Service manual

American English

F5 Corpus VS

Introduction

This is the Service Manual of your product. The Service Manual is not a stand-alone document, but rather a complement to the User's Manual. It is intended for technical personnel who maintain and repair Permobil power wheelchairs. It is important that anyone who performs maintenance and repairs described in this manual reads and understands the content of this manual so that the work is performed professionally.

This Service Manual is not intended for end users or their caregivers. They must contact their local Permobil dealer for any maintenance or repair needs.

Always state the chassis number when contacting Permobil to ensure that the correct information is provided.

Produced and published by Permobil

Edition: 7

Date: 2018-10-18

Order no: 335158 eng-US

How to contact Permobil

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1 Important information

All information, pictures, illustrations and specifications are based upon the product information available at the time this manual was released. Pictures and illustrations used in this manual are representative examples and not intended to be exact depictions of the various parts of the wheelchair.

We reserve the right to make changes to the product without prior notice.

If you are visually impaired, this document can be downloaded at www.permobil.com. Use the magnifying tool in your PDF reader to achieve desired text and picture size.

It is also possible to obtain information concerning our products from our website: www.permobil.com.

1.1 Warranty

Contact your dealer or Permobil Inc. USA for information about the warranty period for this product.

Product Warranty Information sets forth the conditions of the warranty. For further information about applicable warranties, see .

NOTICE

Unapproved replacement of parts

If any part is replaced without approval from Permobil, the wheelchair warranty will become void. Permobil accepts no liability for any loss that occurs as a result of a control system component being opened, adjusted or modified without permission.

If any part is replaced without approval from Permobil, the warranty will become void. Permobil accepts no liability for any loss that occurs as a result of the being modified without permission.

1.2 Technical support

In the event of technical problems, contact your dealer or call Permobil Inc. USA on 1-800-736-0925.

Be prepared to provide the wheelchair serial number, located on the chassis, to ensure proper support. See 3.2 *Serial number labels*, Page 19.

Be prepared to provide the chassis serial number, to ensure proper support. See 3.2 *Serial number labels*, Page 19.

1.3 Spare parts and accessories

Spare parts and accessories must be ordered through your dealer.

The expected service life of this product is five years.

1.4 Ordering documentation

Should you need another copy of this manual, one may be ordered from Permobil. Ask for the order number specified on the back cover.

1.5 Scrapping and recycling

Contact Permobil for information about scrapping agreements in force.

2 Safety instructions

2.1 Descriptions of admonitions

The following admonitions describing warnings, remarks and explanatory texts are used throughout this manual to draw attention to items of significant importance to safety:

DANGER!

Danger admonition

Indicates a dangerous situation which, if not avoided, could result in death as well as serious damage to the product or other property.

WARNING!

Warning admonition

Indicates a hazardous situation which, if not avoided, could result in serious injury or death as well as damage to the product or other property.

CAUTION!

Caution admonition

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury as well as damage to the product or other property.

NOTICE

Notice admonition

Indicates an important but not hazardous situation which, if not avoided, could result in damage to the product or other property.

Provides information about the conditions or circumstances under which the information given applies.

3 Specifications

3.1 Wiring diagram

3.1.1 Seat

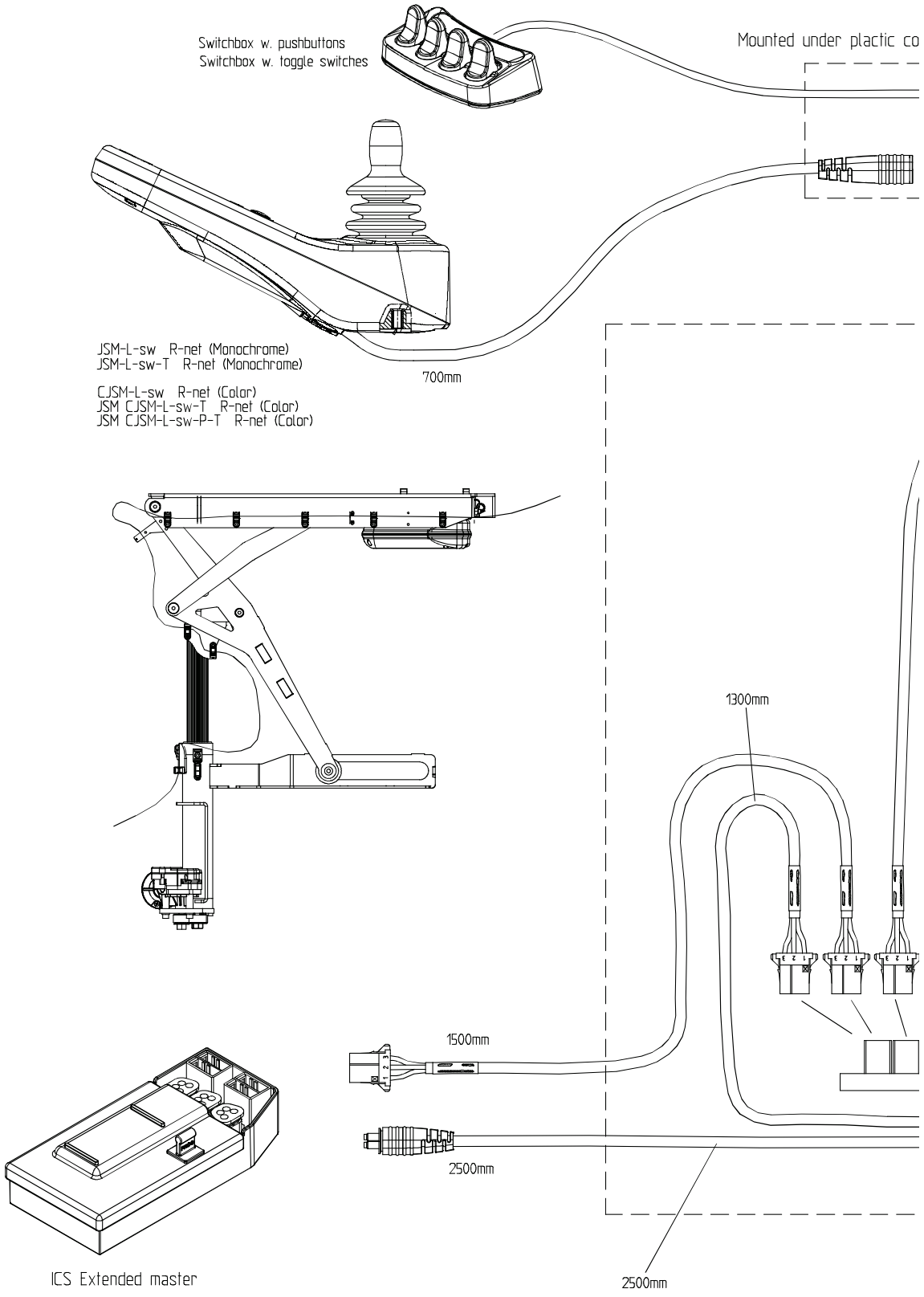


Figure 1. Wiring diagram seat (1/2).

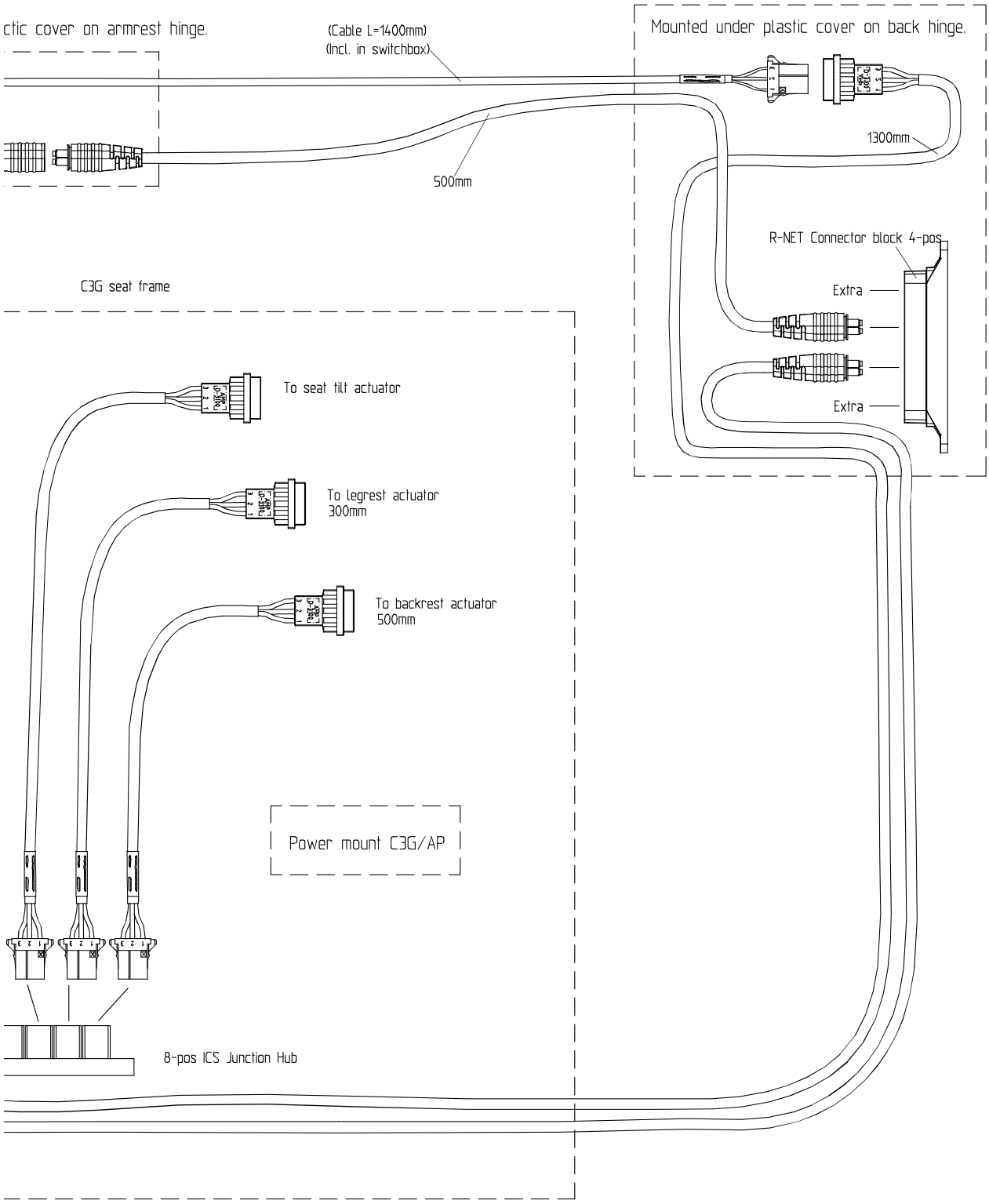
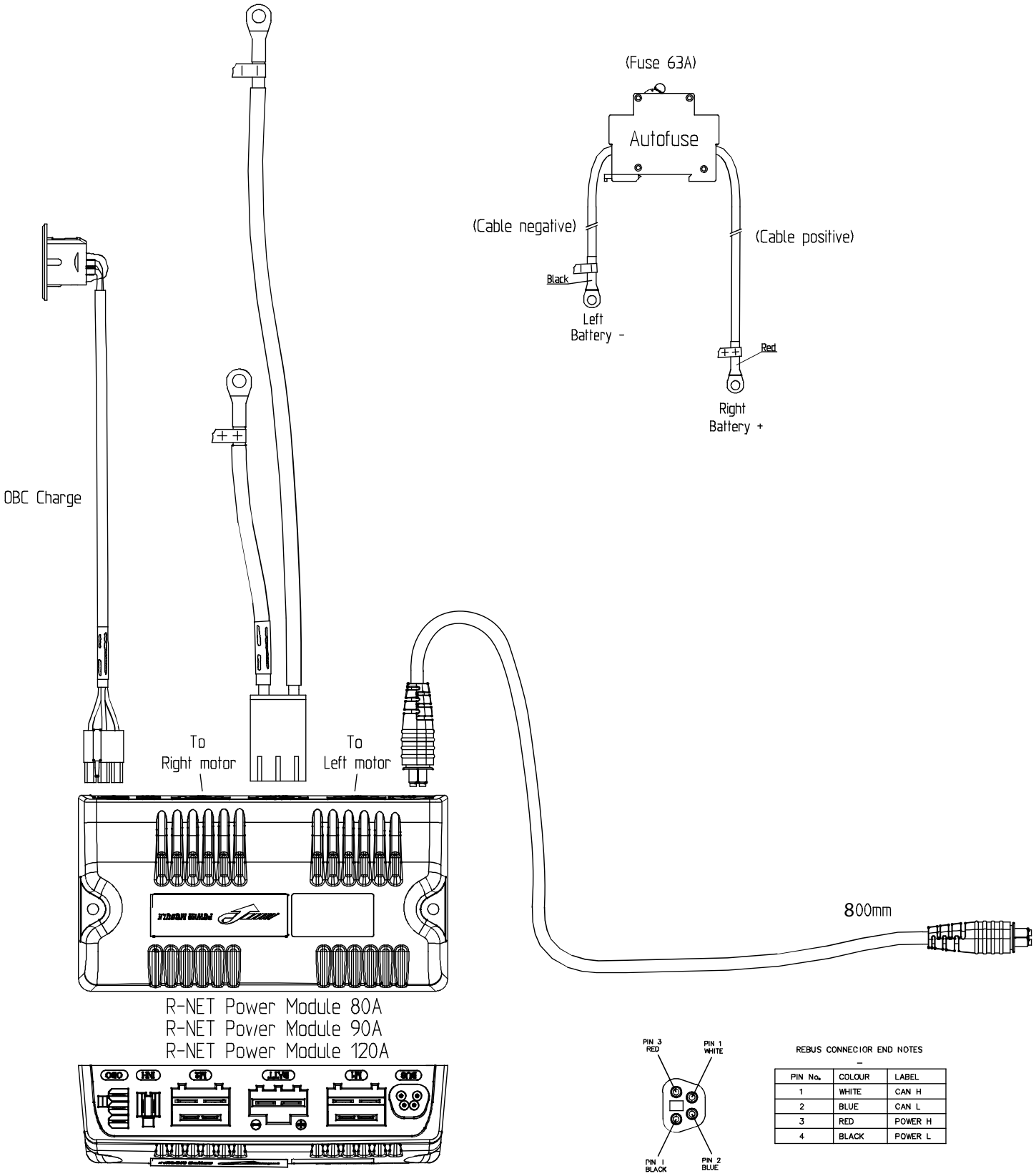


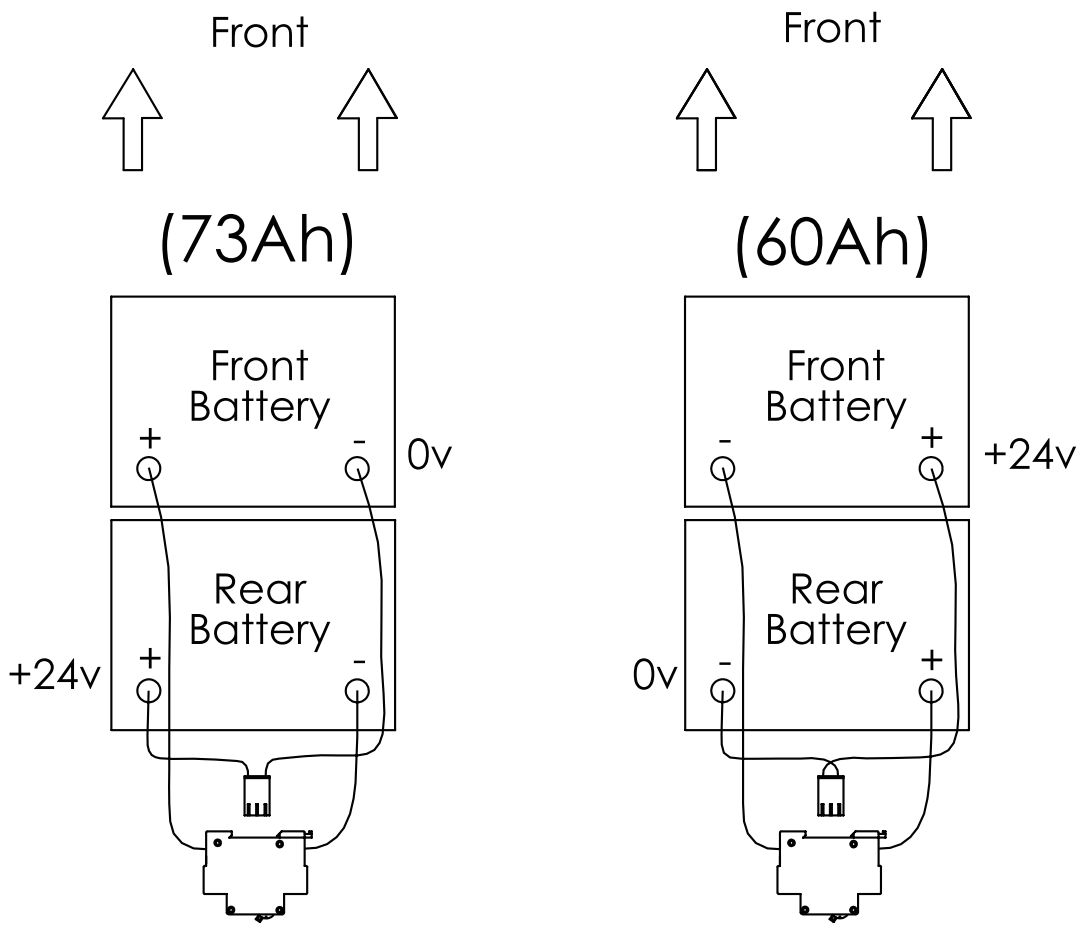
Figure 2. Wiring diagram seat (2/2).

3.1.2 Chassis



PIN No.	COLOUR	LABEL
1	WHITE	CAN H
2	BLUE	CAN L
3	RED	POWER H
4	BLACK	POWER L

Figure 3. Wiring diagram chassis (1/2).



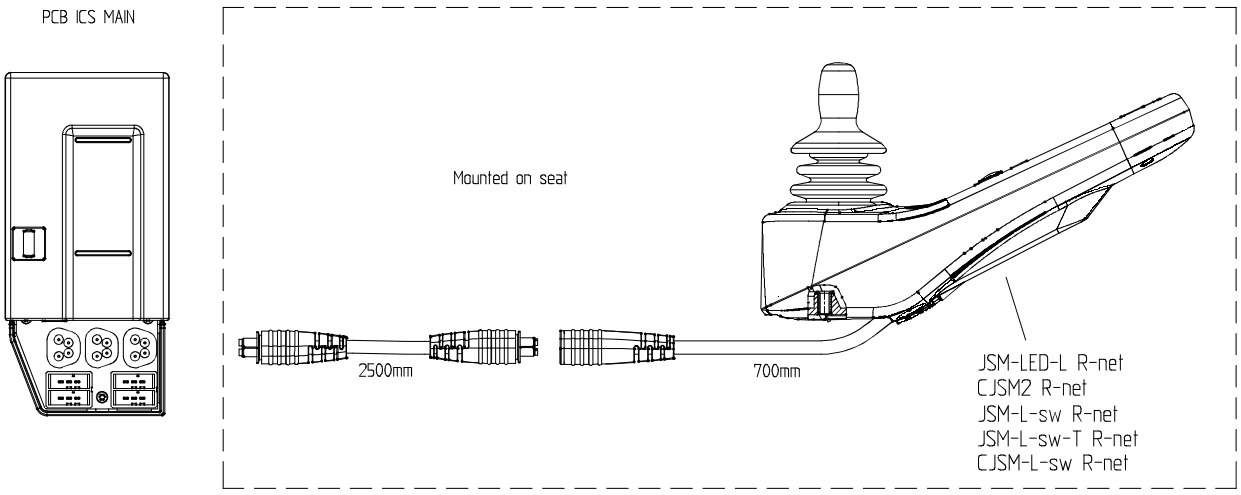


Figure 4. Wiring diagram chassis (2/2).

3.2 Serial number labels

3.2.1 Serial number label on chassis

The serial number label is located on the lower, left hand side of the wheelchair chassis. Look between the rim spokes.

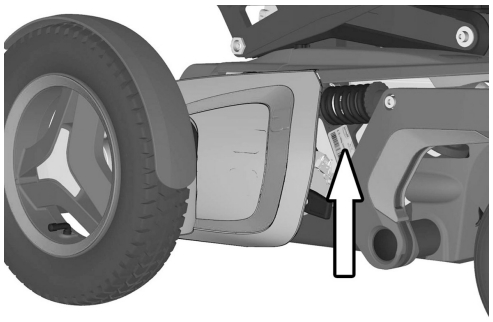


Figure 5. Chassis identification number label.

3.2.1.1 Serial number label description

1. Made in (country of final assembly) by (address of site of final assembly).
2. Serial number.
3. Product type.
4. Date of assembly.
5. EAN code.
6. Maximum user weight.

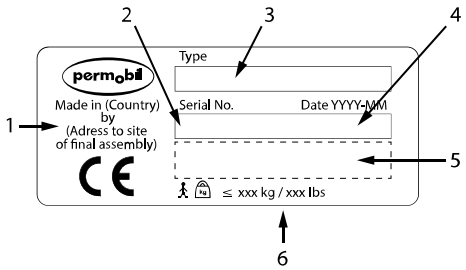


Figure 6. Serial number label.

3.2.2 Serial number label R-net power module

See 4.3.3 *R-net power module*, Page 157 for further information.

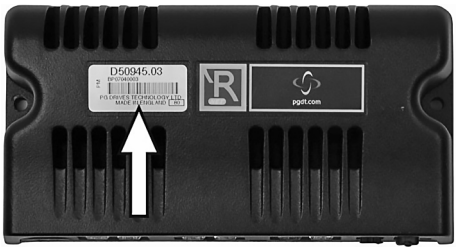


Figure 7. Power module ID number.

3.2.3 Serial number label on the control panel

See for further information.

The serial number label is only visible when the panel is removed from the panel holder.

Figure 8. Control panel ID number.

4 Repairs

4.1 Seat

4.1.1 Seat

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.
- 1 Circlip pliers.

4.1.1.1 Removing seat

1. Switch off the main power switch on the control panel.

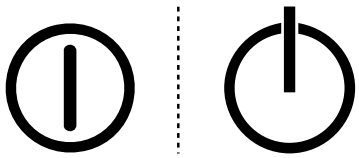


Figure 9. On/Off symbol depending on model.

2. Remove the seat cushion by lifting it straight up.

3. Remove the seat plates, they are fitted with four screws at the back and front edge.

4. Remove the UniTrack rail on the right hand side of the seat. It is assembled with two screws. See 4.1.3 *UniTrack rails*, Page 25.

Figure 10. The seat plates are held in place by four screws.

5. Disconnect the tilt motor cabling from the contact block at the seat frame. Release the cable from its cable bracket. Make note of how the cable is assembled with consideration to subsequent re-assembly. See 4.2.2.3 *AP elevator tilt motor cable*, Page 104.

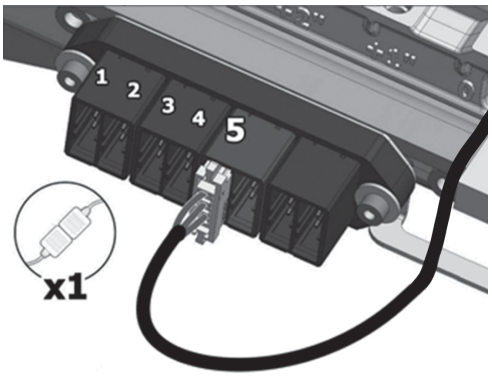


Figure 11. Tilt motor cable is connected to the fifth position of the connector block.

6. Disconnect the ICS bus cable from the contact block at the seat frame. Release the cable from its cable bracket. Make note of how the cable is assembled with consideration to subsequent re-assembly. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

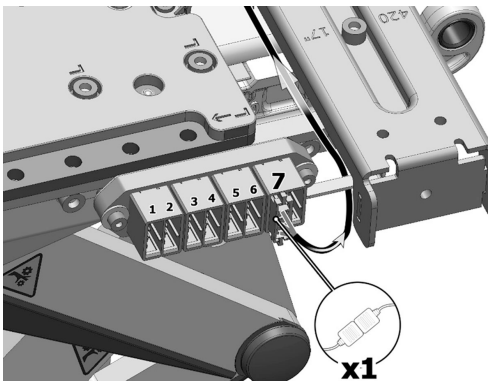


Figure 12. The ICS bus cable is connected to the seventh position of the connector block.

7. Remove the screw securing the plastic knob.

8. Remove the plastic knob.

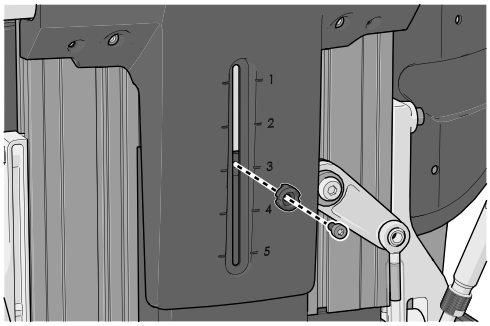


Figure 13. The plastic knob is attached with a screw.

9. Remove the four screws securing the plastic cover.

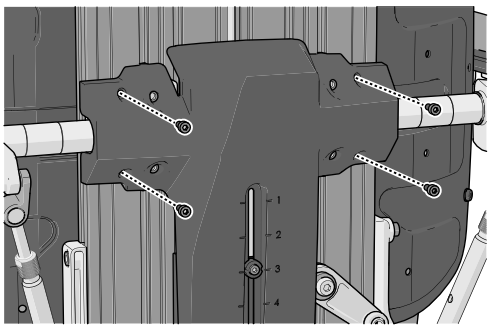


Figure 14. The locations of the four screws securing the plastic cover.

10. Document the cable set up behind the plastic cover.

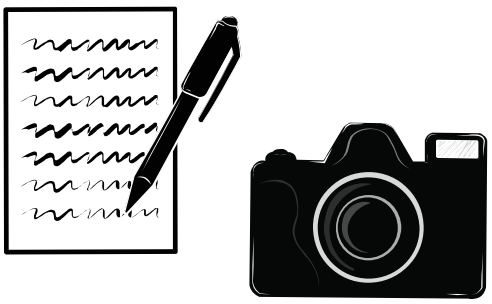


Figure 15. It is important that you document the cable set up. Use a camera or make a drawing.

11. Disconnect the R-net cable from the contact block at the back of the backrest. Release the cable from its cable brackets. Make note of how the cable is mounted with consideration to subsequent mounting. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

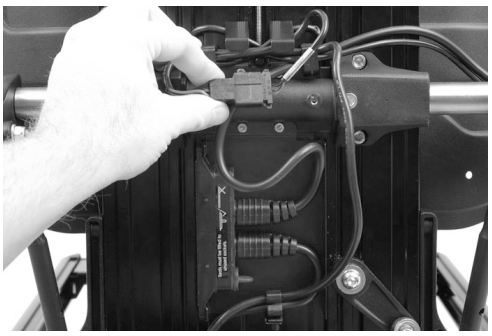


Figure 16. Disconnect the R-net cable from the contact block at back of the backrest.

12. Detach the parallel armrest rod from the backrest hinge. It is attached with a pin and circlip.

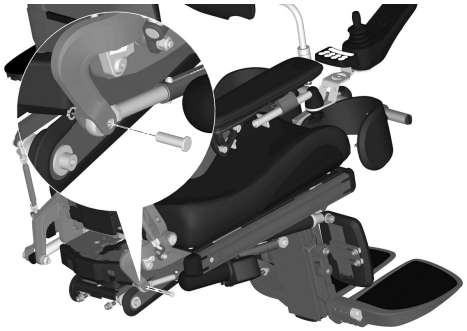


Figure 17. The parallel armrest rod is attached with a pin and circlip.

13. Remove the six screws holding the seat. Make note of in what hole pattern the seat is mounted with consideration to subsequent mounting.

14. Lift the seat off the AP elevator.

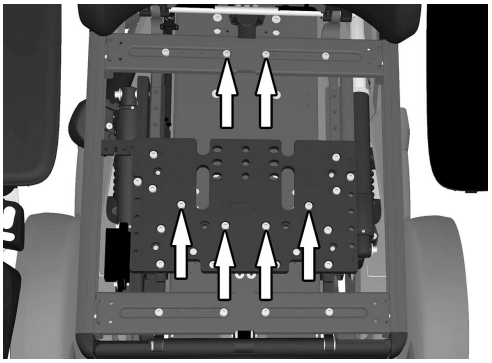


Figure 18. The seat is mounted with six screws.

4.1.1.2 Mounting seat

1. Position the seat on to the AP elevator.
2. Mount the six screws holding the seat. The seat should be mounted in different hole patterns depending on the seat depth setting.

Seat Depth	Front position	Rear position	Front extension	Rear extension
15”	1	1	0	-100
16”	1	2	0	-75
17”	3	3	+50	-100
18”	3	4	+50	-75
19”	3	5	+50	-50
20”	3	6	+50	-25
21”	3	7	+50	0
22”	3	7	+75	0
23”	3	7	+100	0

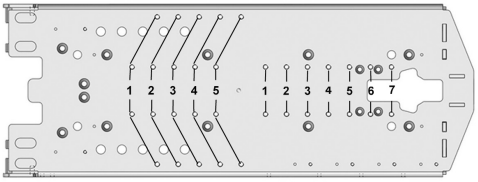


Figure 19. The different mounting positions.

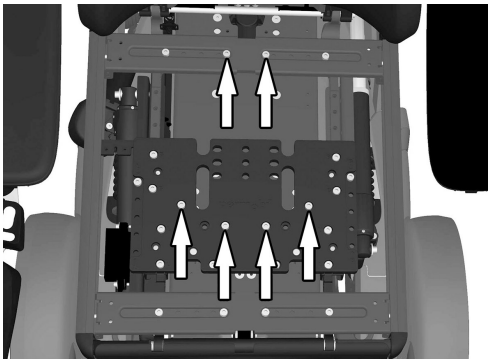


Figure 20. The seat is mounted with six screws.

3. Mount the parallel armrest pad to the backrest hinge. It is attached with a pin and circlip.

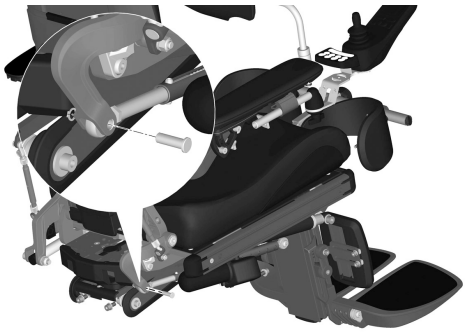


Figure 21. The parallel armrest rod is attached with a pin and circlip.

4. Check your documentation of the cable set up.
5. Connect the R-net cables to the contact block at the back of the backrest. Assemble the cables to its cable brackets. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

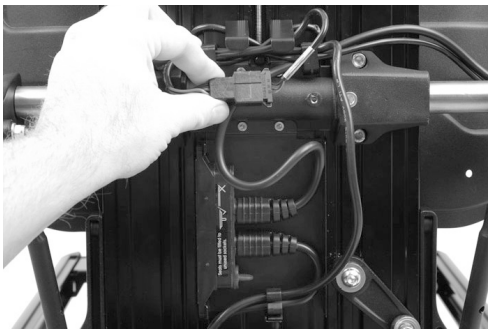


Figure 22. Connect the R-net cable from the contact block at back of the backrest.

6. Attach the plastic cover with the four screws. Tightening torque: 0.89 lb.ft.

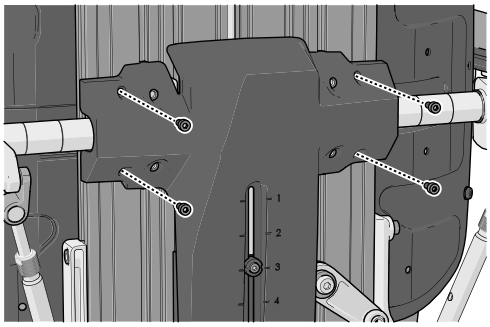


Figure 23. The locations of the four screws securing the plastic cover.

7. Attach the plastic knob with the screw. Tightening torque: 0.22 lb.ft.

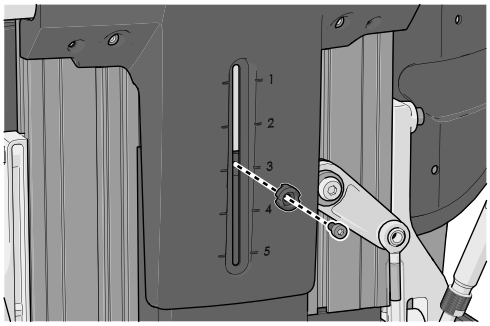


Figure 24. The plastic knob is attached with a screw.

8. Reconnect the ICS bus cable to the contact block at the seat frame. Mount the cable to its cable brackets. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

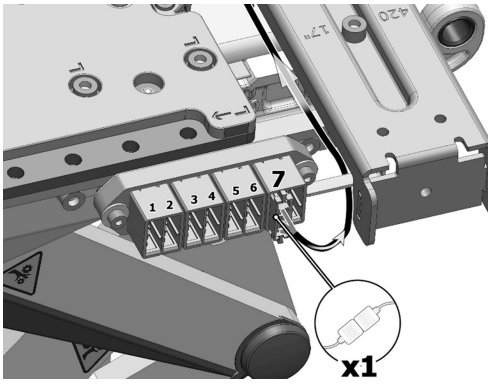


Figure 25. The ICS bus cable is connected to the seventh position of the connector block.

9. Reconnect the tilt motor cabling to the contact block at the seat frame. Mount the cable to its cable brackets. See 4.2.2.3 *AP elevator tilt motor cable*, Page 104.

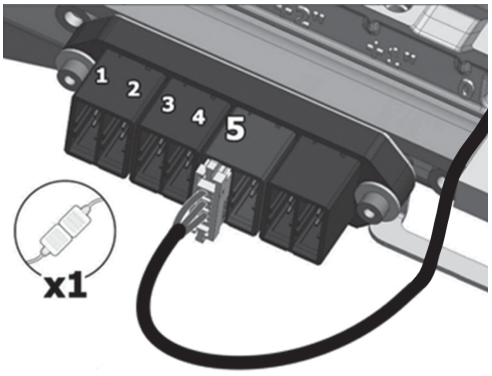


Figure 26. The tilt motor cable is connected to the fifth position of the connector block.

10. Remount the seat plates, they are fitted with four screws at the back and front edge.

11. Remount the seat cushion.

Figure 27. The seat plates are held in place by four screws.

4.1.2 Seat plates

For this task the following tools are necessary:

- 1 Allen key 4 mm.

4.1.2.1 Removing seat plates

1. Remove the seat cushion by lifting it straight up. It is attached by means of velcro on the rear of the cushion.

2. Remove the seat plates, which are held in place by four screws.

Figure 28. The seat plates are held in place by four screws.

4.1.2.2 Mounting seat plates

1. Assemble the seat plates with the four screws.

2. Fit the seat cushion by pressing it against the seat plate in the desired position to ensure good contact for the velcro on its underside.

Figure 29. The seat plates are held in place by four screws.

4.1.3 UniTrack rails

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 5 mm.

4.1.3.1 Removing UniTrack rail

UniTrack rails are available in five different lengths that are used depending on the seat depth selected.

1. Remove the two screws that hold the rail in place.

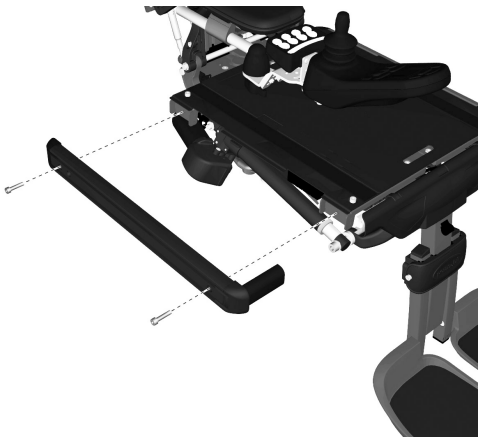


Figure 30. The UniTrack rail is held in place by two screws.

4.1.3.2 Mounting UniTrack rail

1. Assemble the UniTrack rail using two screws. Use a torque wrench to tighten the screws. Tightening torque 7.2 lb.ft.

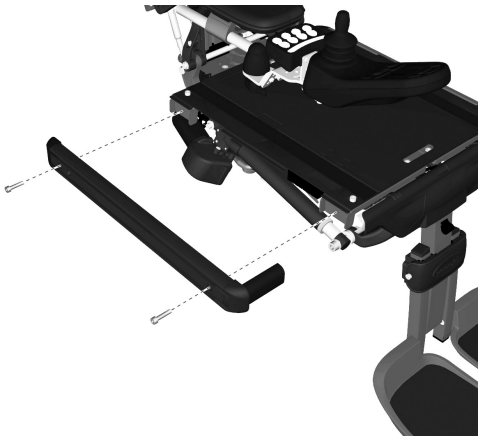


Figure 31. The UniTrack rail is held in place by two screws.

4.1.4 Backrest

Backrest plates are available in three different widths to fit most users. If you change the size of the backrest plates you will also have to change the cushion to one that is a suitable size. See 6 *Customizations*, Page 184.

4.1.4.1 Removing backrest

1. Remove the backrest cushion by pulling it straight forwards. It is attached by means of velcro on the rear of the cushion.

2. Remove the backrest upper plate. For access to the locking mechanism, set the backrest angle to its most upright position. Remove the upper section of the backrest by carefully opening the locking mechanism catch outwards while also pulling the upper section of the backrest straight up.

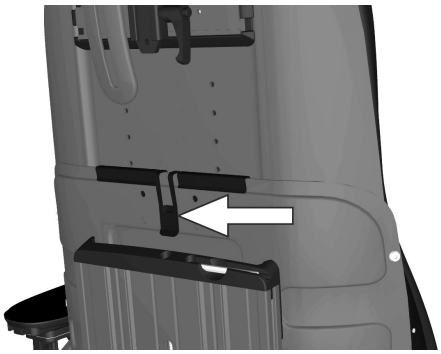


Figure 32. The upper section of the backrest is secured with a locking mechanism.

3. Remove the knob securing the position of the lower backrest plate.

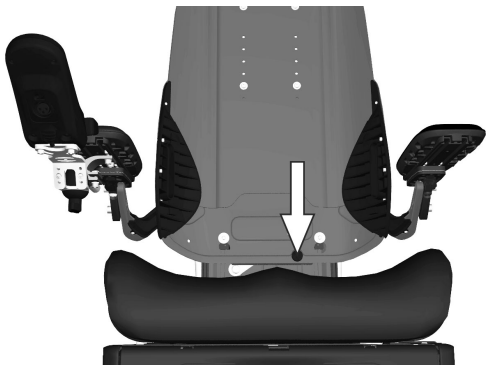


Figure 33. The lower backrest plate is secured by means of a knob.

4. Remove the lower section of the back rest by pulling the backrest plate straight up so it can be removed from the four locking devices.

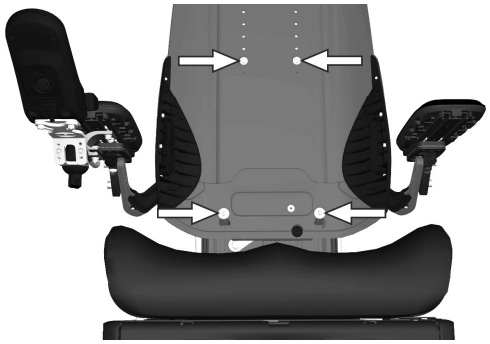


Figure 34. The lower backrest plate is secured by means of four locking devices.

4.1.4.2 Mounting backrest

1. Assembly the lower backrest plate by lining up the four 'keyholes' on the locking devices and then sliding the plate straight down.

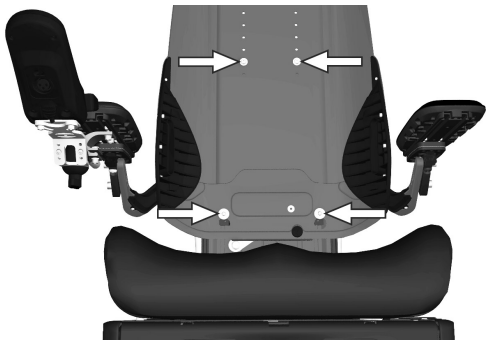


Figure 35. The lower backrest plate is secured by means of four locking devices.

2. Secure the position of the plate by fitting the knob.

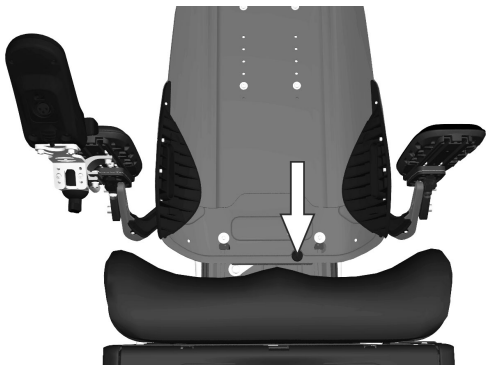


Figure 36. The lower backrest plate is secured by means of a knob.

3. Assemble the upper backrest plate by sliding it down into the lower plate's grooves. The height of the backrest may need to be adjusted.
4. Fit the backrest cushion by pressing it against the plate in the desired position to ensure good contact for the velcro on its underside. The lower section of the cushion is fastened to the seat plate by means of velcro.

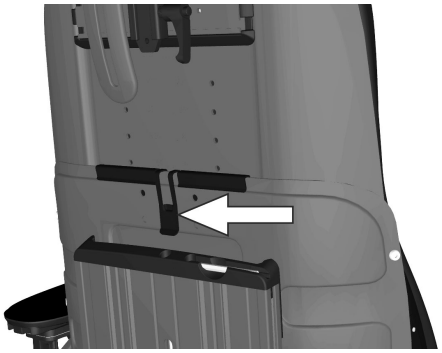


Figure 37. Removal or mounting of the upper section of the backrest.

4.1.5 Backrest actuator

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 3 mm.
- 1 Allen key 5 mm.
- 1 Allen key 8 mm.
- 1 Socket 17 mm.
- 1 Circlip pliers (if the rear attachment uses a circlip).

NOTICE

Identify the actuator

The powered backrest exists in two different versions. What sets them apart is the brand of the actuator. One version uses an LINAK LA28 actuator and the other one an actuator from REAC. The most apparent difference is that the REAC actuator has a orange seal. Their different brand marks is also found on each of them. The replacement actuator must be the same as the original actuator otherwise the actuator will not fit in the bracket.

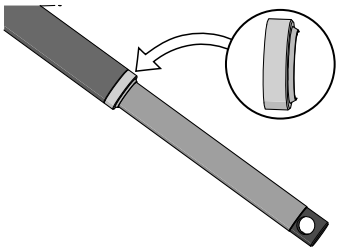


Figure 38. The seal's color sets them apart.

4.1.5.1 Removing backrest actuator

WARNING!

Risk of injury while adjusting backrest

Do not place any weight or load on the backrest while adjusting the backrest.

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.

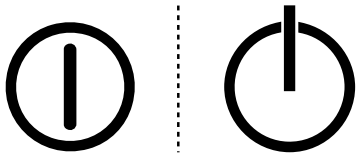


Figure 39. On/Off symbol depending on model.

3. Remove the seat cushion.
4. Remove the thigh supports.
5. Remove the seat plates. See 4.1.2 *Seat plates*, Page 25.
6. Remove the two screws securing the seat plate brackets on the left side.

