Technical Support Package

Freestyle with Perfect Fit Seating

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Section 1

Quickie Freestyle Base

Service Manual
# Quickie Freestyle Troubleshooting Guide

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INTRODUCTION

Please read and follow instructions in this service manual before attempting to troubleshoot or repair this product for the first time. If there is anything in this Service Manual that is not clear, or if you require additional technical assistance, contact Sunrise Medical at: (800) 333-4000 option 2, then option 1.

Safely troubleshooting and/or repair of this product depends on your diligence in following the instructions within this manual. Sunrise Medical is not responsible for injuries or damage resulting from a person’s failure to exercise good judgement and/or common sense.

There are warning symbols used in this document to focus attention on any hazard that could effect the safety of the individual troubleshooting the chairs covered in this Service Manual.

This Service Manual is intended as a troubleshooting guide for the Quickie Freestyle. Photographs and content may differ from the actual products in some cases due to changes in specifications and other factors.

This Service Manual is intended for use by persons with a basic working knowledge and the skills required in servicing and maintaining Power Wheelchairs. Persons without a General Working knowledge and expertise in the servicing of this product should not carry out troubleshooting procedures. This can result in problems with future servicing, and/or damage to the unit.

Parts and configuration or specifications of Products included in this Service Manual are subject to change without prior notice.
Controller (VSI)

VSI Controller

VSI Through Drive Controller

VSI Controller Buttons

- **Battery Condition Meter**: A series of ten LED’s, which indicate charge level. (See Sect. 2.4)
- **Speed/Profile Indicator**: A series of five LED’s, which display speed and profile settings.
- **On/Off Key**: Press to power on or off the power chair or Controller.
- **Horn Key**: Activates a warning horn.
- **Speed/Profile Decrease**: Used to decrease the Speed/Profile setting.
- **Speed/Profile Increase**: Used to increase the Speed/Profile setting.
- **Actuator**: Used to activate the tilt or recline.
Plugs/Connectors (VSI)

1 = 0 Vdc
2 = Inhibit 3
3 = 24 Vdc

1 = 24 Vdc
2 = 0 Vdc
3 = Inhibit 1/Programmer

3-pin connect
Outside View

Charger port
Outside View

4-pin

3-pin

9-pin

Controller and Harness

+24 Vdc Solenoid Brake Input

0 Vdc
24 Vdc
LH Motor -
RH Motor -

0 Vdc
24 Vdc
LH Motor +
RH Motor +

9-pin Connect Harness Socket Face

Motor Plug

1 = Brake Solenoid
2 = Brake Solenoid
3 = Motor
4 = Motor

4-pin connect
Q-Tronix Remote Joystick Control System

Qtronix Remote Joystick

On/Off Toggle
Press to power on or off the power chair or Controller.

Speed/Profile
Increase/Decrease. Used to increase or decrease the Speed Profile setting.

Jacks

Qtronix Indicators

Horn Key - Activates a warning horn.

Battery Condition Meter - A series of ten LED's, which indicate charge level.

Mode Indicators - A series of 5 LED's, which correspond to the 5 programmable Modes.

Tilt Status Indicators - To indicate TIP/LIFT option is activated.
Basic Tool List

The following list of tools should enable any task to be dealt with. Some will only occasionally be needed, but it is advisable to own or have access to them.

1. Metric socket set
2. SAE socket set
3. Hexagon wrenches, (SAE & metric)
4. 3.5 - 8mm flat screwdriver
5. No. 0 cross-head screwdriver
6. No. 1 cross-head screwdriver
7. No. 2 cross-head screwdriver
8. Metric combination spanner set 5 - 25mm
9. SAE combination spanner set 1/8 - 1"
10. Mole grips
11. Long nose pliers
12. Adjustable Spanner
13. Combination pliers
14. Cir-clip pliers
15. Hammer, (small & large)

16. Soft hammer, (rubber, hide or nylon)
17. Feeler gauges, (metric & SAE)
18. Utility knife
19. Pin punches
20. Electric drill, ( mains/battery)
21. Drill bits, (metric & SAE)
22. Hacksaw, (standard & junior)
23. Torque wrench
24. Steel engineering rule
25. Tape measure
26. Tire pump
27. Tire pressure gauge
28. Personal safety gear
29. Wire strippers/cutters
30. Tag crimper
31. Multi-meter
32. Battery tester
33. Hand held electronic programmers
34. Parts manuals & workshop manuals
35. Tire levers

Wiring Diagram for VSI Controller Package

Wiring Diagram for Pilot Plus Controller
Wiring Diagrams for Freestyle Tilt Options

VS Controller - Graphic Power Module

TM-40

TM-40

ALM

STROKE POWER MODULE

STROKE POWER MODULE
Section 1

Troubleshooting: No Power

1.0 Circuit Breaker Reset

If On/Off button is pressed and no light or bar is shown, check for tripped circuit breaker (see figure A1.0.1) and make sure all connections are clean and tight (including the batteries). If the problem persists, then perform the following diagnostics.

1.1 Test Joystick

Check that the voltage is going to the controller, set the meter to 0 volts and take a voltage reading from pin 1 (using the red lead) and pin 2 (using the black lead) to the charger port of the VSI and Pilot controller (see figure A1.1.1). If the voltage meter reads approximately 24 volts, replace the controller, if the meter reads less than 12 volts, proceed to the next step.

Note: Make sure the polarity is correct. If the reading is intermittent, there is a connection or Controller problem. If polarity is reversed proceed to step 1.6

---

1.2 Check Joystick Connection (VSI/Pilot Plus)

Check the Pilot Plus cable by swapping original with a cable that is known to work. Do the same thing with the Joystick and Controller. If this process does not pinpoint the problem, then you should check the Adapter Ctronix Harness.
(Step 1.7)

---

**Warning** Do not use the OHMs meter to check the relay connectors when the system is connected.
1.3 Battery Test

Check that the batteries are fully charged and in good condition. Remove the seat, and the battery cover, with controller connected and turned on, use the meter to check the voltage across the battery terminals (see figure A1.2.1). If the voltage meter reads between 12 - 13.5 volts, then proceed to next step. If the voltage meter reads below 12 volts, charge the batteries.

Note: To find a bad battery, use a battery load tester.

1.4 Re-Charging the Batteries

If the total Battery voltage is less than 8 Volts, charge each Battery separately with a 12 Volt Trickle Charger for a few hours. This should bring the voltage back up to the level that the On-Board Charger will activate.

