Navitas Vehicle Systems Ltd.

NAVITAS TAC 2

440A and 600A 48V-72V CONTROLLERS

for

AC INDUCTION MOTORS

Installation/Service Manual

INSTALLATION INSTRUCTIONS FOR:

E-Z-GO®RXV® 48V (CURTIS®)
E-Z-GO® RXV® 23 48V (DANAHER®)
E-Z-GO® TXT® 48V Conversion
CLUB CAR® Precedent® Conversion
YAMAHA® YDRE2® TOYOTA® (NEOS®)
YAMAHA® G29® Conversion (MORIC®)

NAVITAS

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NAVITAS
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Please refer to Navitas online manuals and installation videos for the most up-to-date install information;
www.navitasvs.com/manuals

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BEST PRACTICES

Speed Control

- To maximize your vehicle's driving range only use the speed you need if using the OTF.
- Use the speed knob to control your maximum cruising speed, turn the speed down to the minimum practical speed necessary for the application. The controller significantly increases the operating efficiency of the motor as the maximum speed adjustment is reduced.
- Minimize acceleration - hard acceleration demands high in-rush currents from the battery pack. This increases wear and tear on both the motor and the mechanical systems.

Hill Descent

- Use regenerative braking for hill descent - it puts energy back into the battery and it increases the life of your brakes. Regenerative Braking can be applied gradually and can reduce the likelihood of losing traction when going down a hill.
- Limit the speed going downhill with fully charged lithium batteries to prevent issues with the lithium BMS from shutting down or having the bleed off resistor over temp and engaging the Motor Brake (E-Z-GO RXV)

Low Battery Warning

- When the battery discharged warning (3-1 flash) is given by the OTF (if present), the controller will reduce the amount of power it supplies to the motor to protect the motor.
- Cycling the key will reset full controller power for 1 minute but doing so repeatedly will adversely affect the life of your motor. Recharge the batteries as soon as possible.

Heavy Duty Usage

- If you notice that your cables or motor are becoming too hot to touch, then your application is probably too demanding and we recommend that you upgrade the motor to a speed/torque system, and upgrade the cables to at least 4 AWG, with 2 AWG being preferable and upgrade the solenoid to 200A or bigger.

Warnings

- Always monitor the motor & battery wiring temperatures after changing the programmer settings (if OTF is present) – particularly when going to higher speeds
- If your battery pack is full, the amount of regenerative braking may be reduced since the controller has nowhere to put the excess energy.

Installation and Maintainance

- Torque the mounting bolts and the wire connections per the chart on page 10. Check torque of the wire connections monthly to prevent them from loosening up, overheating and voiding the warranty.
- Do not put flat or lock washers between the controller post and the wire. Washers go on top of the wire and under the bolt head for best electrical connection.
- If the vehicle is going to in damp or wet conditions, add a small amount of dielectric grease to the connections to help keep moisture out of the OEM connectors.
- Make sure the motor and wires are from rubbing by the frame and/or suspension. Rotate the motor if needed to keep connections clear.

INTRODUCTION

NAVITAS TAC 2 48-72V 440A / 600A Controller

AC INDUCTION MOTOR CONTROLLER

- The owner, and all vehicle operators MUST read and understand all warnings and instructions in this manual and in the Vehicle Owner/Operator's Manual. The owner of this vehicle assumes all liability for accidents, injuries or damages if the warnings and instructions are not followed.
- Navitas Vehicle Systems Ltd. assumes no responsibility for errors or omissions in this manual, in regards to liability or damages resulting from the use of information contained in the manual. If it is lost or damaged please contact your local dealer.
- Navitas Vehicle Systems Ltd. reserves the right to make changes to the controller, parts of the controller, accessories, labelling or instructions without obligation to make these changes on units previously sold.
- Product and specifications are subject to change without notice or obligation.

ATTENTION:

- BEFORE INSTALLING THIS CONTROLLER PLEASE RECORD THE SERIAL NUMBER LOCATED ON THE FRONT OF THE CONTROLLER AND WILL BE IN THE FORMAT OF 10-000XXX-XX.

Controller Model #	SERIAL #

SAFETY WARNINGS

DANGER FAILURE to follow the WARNINGS below can damage the Vehicle and/or cause SERIOUS INJURY OR DEATH!

MAKE SURE TO READ and UNDERSTAND the OWNER'S INSTALLATION and SERVICE MANUAL and ALL WARNING LABELS with this Controller.

Make sure to also Read, Understand, and follow the Vehicle's OWNER'S MANUAL and ALL INSTRUCTIONS and WARNING LABELS.

- Always proceed with caution. Keep speed low and do not drive faster than conditions permit. Terrain, conditions, and the operator's skill will determine a safe speed. Avoid sharp turns and do not accelerate quickly when turning as this can cause the vehicle to slide sideways or skid out of control. Abrupt manoeuvres or aggressive driving can cause a rollover even on flat open areas.
- This controller will increase torque, but DOES NOT increase the GVWR (Gross Vehicle Weight Rating), cargo capacity, or towing capacity of the vehicle. Always follow the vehicle towing and loading specifications.
- Modifying motor controller parameters may change vehicle acceleration, braking and top speed behavior. Please verify vehicle performance before the use and obey federal, county and municipality bylaws and regulations.
- Product use is for golf car and Low Speed Vehicle (LSV) market application and may operate at speeds Up to 25 MPH. Factory settings on controller have been set using: 18 inch diameter tires, non-performance motor & up to 25 MPH limit.
- Operators/Users of Navitas golf car and LSV equipped products must follow published golf car & LSV federal, state, county & municipal bylaws & regulations issued for your "use area". For operation/use beyond golf car & LSV regulations/ guidelines, full liability Is assumed by operators/users.
- Do not leave children or pets unattended in or near the vehicle. Always look behind you before and while backing up.
- Reduce speed when towing and allow more room for stopping and turning.
- Drive with wheels straight when going up and down hills. Slow down and use brakes when going down hills.
- Never drive on hills with a slope greater than 15 degrees.
- Do not drive through fast flowing water or water above the floor of the vehicle.
- If you must cross shallow water, make sure to stop and inspect the area for sudden drop-offs, large rocks or slippery surfaces. Always proceed with caution or choose a safer route.
- When towing this vehicle make sure to follow the manufacturer's instructions on how to do so.

SAFETY WARNINGS, cont'd

- Never exceed the towing capacity rating as specified by the vehicle manufacturer.
- Never re-wire, by-pass or change the wires, switches, or controller. Contact your dealer if vehicle is not operating correctly.
- Keep the controller and the area around it clean and free of debris. Keep electrical components dry and DO NOT wash with direct stream or power washer
- Driver must be a minimum of 16 years of age with a current driver's license, or be accompanied by a parent or legal guardian when operating the car.
- Do not drive vehicles while influenced by alcohol, medications & drugs as this may/ will impair your safe driving use.
- User to verify that golf car & LSV vehicle mechanical brakes are fully functional prior to continued operation of vehicle.
- Do not put flat or lock washers between the controller post and the wire connector. Washers go between the wire connector and the bolt head.
- Vehicle & all parts must be serviced by qualified service personnel. For an authorized service location see your local dealer or visit our web site at www.NavitasVS.com.

Wear Eye Protection!

AC CONTROLLER PARTS LIST

Confirm that all parts listed below are with your kit before starting installation.
If you are missing parts please contact your local dealer.

AC Induction Kit-Curtis 1206AC E-Z-GO RXV 10-000879-01 (440A) / 10-000881-01 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000878-01	1
TAC 2 Controller 600A	10-000880-01	1
TAC 2 Module	40-000620	1

AC Induction Kit-Danaher E-Z-GO RXV23 10-000879-02 (440A) / 10-000881-02 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000878-02	1
TAC 2 Controller 600A	10-000880-02	1
TAC 2 Module	40-000623	1
TAC RXV23 Mounting Plate Kit	20-001844	1
Hardware Mounting Kit	10-000843	1
Wiring for RXV23 resistor	40-000582	1

TAC-IQ PRECEDENT 10-000889-02 (440A) / 10-000891-02 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000888-02	1
TAC 2 Controller 600A	10-000890-02	1
TAC 2 Module	40-000621	1
TAC IQ Mounting Plate Kit	20-001843	1
Hardware Mounting Kit	10-000845	1
AC Motor 4KW (440A) / 5kW (600A)	10-000815 / 10-000823	1
AC Motor Phase Cable	40-000584	1
Cable for TAC-TXT/IQ - Speed Sensor / Motor Temperature	40-000580	1

EZ-GO TXT 10-000889-03 (440A) / 10-000891-03 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000888-03	1
TAC 2 Controller 600A	10-000890-03	1
TAC 2 Module	40-000622	1
TAC TXT Mounting Plate Kit	20-001843	1
Hardware Mounting Kit	10-000834	1
AC Motor 4KW (440A) / 5kW (600A)	10-000816 / 10-000822	1
AC Motor Phase Cable	40-000584	1
Cable for TAC-TXT/IQ - Speed Sensor / Motor Temperature	40-000580	1
Run/Tow Switch Mounting Plate	20-001603	1

AC CONTROLLER PARTS LIST cont'd

AC Induction Kit–YAMAHA YDRE2–TOYOTA (NEOS) 10-000889-01 (440A) / 10-000891-01 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000888-01	1
TAC 2 Controller 600A	10-000890-01	1
TAC 2 Module	40-000627	1
Mounting Plate Kit	20-001843	1
Battery Cable	40-000583	1

TAC 2 - YAMAHA G29 10-000889-09 (440A) / 10-000891-09 (600A)		
PART DESCRIPTION	PART NUMBER	QTY
TAC 2 Controller 440A	10-000888-09	1
TAC 2 Controller 600A	10-000890-09	1
TAC 2 Module	40-000632	1
Mounting Plate	20-001843	1
AC Motor Phase Cable	40-000584	1
Motor Sensor Cable	40-000580	1
4 KW AC Motor	10-000816	1
Ring Terminal for A2 Cable	40-000536	1
Hardware Mounting Kit	10-000833	1

INSTALLATION INSTRUCTIONS

ATTENTION:

- Before installing the controller make sure that the golf car's electrical system is working properly.
- All components such as the motor, Run/Tow switch, pedal cluster, FWD/ REV switch and all wiring needs to be in good condition and operating to manufacturer's standards.

