

DATASHEET



Whitehaven Low Voltage Inverters

The Whitehaven range of LV inverters offers one of the highest power densities on the market (34.6kW/L, 36.1kW/kg) and excels in low-voltage electrification applications below 100V, providing precise torque and speed control for IPM, SPM, and IM motors. It features a small footprint, market-leading performance, and best-in-class customization. Its flexible, multipurpose IO is designed for optimal functionality customization. Turntide's motor controllers are renowned for their quality and reliability, used globally in automotive, industrial, and construction sectors. The Turntide User Code enables advanced, feature-rich development with an auxiliary microprocessor and APIs for easy integration. An extensive library of validated motors can be downloaded via an intuitive interface, simplifying vehicle setup.



Features

- Support All Permanent Magnet Synchronous Machines and AC Induction motors
- Maximum torque per amp algorithms for interior permanent and surface magnets
- Reliable operation in Field Weakening
- Max motor speeds up to 20kRPM (Assuming 4pp machine)
- Scalable power levels to satisfy many On and Off-Highway applications
- Physics based vehicle control and setup
- Motor speed limit/control, DC current limit
- Hill-hold, anti-jerk, active damping
- Advanced user programmability via dedicated user microcontroller
- Secondary CAN bus for baud rate bridging
- Fan PWM control and speed tacho read back (or wheel speed sensor)
- CE Marking

Specifications

Voltage, Current & Power Range

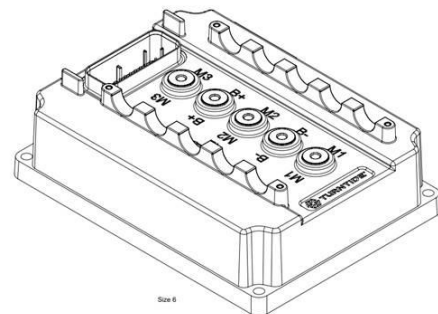
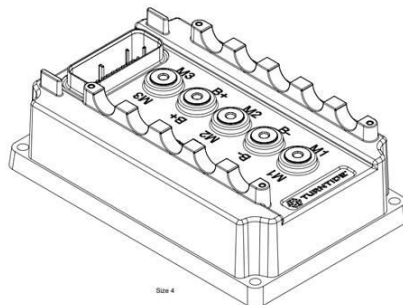
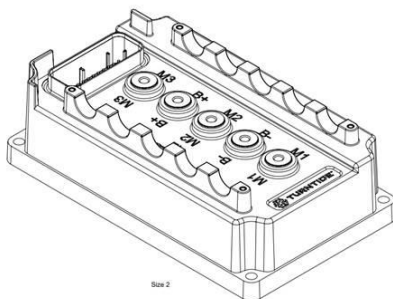
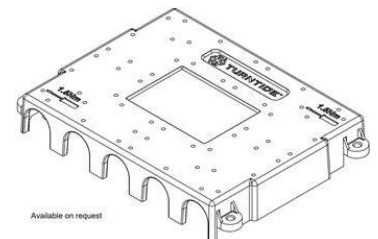
Nominal Vdc	48V (TT-INV-48-300) Size 2	48V (TT-INV-48-450) Size 4	80V (TT-INV-80-550) Size 6
Working Voltage Range [V]	20 - 63	20 - 63	20-106
10 Second Boost Current [Arms]	400*	600*	700*
2 Minute Peak Current [Arms]	300*	450*	550*
60 Minute Current [Arms]	125*	190*	230*
10 Second Boost Motor Power [kW] †	22	33	63
2 Minute Peak Motor Power [kW] †	16	24	50
60 Minute Motor Power [kW] †	7	10	21

* Subject to confirmation of validation testing

† Assuming a PF of 0.95

Weight & Dimensions

	48V (TT-INV-48-300) Size 2	48V (TT-INV-48-450) Size 4	80V (TT-INV-80-550) Size 6
Weight (g)	1450	1590	1890
Length (mm)	197	197	197
Width (mm)	116	123	145
Height (mm)	61	61	61
With Finger Guard			
Weight (g)	1530	1670	1970
Height (mm)	72	72	72