1.5 Not Charging

Check the charger indicator light in the front shroud. If it is not lighted, check the connection from the light to the charger. Check the Circuit Breaker Box and make sure it is not tripped. Make sure the 3 pin Charger plug is connected properly and is in good condition. Check all batteries and harness connections following steps 1.2 and 1.5 - 1.9. Check the connection from the A/C charging outlet to the charger. If none of these actions have corrected the problem, then replace the charger.

Note: On Board Charger Indicator Light shows Amber color when charging, and Green when fully charged.
1.5 Battery Connection Check

Check that the female Beau plug on the chair has voltage. Set the meter to DC volts and measure pins 5 (using the red lead of the meter) and 7 (using the black lead of the meter) as shown in (figure A1.5.1).

If the voltage meter reads full voltage, then measure pins 6 (using the red lead of the meter) and 8 (using the black lead of the meter) as shown in (figure A1.5.2). If both the measurements read full voltage, then replace the controller, or else proceed to the next step.

- If both of the measurements read full voltage, then replace the controller.

1.7 Check Adapter Qtronix Harness (Pilot Plus only)

Check the battery Connector on the Adapter Harness to make sure it has voltage. Set the meter to DC volts and measure the pins (using the red lead for the left side and the black lead for the right side) as shown in figure (1.7.1). If the voltage meter reads full voltage, this could indicate that the problem can be found in the controller module, Joystick, or cable. Potentially one or all three of these components would need to be replaced.
1.8 Battery Wire Harness

Check that the battery wire harness has the polarity correct. Set the motor to do volts and measure the connector with the red lead on the red wire contact (top of the connector) and the black lead on the black wire contact (bottom of the connector) as shown in figure A1.6.1. If both battery wire harnesses have full voltage and correct polarity, then proceed to step 1.8. If voltage is absent, proceed to step 1.7. If polarity is reversed correct battery wiring.

- If polarity is reversed correct battery wiring.

text continues...

1.9 Battery Fuse

Check that the battery fuse is in good condition. With the batteries disconnected, remove the fuse cap, inspect the fuse to see if the fuse is blown. To make sure the fuse is not blown, set the meter to ohms and measure the resistance across the fuse, see figure A1.7.1. If the meter reads more than one ohm, change the fuse, or else proceed to the next step.

- If the meter reads more than one ohm, change the Battery fuse.

text continues...

1.10 Circuit Breaker Test

To check the circuit breaker set the motor to ohms and measure the resistance across the circuit breaker as shown in figure A1.8.1. If the meter reads more than 1 ohm, then change the circuit breaker, otherwise proceed to next step.

- If the meter reads more than 1 ohm, then change the circuit breaker.

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1.11 Main Harness

If the above steps did not correct the problem, change the main harness.

- If the previous steps did not correct the problem, change the main harness.
Section 2

Understanding Controller Display (VSI/Pilot Plus)

2.1 The Maximum Speed Indicator Ripples (VSI)
Indicates that the wheelchair is locked. To unlock the wheelchair, deflect the joystick forwards until the control system chirps. Then deflect the joystick in reverse until the control system chirps. Release the joystick, there will be a long beep. The wheelchair is now unlocked. To lock the wheelchair, while the control system is switched on, depress and hold the on/off button. After 1 second, the control system will chirp. Now release the on/off button, deflect the joystick forwards until the control system chirps, and deflect the joystick in reverse until the control system chirps. Release the joystick, there will be a long beep. The wheelchair is now locked.

2.2 The Maximum Speed Indicator Flashes (VSI and Pilot Plus)
* VSI This indicates that the chair is charging via on-board charger. The chair will be ready to drive as soon as the charger is unplugged.

* Pilot Plus, This indicates that the chair is in a profile change mode. Moving the Joystick to the left will decrease the speed setting, moving it to the right will increase your speed setting. Moving the Joystick forward, or backward, will reset the chair to normal drive mode.

2.3 Battery Gauge is Steady (VSI and Pilot Plus)
This indicates that all is well.

2.4 Battery Gauge Flashes Slowly (VSI and Pilot Plus)
The control system is functioning correctly, but you should charge the battery as soon as possible. At 21.5 V, the red light starts to blink. Each bar represents a 5V value. The controller requires 16V to start and a minimum of 16V to work once started.

2.5 Battery Gauge Steps Up. (VSI only)
Indicates the wheelchair batteries are being charged with the onboard charger. You will not be able to drive the wheelchair until the charger is disconnected and you have reset the control system by switching off the power and then powering up again.

2.6 Battery Gauge Blinks Once Every 2.5 Seconds (VSI and Pilot Plus)
The control system has "gone to sleep" because the wheelchair has not been driven for a period of time. The time period depends on the programming of the system. To re-start, reset the system by switching off the power and then powering up again.

2.7 Battery Gauge Flashes Rapidly (VSI and Pilot Plus)
Make sure the Joystick is completely released. The control system safety circuits have been activated and the control system has been prevented from moving the wheelchair. This indicates a system trip, i.e. the VSI has detected a problem somewhere in the wheelchair's electrical system. Please refer to Section 3 (VSI Controller Diagnostics).
2.8 Actuator Indicator Illuminated (Pilot Plus only)

The section of the wheelchair symbol that is illuminated indicates the actuator that has been selected for adjustment. To change the (select actuator mode) back to (drive mode), simply move the Joystick left or right. To make actuator adjustments, move the joystick forwards or backwards.

2.8 Actuator Indicator Illuminated (VSI only)

The section of the wheelchair symbol that is illuminated indicates the actuator that has been selected for adjustment. To change the (select actuator mode) to off, simply push the button once again. To make actuator adjustments, move the joystick forwards or backwards.
Section 3

Understanding Controller Diagnostics Codes (VSI and Pilot Plus)

3.1 One Bar - Low Battery Voltage (VSI/Pilot Plus)

This code could indicate discharged batteries, failed batteries, or poor battery connections. Begin by recharging the batteries and then refer to Section 1 to check batteries and connections.

3.2 Two Bars - Left Motor Disconnected (VSI/Pilot Plus)

The left hand motor has a bad connection. Check all the connections to the left hand motor.

Test Left Motor Open

Check that the batteries are fully charged and in good condition, and check all cables and connections. Check the connections to the left motor, look for a loose or damaged connector. Remove the 9-pin Beau plug and check the resistance across pin 3 and pin 4 as shown in (figure A3.2.1). If the meter reads between 0 to 1.5 ohms, then replace the controller.