- The batteries must be in good condition and each battery must hold a charge!
- If the system is not working properly this must be repaired before installing this controller!

DANGER FAILURE to follow the WARNINGS below can damage the Vehicle and/or cause SERIOUS INJURY OR DEATH!

Installation or Servicing of the NAVITAS 440A / 600A 36-72V Controller must be done by a trained golf car technician. Before installing or servicing of the NAVITAS Controller:

- Disconnect the main (+) positive and (-) negative cable on the vehicle's battery system.
- Make sure the **Run**/**Tow** switch is in the **Tow** position (if vehicle has one)
- The Key is turned OFF and removed from the ignition
- The parking brake is engaged
- Before testing the controller/vehicle make sure ALL four wheels are off the ground and supported with jack stands.
- The area around the vehicle must be clear. Keep all people, children and pets away from the vehicle when installing, servicing or testing the vehicle.
- Read NAVITAS 440A / 600A 48-72V Controller Installation/Service and all warning labels before servicing or troubleshooting this Vehicle.
- The controller is sealed and cannot be opened for service. To replace the controller call your local dealer. Opening the controller will void the warranty
- Wear safety glasses and gloves when installing this controller.
- Wear a safety shield when working in or near the vehicle battery compartment.
- Use insulated tools to protect from electric burns.
- Never lay or put down tools in the vehicle battery compartment.
- Remove pre-charge resistor and diode (if present) from contactor and discard.

INSTALLATION INSTRUCTIONS

REQUIRED TOOLS & PARTS

REQUIRED TOOLS

- #3 Phillips screwdriver
- 10, 11, & 13mm wrench
- Socket driver w/ extension
- Wire cutters
- Assorted socket set
- Safety glasses
- Flashlight (optional)

PURCHASED PARTS

- Controller w/ Bluetooth
- Mounting Plate w/ hardware
- On-The-Fly Programmer

Torque Specifications

Location	Size	Torque
Controller Mounting	1/4x20 - RXV M5x60	108 in-lbs/ 9 ft-lbs/12.3 Nm
Controller Terminals	6 mm Bolt	88 in-lbs/ 7.5 ft-lbs/ 10 Nm
Motor Mounting		84 in-lbs/ 7 ft-lbs/ 9.5 Nm
Wire connections on motor		144 in-lbs/ 12ft-lbs/ 16.2 Nm

CAUTION

Disconnect all batteries before beginning installation. If the car has a Run/Tow switch, you must place the switch in the TOW position first!

INSTALLATION INSTRUCTIONS

RXV Installation

CAUTION **Disconnect all batteries before beginning installation. If the car has a Run/Tow switch, you must place the switch in the TOW position first!**

PARTS

- AC controller
- B+ cable (for solenoid to controller)
- On-The-Fly programmer

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

Note: Installation is easier and faster if RXV body is removed completely. See Manufacturer's instructions for body removal.

1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

2. Remove OEM Controller

- Remove OEM protective cover
- Remove and discard the battery positive bus bar
- Remove resistor wires
- Remove battery negative cable
- Remove resistor cage with solenoid
- Unplug Harness
- Remove motor phase cables.
- Unbolt and remove the controller

Fig. 1

3. Install Navitas TAC 2 Controller

- Route motor cables to new controller around outside of controller mount
- Remove bolts, washer, lock washer from top of new controller.
- Fasten TAC 2 Controller to existing mounting bracket using original hardware (*Fig. 2)*

Fig. 2

INSTALLATION INSTRUCTIONS

RXV Installation cont'd

4. Connect Navitas TAC 2 Controller (*Fig. 3)*

- Connect cables using bolts, washers and lock washers: U to U, V to V, W to W
- Fasten NEW battery positive cable (B+ from controller to solenoid) and add black lead from resistor on top of battery cable and tighten w/13mm wrench or socket
- Re-fasten resistor cage with solenoid mounted on it.
- Add battery positive cable to solenoid and tighten w/13mm wrench or socket
- Tighten back positive terminal
- Add wire from the resistor to the resistor output of the controller marked as "R" and tighten w/10mm wrench or socket

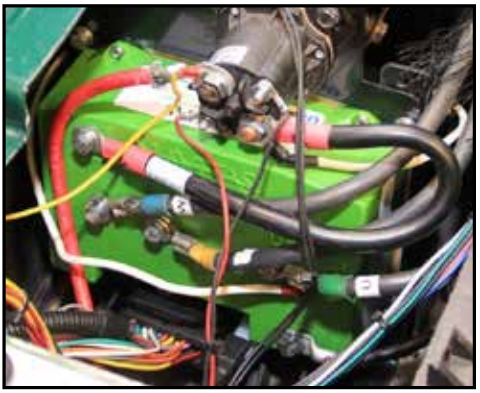


Fig. 3

- Connect battery negative cable - Tighten w/10mm wrench or socket per specs on page 10.

5. Connect RXV OEM harness (*Fig. 3)*

- Insert RXV OEM harness into adapter module
- The Programming end of the CURTIS harness will NOT be used
- Re-connect the cover.

6. Install On the Fly Programmer (Optional)

- Unclip the three nuts to remove cup holders
- Feed end of cable through body hole on the dash and leave enough slack to mount the OTF on the dash
- Mount on On-the-Fly programmer on the dash w/ Velcro strap
- Feed cable back through the channel to the floor and chase back following wiring harness to the Navitas adaptor module and connect it. Zip tie cable to the factory wiring harness
- Connect OTF programming end into the adaptor module, and connect original controller harness into adaptor module;
- Zip tie motor phase wires to resistor cage
- Original communication plug from OEM controller not used
- Re-Connect cover
- Mount OTF on the dash
- Re-power the system by Connecting battery connection.

7. Test installation

- Lift drive wheels off ground
- Reconnect battery pack
- Turn key to Forward
- Press on throttle to activate wheels.

Navitas TAC2 AC Motor Controller for RXV Product Model 10-000880-01 (440A) 10-000880-01 (600A)

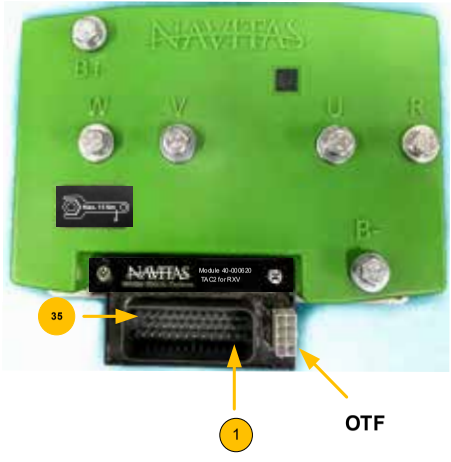
Issue Date: 20181219

Pinout for Controller

To OTF Programmer PN: 10-000686

8-POS Molex
39-28-1083

P1: +12V PF
P2: OTF Regen
P3: OTF speed
P4: OTF acceleration
P5: +5V PF
P6: OTF Lock
P7: OTF LED
P8: Analog Ground



To OEM vehicle harness

35-POS Ampseal
1-776231-1

P1: Key In
P2: Reverse Buzzer
P3: NA
P4: Brake Light Relay Release
P5: Brake Solenoid Out
P6: Main Solenoid Out
P7: Logic Power GND
P8: Motor Temperature In
P9: Foot Switch In
P10:Tow Switch In
P11:Charger Interlock In
P12:Brake Switch In
P13: NA
P14: NA
P15:+5V PF
P16:Throttle In
P17:Brake In
P18:Anolog GND
P19:NA
P20:NA
P21:NA
P22:Forward In
P23:CAN Positive
P24:NA
P25:+12V Output
P26:+5V PF
P27:NA
P28:NA
P29:NA
P30:SOC Display Out
P31:SPD A In
P32:SPD B In
P33:Reverse In
P34:Analog Ground
P35:CAN Negative

Diagrams and other updates available at:
NavitasVS.com/support

INSTALLATION INSTRUCTIONS

RXV 23 (Danaher) Installation

CAUTION **Disconnect all batteries before beginning installation. If the car has a run/tow switch, you must place the switch in the TOW position first!**

Parts:

- AC Navitas controller with Bluetooth
- On-The-Fly programmer (optional)
- Mounting plate and hardware
- Resistor wire (longer for replacement)

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

2. Remove OEM Controller

- Remove OEM Protective cover
- Remove solenoid (*Fig. 1)* - keep wires connected
- Remove resistor cage
- Remove motor phase cables and resistor cable, B- cable from controller
- Unclip Harness wires
- Remove plate (along with Danaher controller and black resistor module and wires)

3. Install New Mounting Plate (*Fig. 2)*

- Install plate in existing location using OEM hardware.