Environmental			
Cutback Temp (Low)	-40°C to -30°C	Inverter Cutback	85°C to 95°C
Ambient Operation	-30 °C to 70°C	IP Rating	IP67, IPXXB – with Finger Guard (Optional)
Controls			
Control Interface	<ul style="list-style-type: none"> Remote Torque Actuator Intelligent Torque Modulator Integrated Vehicle Controller User defined behaviours via TUC 	Communications Protocols	<ul style="list-style-type: none"> CAN 2.0B + CAN2.0B + FD User Definable Messages Custom Protocols via TUC UDS (ISO 14229) J1939 – proCAN J1939 – H-Protocol
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	1x Absolute position SinCos†† 1x Absolute position UVW†† 1x Incremental AB††
		Supply	2x Selectable 5V or 10 V / 200mA
† - Dig In; 3xActive High, Low or Analogue 2x Active Low Only †† - Encoder types all share same header pins			
Standards Compliace			
Electrical Safety	<ul style="list-style-type: none"> EN 60664-1-(2020) ISO 6469-3 (2021) AIS-156 / AIS-038 	Functional Safety	Quality Managed
Electrical Isolation	<ul style="list-style-type: none"> 1.5kV 	EMC	AIS004, Reg10, EN 61000-4-8:2010
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, multiple adapters are supported – IXXAT, KVASER, VECTOR.		
Configuration & Ease of Use			
Features	<ul style="list-style-type: none"> Online library of validated motor configs Auto characterization of motors including IPM, SPM, IM Customizable login in levels 	<ul style="list-style-type: none"> Powerful guided vehicle setup process Intuitive diagnostic processes Constantly updated online library of validated motor configurations 	
Pre-Paired Motors			
Dana TM4	<ul style="list-style-type: none"> IPM-200-66 	<ul style="list-style-type: none"> IPM-200-33 	Motenergy
Electrified Automation	<ul style="list-style-type: none"> EA-193-40 	<ul style="list-style-type: none"> EA-193-80 	
SEG	<ul style="list-style-type: none"> EM 1.9 E1M1 410 028-01 		<ul style="list-style-type: none"> ME0904

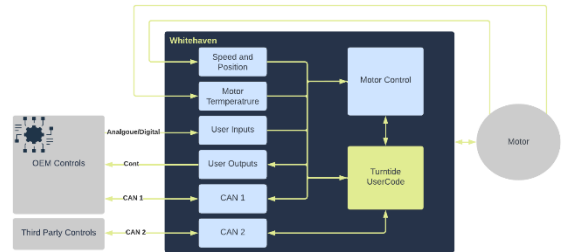
Other Features

General

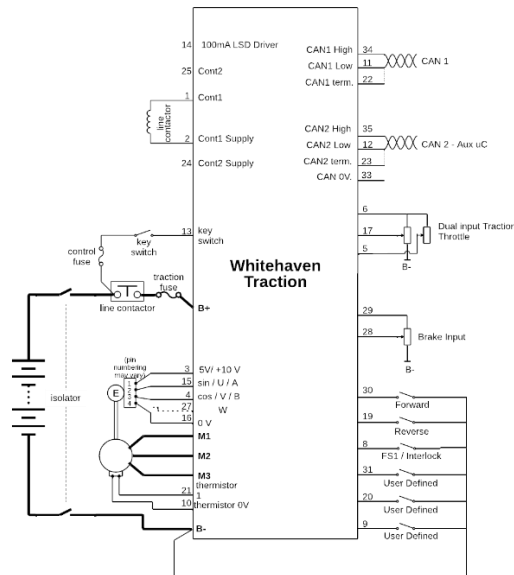
- Optional finger guard for IPXXB compliance and general protection
- Interfacing to 3rd party systems such as BMS and displays and HMIs becomes a trivial coding task via TUC.
- An intelligent torque modulator is included which uses physics-based modelling to control the DC link voltages and currents,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

Turntide UserCode

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



Pin Out Functional Diagram



For further information please contact our team of experts at electrificationsales@turntide.com

TURNTIDE TECHNOLOGIES

Our breakthrough technologies accelerate electrification and sustainable operations for energy-intensive industries

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