 3	20	Digital Input 5	31	Digital Input 4
9	PWM Input 1	21	Thermistor Input 1	32	Thermistor Input 2
10	Logic 0V	22	CAN Termination 1	33	Thermistor 0V
11	CAN Low 1	23	CAN Termination 2	34	CAN High 1
12	CAN Low 2			35	CAN High 2

Safety and Compliance			
Electrical Safety*	• EN 60664-1 (2020) • ISO 6469-3 (2021) • AIS-156 (08/2022) + Amendment 3 (09/2022) • AIS-038 (12/2017) + Amendment 3 (09/2022)	**EMC***	• AIS-004 (07/2009) + Amendment No. 2 (09/2022) • Reg10:R6 • EN 61000-4-8:2010
Electrical Isolation	• 1.5kVdc to heatsink	**Functional Safety**	• Quality Managed
Product Safety	• CE Marking		

** Designed to meet the requirements of*

Additional Information

Turntide User Code (TUC)

- A dedicated powerful 80Mhz 16bit (32kB RAM,128kB Flash) micro for C-based development of custom features.
- Powerful API to interface to motor controller.
- FreeRTOS based environment.
- Extensive examples provided.

General

- Optional finger guard for IPXXB compliance and general protection.
- Interfacing to 3rd party systems such as BMS and displays and HMIs becomes a trivial coding task via TUC.
- An intelligent torque modulator is included which uses physics-based modelling to control the DC link voltages and currents, maximum motor speed, torque, and temperatures, based on CAN messages, TUC or programable parameters.

Configuration

Turntide offers a Windows-based PC tool for configuration of the inverter. The tool provides a simple yet powerful means of accessing the inverter for diagnostics or parameter adjustment. Communication is through CAN, IXAAT and Vector adaptors are supported, with support for others on request. Key features include:

- Online library of validated motor configs
- Auto characterization of motors including IPM, SPM, IM
- Customizable login levels
- Powerful guided vehicle setup process
- Intuitive diagnostic processes

For more information on this product or Turntide's range of inverters, motors, batteries, pumps and fans, please visit our website or contact our team of experts at electrificationsales@turntide.com.