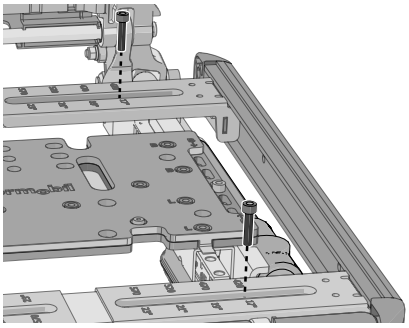


Figure 40. The two seat plate brackets are attached with two screws.

7. Remove the UniTrack and the seat plate brackets as one unit by pulling it straight out from the left-hand side.

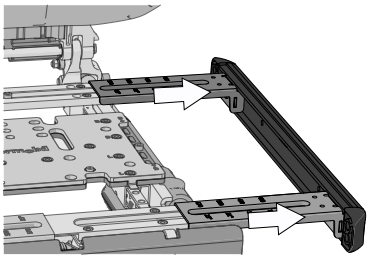


Figure 41. The brackets can be wedged if you do not pull out both simultaneously.

8. Remove the actuator connector by pushing in the two latches on the connector and pulling it straight out from the junction box on the right side of the seat. Remove the cable clips then detach the actuator cabling.

   Widen the right-hand side of the seat if the seat width is 17" or smaller to make it possible to disconnect the connector.

   Make a note of how the cabling is positioned; this is needed when you re-attach it later.

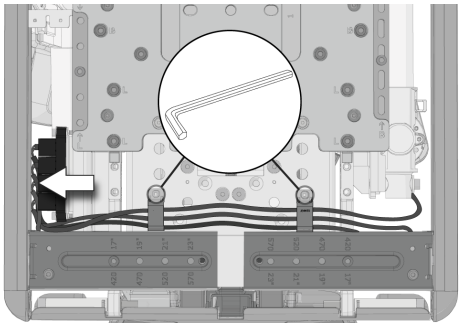


Figure 42. Backrest actuator cabling.

9. Remove the nut (D) and the washer (C).

ⓘ Newer revision of the rear attachment uses a pin with a washer and a circlip.

Remove the circlip (C) and the washer (B).

10. Hold the backrest and the actuator in a steady grip unit when you remove the screw (A) and the washer (B) from the slewing bracket and the actuator.

ⓘ Newer revision of the rear attachment uses a pin with a washer and a circlip.

Hold the backrest and the actuator in a steady grip unit when you remove the pin (A) from the slewing bracket and the actuator.

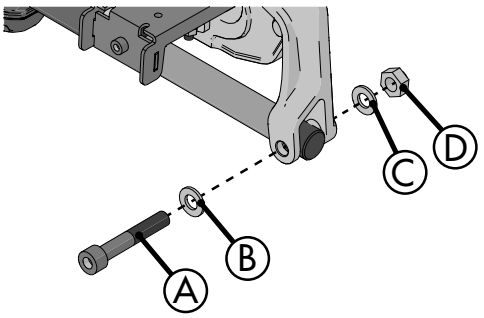


Figure 43. The rear attachment of the actuator.

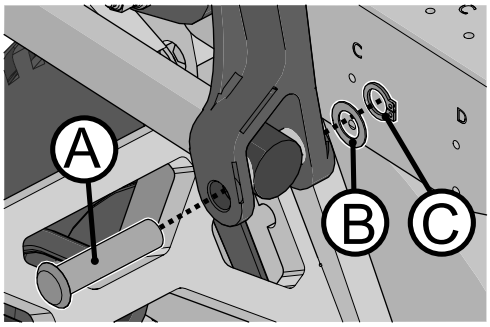


Figure 44. The new rear attachment of the actuator.

11. Once the slewing bracket has been detached from the actuator, the backrest can be angled forward to rest on the seat frame.

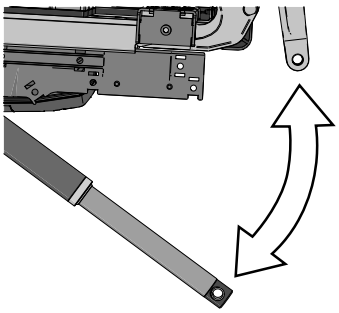


Figure 45. The rear attachment of the actuator is now detached.

12. Remove the spacer.

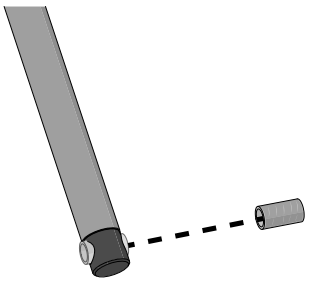


Figure 46. The spacer's location.

13. Remove the screw and washer from the front bracket of the actuator.

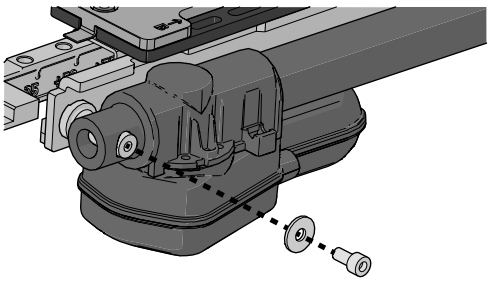


Figure 47. The front attachment of the actuator.

14. Remove the actuator.

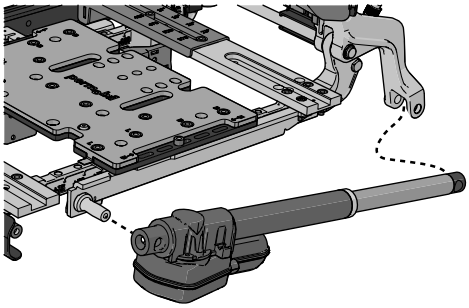


Figure 48. You have to angle out the actuator.

4.1.5.2 Mounting backrest actuator

1. Apply grease (Lubetec Red Guard or equivalent) on the shaft.

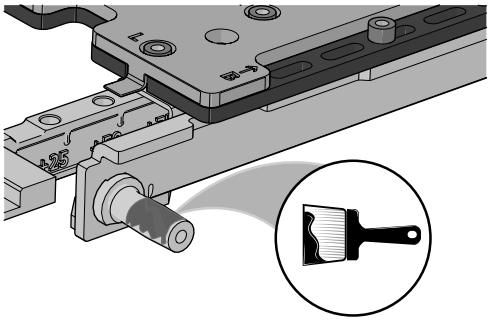


Figure 49. The shaft on the actuator bracket.

2. Assemble the front end of the actuator with the screw and washer. Tightening torque 7.2 lb.ft.

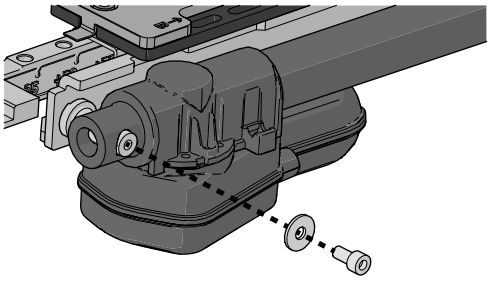


Figure 50. The front attachment of the actuator.

3. Apply grease (Lubetec Red Guard or equivalent) on the spacer.

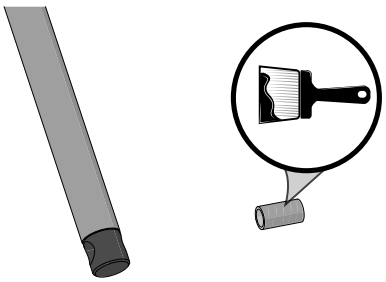


Figure 51. Apply grease before mounting the spacer.

4. Fit the spacer into the actuator's end.

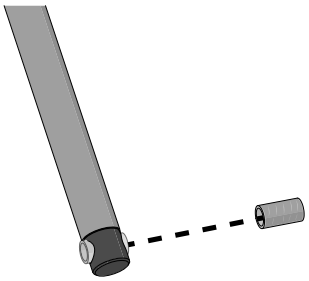


Figure 52. The spacer's location.

5. Raise the backrest to get the slewing bracket in the correct position. Hold the actuator and backrest in place until it is secured with the screw in the upcoming step.

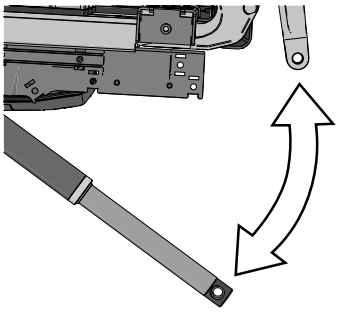


Figure 53. Get the actuator in position.

6. Push the screw (A) with washer (B) through the spacer and the slewing bracket. Fit the nut (D) with washer (C) onto the screw. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. Tightening torque: 17.7 lb.ft

ⓘ Newer revision of the rear attachment uses a pin with a washer and a circlip.

Push in the pin (A) through the spacer and the slewing bracket. Fit the circlip (C) with washer (B) onto the pin.

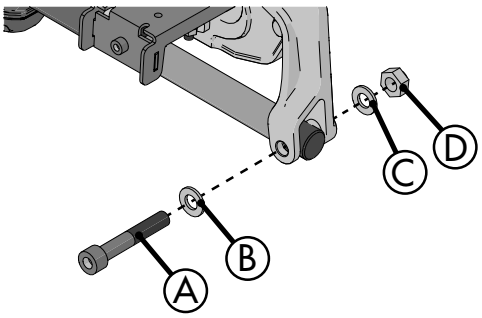


Figure 54. The rear attachment of the actuator.

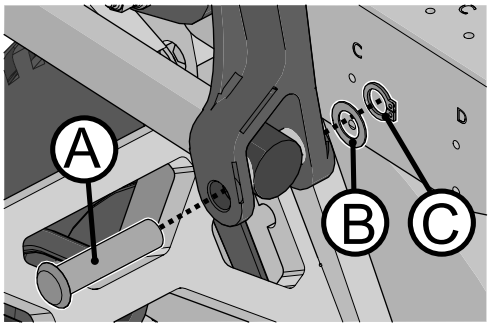


Figure 55. The new rear attachment of the actuator.

7. Secure the cabling for the actuator in its fixing points. Consider the arrangement of the cables carefully and make sure there is no risk of them getting trapped or otherwise damaged.

8. Connect the actuator connector to the same position as noted, in step 8. in the removing section, into the junction box on the right-hand side of the seat. Fit the connector by pushing it straight in at any point.

9. Assemble the seat plate brackets together with UniTrack rail, adjust it to its original width.

10. Assemble the seat plates. See 4.1.2 *Seat plates*, Page 25.

11. Assemble the thigh supports.

12. Reattach the cushions by means of velcro.

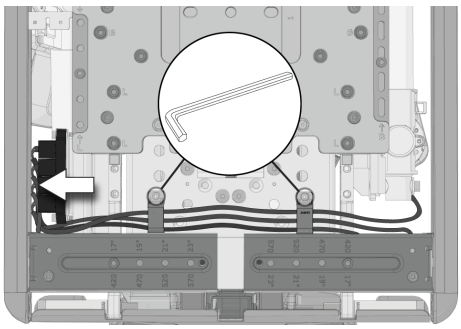


Figure 56. Backrest actuator cabling.

4.1.6 Backrest actuator bracket

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 5 mm.
- 1 Allen key 8 mm.
- 1 Socket 10 mm.
- 1 Allen key 3 mm.
- 1 Awl.
- 1 Circlip pliers (if the rear attachment uses a circlip).

4.1.6.1 Resetting backrest actuator bracket function

The backrest actuator bracket provides the backrest with a function that enables it to move slightly forward and then snap to a fixed position in case of a sudden stop when moving fast forward. This function reduces the movement backwards of the user and decreases the risk of injuries sustained to the head, back and neck.

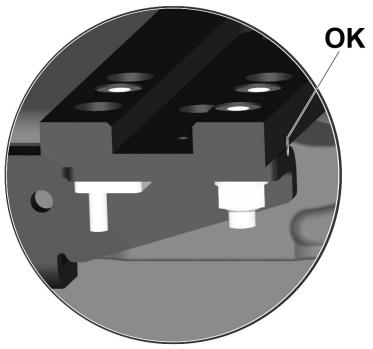


Figure 57. If the rear edge of the actuator bracket is in line with the seat bar, it means that it hasn't been triggered.

When triggered, this function needs to be reset before the seat is used again. If the rear edge of the actuator bracket is in line with the seat bar, it means that it hasn't been triggered. But if the actuator bracket is protruding at the rear, the function has been triggered and the bracket must then be reassembled and some parts must be replaced. Parts needed are included in the spare parts kit. Contact Permobil or your dealer for further information.

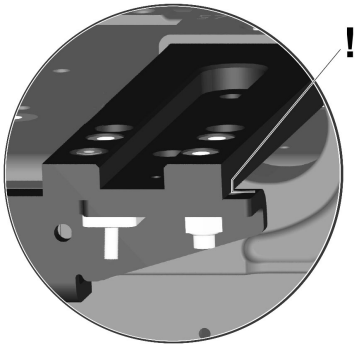


Figure 58. If the actuator bracket is protruding at the rear, the function has been triggered, the function has been triggered and the bracket must then be reassembled and some parts must be replaced.

4.1.6.2 Removing backrest actuator bracket

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.

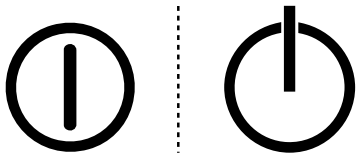


Figure 59. On/Off symbol depending on model.

3. Remove the seat cushion.
4. Remove the thigh supports.
5. Remove the seat plates. See 4.1.2 *Seat plates*, Page 25.
6. Remove the two screws securing the seat plate brackets on the left side.

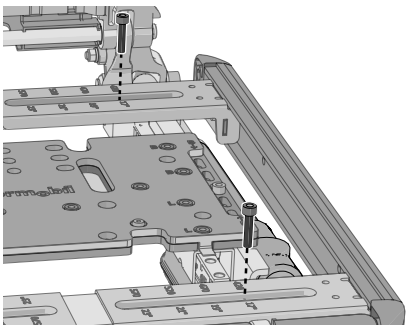


Figure 60. The two seat plate brackets are attached with two screws.

7. Remove the UniTrack and the seat plate brackets as one unit by pulling it straight out from the left-hand side.

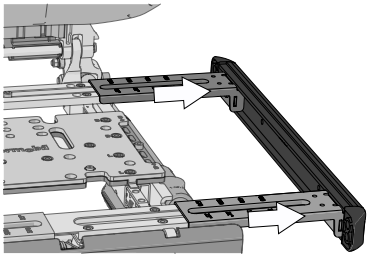


Figure 61. The brackets can be wedged if you do not pull out both simultaneously.

8. Remove the actuator connector by pushing in the two latches on the connector and pulling it straight out from the junction box on the right side of the seat. Remove the cable clips then detach the actuator cabling.

   Widen the right-hand side of the seat if the seat width is 17" or smaller to make it possible to disconnect the connector.

   Make a note of how the cabling is positioned; this is needed when you re-attach it later.

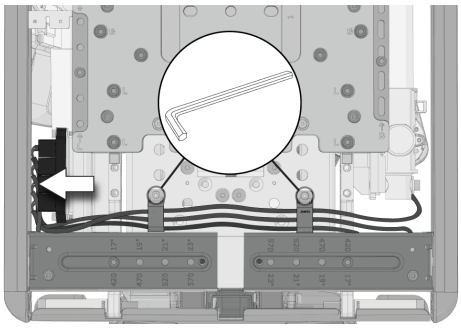


Figure 62. Backrest actuator cabling.

9. Remove the nut (D) and washer (C).

ⓘ Newer revision of the rear attachment uses a pin with a washer and a circlip.

Remove the circlip (C) and the washer (B).

10. Hold the backrest and the actuator in a steady grip unit when you remove and screw (A) and the washer (B) from the slewing bracket and the actuator.

ⓘ Newer revision of the rear attachment uses a pin with a washer and a circlip.

Hold the backrest and the actuator in a steady grip unit when you remove the pin (A) from the slewing bracket and the actuator.

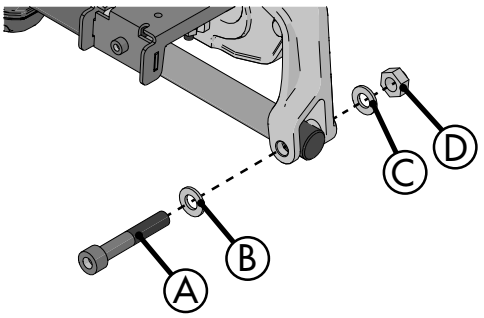


Figure 63. The rear attachment of the actuator.

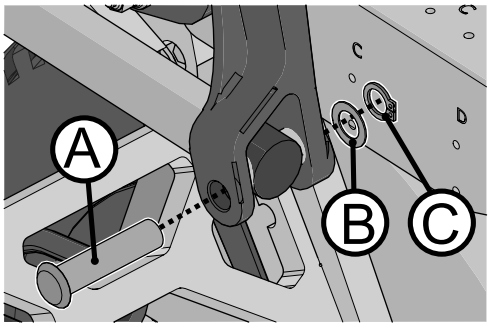


Figure 64. The new rear attachment of the actuator.

11. Remove screw and washer from the front bracket of the actuator.

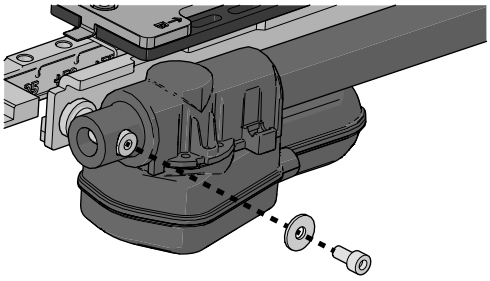


Figure 65. The front attachment of the actuator.

12. Remove the actuator.

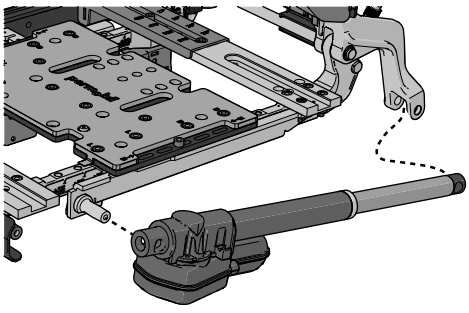


Figure 66. You have to angle out the actuator.

13. Remove the three screws and the nut with the washer securing the actuator.

ⓘ If triggered: remove the broken part of the middle screw by screwing it upwards from underneath.

14. Check for damages on other parts and replace if needed.

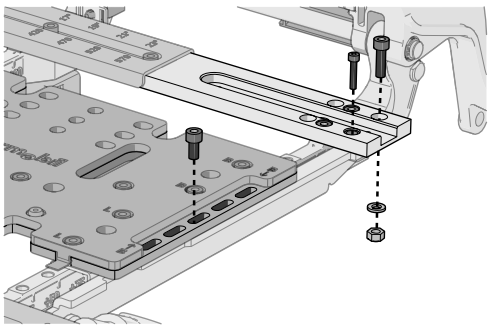


Figure 67. Remove the three screws.

4.1.6.3 Mounting backrest actuator bracket

Items	Description
A	Screw, M4x20
B	Bushing
C	Key
D	Leaf spring
E	Screw, M6x20
F	Washer
G	Lock nut

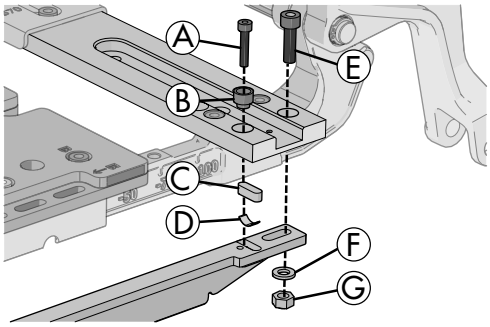


Figure 68. The rear assembly of the backrest actuator bracket.

1. Fit the leaf spring on the actuator bracket.

2. Fit the key on top of the leaf spring.

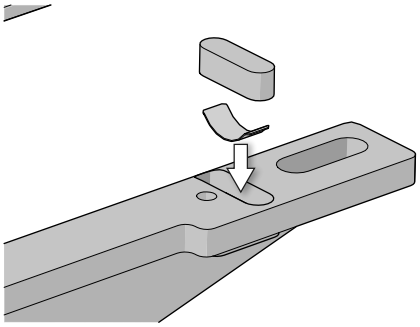


Figure 69. The leaf spring and the key.

3. Fit the front screw thru the seat plate into the actuator bracket.
Leave a 3/64 inch gap between the actuator bracket and the seat plate.

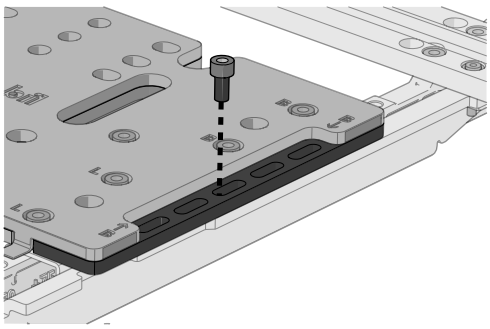


Figure 70. The screw that secures the front of the actuator bracket.

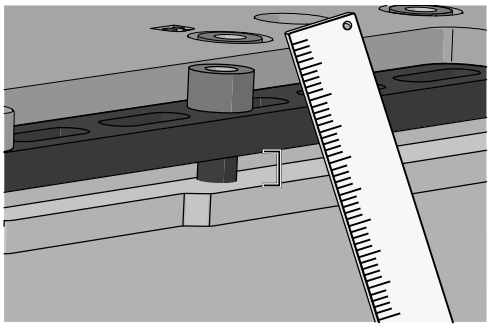


Figure 71. The 3/64 inch gap between the actuator bracket and the seat plate.

4. Fit the M6x20 screw thru the rear seat bar, the actuator bracket and washer into the lock nut.
Leave a 3/64 inch gap between the actuator bracket and the seat plate.

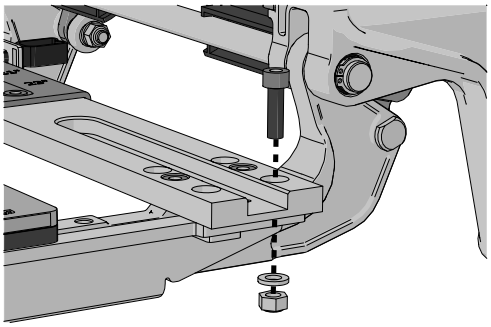


Figure 72. The M6x20 screw position.

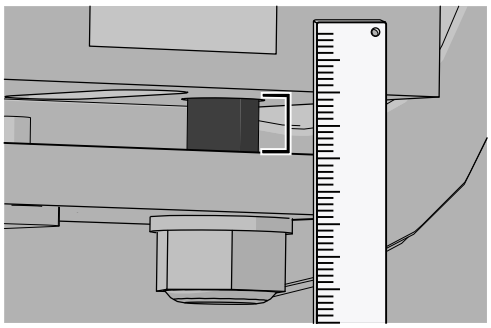


Figure 73. The 3/64 inch gap between the actuator bracket and the rear seat bar.

5. Mount the backrest actuator, see
4.1.5.2 *Mounting backrest actuator*, Page 31.

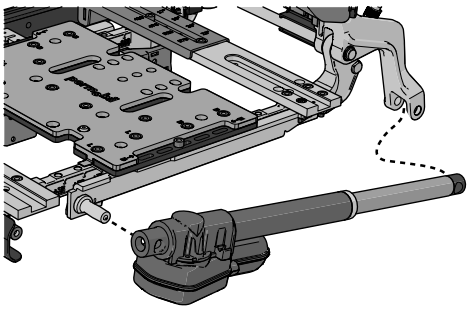


Figure 74. Mount the backrest actuator.

6. Test the backrest actuator bracket function by pushing the backrest forward and then try to pull it backwards. It should lock in a forward position. If the function is defective then the backrest will go back to its original position. When defective always check that the gap between the actuator bracket and seat is 3/64 inch and that the leaf spring isn't flattened or damage in any way.

Figure 75. Push the backrest forward and then pull it backwards.

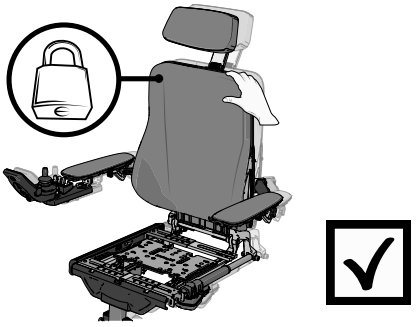


Figure 76. The backrest should lock in a forward position.

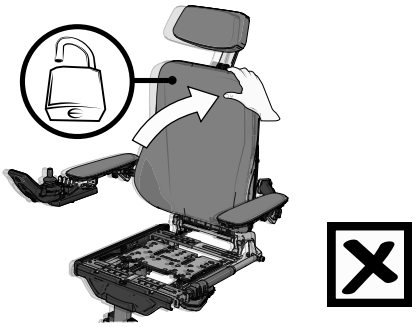


Figure 77. If the backrest actuator bracket function is defective then the backrest will go back to its original position.

7. Push in the key using an awl and pull the backrest backwards into its original position.

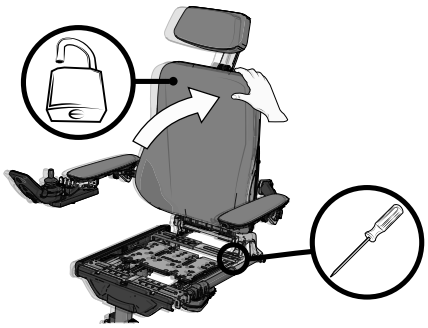


Figure 78. Push in the key and pull the backrest backwards into its original position.

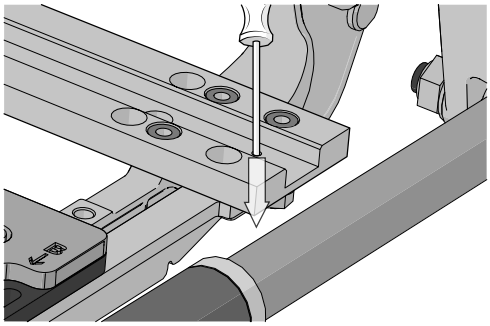


Figure 79. Use an awl to push in the key.

8. Fit the M4x20 screw thru the bushing and the rear seat bar.

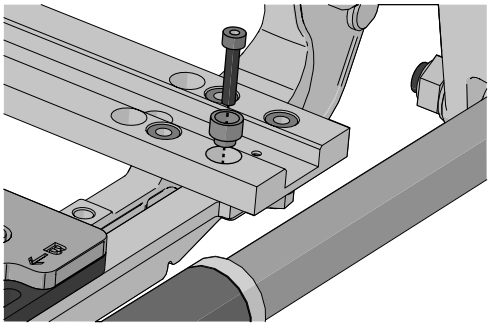


Figure 80. Fit the M4x20 screw thru the bushing.

9. Tighten the M4x20 screw (A) with 2.2 lb.ft.

10. Tighten the front attachment (H) and the M6x20 (E) at the rear attachment with 7.2 lb.ft.

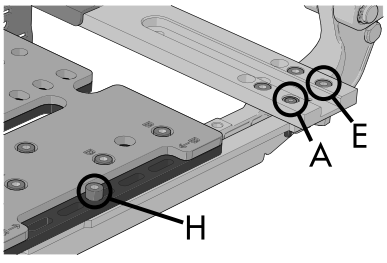


Figure 81. The front attachment (H), M4x20 (B) screw with the bushing and M6x20 (E) with the washer and lock nut at the rear attachment.

11. Push back the UniTrack rail brackets with the rail onto the seat bars.
12. Mount the two screws securing the two UniTrack rail brackets.

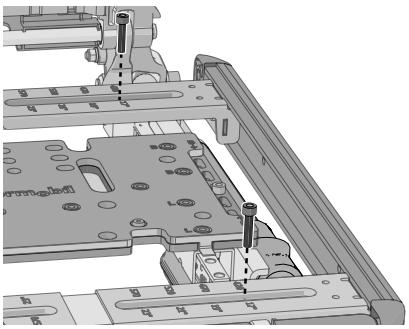


Figure 82. The UniTrack rail brackets is attached with two screws.

13. Secure the cabling for the actuator in its fixing points. Consider the arrangement of the cables carefully and make sure there is no risk of them getting trapped or otherwise damaged.
14. Connect the actuator connector to the junction box on the right side of the seat. Fit the connector by pushing it straight in at any point.
15. Assemble the seat plates. See 4.1.2 *Seat plates*, Page 25.
16. Assemble the thigh supports.
17. Assemble the seat cushion by means of velcro.

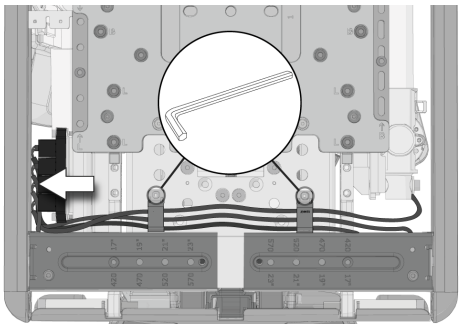


Figure 83. Backrest actuator cabling.

4.1.7 Armrest height adjustment mechanism

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 3 mm.
- 1 Allen key 5 mm.

4.1.7.1 Removing armrest height adjustment mechanism

1. Remove the backrest plates. For a detailed description, see 4.1.4 *Backrest*, Page 26.
2. Remove the screw securing the plastic knob.
3. Remove the plastic knob.

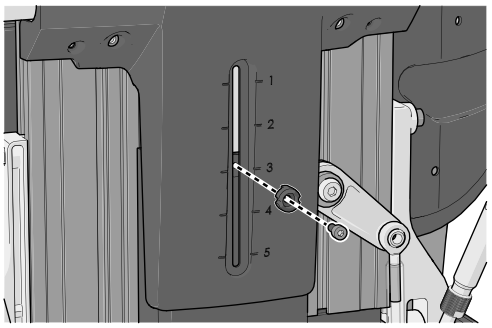


Figure 84. The plastic knob is attached with a screw.

4. Remove the four screws securing the plastic cover.

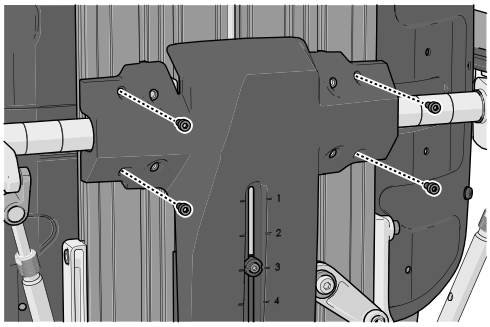


Figure 85. The locations of the four screws securing the plastic cover.

5. Document the cable set up behind the plastic cover.

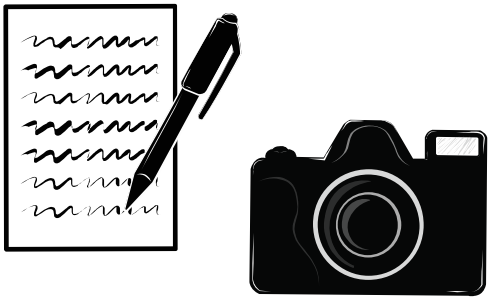


Figure 86. It is important that you document the cable set up. Use a camera or make a drawing.

6. Remove the BUS contacts from the contact block and divide the cabling for the ICS switchbox at the contacts on the cabling.

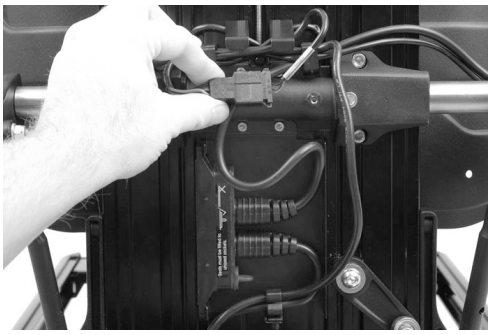


Figure 87. Disconnect the R-net cable from the contact block at back of the backrest.

7. Remove the four screws attaching the armrest hinge to the backrest. Also remove the four washers.

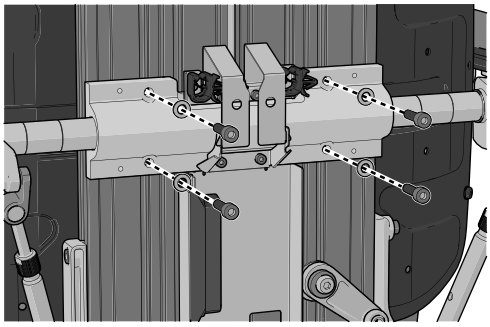


Figure 88. The armrests are held in place by four screws

8. Remove the joint for the backrest slide function, which is held in place by one screw.

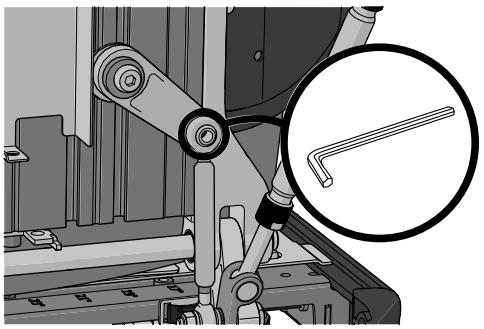


Figure 89. The joint for the backrest slide function is held in place by one screw.

9. Carefully move the armrests together with armrest hinge backwards. Lay the armrest together with the armrest hinge behind the seat.

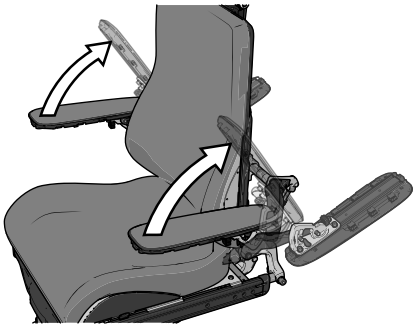


Figure 90. The armrests together with the armrest hinge are only attached by the two tie bars to the seat.

10. Loosen the two screws on the left and the right side of the backrest profile.

11. Slide the backrest profile out from the hinge and slewing bracket by pulling it straight up.

Figure 91. The backrest profile is secured by two screws on the left and right.

12. Loosen the screws on the left and right side of the backrest profile and then remove its end cover by sliding it straight out.

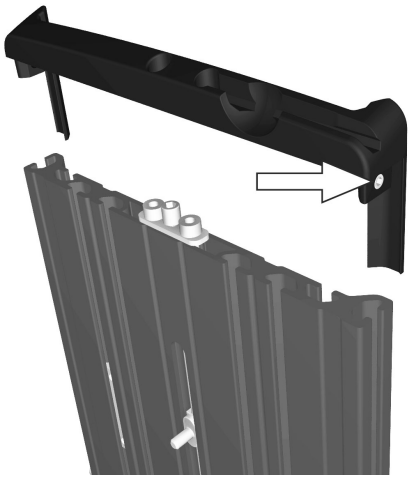


Figure 92. The end cover of the backrest profile is secured using one screw on the left side and one on the right.

13. Remove the adjustment bar brackets, which are each held in place by two screws.

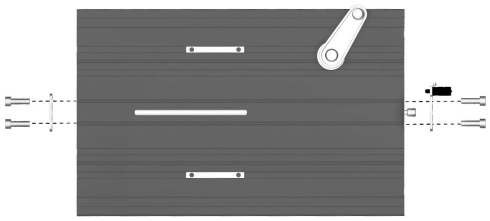


Figure 93. The adjustment bar brackets are each held in place by two screws.

14. Screw the adjustment bar down far enough to be able to prize it up out of the groove on the backrest profile.

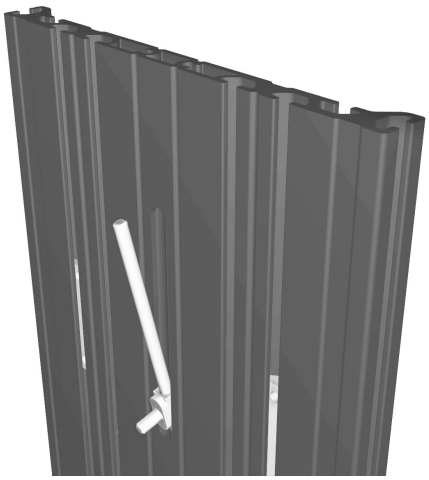


Figure 94. Screw the adjustment bar down far enough to be able to prize it up out of the groove on the backrest profile.

4.1.7.2 Mounting armrest height adjustment mechanism

1. Push the threaded rod into the backrest profile and at the same time screw on the driver (1).

2. Apply thread locker (Loctite 2701) to the ends of the threaded rod and fit the two end pieces (2 & 3) onto the threaded rod.

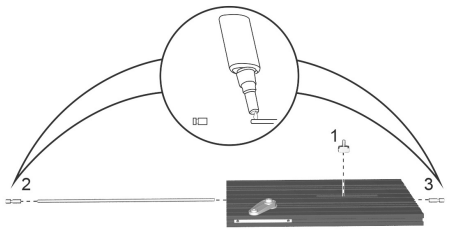


Figure 95. Apply thread locker.

3. Assemble the adjustment bar brackets, which are each held in place by two screws.

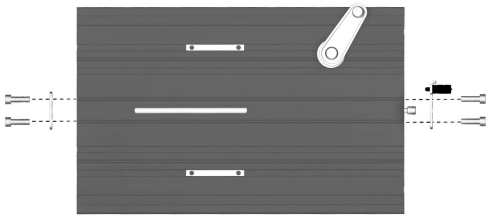


Figure 96. The adjustment bar brackets are each held in place by two screws.

4. Reassemble the end cover of the backrest profile by pushing it straight into the end of the profile. Secure the cover by tightening the screws on the left and right.

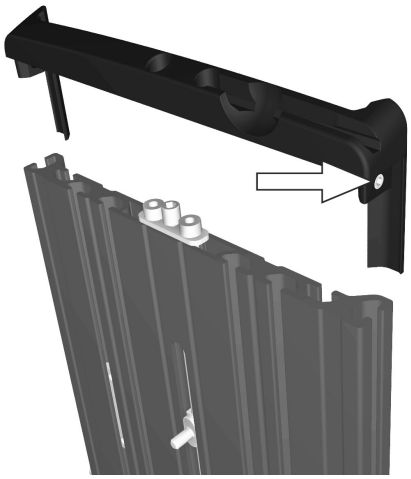


Figure 97. The end cover of the backrest profile is secured using one screw on the left side and one on the right.

5. Reassemble the backrest profile by fitting the hinge and the slewing bracket into the profile groove on the left and right sides. Slide the profile downwards until the stop on the bracket and the slewing bracket is touching the end of the backrest profile on both the left side and the right. Secure the backrest profile by tightening the two screws on the left and right. Tighten the screws using a torque wrench. Tightening torque 7.2 lb.ft.

Figure 98. The backrest profile is secured by two screws on the left and right.

6. Carefully put the armrests and the armrest hinge back to its original position.
7. Reattach the armrests using the four screws with the washers. Tighten the screws using a torque wrench. Tightening torque 7.2 lb.ft.

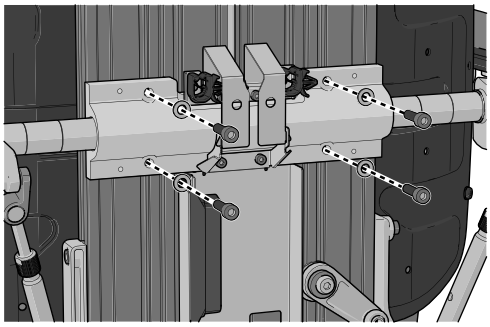


Figure 99. The armrests are held in place by four screws

8. Assemble the joint for the backrest slide function using the screw supplied. Tighten the screw using a torque wrench. Tightening torque 7.2 lb.ft.

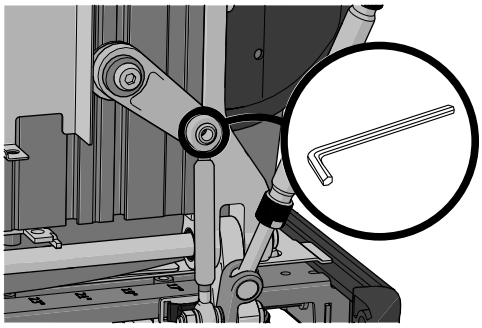


Figure 100. The joint for the backrest slide function is held in place by one screw.

9. Check your documentation on the cable set up.
10. Connect the BUS contacts into the contact block and assemble the cabling for the ICS switchbox at the contact on the cabling.

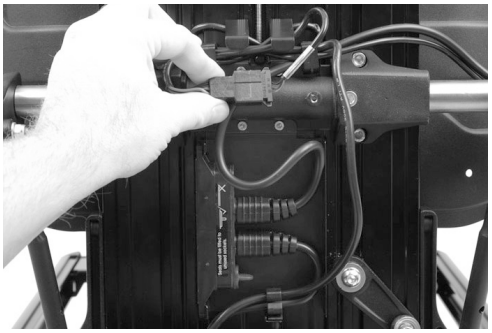


Figure 101. Connect the R-net cable into the contact block at back of the backrest.

11. Attach the plastic cover with the four screws. Tightening torque: 0.89 lb.ft.
12. Reassemble the backrest plates. For a detailed description. See 4.1.4 *Backrest*, Page 26.

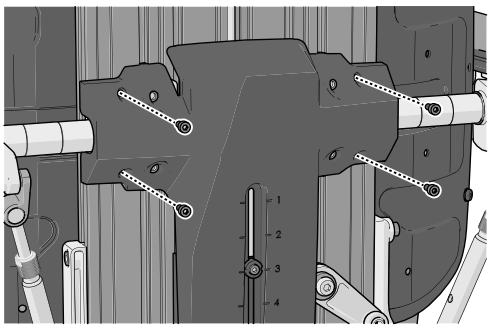


Figure 102. The locations of the four screws securing the plastic cover.

4.1.8 Parallel armrest rod

For this task the following tools are necessary:

- 1 Circlip pliers.
- 1 Allen key 5 mm.

4.1.8.1 Removing parallel armrest rod

1. Remove the screw at the front of the parallel armrest rod.

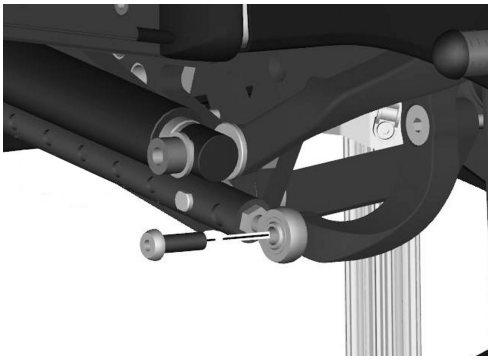


Figure 103. The parallel armrest rod front attachment screw.

2. Remove the circlip and the bolt at the back of the parallel armrest rod.

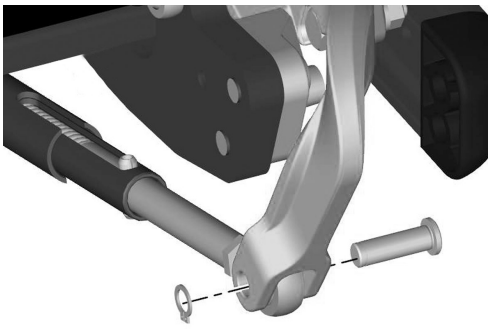


Figure 104. The parallel armrest rod rear attachment.