- If the meter reads between 0 to 1.5 ohms, then replace the controller. (VSI only)

For the Pilot Plus check the Harness Adapter Qtronix. Check the bottom two contacts of the left connector. If the meter reads 0 to 1.5 ohms then replace the controller. Otherwise, check the brushes on the left motor. Ensure that they are not excessively worn, (replace as required) as shown in (figure A3.2.2).

Use the meter to check the resistance across the two bottom contacts (thicker wires) on the 4-pin motor connector as shown in (figure A3.2.3). If the meter reads between 0 to 1.5 ohms, then replace the main harness. If none of the above corrects the problem, replace the left motor.

- If the meter reads between 0 to 1.5 ohms, then replace the main harness.

- If none of the above corrects the problem, replace the left motor.
3.3 Three Bars - Left Motor Wiring Trip (VSL and Pilot Plus)

The left hand motor has a short circuit to a battery connection.

Test Left Motor Short
Check that the batteries are fully charged and in good condition; and check all cables and connections. Check the connections to the left motor, look for a loose or damaged connector. Take a resistance reading from pin 3 to pin 9 and pin 3 to pin 7 or pin 8, see (figures A3.3.1) and (A3.3.2), if the all the circuits are open (resistance is greater than 10 K ohm), then replace the controller. If the reading is short (resistance is less than 10 K ohm), proceed to check the 4-pin motor connector.

- If the all the circuits are open (resistance is greater than 10 K ohm), then replace the controller.

Measure the resistance from the bottom contact of the red thick wire on the 4-pin left motor connector to each of the top contacts of the connector see (figure A3.3.3). Measure the resistance from the bottom contact of the black thick wire on the 4-pin left motor connector to each of the top contacts of the connector see (below right). If all of the readings are open, then replace the main harness. If any of the readings are short, then replace the left motor.

- If all of the readings are open, then replace the main harness.

- If any of the readings are short, then replace the left motor.
3.4 Four Bars- Right Motor Disconnected (VSI/Pilot Plus)

The right hand motor has a bad connection. Check the connections to the right hand module.

Test Right Motor Open
Check that the batteries are fully charged and in good condition, and check all cables and connections. Check the connections to the right motor; look for a loose or damaged connector. Remove the 9-pin Beau plug and check the resistance across pin 1 and pin 2 as shown on (figure A3.4.1). If the meter reads between 0 to 1.5 ohms, then replace the controller.

- If the meter reads between 0 and 1.5 ohms, then replace the controller.

Otherwise, check the brushes on the right motor. Ensure that they are not excessively worn, (replace as required) as shown in (Figure A3.4.2).

Use the meter to check the resistance across the two bottom contacts of the thicker wires on the 4-pin motor connector as shown in (figure A3.4.3). If the meter reads between 0 to 1.5 ohms, then replace the main harness. If none of the above corrects the problem, replace the right motor.

- If the meter reads between 0 and 1.5 ohms, then replace the main harness. If this does not correct the problem, then replace the right motor.
3.5 Five Bars - Right Motor Wiring Trip (VSI/Pilot Plus)

The right hand motor has a short circuit to a battery connection.

Test Right Motor Short

Check that the batteries are fully charged and in good condition, and check all cables and connections. Check the connections to the right motor, look for a loose or damaged connector. Take a resistance reading from pin 2 to pin 9 see (figure A3.5.1). Take a resistance reading from pin 2 to pin 7 or pin 8 see (figure A3.5.2), if the all the circuits are open (resistance is greater than 10K ohms), then replace the controller.

- If the all the circuits are open (resistance is greater than 10K ohms), then replace the controller.

If the reading is short (resistance is less than 10 K ohms) on any of the readings, proceed to check the 4-pin motor connector. Measure the resistance from the bottom contact of the red thick wire on the 4-pin right motor connector to each of the top contacts of the connectors see (figure A3.5.3). Measure the resistance from the bottom contact of the black thick wire on the 4-pin right motor connector to each the top contacts of the connector (below right). If all of the readings are open, then replace the main harness. If any of the readings are short, then replace the right motor.

- If all of the readings are open, then replace the main harness.
- If any of the readings are short, then replace the right motor.
3.6 Six Bars - Possible Joystick Trip (Pilot Plus only)

The Onboard Batteries are being charged with the off-board charger. You will not be able to drive the wheelchair until the charger is disconnected. You will have to reset the control system by switching off the power and the Powering up again. The On-Board charger has no indication that the chair is charging, and the chair will not move until complete.

- If the joystick fails to center because it is bent or broken, replace the controller.

3.6 Seven Bars - Possible Joystick Trip (VSI only)

A joystick trip is indicated. Make sure that the joystick is in the center position before switching on the control system. Check that the batteries are fully charged and in good condition, examine the joystick for damage. This fault can be caused by a joystick that fails to center itself due to being dirty, bent or broken. If this is the case, replace the controller.

3.7 Eight Bars - Possible Control System Trip (VSI only)

Controller Fault - A control system trip is indicated. Make sure that all connections are secure. Check that the batteries are fully charged and in good condition, and check all joystick connections and cables. If this does not correct the problem, then replace the controller.

3.7 Eight Bars - Possible Joystick Trip (Pilot Plus only)

Controller Fault - A control system trip is indicated. Make sure that all connections are secure, especially the connection to the Power Module including cable and the ground wire that is connected to the motor plate and controller. Check that the batteries are fully charged and in good condition, and check all joystick connections and cables. If this does not correct the problem, then replace the controller.

3.8 Nine Bars - Solenoid Brake Trip (VSI and PP)

Brake Fault (VSI)
The parking brakes have a bad connection. Check the parking brake and motor connections. Make sure the control system connections are secure.

Brake Fault (VSI)
Check battery connections and cables. Set the meter to ohms and measure the resistances from pin 9 to pin 7 of the 9-pin bumper plug see (figure A3.8.1). Measure the resistance from pin 9 to pin 8 of the 9 pin bumper connector see (figure A3.8.2). If both readings are approximately 30 ohms, replace the controller.

- If both readings are approximately 30 ohms then replace the controller.
3.8 Nine Bars - Solenoid Brake Trip (cont.)

Test Motor Connections (VSI only)

If either or both readings are incorrect, then measure the resistance on the two small contacts on the 4-pin motor connector see (figure A3.8.3). If both motor connectors read approximately 60 ohms, then replace the main harness. Otherwise, replace the motor that does not read approximately 60 ohms.

- If both motor connectors read approximately 60 ohms, then replace the main harness. Otherwise, replace the motor that does not read approximately 60 ohms.

