

## DESCRIPTION

The TSX line of fully-programmable controllers for separately excited motors have half-H armature control and independent full-H field control enabling contactor-less reversing and motor performance optimization.

With current and thermal limiting of armature and field sections, current limited contactor I/O, automotive quality Molex connectors, and rugged highly ingress resistant ABS case the TSX is fully protected. (Some TSX models have a full CANopen interface and can be slaved with to another TSX for dual-motor control.)

TSX controllers are fully programmable with the intuitive PC Probit II RS232 user interface or Bluetooth Apps allowing control of virtually all settings including current limits, maximum speeds in both forward and reverse, and battery over-discharge protection.



## KEY FEATURES

- 600A state of the art Mosfet technology
- Compact size and low weight
- Regenerative braking
- Contactor-less motor reversing
- Separate armature and field current limits
- Molex waterproof connector
- Thermal protection
- Sensor less motor thermal protection
- Under voltage protection
- Fully sealed IP5X
- Speed sensor input
- OEM multi-platform mounting options
- Plug & Play installation for major OEM golf cars
- Rollback protection
- Speed-limiting (w/ optional speed sensor)
- Compatible with Navitas On-The-Fly (OTF) programmer (optional)(see OTF Data Sheet)
  - Variable maximum speed control
  - Variable regen control
  - Variable Acceleration rate
  - Simplified wiring diagnostics

## BATTERY VOLTAGE

- 36 to 48 Volt
- 48 to 72 Volt

## OUTPUT CAPABILITY

- Up to 600A motor current
- Up to 50A peak field current

## APPLICATIONS

- Golf carts, LSV's
- UTV, Hunting buggies



## **Flexibility**

- Fully programmable with the Navitas PC Probit II programming package (Optional Purchase)
- Programmable to match the unique characteristics of each separately excited motor model
- Programmable low-voltage battery discharge interrupt (BDI) cutbacks will limit motor current to extend the battery charge
- Up to three speed limit inputs with programmable cut-back speeds and priority level

## **Control**

- Full bridge field control design allows reversing without the use of direction contactors
- Armature current controlled at all times to help reduce brush wear and arcing
- Regenerative braking harnesses excess energy to extend the battery charge
- Motor over-speed protection is ensured using the motor field

## **Communications**

- Integrated LEDs flash information and error codes for basic controller diagnostics
- Protected I/O connections

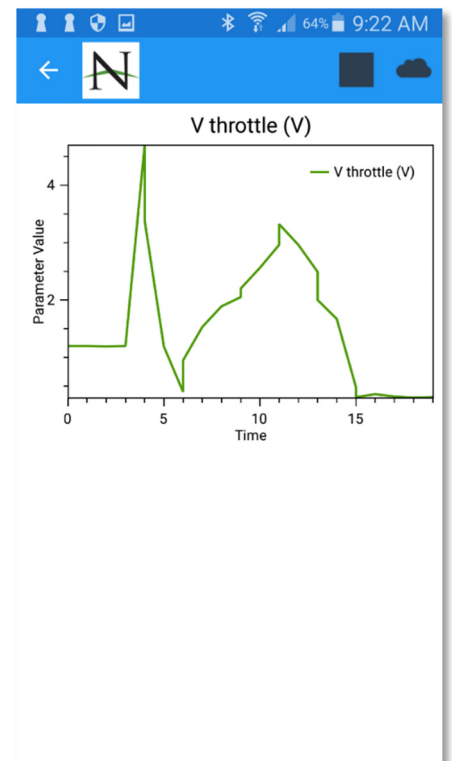
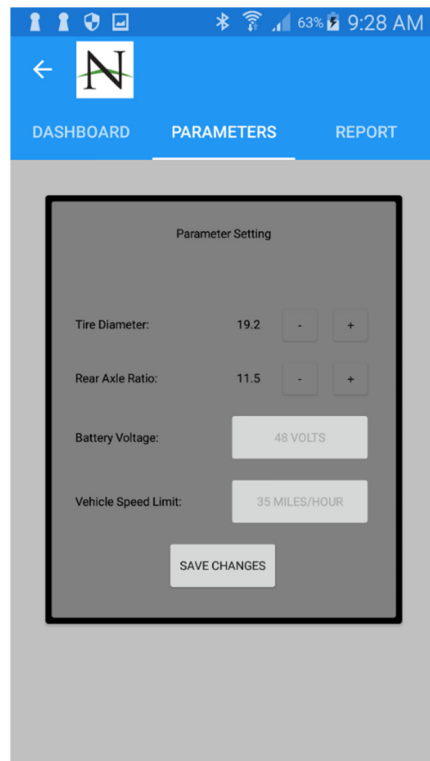
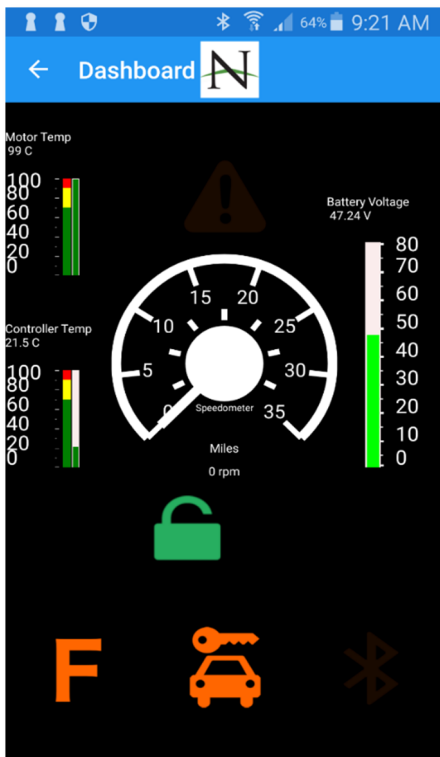
## **Safety**