4.1.8.2 Mounting parallel armrest rod

1. Adjust the length of the parallel armrest rod. See 5.1.8 *Parallel armrest rod length*, Page 169.

Figure 105. Parallel armrest rod.

2. Assemble the parallel armrest rod at the back using the bolt and the circlip.

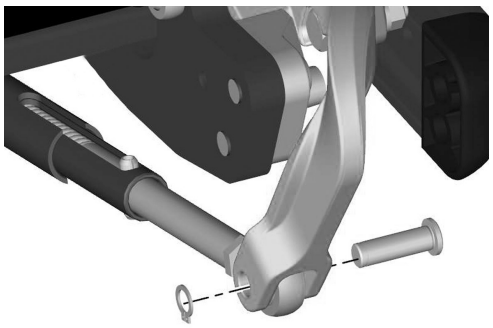


Figure 106. The parallel armrest rod rear attachment.

3. Assemble the parallel armrest rod at the front using the screw.

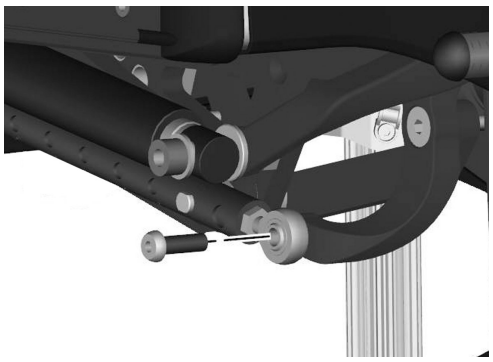


Figure 107. The parallel armrest rod front attachment screw.

4.1.9 Panel holder

- Allen key, 4 mm.
- Allen key, 5 mm.
- Diagonal pliers.
- Something to document with (camera, pen and paper etc.).

4.1.9.1 Removing panel holder

1. Switch Off the main power switch on the control panel.

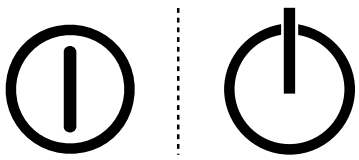


Figure 108. On/Off symbol depending on model.

2. Document the locations of the cable ties for the reassembly. The locations of the cable ties can vary between different configurations.

Figure 109. It is important that you document the locations of the cable ties. Use a camera or make a drawing.

3. Remove the cable ties necessary for removing the panel holder.

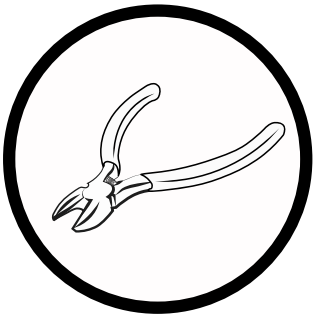


Figure 110. Use the diagonal pliers.

4. Disconnect the control panel's cable.

Figure 111. The control panel's cable connection is in most cases situated under the armrest.

5. Loosen the screw(s).

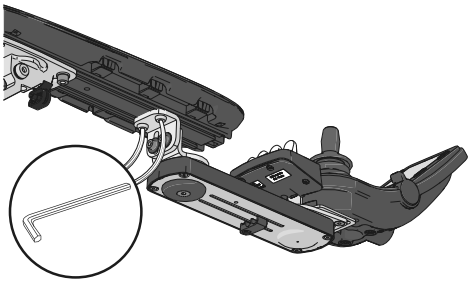


Figure 112. The position of the screws on the new model of the parallel panel holder.

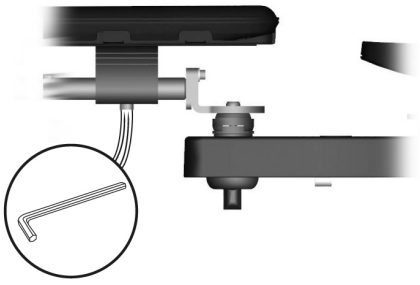


Figure 113. The screw's position on the earlier model of the parallel panel holder and the rotational panel holder.

6. Pull out the panel holder.

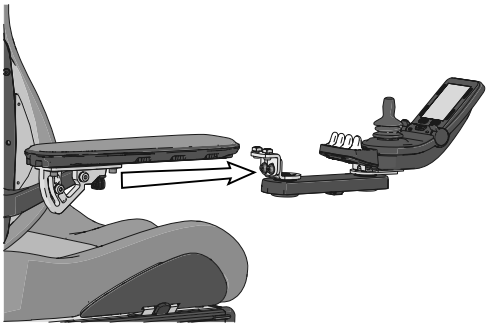


Figure 114. The new parallel panel holder is attached by two nuts into the UniTrack.

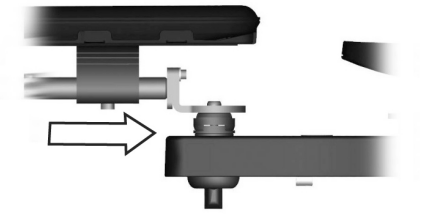


Figure 115. The earlier model of the parallel panel holder and the rotational panel holder is attached by a clamp.

4.1.9.2 Mounting panel holder

1. Push in the panel holder either in through the clamp or into the UniTrack.

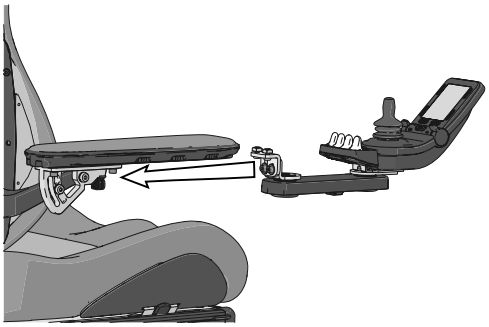


Figure 116. The new parallel panel holder is attached by two nuts into the UniTrack.

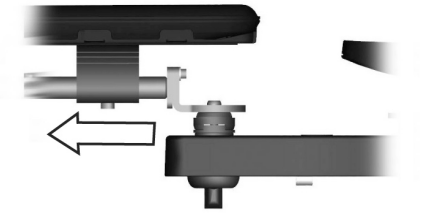


Figure 117. The earlier model of the parallel panel holder and the rotational panel holder is attached by a clamp.

2. Tighten the screw(s).

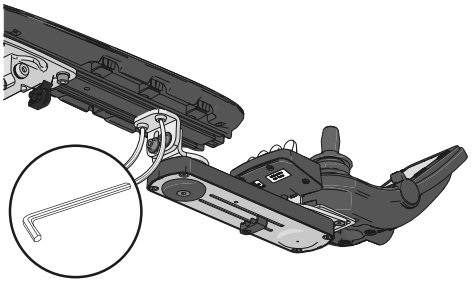


Figure 118. The screws position on the new model of the parallel panel holder.

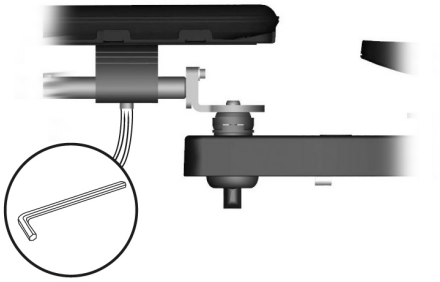


Figure 119. The screw's position on the earlier model of the parallel panel holder and the rotational panel holder.

3. Connect the control panel's cable connection.

Figure 120. The control panel's cable connection is in most cases located under the armrest.

Figure 121. Check your documentation.

4. Check your documentation of the cable ties locations ...

5. ... and attach the cable ties accordingly.

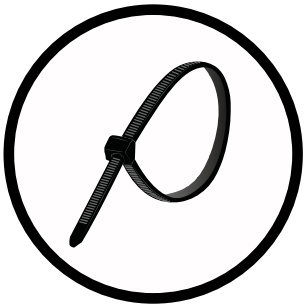


Figure 122. Be careful when tightening the cable ties. Do not damage the cables.

6. Switch On the main power switch on the control panel.

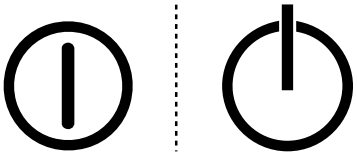


Figure 123. On/Off symbol depending on model.

4.1.10 Leg rest

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

WARNING!

Risk of injury while working on the leg rest

Do not place any weight on the leg rest while working on it.

4.1.10.1 Removing leg rest

1. Switch off the main power switch on the control panel.

2. Remove the leg rest's top cover by carefully pulling it straight out.

3. Disconnect the articulation actuator by dividing the connector on its cable.

Figure 124. Remove the leg rest's top cover by carefully pulling it straight out.

4. Remove the front ends of the UniTrack rails.

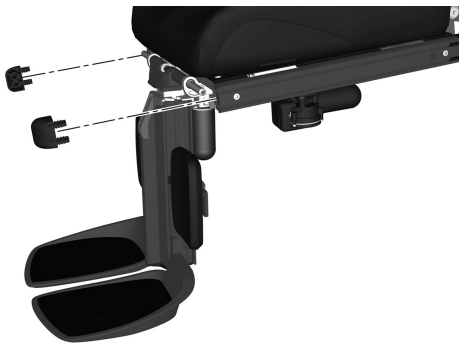


Figure 125. Remove the front ends of the UniTrack rails.

5. Remove the front bracket of the manual adjustment unit or actuator. Start with the lock nut (7) and the shim washer (6) on the inside of the bracket, then remove the screw (3), washer (4) and spacer (5).
6. Remove the leg rest, which is held in place by a axle (2) with a circlip (1) on the left and right hand side of the leg rest.

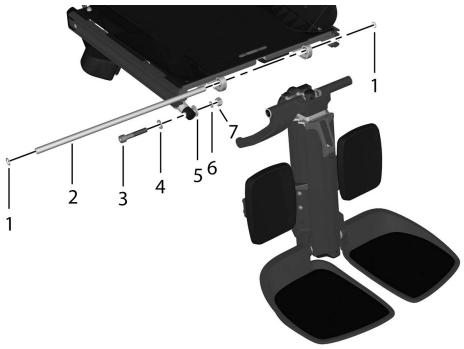


Figure 126. The leg rest is held in place by an axle (2) with a circlip (1) on the left and right hand side of the leg rest. The front bracket of the actuator is held in place by a screw (3), washer (4) and shim washer (5) and lock nut (7).

4.1.10.2 Mounting leg rest

1. Mount the leg rest using the axle and the two circlips.
2. Mount the front bracket of the manual adjustment unit/actuator. Start with the screw (3), washer (4) and spacer (5). Tighten the screw using a torque wrench. Tightening torque: 17.7 lb.ft. Then fit the shim washer (6) and lock nut (7) on the inside of the bracket. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. Tightening torque: 17.7 lb.ft.

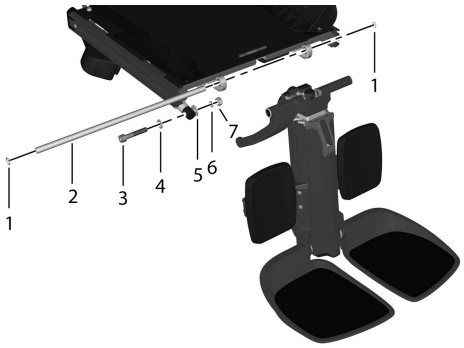


Figure 127. The leg rest is held in place by an axle (2) with a circlip (1) on the left and right hand side of the leg rest. The front bracket of the actuator is held in place by a screw (3), washer (4) and shim washer (5) and lock nut (7).

3. Mount the front ends of the UniTrack rails.
4. Connect the articulation actuator to the connector on its cable.

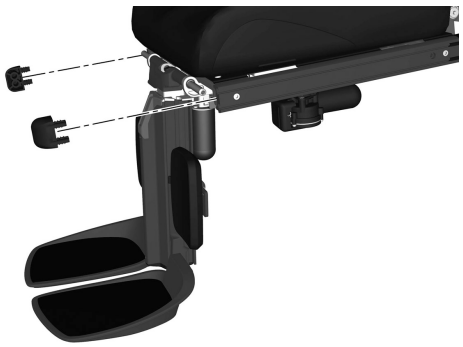


Figure 128. Remount the front ends of the UniTrack rails.

5. Mount the leg rest's top cover by carefully pressing its bracket into place on the leg rest's axle.

Figure 129. Mount the leg rest's top cover by carefully pressing its bracket into place on the leg rest's fixing screws and spacers.

4.1.11 Leg rest actuator

The powered leg rest exists in two different versions. What sets them apart is the brand of the actuator. One version uses an LINAK LA28 actuator and the other one an actuator from REAC. The most apparent difference is the motor location compared to the front. The motor on LINAK LA28 is pointing forward, see figure 134, while the motor on REAC points backwards, see figure 135. Their different brand marks is also found on each of them.

For this task the following tools and grease are necessary:

- 1 Torque wrench.
- 1 Socket 17 mm.
- 1 Allen key 5 mm.
- 1 Allen key 8 mm.
- Grease: Lubetec Red Guard or MICROLUBE GL 261/GL 262.

4.1.11.1 Removing leg rest actuator

WARNING!

Risk of injury while working on the leg rest

Do not place any weight on the leg rest while working on it.

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.

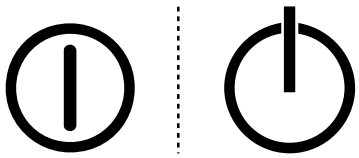


Figure 130. On/Off symbol depending on model.

3. Remove the seat cushion.
4. Remove the thigh supports.
5. Remove the seat plates on the right-hand side. See 4.1.2 *Seat plates*, Page 25.
6. Remove the UniTrack rail from the right side of the seat. See page 4.1.3 *UniTrack rails*, Page 25.
7. Remove the actuator connector by pushing in the two latches on the connector and pulling it straight out from the junction box on the right side of the seat.

   ⓘ Make a note of how the cabling is positioned; this is needed when you re-attach it later.
8. Loosen the actuator cabling from its fixing points. Pay attention to how the cable is positioned and strapped; this will help during reassembly. It is very important that positioning and strapping is performed the same way during the reassembling.

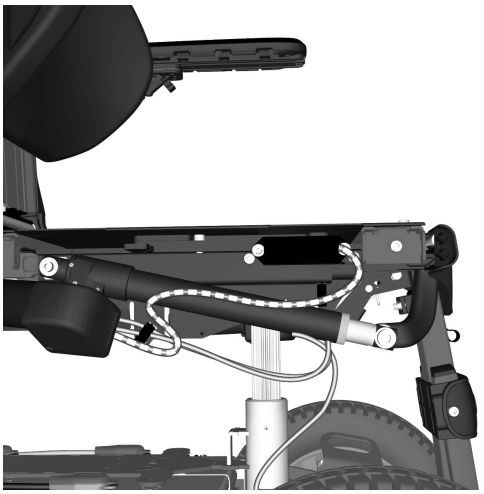


Figure 131. Actuator cabling, applies to both LINAK and REAC.

9. Remove the nut (F) and shim washer (E) from the front fixing screw (C).
10. Unscrew the front fixing screw (C) and dismount the thick washer (D), bushing (A in the front) and actuator from the leg rest arm.
11. Unscrew the rear mount screw with its washer (B) and dismount the actuator from the trunnion (A in the rear).

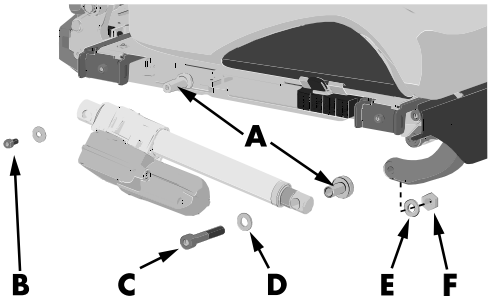


Figure 132. LINAK LA28 leg rest actuator is held in place by two screw joints, (B) and (C).

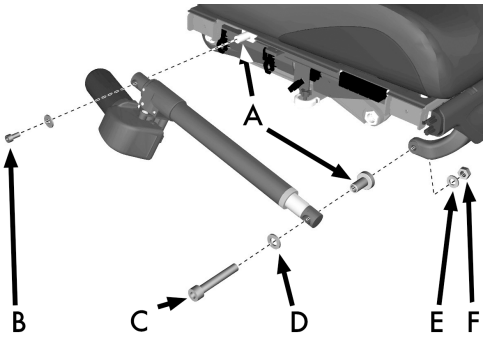


Figure 133. REAC leg rest actuator is held in place by two screw joints, (B) and (C).

4.1.11.2 Mounting leg rest actuator

1. Apply grease (Lubetec Red Guard or equivalent) on trunnion and bushing surfaces (A).
2. Mount the rear of the actuator onto the trunnion using the M6x12 screw (B) and its washer.

   Tighten the screw using a torque wrench. Tightening torque 7.2 lb.ft.
3. Place the thicker washer 2 mm (approximately 0.08") (D) onto the front fixing screw (C).
4. Mount bushing (A), front fixing screw (C), thick washer (D) and actuator to the leg rest arm.
5. Place the shim washer (E) on the front fixing screw (C) and screw the check nut (F) by hand onto the front fixing screw (C).
6. Use a Allen key to hold the front fixing screw (C), this to prevent it from loosening of the leg support arm when tightening the check nut (F).

   Tighten the check nut (F) using a torque wrench. Tightening torque: 17.7 lb.ft.
7. Consider the cables placement carefully, ensuring that there is no risk for them to jam or become damaged. It is very important that the positioning and strapping is performed in the same way as they were before disassembly.
8. Connect the actuator connector to the same position as noted in step 7. into the junction box on the right-hand side of the seat. Fit the connector by pushing it straight in at any point. See fig. 131.
9. Assemble the UniTrack rail on the right side of the seat. See 4.1.3 *UniTrack rails*, Page 25.
10. Assemble the seat plates on the right-hand side. See 4.1.2 *Seat plates*, Page 25.
11. Assemble the thigh supports.
12. Reattach the cushions by means of velcro.

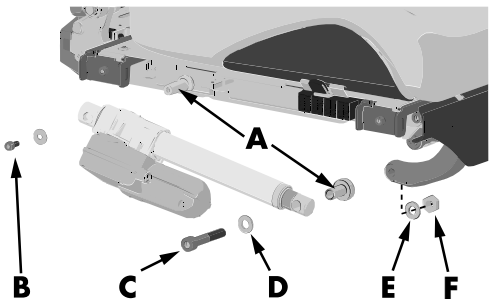


Figure 134. LINAK LA28 leg rest actuator is held in place by two screw joints, (B) and (C).

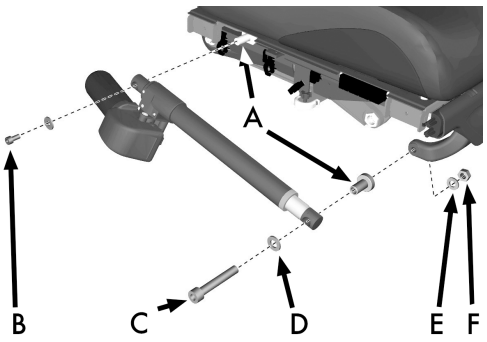


Figure 135. REAC leg rest actuator is held in place by two screw joints, (B) and (C).

4.1.12 Knee support

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 3 mm.
- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

4.1.12.1 Removing inner tube

1. Push in the handle on the lock mechanism and pull of the knee support.

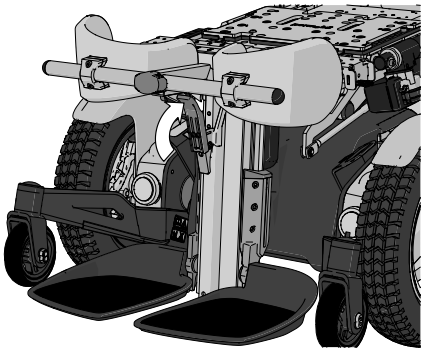


Figure 136. The lock is easily released by pushing in the handle.

2. Unscrew the plastic knob until ...

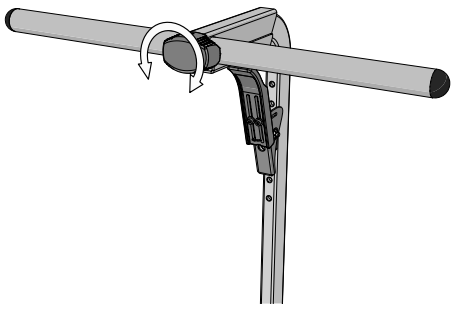


Figure 137. The knee pads are removed in the following figures for better visual orientation, you do not need to remove the pads.

3. ... the screw is visible on the bottom of the front frame.

4. Remove the screw and washer.

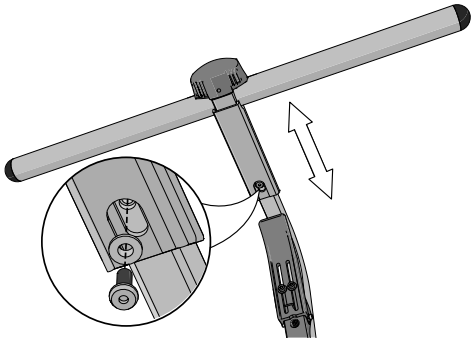


Figure 138. View from below.

5. Pull the front frame off the tube.

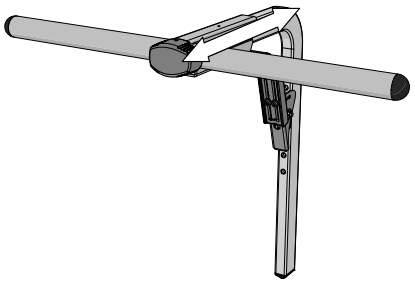


Figure 139. Grab the front frame and pull.

6. Unscrew the screw that holds the lock in place.

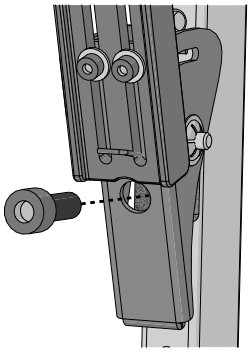


Figure 140. The lock is attached with one screw.

7. Remove the lock.

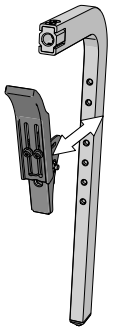


Figure 141. The lock.

8. Remove the plastic plug.

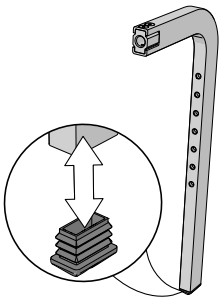


Figure 142. The plastic plug is located in the bottom end of the tube.

4.1.12.2 Mounting inner tube

1. Mount the plastic plug.

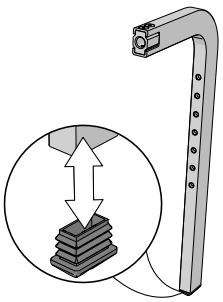


Figure 143. Mount the plastic plug in the bottom end of the tube.

2. Place the lock at the desired height.

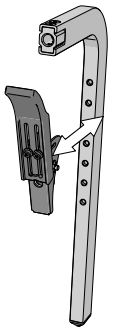


Figure 144. There are several height settings.

3. Mount the lock with M6x16 hexagon socket head screw. Tightening torque 7.2 lb.ft.

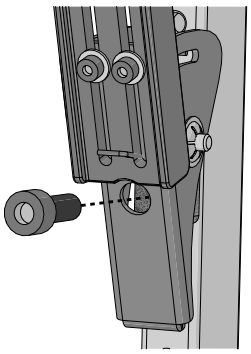


Figure 145. Use the M6x16 screw to secure the lock.

4. Slide the front frame onto the tube.

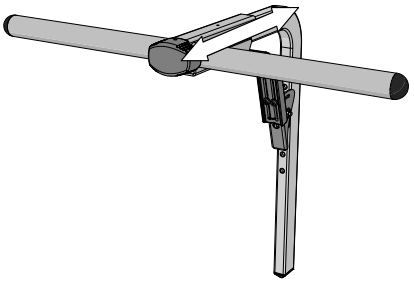


Figure 146. The knee pads are removed in the following figures for better visual orientation, you do not need to remove the pads.

5. Mount the front frame with the M4x10 hexagon socket button head screw and the supplied washer.

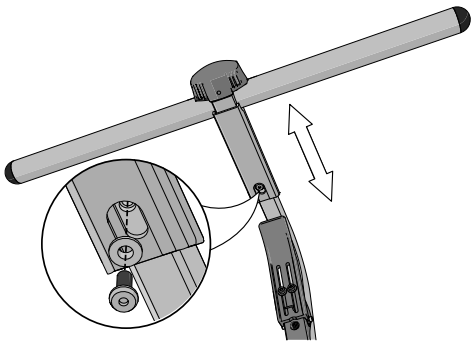


Figure 147. Use the M4x10 screw to secure the front frame.

6. Screw the plastic knob until the M4 screw is overlapped by the front frame.

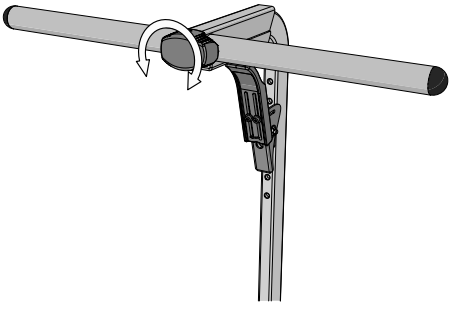


Figure 148. Screw the plastic knob.

7. Insert the tube into the leg rest.

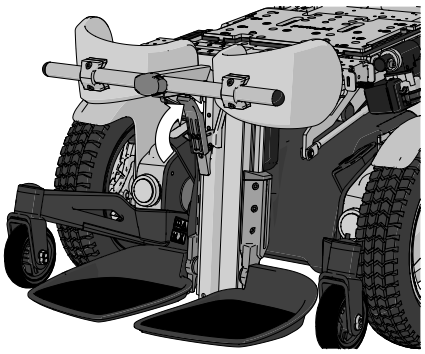


Figure 149. Adjust the height by pushing in the handle.

4.1.12.3 Removing knee pads

1. Loosen the four screws.

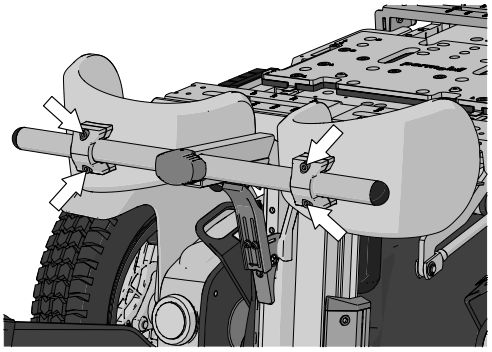


Figure 150. There are two screws on each bracket.

2. Slide the knee pads of the front frame.

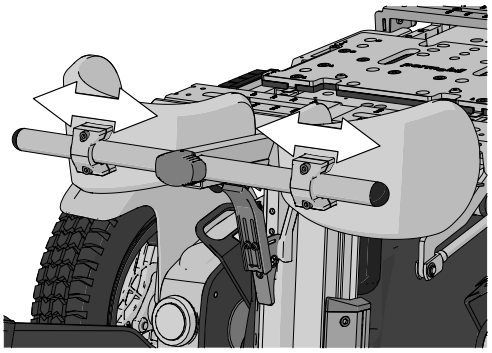


Figure 151. The brackets should slide easily, otherwise loosen the screws even more.

3. Remove the upholstery.

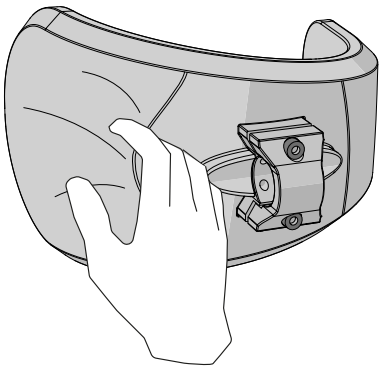


Figure 152. The upholstery.

4. Remove the four screws on each knee pad.

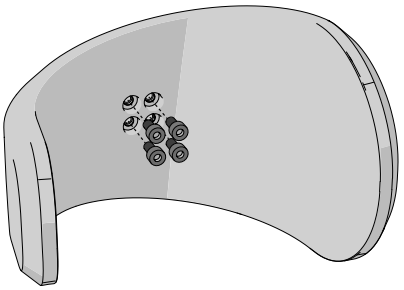


Figure 153. The inside of the knee pad.

5. Remove the bracket.

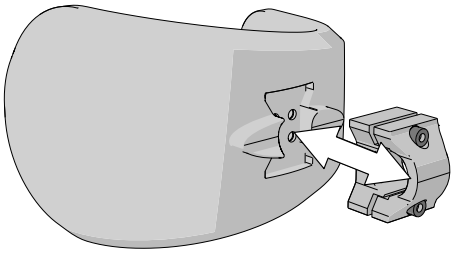


Figure 154. The bracket.

4.1.12.4 Mounting knee pads

1. Insert the bracket into the countersunk of the knee pad.

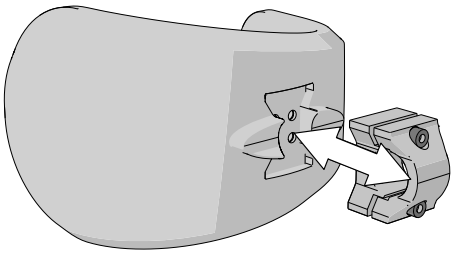


Figure 155. The bracket should have the screws in place.

2. Attach the bracket with the four M5x10 hexagon socket head cap screws.

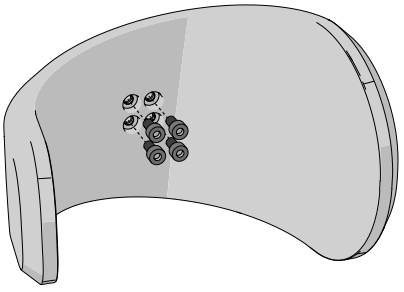


Figure 156. The inside of the knee pad.

3. Fit the upholstery.

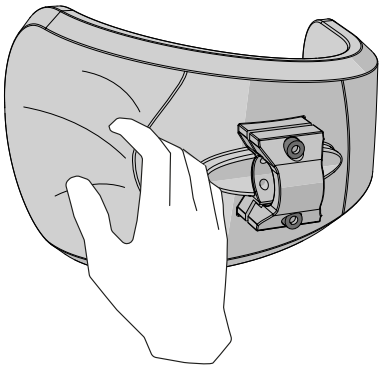


Figure 157. Pull the upholstery onto the pad.

4. Slide the knee pads onto the front frame.

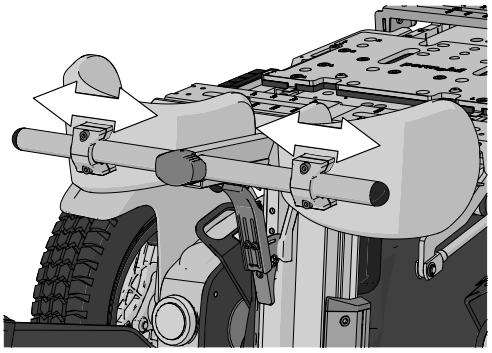


Figure 158. The brackets should slide easily, otherwise loosen the screws even more.

5. Tighten the screws on the two brackets.

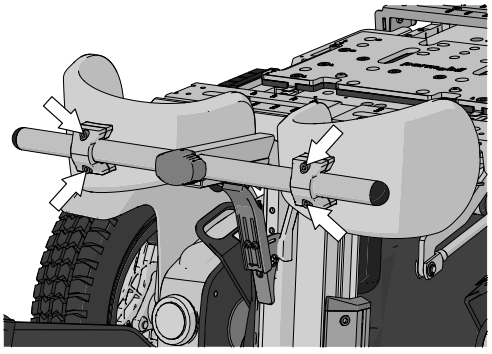


Figure 159. There are two screws on each bracket.

4.1.13 Footplates

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 5 mm.

WARNING!

Risk of injury while adjusting footplates

Do not place any weight or load on the footplates while adjusting the footplates.

4.1.13.1 Removing footplate

1. Switch off the main power switch on the control panel.
2. Remove the screw holding the footplate in place.
3. Remove the footplate friction brake by taking the parts off the shaft. See fig. 161.
4. Remove the footplate by taking it off the shaft. See fig. 161.

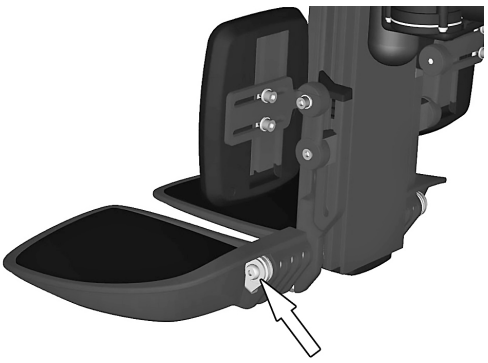


Figure 160. The friction brake's metal butt is in place in the intended hole in the footplate.

4.1.13.2 Mounting footplate

1. Mount the footplate by sliding it onto the shaft.
2. Mount the footplate friction brake by sliding the parts onto the shaft. Make sure that the metal butt is positioned in the intended hole in the footplate. See fig. 160.
3. Fit the screw that holds the footplate in place. See fig. 161. Tighten the screw using a torque wrench. Tightening torque: 17.7 lb.ft.

Figure 161. The footplate and its friction brake.

4.2 Chassis

4.2.1 Covers

4.2.1.1 Removing chassis covers

1. If possible, on chassis with powered seat lift, raise the seat halfway up, or on chassis with seat tilt only, raise the seat tilt halfway backwards, to facilitate removal of the chassis top cover.
2. Switch off the main power switch on the control panel.

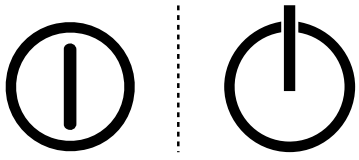


Figure 162. On/Off symbol depending on model.

3. Remove the two knobs holding the chassis covers.

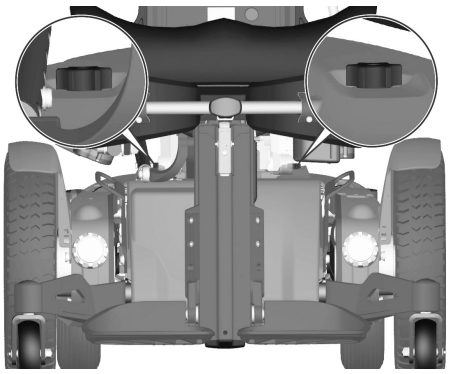


Figure 163. The chassis covers are fitted with two knobs.

4. Pull the top chassis cover backwards off the chassis.

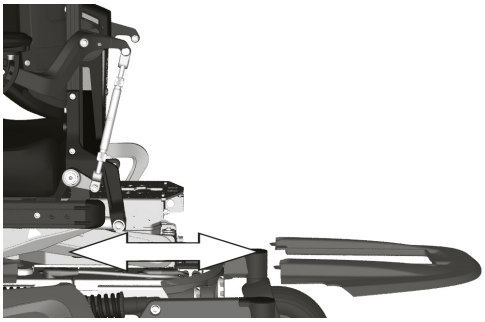


Figure 164. Top cover.

5. Pull the rear chassis cover off the chassis. Note that the cover is mounted around the axles of the link arms. On chassis with lights, disconnect the connector on the cable at the back marked “Rear lights and turn signals”.

Pull the rear chassis cover off the chassis. Note that the cover is mounted around the axles of the swing arms. On chassis with lights, disconnect the connector on the cable at the back marked “Rear lights and turn signals”.

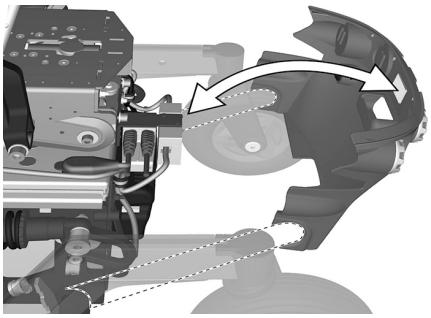


Figure 165. Rear cover.

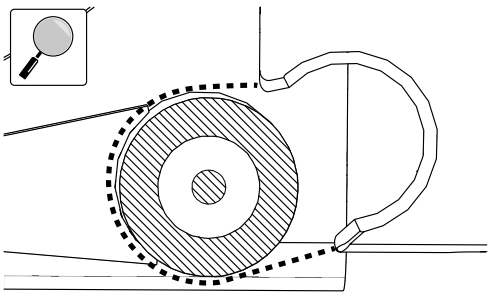


Figure 166. An enlargement of the rear cover going over the rear axle.

6. Pull the front chassis cover off the chassis. Note that the cover is mounted with snap hooks on the lower part of the chassis.

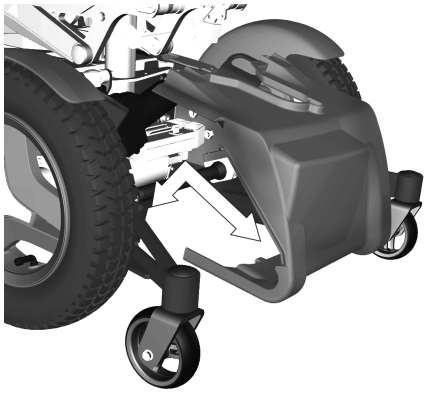


Figure 167. Front cover.

4.2.1.2 Mounting chassis covers

1. Switch off the main power switch on the control panel.

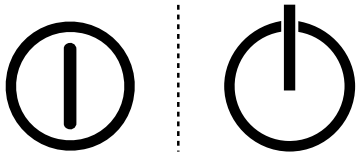


Figure 168. On/Off symbol depending on model.

2. On chassis with lights, connect the rear light cables on the rear cover to the cables marked "rear lights and turn signal" on the back of the chassis.
3. Mount the rear chassis cover on to the chassis by positioning the cover on the link arms axles.

   Mount the rear chassis cover on to the chassis by positioning the cover on the swing arms axles.
4. Secure the cover by pressing its upper part against the Velcro strip on the back of the chassis.

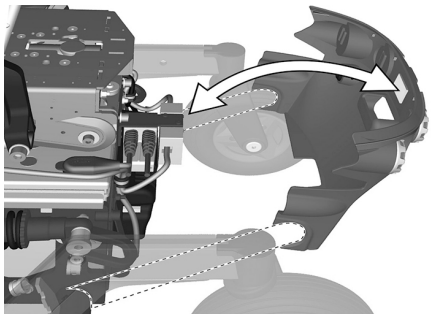


Figure 169. Rear cover.

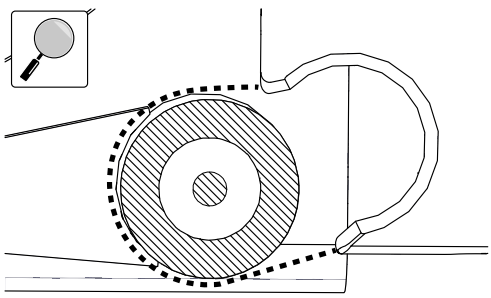


Figure 170. An enlargement of the rear cover going over the rear axle.

5. Mount the front chassis cover on to the chassis. Note that the cover is mounted with snap hooks on the lower part of the chassis. Position the cover making sure the fixing points are correctly positioned with the corresponding holes of the chassis.

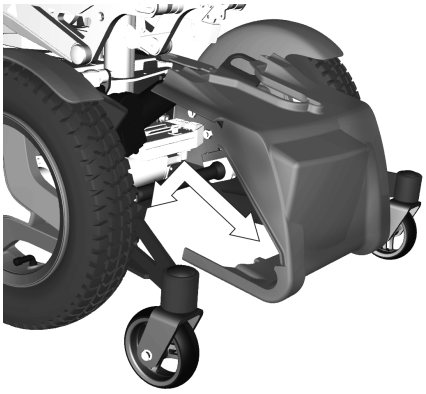


Figure 171. Front cover.

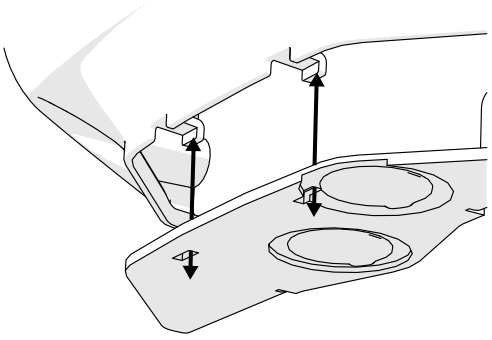


Figure 172. Snap hooks and its fixing point in the lower part of the chassis.

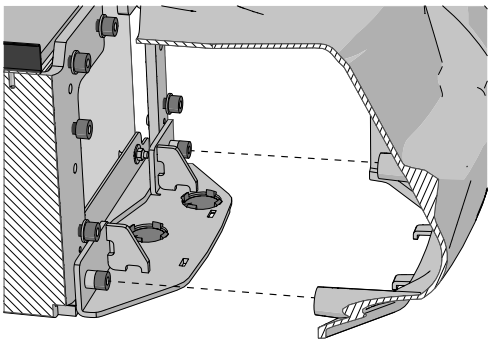


Figure 173. The lower screws of the chassis have to match the holes in the extrudes of the front cover.

6. Slide the top chassis cover on to the chassis and at the same time press the rear edge of it downwards to make sure it hooks on to the rear chassis cover.

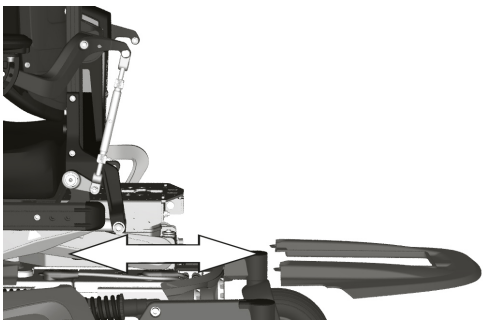


Figure 174. Top cover.

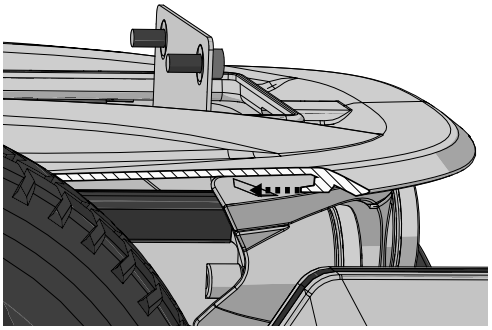


Figure 175. Make sure that the top cover hooks on to the rear cover.

7. Mount the two knobs holding the chassis covers without tightening them.

8. Press the top chassis cover and the front chassis cover against each other until any space between them is eliminated, then tighten the two knobs.

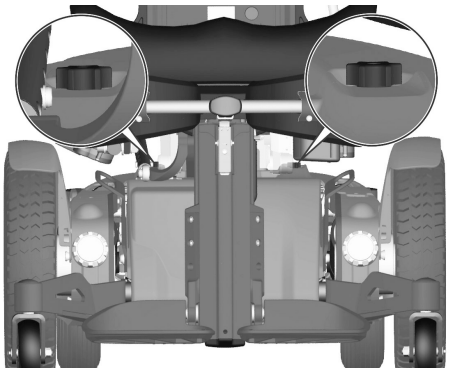


Figure 176. The chassis covers are fitted with two knobs.

4.2.1.3 Link arm covers

Removing link arm accent color cover

There is an accent color cover fitted on each link arm. This cover can be removed with the link arm still assembled on the wheelchair.

1. Switch off the main power switch on the control panel.
2. Remove the accent color cover by carefully bending it loose from underneath of the link arm by using a screwdriver.