Brake Fault (Pilot Plus only)

Check battery connections and cables. Set the meter to ohms and measure the resistances from top two pins of the InTech connectors. If the readings are approximately 30 Ohms, then replace the controller. If either or both readings are incorrect, then measure the resistance of the two small connectors located on the motor. If both motor connectors read approximately 60 ohms, then replace the Pilot Plus Adapter Harness. Otherwise replace the motor that does not read approximately 60 Ohms.

3.10 Ten Bars - High Battery Voltage

An excessive voltage has been applied to the control system. This is usually caused by a poor battery connection. Check the battery connections.

Battery Fault

Check that the batteries are fully charged, the correct voltage and in good condition. Take a voltage reading from pin 1 and pin 2 of the charger port of the VSI controller, see (figure A3.9.1). If the meter reads more than 30 volts, then check the charger. Otherwise, replace your controller.

- If the meter reads more than 30 volts replace the charger.
- If the Batteries, connections, and voltage level are correct replace the controller.
Section 4

Tilt System Diagnostics

4.1 Tilt - VSI Drive-Thru System

Tilt Fault
Tilt Failure can be caused by the malfunction of either the Controller or the Actuation system.
Best way to determine Controller fault is to switch out the Joystick with one that is in good working order.
If the controller is not the problem, then check the Actuators by measuring the resistances across the 2-pin connector.
If the resistances read more than 10K Ohms, then change the actuator or the Tilt Wire Harness

4.2 Tilt - Pilot Plus with ALM

Tilt Fault
If the Tilt symbol is not illuminated, there is a communication problem between the Joystick and the Actuator.
Check the connections between the Joystick and controller Module, paying special attention to the cable connection.
Check the onboard charger plug adapter by measuring the voltage across Pin 1 and Pin 3 of the charger plug.
If the voltage reads approximately 24 volts proceed to the next step.

Actuator Fault
Check the Actuator by measuring the Resistance across the 2 pin connector. If the Resistance reads more than 10K Ohms, change out the Actuator.
Also, measure the Resistance across the four pin Harness connector. If the Resistance here reads less than 10K Ohms, the problem most likely resides with the ALM.
Before changing out the ALM check the wire connections to make sure there is no damage to the micro switches. The Red wire of the wire harness must connect to pin 5 of PL1, the Black wire must connect to pin 6 of PL1, and the two white wires must connect to pin 11 and pin 12 of PL2.
If all of the wiring and connections are correct, and the tilt problem persists, connect an ALM that is known to be working, if this doesn’t take care of the problem, the wiring Harness will need to be replaced.
### PL1

- **Pin 1**: Actuator Channel 1 +
- **Pin 2**: Actuator Channel 1 -
- **Pin 3**: Actuator Channel 2 +
- **Pin 4**: Actuator Channel 2 -
- **Pin 5**: Actuator Channel 3 + Seat Tilt
- **Pin 6**: Actuator Channel 3 - Seat Tilt
- **Pin 7**: Actuator Channel 4 +
- **Pin 8**: Actuator Channel 4 -
- **Pin 9**: Actuator Channel 5 +
- **Pin 10**: Actuator Channel 5 -
- **Pin 11**: Actuator Channel 6 +
- **Pin 12**: Actuator Channel 6 -

### PL2

- **Pin 12**: Speed Limit Output
- **Pin 11**: Speed Limit Output
- **Pin 10**: Lights -
- **Pin 9**: Lights +
- **Pin 8**: Left rear indicator -
- **Pin 7**: Left rear indicator +
- **Pin 6**: Left front indicator -
- **Pin 5**: Left front indicator +
- **Pin 4**: Right rear indicator -
- **Pin 3**: Right rear indicator +

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**4.3 VSI or Pilot Plus with TM-40**

Tilt Fault

Check all of the wire connections and swap out known working Pilot plus cable, joystick, and controller module or VSI controller. Check the battery adapter harness by measuring the voltage across pin 1 and pin 3 of the charger plug. (see Figxx) If the voltage reads approximately 24 volts, proceed to the next step, or else check the fuse on the battery adapter harness. If the fuse is good, change the battery adapter harness. Check the dual switch or single switch by measuring the resistance across the pin. (see Figxx) If the resistances are more than 10K, replace the switch, or else proceed to the next step. Check the actuator by checking the resistances across the pins. If the resistance reads more than 10K then replace the actuator or else proceed to the next step. Check the wire harness by measuring the resistances across each of the connectors (see Figxx). If the resistances read less than 10K, then most of the time there is a problem with the TM-40. Swap a known working TM-40. If the chair still doesn't tilt, replace the wire harness.
Section 5

Disassembly/Reassembly, and Adjustment

Step 1 - Controller and Seat

Note: When using the terms "Right Hand, Left Hand" this is referenced as if seated in the chair.

Disassembly
a. Squeeze down the locking legs of the 3 pin charger plug and unplug it from the rear of the chair (figure s1.1).
b. Rock the controller plug back and forth until it is loose and then unplug it (figure s1.1).

Note: Remember to lay cables on the seat otherwise they may become tangled when taking off the seat.

c. Pull out the safety pin from the left front seat post (figure s1.2).
d. Tilt the seat back, slide it forward, and lift it off of the base (figure s1.2).

Reassembly
a. Line up the rear seat frame with the rear seat posts, slide the seat back to the stops and let the seat frame rotate down into the front seat post latching brackets.
b. Make sure the latching levers are locked flat against the seat post brackets, and insert the locking pin.
c. Plug the controller plugs into the plug receptacles at the rear of the chair.

Adjustment

Note: There is a setscrew in each "saddle" of the front seat post brackets that can adjust the free play of the seat frame in the bracket. Adjustment of this part is accomplished by using a 3 mm Hex wrench. After adjustment, ensure that the latching levers are fully seated and the locking pin can be installed see (figure s1.3).
Step 2 - Cog Release

Disassembly
a. Turn each of the two cog release handles counter-clockwise to unscrew them.

Note: For better access, pull the cog release handle to the free-wheel position (figure s2.1).

Reassembly
a. Hold the cog release pivot joint, and thread the cog release handle back to the pivot joint.

Adjustment
Tighten the Jam nut to set the cog release handle to the correct orientation.
Note: It is recommended that the handles end up facing outward.

Step 3 - Seat Posts

Disassembly
a. Remove the cap from the left side of the front shroud (Figure s3.1)
b. Pull the spring loaded release pin to disengage the seat post. While holding the Spring Loaded Release Pin, slide the seat post to it’s maximum height position to expose the small quick release pin at bottom of shaft (Figure s3.2)
c. Remove the small quick release pin, pull the Spring Loaded Release Pin and remove the seat post.
d. Pull out the three remaining quick release pins, and remove all other seat posts.

