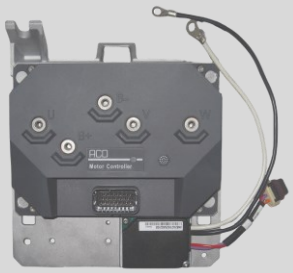
Danaher RXV 83A21102A

This sheet is provided to aid in the installation of your remanufactured Danaher Electric Motor controller. Upon installation, you may encounter problems that may, or may not, be due to a faulty controller. The following steps must be taken to help diagnose a possible cart fault or faulty controller. An analog or digital volt ohm meter (VOM) will be needed to perform these checks.



WARRANTY WILL BE VOID

If These Steps are Not Performed Before Installing The Control

STEPS TO PERFORM ***BEFORE*** CONTROL INSTALLATION

BEFORE INSTALLATION:

☐ Place cart on jack stands (wheels off the ground)

☐ Use proper eye protection and tools when working with electrical equipment

☐ Disconnect the batteries

CHECK MOTOR PHASES: Set your VOM to RESISTANCE (Ω). (NOTE: Motor Resistance between U, V, and W is 6.8 – 8.36 milliohms. Most DVM meters will not read this. Test below for open windings)

☐ With your motor disconnected, measure U to V. This should measure BETWEEN .4Ω and .8Ω.

☐ With your motor disconnected, measure V to W. This should measure BETWEEN .4Ω and .8Ω.

☐ With your motor disconnected, measure W to U. This should measure BETWEEN .4Ω and .8Ω.

☐ Motor disconnected, measure U, V, & W to Motor Frame. This must measure greater than 5MΩ

CHECK MAIN SOLENOID:

☐ Disconnect all wires from the main solenoid.

☐ Set your VOM to RESISTANCE (Ω).

☐ Measure the solenoid coil. This must measure NO LESS than 180Ω.

☐ Connect VOM leads to the main solenoid lugs.

☐ Attach jumpers from main battery positive and negative to the coil (small terminals).

☐ Meter must jump from infinity to LESS THAN .3Ω.

☐ Remove jumpers and reconnect solenoid wiring from the harness. (If suppression diode is present, The non-banded side must go to the Red/Black wire – from pin 18 of controller.)

CHECK BRAKE COIL

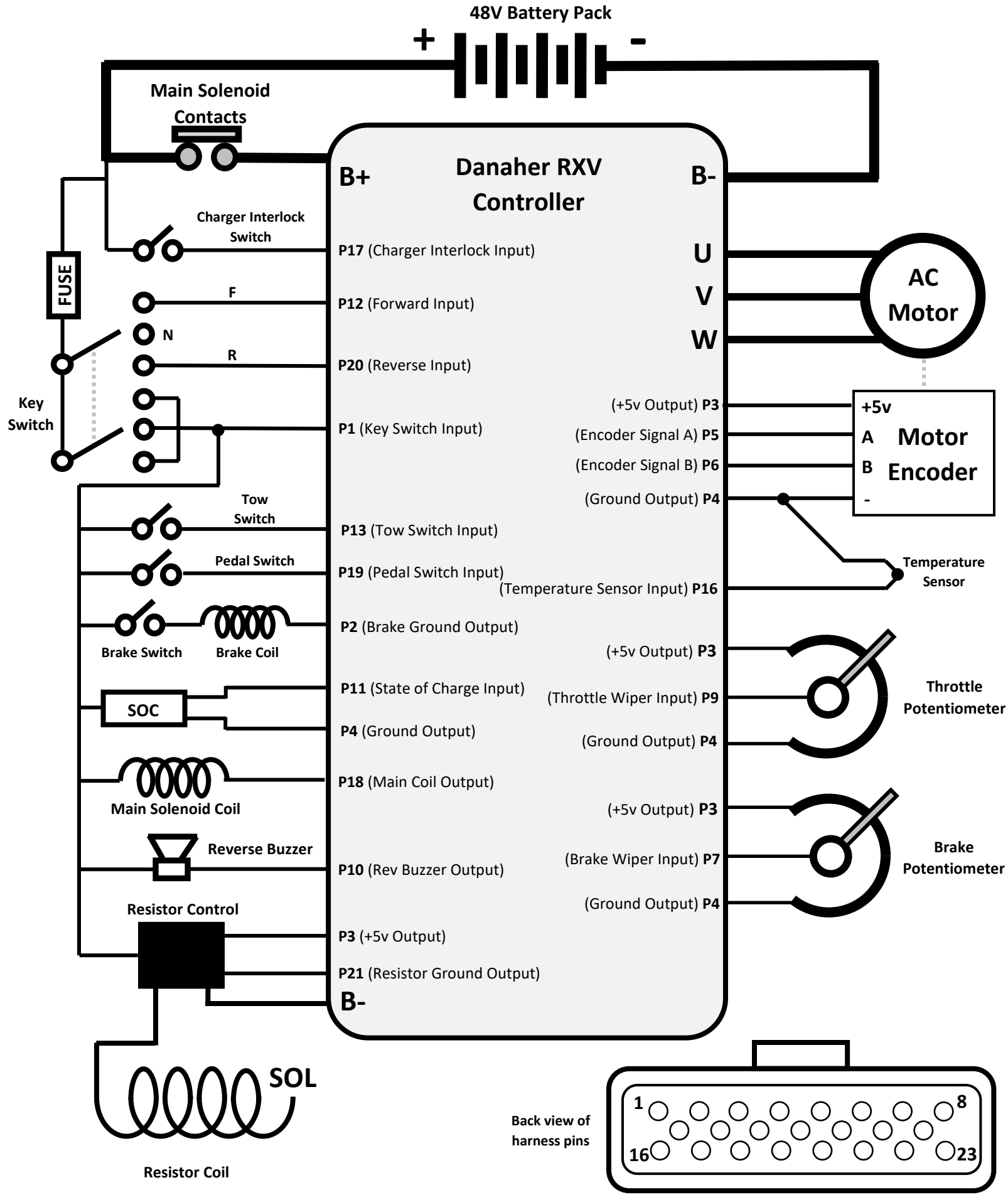
☐ Set your VOM to RESISTANCE (Ω). Measure the brake coil. Approx. 25Ω at room temp.