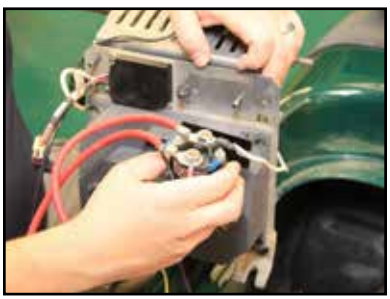


Fig. 1

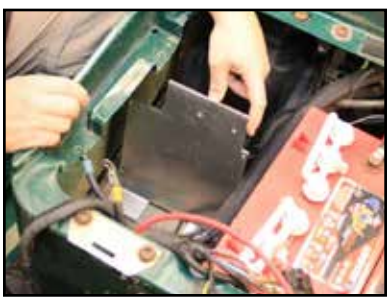


Fig. 2

INSTALLATION INSTRUCTIONS

RXV 23 (Danaher) Installation cont'd

4. Mount Controller *(Fig. 3)*

- Use supplied bolts / washers / lock washers
- Bolt plate from back side
- Connect harness at bottom

Fig. 3

5. Connect Controller

- Replace one existing resistor cable with the NEW included longer resistor cable to resistor output marked "R" on controller. Re-fasten other existing resistor wire on other end of the resistor to the Controller side of the solenoid or Controller B+. Do not use Grey wire that was previously connected to resistor.
- Re-fasten resistor cage to the plate
- Re-fasten solenoid to the cage using 2 of the OEM bolts *(Fig. 4)*
- Connect battery B- cable from battery pack to controller
- Connect motor phase cables (U,V,W)
- Connect battery to B+ from solenoid

Fig. 4

Fig. 5

6. Connect OEM Wire Harness *(Fig. 5 & 6)*

- Connect OEM wire harness to adaptor module

7. Install On-The-Fly Programmer (optional)

- Install OTF (optional) (see install description in RXV INSTALL instructions, p12)
- Connect OTF to Navitas adaptor module
- Zip Tie loose cables

8. TESTING INSTALLATION

- Lift drive wheels off ground
- Reconnect battery pack

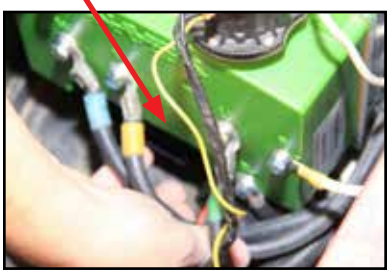


Fig. 6

INSTALLATION INSTRUCTIONS

RXV 23 (Danaher) Installation cont'd

Pinout for Controller

Navitas TAC2 AC Motor Controller
for EZ-GO RXV Danahar
Product Model 10-000880-01 (440A)
10-000880-02 (600A)

Issue Date: 20181219

To OTF Programmer
PN: 10-000686

8-POS Molex
39-28-1083

P1: +12V PF
P2: OTF Regen
P3: OTF speed
P4: OTF acceleration
P5: +5V PF
P6: OTF Lock
P7: OTF LED
P8: Analog Ground

To OEM vehicle harness

23-POS Ampseal
776228-1

P1: Key In
P2: Brake Solenoid Out
P3: +5V PF
P4: AGND
P5: SPD A In
P6: SPD B In
P7: Brake In
P8: NA
P9: Throttle In
P10:Reverse Buzzer Out
P11:SOC Display Out
P12:Forward In
P13:Tow Switch In
P14:NA
P15:NA
P16:Motor Temperature In
P17:Charger Interlock In
P18:MAIN Solenoid Out
P19:Foot Switch In
P20:Reverse In
P21:NA
P22:Brake Light Relay Release
P23:NA

Diagrams and other updates available at:
NavitasVS.com/support

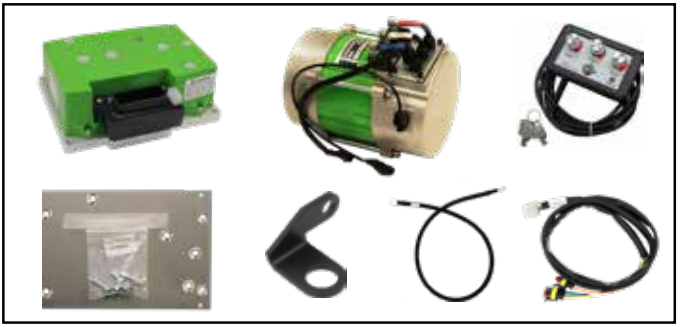
INSTALLATION INSTRUCTIONS

E-Z-GO TXT 48 DC to AC Conversion

CAUTION **Disconnect all batteries before beginning installation. If the car has a run/tow switch, you must place the switch in the TOW position first!**

PARTS INCLUDED

- AC Controller
- AC 4 kW motor
- On-The-Fly programmer (Optional)
- Mounting plate and hardware
- Run/Tow switch mount
- Motor phase cable
- Speed sensor/motor temperature harness



Note: This instruction is for stock TXT-48 model carts. Other E-Z-GO models might need extra parts and steps not covered in this installation.

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

Fig. 1

2. Remove OEM Protective Cover

- Remove cables from controller
- Unclip OEM Wire Harness

3. Remove OEM Controller

4. Install TXT Mounting Plate

- Align plate with existing holes (where OEM controller was fastened) and fasten with screws (*Fig. 2*)

Fig. 2

INSTALLATION INSTRUCTIONS

E-Z-GO TXT 48 DC to AC Conversion cont'd

5. Mount Controller

- Install Navitas AC controller (*Fig. 3*)
- Attach Run/Tow switch mount and fasten Run/Tow switch to mount.
- Connect B- from battery, B+ from solenoid and motor phase cables to U, V, W (use new cable provided as 'W' and re-use the 2 existing motor phase cables from A1=U, A2=V) to the controller (*Fig. 5*)

Fig. 3

6. Motor Conversion

- Remove motor cables A1 & A2 from motor
- Remove and DISCARD field cables (F1, F2)
- Remove DC motor. Save motor mounting bolts.
- Install Navitas AC motor using the motor mounting bolts from the DC Motor.
- Connect new speed sensor/motor temp harness to motor (*Fig. 4*) and route to controller.
- Connect motor phase wires from controller using the removed A1 and A2 wires and the included wire (U = U, V = V and W = W) (*Fig. 6*)
- Check cabling to make sure U, V, and W match exactly from motor to controller (*Fig. 6*)

Fig. 4

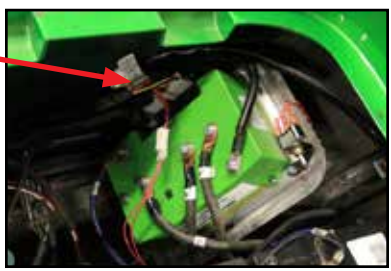


Fig. 5

7. Connect OEM Harness to Adaptor Module

8. Connect Speed Sensor/Motor Temperature Wire Harness to Controller (*Fig. 5*)

9. Install On-The-Fly Programmer (optional)

- Install OTF (optional) (see install description in RXV INSTALL instructions, p12)
- Connect OTF to Navitas Controller
- Zip Tie loose cables

10. Test Installation

- Lift rear wheels
- Reconnect battery pack
- Put in "RUN" mode
- Turn key on
- Put in "F" for Forward
- Press on throttle to activate wheels

Fig. 6

Navitas TAC2 AC Motor Controller for EZ-GO TXT DC-AC Conversion Product Model 10-000888-03 (440A) 10-000880-03 (600A)

Issue Date: 20181219

Pinout for Controller

To OTF Programmer
PN: 10-000686

8-POS Molex
39-28-1083

P1: +12V PF
P2: OTF Regen
P3: OTF speed
P4: OTF acceleration
P5: +5V PF
P6: OTF Lock
P7: OTF LED
P8: Analog GND

To OEM vehicle harness (Curtis 1206HB)

16-POS Molex
39-28-1163

P1: ITS Throttle Negative
P2: ITS Throttle Positive
P3: Fused GND
P4: NA
P5: Charger Interlock Input
P6: Foot Switch In
P7: Reverse Buzzer
P8: Forward In
P9: Logic Power In
P10:Key In
P11: NA
P12:Main Solenoid Out
P13: NA
P14: NA
P15: NA
P16:Reverse In

To Navitas AC Motor Adapter
PN: 40-000580

10-POS Molex
39-28-1103

P1: +5V PF
P2: Encoder A In
P3: Encoder B In
P4: Digital GND
P5: NA
P6: Motor Temperature In
P7: Analog GND
P8: NA
P9: Key In
P10: Motor Brake Solenoid Release

Navitas AC Motor Adapter 40-000580

10-POS Molex
39-01-2100

P1: +5V PF
P2: Encoder A In
P3: Encoder B In
P4: Digital GND
P5: NA
P6: Motor Temperature In
P7: Analog GND
P8: NA
P9: NA
P10: NA

To AC Motor
Speed Sensor
Temperature Sensor

P1: Motor Temperature In
P2: Analog GND

P1: +5V PF
P2: Encoder B In
P3: Encoder A In
P4: Digital GND

RES Post may not be installed in conversion model!

Diagrams and other updates available at:
NavitasVS.com/support

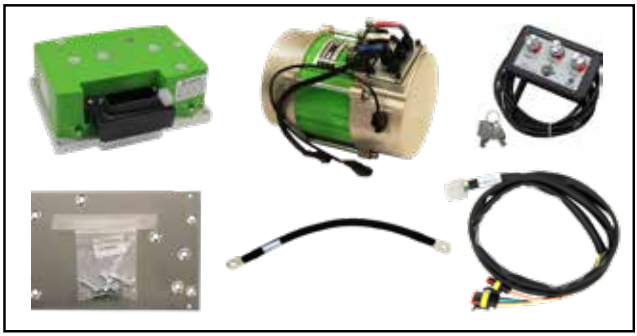
INSTALLATION INSTRUCTIONS

Club Car IQ (Precedent) DC to AC Conversion

CAUTION **Disconnect all batteries before beginning installation. If the car has a run/tow switch, you must place the switch in the TOW position first!**

PARTS

- AC 4 kW motor
- AC Navitas controller
- Mounting plate w/ hardware
- Motor phase cable (4AWG)
- Speed sensor/motor temperature harness
- On-The-Fly programmer (Optional)



1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

Note: This instruction is for stock IQ/Precedent/ Excel/Onward model carts. Other Club Car models might need extra parts and steps not covered in this installation.