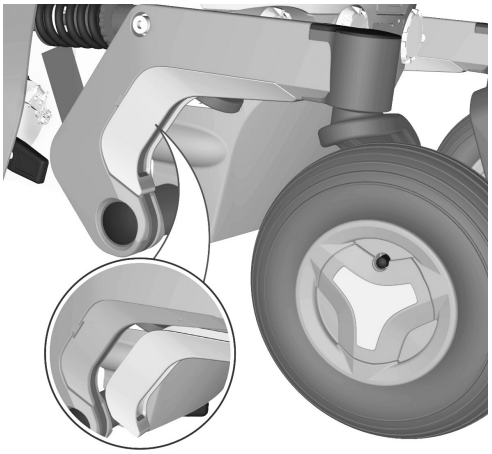


Figure 177. Link arm accent color cover.

Mounting link arm accent color cover

There is an accent color cover fitted on each link arm. This cover can be removed with the link arm still assembled on the wheelchair.

1. Switch off the main power switch on the control panel.
2. Fit the link arm accent color cover by carefully pushing it in to position until you hear a “click”.

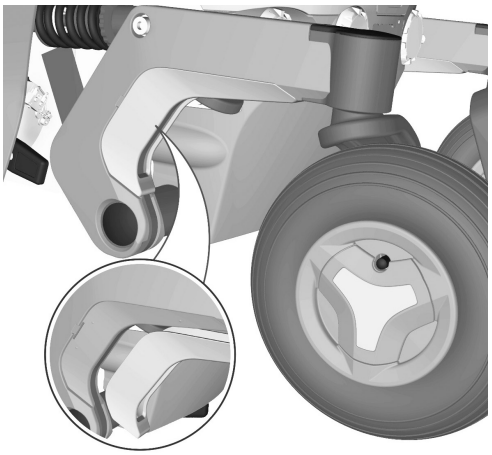


Figure 178. Link arm accent color cover.

Removing link arm covers

Both sides of the link arms have covers fitted. The covers are fitted with three screws. To remove these covers, the link arm has to be removed.

1. Switch off the main power switch on the control panel.
2. Remove the accent color cover. See fig. *Removing link arm accent color cover*, Page 68.
3. Remove the link arm. See 4.2.14 *Link arms*, Page 144.
4. Remove the three screws holding the link arm covers.

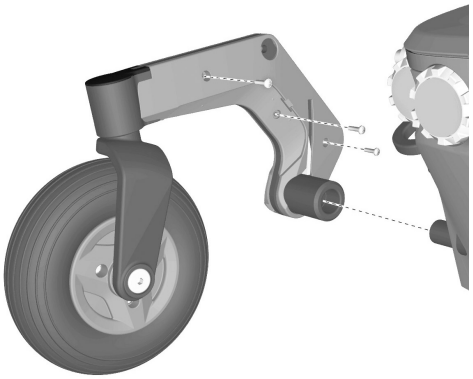


Figure 179. The link arm covers are mounted with three screws.

Mounting link arm covers

Assemble in the reverse order.

1. Fit the link arm covers using the three screws.
2. Fit the link arm. See 4.2.14 *Link arms*, Page 144.
3. Fit the link arm accent color cover. See *Mounting link arm accent color cover*, Page 68.

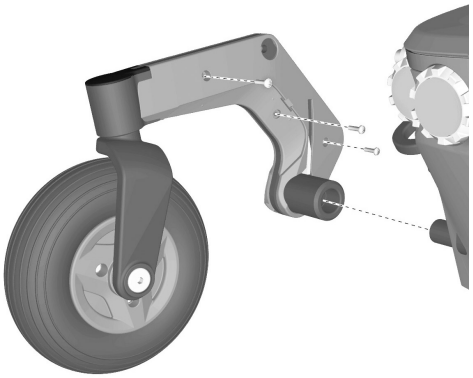


Figure 180. The link arm covers are mounted with three screws.

4.2.1.4 Removing drive package covers including front fender

Removing front fender

1. On wheelchairs with lights, pull the cable out of the slot to reveal the cable connector. Divide the connector to unplug the front lights.

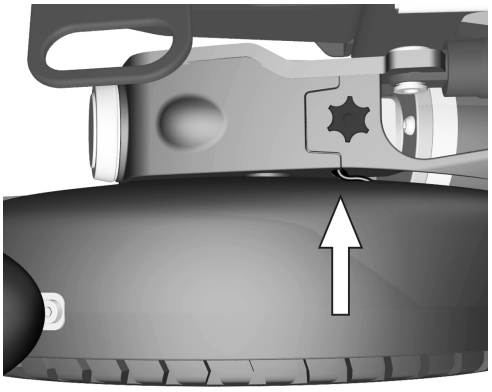


Figure 181. On wheelchairs with lights, pull the cable out of the slot to reveal the cable connector. Divide the connector to unplug the front lights.

2. Rotate the drive wheel in question to get access to the screw (1) holding the front fender.
3. Remove the screw and washer. Carefully pull the front fender straight up.

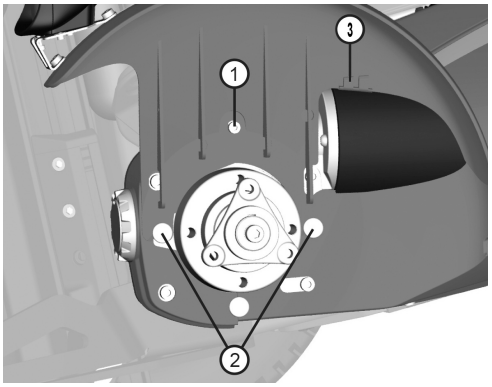


Figure 182. The front fender is fitted with one screw (1) and two fixing points (2) at the bottom. The wheelchair is shown without the drive wheel to get a better view of the front fender, the drive wheel does NOT need to be removed for this operation.

Removing drive motor cover

The drive motor cover is assembled with a knob (3) on the top and hook and loop fasteners (4) on the side and a fixing point (5) at the bottom. The front fender needs to be removed before removing the drive motor cover. See *Removing front fender*, Page 69.

1. Remove the knob (3).
2. Pull the upper rear edge of the drive motor cover straight out to release the hook and loop fastener (4). Bend a bit at the lower edge to release the cover from the fixing point (6) and then pull it straight backwards to release it from the fixing points (5).

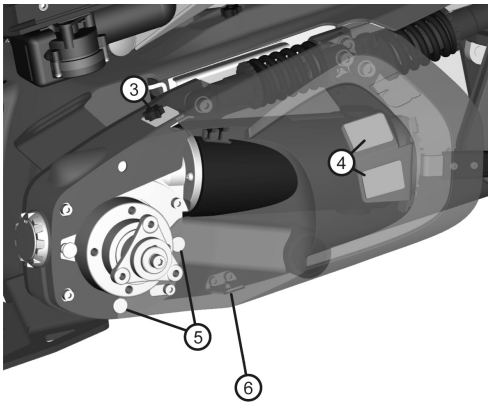


Figure 183. The drive motor cover is assembled with a knob (3) on the top and a dual lock (4) on the side and a fixing point (5) at the bottom.

Removing drive gear cover

The drive gear cover is assembled with a hook and loop fastener at the top. The front fender needs to be removed before removing the drive gear cover. See *Removing front fender*, Page 69.

1. On wheelchair with VS-seat, raise the seat to standing position making the support wheels go down towards the floor.
2. Carefully pull the upper edge of the drive gear cover upwards until the hook and loop fastener (7) releases. Then move the cover forward to release it from the fixing point (8) and simultaneously a bit outwards to make the screw heads (9) go out of the recesses of the drive gear cover.

   On wheelchairs with indicators, disconnect the indicator by dividing the connector on the cable.

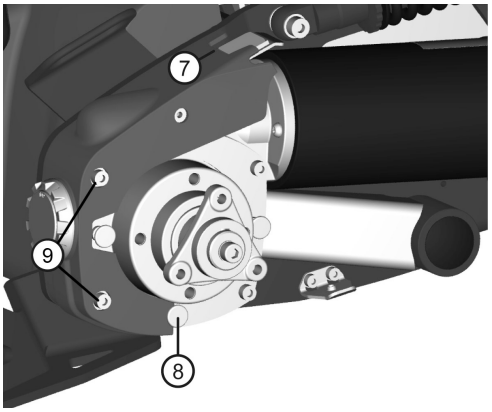


Figure 184. The drive gear cover is assembled with one hook and loop fastener at the top (6) and a fixing point at the bottom (7).

4.2.1.5 Mounting drive package covers including front fender

Mounting drive gear cover

The drive gear cover is assembled with one hook and loop fastener at the top (7) and a fixing point at the bottom (8).

1. On wheelchair with VS-seat, raise the seat to standing position making the support wheels go down towards the floor.
2. Position the cover on the drive gear making sure the fixing point (8) is correct positioned in the groove of the cover and that the screw heads (9) are positioned in the recesses of the cover.

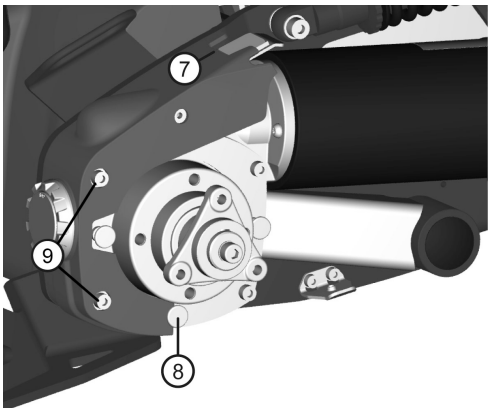


Figure 185. The drive gear cover is assembled with one hook and loop fastener at the top (7) and a fixing point at the bottom (8).

3. Position the cover and press it from above against the gear until the hook and loop fastener attaches with a "Click".
4. On wheelchairs with lights and indicators, connect the indicators cable to the connector marked front lights and turn signal. Position the other cable around the gear and through the slot on top of the cover.

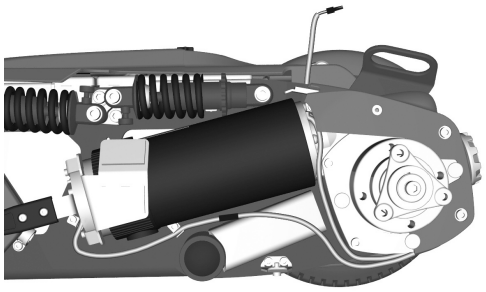


Figure 186. On wheelchairs with lights and indicators, connect the indicators cable to the connector marked front lights and turn signal. Position the other cable around the gear and through the slot on top of the cover.

5. On wheelchairs with lights only (no indicators), position the adapter cable between the drive motor and gear and through the slot on top of the cover.

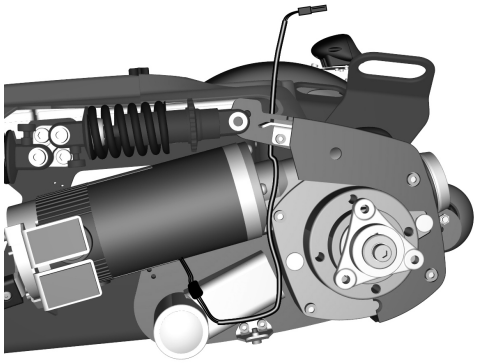


Figure 187. On wheelchairs with lights only (no indicators), position the adapter cable between the drive motor and gear and through the slot on top of the cover.

Mounting drive motor cover

The drive motor cover is assembled with a knob (3) on the top and hook and loop fasteners (4) on the side and a fixing point (5) at the bottom.

1. Position the drive motor cover on the fixing point at the lower edge of the drive gear.
2. Position the cover on the drive package making sure the fixing point (5) is correct positioned with the screw head (6) in corresponding hole of the cover.
3. Make sure it fits towards the drive gear cover and assemble the knob (3) on the top.
4. Press the cover from the side against the drive package until the hook and loop fastener (4) attaches with a "Click".

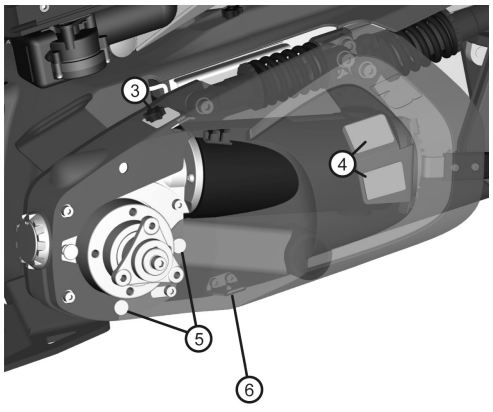


Figure 188. The drive motor cover is assembled with hook and loop fasteners (3 – 4) and a fixing point (5) at the bottom.

Mounting front fender

The front fender is assembled with a screw (1) and two fixing points (2). The wheelchair is shown without the drive wheel to get a better view of the front fender. The drive wheel does NOT need to be removed for this operation.

1. Position the front fender making sure the two fixing points (2) are correctly positioned in the grooves on the fender.
2. Assemble the screw (1) and washer. The front fender and the drive motor cover should be attached in a groove (3).
3. Position the drive motor cover making sure the two fixing points are correctly positioned in the grooves on the fender.

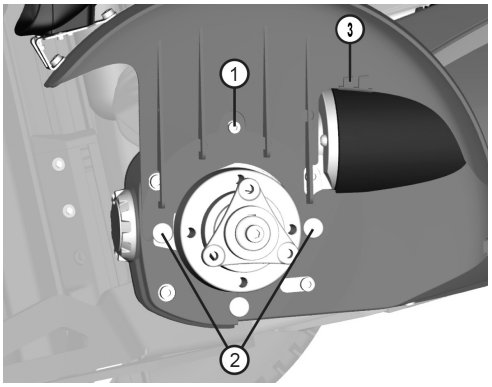


Figure 189. The front fender is fitted with one screw (1) and two fixing points (2) at the bottom.

4. On wheelchairs with lights, make sure to position the end of the lights cable up the hole through the fender.

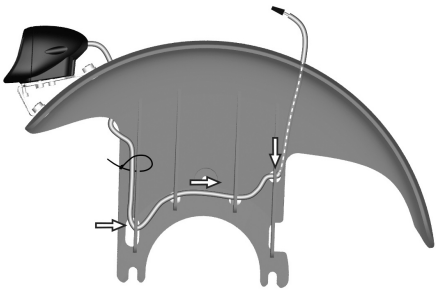


Figure 190. On wheelchairs with lights, make sure to position the end of the lights cable up the hole through the fender.

5. On wheelchairs with lights, connect the lights cable to the cable positioned in the slot on top of the driver gear cover. After connecting, push the cables and connectors into the slot, i.e. hide the connectors inside the drive gear cover.

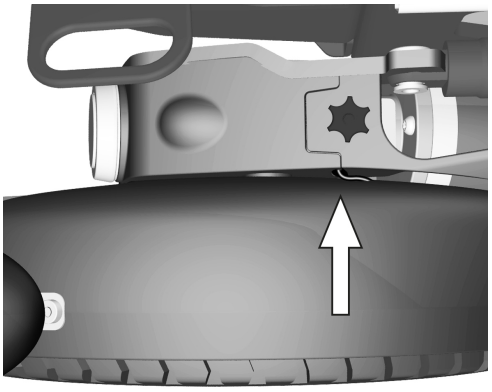


Figure 191. Hide the connectors inside the drive gear cover.

4.2.2 AP elevator

4.2.2.1 AP elevator

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 3 mm.
- 1 Allen key socket 6 mm.
- 1 Allen key socket 8 mm.
- 1 Ring wrench 17 mm.

- 1 Torx key T–20.
- Means of documentation (camera, pen and paper etc.).

Manual operation of AP elevator

If the AP elevator does not work normally because the batteries are discharged or the adjustment devices are defective, the seat can be raised or lowered manually.

Prepare manual operation

1. Switch off the main power switch on the control panel.

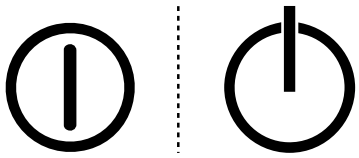


Figure 192. On/Off symbol depending on model.

2. Remove the seat cushion by lifting it straight up.

3. Remove the seat plates, they are fitted with four screws at the back and front edge.

Figure 193. The seat plates are held in place by four screws.

4. Remove the actuator from the leg rest, it is attached with one screw, washer, spacer, washer and a lock nut.

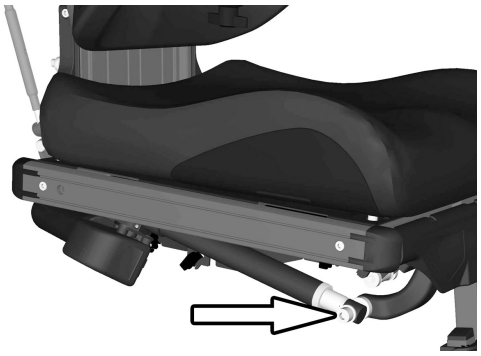


Figure 194. The actuator attachment screw.

5. Remove the leg rest's top cover by carefully pulling it straight out. If the three attachment screws of the power motor of the seat tilt mechanism are accessible, proceed to step 10.

Figure 195. Remove the leg rest's top cover by carefully pulling it straight out.

6. Remove the rear attachment screw of the UniTrack rail on the left and right hand side of the seat.

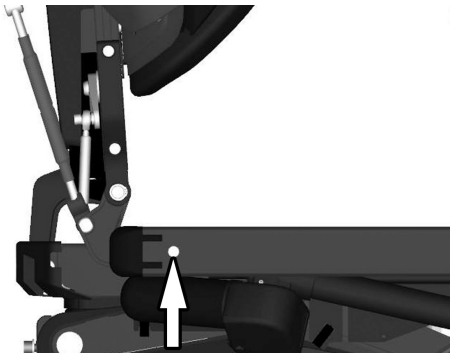


Figure 196. The rear attachment screw of the UniTrack rail.

7. Remove the circlip and the bolt at the back of the parallel armrest rod.

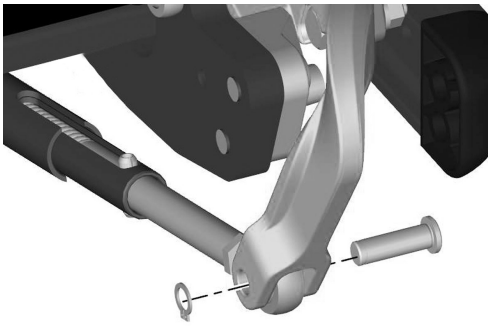


Figure 197. The parallel armrest rod rear attachment.

8. Remove the seven screws marked (B) securing the seat frame's rear section.

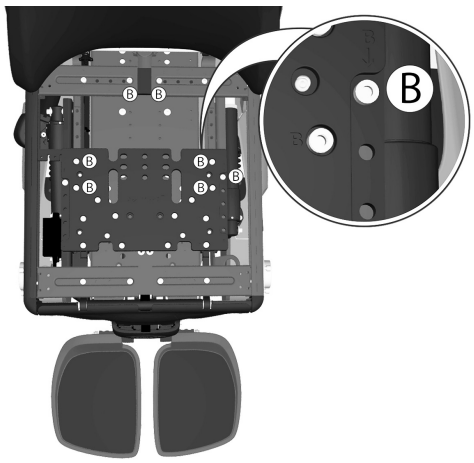


Figure 198. The position of the rear section of the seat frame (backrest position) is fixed by seven screws, here marked with the letter B.

9. Take note of the current seat depth setting with consideration to subsequent assembling. The rails with which the seat depth is adjusted are marked with the settings for each potential position. The scale is marked with "millimeters" on one side and "inches" on the other. Pull the rear section of the seat forward to uncover the three screws holding the power motor of the seat tilt mechanism.

10. Remove the power motor of the seat tilt mechanism, it is assembled with three screws.

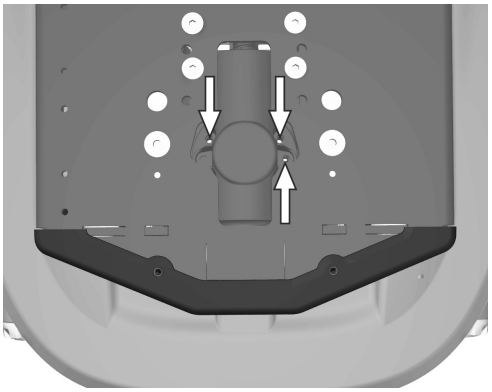


Figure 199. The power motor of the seat tilt mechanism is assembled with three screws.

11. Remove the protective rubber cover underneath the chassis to get access to the seat elevator axle. In the figure the wheelchair is shown without the front chassis cover for better view, the front chassis cover does not need to be removed.

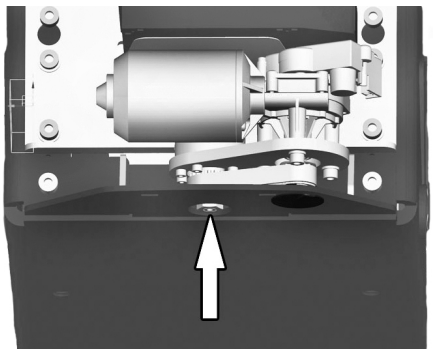


Figure 200. Remove the protective rubber cover underneath the chassis to get access to the seat elevator axle.

Manual adjustment of height and angle

1. Fold the leg rest upwards to get access to the seat elevator axle.
2. Use the Allen key from the back rest to manually adjust the height of the seat elevator i.e. rotate the axle.
3. Use the supplied spanner to manually adjust the angle of the seat elevator i.e. rotate the seat elevator axle. It is accessed through the hole in the bottom of the chassis. See fig. 200.

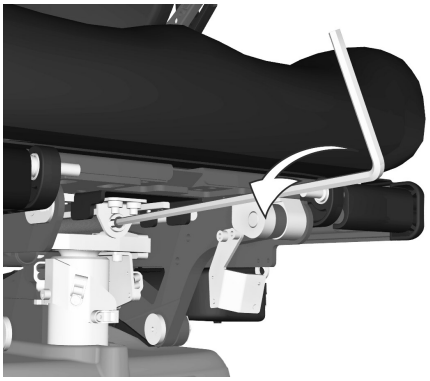


Figure 201. Use the Allen key from the back rest to manually adjust the height of the seat elevator. The seat is shown without the leg rest to get a better view, the leg rest do not need to be removed for this operation.

Reassemble after manual operation

1. Refit the protective rubber cover underneath the chassis.
2. Refit the power motor of the seat tilt mechanism, it is assembled with three screws. The actuator has to be calibrated after refitting. If the rear section of the seat frame hasn't been moved, proceed to step 6.

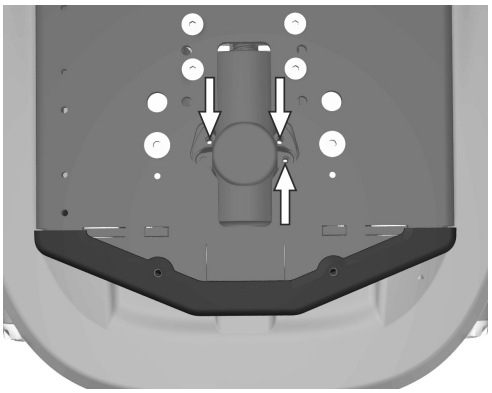


Figure 202. The power motor of the seat tilt mechanism is assembled with three screws.

3. Pull the rear section of the seat backwards to the correct seat depth setting. Tighten the seven screws marked (B) securing the seat frame's rear section.

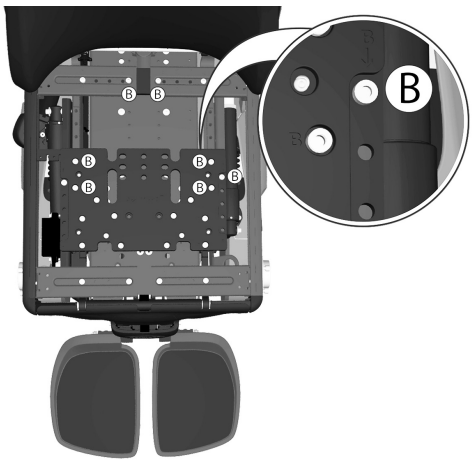


Figure 203. The position of the rear section of the seat frame (backrest position) is fixed by seven screws, here marked with the letter B.

4. Refit the circlip and the bolt at the back of the parallel armrest rod.

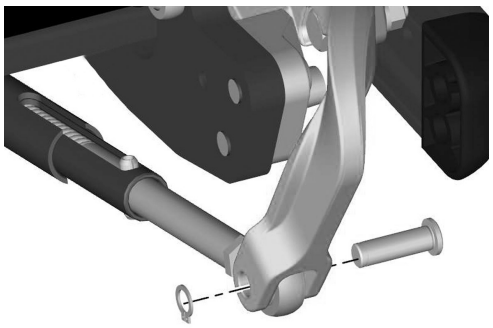


Figure 204. The parallel armrest rod rear attachment.

5. Refit the rear attachment screw of the UniTrack rail on the left and right hand side of the seat.

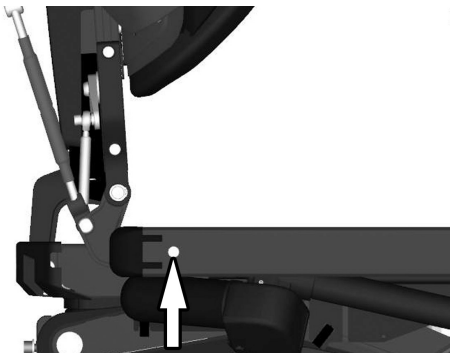


Figure 205. The rear attachment screw of the UniTrack rail.

6. Mount the leg rest's top cover by carefully pressing its bracket into place on the leg rest's axle.

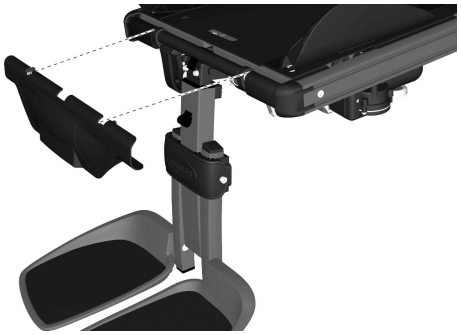


Figure 206. Mount the leg rest's top cover by carefully pressing its bracket into place on the leg rest's fixing screws/spacers.

7. Refit the actuator to the leg rest, it is attached with one screw, washer, spacer, washer and lock nut. Tighten the screw and nut using a torque wrench. Tightening torque: 17.7 lb.ft.

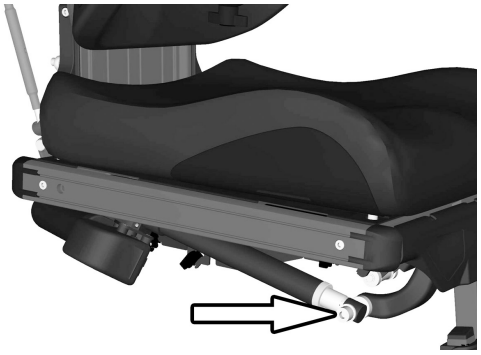


Figure 207. The actuator attachment screw.

8. Refit the seat plates, they are fitted with four screws at the back and front edge.
9. Refit the seat cushion.

Figure 208. The seat plates are held in place by four screws.

Removing AP elevator

1. Raise the seat lift to its highest position. To raise the seat on a chassis with an powered seat lift that does not work normally because the batteries are discharged or the adjustment device is defective, see *Manual operation of AP elevator*, Page 73.
2. Switch off the main power switch on the control panel.

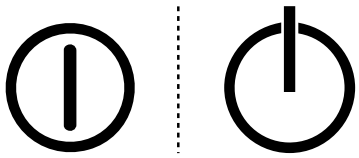


Figure 209. On/Off symbol depending on model.

3. Set the main circuit breaker to the "OFF" position. See 4.3.5 *Main circuit breaker*, Page 160.
4. Remove the chassis covers. See 4.2.1 *Covers*, Page 63.
5. Remove the seat plates. See4.1.2 *Seat plates*, Page 25.
6. Remove the UniTrack rail on the right hand side of the seat. It is mounted with two screws. See 4.1.3 *UniTrack rails*, Page 25.
7. Disconnect the Tilt motor cabling from the contact block at the seat frame. Release the cable from its cable brackets on the seat and the AP elevator. Make note of how the cable is assembled with consideration to subsequent re-assembly. See also 4.2.2.3 *AP elevator tilt motor cable*, Page 104.

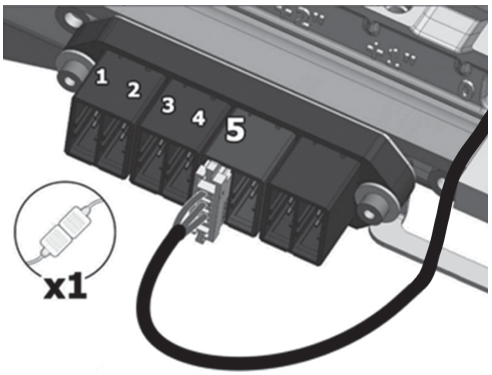


Figure 210. Tilt motor cabling is attached to the contact block on the seat frame.

8. Disconnect the cable that connects the ICS master module to the contact block at the seat frame. Make note of how the cables are assembled on the seat frame with consideration to subsequent re-assembly. See also 4.3.2 *R-net and ICS bus cabling*, Page 152.

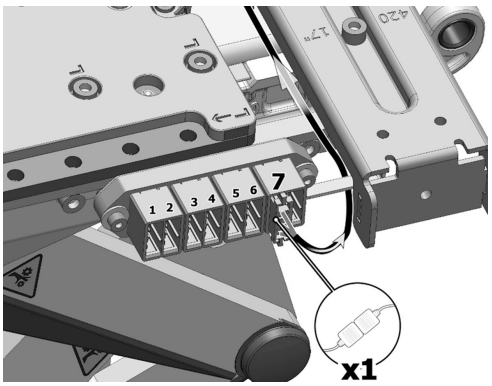


Figure 211. The ICS bus cable is connected to the seventh position of the connector block.

9. Remove the screw securing the plastic knob.

10. Remove the plastic knob.

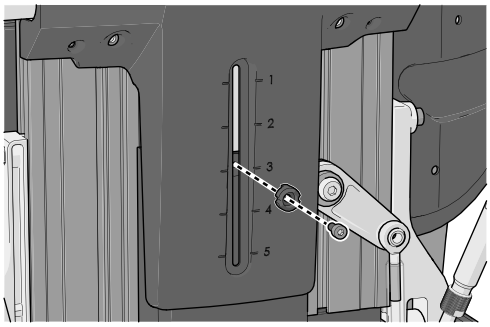


Figure 212. The plastic knob is attached with a screw.

11. Remove the four screws securing the plastic cover.

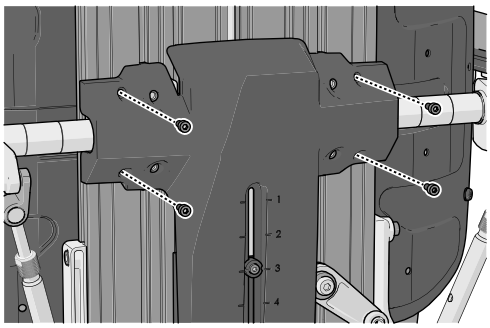


Figure 213. The locations of the four screws securing the plastic cover.

12. Document the cable set up behind the plastic cover.

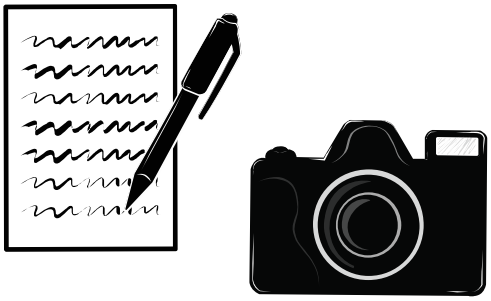


Figure 214. It is important that you document the cable set up. Use a camera or make a drawing.

13. Disconnect the R-net cable from the contact block at the back of the backrest. Release the cable from its cable brackets. Make note of how the cable is mounted with consideration to subsequent mounting. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

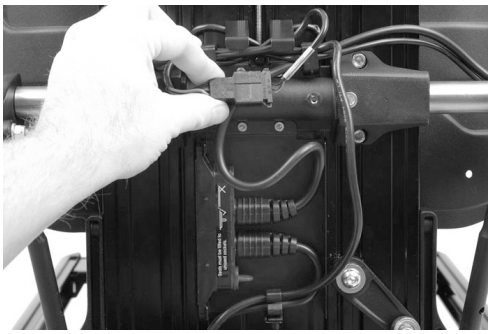


Figure 215. Disconnect the R-net cable from the contact block at back of the backrest.

14. Detach the AP elevator rod from the back rest hinge. It is attached with a pin and circlip.

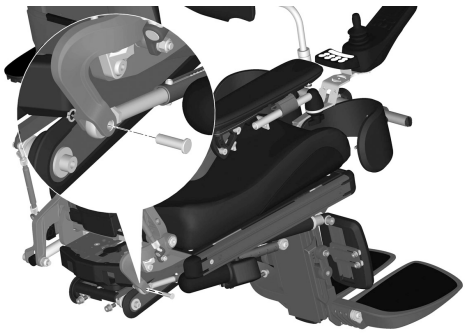


Figure 216. The AP elevator rod is attached with a pin and circlip.

15. Remove the seat. See 4.1.1 *Seat*, Page 20.

16. Disconnect the AP elevator cabling from the ICS master module. It is connected to one of the connectors J11 or J12. Release the cable from its cable brackets. Make note of how the cable is mounted with consideration to subsequent re-assembly.

17. Remove the ICS master module. See 4.3.4 *ICS master module*, Page 158.

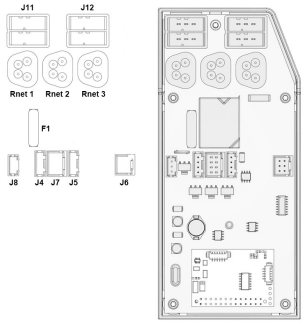


Figure 217. ICS master module.

18. Remove the front transport eyes, they are attached with two screws each.

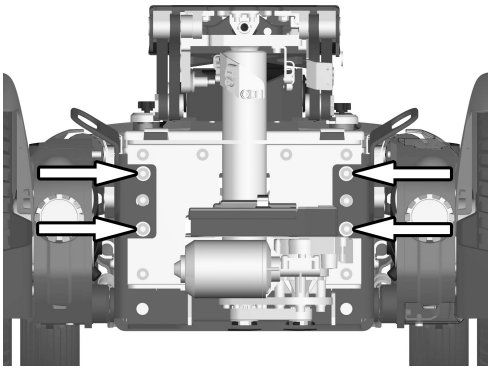


Figure 218. The front transport eyes, are attached with two screws each.

19. Remove the six screws (1) and loosen the two screws (2) holding the AP elevator at the front.

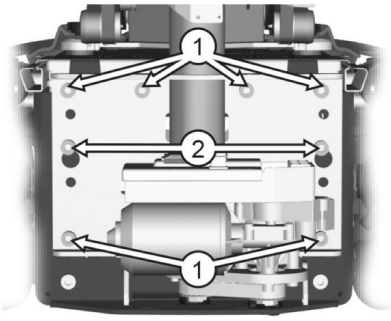


Figure 219. The AP elevator is attached with eight screws at the front.

20. Remove the two screws (3) holding the AP elevator at the back.

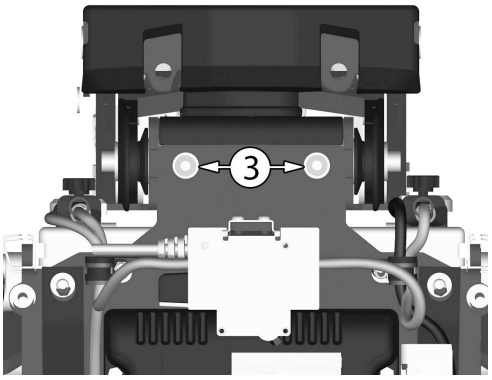


Figure 220. The two screws holding the AP elevator at the back.

21. Lift the AP elevator straight up out of the chassis.

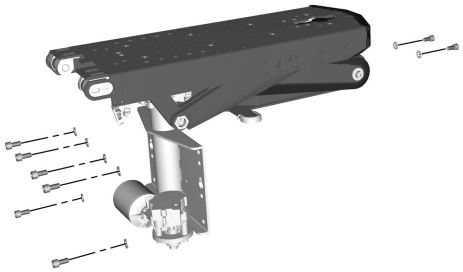


Figure 221. AP elevator.

Mounting AP elevator

Mount in the reverse order.

1. Fit the AP elevator into the chassis. Fit the six screws (1) and tighten the two screws (2) holding the AP elevator at the front. Use a torque wrench to tighten the screws. Tightening torque: 17.7 lb.ft.

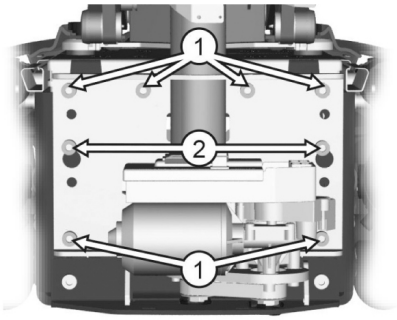


Figure 222. The AP elevator is attached with eight screws at the front.

2. Fit the two screws (3) holding the AP elevator at the back. Use a torque wrench to tighten the screws. Tightening torque: 17.7 lb.ft.

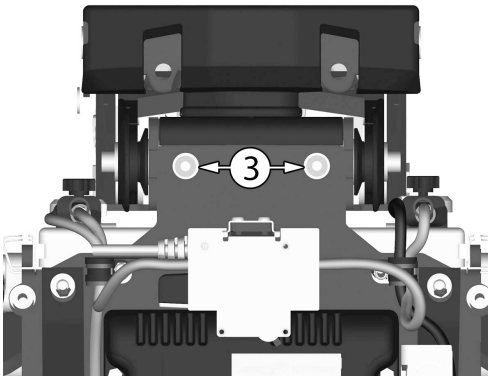


Figure 223. The two screws holding the AP elevator at the back.

3. Refit the front transport eyes, they are attached with two screws each. Use a torque wrench to tighten the screws. 17.7 lb.ft

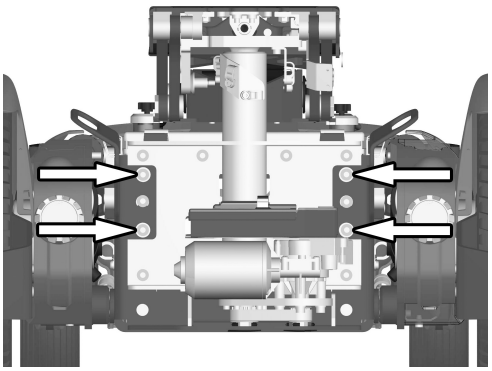


Figure 224. The front transport eyes, are attached with two screws each.

4. Mount the ICS master module. See 4.3.4 *ICS master module*, Page 158.
5. Connect the AP elevator cabling to the ICS master module. It should be connected to either one of the connectors J11 or J12.
6. Mount the seat. See 4.1.1 *Seat*, Page 20.

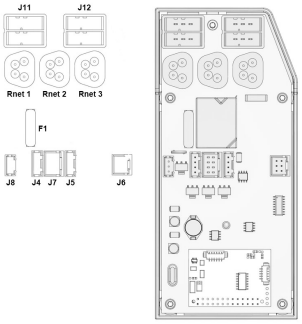


Figure 225. ICS master module.

7. Mount the AP elevator rod to the back rest hinge. It is attached with a pin and circlip.

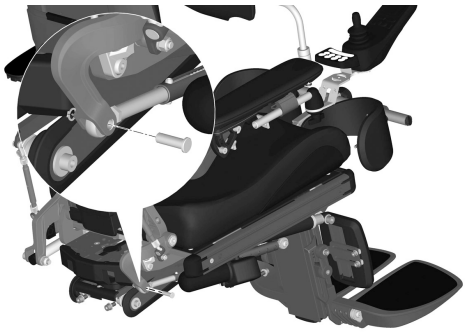


Figure 226. The AP elevator rod is attached with a pin and circlip.

8. Connect the Tilt motor cabling to the contact block at the seat frame. Mount the cable to its cable brackets on the right hand side of the seat. See 4.2.2.3 *AP elevator tilt motor cable*, Page 104.

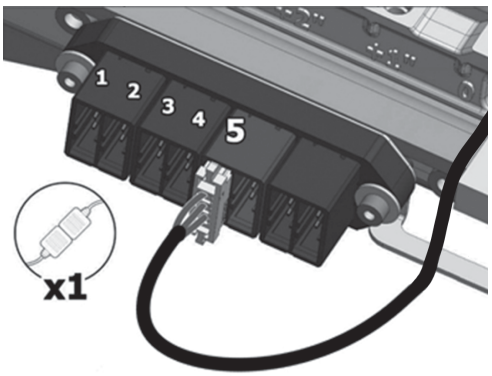


Figure 227. The Tilt motor cabling is attached to the contact block on the seat frame.

9. Check your documentation of the cable set up.

10. Connect the R-net cables to the contact block at the back of the backrest. Assemble the cables to its cable brackets. See 4.3.2 *R-net and ICS bus cabling*, Page 152.

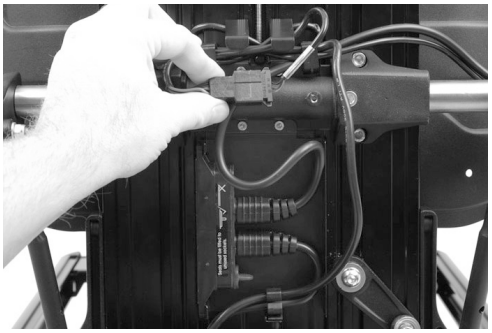


Figure 228. Connect the R-net cable from the contact block at back of the backrest.

11. Attach the plastic cover with the four screws. Tightening torque: 0.89 lb.ft.

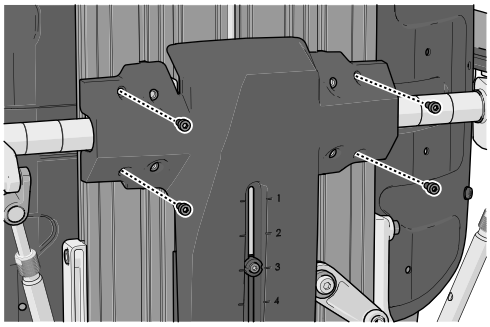


Figure 229. The locations of the four screws securing the plastic cover.

12. Attach the plastic knob with the screw. Tightening torque: 0.22 lb.ft.

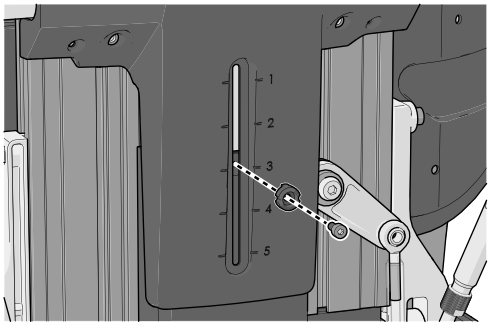


Figure 230. The plastic knob is attached with a screw.

13. Connect the ICS bus cable at the connector on the cables next to the contact block at the back of the back rest. See 4.3.2 *R-net and ICS bus cabling*, Page 152.
14. Mount the UniTrack rail. See 4.1.3 *UniTrack rails*, Page 25.
15. Mount the seat plates. See4.1.2 *Seat plates*, Page 25.
16. Mount the chassis covers. See 4.2.1 *Covers*, Page 63.
17. Switch the main circuit breaker to ON (ON). See 4.3.5 *Main circuit breaker*, Page 160.