CHECK THE RESISTOR BLEEDER MODULE:

☐ Disconnect white and black wires. *Measure resistance between two wires, + lead on black & - lead on white. Should read approx.. 300K ohms. If shorted, module is faulty.*

IF ANY OF THE ABOVE ITEMS ARE NOT WITHIN THE SPECIFICED RANGES THE CONTROLLER WILL FAIL. THESE ITEMS MUST BE CORRECTED BEFORE THE CONTROLLER IS INSTALLED OR WARRANTY WILL BE VOID.

It is recommended to replace your solenoid at the time of controller replacement. FSIP now stocks popular replacement White Rodgers solenoids for your convenience.


48V Battery Pack
+
-
Main Solenoid Contacts
Danaher RXV Controller
B+
B-
Charger Interlock Switch
P17 (Charger Interlock Input)
FUSE
F
P12 (Forward Input)
N
R
P20 (Reverse Input)
Key Switch
P1 (Key Switch Input)
U
V
W
AC Motor
(+5v Output) P3
(Encoder Signal A) P5
(Encoder Signal B) P6
(Ground Output) P4
+5v
A
B
-
Motor Encoder
Tow Switch
P13 (Tow Switch Input)
Pedal Switch
P19 (Pedal Switch Input)
(Temperature Sensor Input) P16
Temperature Sensor
Brake Switch
Brake Coil
P2 (Brake Ground Output)
(+5v Output) P3
P11 (State of Charge Input)
SOC
(Throttle Wiper Input) P9
P4 (Ground Output)
(Ground Output) P4
Throttle Potentiometer
Main Solenoid Coil
P18 (Main Coil Output)
(+5v Output) P3
Reverse Buzzer
P10 (Rev Buzzer Output)
(Brake Wiper Input) P7
(Ground Output) P4
Brake Potentiometer
Resistor Control
P3 (+5v Output)
P21 (Resistor Ground Output)
B-
SOL
Resistor Coil
Back view of harness pins
1
8
16
23

RXV POWER-UP SEQUENCE

During the first second after turning the key to the "on" position, the vehicle undergoes a series of checks to ensure proper functionality:

- **Electric Brake Test**: The controller attempts to rotate the motor ¼ turn in both directions.
- **Park Brake Test**: The controller disengages and reengages the parking brake.
- **Reverse Alarm Test**: The controller activates the reverse alarm for 100 milliseconds.
- **Charger Inhibit Test**: The system verifies if the charge receptacle is connected to a charger.
- **Throttle Switch Test**: The throttle switch must remain open to pass this step.
- **Throttle Position Sensor (TPS) Test**: The controller confirms the TPS reads 0% throttle, with a voltage range of 0.38–0.56 volts.
- **Throttle Function Test**: The TPS is checked for correct open and closed voltage ranges, typically 0.5–4.8 volts.

If any issues are detected in these circuits, the vehicle will not operate.

Using the handheld diagnostic tool (Fig 1)

- **Turn the key switch off.**
- **Insert the diagnostic tool plug into the CAN port under the cup holder / console.**
- **Turn the key on.**
- **The diagnostic tool screen will illuminate.**
- **Scroll through menu selections for Diagnostics Report, Errors and Warnings.**

Fig. 1 Hand Held Diagnostic Unit

Danaher RXV Troubleshooting Sequence

FOR SAFETY, ALWAYS LIFT THE DRIVE WHEELS OFF THE GROUND WHEN TROUBLESHOOTING!

ALL TESTS ARE CONDUCTED WITH A GOOD BATTERY PACK VOLTAGE MEASUREMENT. ALSO, THE CONNECTOR MUST BE ATTACHED TO THE CONTROLLER WHEN MAKING THESE CHECKS. YOU WILL NEED TO 'BACK PROBE' THE PINS FROM THE WIRE SIDE OF THE CONNECTOR. USE A PAPERCLIP IF NECESSARY.