Reassembly
a. Perform the reverse of instructions above.
Step 4 - Shroud

Disassembly

Note: Make sure the cog release pivot joints are in a position that matches the shroud cutout.

a. Use a #2 Phillips screw driver to remove the four mounting screws and slide out while lifting off the top shroud from the back of the chair. (figure s4.1)

b. Use a #2 phillips screw driver to remove the six mounting screws on the inside of the shroud to remove the side shroud fairing (figure s4.2)

c. Lift the color side shrouds from the side shroud fairing.

Note: Color side shrouds are attached using a hook and loop fastener system.

Reassembly

a. Perform the reverse of instructions above.

Note: Remember short screws to rear and middle holes and long screws to front.
Step 5 - Front Caster Cover

Disassembly
a. Use a #2 Phillips screw driver to remove the two mounting screws on the side of the front caster cover. (figure s5.1).
b. Use a #2 phillips screw driver to remove the two mounting screws and the caster cover mounting bracket (figure s5.2).
c. Repeat steps a and b on the other side.

Reassembly
a. Perform the reverse of instructions above.
Disassembly/Reassembly, and Adjustment (cont)

Step 6 - Charger

Disassembly
a. Peel the velcro strip apart, and remove the on-board charger (figure 6.1).
b. Slide the female charger plug out of the beam plug bracket (figure 6.2).
c. Depress the locking tabs and unplug the A/C plug and charger light indicator plug.
   (figure 6.1)

Reassembly
a. First insert the velcro strip through the support ring before starting reassembly.
b. Perform the reverse of instructions above.
Note: The charger bar code sticker side must face outward.

Step 7 - Battery

Disassembly
a. Depress the locking tabs and unplug the battery connectors.
b. Grip the battery handle and pull the battery out of the base.
Note - Pull out the front battery first, slide the second battery out of the base (figure 7.1)

Reassembly
a. Perform the reverse of instructions above.
**Disassembly/Reassembly, and Adjustment (cont)**

**Step 8 - Motor/Wheel**

**Disassembly**

Note: For ease of disassembly, set the base frame on a block where all six wheels are at least 1 inch above the ground.

a. Unwrap the wire looms from the motor and pull the motor connector out (figure s8.1).
b. Depress the motor connector locking tab and unplug it (figure s8.1).
c. Use a 5mm hex key to remove the six mounting screws (figure s8.2).
d. Hold the motor-wheel assembly and tilt the cog release rod toward the center of the base to get around the motor mount, then pull the motor-wheel assembly out through the bottom of the frame.
e. Straighten the lock washer tab of the drive wheel.
f. Use a 17mm deep socket wrench to remove the drive wheel retention nut, then pull the drive wheel out from the motor shaft.

Note: If the drive wheel is difficult to remove, then remove the wheel plate screws (Phillips Head)

**Reassembly**

a. Perform the reverse of instructions above.

Note: Torque specifications

* Motor mounting screws: 15-20 ft-lbs
* Wheel retention nut: 33-40 ft-lbs
* Wheel plate screw: 15-20 ft-lbs

**Adjustment**

Note: There is a suspension bumper on the frame to limit the motor's movement (figure 8.3). It also changes the preload on the front caster.

a. Use a 13mm open wrench to loosen or tighten the jam nut and make the proper adjustment (operator preference).
b. Install wire tie on back inside corner of gear box.
Disassembly/Reassembly, and Adjustment (cont)

Step 9 - Motor Mounts

Disassembly
a. Use a 5mm allen wrench and 13mm wrench to remove the mounting bolt connecting the linkage to the caster arm (figure s9.1).
b. Use a 16mm wrench and 19mm wrench to remove the motor mount pivot bolt (figure s9.2).
c. Slide the motor mount out from the base frame pivot bracket.

Reassembly
a. Reverse above instructions.
   Hint: If the mounting bolt is difficult to remove or install, then grasp the front trailing arm and the swing arm with one hand and squeeze together or remove the center bolt and the stopper tube.
   Note: Torque specifications on the pivot bolt and the mounting bolt are 40 in-lbs.
Disassembly/Reassembly, and Adjustment (cont)

Step 10 - Front and Rear Caster Assembly

Disassembly
a. Straighten the locking washer tabs on the front (figure s10.1) and/or rear (figure s10.2) caster assemblies.
b. Use the 13mm wrench and 13mm socket wrench to remove the mounting bolts.
c. Slide the caster assemblies out from the base frame tubes.

Reassembly
a. Reverse above instructions.
Note: Torque specification on the mounting bolts is 13 ft-lbs.
Note: Bend locking tabs against bolt head flats.

Adjustment
Note: There is a suspension bumper on the rear caster assembly to limit rocking motion (figure s10.3).
a. Use a 13mm open wrench to loosen or tighten the jam nut to make the proper adjustment (operator preference).
Disassembly/Reassembly, and Adjustment (cont)

**Step 11 - Wire Harnesses**

**Disassembly**
- a. Remove all the zip ties on the base frame.
- b. Unwrap all the wire loom ties securing the harness to the frame.
- c. For the main harness, remove the two screws that holding the female beau plug (figure s11.1).
- d. Remove the circuit breaker locking nut and push it through the bracket (figure s11.2), then remove the main wire harness.
- e. For the light and A/C harness, remove the front shroud and then remove the mounting screws on the A/C plug bracket (figure s11.3).
- f. Push the light harness through the bracket.
- g. Pull the A/C harness through the bracket.

**Reassembly**
- a. Reverse above instructions.

**Adjustment**

Note: The circuit breaker can be removed without removing the main harness.
- a. Pull the quick disconnect terminal out from the bottom of the circuit breaker, then remove the circuit breaker locking nut.
Section 2

Perfect Fit Seat

Service Manual
The Deep Contour Positioning Lateral Back contains:
- Deeply curved lateral wings to provide a lateral hug
- Headrest adjustment points
- 7” width adjustment
- 3” height adjustment
- Posterior lateral support (75 mm)

The Curved General Purpose Back contains:
- Slight curvature
- Multiple T-nut mounting positions
- Multiple hardware mounting positions in the back
- No size adjustment

Recline Options
Recline options include Manual Recline and Power Recline with Shear Reduction using dual actuators and keepers.