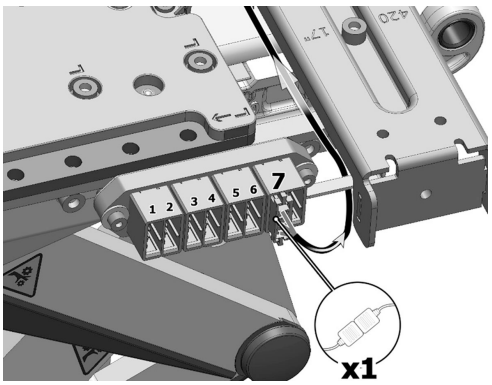


Figure 231. The ICS bus cable is connected to the seventh position of the connector block.

4.2.2.2 AP elevator tilt actuator

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.
- 1 Allen key 6 mm.
- 1 Brush
- Grease (Molykote or equal lubricant compatible with plastic and elastomer).
- 1 Measuring tape
- 1 Ring wrench 10 mm.
- 1 Circlip pliers
- 1 Strap with ratchet (Approved for ≥ 440 Ibs).
- ICS switchbox if not installed on the chair.

Replacing AP elevator tilt actuator

CAUTION!

No user in the seating system

The user of the power wheelchair cannot be seated in the seating system during this repair.

CAUTION!

Maintenance by a qualified service technician

Only qualified service technicians should perform the maintenance and repair specified in this manual. Read all instructions carefully before proceeding. If any questions arise, contact Permobil for assistance.

NOTICE

Always change the textile tube

The textile tube should always be changed when the actuator is replaced.

ⓘ There will be actions in this instruction when you have to move the seat from its position, see 5.1.2 *Seat depth*, Page 162 for more information.

1. Begin by fully elevating the seating and fully elevating the leg rest.

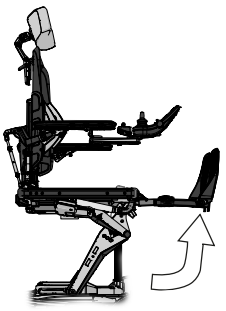


Figure 232. Elevate the seating and the leg rest..

2. Remove the M8x25 bolt and washer.

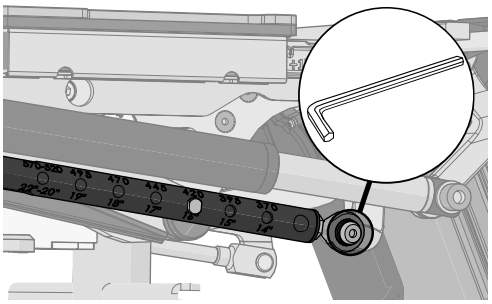


Figure 233. Placement of the bolt and the washer.

3. Secure the adjustment brace for the armrest linkage lightly to the leg rest actuator, or if present, the manual adjustment rod for the leg rest.

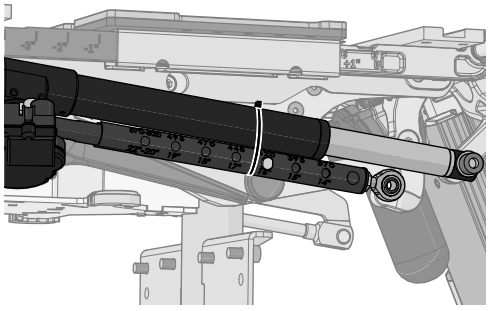


Figure 234. Secure it with a strap.

4. Remove the seat cushions by lifting it straight up. It is attached by means of Velcro on the rear of the cushion. Remove the seat plates, which are held in place by four screws.

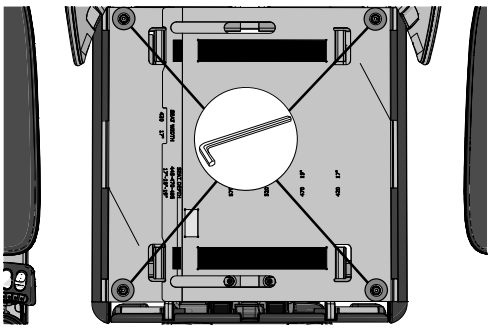


Figure 235. The seat plates are held in place by four screws.

5. Remove the cable clips from the left and right side of the top plate. Save them for later installation.

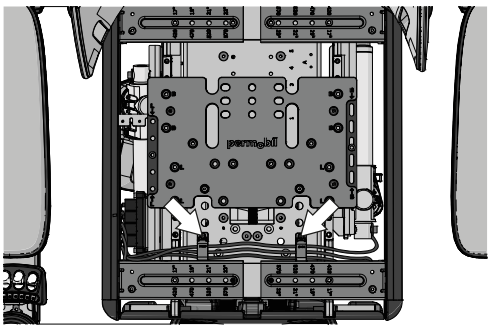


Figure 236. The placement of the cable clips is highlighted with the white arrows.

CAUTION!

Seating unbolted

The seating system is unbolted from the top plate in these steps. Carefully slide the seating system to and fro to gain access to the bolts required.

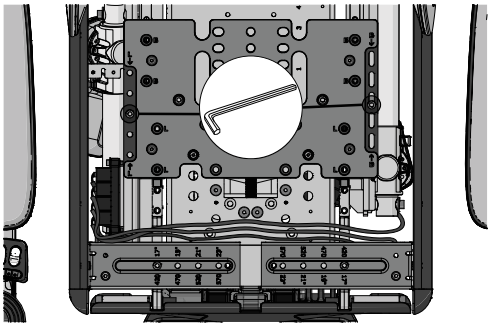


Figure 237. The placement of the seat depth bolts.

6. Note the location of the M6x12 bolts identified with circles. The location of these bolts indicates the original seat depth. Remove these M6x12 bolts.

7. Remove the eight M6x25 bolts.

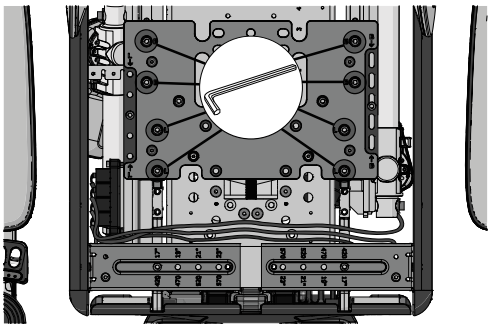


Figure 238. The placement of the eight bolts.

8. Note the center of gravity setting for reassembly.

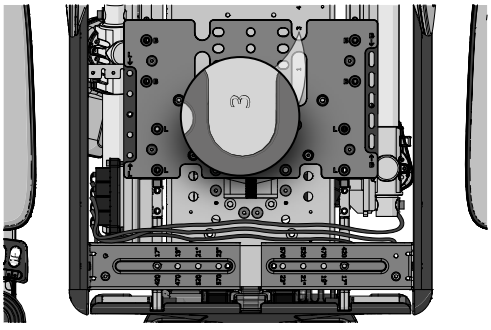


Figure 239. It's very important to note the center of gravity.

9. Remove the four M6x12 bolts. The plate and plastic cover are now disassembled.

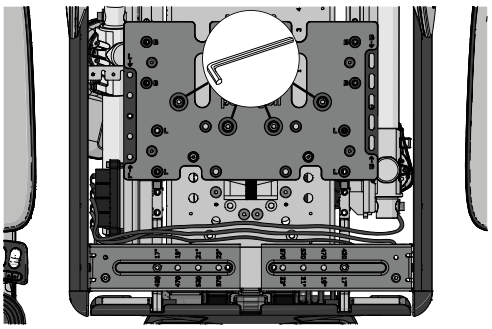


Figure 240. The placement of the four bolts.

10. Remove the two M6x12 bolts securing the rear seat bar to the top plate.

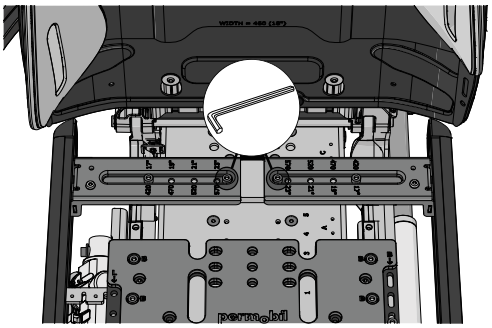


Figure 241. The placement of the two bolts.

11. Remove the four M6x25 bolts. Carefully slide the width adjustment brackets together with the unitrack rail.

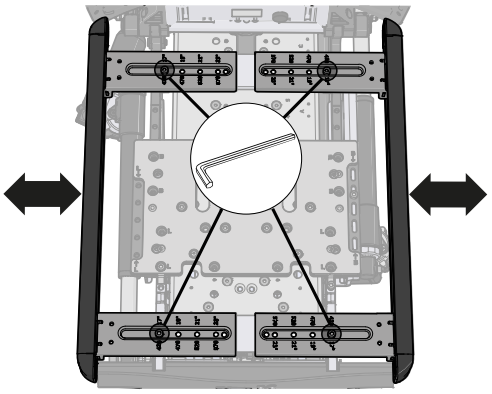


Figure 242. Be careful when you slide the brackets with the unitrack.

12. Remove the bracket holding the end of the actuator and scrap it. The bracket can look different depending on the revision, see A, B or C. If you have bracket A or B, remove the end stop D and scrap it.

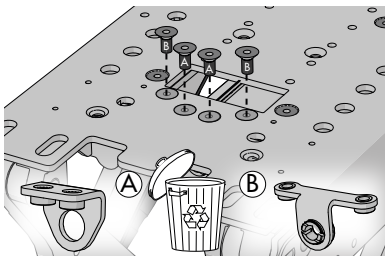


Figure 243.

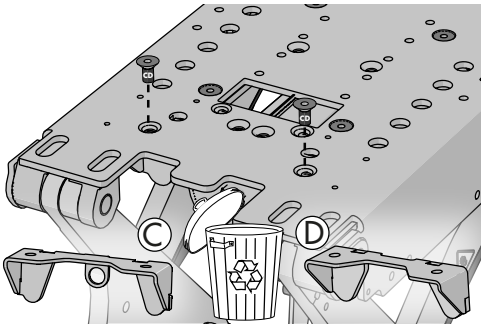


Figure 244. Scrap the end stop.

13. Carefully position the seating to gain access to the four bolts securing the actuator's holder. Remove the bolts securing the actuator's holder. Save the bolts.

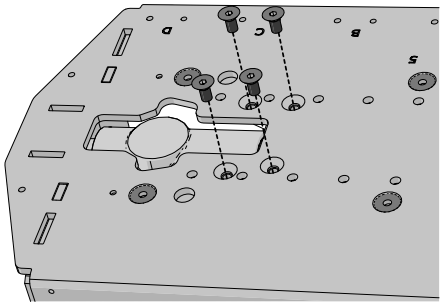


Figure 245. The seat has been removed in this picture for a better view.

14. Remove and save the holder. Note the orientation for reassembly.

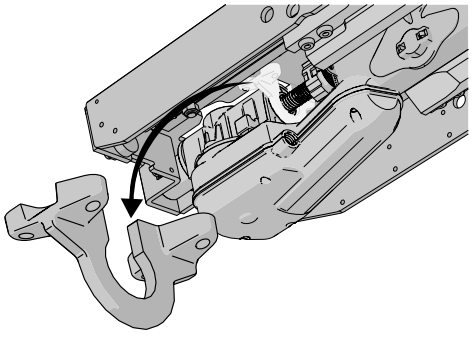


Figure 246. Remove the holder.

15. Remove the pinch guard from the top plate.

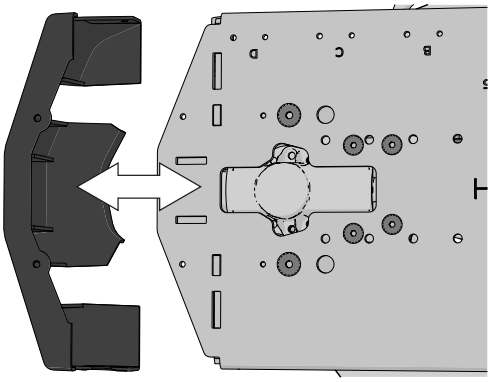


Figure 247. The seat has been removed in this picture for a better view.

16. Place the plate in the "center of gravity", position 3, for easy access of the bolts in the coming steps. Return the two M6x12 bolts.

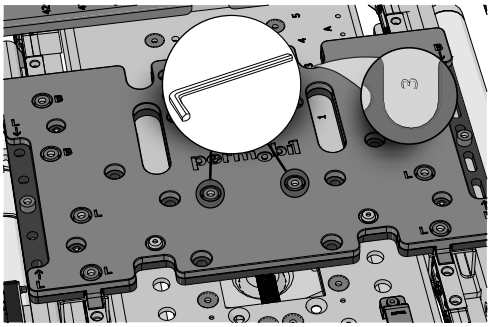


Figure 248. The placement of the two bolts.

CAUTION!

Seating unbolted

The seating system is unbolted from the top plate in these steps. Carefully slide the seating system to and fro to gain access to the bolts required.

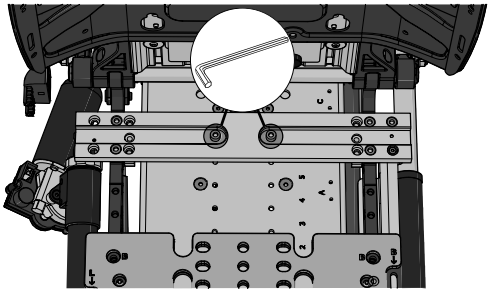


Figure 249. The placement of the two bolts.

17. Position the rear seat bar in the position –2". Return the two M6x12 bolts.

18. Position the front seat bar in position +2" and return these ten bolts and snug them tight. They will be removed again at a later stage.

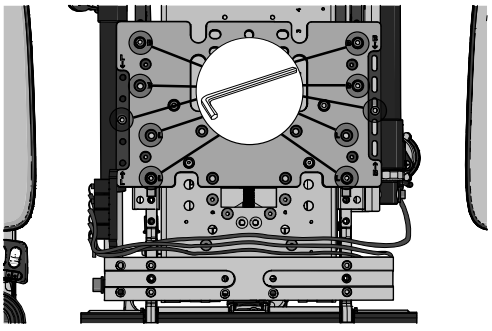


Figure 250. The placement of the ten bolts.

19. Check that the leg rest is fully elevated.

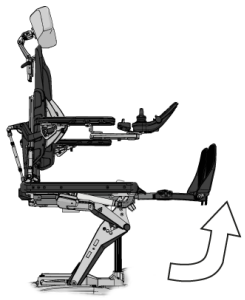


Figure 251. The leg rest must be fully elevated.

20. Enter seating into the Emergency operation mode.

i. Turn off the wheelchair.

ii. Press and hold button 6 and 8 on the ICS switchbox.

iii. While holding these buttons, turn on the wheelchair with the Power button on the joystick (or input device). All LED:s on the ICS switchbox will glow green, continue to hold buttons 6 and 8.

iv. When all the ICS switchbox LED:s glow red, release buttons 6 and 8 (approximately 30 seconds). The switchbox LED:s will oscillate green to signify that you are in Manual operation mode. If the switchbox LED:s do not oscillate green, begin again.

Figure 252. The ICS switchbox has two versions, one with buttons and one with paddle switches.

21. Press and hold button 5 to anterior tilt the seating system. The seating system will move very slowly. Monitor closely for binding or possible collision of seating.

Figure 253. The ICS switchbox has two versions, one with buttons and one with paddle switches.

22. The goal is to anterior tilt the seating to a position that allow easy access to the underside of the top plate. After reaching this position power down the chair.

Figure 254. Tilt the seat.

23. Use a strap to secure the elevators position. Attach the strap to the leg rest and the shaft of the lower back of the AP elevator.

Figure 255. Attach the strap around the leg rest ...

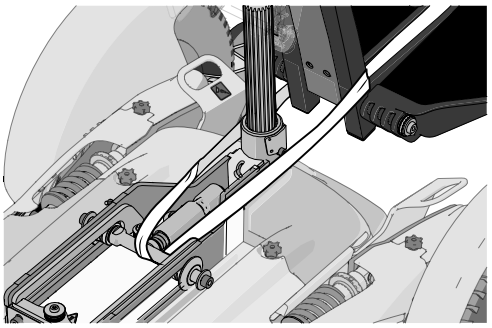


Figure 256. ... and the shaft of the lower back of the AP elevator.

24. Remove the cable clip securing the wiring harness from the actuator. Disconnect the actuator lead from ICS system.

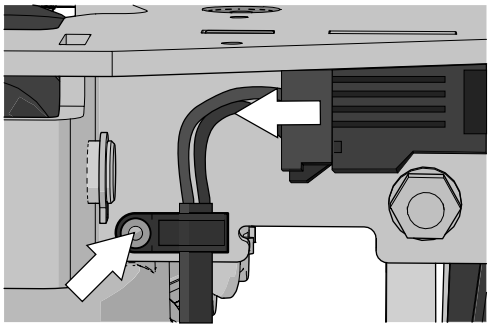


Figure 257. Rear view of the AP elevator's top plate.

25. Remove the snap ring and pin securing the actuator to the top plate assembly.

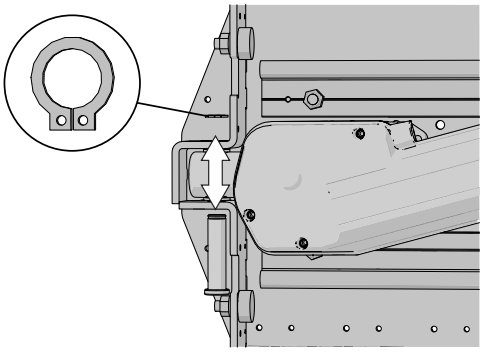


Figure 258. Remove the snap ring from the shaft.

CAUTION!

Always replace the textile cover

The textile cover should always be replaced when the actuator is replaced.

26.

ⓘ Depending on the revision of the carriage there are different actions.

Carriage A: Remove the nut and the M6 screw and scrap them, remove the locking plate (A) and save it for later installation. If the M5 screw and textile cover is present remove and scrap them.

Carriage B: Remove the M5 screw for the locking plate and scrap it, remove the locking plate (A) and save it for later installation. If the M5 screws and textile cover is present remove and scrap them.

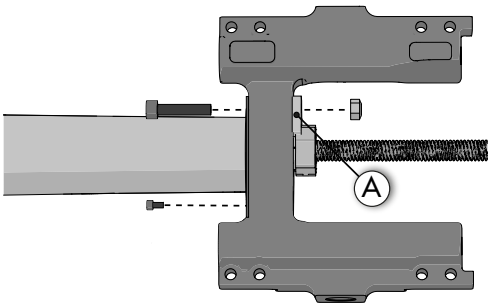


Figure 259. The carriage A with the M6 screw and nut.

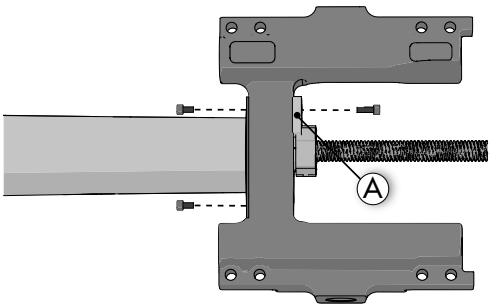


Figure 260. The carriage B with the M5 screws.

27. Gradually loosen the strap that goes around the leg rest and the AP elevator shaft while unscrewing the plastic nut.

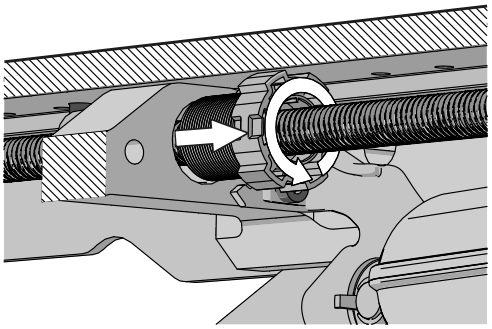


Figure 261. The plastic nut is located in the carriage. The white striped areas marks a cut through parts for better visuals.

28. Remove the actuator.

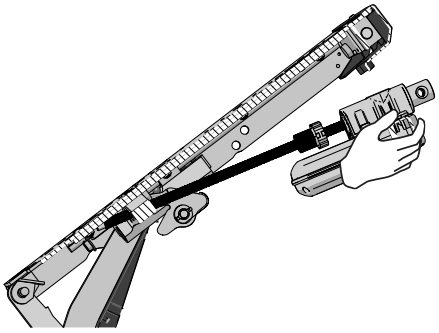


Figure 262. The top plate without the seat for better visuals.

29.

ⓘ The length of the actuator spindle might differ depending on different revisions.

Position, by eye, the polymer nut on the new actuator in the same position as the nut on the previously removed actuator.

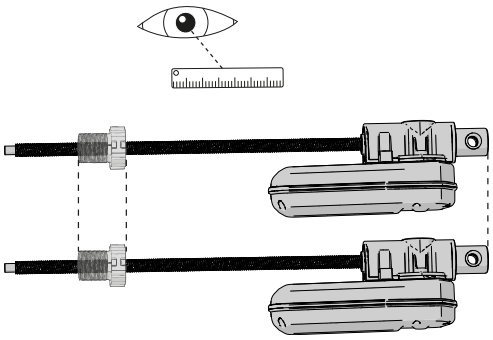


Figure 263. Place the new actuator beside the old actuator.

30. Insert the new actuator into the carriage. You might need to loosen the strap and tilt back the seat a little in order to fit the new actuator.

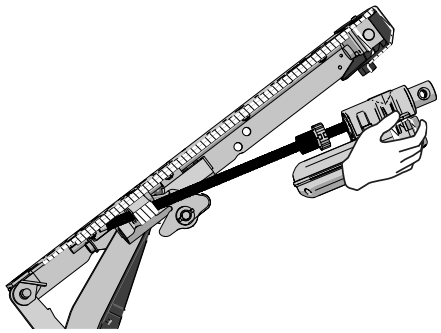


Figure 264. The top plate without the seat for better visuals.

CAUTION!

Do not use tools

Do not use tools when mounting the polymer nut. Usage of tools can lead to critical damage on the polymer nut.

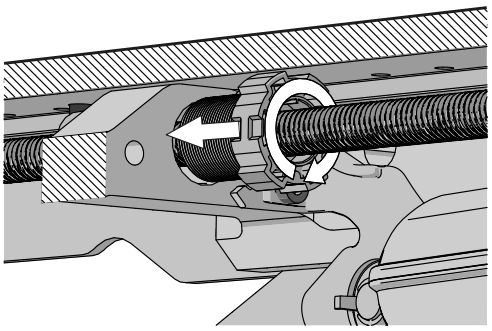


Figure 265. Screw in the polymer nut into the carriage.

31. Mount the polymer nut in the carriage.

32. There must be a gap of 3/64 inch between the polymer nut and the carriage.

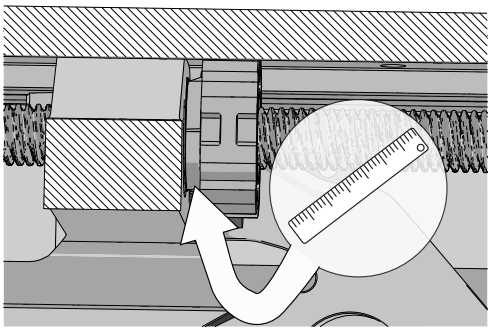


Figure 266. It is very important that there is a gap between the polymer nut and the carriage.

33. Reattach the snap ring and the shaft holding the actuator.

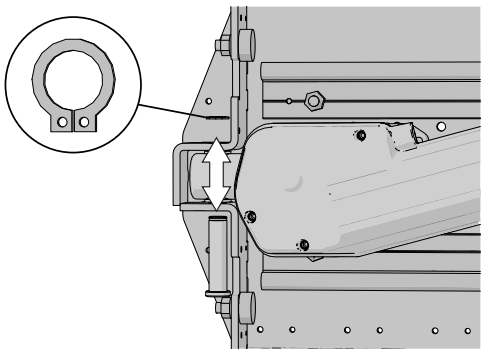


Figure 267. Reattach the snap ring and the shaft.

34. Detach the strap from the leg rest and the shaft of the lower back of the AP elevator.

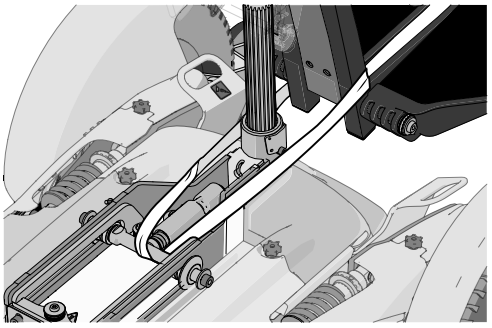


Figure 268. Detach the shaft of the lower back of the AP elevator.

35.

ⓘ This step is only necessary if the textile cover is in separate parts.

Drop the plastic bushing inside the textile cover. Work the bushing into the hole at the other end as shown.

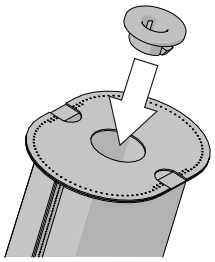


Figure 269. Drop the new plastic bearing into the textile cover.

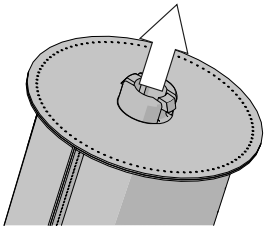


Figure 270. Pull it thru the smaller hole in the textile cover.

36.

ⓘ This step is only necessary if the textile cover is in separate parts.

Assemble the plate to the textile cover.

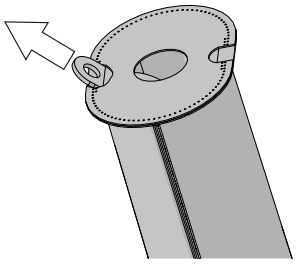


Figure 271. Pull one end of the plate thru one of the holes.

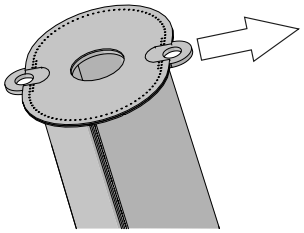


Figure 272. Pull the other end of the plate thru the opposite hole.

NOTICE

Snap the plastic bearing in place

Make sure that the plastic bearing snaps in place properly into the bracket.

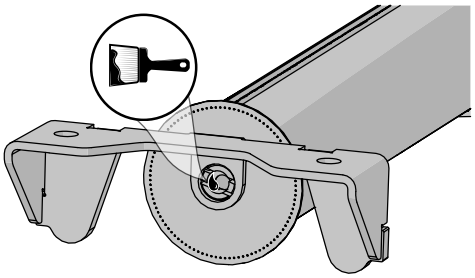


Figure 273. Apply grease on the inside of the bearing.

37. Mount the plastic bearing into the bracket. Apply grease (Molykote PG-75 or equal lubricant compatible with plastic and elastomer) on the inside of the bearing.

38. Slide the textile tube onto the actuator spindle. Make sure that the seam of the cover is facing the top plate's underside.

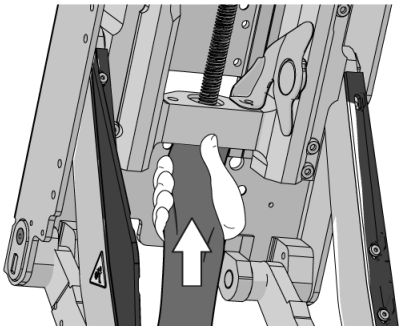


Figure 274. Underside of the top plate.

39. Mount one of the new M5x12 screws in the upper hole. Do not tighten the screw.

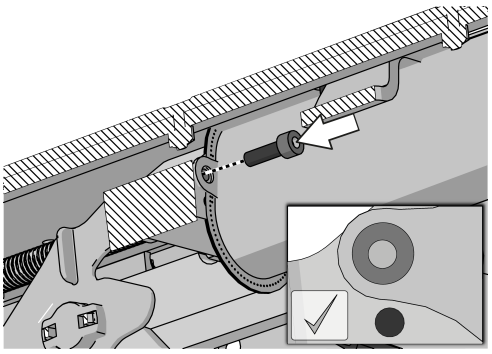


Figure 275. Use the upper hole in the carriage.

40.

ⓘ Depending on the revision of the carriage there are different actions.

Carriage A: Mount the locking plate on the actuator plastic nut. Mount the new M6x40 screw and washer. Tightening torque 7.2 lb.ft. Mount the new nut. Tightening torque 2.1 lb.ft. Tighten the screw mounted in step 39. Tightening torque 4.2 lb.ft.

Carriage B: Mount the locking plate on the actuator plastic nut. Mount the M5x16 screw securing the locking plate. Mount the M5x12 screw securing the textile tube. Tighten all three screws, including the screw in step 39., with 4.2 lb.ft.

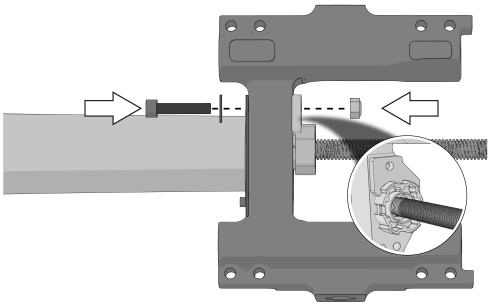


Figure 276. Carriage A.

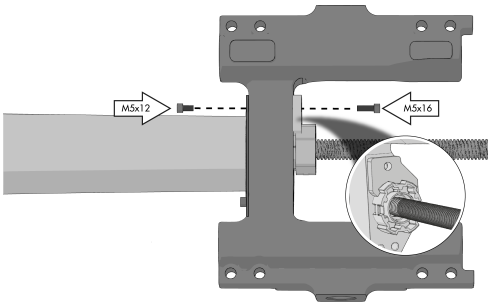


Figure 277. Carriage B.

41. Connect the actuator lead to the ICS system and power the chair up thru the On/Off button on the input module. After the chair powers up all LED:s flashes red.

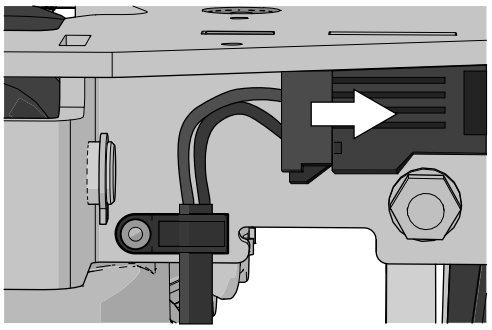


Figure 278. Connect the actuator lead.

42. Turn off the wheelchair and disconnect the actuator lead.

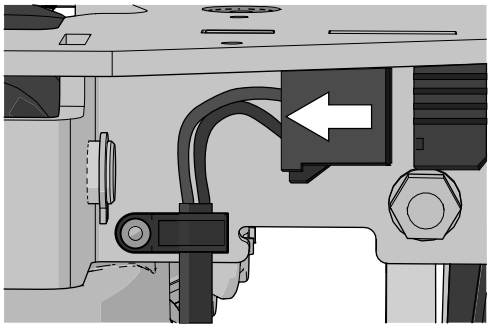


Figure 279. Disconnect the actuator lead.

43. Power the chair up thru the On/Off button on the input module. After the chair powers up, connect the actuator lead to the ICS system. Install the cable clip securing the wiring harness from the actuator. Tighten the screw for the cable clip with 0.89 lb.ft.

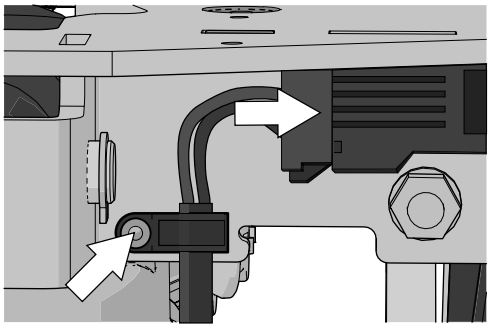


Figure 280. Connect the actuator lead.

44. LED 1 will now flash red/yellow. The actuator is now in calibration mode.

Figure 281. The ICS switchbox has two versions, one with buttons and one with paddle switches.

NOTICE

Monitor the textile cover

Carefully monitor the textile cover as the seating moves. Make certain the cover does not entangle with the rotating spindle.

Figure 282. The ICS switchbox has two versions, one with buttons and one with paddle switches.

45. Push and hold button 1 to move the seating from its anterior tilt position to 0 °/horizontal position.

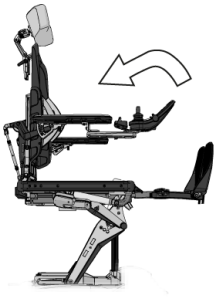


Figure 283. Move the seating to horizontal position.

46. Push the plastic bearing onto the spindle.

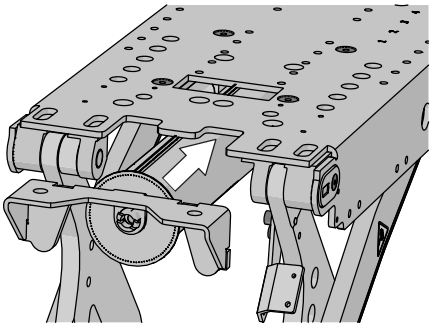


Figure 284. Push the plastic bearing onto the spindle.

47. Mount the bracket with two screws to the top plate. Tighten with 9.4 lb.ft.

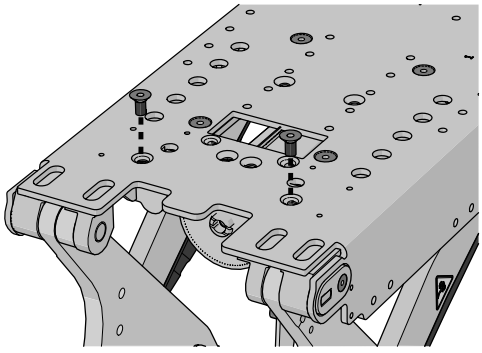


Figure 285. The placement of the screws.

48. Continue to push and hold button 1 until the actuator reaches the end stop and the LED:s flashes red.

Figure 286. The ICS switchbox has two versions, one with buttons and one with paddle switches.

49. When the LED:s flash red the system is requesting a restart. The system may require multiple restarts. Power the chair off and back on again. The switchbox will return to normal operation.

Figure 287. The ICS switchbox has two versions, one with buttons and one with paddle switches.

50. Return the seating to 0°/ horizontal position and elevate the seating for access to the underside of the AP elevator's top plate.

Figure 288. Move the seating to horizontal position.

CAUTION!

Seating unbolted

The seating system is unbolted from the top plate in these steps. Carefully slide the seating system to and fro to gain access to the bolts required.

51. Make sure the 12 marked bolts are removed so the plastic cover and plate can be moved.

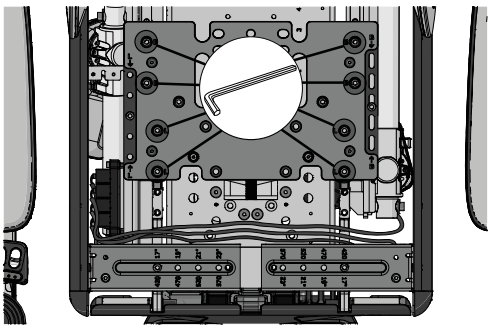


Figure 289. The placement of the eight bolts.

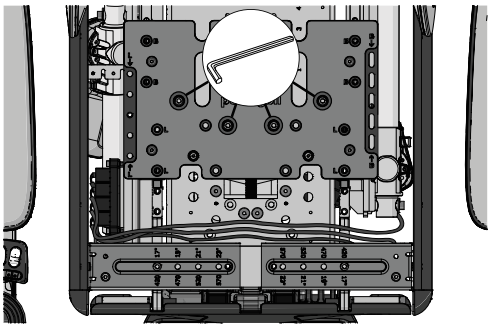


Figure 290. The placement of the four bolts.

52. Remove the two M6x12 bolts securing the rear seat bar to the top plate. Move the seating system so you can access the screw holes in step

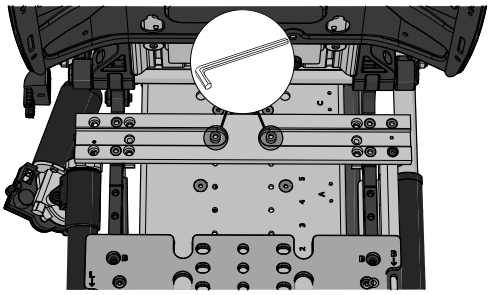


Figure 291. The placement of the two bolts.

53. Put back the holder and reattach the four screws. Tightening torque 5.46 lb.ft.

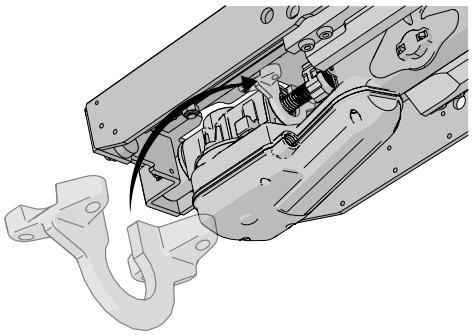


Figure 292. Put back the holder.

54. Fit the pinch guard to the top plate using the two screws. Tightening torque 2.2 lb.ft.

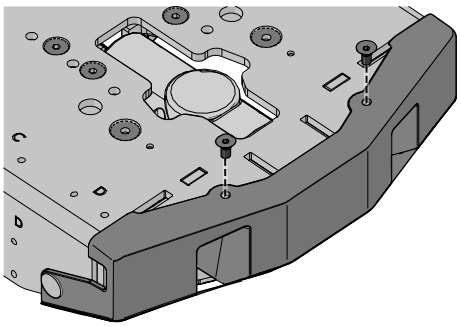


Figure 293. The pinch guard is assembled with two screws from the top.

55. Push in the two plastic rivets into the pinch guard and the top plate.

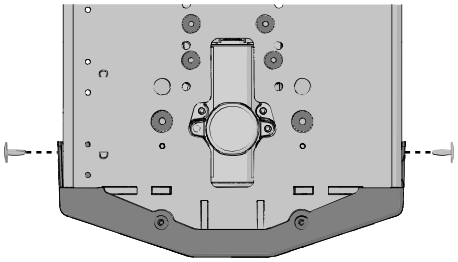


Figure 294. The plastic rivets are positioned on the sides of the pinch guard.

56. Adjust and reposition the seating to its original seat depth and center of gravity setting. According to steps 6. to 8.

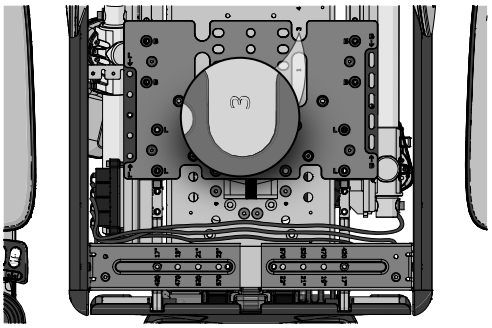


Figure 295. Reposition to the original seat depth and center of gravity.

57. Reattach the bolts securing the plastic cover and plate. Tighten with 7.2 lb.ft.

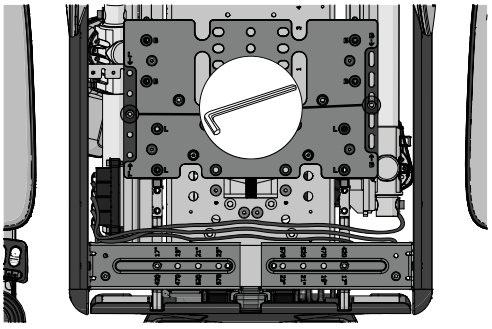


Figure 296. The placement of the two bolts.

58. Reattach the bolts securing the plastic cover and plate. Tighten with 7.2 lb.ft

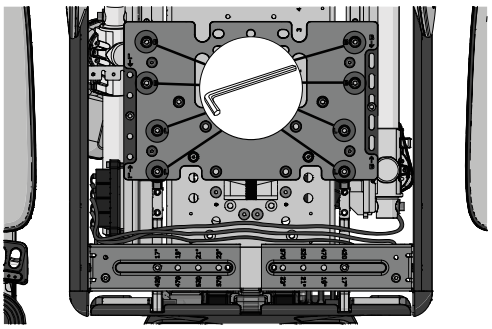


Figure 297. The placement of the eight bolts.

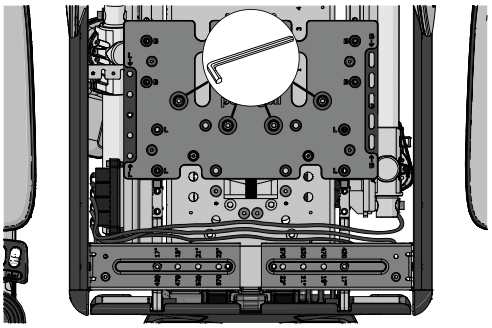


Figure 298. The placement of the four bolts.

59. Reattach the unitrack rail and the width adjustment brackets. Tighten the bolts with 7.2 lb.ft.

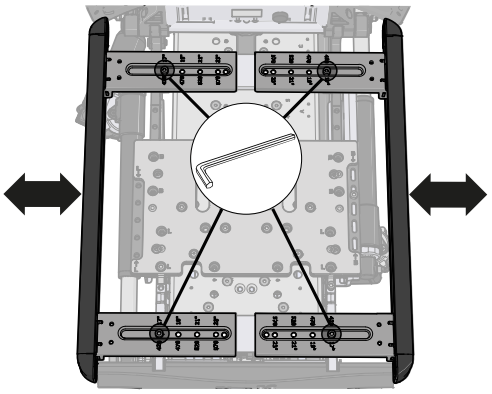


Figure 299. The placement of the four bolts.

60. Reattach the two M6x12 bolts securing the rear seat bar to the top plate. Tighten with 7.2 lb.ft.

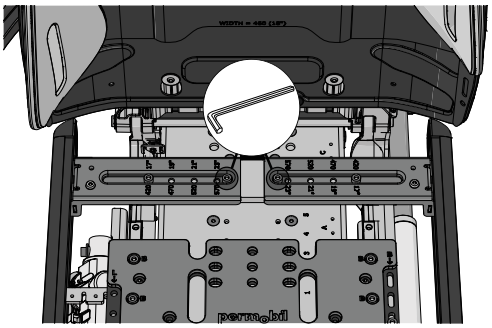


Figure 300. The placement of the two bolts.

61. Reattach the cable clips with cables in them. Tighten with 11 in-lbs.

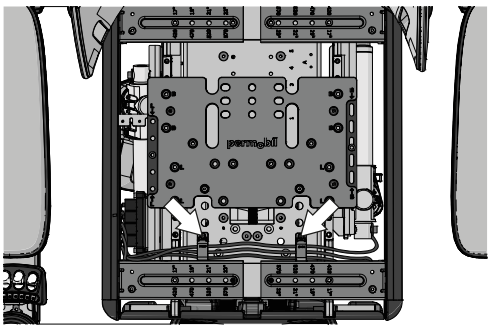


Figure 301. The placement of the cable clips.

62. Reattach the seat plates, which are held in place by four screws. Tighten with 7.2 lb.ft. Reattach the seat cushions. It is attached by means of Velcro on the rear of the cushion.

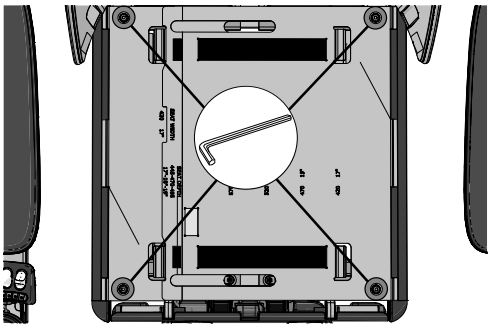


Figure 302. The placement of the seat plate's four screws.