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

2. Remove OEM Protective Cover

- Remove cables from controller
- Unclip OEM wire harness

3. DC Motor and Controller Removal

- Raise car safely with jack/hoist and place on stands to be able to work safely from underneath car **or** pull batteries and work from top of battery box
- Remove (A1, A2, F1, F2 cables from DC Motor) dispose of F1, F2 cables and keep A1,A2 cables
- Cut off the short B+ cable from DC controller to solenoid. Continue to use the A2 Cable for new controller connection
- Remove cables from DC controller
- Remove OEM Controller (*Fig. 3*)

Fig. 3

INSTALLATION INSTRUCTIONS

Club Car IQ (Precedent) DC to AC Conversion cont'd

4. Install Navitas TAC 2 Controller

- Install NEW Club Car Precedent mounting plate using supplied hardware
- Connect motor phase wires from controller using the removed A1 and A2 wires and the included wire (U = U, V = V and W = W)
- Connect B+ cable from solenoid to controller and existing B- cable from battery pack to controller
- Install OTF (Optional). See OTF installation instructions in RXV install description p12

Fig. 2

- Connect OEM harness to adaptor module
- Connect OTF to adaptor module (optional)
- Connect NEW speed sensor/motor temperature harness to controller
- Connect OEM wiring harness to controller (may need to chase back harness to free up sufficient slack)

5. Install AC Motor

- Re-connect A1=U, A2=V and NEW motor cable=W from controller to the AC motor (examine to make sure the cables align from controller to motor exactly. . . .U-U, V-V and W-W)
- Connect new speed sensor/motor temperature harness from controller to AC motor

6. TESTING INSTALLATION

- Make sure drive wheels are in the air
- Reconnect battery pack
- Put in RUN mode
- Turn key On
- Put in "F" for Forward
- Press on throttle to activate wheels

Pinout for Controller

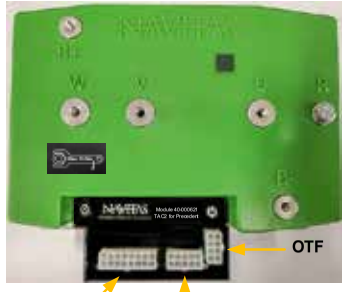
Navitas TAC2 AC Motor Controller for Club Car Precedent DC-AC Conversion Product Model 10-000888-02 (440A) 10-000890-02 (600A)

Issue Date: 20181219

To OTF Programmer
PN: 10-000686

8-POS Molex
39-28-1083

P1: +12V PF
P2: OTF Regen
P3: OTF speed
P4: OTF acceleration
P5: +5V PF
P6: OTF Lock
P7: OTF LED
P8: Analog GND



To OEM vehicle harness

16-POS Molex
39-28-1163

P1: +5V PF
P2: Throttle In
P3: Fused GND
P4: NA
P5: Charger Interlock Input
P6: Foot Switch In
P7: Reverse Buzzer
P8: Forward In
P9: Logic Power In
P10: Key In
P11: NA
P12: Main Solenoid Out
P13: NA
P14: NA
P15: NA
P16: Reverse In

To Navitas AC Motor Adapter
PN: 40-000580

10-POS Molex
39-28-1103

P1: +5V PF
P2: Encoder A In
P3: Encoder B In
P4: Digital GND
P5: NA
P6: Motor Temperature In
P7: Analog GND
P8: NA
P9: Key In
P10: Motor Brake Solenoid Release

Navitas AC Motor Adapter
40-000580

10-POS Molex
39-01-2100

P1: +5V PF
P2: Encoder A In
P3: Encoder B In
P4: Digital GND
P5: NA
P6: Motor Temperature In
P7: Analog GND
P8: NA
P9: NA
P10: NA

To AC Motor
Speed Sensor
Temperature Sensor

2-POS
282080-1

P1: Motor Temperature In
P2: Analog GND

4-POS
282088-1

P1: +5V PF
P2: Encoder B In
P3: Encoder A In
P4: Digital GND

RES Post may not be installed in conversion model!

Diagrams and other updates available at:
NavitasVS.com/support

INSTALLATION INSTRUCTIONS

YAMAHA YDRE2 - TOYOTA (NEOS) Installation

CAUTION **Disconnect all batteries before beginning installation. If the car has a run/tow switch, you must place the switch in the TOW position first!**

PARTS

- AC Controller
- Mounting plate with hardware
- Motor phase cable (4AWG)
- On-The-Fly programmer (Optional)

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

2. Remove cables from OEM controller

- Unclip OEM Wire Harness

3. Remove OEM Controller

4. Install YDRE2 Mounting Plate

- Align plate with existing holes (where OEM controller was fastened) and fasten with screws. *(Fig. 2)*
- To make it easier to install bolts on the left side of the controller, loosen and slide assembly to a central, more accessible position. *(Fig. 2, 3, 4)*

Fig. 1

Fig. 2

INSTALLATION INSTRUCTIONS

YAMAHA YDRE2 - TOYOTA (NEOS) Installation cont'd

5. Mount Controller

- Install Navitas AC controller (*Fig. 3*)
- Connect B- from battery, B+ from solenoid using supplied battery cable, and motor phase cables to the controller:
  - Black - U
  - Red - V
  - White - W

Fig. 3

6. Connect OEM Harness to Adaptor Module

Fig. 4

7. Install On-The-Fly Programmer (optional)

- Install OTF (optional) (see install description in RXV INSTALL instructions, p12)
- Connect OTF to Navitas Controller
- Zip Tie loose cables

8. Test Installation

- Lift rear wheels
- Reconnect battery pack
- Put in "RUN" mode
- Turn key on
- Put in "F" for Forward
- Press on throttle to activate wheels

Fig. 5

Fig. 6

INSTALLATION INSTRUCTIONS

YAMAHA YDRE2 - TOYOTA (NEOS) Installation cont'd

Pinout for Controller

Navitas TAC2 AC Motor Controller
for YAMAHA YDRE2
Product Model 10-000888-01 (440A)
10-000890-01 (600A)

Issue Date: 20181219

To OTF Programmer
PN: 10-000686

8-POS Molex
39-28-1083

P1: +12V PF
P2: OTF Regen
P3: OTF speed
P4: OTF acceleration
P5: +5V PF
P6: OTF Lock
P7: OTF LED
P8: Analog GND

To OEM vehicle harness

23-POS Ampseal
776228-1

P1: Logic Power
P2: NA
P3: NA
P4: Throttle In
P5: Logic Power
P6: Main Solenoid
P7: Rev Buzzer
P8: Logic Power
P9: +12V PF
P10: SPD B In
P11: SPD A In
P12: Key In
P13: Foot Switch In
P14: Analog GND
P15: Motor Temperature In
P16: Battery Negative
P17: Reverse In
P18: Forward In
P19: NA
P20: +5V PF
P21: NA
P22: CAH Positive
P23: CAN Negative

RES Post may not be installed in conversion model!

Diagrams and other updates available at:
NavitasVS.com/support

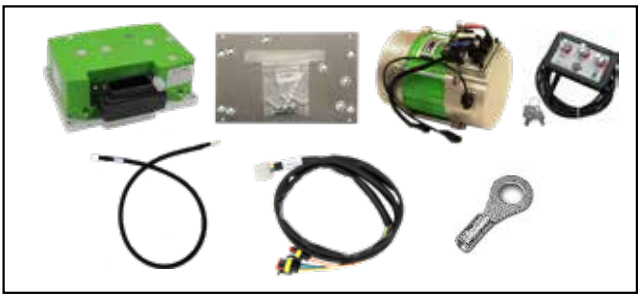
INSTALLATION INSTRUCTIONS

YAMAHA G29 DC to AC Conversion

CAUTION **Disconnect all batteries before beginning installation. If the car has a run/tow switch, you must place the switch in the TOW position first!**

PARTS INCLUDED

- AC Controller
- AC 4 kW motor
- OTF programmer (optional)
- Mounting plate and hardware
- Motor phase cable
- Speed sensor/motor temperature harness
- Ring Terminal



1. Power down

- Turn off key, disconnect battery
- Put car on a stand and block wheels
- Use insulated tools
- Never use battery as workbench

To view our Installation video for Golf Cars, visit: **NavitasVS.com/support**

2. Remove OEM Controller

- Remove cables from controller
- Unclip OEM Wire Harness

3. Prepare Cables --Important--

- Locate the 'Y' cable on the vehicle harness (*Fig. 1)*. This cable consists of 2 cables crimped together into a single ring terminal. One side comes from the Battery Negative. The other wire is connected to the A2 on the motor. Use side cutters to cut the A2 wire at the ring terminal (*Fig. 2)*. Then crimp the supplied ring terminal to the A2 wire (*Fig. 3)*.

Fig. 1

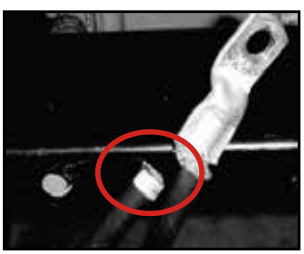


Fig. 2

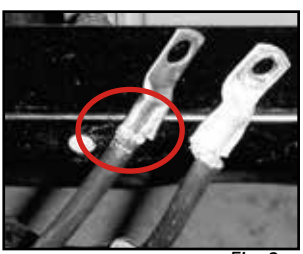


Fig. 3

INSTALLATION INSTRUCTIONS

YAMAHA G29 DC to AC Conversion cont'd

4. Install G29 Mounting Plate

- Align plate with existing holes (where OEM controller was fastened) and fasten with screws (*Fig. 4*)

Fig. 4

5. Mount Controller

- Install Navitas AC controller (*Fig. 5*).
- Connect B- from battery, B+ from solenoid and motor phase cables to U, V, W (use new cable provided as 'W' and re-use the 2 existing motor phase cables from A1=U, A2=V) to the controller (*Fig. 6*)

6. Motor Conversion

- Remove motor phase cables A1, A2 from motor
- Remove and DISCARD field cables (F1, F2)
- Remove DC motor
- Install Navitas AC motor
- Connect new speed sensor/motor temp harness to motor
- Connect motor phase wires from controller using the removed A1 and A2 wires and the included wire (U = U, V = V and W = W)
- Check cabling to make sure U, V, and W match exactly from motor to controller

Fig. 5

7. Connect OEM Harness to Adaptor Module

8. Install On-The-Fly Programmer (optional)

- Install OTF (optional) (see install description in RXV INSTALL instructions, p12)
- Connect OTF to the adapter module
- Zip Tie loose cables

Fig. 6

9. Test Installation

- Lift rear wheels
- Reconnect battery pack
- Put in "RUN" mode
- Turn key on
- Put in "F" for Forward
- Press on throttle to activate wheels