The Manual Recline Back Rest provides:
- Maximum posterior back angle 40° from vertical, limited by Gear Reduction Mechanism (GRS).
- Minimum anterior back angle 10 degrees.
- The backrest can be folded all the way down if the armrests are up and the back plates are an inch off the seat.
The Power Recline with Shear Reduction provides:
- Shear induced during full angle range: 2° to 2.5°
- Back reclines 82° from vertical (90° - 172°)

**Changing the Seating Size**
Changing the seating size of the Perfect Fit Seating System is accomplished by either adjusting the width, depth, and/or the seat height by relocating the growth pans; or by replacing the growth pans with growth pans of different sizes.
# Adjustments

Refer to the following tables for the range of adjustments for the Perfect Fit Seating System.

## Seat Pan Width Table

<table>
<thead>
<tr>
<th>Narrow Center Pan</th>
<th>Medium Center Pan</th>
<th>Wide Center Pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; - 17&quot;</td>
<td>15&quot; - 20&quot;</td>
<td>19&quot; - 24&quot;</td>
</tr>
</tbody>
</table>

![Seat Pan Width](image)

## Seat Frame Depth Table

<table>
<thead>
<tr>
<th>Pan</th>
<th>Wing</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>12&quot;</td>
<td>12&quot; - 16&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>15&quot;</td>
<td>15&quot; - 19&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>18&quot;</td>
<td>18&quot; - 22&quot;</td>
</tr>
<tr>
<td>13&quot;</td>
<td>13&quot;</td>
<td>13&quot; - 16&quot;</td>
</tr>
<tr>
<td>13&quot;</td>
<td>16&quot;</td>
<td>16&quot; - 19&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>14&quot;</td>
<td>14&quot; - 17&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>17&quot;</td>
<td>17&quot; - 20&quot;</td>
</tr>
</tbody>
</table>

![Seat Frame Depth](image)

## Seat Back Width Table

<table>
<thead>
<tr>
<th>Narrow Center Pan</th>
<th>Narrow Wing</th>
<th>Wide Wing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12&quot; - 13&quot;</td>
<td>14&quot; - 19&quot;</td>
</tr>
<tr>
<td>Wide Center Pan</td>
<td>N/A</td>
<td>17&quot; - 24&quot;</td>
</tr>
</tbody>
</table>

![Seat Back Width](image)
### Manual Recline Back Height Table

<table>
<thead>
<tr>
<th>Wing</th>
<th>Back Height</th>
<th>Bottom of Back from Seat Pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot;</td>
<td>15.5&quot; - 18.5&quot;</td>
<td>.8&quot; - 3.6&quot;</td>
</tr>
<tr>
<td>17&quot;</td>
<td>17&quot; - 20&quot;</td>
<td>.5&quot; - 3.5&quot;</td>
</tr>
<tr>
<td>19&quot;</td>
<td>19&quot; - 22&quot;</td>
<td>.5&quot; - 3.5&quot;</td>
</tr>
<tr>
<td>21&quot;</td>
<td>21&quot; - 24&quot;</td>
<td>.5&quot; - 3.5&quot;</td>
</tr>
<tr>
<td>23&quot;</td>
<td>23&quot; - 26&quot;</td>
<td>.5&quot; - 3.5&quot;</td>
</tr>
</tbody>
</table>

### Power Recline Back Height Table

<table>
<thead>
<tr>
<th>Wing</th>
<th>Back Height</th>
<th>Bottom of Back from Seat Pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot;</td>
<td>17.5&quot; - 20.5&quot;</td>
<td>3.0&quot; - 6.0&quot;</td>
</tr>
<tr>
<td>17&quot;</td>
<td>19&quot; - 22&quot;</td>
<td>2.6&quot; - 5.6&quot;</td>
</tr>
<tr>
<td>19&quot;</td>
<td>21&quot; - 24&quot;</td>
<td>2.6&quot; - 5.6&quot;</td>
</tr>
<tr>
<td>21&quot;</td>
<td>23&quot; - 26&quot;</td>
<td>2.6&quot; - 5.6&quot;</td>
</tr>
<tr>
<td>23&quot;</td>
<td>25&quot; - 28&quot;</td>
<td>2.6&quot; - 5.6&quot;</td>
</tr>
</tbody>
</table>

### Seat Back and Seat Pan Width Adjustments

Both the seat back and the seat pad width adjust independently. To adjust either the seat back or seat pad:

- Locate the hardware securing the wings to the main frame of the Perfect Fit Seating System. Note: Each hole on the back or seat pad allow 1/8 inch increments.
- Determine the correct adjustment needed. Example, if the seat back is 18" wide and the desired width is 17", then each wing should be moved 1/2" (one hole) outward.
- Remove the hardware using the correct size Allen wrench.
- Restoposition the wing and reinstall the mounting hardware.
Seat Back Height Adjustments

Note: Each starting back height adjusts upward 3". The adjustment is based on a slot & block alignment. Refer to the following illustrations for adjustment procedures and ranges.

- Locate the mounting hardware securing the back frame to the Perfect Fit Seating System.
- Remove the wing assemblies from the back.
- Locate the base block assembly. Refer to the following diagrams.
- Reposition the back by moving the hardware on the block assembly.
- Install the back frame followed by the wings.

Note: Many third-party backs will mount to the Perfect Fit Seating System. Refer to their installation instructions before mounting their equipment to the Perfect Fit Seating System.
**Seat Depth Adjustments**

The seat has 3" to 4" of built-in depth adjustment depending on the starting depth.

*Note: Seat Depth Adjustment is only used as a means of accommodating an offset backrest.*

To adjust the seat depth, follow these adjustments:

- The Seat Depth is adjusted by first moving the front seat-weldment forward. Do this by loosening the mounting hardware and sliding the seat pan.
- Tighten the mounting hardware after the correct adjustment is reached.
- Remove the mounting hardware that secures the seat wings.
- Slide the wings to the correct position and reinstall the mounting hardware.

**Notes:**

1. The seat-depth growth in this manner may be used to accommodate offset backrest mounting hardware. Refer to the following illustration.
2. If adjusting for user growth, make sure and use a solid seat insert or metal pan under the cushion.
SEATING SECTION

Manual Back Rest Adjustment

Two versions of the manual back adjustment are available, the Adjustable Integrated Back and the Manual Recline to 40 Degree Back.

To adjust the Adjustable Integrated Back, complete the following procedures:
• Locate the 6 mm adjusting nut on the rear bottom of the back.
• Using a 6 mm wrench, adjust the back to the desired angle.