63. Remove the strap.

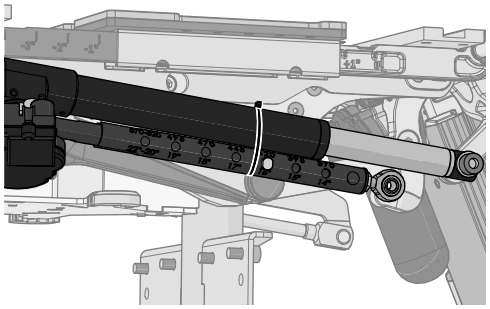


Figure 303. Remove the strap.

64. Reattach the adjustment brace for the armrest linkage with the M8x25 bolt and washer. Tighten with 17,7 lb.ft.

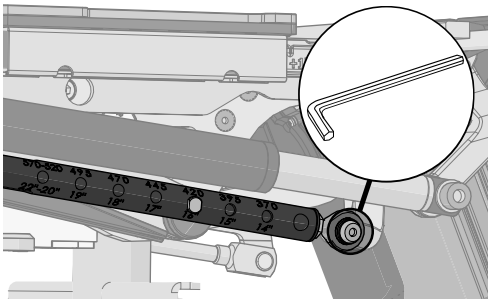


Figure 304. Placement of the bolt and the washer.

65. Carefully test the system for proper operation of the seat functions. Pay particular attention to the operation of tilt and the seat lift in both directions of travel. Make certain the textile cover cannot become entangled in the rotating spindle.

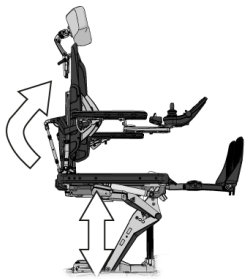


Figure 305. Test the system carefully.

4.2.2.3 AP elevator tilt motor cable

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 3 mm.

This section describes how the tilt motor cabling is mounted.

1. The cable is mounted in the three cable brackets at the back of the AP elevator.

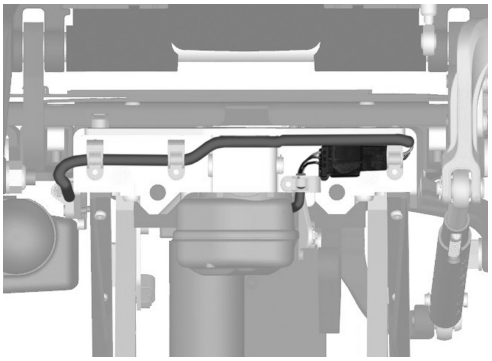


Figure 306. The cable is mounted in the three cable brackets at the back of the AP elevator.

2. Based on the seat depth, the cable should be mounted in either cable bracket A, B, C or D.

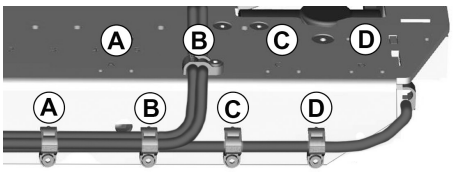


Figure 307. Tilt motor cable mounted with four cable brackets.

3. There should be 5” between the upper cable bracket and the lower cable bracket.

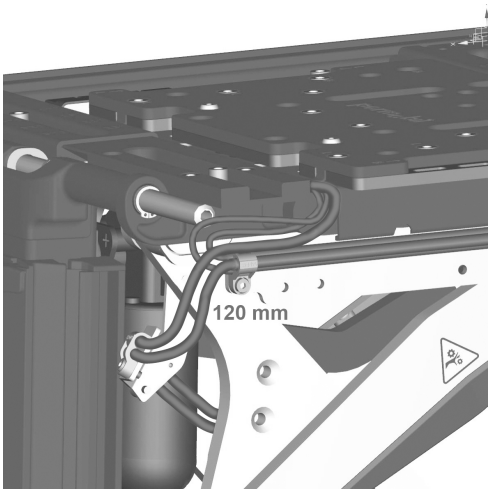


Figure 308. There should be 5” between the upper cable bracket and the lower cable bracket.

4. The bus cables are laid across the seat frame and mounted in the two cable brackets. Avoid crossing the cables with each other between the connector block and the first cable bracket on top of the seat. Use a torque wrench to tighten the screws. Tightening torque 0.9 lb.ft.
5. The tilt motor cable is connected to the fifth position of the connector block at the right hand side of the seat.

Seat depth	Mounting position
15”	A
16”–17”	B
18”–19”	C
20”–23”	D

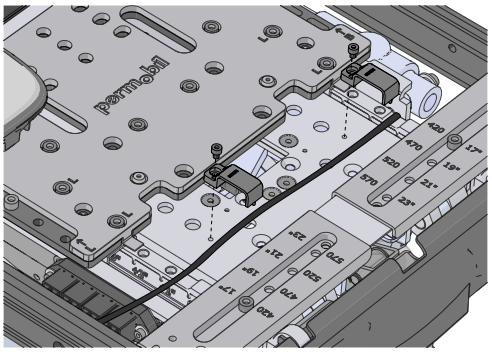


Figure 309. The cables are laid across the seat frame and mounted in the two cable brackets.

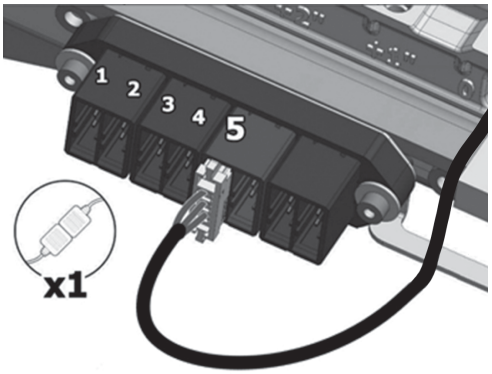


Figure 310. Tilt motor cable is connected to the fifth position of the connector block.

4.2.2.4 AP elevator pinch guards

For this task the following tools are necessary:

- 1 Allen key 2,5 mm.

Removing AP elevator pinch guards

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.

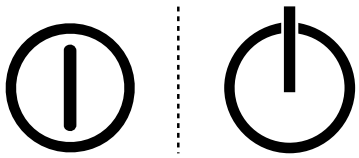


Figure 311. On/Off symbol depending on model.

3. Remove the four screws holding the pinch guard to the upper arm.
4. Remove the pinch guard.

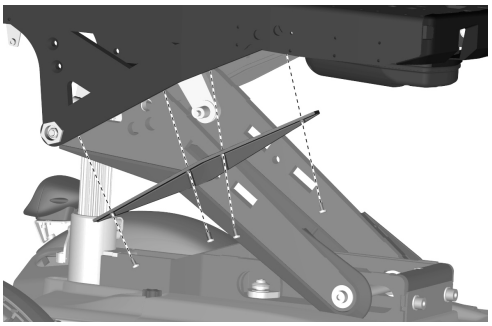


Figure 312. The pinch guard is assembled with four screws.

5. Remove the five screws holding the pinch guard to the lower elevator arm.
6. Remove the pinch guard from the lower elevator arm.

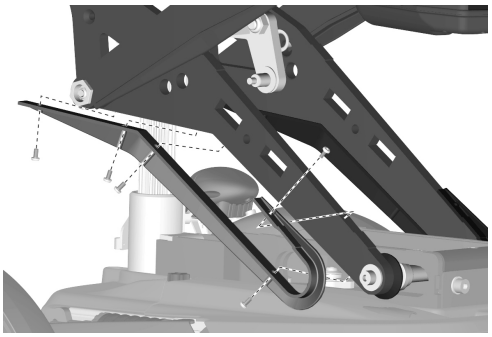


Figure 313. The pinch guard is assembled with five screws.

7. Pull out the two plastic rivets out of the pinch guard and the top plate (depending on revision could the rivets be screws instead).

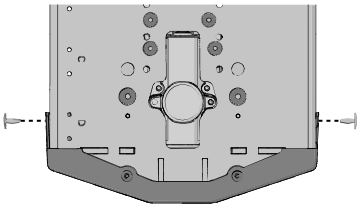


Figure 314. The plastic rivets are positioned on the sides of the pinch guard.

8. Remove the two screws holding the pinch guard on the top plate.
9. Remove the pinch guard from the plate.

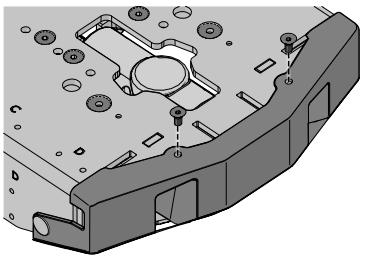


Figure 315. The pinch guard is assembled with two screws from the top.

Mounting AP elevator pinch guards

1. Fit the pinch guard to the top plate using the two screws. Tightening torque 2.2 lb.ft.

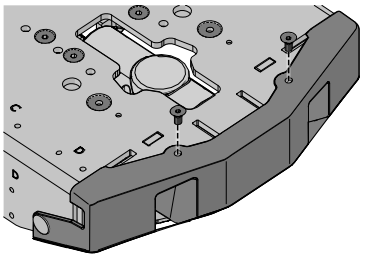


Figure 316. The pinch guard is assembled with two screws from the top.

2. Push in the two plastic rivets into the pinch guard and the top plate.

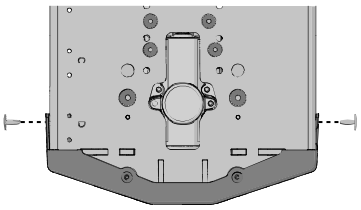


Figure 317. The plastic rivets are positioned on the sides of the pinch guard.

3. Fit the pinch guard to the lower elevator arm with the five screws. Tightening torque 2.2 lb.ft.

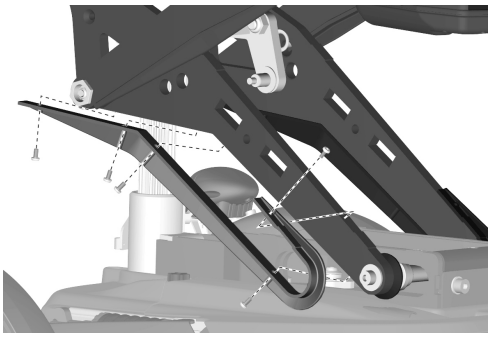


Figure 318. The pinch guard is assembled with five screws.

4. Fit the pinch guard to the upper elevator arm with the four screws. Tightening torque 2.2 lb.ft.

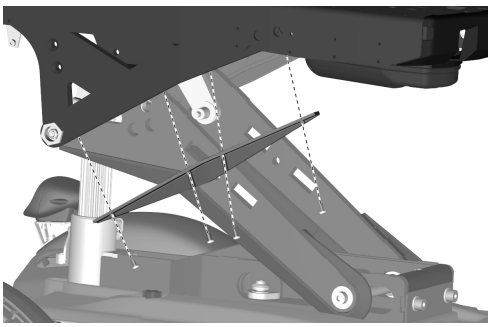


Figure 319. The pinch guard is assembled with four screws.

4.2.2.5 AP elevator battery pole protection

Removing AP elevator battery pole protection

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.

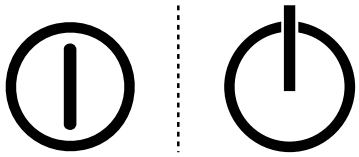


Figure 320. On/Off symbol depending on model.

3. Remove the top chassis cover. See 4.2.1 *Covers*, Page 63.
4. Remove the battery pole protection by carefully levering its edges outwards and at the same time pull it off from the AP elevator.

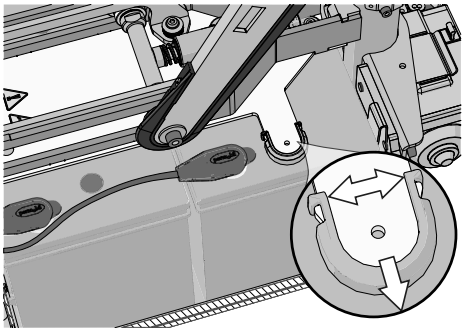


Figure 321. AP elevator battery pole protection.

Mounting AP elevator battery pole protection

1. Push the battery pole protection on to the AP elevator.
2. Assemble the top chassis cover. See 4.2.1 *Covers*, Page 63.

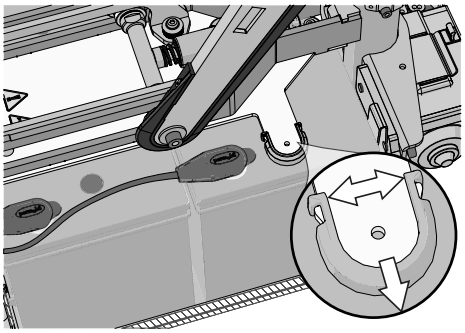


Figure 322. AP elevator battery pole protection.

4.2.2.6 AP elevator gas spring

For this task the following tools are necessary:

- 1 Circlip pliers.
- 1 Allen key 6 mm.

Removing AP elevator gas spring

1. Raise the seat to its highest position.
2. Switch off the power supply using the On/Off key on the control panel.
3. Remove the circlip and pin holding the gas spring unit at the front.
4. Remove the screw, washers and nut holding the gas spring unit at the back.

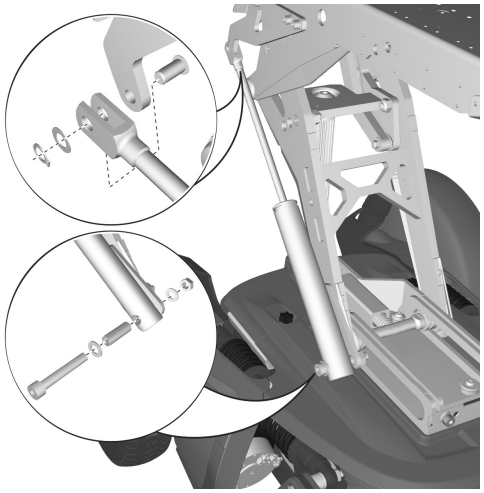


Figure 323. AP elevator gas spring.

5. Unscrew the front and rear brackets of the gas spring.

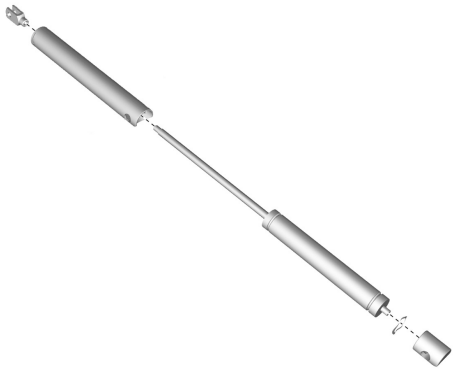


Figure 324. The rear and front bracket is screwed on to the gas spring.

Mounting AP elevator gas spring

1. Assemble the front and rear brackets of the gas spring.

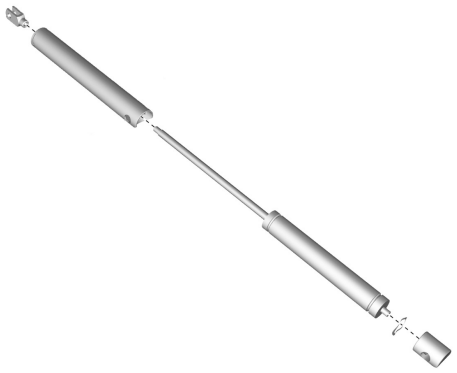


Figure 325. The rear and front bracket is screwed on to the gas spring.

2. Assemble the gas spring unit at the back using the screw, washers and nut.
3. Assemble the gas spring unit at the front using the circlip and pin.

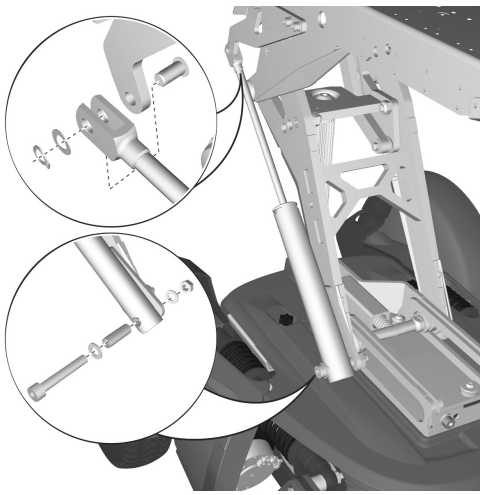


Figure 326. AP elevator gas spring.

4.2.2.7 AP elevator spring unit

For this task the following tools are necessary:

- 1 Allen key 4 mm.

Removing AP elevator spring unit

1. Raise the seat a bit to get access to the spring unit, stop just before the AP elevator axle touches the spring unit.
2. Switch off the power supply using the On/Off key on the control panel.
3. Remove the spring unit, it is attached with two button head screws with washers and one countersunk head screw.

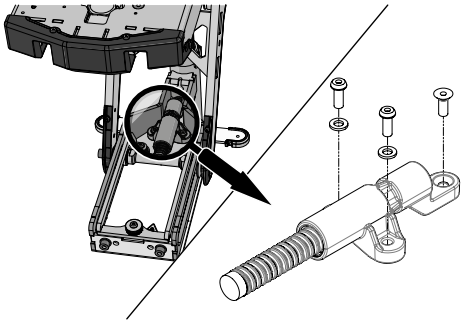


Figure 327. Assembling the spring unit, it is attached with three screws and washers.

Mounting AP elevator spring unit

1. Assemble the spring unit, it is attached with two button head screws with washers and one countersunk head screw.

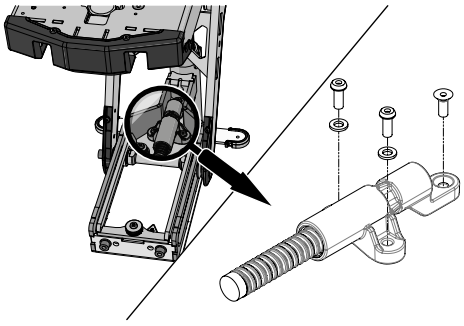


Figure 328. Assembling the spring unit, it is attached with three screws and washers.

4.2.2.8 AP elevator track wheel kit

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 6 mm.

WARNING!

Risk of crushing - two people are required

Two people are required for this task due to heavy lifting. Watch out for moving parts, there is a risk of crushing.

Removing track wheel kit

1. Raise the seat a bit, stop just before the AP elevator axle touches the spring unit.
2. Run the leg rest slightly outwards, approximately 30°.
3. Switch off the main power switch on the control panel.

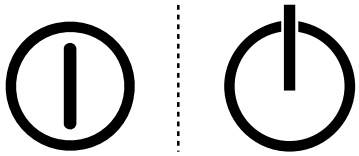


Figure 329. On/Off symbol depending on model.

4. Hold the rear end of the seat in a steady grip. Remove the screw (1) and washers (2 and 3) on both sides.
5. When the screws are removed, the rear end of the seat will come loose. Tilt the seat slightly forward in order to reveal the axle and all the parts.
6. Remove the roller (4), the slide bearing (5), the shaft (6), the slide bearing (7) and the inner roller (8) from each side.
7. Remove the shaft (9).

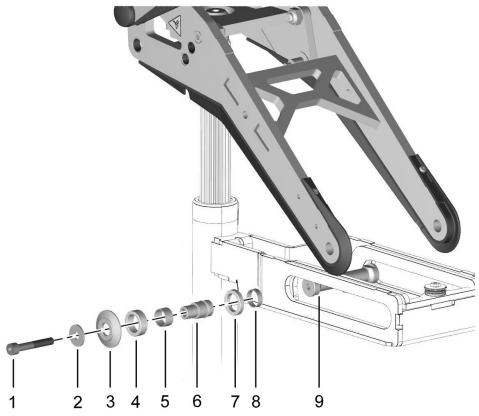


Figure 330. The track wheel kit.

Mounting track wheel kit

1. Position the shaft (9).
2. Assemble the inner roller (8), the slide bearing (7), the shaft (6), the slide bearing (5), the roller (4), the washers (3 and 2) and the screw (1) on to the shaft (9).
3. Tighten the screws (1) using a torque wrench. Tightening torque: 17.7 lb.ft.

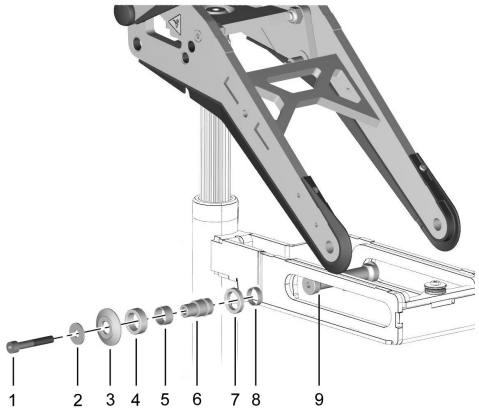


Figure 331. The track wheel kit.

4.2.3 Batteries

4.2.3.1 Removing batteries

The following tools are necessary for this task:

- 1 Allen key, 6 mm.

- 1 Ring wrench, 10 mm.
- Means of documentation (camera, pen and paper etc.).

WARNING!

Use safety gloves and safety goggles

Always use safety gloves and safety goggles when working with batteries. Exercise caution when using metallic tools or other objects while working with batteries. Batteries are heavy and charged devices and must be handled with great caution. Failure to follow any of these warnings could cause a short circuit, explosion, property damage and/or bodily harm.

CAUTION!

Recycling batteries

Used or malfunctioning batteries must be disposed of responsibly in accordance with local recycling regulations.

1. Place the wheelchair on a level surface. If possible, raise the seat lift halfway up, to facilitate removal of the chassis top cover.
2. Switch off the power supply using the On/Off key on the control panel and switch the automatic main circuit breaker to OFF.

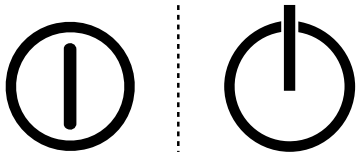


Figure 332. On/Off symbol depending on model.

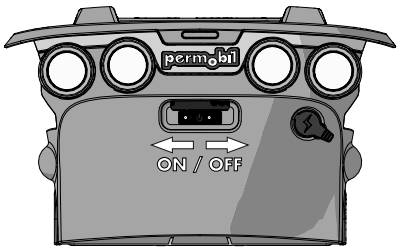


Figure 333. Main circuit breaker.

3. Remove the two knobs holding the chassis top and front covers.

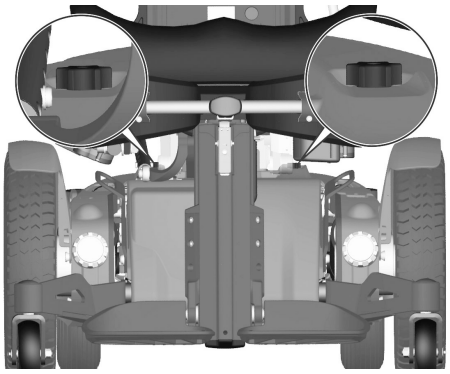


Figure 334. The chassis covers are secured with two knobs.

4. Slide the top cover off the chassis.

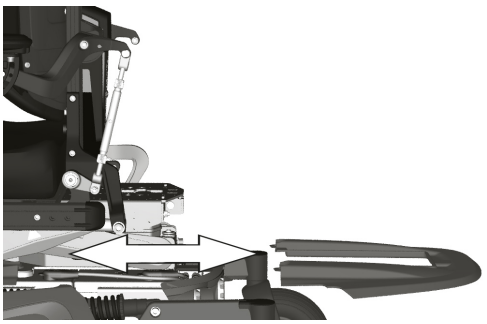


Figure 335. Top cover.

5. Pull the back cover off the dual locks and off the chassis.

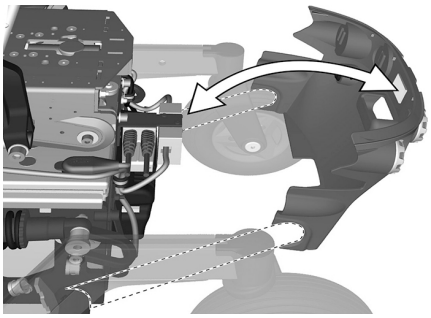


Figure 336. Back cover.

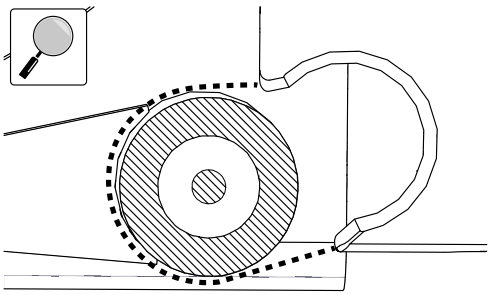


Figure 337. An enlargement of the back cover going over the rear axle.

WARNING!

Do not load the seat

Do not load the seat or the AP elevator during this operation. Any load on the seat or the AP elevator could cause permanent damage to the wheelchair or injuries on person(s) in the wheelchair or in its close vicinity. These conditions apply until the screws are reinstalled and tightened to the correct torque.

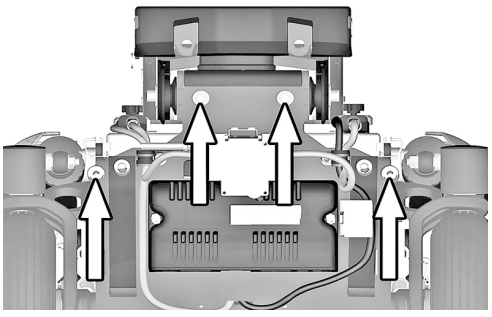


Figure 338. The battery box is secured with four bolts.

6. Remove the four screws holding the battery box.

7. Disconnect the right motor and inhibit cable connector (C).
8. Disconnect the left motor and the bus cable connector (B).
9. Disconnect the control panel connector (A).

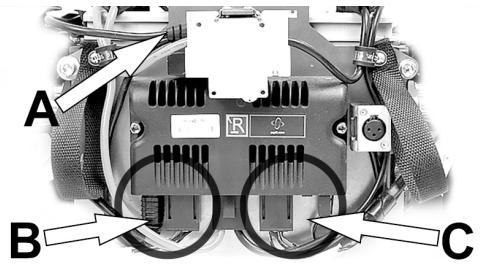


Figure 339. Connectors (B) and (C); for disconnection.

10. Use the straps to pull the battery box out of the chassis.

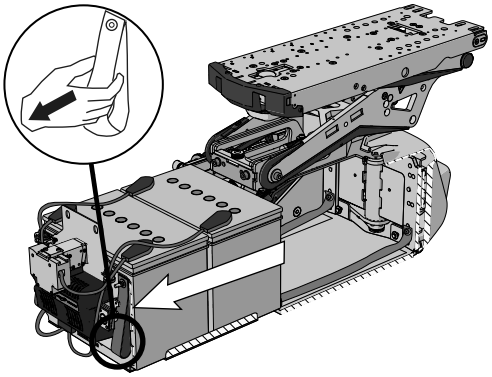
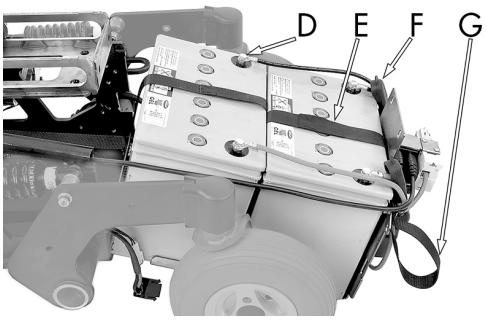


Figure 340. Straps for pulling out battery box.

11. Slide the battery terminal covers along the cables to access all four battery terminal screws.
12. Disconnect the cables from the four battery terminals.
13. Lift the batteries out of the battery box using the battery straps.



D. Battery terminal.
E. Battery strap.
F. Battery terminal cover.
G. Battery box pull-out strap.

Figure 341. Battery box when pulled out from chassis.

4.2.3.2 Installing batteries

The following tools are necessary for this task:

- 1 Torque wrench.
- 1 Allen key socket, 6 mm.
- 1 Ring wrench, 10 mm.

NOTICE

Different types of batteries

The chair can be equipped with 60 Ah or 73 Ah maintenance-free batteries. Check carefully which battery you have.

CAUTION!

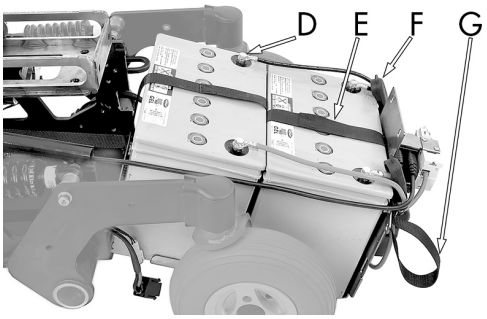
Always use recommended batteries

Always use Permobil recommended batteries. Other replacement batteries have not been tested for use with Permobil wheelchairs.

1. Use the battery straps and lift the new batteries in reverse order (leave the straps on the new batteries).

2. Make sure the batteries are positioned correctly to bring terminals into the right position; refer to the wiring diagram. Connect the four wires to the correct terminals on the batteries as shown in the diagram. Also refer to the sticker inside of the cover.

3. Attach the cable that is connected to the rear battery's left terminal on its cable holder.



D. Battery terminal.

E. Battery strap.

F. Battery terminal cover.

G. Battery box pull-out strap.

Figure 342. Battery box when pulled out from chassis.

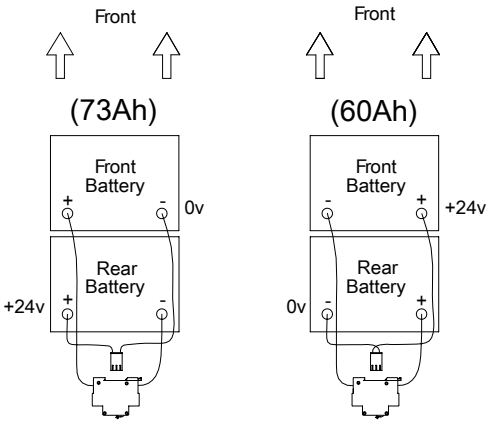


Figure 343. Wiring diagram for the battery connection.

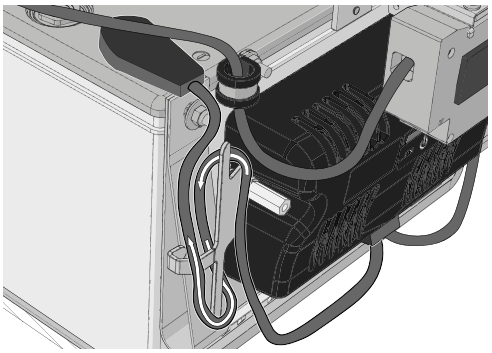


Figure 344. Attach the cable that is connected to the rear battery's left terminal on its cable holder as shown.

4. Attach the cable that is connected to the front battery's right terminal in its cable holder.

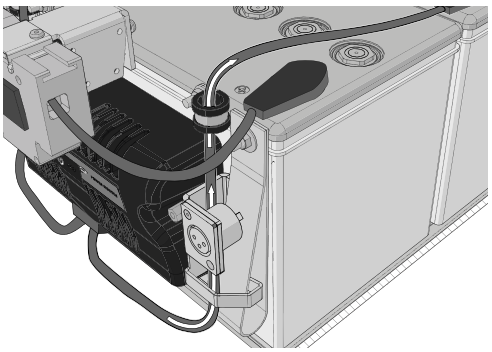


Figure 345. Attach the cable that is connected to the front battery's right terminal in its cable holder as shown.

5. Push the battery box in to the chassis.

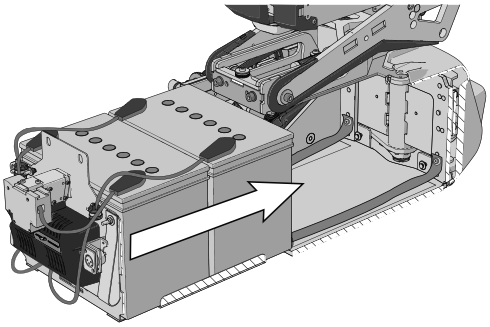


Figure 346. Push in the battery box.

6. Connect the right motor and inhibit cable connector (C).
7. Connect the left motor and bus cable connector (B).
8. Connect the control panel connector (A).

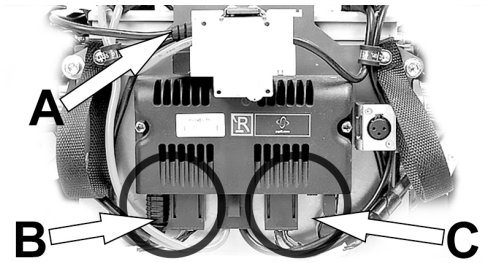


Figure 347. Connectors (B) and (C); for connection.

9. Refit the four screws securing the battery box. Use a torque wrench to tighten the screws. Tightening torque: 17.7 lb.ft.

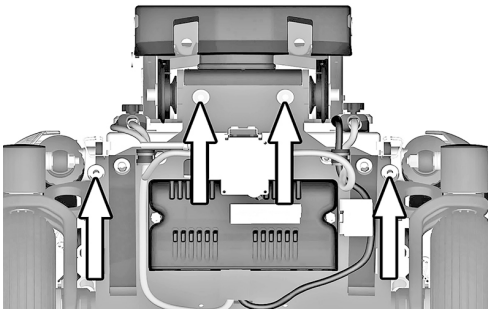


Figure 348. The battery box is secured with four bolts.

10. Refit the rear chassis cover on to the chassis.

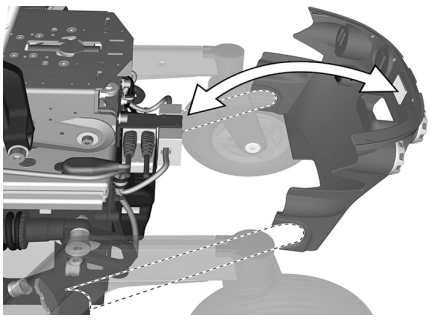


Figure 349. Rear cover.

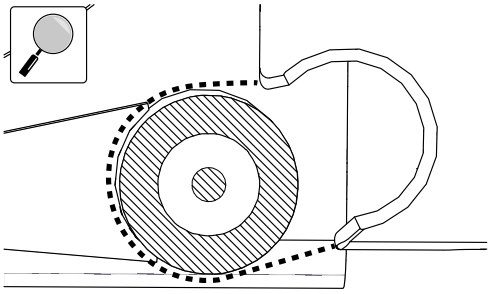


Figure 350. An enlargement of the rear cover going over the rear axle.

11. Refit the top chassis covers on to the chassis.

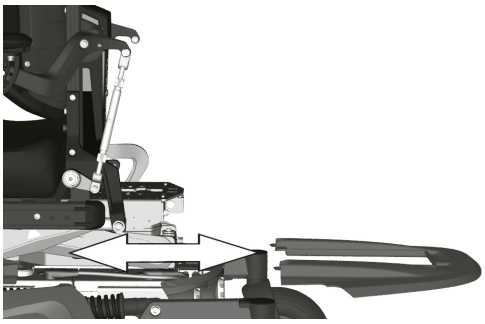


Figure 351. Top cover.

12. Refit the two knobs.

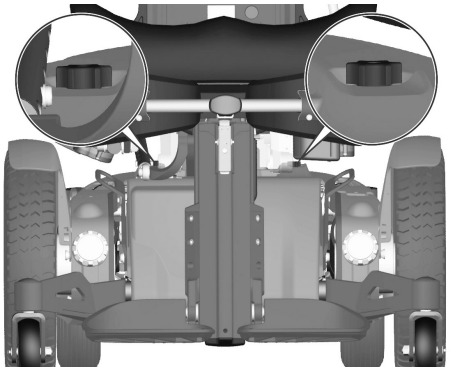


Figure 352. The chassis covers are secured with two knobs.

13. Switch the automatic main circuit breaker to the On position.

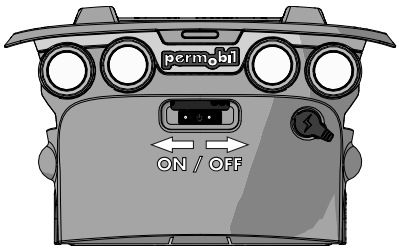


Figure 353. Main circuit breaker located under the Permobil logotype on the rear cover.

4.2.4 Drive motors

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 6 mm.
- 1 Allen key 5 mm.
- 1 Allen key 4 mm.

4.2.4.1 Removing drive motor

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised or lowered manually, see *Manual operation of AP elevator*, Page 73.

2. Switch off the main power switch on the control panel.

3. Remove the chassis covers. See 4.2.1 *Covers*, Page 63.

4. Chock up the wheelchair so that the wheel turns freely and let out the air.

5. Remove the drive wheel. See 4.2.5.1 *Drive wheels*, Page 120.

6. Disconnect the magnetic wheel lock and drive motor cabling from the power module.

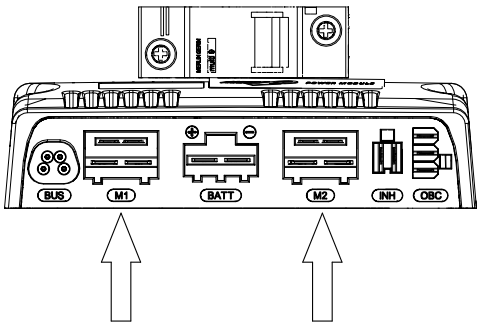


Figure 354. Disconnect the magnetic wheel lock and drive motor cabling from the power module.

7. Remove the cable cover by undoing the rear and removing the front screw that holds the cable cover.

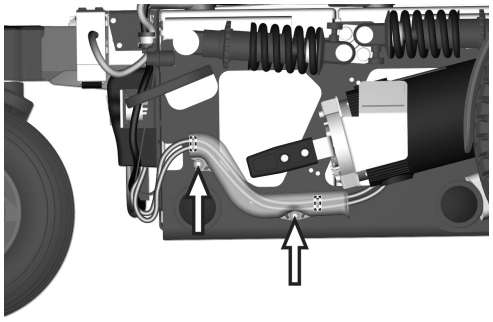


Figure 355. The drive motor cable and the wheel lock cable are held in place with a cable cover.

8. Remove the drive motor, it's fitted with four screws.

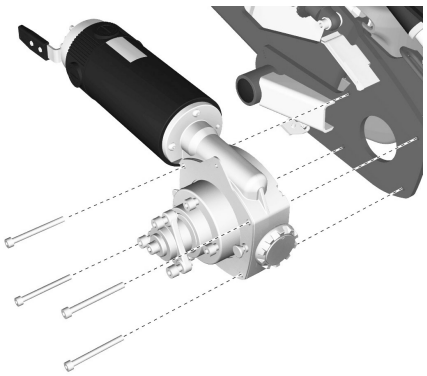


Figure 356. Mounting or removing the drive motor.

4.2.4.2 Mounting drive motor

Assemble the drive motor in the reverse order.

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised or lowered manually, see *Manual operation of AP elevator*, Page 73.

2. Mount the drive motor with the four screws.

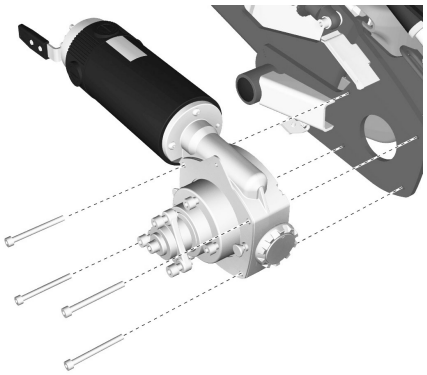


Figure 357. Fitting or removing the drive motor.

3. Fit the cable cover onto the drive motor cable and wheel lock cable.

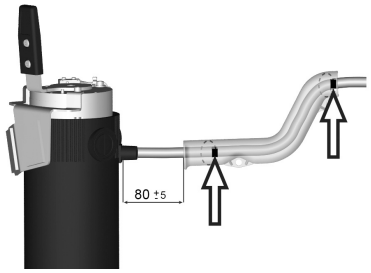


Figure 358. Mounting of the drive motor cable cover.

4. Fit the cables with the cable cover using the two screw that holds the cable cover to the chassis.

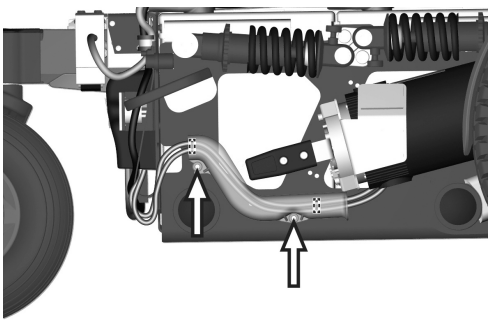


Figure 359. The drive motor cable and the wheel lock cable are held in place with a cable cover.

5. Connect the magnetic wheel lock and drive motor cabling to the power module.
6. Mount the drive wheel. See 4.2.5.1 *Drive wheels*, Page 120.
7. Mount the chassis covers. See 4.2.1 *Covers*, Page 63.

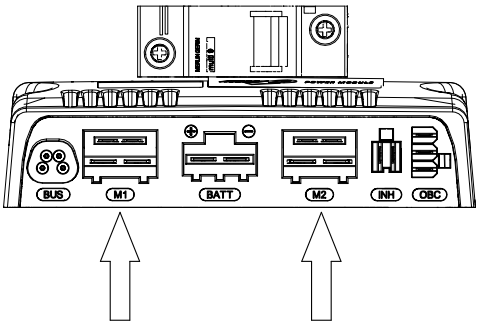


Figure 360. Connect the magnetic wheel lock and drive motor cabling to the power module.

NOTICE

Check brake release

Check that the brake release works properly. When the brakes are released, it should not be possible to drive the wheelchair.

4.2.5 Wheels

4.2.5.1 Drive wheels

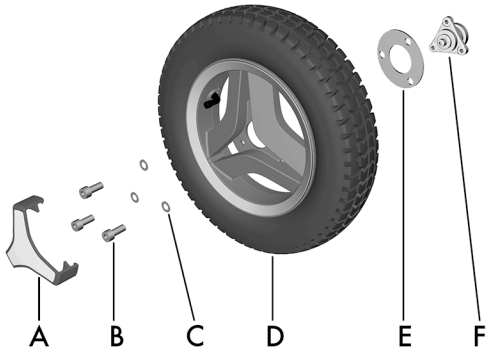


Figure 361. Installing the drive wheel.

A. Hub cap (the design may vary depending on markets and market regulations).

B. Screw, ISO 4762 M8x20 8.8 Fe/Zn 5 C1/ TUF-LOK DIN 267-28.

C. Washer, ISO 7089 8 200 HV Fe/Zn 5 C1 (8,4x16x1,6).

D. Drive wheel.

E. Spacer, in use only when the wheelchair is fitted with winter tires.

Spacer.

F. Wheel hub, do not remove the hub from drive unit while performing service on the wheel.

The following tools are necessary for this task:

- 1 Torque wrench.
- 1 Allen key socket, 6 mm.
- 1 Jack.
- 4 Blocks for securing the wheelchair.

NOTICE

Replace used wheel bolt

If a wheel bolt is removed for tire service, replace it with a new, unused bolt from Permobil and tighten it to the recommended torque. Also, inspect the drive axle and wheel rim for any damage. Damage to either part can cause the wheel bolt to loosen or fracture. Because the TUF-LOK thread lock fluid wears off, Permobil recommends that wheel bolts only be used once.