INSTALLATION INSTRUCTIONS

YAMAHA G29 DC to AC Conversion cont'd

Pinout for Controller

Diagrams and other updates available at:
NavitasVS.com/support

TROUBLESHOOTING

* Check the 'Caution' icon on app first for fault descriptions or refer to the chart below

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
1-1	**Throttle Fault**	The foot switch is not engaged and the throttle signal voltage is above minimum throttle parameter. This indicates the foot switch is not coming on or the throttle has broken where its off voltage is too high	• Check wiring • Verfiy throttle operation • Calibrate Throttle • Replace throttle	• The diagnostic page of the App will give you readings for the throttle voltage and foot switch. • Put the vehicle in neutral and slowly depress the throttle. • The foot switch should change from **Off** to **On** before the throttle voltage reaches throttle min setting on the settings page of the app. • Standard throttles usually read 0.5V in the app when off. The minimum voltage to start the vehicle is usually 1V. The maximum when depressed should read around 4V.
1-2	**Brake Fault** (RXV Only)	The analog brake signal is higher than the high voltage threshold which is 4.64V.	• Check wiring • Replace brake Sensor	• The diagnostic page of the App will give you readings for the brake voltage • Put the vehicle in neutral and slowly depress the brake. Ensure voltage reads between ~0.5v to ~4v
1-3	**Charger Interlock**	Charger is connected and the vehicle is not in neutral. If just installed Lithium battery	• Disconnect the Charger before trying to move. • Charger Interlock not wired in cart	• The diagnostic page of the App will give you readings for the charger input connected signal. • The charger input will read off when there is no charger connected. • Toggle Invert Charger Input on Settings page of app
1-4	**Temperature (Controller)**	Performance is limited because the controller is hot.	• Let vehicle cool off, system is over worked.	Check the temperature of the controller with a non-contact temperature sensor
1 - 5	**Temperature (Motor)**	Performance is limited because the motor is hot.	• Let vehicle cool off, system is over worked • Temp Sensor connector is loose • Check temperature sensor in app is set for the correct one for that cart	• Check the temperature of the motor with a non-contact temperature sensor. • Check motor temperature sensor wires are making connected. Re-seat connector. • Turn cart OFF, unplug temp sesnor from harness. Measure motor side connector for resistance. ~600Ω is the KTY84 ~1000Ω is the PT1000 • Set the correct thermistor in the settings page of the app.

TROUBLESHOOTING cont'd

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
1 - 6	**Solenoid High Resistance**	Voltage across solenoid (battery side (logic power) to controller side measured (B+ terminal)) is greater than the hard coded 5V.	• Replace solenoid	• Test the solenoid by measuring ohms across the large terminals. • The error usually only occurs when drawing large currents (200A) through the solenoid. The solenoid may be under rated or oxidizing with age
1 - 7	**Parameter Table not intialized**	Code updates from the App may force this error so cause the user to press the Initialize button and Save button.	• Press the Initialize button and Save button in the App.	• Go to the settings page, press the Initialize button and Save button in the App.
1 - 8	**Brake Check Fault**	Brake failed to hold vehicle still during start up tests. Vehicle should not move during brake check.	• Check motor brake	• Turn key off and disconnect brake harness from motor brake. Try pushing vehicle, you should not be able to push vehicle. • If new brake has been installed, check installation, over/under torquing brake can cause issues
1- 9	**Brake Hold Fault**	Brake failed to hold vehicle still when stopped. Wheels are still turning with Parking Brake set.	• Check motor brake	• Turn key off and disconnect brake harness from motor brake. Try pushing vehicle, you should not be able to push vehicle. • If new brake has been installed, check installation, over/under torquing brake can cause issues
1- 10	**Resistor Check Fault**	The large external power resistor was not detected during start up tests.	• Check resistor wiring	• Resistor wires should go to controller B+ side of the solenoid and to the 'R' terminal on the controller. <u>DO NOT TO CONNECT TO BATTERY SIDE OF SOLENOID</u>
2 - 1	**Direction Switch Fault**	Both FWD & REV signal came on at the same time.	• Check and replace FWD & REV switch • Dry out F/R switch if it got wet	• The diagnostic page of the App will give you readings for the Forward switch and Reverse switch • Check the Switch. Does the Switch feel the same when toggled from FWD to Neutral to REV. If so check continuity of the switch.

TROUBLESHOOTNG cont'd

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
2 - 2	**Main Solenoid**	Voltage across solenoid (battery side to controller side measured B+ terminal) is greater than the hard coded 1V after solenoid has closed	• Confirm the solenoid is working properly. Change solenoid if required.	• Put vehicle in Neutral. Measure voltage on main terminals (high current connections) of the solenoid. Depress throttle and listen for solenoid to click. If solenoid clicks and the voltage does not drop to zero between the main terminals. Replace solenoid. • If solenoid does NOT click measure the voltage across the small terminals of the solenoid when the throttle is depressed. It should read the battery voltage. If it reads the battery voltage the solenoid is bad. If it does not read the battery voltage check vehicle wiring
2 - 3	**Controller not pre-charging**	Abnormally low voltage on the controller between B+ and B-.	• Clean and dry off the controller • Check voltage • Check all wires are connected to controller • **DO NOT replace the controller until all of the "How to Check" diagnostics regarding Flash Code 2 - 3 have been completed and the motor has been tested for short circuits!**	• The dashboard page of the App will give you readings for the battery voltage. • Visually check for debris or moisture on controller terminals and wires (There may be a short across the B+ and B- terminals). • Check the voltage between B+ and B- on the controller. It should equal the battery pack voltage. • Check that the wires are not damaged. • Check that no accessories (light kits, stereos, etc.) are using the frame as a ground. • Remove all cables except B- from the controller. • Tape cables so they do not touch each other or the vehicle frame. Controller harness should remain plugged into the controller. • Move Run/Tow switch to Run, turn on key switch, depress the throttle. If Flash Code 2-3 returns replace the controller. • Otherwise there is a wiring problem. Reconnect wires one at a time (turn off RUN/TOW switch each time) until Flash Code 2-3 returns. This will indicate where the wiring issue is located.

TROUBLESHOOTING cont'd

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
2 - 4	**Main Solenoid Current Fault**	Solenoid coil takes too much current.	• Check for loose wires or a short across small terminals on the solenoid. • Replace main solenoid.	• Check for loose wires. If there is a diode across the solenoid check that it is not shorted. • Test solenoid by measuring resistance across the small terminals of the solenoid. The resistance should be greater than 48 OHMS if it is a single coil solenoid and greater than 20 OHMS if it is a double coil solenoid.
2 - 5	**Motor Brake Solenoid (Connected to motor) Current Fault** (RXV Only)	Motor Brake coil pulling too much current.	• Check for loose wires or a short across small terminals on the motor brake. • Replace motor brake	• Check for loose wires.
2-8	**Precharging Too fast**	1. Main solenoid may be welded. 2. (External Resistor Option Only) Regen resistor may be incorrectly connected to battery side of main solenoid.	• Check Main Solenoid • Check resistor wiring	• 1. Turn Key off and place in Tow. Measure voltage across large terminals of solenoid. If you measure anything but 0V, the solenoid is welded • 2a. Check Resistor wiring. Resistor wires should go to switched side of solenoid (controller side) and to the 'R' terminal on the controller. • 2b. Turn Key off and place in Tow. Disconnect controller 'B+' and 'R' cables. Make sure to isolate them with electrical tape. Place in Run and turn Key on check to see if error changes. If error changes, turn key off and place in Tow again. Then reconnect 'B+' cable and repeat. If error does not reappear, repeat process again and reconnect resistor to 'R' terminal. If the problem reappears, recheck the resistor wiring.
2-9	**Main Solenoid Open During Parking Brake Test**	Solenoid didn't close during the parking brake test	• Check Main Solenoid	• Upgrade Firmware to v8.0 or higher

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
3 - 1	**Battery Under Voltage**	Batteries are empty or too low.	• Recharge batteries • Check for bad or damaged batteries. • Check battery cables are not loose or damaged. • Check solenoid	• Use a battery load tester to verify battery condition after charging. • Connect volt meter batteries. (Use alligator clips). Measure the voltage while driving to see if the voltage drops. • Connect Volt meter to the controller if the voltage drops at the controller and not at the battery then the solenoid may be bad.
3 - 2	**Battery Over Voltage**	Batteries are over charged or not excepting any more regenerative currents	• Check for bad or damaged Batteries. • Check Battery Cables are not loose or damaged. • Check Solenoid	• Use a battery load tester to verify battery condition after charging. • Connect volt meter batteries. (Use alligator clips). Measure the voltage while driving to see if the voltage rises. • Connect volt meter to the controller if the voltage rises at the controller and not at the battery then the solenoid may be bad.
3 - 3	**Motor Over Current**	Motor current has risen above the maximum motor current parameter.	• Check Motor U,V,W cables are not shorted to ground **See diode chart below**	• The diagnostics page of the App will give you readings for the U phase voltage, V phase voltage, W phase voltage • The phases should read around half the battery voltage. • Disconnect phases at controller and check readings again
4-5	**Over Current Fault**	Motor current has exceeded controller current limit.	• Release throttle and reapply to drive	• Error code will clear when key is off and in Tow.