Manual Recline to 40 Degree Back

To adjust the Manual Recline Back, complete the following procedures:
• Locate the adjustment knob on the rear bottom of the back.
• Rotate the knob to achieve the desired back angle.
Arm Rest Adjustments

1. The Perfect Fit Flip Back Height Adjustable Armrest is only available with the manually reclining backrest.
2. Armrest height ranges from 7”–14”. Up to 1.5” of width adjustment is available.
   - Complete the following procedures to adjust the armrest height:
   - To adjust the armrest height, loosen the two mounting-clamp bolts, slide the armrest up or down.
   - To increase the slots adjustment range, remove the armrest, flip the mounting bracket, and reinsert the armrest. This adds an additional 1.5” of vertical adjustment to the existing 1.5”, providing a total 3” of vertical adjustment.
   - If still more upward or lower adjustment is necessary, remove the armrest from the mounting bracket and reinsert at an upward 45° angle.
   - Retighten the mounting bracket.
**SEATING SECTION**

*Level the Arm Pad*
Complete the following steps to level the arm pad:
- Loosen the upper clamps.
- Pull the armrest out.
- Reinsert the armrest so the arm pad is parallel to the ground and tighten the upper clamps.

**Notes:**
1. This method of adjusting the armrest height adds an additional 2" to each of the upper and lower adjustment range.
2. The total available adjustment range from the seat to the top of the arm pad is 7" (7"-14" total range).

---

**Armrest Angle Adjustment**
Complete the following procedures to adjust the angle of the armrest:
- Turn the rear fine-tune adjustment screw in the upper armrest adjustment clamp clockwise or counter clockwise, depending on the change needed.
- If this does not provide enough angle adjustment, it may be necessary to remove the armrest and reinsert it closer to the desired angle, and then make any fine-tune adjustments.
Arm Pad-Position Adjustment

The arm pad features 2” of horizontal arm pad adjustment.

Complete the following procedures to adjust the length of the arm pad:

- Loosen the two slot screws on the underside of the arm pad.
- Slide the arm pad to the desired position.
Installation - Adjustment of Lateral Knee Supports

- Mount and Adjust Lateral Knee Supports using the two illustrated screws.
- To open Lateral Knee Supports, push release lever and rotate out.
- To close Lateral Knee Supports, rotate to the front.
- To adjust Lateral Knee Supports, loosen and rotate pad. Note: Arms come in either 2” or 4” offset.
**Leg Rest Hangers**

New leg rest hangers are used on the Precise Fit Seating System. These hangers provide more positive lock and increased adjustment. The following drawing illustrates the repair/adjustment procedures:

- Locate the adjustment bolt covered with a rubber bumper.
- To replace the rubber bumper, twist and pull off the rubber cap.
- To adjust the leg rest angle, loosen the lock nut and rotate the stop bolt in or out until the desired angle is reached.
- To replace the mounting pins, remove the pin by loosening the bolt head of the pin. Replace with a new mounting pin.
- To replace the latch spring, remove the screw securing the latch and remove the latch. Replace the spring and reinsert the bolt.

---

**Leg Rest**

Refer to the following drawing.

The leg rest length may be adjusted as follows:

- Locate the mounting bolts. Remove the bolts.
- Move the leg rest up or down in the hanger until the desired length is reached.
SEATING SECTION

Installing and Adjusting Side Guards

- Mount the side guard on the seat pan rail as illustrated.
- Slide the side guard forward or rearward as required.
- Adjust the height of the guard by moving up or down.

Positioning Belts

Mount to dovetail channel on seat wings.

Mounting and Adjusting Lateral Supports

- Lateral supports come in several different styles, mounts and offsets. Mount them on the seat back wings as shown.
- Position them by moving them up and down in the slot on the back wing.
Mounting and Adjust Head Rests

- Head rest come in different styles. Several third party head rest such as Whitmyer, Otto Bock and Jay may be used.
- Mount them to the seat back mount as illustrated.
- Adjust the head rest by sliding it up and down, as well as rotating it in its mount.

Center Mount Foot Rest

There are several leg and foot rests available. Most are mounted in the normal manner. Refer to the following illustrations for adjusting the Center Mount Foot Rest.

- Loosen the top bolt to raise or lower the calf pad and to adjust the angle.
- Loosen the bottom bolt to raise or lower the foot plate.
The Recline System

Theory of Operation
The Recline Portion of the Perfect Fit Seating System uses dual kiepers to operate the back. Each kieper is powered by independent 24 VDC motors. A cogged belt connects the motors to the kiepers.

The kiepers are similar to those used in the automobile industry to recline seat backs. A hinged rod connects the left kieper to the right kieper to ensure synchronization.

An optical encoder is mounted on the left kieper assembly to record the rotation of the kiepers. The control module decodes this signal and calculates the back angle.

A conventional joystick, or other input device, sends actuator commands over the CANBUS line to the control module. The control module sends commands and operating voltage to a PC board mounted on the seat back.
The PC board has several functions, including routing the voltage from the controller module to the recline actuators. The optical encoder sends its signal to the PC board. The PC board routes this signal to the control module where it is analyzed for correct operation and position.

The PC board receives a signal from a rocker switch that is mounted in the center of the back. This switch (the Encoder Reset Switch) is operated by a sliding link connected to a strut. It has two purposes: (1) to synchronize the optical encoders with the back angle, and (2) to provide a "creep" mode to limit the speed of the wheelchair if the back is reclined more than 17 degrees. This signal is sent to the control module.

Two reed switches are mounted on the same bracket that houses the Encoder Reset Switch. One reed switch is the End of Travel (EOT) "Home" for the up direction of the actuator, and the other reed switch is the EOT for the "Back", or down direction, of the actuator. These signals are sent to the PC board and routed to the control module, where they are monitored.

The actuators are connected to the PC board. The actuator drive voltage is provided by the control module and routed through the PC board to the actuators.

The PC board contains three LEDs to assist the technician in troubleshooting the Perfect Fit Seating System. Refer to the following table for the fault codes.

<table>
<thead>
<tr>
<th>LED Operation</th>
<th>Green LED</th>
<th>Yellow LED</th>
<th>Red LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Operation</td>
<td>Heartbeat (Flashing)</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Home Switch Active</td>
<td>Heartbeat (Flashing)</td>
<td>Off</td>
<td>Solid On</td>
</tr>
<tr>
<td>Back Switch Active</td>
<td>Heartbeat (Flashing)</td>
<td>Flashing (1/4 duty cycle)</td>
<td>Solid On</td>
</tr>
<tr>
<td>Backrest Angle Limit Switch Active</td>
<td>Heartbeat (Flashing)</td>
<td>Solid On</td>
<td>Off</td>
</tr>
<tr>
<td>Over Current Fault Detected</td>
<td>Solid On</td>
<td>Flashing (1/2 duty cycle)</td>
<td>Flashing (1/2 duty cycle)</td>
</tr>
<tr>
<td>Differential Current Fault Detected</td>
<td>Solid On</td>
<td>Flashing (1/2 duty cycle)</td>
<td>Off</td>
</tr>
</tbody>
</table>
Troubleshooting the Recline Seating System

See below to troubleshoot each indicated fault.