Attach voltmeter negative (-) lead to main battery – for the following tests

Use the following sequence when checking individual pins (don't skip steps). **If you find a fault, do not move on to the next step until the fault is corrected:**

☐ Measure the voltage at the main battery positive post (let's call it Pack Voltage)

☐ **Pin 17** ***With Charger NOT plugged in***, must be approximately 21-28 volts
- *If not* approximately *21-28 volts, charge receptacle and wiring for open/shorted condition*

☐ **Pin 1** ***With Key Switch set to FWD, N, or REV***, must be equal to Pack Voltage
- *If not Pack Voltage, check Key Switch and main Fuse for open/shorted condition*

☐ **Pin 13** ***With Tow Switch On***, must equal Pack Voltage
- *If not Pack Voltage, check wiring and Tow Switch for an open condition*

☐ **Pin 12** ***With F/R Switch in Reverse***, must equal 0 volts
- *If not 0 volts, check wiring and F/R Switch for a shorted condition*

☐ **Pin 12** ***With F/R Switch in Forward***, must equal Pack Voltage
- *If not Pack Voltage, check wiring and F/R Switch for an open condition*

☐ **Pin 20** ***With F/R Switch in Forward***, must equal 0 volts
- *If not 0 volts, check wiring and F/R Switch for a shorted condition*

☐ **Pin 20** ***With F/R Switch in Reverse*** must equal Pack Voltage
- *If not Pack Voltage, check wiring and F/R Switch for an open condition*

☐ **Pin 19** ***With Pedal Up***, must equal 0 volts
- *If not 0 volts, check wiring and Pedal Switch for a shorted condition*

☐ **Pin 19** ***With Pedal Down***, must equal Pack Voltage
- *If not Pack Voltage, check wiring and Pedal Switch for an open condition*

☐ **Pin 11** ***With Battery Fully Charged***, must be approximately 4.5 volts, 0.5 volts with batteries empty
- *If not showing correctly, check voltage input from keyswitch, and wiring for open/shorted condition, SOC meter may be defective*

☐ **Pin 18** ***With Key Switch set to FWD, N, or REV***, must be approximately 0 volts, and solenoid should engage
- *If not approximately 0 volts, check Solenoid Coil and wiring for an open/shorted condition. If this tests good, controller may be faulty*

☐ **Pin 2** ***With Key Switch set to FWD, N, or REV***, ***and the Brake Switch Engaged,*** must be approximately 0 volts, and Brake should engage
- *If not approximately 0 volts, check Brake Coil, Brake Switch, and wiring for an open/shorted condition. If this tests good, controller may be faulty*

☐ **Pin 10** ***With F/R Switch in Reverse***, must be approximately 0 volts
- *If not approximately 0 volts, check Reverse Buzzer for open/shorted condition. If this tests good, controller may be faulty*

☐ **Pin 3** Must be 5 volts

If not approximately 5 volts, check wiring for open/short condition If this tests good, controller may be faulty

Continued on next page …

☐ **Pin 21** Must equal approximately 0 volts
- *If not approximately 0 volts, check wiring and Resistor (Bleeder Module) for open/shorted condition*

☐ **Pin 4** Must equal approximately 0 volts
- *If not approximately volts, check wiring for an open condition. If this tests good, controller may be faulty*

☐ **Pin 9** ***With Throttle Pedal Up***, must equal approximately 0.4 volts
- *If not approximately 0.4 volts, check throttle assembly and wiring for open/shorted condition*

☐ **Pin 9** ***With Throttle Pedal Down***, must equal approximately 4.8 volts
- *If not approximately 4.8 volts, check throttle assembly and wiring for open/shorted condition*

☐ **Pin 7** ***With Brake Pedal Up,*** must equal approximately 0.36 volts
- *If not approximately 0.36 volts, check brake assembly and wiring for open/shorted condition*

☐ **Pin 7** ***With Brake Pedal Down,*** must equal approximately 4.7 volts
- *If not approximately 4.7 volts, check brake assembly and wiring for open/shorted condition*

☐ **Pin 5 & 6** ***Measuring Across the Two Pins, and Rotating the Drive Wheel,*** Must show 0-5v
- *If not approximately 0-5 volt sweep, check Encoder, Motor, and wiring for an open/shorted condition*

Helpful Hints

☐ **DO NOT UNDER ESTIMATE THE IMPORTANCE OF MOTOR RESISTANCE CHECKS AND MAIN SOLENOID CHECKS. MANY CART ISSUES ARE CAUSED BY MOTOR ISSUES THAT WILL BE FOUND AS PART OF THE SHORTED PHASE CHECKS. ALSO SHORTED PHASES WITHIN THE MOTOR <u>WILL</u> DAMAGE THIS CONTROLLER.**

Flight Systems Industrial Products also offers the following Technical Support options …

Troubleshooting Manuals / Codes
www.shop.fsip.biz/en/content/technical-documents

Live Tech Support Chat
www.fsip.biz

Technical Support Forum
fsip.websitetoolbox.com

Phone Support
1-800-333-1194 (Option 4)