FLASH CODES	FLASH CODE MESSAGE	DESCRIPTION	SOLUTION	HOW TO CHECK
4-7	**Power Stage Fault**	Controller has failed power check on startup	• Check motor connections	• Turn Key off, place in Tow. • Disconnect U,V,W from controller. • Place in Run, turn on Key. • Check if error message now shows that motor is not connected. If error continues to show, contact Navitas Support. Please take screenshot of error message to provide to Navitas Support
4-8	**Encoder A input Fault**	Speed input A is not changing when Motor Current is Applied	• Check speed sensor	• With Key off and vehicle in Tow, disconnect speed encoder harness from motor. (4 pin connector at motor) • Place vehicle in Run and turn Key on. • Using a volt meter, measure the voltage at each of the pins. You should read 5V, 3V, 3V, 0V on the wires. • Reconnect to controller with app. Go to Diagnostics page and look for Encoder A & B inputs. • With a piece of wire or a paperclip, short the 3V wires to the 0V wire and check on the app if the input has gone from high to low. If it has, the inputs at the controller are working and the sensor may be at fault.
4-9	**Encoder B input Fault**	Speed input A is not changing when Motor Current is Applied	• Check speed sensor	
4-12	**Encoder Rate Limit Fault**	Speed input A is not changing when Motor Current is Applied	• Check speed sensor	• Check Encoder wires and connectors for damage. • Remove Encoder from motor, check for debris and reset Encoder. • Contact Technical Support for further testing.

TROUBLESHOOTING cont'd

NON-FLASH CODE ERRORS. Note: The list below shows some possible issues when the Controller does not show a Flash Code Error. These issues are mainly related to the Vehicle. Always check the Manufacturers Service Manual.

ISSUE	CAUSE	HOW TO CHECK
The Vehicle is moving slower than normal.	• Batteries are discharged • Bad or damaged motor • Faulty speed sensor • Faulty throttle • OTF programmer is locked at low speed	• Re-charge the batteries • Check brakes are releasing properly and vehicle is easy to push • Check motor • With the App verify throttle reaches maximum value • Connect the OTF programmer, unlock it and adjust to desired speed. Note: Lock OTF programmer before removing it or the settings may change.
Vehicle is shutting down	• Check vehicle wiring for loose connections • Check the OBC (On Board Computer)	• Check the OBC by referring to the "OBC section" in the manufacturer's service manual.
Vehicle feels sluggish after driving for a while.	• Battery cables are undersized	• Upgrade the power cables to recommended 4AWG
Faulty Controller	• Controller malfunction	• Use a digital multi-meter set to diode mode →| • Remove all wires and cables on controller • Use "Controller Diode Test" chart below to test the controller
Vehicle Stutters	• Motor cables are not connected properly • Motor cables are not connected properly	• Check motor cables properly connected U-U< V-V, W-W • Check speed sensor wires not crossed. • Check speed sensor works

Table 1 Controller Test Diode Chart

BLACK LEAD ⊖	RED LEAD ⊕	VOLTAGE →|
B+	U	0.42 V approx.
U	B-	0.42V approx.
B+	V	0.48V approx.
V	B-	0.48V approx.
B+	W	0.48V approx.

BLACK LEAD ⊖	RED LEAD ⊕	VOLTAGE →|
W	B-	0.48 V approx.
B+	R	0.42V approx.
R	B-	0.48V approx.

ACCESSORIES

Bluetooth® Apps for TAC 2.0

Customer and Dealer App available for Android and Apple IOS:

IOS: https://itunes.apple.com/us/app/dashboard-navitas/

Android: https://play.google.com/store/apps/developer?id=Navitas+Vehicle+Systems+Ltd.

Free Bluetooth App*

Available for all users of Navitas controllers.
Extra features available for authorized Dealers

Download the app from your App Store today!

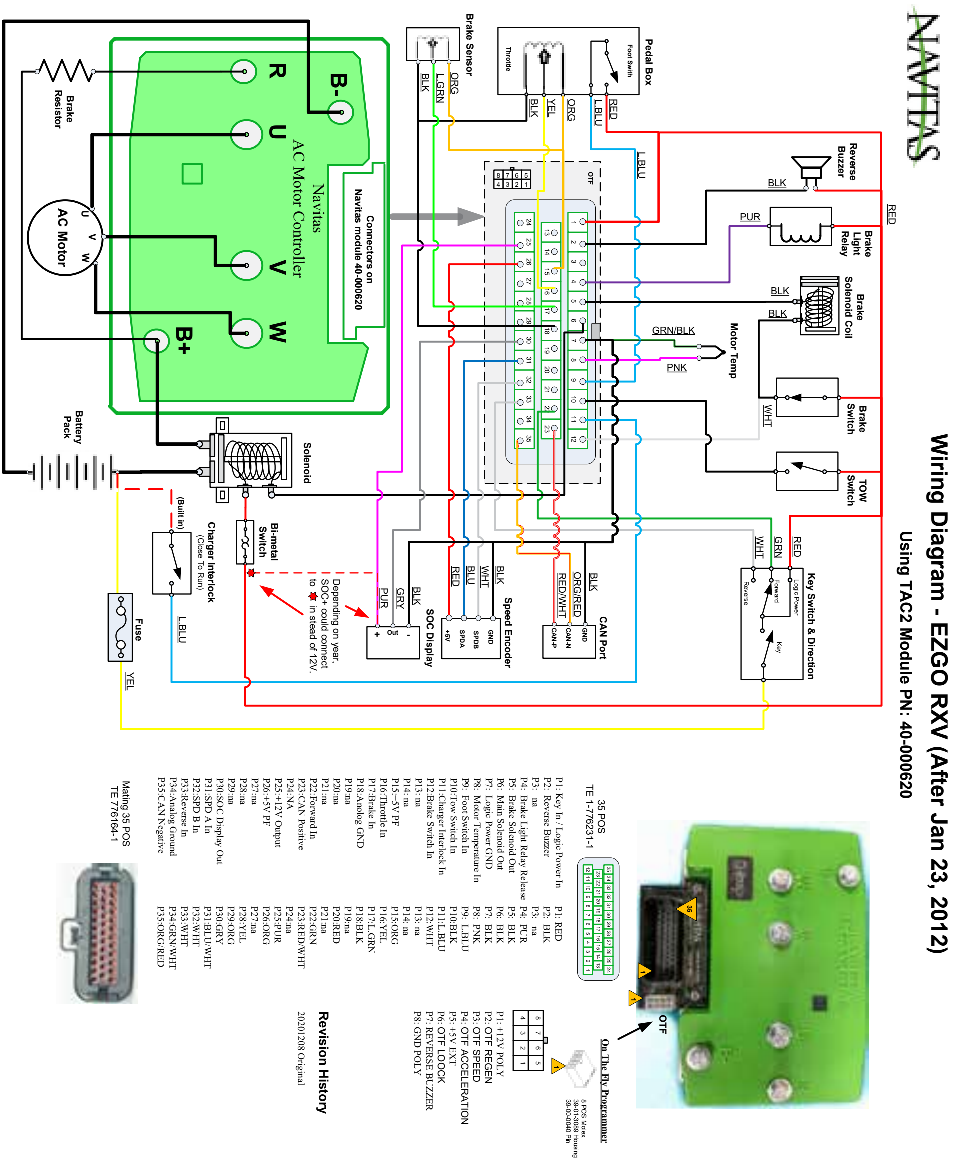
Features and Benefits

- Customize your settings
- Tune car performance
- Limit/set top speed
- Troubleshoot **on site** with diagnositc reporting using any iOS or Android enabled device
- Technicians can also diagnose cars **remotely** via email
- Emails can also be forwarded to NAVITAS engineering department for additional support
- Upgrade Firmware with ease.

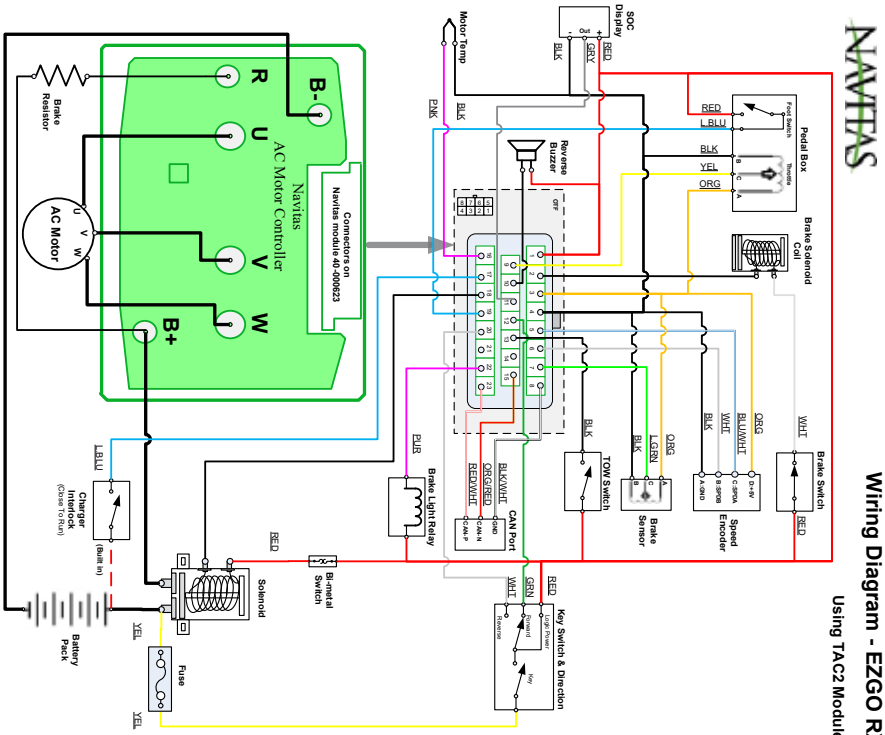
*Actual screen format and features may vary.

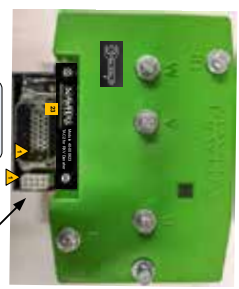
Visit NavitasVS.com/support for more App support documentation.