Removing the drive wheels

(i) Do not remove the wheelhub (F) from drive unit while performing service on a wheel.

1. Switch off the main power switch on the control panel.

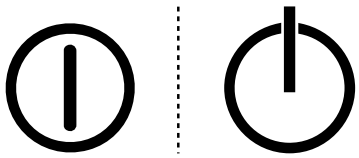


Figure 362. On/Off symbol depending on model.

2. Jack up the wheelchair until the wheel turns freely.

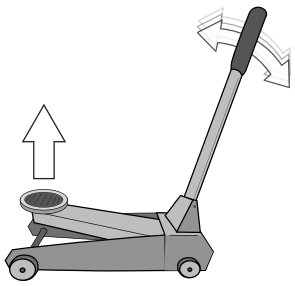


Figure 363. Use a jack or equivalent to lift up the wheelchair.

3. Use the blocks to secure the chair further.

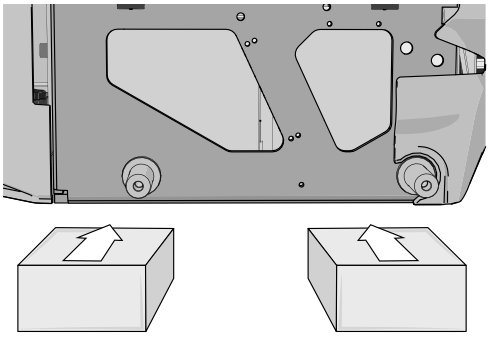


Figure 364. Use two blocks on each side of the chassis. The wheels have been removed in this figure for a better view.

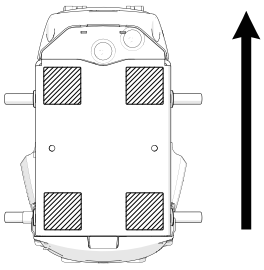


Figure 365. Block location. The arrow shows the direction of travel.

4. Remove the hub cap (the design may vary depending on markets and market regulations) by carefully levering it out using fingers on two edges of the hub cap.

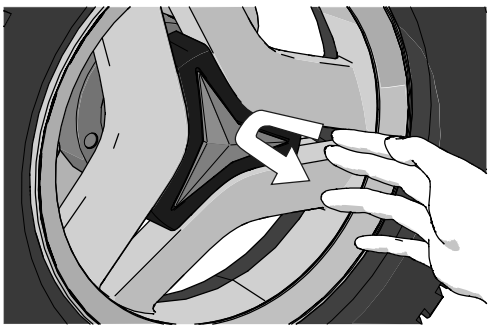


Figure 366. Use your fingers as follows on two edges of the hub cap.

5. Remove the three screws that hold the wheel in place. The central screw must not be removed.
6. Remove the wheel by pulling it straight out.
7. Remove the spacer (only on some models).
Remove the spacer.

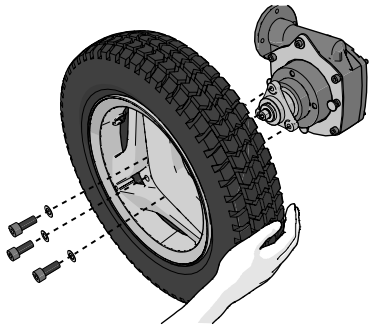


Figure 367. Pull the wheel straight out after you have removed the three screws.

Installing drive wheels

1. Fit the spacer (only on some models).
Fit the spacer.
2. Fit the wheel onto the wheel hub.
3. Insert the three screws and the three washers. Tighten the screws no more than 11 lb.ft.

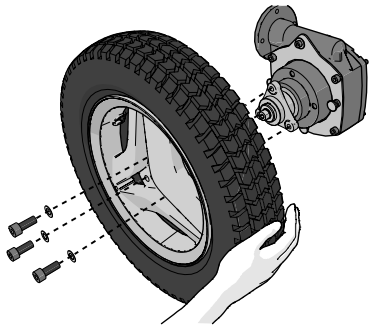


Figure 368. Fit the wheel onto the wheel hub.

4. When all screws and washers are in place, tighten the screws. Tightening torque 17.7 lb.ft.

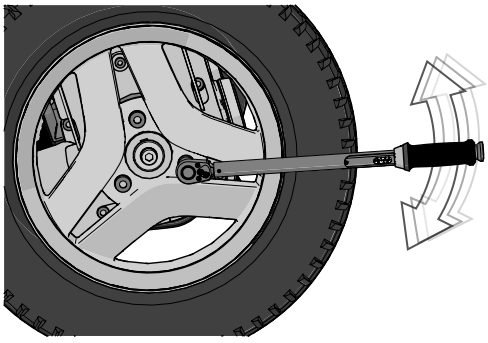


Figure 369. Use a torque wrench to tighten the screws.

5. Push the hub cap (the design may vary depending on markets and market regulations) in place.
6. Remove the blocks.
7. Lower the wheelchair using a jack or equivalent.

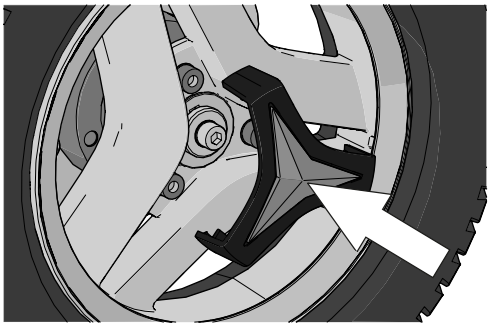


Figure 370. The hub cap snaps when it is in place.

Drive wheel rim

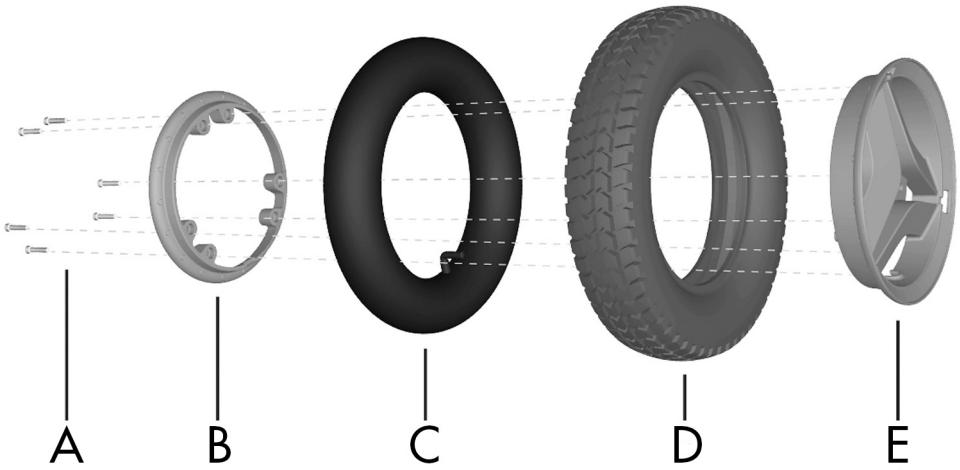


Figure 371. Fitting a pneumatic tire to a split rim.

A. Screw, ISO 4762 M6x25 8.8 Fe/Zn 5 C1/TUF-LOK DIN 267-28.
B. Rim, inner section.
C. Inner tube (only on pneumatic tires).
D. Tire.
E. Rim, outer section.

Taking the drive wheel rim apart

WARNING!

Risk of injury - release air from tire

Before taking the wheel rim apart, release air from the pneumatic tire. Failure to do so may cause damage to the tire, rim and/or bodily injury.

The rim can be taken apart to allow fitting or removal of solid or pneumatic tires.

1. Remove the wheel from the wheelchair. See 4.2.5.1 *Drive wheels*, Page 120.
2. If the tire is pneumatic, release the air.
3. Remove the six screws holding the two halves of the rim together.
4. Take the rim apart.

Assembling the drive wheel rim

Read all warnings contained in this section before filling the tires. Failure to do so may result in injury to the user and damage to the wheelchair and other property and also void any warranty applicable to the wheelchair.

Assemble in the reverse order. Tighten the six screws using a torque wrench. Tightening torque: 16.2 lb.ft. Inflate the tire to the recommended tire pressure: 29–36 psi.

CAUTION!

Risk of injury if tire pressure is incorrect

Before operating the wheelchair for the first time and regularly thereafter, check that the tire pressure meets the specifications in this manual. Check the tire pressure when the wheelchair experiences a significant change in temperature or altitude. Incorrect tire pressure may cause the wheelchair to be less stable, less maneuverable and cause damage to the wheelchair and/or bodily injury.

NOTICE

Risk of damage if tires are overfilled

Do not overfill the tires. Overfilling may result in damage to the wheel assembly.

NOTICE

Risk of reduced performance when tire pressure is insufficient

Insufficient tire pressure may result in abnormal wear and a shorter driving range.

CAUTION!

Maintenance by a qualified service technician

Only qualified service technicians should perform the maintenance and repair specified in this manual. Read all instructions carefully before proceeding. If any questions arise, contact Permobil for assistance.

4.2.5.2 Inflating tires

ⓘ Read all warnings contained in this section before filling the tires. Failure to do so may result in injury to the user and damage to the wheelchair and other property and also void any warranty applicable to the wheelchair.

ⓘ Applies only if the wheelchair is fitted with pneumatic tires.

At regular intervals, check that the wheelchair's tires have the prescribed pressure between 29–36 psi. Incorrect tire pressure can impair stability and maneuverability, while extremely low tire pressure can cause abnormal wear as well as shorter tire life.

1. Unscrew and remove the plastic valve cap on the tire air valve.
2. Connect the compressed air nozzle to the valve and adjust the tire pressure to the prescribed level.
3. Install the plastic valve cap.

Figure 372. Filling valve on drive wheel.

CAUTION!

Risk of injury if tire pressure is incorrect

Before operating the wheelchair for the first time and regularly thereafter, check that the tire pressure meets the specifications in this manual. Check the tire pressure when the wheelchair experiences a significant change in temperature or altitude. Incorrect tire pressure may cause the wheelchair to be less stable, less maneuverable and cause damage to the wheelchair and/or bodily injury.

NOTICE

Risk of damage if tires are overfilled

Do not overfill the tires. Overfilling may result in damage to the wheel assembly.

NOTICE

Risk of reduced performance when tire pressure is insufficient

Insufficient tire pressure may result in abnormal wear and a shorter driving range.

CAUTION!

Maintenance by a qualified service technician

Only qualified service technicians should perform the maintenance and repair specified in this manual. Read all instructions carefully before proceeding. If any questions arise, contact Permobil for assistance.

4.2.5.3 Casters

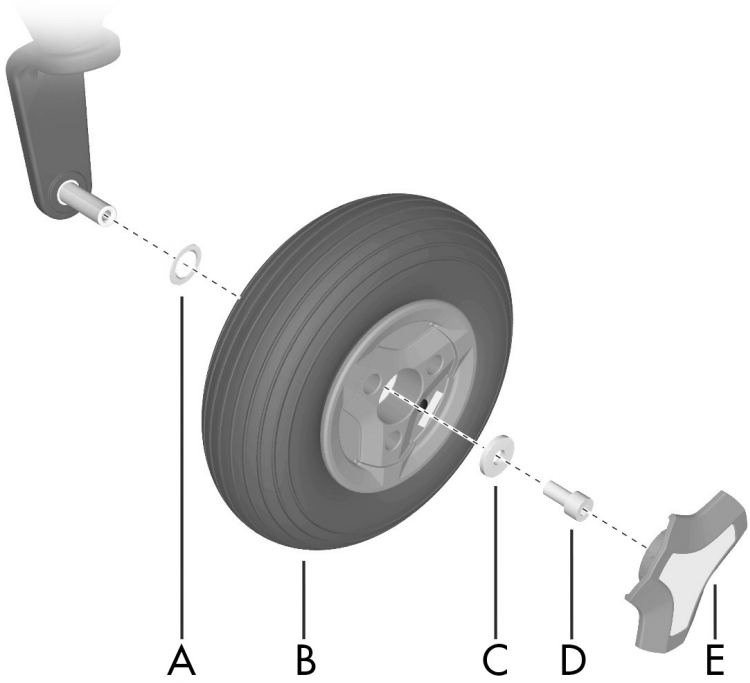


Figure 373. Assembling the rim.

A. Spacer.
B. Wheel.
C. Washer, 8,5x23x3.
D. Screw, ISO 4762 M8x16 10.9 Fe/Zn/TUF-LOK.
E. Hub cap (the design may vary depending on markets and market regulations).

The following tools are necessary for this task:
- 1 Torque wrench.
- 1 Allen key socket, 6 mm.
- 1 Jack.
- 4 Blocks for securing the wheelchair.

Removing casters

1. Switch off the main power switch on the control panel.

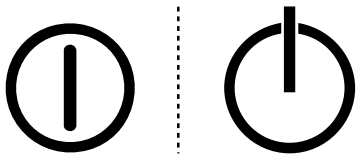


Figure 374. On/Off symbol depending on model.

2. Jack up the wheelchair until the wheel turns freely.

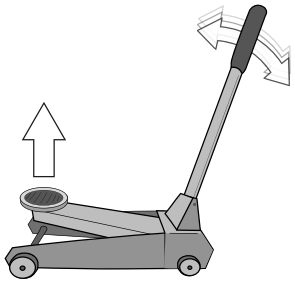


Figure 375. Use a jack or equivalent to lift up the wheelchair.

3. Use the blocks to secure the chair further.

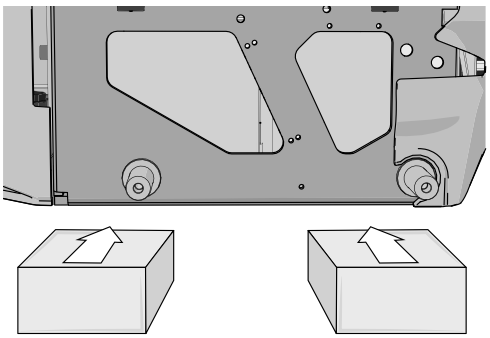


Figure 376. Use two blocks on each side of the chassis. The wheels have been removed in this figure for a better view.

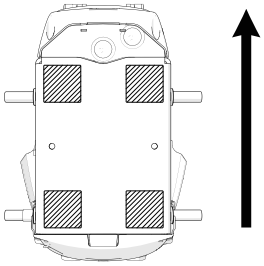


Figure 377. Block location. The arrow shows in the direction of travel.

4. Remove the hub cap (E) by carefully prying it out using a screw driver.
5. Remove the screw (D) and the washer (C).
6. Pull the wheel off the shaft.

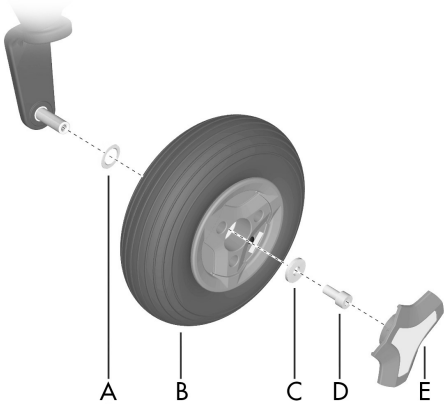


Figure 378. Assembling the rim.

Installing casters

NOTICE

Replace used wheel bolt

If a wheel bolt is removed for tire service, replace it with a new, unused bolt from Permobil and tighten it to the recommended torque. Also, inspect the drive axle and wheel rim for any damage. Damage to either part can cause the wheel bolt to loosen or fracture. Because the TUF-LOK thread lock fluid wears off, Permobil recommends that wheel bolts only be used once.

1. Check that the wheel shaft and rim are undamaged. Clean to remove dirt and rust. Replace damaged parts.
2. Fit the spacer (A) on the axle.
3. Install the wheel (B) on the axle by hand without using any tools. Make sure the rim is fully seated on the axle.
4. Use the screw (D) and washer (C) to install the wheel (B); do so by hand without using any tools.
5. Tighten the screw (D) using a torque wrench. Tightening torque: 17.7 lb.ft. Do not use a pneumatic impact wrench.
6. If the tire is pneumatic fill it with recommended pressure. See 4.2.5.4 *Inflating casters*, Page 129.
7. Fit hub cap (E).
8. Remove the blocks.
9. Lower the wheelchair using the jack.

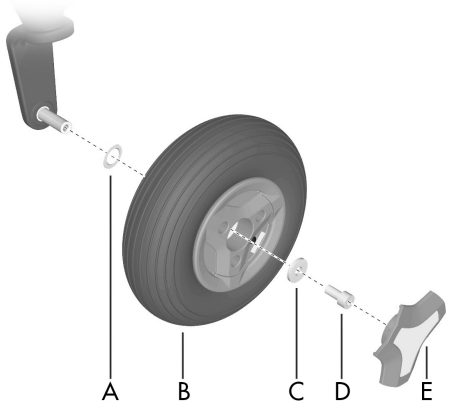


Figure 379. Assembling the rim.

Taking the caster rim apart

1. Remove the caster from the wheel fork. See *Removing casters*, Page 126.
2. If the tire is pneumatic, release the air.
3. Remove the three bolts with nuts which holds the inner and outer parts of the rim together.
4. Take the rim apart.

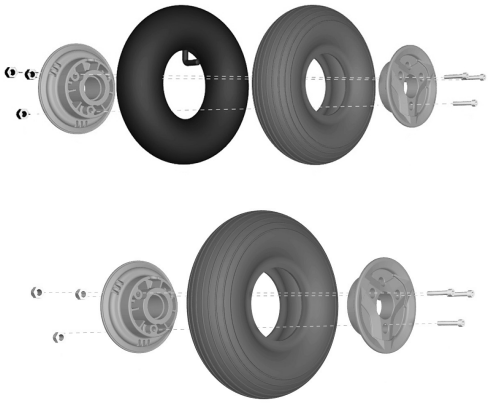


Figure 380. Rim.

Putting the caster rim together

1. Fit the two rim halves together with tire.
2. Tighten the three screws using a torque wrench. Tightening torque: 7.2 lb.ft.
3. Fit the wheel on to the wheelchair. See *Installing casters*, Page 127.
4. Remove the blocks.
5. Lower the wheelchair with the jack or equivalent.

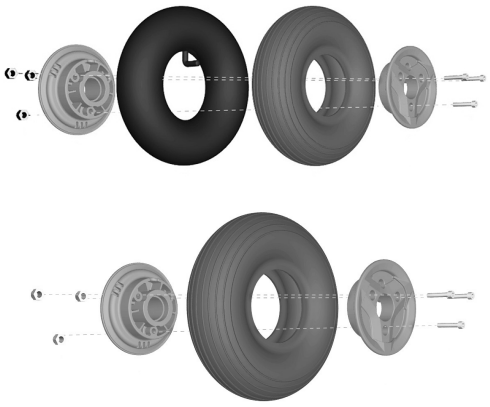


Figure 381. Rim.

4.2.5.4 Inflating casters

ⓘ Applies only if the wheelchair is fitted with pneumatic caster tires.

ⓘ Read all warnings contained in this section before filling the tires. Failure to do so may result in injury to the user and damage to the wheelchair and other property and also void any warranty applicable to the wheelchair.

Figure 382. Filling valve.

At regular intervals, check that the wheelchair's tires have the prescribed pressure. Incorrect tire pressure can impair stability and maneuverability, while extremely low tire pressure can cause abnormal wear as well as shorter tire life. Accordingly, check regularly to ensure tire pressure is maintained at 29–36 psi. You need the valve adapter from the wheelchair's tool bag to inflate the caster tires.

1. Unscrew and remove the valve cap on the tire valve.
2. Attach the valve adapter to the tire valve.
3. Connect the compressed air nozzle to the valve and adjust the tire pressure to the correct level.
4. Put the valve adapter back into the tool bag and put the valve cap back when the caster tires are inflated.

CAUTION!

Risk of injury if tire pressure is incorrect

Before operating the wheelchair for the first time and regularly thereafter, check that the tire pressure meets the specifications in this manual. Check the tire pressure when the wheelchair experiences a significant change in temperature or altitude. Incorrect tire pressure may cause the wheelchair to be less stable, less maneuverable and cause damage to the wheelchair and/or bodily injury.

NOTICE

Risk of damage if tires are overfilled

Do not overfill the tires. Overfilling may result in damage to the wheel assembly.

NOTICE

Risk of reduced performance when tire pressure is insufficient

Insufficient tire pressure may result in abnormal wear and a shorter driving range.

CAUTION!

Maintenance by a qualified service technician

Only qualified service technicians should perform the maintenance and repair specified in this manual. Read all instructions carefully before proceeding. If any questions arise, contact Permobil for assistance.

4.2.6 Wheel hubs

The following items are necessary for this task:

- Torque wrench.
- Allen socket, 6 mm.
- Puller

4.2.6.1 Install wheel hub

1. Check the axle and key for damages.
2. Clean all parts with alcoholic cleaner.

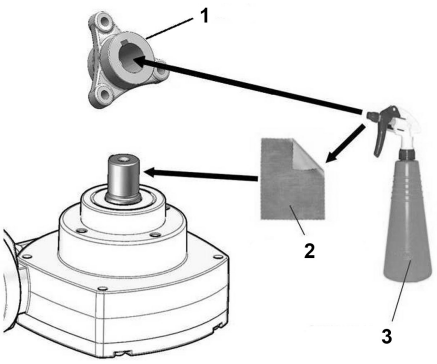


Figure 383. Clean all parts with alcoholic cleaner.

3. Attach the key onto the axle.
4. Position the hub onto the axle using just your hands and make sure the key fits the groove of the hub.

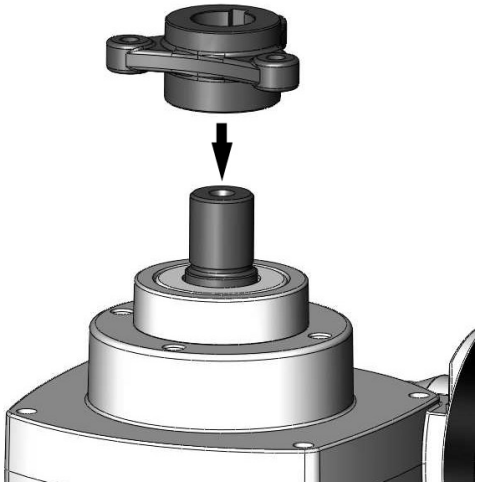


Figure 384. Position the hub onto the axle.

5. Make sure to fit the hub with the longer sleeve (11 mm) towards the gear housing. Push the hub 3–5 mm onto the axle.

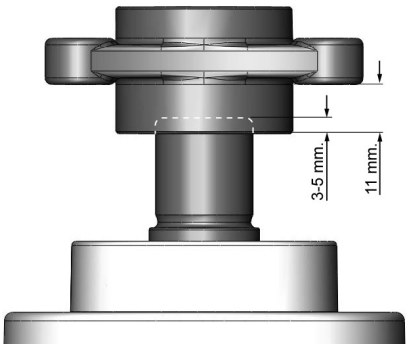


Figure 385. Make sure to fit the hub with the longer sleeve (11 mm) towards the gear housing.

6. Apply a thin layer of Loctite 638 around the chamfer of the shaft.

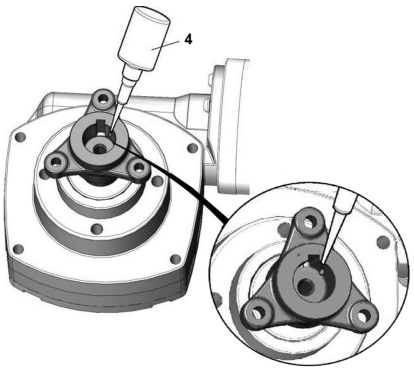


Figure 386. Apply a thin layer of Loctite 638 around the chamfer of the shaft.

7. Attach the screw (TUF-LOK) with washers on the axle. Mind the assembly order of the different types of washer. Push the hub onto the axle by tightening the screw. Tighten the screw using a torque wrench. Tightening torque: 24.3 lb.ft.

WARNING!

Replace wheel hub screw

Failure to follow these instructions could cause the wheel to malfunction causing damage to the wheelchair and/or bodily injury.

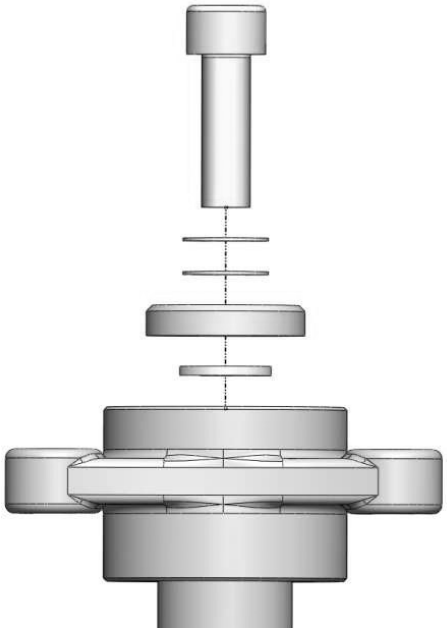


Figure 387. Mind the assembly order of the different type of washers.

4.2.7 Wheel fork

4.2.7.1 Remove wheel fork

1. Switch off the main power switch on the control panel.

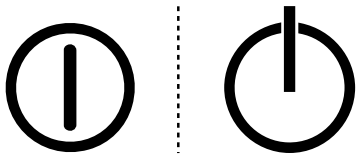


Figure 388. On/Off symbol depending on model.

2. Jack up the wheelchair so that the wheel turns freely.

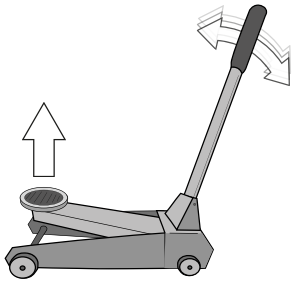


Figure 389. Use a jack or equivalent to lift up the wheelchair.

3. Use the blocks to secure the chair further.

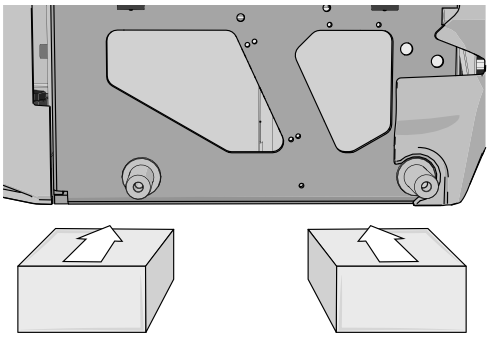


Figure 390. Use two blocks on each side of the chassis box. The wheels has been removed in this figure for better viewing.

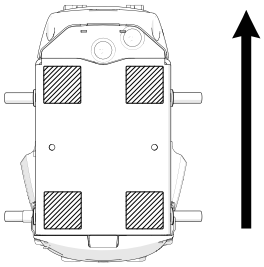


Figure 391. The position of the blocks. The arrow points in the direction of travel.

4. Remove the cover on the top of the swing arm.
Remove the cover on the top of the link arm.

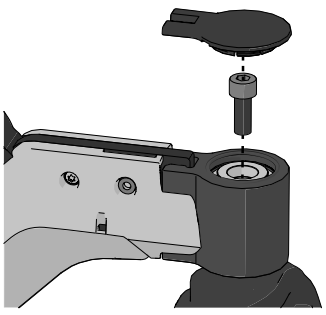


Figure 392. Remove the cover and unscrew the screw.

ⓘ This step does only apply if the wheelchair is equipped with a later revision of the friction brake.

5. Unscrew the screw.

6. Remove the spacer, bearing, washer and wheel fork.

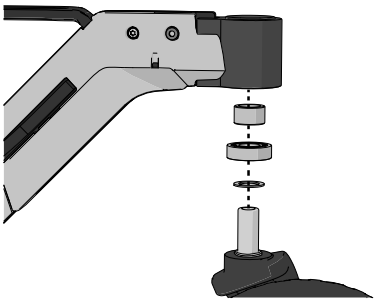


Figure 393. The spacer, bearing, washer and wheel fork.

ⓘ This step does only apply if the wheelchair is equipped with an early revision of the friction brake (see Figure 394).

7. Remove the nut, washer, adjustment unit, o-ring, friction brake screw and friction brake plate.

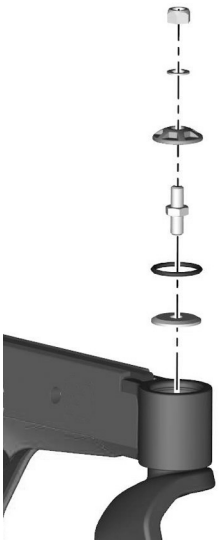


Figure 394. An early revision of the friction brake.

4.2.7.2 Install wheel fork

1. Check that the wheel fork and swing arm with bearings and friction brake are not damaged. Clean to remove dirt and rust. Replace damaged parts. Make sure the washer is installed on the wheel fork.

   Check that the wheel fork and link arm with bearings and friction brake are not damaged. If necessary, clean to remove dirt and rust. Replace damaged parts. Make sure the washer is installed on the wheel fork.

2. Attach the wheel fork together with the washer, bearing and spacer on the swing arm using just your hands. Check that the wheel fork is fully pushed into the swing arm.

   Attach the wheel fork together with the washer, bearing and spacer on the link arm using just your hands. Check that the wheel fork is fully pushed into the link arm.

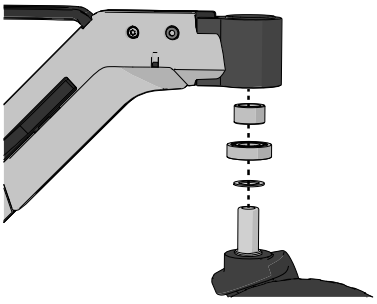


Figure 395. The spacer, bearing, washer and wheel fork.

(i) This step does only apply if the wheelchair is equipped with an early revision of the friction brake (see Figure 396).

3. Attach the nut, washer, adjustment unit, o-ring, friction brake screw and friction brake plate.
   For the adjustment see: 5.2.1 *Friction brakes*, Page 181.

CAUTION!

Be careful with the O-ring

Do not damage the O-ring. It will affect the maneuverability of the wheelchair.

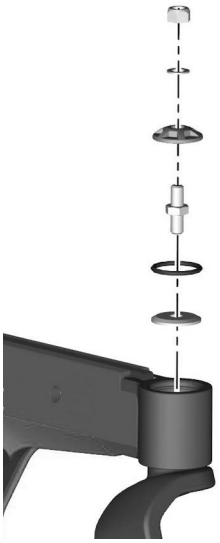


Figure 396. An early revision of the friction brake.

(i) This step does only apply if the wheelchair is equipped with a later revision of the friction brake.

4. Install the screw. Screw the friction brake in place while holding the wheel fork. Tightening torque: 17.7 lb.ft.

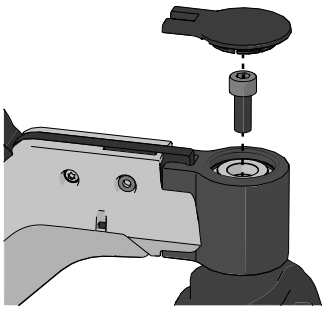


Figure 397. Push the cover into place.

5. Install the cover on top of the swing arm.
   Install the cover on top of the link arm.

4.2.8 Support wheel unit

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 5 mm.
- 1 Allen key socket 6 mm.

4.2.8.1 Removing support wheel unit

1. Switch off the main power switch on the control panel.
2. Remove the front chassis cover. See 4.2.1 *Covers*, Page 63.
3. Remove the support wheel actuator. See 4.2.10.1 *Removing support wheel actuator*, Page 136
4. Remove the support wheel unit, it's attached with fours screws and washers. See fig. 400.

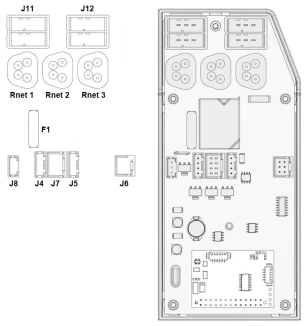


Figure 398. ICS Master Module.

4.2.8.2 Mounting support wheel unit

1. Make sure the four screws holding the brass bearings are NOT tightened.

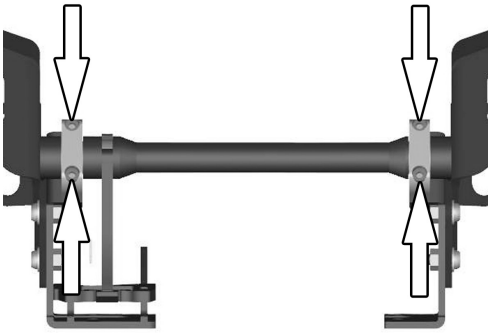


Figure 399. The four screws holding the brass bearings.

2. Mount the Support wheel unit using the four screws and washers. Use a torque wrench to tighten the screws. Tightening torque: 17.7 lb.ft.
3. Move the support wheels a bit up and down before tightening the four screws holding the brass bearings. Use a torque wrench to tighten the screws. Tightening torque: 7.2 lb.ft.
4. Fit the support wheel actuator. See 4.2.10.2 *Mounting support wheel actuator*, Page 137.
5. Refit the chassis covers. See 4.2.1 *Covers*, Page 63.

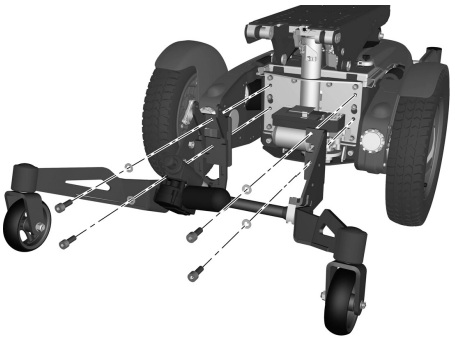


Figure 400. Support wheel unit.

4.2.9 Support wheels

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 5 mm.
- 1 Spanner 10 mm.

4.2.9.1 Removing support wheel

WARNING!

Removing support wheels increases tipping risk

Removing the support wheels increases the risk of the wheelchair's tipping over. The wheelchair may not be driven without support wheels.

1. Switch off the main power switch on the control panel.
2. Remove the screw.

4.2.9.2 Mounting support wheel

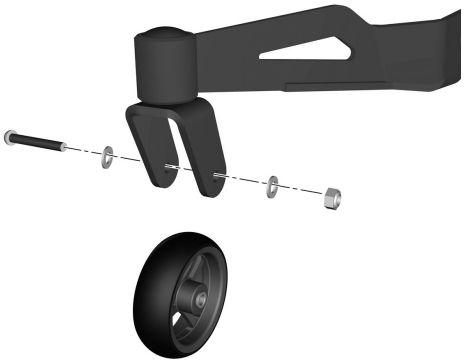


Figure 401. Support wheel.

1. Switch off the main power switch on the control panel.
2. Fit the wheel with the screw, washers and nut. Screw, washers and nut must be fitted from the outside in. Tighten the screw using a torque wrench. Tightening torque: 13.3 lb.ft. See fig. 401.

4.2.10 Support wheel actuator

For this task the following tools are necessary:

- 1 Allen key socket 6 mm.

4.2.10.1 Removing support wheel actuator

1. Remove the front chassis cover. See 4.2.1 *Covers*, Page 63.
2. Raise the seat just a bit towards standing position to facilitate removal of the actuator.
3. Switch off the main power switch on the control panel.
4. Disconnect the actuator from the ICS Master Module. It is connected to one of the connectors J11 or J12. Note the positions of the connector with consideration to subsequent mounting.
5. Remove the actuator. It is attached with a pin and circlip at the bottom and a screw and nut at the top. See fig. 403.

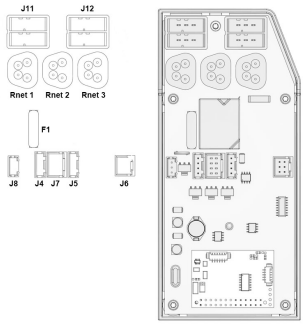


Figure 402. ICS Master Module.

4.2.10.2 Mounting support wheel actuator

1. Mount the actuator using the screw, washer and nuts at the top and the pin and circlip at the bottom.
2. Reconnect the actuator to the connectors J11 or J12 on the ICS Master Module. See fig. 402.
3. Refit the chassis front cover. See 4.2.1 *Covers*, Page 63.

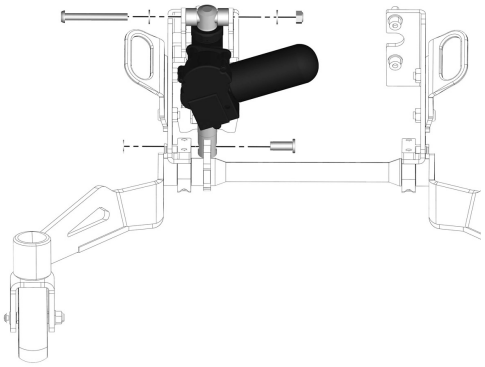


Figure 403. Support wheel unit.

4.2.11 Magnetic wheel locks

For this task the following tools are necessary:

- 1 Allen key 3 mm.
- 1 Allen key 4 mm.

4.2.11.1 Removing magnetic wheel lock

The wheelchair is equipped with a magnetic wheel locks on the left and right drive motor. The magnetic wheel locks are both equipped with a brake release lever which is used to manually release the brakes.

1. Switch off the main power switch on the control panel.
2. Remove the drive package covers. See *Removing drive motor cover*, Page 70.
3. Remove the chassis rear cover. See 4.2.1 *Covers*, Page 63.
4. Disconnect the magnetic wheel lock at the connector on the cable.

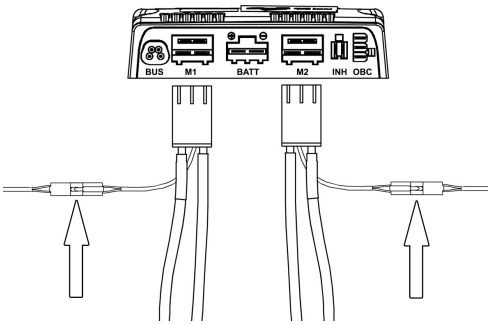


Figure 404. The connectors of the magnetic wheel locks.

5. Remove the cable cover by unscrewing the two screws.

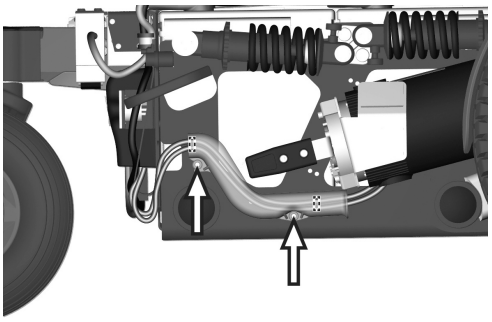


Figure 405. Remove the cable cover.

6. Remove the magnetic wheel lock, it's fitted with three screws.

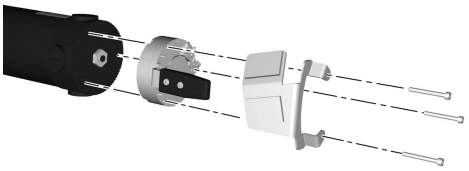


Figure 406. The magnetic wheel lock is fitted with three screws.

4.2.11.2 Mounting magnetic wheel lock

Assemble in the reverse order.

1. Fit the magnetic wheel lock with the brake release lever pointing outwards using the three screws.

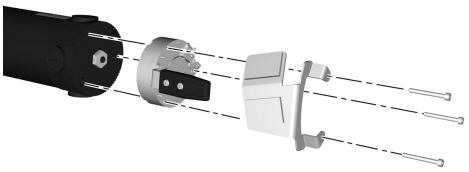


Figure 407. The magnetic wheel lock is fitted with three screws.

2. The brake release lever has an end position screw which is assembled in different positions depending on if the magnetic wheel lock is assembled on the chassis right or left drive motor. On delivery of a new brake release, the end position screw is assembled on the end of the brake release lever. Fit the end position screw in the hole above the brake release lever.

3. Fit the cable to the chassis using the cable cover.

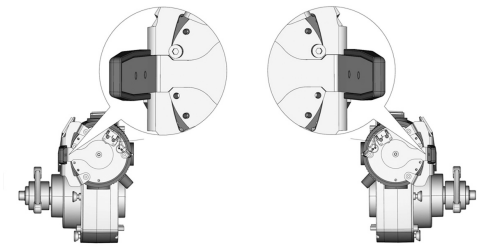


Figure 408. The brake release lever has an end position screw which is assembled in different positions depending on if the magnetic wheel lock is assembled on the chassis right or left drive motor.

4. Connect the magnetic wheel lock to the connector on the cable, next to the connector on the power module.

5. Fit the drive package covers. See *Mounting drive motor cover*, Page 71.

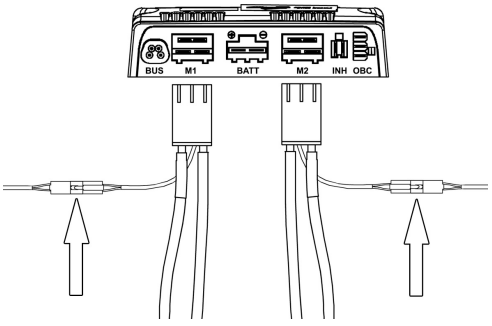


Figure 409. The contacts of the magnetic wheel locks.

4.2.12 Friction brakes

The following items are necessary for this task:

- Torque wrench.
- Allen socket.

NOTICE

Use the correct tools and spare parts

Do not use a pneumatic impact wrench.

Do not use other types of screws or washers.

Do not use any other type of thread lock.

4.2.12.1 Remove friction brake

1. Switch off the main power switch on the control panel.

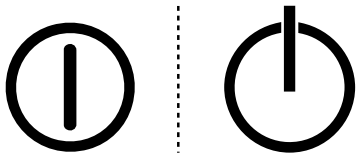


Figure 410. On/Off symbol depending on model.

2. Jack up the wheelchair so that the wheel turns freely.

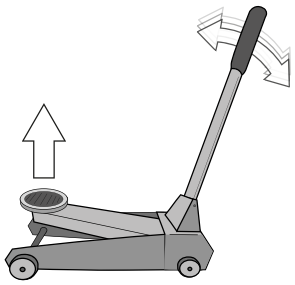


Figure 411. Use a jack or equivalent to lift up the wheelchair.

3. Use the blocks to secure the chair further.

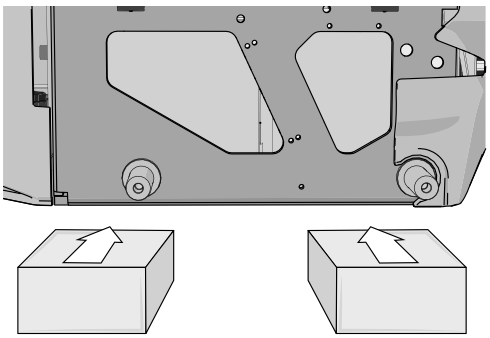


Figure 412. Use two blocks on each side of the chassis box. The wheels has been removed in this figure for better viewing.

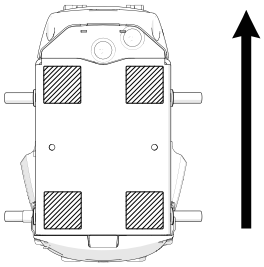


Figure 413. The position of the blocks. The arrow points in the direction of travel.

NOTICE

Always replace the cover

Always replace the old cover. The old cover will let in water in the housing causing damage to the friction brake.

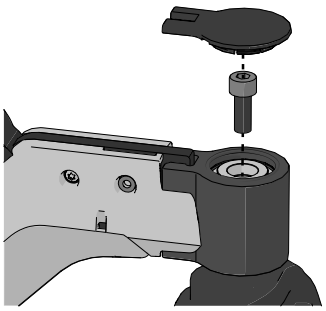


Figure 414. Remove the cover and unscrew the screw.