The Recline Actuator will not function or will not correctly function.
Verify that the Recline fault LED is illuminated on the input device (joystick or Enhanced Display). If not, refer to the Delphi troubleshooting section of the service manual.

- Remove the cover on the back of the wheelchair.
- Verify that the Fault Code LEDs are indicating correct operation. Refer to the LED Fault Code Table. If a fault is observed, continue testing.
- If an over-current indication is noted, note if there is binding or sticking. Repair as required and retest.
- If a PCB Microprocessor or Power Failure is noted, locate the Actuator Cable running from the control module to the PC board. Refer to the Perfect Fit Wiring Diagram for the cable location.
- Disconnect the cable and measure the battery voltage between pins 3 (ground) and 6 (+ 24 VDC). Full battery voltage should be observed.
- If full battery voltage is not observed, ensure that the Actuator Cable is connected to the control module. If not, reconnect and retest.
- If voltage is still not present at the Actuator Cable, replace the Actuator Cable and retest.
- If voltage is not present after replacing the Actuator Cable, replace the control module and retest.
- Disconnect the 4-pin "Redline" cable leading from the actuators to the Printed Circuit Board.
- Using this connector, check the resistance of the actuators by measuring across the two left pins on the connector (black and blue wires), followed by the two right pins on the connector (black and blue wires). Correct resistance is between 3 and 9 ohms.
- If one or both motors indicate an open, verify that the 2-pin connector at each motor is connected. Reconnect and retest.
• If the motors indicate a value outside of normal range, disconnect each motor at the 2-pin connector located near the motor and read the resistance through the motor.
• If the readings are not in the acceptable range (3 to 9 ohms), replace the kiever assembly and retest.
• If the readings are acceptable, replace the cable assembly leading from the PC Board to the actuators and retest.
• Locate the Encoder Reset and Back EOT and Home EOT switch assembly on the back of the chair.
• Locate the two EOT switches at the bottom of the mounting plate.
• Refer to the LED Fault Code Table. Observe the LEDs while moving the seat back through its entire range of motion. If the LEDs do not illuminate correctly, disconnect the 6-pin connector leading from the Encoder Reset and Back EOT and Home EOT switch assembly.
• Connect a multimeter across the two black wires on the 6-pin connector. Check for continuity with the “Home” switch open and closed by moving a magnet close to the switch and then removing it. If the switch does not open and close, replace the Encoder Reset and EOT switch assembly and retest.
• If the multimeter indicates correct switch operation, readjust the Home switch by following the reed switch adjustment procedures outlined in this manual.
• Connect a multimeter across the two green wires on the 6-pin connector and check for continuity with the “Back” switch open and closed by moving a magnet close to the switch and then removing it. If the switch does not open and close, replace the Encoder Reset and EOT switch assembly and retest.
• If the multimeter indicates open and close, readjust the Back switch by following the reed switch adjustment procedures outlined in this manual.
• If all of the above tests are correct, replace the PC Board assembly and retest.
• If replacing the PC Board does not fix the problem, replace the control module and retest.
The chair will not drive or will only drive in creep mode:

- Verify that the battery charger is not plugged into the chair.
- Verify that there are no faults displayed on the joystick or Enhanced Display. If faults are displayed, refer to the Delphi troubleshooting section of the service manual.
- Verify that the seat is not reclined, tilted or elevated if equipped with a power seat and/or tilt. If tilted, reclined, or elevated, return to neutral position and retest.
- Verify that the Fault Code LEDs are indicating correct operation. Refer to the LED Fault Code Table. If a fault is observed, continue testing.
- Locate the Encoder Reset and EOT switch assembly on the back of the chair. Follow the cable to the 6 pin connector on the PC board.
- Disconnect the 6-pin connector leading from the Encoder Reset and EOT switch assembly.
- Connect a multimeter across the two white wires of the 6-pin connector. Check for continuity when the Encoder Reset switch is open and closed by manually operating the rocker switch.
- Replace the Encoder Reset and EOT switch assembly if the continuity tests fail. Retest the chair.
- Replace the PC Board if no problems are observed. Retest the chair.
- Replace the control module if replacing the PC Board does not solve the problem. Retest the chair.
Repair and Adjustment Procedures

Remove and replace the Dual Kieper Assembly

- Remove the back cover from the chair.
- Remove the two covers over the left and right kiepers.
- Disconnect the 2-pin motor connectors on the left and right kieper.
- Disconnect the 3-pin connector leading from the Optical Encoders to the PC Board. Remove the strain relief and pull the cable free.
- Disconnect the cables leading to the control module. Free the cables from any strain relief(s).
- Disconnect the CANBUS cables from the control module and the joystick. Free the cables from any strain relief(s).
- Remove the four bolts securing the booster strut to the seat pan.
- With someone holding the seat back, remove the two bolts on each kieper that secures the back to the kieper assembly.
- Remove the back.
- Tilt the seat pan back on the wheelchair base. Refer to the Battery Changing section for directions on lifting the seat pan.
- Remove the four bolts on each side that secures the kieper assembly to the seat pan and remove the kieper.
- To reinstall the kieper assembly, reverse the above procedures.
**Reed Switch Adjustment**

With the back pan set at 95° ±1° with respect to the seat pan, the Actuator Magnet “B” should activate Reed Switch “A”. Actuator Magnet “B” may be moved vertically as shown by arrow “C” to accomplish this set up. Rocker Switch MUST be in the down position as shown, during initial set-up, and be activated with the back pan set at 107° ±2.5° with respect to seat pan. Hole pattern in Actuator Bracket provides 2.5° incremental adjustments.

Gap between the Reed Switch “A” and Actuator Magnet “B” to be 1.3 mm (3mm maximum). Actuator Magnet “B” is depth adjustable by loosening hex nut, pushing mount in, then rotating it 90°, and re-tightening hex nut.

With the back pan set at 171° ±1° with respect to the seat pan, (Gas Spring fully compressed), the Actuator Magnet “E” should activate Reed Switch “D”. Actuator Magnet “E” may be moved vertically as shown by arrow “F” and horizontally as shown by arrow “G” to accomplish this set up.