APPENDIX A


NAVITAS
Wiring Diagram - EZGO RXV (After Jan 23, 2012)
Using TAC2 Module PN: 40-000620
RED
Reverse Buzzer
Brake Light Relay
Brake Solenoid Coil
Brake Switch
TOW Switch
BLK
PUR
BLK
BLK
WHT
Key Switch & Direction
Logic Power
Forward
Key
Reverse
RED
GRN
WHT
Motor Temp
GRN/BLK
PNK
Pedal Box
Foot Swith
Throttle
RED
L.BLU
ORG
YEL
BLK
L.BLU
OTF
CAN Port
BLK
ORG/RED
RED/WHT
GND
CAN-N
CAN-P
Speed Encoder
BLK
WHT
BLU
RED
GND
SPDB
SPDA
+5V
SOC Display
BLK
GRY
PUR
Out
Brake Sensor
ORG
L.GRN
BLK
Connectors on
Navitas module 40-000620
B-
Navitas
AC Motor Controller
R
U
V
W
B+
Brake Resistor
AC Motor
U
V
W
Battery Pack
Solenoid
Bi-metal Switch
Depending on year, SOC+ could connect to ★ in stead of 12V.
Charger Interlock
(Close To Run)
(Built in)
L.BLU
Fuse
YEL
OTF
On The Fly Programmer
8 POS Molex
39-01-3089 Housing
39-00-0040 Pin
35 POS
TE 1-776231-1
P1: Key In / Logic Power In
P2: Reverse Buzzer
P3: na
P4: Brake Light Relay Release
P5: Brake Solenoid Out
P6: Main Solenoid Out
P7: Logic Power GND
P8: Motor Temperature In
P9: Foot Switch In
P10:Tow Switch In
P11:Charger Interlock In
P12:Brake Switch In
P13: na
P14: na
P15:+5V PF
P16:Throttle In
P17:Brake In
P18:Anolog GND
P19:na
P20:na
P21:na
P22:Forward In
P23:CAN Positive
P24:NA
P25:+12V Output
P26:+5V PF
P27:na
P28:na
P29:na
P30:SOC Display Out
P31:SPD A In
P32:SPD B In
P33:Reverse In
P34:Analog Ground
P35:CAN Negative
P1: RED
P2: BLK
P3: na
P4: PUR
P5: BLK
P6: BLK
P7: BLK
P8: PNK
P9: L.BLU
P10:BLK
P11:L.BLU
P12:WHT
P13: na
P14: na
P15:ORG
P16:YEL
P17:L.GRN
P18:BLK
P19:na
P20:RED
P21:na
P22:GRN
P23:RED/WHT
P24:na
P25:PUR
P26:ORG
P27:na
P28:YEL
P29:ORG
P30:GRY
P31:BLU/WHT
P32:WHT
P33:WHT
P34:GRN/WHT
P35:ORG/RED
P1: +12V POLY
P2: OTF REGEN
P3: OTF SPEED
P4: OTF ACCELERATION
P5: +5V EXT
P6: OTF LOOCK
P7: REVERSE BUZZER
P8: GND POLY
Revision History
20201208 Original
Mating 35 POS
TE 776164-1

APPENDIX A cont'd





23-POS Amppeal 776228-1

P1: Key In / Logic Power In
P2: Brake Solenoid Out
P3: +5V PF
P4: AGND
P5: SPD A In
P6: SPD B In
P7: Brake In
P8: CAN GND
P9: Throttle In
P10:Reverse Buzzer Out
P11:SOC Display Out
P12:Forward In
P13:Tow Switch In
P14:NA
P15:CAN NEG
P16:Motor Temperature In
P17:Charger Interlock In
P18:MAIN Solenoid Out
P19:Foot Switch In
P20:Reverse In
P21:Resistor Control (Not Used)
P22:Brake Light Relay Release
P23:CAN POS

P1: RED
P2: BLK
P3: ORG
P4: BLK
P5: BLU/WHT
P6: WHT
P7: L GRN
P8: BLK/WHT
P9: YEL
P10: BLK
P11: GRY
P12: GRN
P13: BLK
P14: GRY
P15: ORG/RED
P16: PNK
P17: L BLU
P18: BLK
P19: L BLU
P20: WHT
P21: PUR/WHT
P22: PUR
P23: RED/WHT

Mating 23 POS TE 770680-1

On The Fly Programmer

P1: +12V POLY
P2: OTF REGEN
P3: OTF SPEED
P4: OTF ACCELERATION
P5: NA
P6: OTF LOOCK
P7: REVERSE BUZZER
P8: GND POLY

Revision History

20210413 Original

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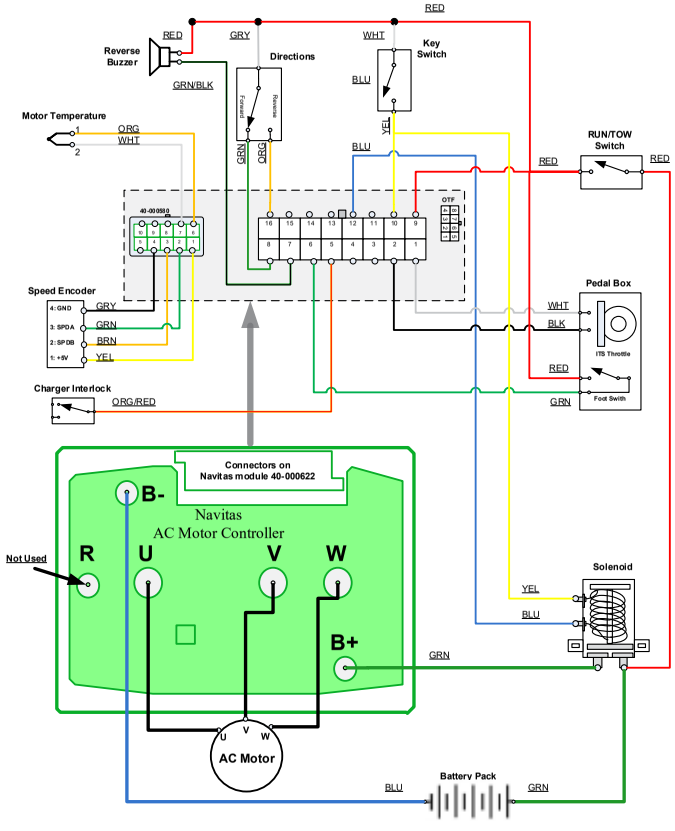
Wiring Diagram – EZGO TXT48 Conversion Kit

Using TAC2 Module PN: 40-000622



Vehicle Harness
16-POS Molex
39-28-1163

AC Motor Adapter

On The Fly Programmer
8 POS Molex
39-01-3089 Housing
39-00-0040 Pin

P1: ITS THROTTLE-	P1:WHT
P2: ITS THROTTLE+	P2:PUR/WHT
P3: Fused GND	P3:YEL
P4: NA	P4: NA
P5: Charger Interlock Input	P5: LT.BLU
P6: Foot Switch In	P6: GRN
P7: Reverse Buzzer	P7: ORG/WHT
P8: Forward In	P8: BRN
P9: Logic Power In	P9: GRY
P10:Key In	P10:TAN
P11: NA	P11:NA
P12:Main Solenoid Out	P12:BLU/WHT
P13: NA	P13:NA
P14: NA	P14:NA
P15: NA	P15:NA
P16:Reverse In	P16:BLU

P1: +12V POLY
P2: OTF REGEN
P3: OTF SPEED
P4: OTF ACCELERATION
P5: +5V EXT
P6: OTF LOOCK
P7: REVERSE BUZZER
P8: GND POLY

AC Motor Adapter
10 POS Molex
39-01-3109 Housing
39-00-0040 Pin

P1: +5V PF	P1: YEL
P2: Encoder A In	P2: GRN
P3: Encoder B In	P3: BRN
P4: Digital GND	P4: GRY
P5: Encoder C In	P5: NA
P6: Motor Temperature In	P6: ORG
P7: Analog GND	P7: WHT
P8: NA	P8: NA
P9: Key In	P9: NA
P10: Motor Brake Solenoid Release	P10: NA

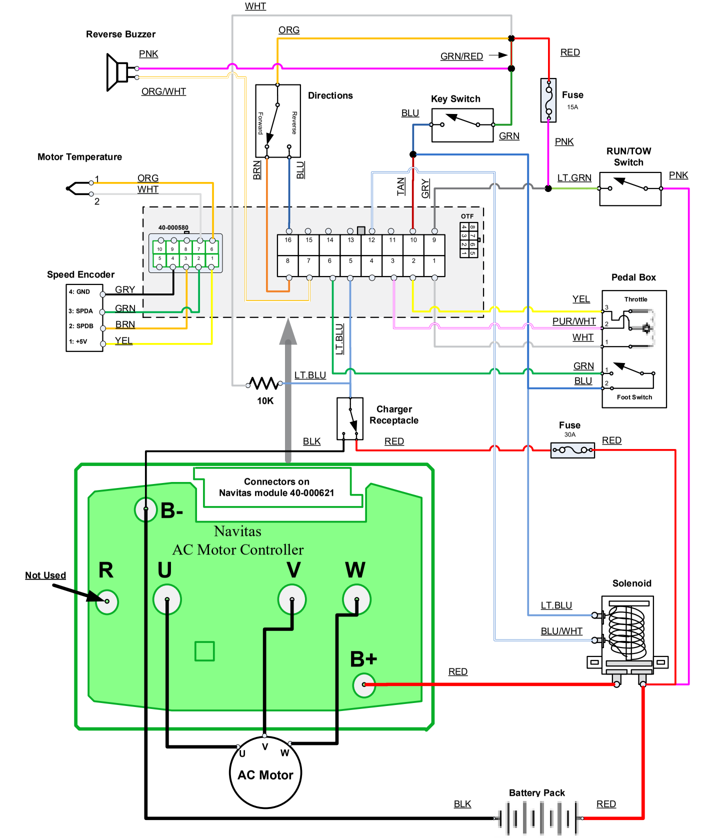
Revision History

20210415 Original

APPENDIX A cont'd

Wiring Diagram – Club Car Precedent Conversion Kit (2014)