- Regenerative braking provides vehicle speed control at any throttle position when going down ramps and channels the extra energy back into the batteries for longer battery life
- Adjustable regen settings allow for braking strength to be tailored to the specific vehicle for safety during stopping and forward/reverse transitions
- Safe-Sequencing including high pedal disable (HPD) and static-return-to-off (SRO) interlock ensure safe startup and vehicle operation
- Controlled temperature cutback on armature and field drive current limits ensures there is no sudden loss of power under any thermal condition

## FEATURES AND BENEFITS

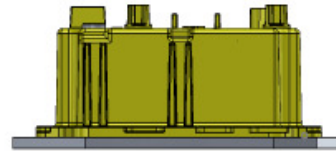
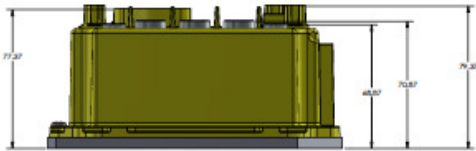
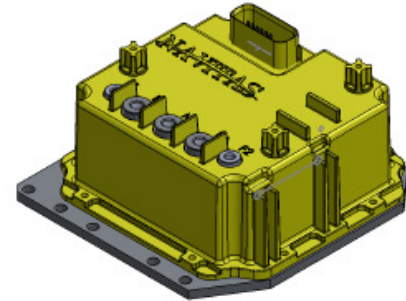
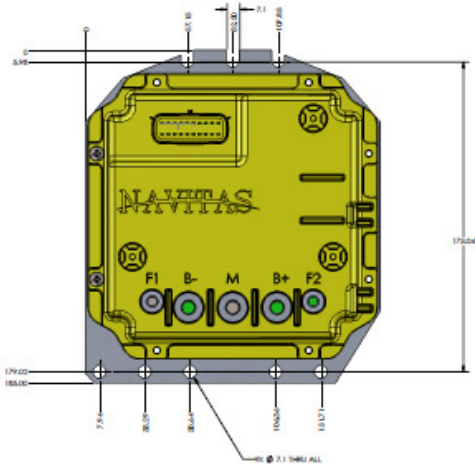
### Apps and Configuration Tools (TSX3.0 Controller only)

- Various iOS and Android apps for smart phones and tablets are available at the App Store and Google Play (Free APPs).
  - Android Phones-Down Load from Google Play-Search Apps-“Navitas Vehicle Systems Ltd”
    - Select-Install
  - iPhone-Down Load from App store-Search “Dashboard Navitas”
    - Select-Install
  - Complete Installation of Controller in Vehicle
  - Make sure Bluetooth is turned on your phone to make app work



- Publicly available Dashboard Apps allow the vehicle owners to remotely lock their vehicle, monitor usage and performance or notify their dealers with diagnostic information
- Authorized Dealer Apps allow modifications for basic vehicle types and settings.

# NAVITAS



- Base footprint 165x185mm
- Enclosure height 79.37mm (connector housing [without plug] projects a further 17mm)
- Field connection is 2xM5 bolt
- Motor and battery connection are 3xM8 bolt
- Connectors are Molex 20 pin MX150
- Ingress: Robust ABS/aluminum enclosure designed to meet IP67.
- Operating Ambient Temperature: -40°C to +55°C
- Storage Temperature: -40°C to +70°C
- Switching frequency: 16 kHz



**TSX Options**

PN#	Description	Notes
10-000673	TSX 2.0 600A 36-48V Controller	
10-000681	TSX 2.0 420A 36-48V Controller	
10-000685	TSX 3.0 600A 36-48V Controller with Bluetooth	
10-000644	OTF On The Fly Programmer (2.7m) cable	
10-000686	OTF On The Fly Programmer w/ 147" (3.75m) cable	



## TSX Harnesses

PN#	Description	Notes
40-000541	TSX Harness For EZ-GO TXT Harness Works w/E-Z-Go® TXT	
40-000542	TSX Harness For Club Car (IQ) Harness Works w/ Club Car® IQ	
40-000512	TSX Harness For EZ-GO (TXT 36V) Works w/E-Z-Go® TXT PDS 36V) (Curtis® 1206MX)	
40-000513	TSX Harness For Yamaha YDRE (G29) Works w/ Yamaha® Drive YDRE (G29) (Moric)	
40-000514	TSX Harness For Yamaha (G19/G22) Works w/ Yamaha® (G19/G22)	
40-000515	TSX Harness For (1268/1520) Works w/ vehicles with Curtis® (1268/1520)	
40-000516	TSX Harness For EZ-GO (1268/1264) Works w/ vehicles with Curtis® (1268/1264)	
40-000540	TSX Harness For EZ-GO TXT DCS 36V Works w/E-Z-Go® TXT DCS 36V	
10-000666	Connector Module Series Motor w/ 40-000517 Plug Cable (Works w/ Club Car® carts with Series wound motors.)	
10-000667	Connector Module Series ITS w/ 40-000517 Plug Cable (Works w/ E-Z-Go® carts with Series wound motors.)	

*Note: Specifications are subject to change without notice.*

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