Using TAC2 Module PN: 40-000621



Vehicle Harness

16-POS Molex
39-28-1163

P1: +5V PF	P1:WHT
P2: Throttle In	P2:PUR/WHT
P3: Fused GND	P3:YEL
P4: NA	P4: NA
P5: Charger Interlock Input	P5: LT.BLU
P6: Foot Switch In	P6: GRN
P7: Reverse Buzzer	P7: ORG/WHT
P8: Forward In	P8: BRN
P9: Logic Power In	P9: GRY
P10:Key In	P10:TAN
P11: NA	P11:NA
P12:Main Solenoid Out	P12:BLU/WHT
P13: NA	P13:NA
P14: NA	P14:NA
P15: NA	P15:NA
P16:Reverse In	P16:BLU

AC Motor Adapter (column header for the wire colours above)

On The Fly Programmer

8 POS Molex
39-01-3089 Housing
39-00-0040 Pin

P1: +12V POLY
P2: OTF REGEN
P3: OTF SPEED
P4: OTF ACCELERATION
P5: +5V EXT
P6: OTF LOOCK
P7: REVERSE BUZZER
P8: GND POLY

AC Motor Adapter

10 POS Molex
39-01-3109 Housing
39-00-0040 Pin

P1: +5V PF	P1: YEL
P2: Encoder A In	P2: GRN
P3: Encoder B In	P3: BRN
P4: Digital GND	P4: GRY
P5: Encoder C In	P5: NA
P6: Motor Temperature In	P6: ORG
P7: Analog GND	P7: WHT
P8: NA	P8: NA
P9: Key In	P9: NA
P10: Motor Brake Solenoid Release	P10: NA

Revision History

20210307 Original
20210818 Removed precharge resistor

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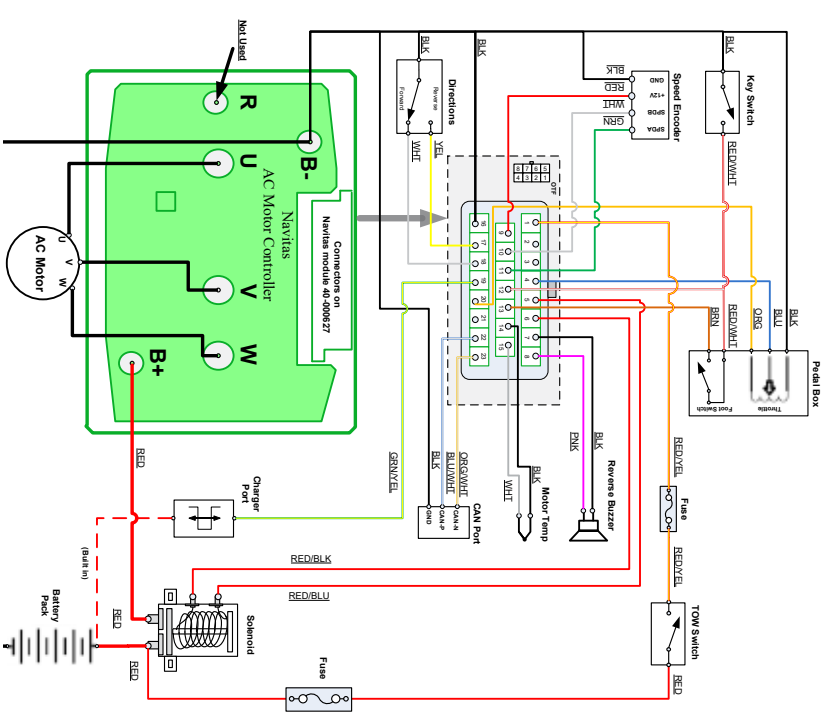
Wiring Diagram – Yamaha YDRE2

Using TAC2 Module PN: 40-000627



23-POS Amp seal 776228-1

P1: Logic Power
P2: NA
P3: NA
P4: Throttle In
P5: Logic Power
P6: Main Solenoid
P7: Rev. Buzzer
P8: Logic Power
P9: +12V PF
P10: SPD B In
P11: SPD A In
P12: Key In
P13: Foot Switch In
P14: Analog GND
P15: Motor Temperature In
P16: Analog GND
P17: Reverse In
P18: Forward In
P19: CHARGER INTERLOCK
P20: +5V PF
P21:NA
P22: CAN Positive
P23: CAN Negative

Mating 23 POS TE 770680-1

P1: RED/YEL
P2: NA
P3: NA
P4: BLU
P5: RED/BLU
P6: RED/BLK
P7: BLK
P8: PNK
P9: RED
P10:WHT
P11:GRN
P12:RED/WHT
P13:BRN
P14:BLK
P15:CLR
P16:BLK
P17:YEL
P18:WHT
P19:GRN/YEL
P20:ORG
P21:NA
P22:BLU/WHT
P23:ORG/WHT

On The Fly Programmer

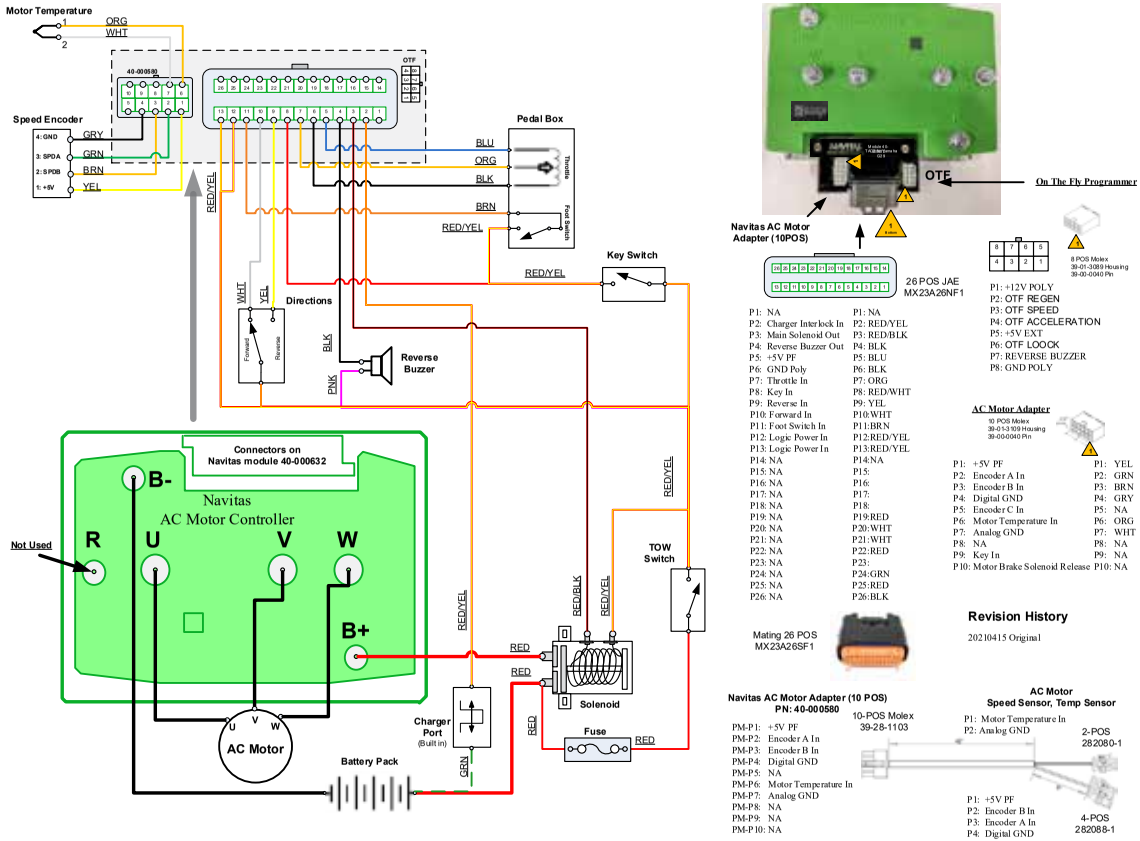
P1: +12V POLY
P2: OTF REGEN
P3: OTF SPEED
P4: OTF ACCELERATION
P5: +5V EXT
P6: OTF LOCK
P7: REVERSE BUZZER
P8: GND POLY

Revision History

20201208 Original

Wiring Diagram – Yamaha G29 DC/AC Conversion Kit

Using TAC2 Module PN: 40-000632



WARRANTY

Warranty Document #05-000102

Navitas Vehicle Systems Ltd. warrants that the products sold to Customer by Navitas will be free from defect in materials and workmanship as noted below, from the date of manufacturing shipping of the product, subject to the terms and conditions in this Limited Warranty.

1. TSX, TSX2.0,TSX3.0, Separately Excited Models, TPM Permanent Magnet Models, TAC AC Induction Models – 24 months
2. TSE Series Models, PSE Hydraulic Models, CTL Series Models – Lessor of 12 months or 4,000 hours
3. MAC AC Motor ¬ 12 months

If, during the applicable warranty period, (i) Navitas is advised in writing as to a defect in a Navitas product; (ii) such product is returned to a receiving point designated by Navitas; and (iii) an examination of such product discloses to Navitas' reasonable satisfaction that such product is defective and such defect was not caused by accident, abuse, neglect, alteration, improper installation, lightning damage, submersion, short circuits due to improper handling, repair, improper testing or use contrary to any instruction issued by Navitas, Navitas will repair or replace the defective product at no cost to Customer, except for transportation costs. Replacement shall mean furnishing the Customer with a new product equivalent to the defective product. All defective products replaced by Navitas under this warranty shall become the property of Navitas and must be returned to Navitas properly packed to prevent physical damage.

Navitas does not warrant that any product is suitable for use in any particular application. Customer shall be responsible for evaluating the appropriateness of the use of any specific Navitas product for a particular application. Navitas shall be entitled to rely exclusively upon such representation in furnishing any product to Customer.
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April 2019

Distributed by:

Navitas Vehicle Systems Ltd. (Navitas)
Waterloo, Ontario N2L 6A7 Canada
Phone: 1-844-576-2499
Fax: 519-725-1645
Web: NavitasVS.com

Navitas Vehicle Systems Ltd.
500 Dotzert Crt.
Waterloo, ON Canada
N2L 6A7

Navitas Vehicle Systems (US) Ltd.
P.O. BOX 691934 Orlando, FL
32869 United States

1-844-576-2499

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