The swing arms are equipped with friction brakes working as anti flutter devices.

The rear link arms are equipped with friction brakes working as anti flutter devices.

(i) There are two variants of the friction brake.

4. Remove the cover on the top of the swing arm.

Remove the cover on the top of the link arm.

(i) This step does only apply if the wheelchair is equipped with a later revision of the friction brake (see Figure 417).

5. Unscrew the screw.

(i) This step does only apply if the wheelchair is equipped with an early revision of the friction brake (see Figure 415).

6. Remove the nut, washer, adjustment unit, o-ring, friction brake screw and friction brake plate.

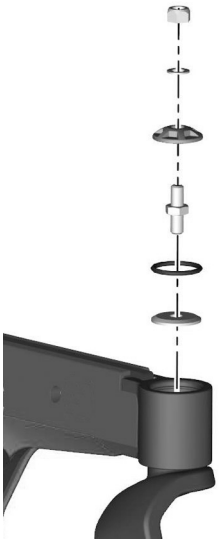


Figure 415. An early revision of the friction brake.

(i) This step does only apply if the wheelchair is equipped with a later revision of the friction brake (see Figure 417).

7. Pull off the wheel fork.

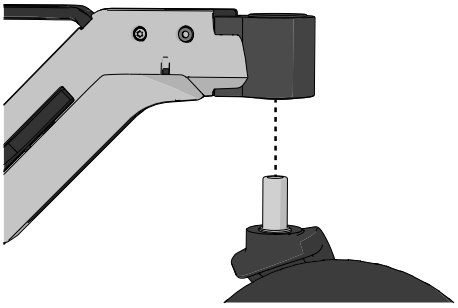


Figure 416. Remove the wheel fork.

(i) This step does only apply if the wheelchair is equipped with a later revision of the friction brake (see Figure 417).

8. Push out the friction brake with a steel rod (1/2" in diameter) or equivalent.

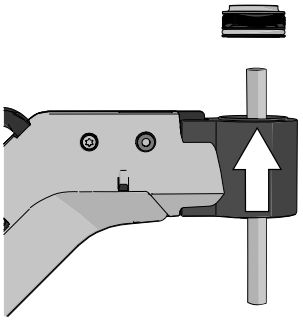


Figure 417. Remove the friction brake.

4.2.12.2 Install friction brake

1. Clean the friction brake and the friction brake housing. Remove all grease and dirt.

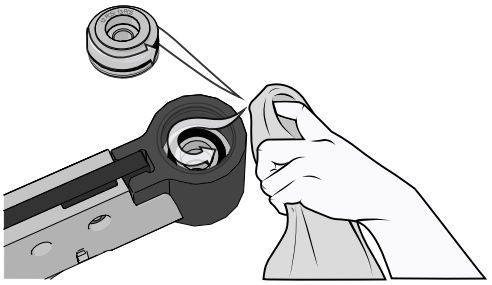


Figure 418. The friction brake and the friction brake housing.

2. Attach the wheel fork and hold it in place.

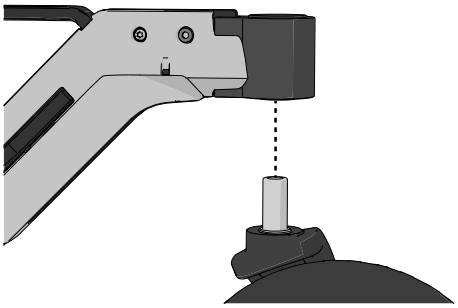


Figure 419. The wheel fork.

3. Attach the friction brake while holding the wheel fork.

CAUTION!

Be careful with the O-ring

Do not damage the O-ring. It will affect the maneuverability of the wheelchair.

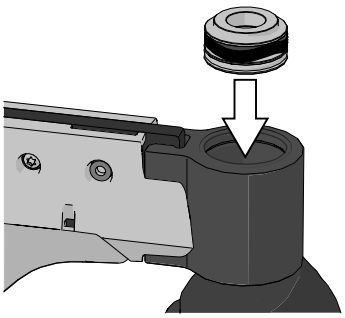


Figure 420. The friction brake.

NOTICE

Always replace the cover

Always replace the old cover. The old cover will let in water in the housing causing damage to the friction brake.

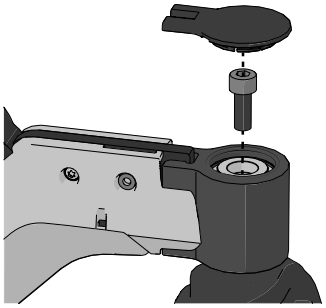


Figure 421. Push the cover into place.

4. Install the screw. Screw the friction brake in place while holding the wheel fork. Tightening torque: 17.7 lb.ft.

5. Install the new cover on top of the swing arm.
Install the new cover on top of the link arm.

4.2.13 Shock absorbers

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 6 mm.
- 1 Spanner 13 mm.

4.2.13.1 Removing front shock absorber

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised or lowered manually, see *Manual operation of AP elevator*, Page 73.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers and drive package covers. See page 4.2.1 *Covers*, Page 63.
4. Chock up the wheelchair so that the wheel turns freely and let out the air.
5. Remove the shock absorber, it's fitted with two screws and washers.

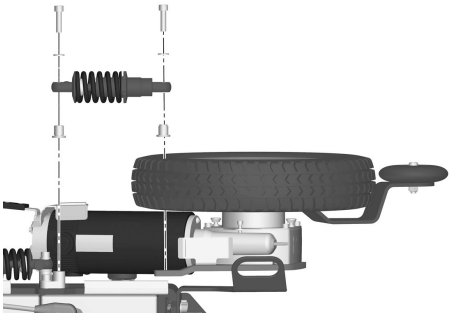


Figure 422. Mounting or removing the front shock absorber.

4.2.13.2 Mounting front shock absorber

1. Mount the shock absorber using the two screws and washers. Tighten the screws using a torque wrench. Tightening torque: 17.7 lb.ft. See fig. 422.
2. Adjust the shock absorber spring force. See 5.2.2 *Shock absorber*, Page 182.

4.2.13.3 Removing rear shock absorber

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised or lowered manually, see *Manual operation of AP elevator*, Page 73.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers and drive package covers. See page 63.
4. Chock up the wheelchair so that the wheel turns freely and let out the air.
5. Remove the shock absorber, it's fitted with two screws and washers and a nut. See fig. 422.

4.2.13.4 Mounting rear shock absorber

Assemble in the reverse order.

1. Mount the shock absorber using the two screws and washers and nut. Tighten the screws using a torque wrench. Tightening torque: 17.7 lb.ft.
2. Adjust the shock absorber spring force. See 5.2.2 *Shock absorber*, Page 182.

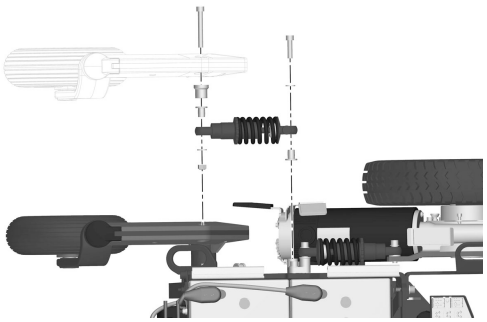


Figure 423. Mounting or removing the rear shock absorber.

4.2.14 Link arms

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key socket 6 mm.

4.2.14.1 Removing rear link arm

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the shock absorber from the link arm. It is fitted with one screw (1) and washer (2).
4. Remove the cover (3) from the link arm by pulling it straight out. If necessary, carefully lever it out using a screwdriver in the slot on the cap.
5. Remove the link arm (7) and the wave washer (6). It is fitted with the screw (4) and the washer (5).

For removal of wheel forks and wheels, see the respective chapters.

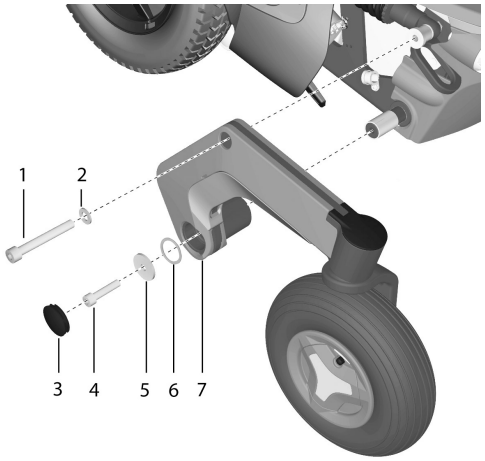


Figure 424. Removing the Rear Link Arm.

4.2.14.2 Mounting rear link arm

Assemble in the reverse order.

1. Check that the shaft and link arm are undamaged. Clean as necessary to remove dirt and rust. Replace damaged parts.
2. Mount the link arm (7) onto the axle with the use of hand force only. Make sure the link arm is fully seated upon the axle.
3. Fit the screw (4), the washer (5) and wave washer (6). Tighten the screw using a torque wrench. Tightening torque: 17.7 lb.ft.
4. Fit the shock absorber to the link arm. It is fitted with one screw (1) and washer (2). Tighten the screw using a torque wrench. Tightening torque: 17.7 lb.ft.
5. Fit the cover (3) on to the link arm by pushing it straight in.

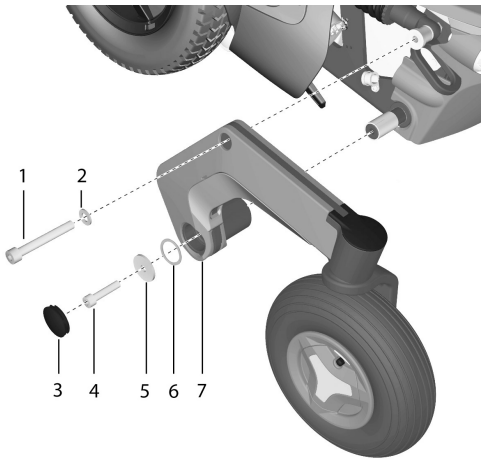


Figure 425. Fitting the Rear Link Arm.

4.2.14.3 Removing front link arm

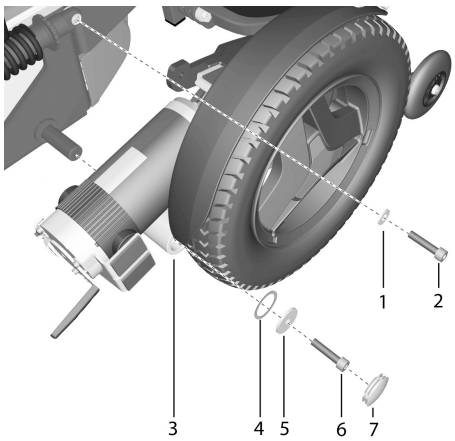


Figure 426. Removing the front link arm.

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised or lowered manually, see *Manual operation of AP elevator*, Page 73.
2. Switch off the main power switch on the control panel.
3. Chock up the wheelchair so that the wheel turns freely and let out the air.
4. Remove the drive wheel. See 4.2.5.1 *Drive wheels*, Page 120.
5. If the wheelchair is equipped with support wheels, remove them. See 4.2.8 *Support wheel unit*, Page 134.
6. Remove the drive package covers. See *Removing drive motor cover*, Page 70
7. Remove the cover (7) from the link arm.
8. Remove the shock absorber from the link arm. It is fitted with one screw (2) and washer (1).
9. Remove the link arm (3), it's fitted with the screw (6) and the washer (5).

For removal of drive motor, see 4.2.4 *Drive motors*, Page 118.

4.2.14.4 Mounting front link arm

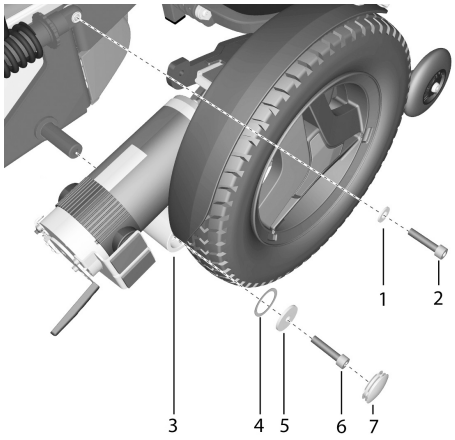


Figure 427. Fitting the front link arm.

Mount in the reverse order.

1. Check that the axle and link arm are not damaged. If necessary, clean to remove dirt and rust. Replaced damaged parts.
2. Fit the link arm (3) on the axle using just your hands. Check that the link arm is fully located on the axle.
3. Fit the screw (6), the washer (5) and the wave washer (4). Tighten the screw with a torque wrench. Tightening torque: 17.7 lb.ft.
4. Fit the shock absorber on to the link arm. It is fitted with one screw (2) and washer (1).Tighten the screw with a torque wrench. Tightening torque: 17.7 lb.ft.
5. Fit the cover (7) on to the link arm.
6. Fit the drive package covers. See *Mounting link arm accent color cover*, Page 68.
7. If the wheelchair is equipped with support wheels, refit them. See 4.2.8 *Support wheel unit*, Page 134.
8. Fit the drive wheel. See 4.2.5.1 *Drive wheels*, Page 120.

4.2.15 Lights and turn signals

4.2.15.1 Main cable

Removing main cable

1. Switch off the power supply using the On/Off key on the control panel and switch the automatic main fuse to Off. See 4.3.5 *Main circuit breaker*, Page 160.
2. Remove the chassis covers. See 4.2.1 *Covers*, Page 63.
3. Remove the drive package covers including the front fender. See *Removing drive motor cover*, Page 70.
4. Disconnect the connectors J4, J5 och J7 from the ICS master module.

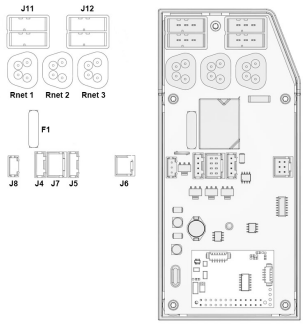


Figure 428. ICS master module.

5. Remove the cable from its cable brackets on the left and right hand side of the chassis.

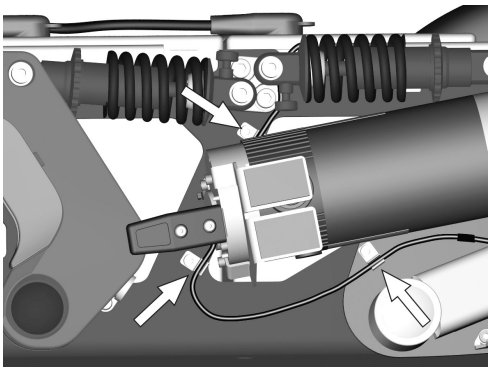


Figure 429. The cable is assembled with three cable brackets on the left and right hand side of the chassis.

6. Remove the lights cabling from the cable tunnels on the left and right hand side of the chassis.

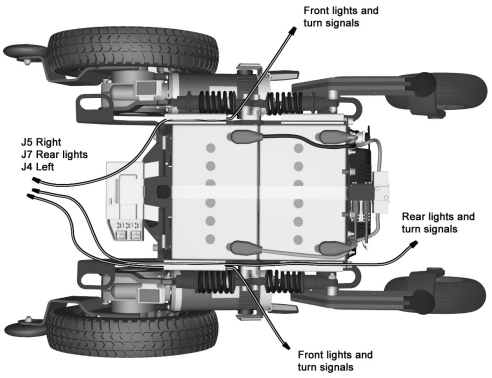


Figure 430. Lights cabling.

Mounting main cable

1. Switch off the power supply using the On/Off key on the control panel and switch the automatic main fuse to Off. See 4.3.5 *Main circuit breaker*, Page 160.
2. Remove the chassis covers. See 4.2.1 *Covers*, Page 63.
3. Remove the drive package covers including the front fender. See *Removing drive motor cover*, Page 70.
4. Position the lights cabling on the chassis and assemble the cables in the cable tunnels on the left and right hand side of the chassis.

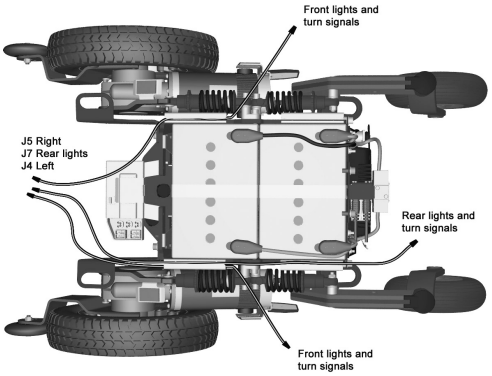


Figure 431. Lights cabling.

5. Connect the connectors J4, J5 and J7 to the ICS master module.

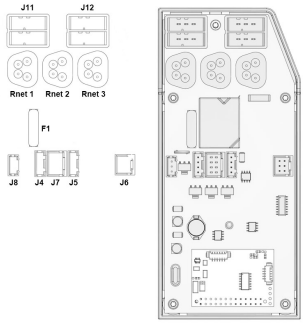


Figure 432. ICS master module.

6. Assembly the cable to its cable brackets on the left and right hand side of the chassis.

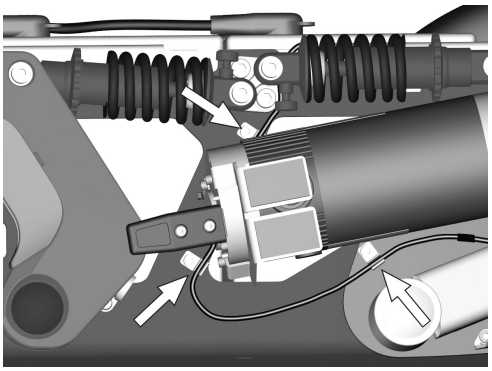


Figure 433. The cable is assembled with three cable brackets on the left and right hand side of the chassis.

4.2.15.2 Front turn signals

Removing front turn signal

1. Switch off the power supply using the On/Off key on the control panel and switch the main circuit breaker to Off. See 4.3.5 *Main circuit breaker*, Page 160.
2. Remove the drive package covers including the front fender. See *Removing drive motor cover*, Page 70. Disconnect the lights and indicators at the connectors on the cables.
3. Disconnect the two cables on the back of the indicator by pulling them straight out.
4. The indicators are assembled on the cover with double sided tape. Carefully peel the indicator in question off, if needed use a suitable tool to facilitate removal. Be careful not to damage the paint work on the cover.
5. To remove the cables, remove the tape that holds the cables to the cover.

Figure 434. The front turn signal is assembled on the drive package cover.

Mounting front turn signal

1. Remove the protective tape on the back of the indicator.
2. Rotate the indicator until the text ”TOP” is pointing straight upwards and position the indicator on the drive package cover. Press it against the cover until the double sided tape sticks on to the cover.
3. Connect the two cables on the back of the indicator.
4. If removed, fit the cables with a tape on the inside of the cover. See fig. 434.
5. Connect the indicator cables to the front light and to the lights main cable in the chassis. See *Mounting drive motor cover*, Page 71.
6. Fit the covers. See 4.2.1 *Covers*.

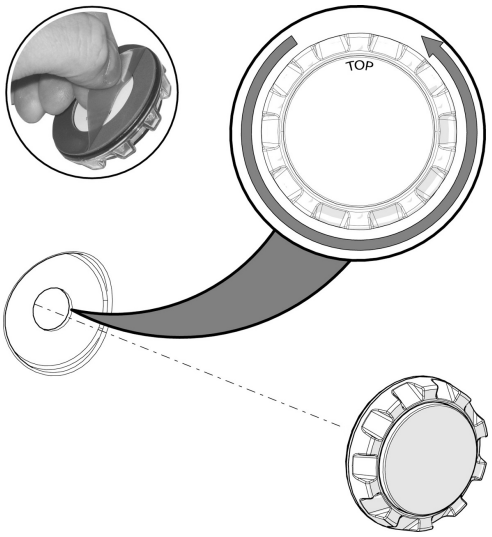


Figure 435. Remove the protective tape and rotate the indicator until the text ”TOP” is pointing straight upwards.

4.2.15.3 Front lights

For this task the following tools are necessary:

- 1 Allen key 2,5 mm.

Removing front light

1. Switch off the power supply using the On/Off key on the control panel and switch the main circuit breaker to Off. See 4.3.5 *Main circuit breaker*, Page 160.
2. Remove the front fender. See *Removing front fender*, Page 69.
3. Pull the cable out of the slots and fasten it with a cable tie, then position the end of the lights cable up the hole through the fender.

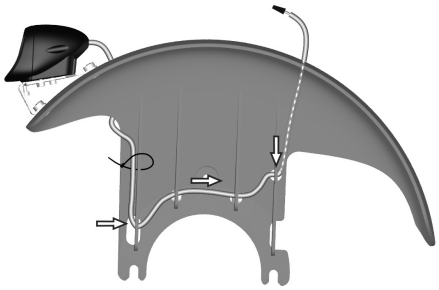


Figure 436. Pull the cable out of the slots and fasten it with a cable tie, then position the end of the lights cable up the hole through the fender.

4. Remove the front light. It is attached with two screws from underneath.

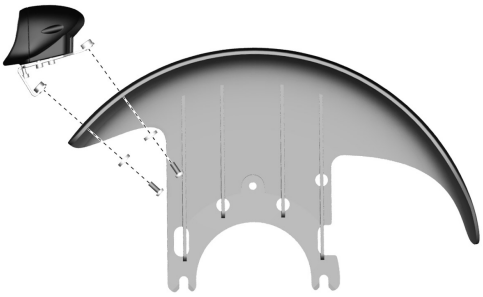


Figure 437. The front light. It is attached with two screws from underneath.

Mounting front light

1. Assemble the front light using the two screws from underneath. See fig. 437.
2. Assemble the cable on the inside of the front fender running it through the slots and using a cable tie, then position the end of the lights cable up the hole through the fender. See fig.436.
3. Assemble the front fender. See *Mounting front fender*, Page 72.

Adjusting front light

1. Loosen the three attachment screws.
2. Adjust the angle of the light by turning the adjustment screw clock- or counter clockwise.
3. Fix into desired angle by tightening the three attachment screws.

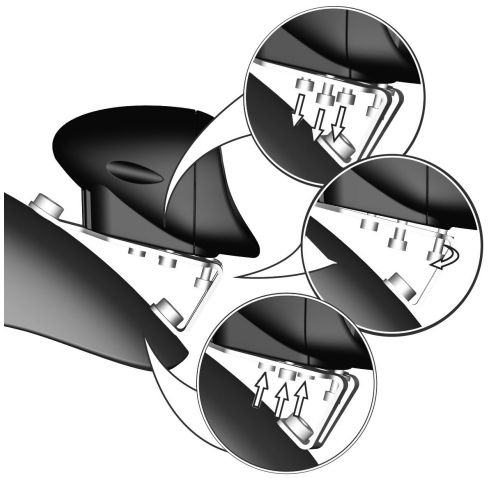


Figure 438. Adjustment of the front lights.

4.2.15.4 Rear lights and turn signals

Remove rear light and turn signal

1. Remove the chassis covers. See 4.2.1 *Covers*, Page 63.
2. Disconnect the cables on the back of the light or turn signal by pulling them straight out.
3. The lights or turn signals are assembled on the cover with double sided tape. Carefully peel the light or turn signal in question off, if needed use a suitable tool to facilitate removal. Be careful not to damage the paint work on the cover.

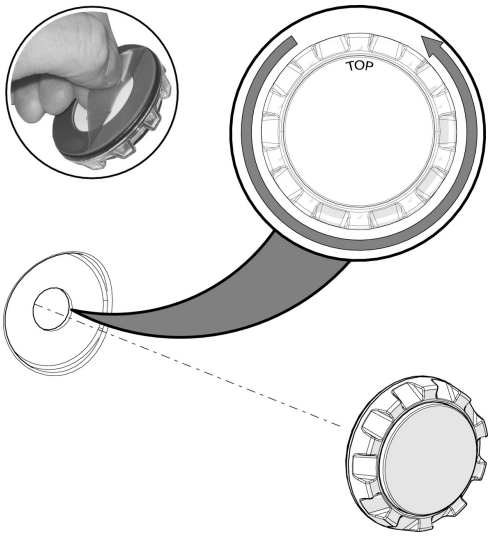


Figure 439. Remove the protective tape and rotate the light/turn signal until the text "TOP" is pointing straight upwards.

Install rear light and turn signal

1. Remove the protective tape on the back of the light/turn signal.
2. Rotate the light or turn signal until the text TOP is pointing straight upwards and position the turn signal on the rear cover. Press it against the rear cover until the double sided tape sticks on to the cover. See fig. 439.
3. Connect the cables on the back of the light or turn signal.
4. Connect the lights or turn signals cable to the lights main cable in the chassis.
5. Fit the covers. See 4.2.1 *Covers*, Page 63.

Figure 440. Cabling from the inside of the rear cover.

4.3 Control panel and electronics

4.3.1 R-net control panel

The following tools are necessary for this task:

- 1 Allen key 4 mm.

4.3.1.1 Removing R-net control panel

1. Switch Off the main power switch on the control panel.

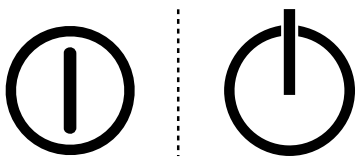


Figure 441. On/Off symbol depending on model.

2. Remove the cable ties holding the R-net control panel (A) and the ICS control panel (B) cabling in place under the arm rest. Note the attachment locations of the cable ties for subsequent reassembly. Same attachment points must be used.
3. Disconnect the R-net control panel (A) cable connector.
4. Remove the R-net control panel (A). It is held in place by two screws. The same two screws also fasten the bracket for the ICS control panel (B), where fitted.

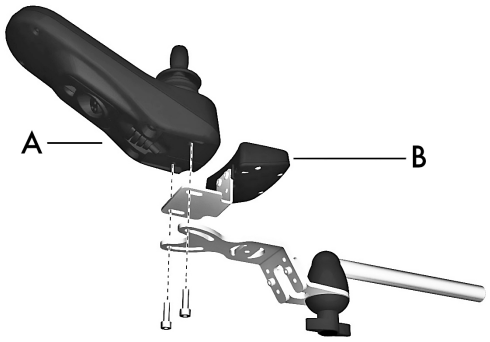


Figure 442. The control panel is held in place by two screws on the rotational panel holder.

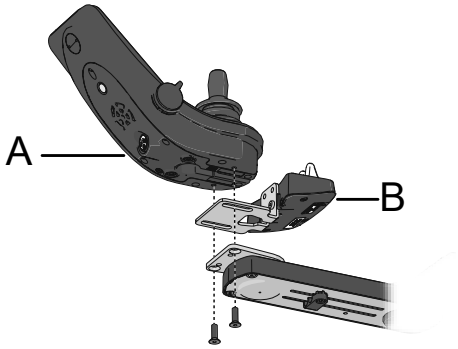


Figure 443. The control panel is held in place by two screws on the parallel panel holder.

4.3.1.2 Mounting R-net control panel

1. Assemble the R-net control panel (A). It is held in place by two screws. The same two screws also fasten the bracket for the ICS control panel (B). Be sure not to over tighten the screw.
2. Reconnect the R-net control panel cable connector.
3. Use cable ties to secure the cabling from the R-net control panel (A) and the ICS control panel (B). Use the same mounting points for the cable ties that were used before the cables were disassembled.

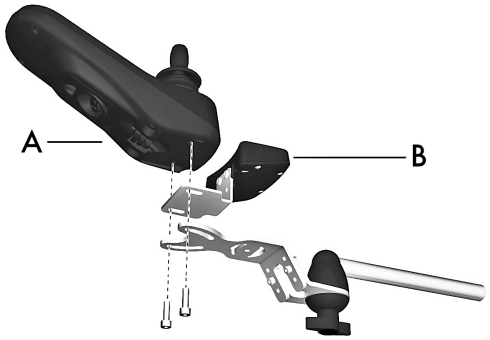


Figure 444. The control panel is held in place by two screws on the rotational panel holder.

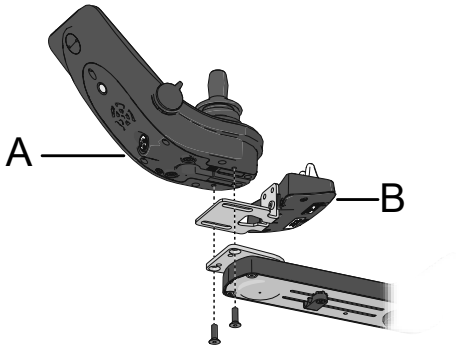


Figure 445. The control panel is held in place by two screws on the parallel panel holder.

4. Switch On the main power switch on the control panel.

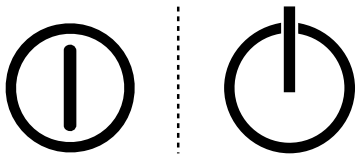


Figure 446. On/Off symbol depending on model.

4.3.2 R-net and ICS bus cabling

This section describes how the R-net and ICS bus cables are mounted between the chassis and the seat.

1. The R-net bus cable is connected to the connector block and mounted with the cable brackets at the back of the backrest.

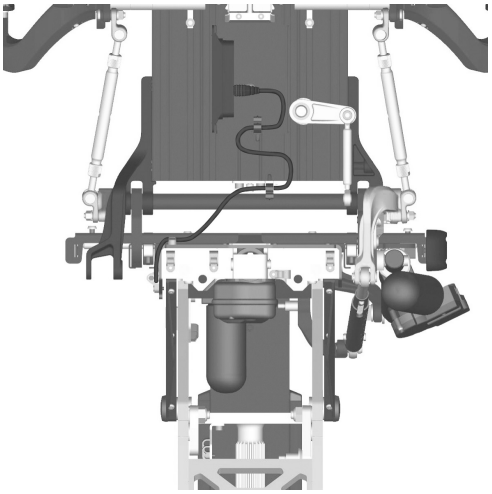


Figure 447. The R-net bus cable is connected to the connector block and mounted in two cable attachments at the back of the backrest.

2. The cable is mounted in the four cable attachments on the right hand side of the seat.

Based on the seat depth, the cable bracket on top of the AP elevator should be mounted in position A, B, C or D.

Seat depth	Mounting position
15”	A
16”–17”	B
18”-19”	C
20”-23”	D

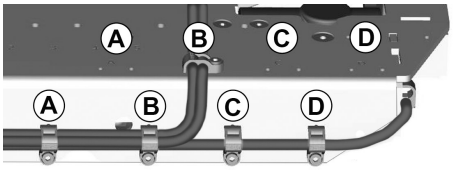


Figure 448. Tilt motor cable is mounted with four cable attachments.

3. The cable loop between the upper and lower cable bracket should be 5”.

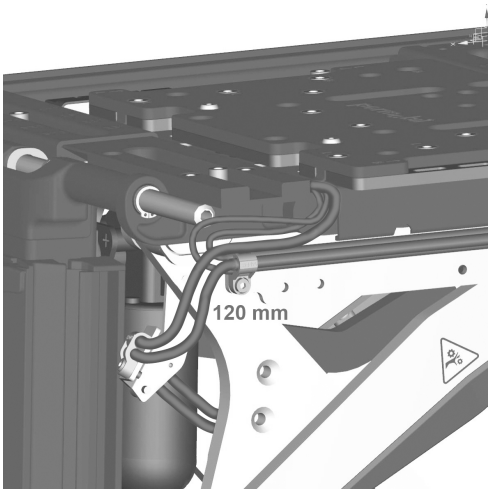


Figure 449. The cable loop between the upper and lower cable bracket should be 5”.

4. The ICS bus cable is connected to the seventh position of the connector block on the right hand side of the seat.

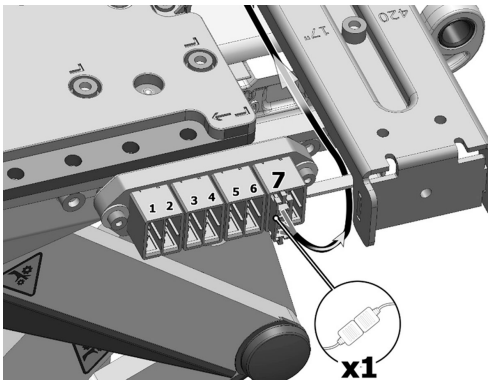


Figure 450. The ICS bus cable is connected to the seventh position of the connector block.

5. The ICS bus cable is laid across the seat frame and mounted in the two cable brackets. Avoid crossing the cables with each other between the connector block and the first cable bracket on top of the seat. Use a Torque wrench to tighten the screws. Tightening torque 0.9 lb.ft.

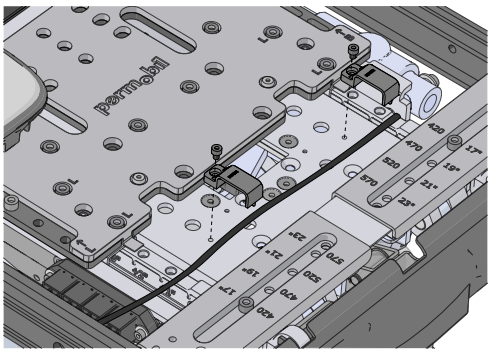


Figure 451. The ICS bus cable is laid across the seat frame and mounted in the two cable brackets.

6. The length of the cable loop between the first cable bracket on the AP elevator and the seat frame must be 5″as indicated by the with double-pointed arrow. The ICS bus cable is mounted behind the R-net bus cable in the cable brackets.

ⓘ On seats with a VS leg rest, power transfer leg rest or power adjustable leg length, the actuator's cable must always be positioned in front of the bus cables loop. This to avoid damages to the cables during leg rest movement.

7. The bus cables are mounted in the two cable brackets on the upper AP elevators arm. The cable brackets are mounted with one screw each. Use a torque wrench to tighten the screws. Tightening torque 0.9 lb.ft.

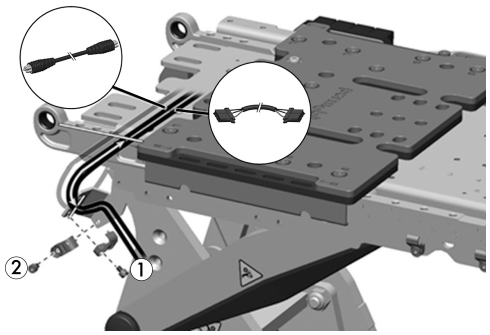


Figure 452. The distance between the first cable bracket on the AP elevator and the seat frame must be 7″.

8. The length of the cable loop between the cable brackets on the upper and lower AP elevator arm must be 7”.

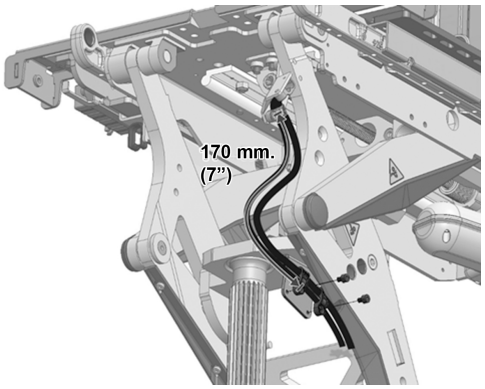


Figure 453. The length of the cable loop between the cable brackets on the upper and lower part of the AP elevator must be 7″.

9. The bus cable is mounted in the two cable brackets on the lower AP elevators arm. The cable brackets are mounted with one screw each. Use a torque wrench to tighten the screws. Tightening torque 0.9 lb.ft.

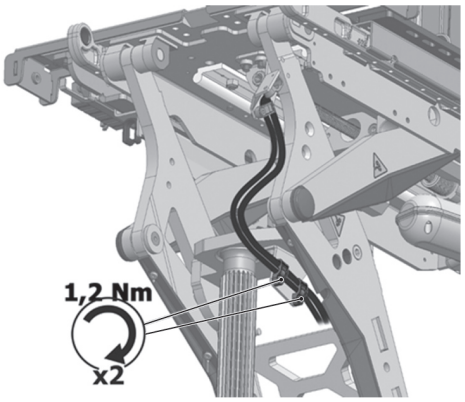


Figure 454. The bus cable is mounted in the two cable brackets on the lower part of the AP elevator's arm.

10. The bus cables are tied together with a cable tie in the middle of the cable loop.

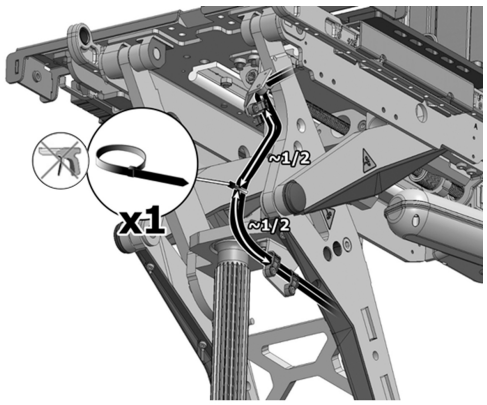


Figure 455. The R-net and ICS bus cables are tied together with a cable tie in the middle of the cable loop.

11. The length of the cable loop between the lowest cable bracket on the lower AP elevator arm and the cable brackets on the pillar must be 11".

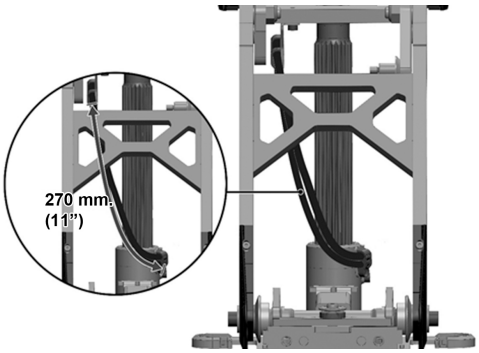


Figure 456. The length of the cable loop between the cable brackets on the lower part of the AP elevator and the pillar must be 11".

12. The bus cables are mounted on the pillar with three cable brackets. The ICS bus cable is mounted above the R-net bus cable in the cable brackets.

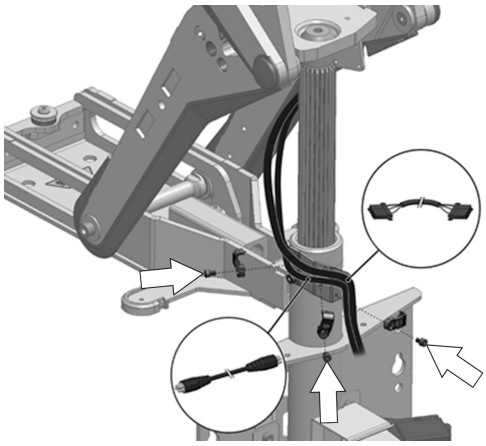


Figure 457. The bus cables are mounted on the pillar with three cable brackets.

13. The cable brackets are mounted with one screw each. Use a Torque wrench to tighten the screws. Tightening torque 0.9 lb.ft.

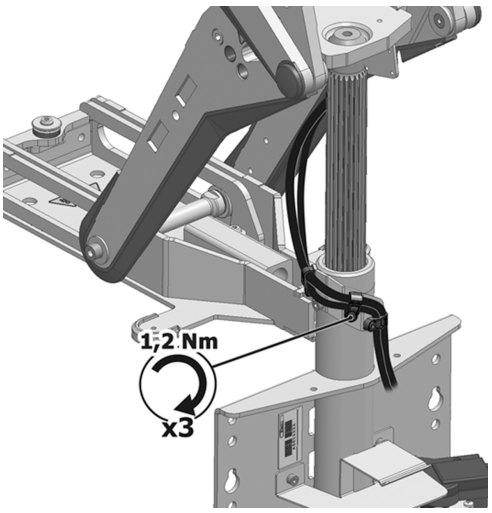


Figure 458. The cable is mounted with three cable brackets on the pillar, each mounted with a screw.

14. The bus cables are tied together with two cable ties, at regular distances on the cable loop.

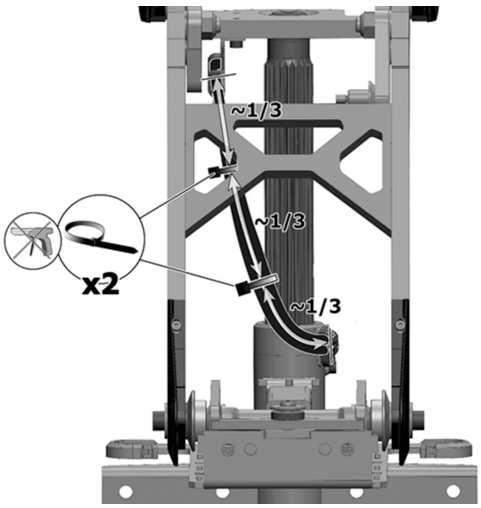


Figure 459. The bus cables are tied together with two cable ties, at regular distances on the cable loop.

15. The bus cables are connected to the ICS master module.

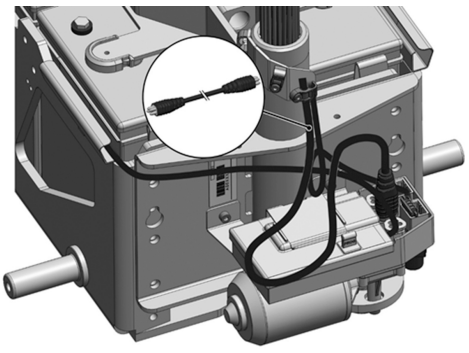


Figure 460. The bus cables are connected to the ICS master module.

16. The rest of the cables is tied into a loop with a cable tie. It is important that the cables go straight down from the last cable bracket on the pillar to avoid pinching when mounting the chassis front cover.

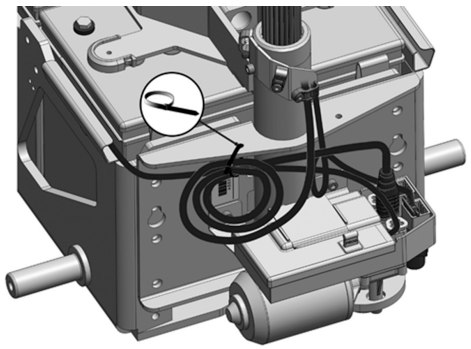


Figure 461. The rest of the cables is tied with a cable tie.

4.3.3 R-net power module

For this task the following tools are necessary:

- 1 Ring wrench 8 mm.

4.3.3.1 Removing R-net power module

1. Switch OFF the main power switch on the control panel.
2. Switch the main circuit breaker to OFF. See 4.3.5 *Main circuit breaker*, Page 160.
3. Remove the chassis covers, see4.2.1 *Covers*, Page 63.
4. Disconnect the electrical connections to the R-net controller, being attentive to their placement.
5. Remove the two nuts.
6. Remove the battery cable holder on each side of the R-net power module.
7. Remove the R-net power module.

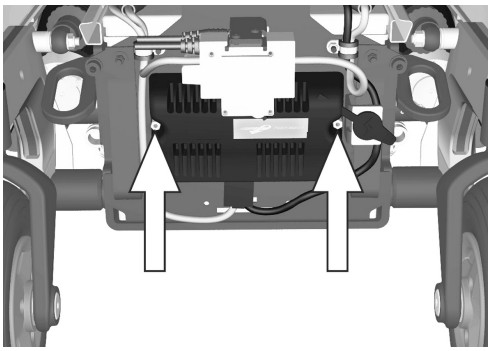


Figure 462. The power module is fitted with two nuts.

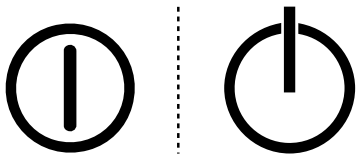


Figure 463. On/Off symbol depending on model.

4.3.3.2 Mounting R-net power module

Assemble in reverse order.

1. Reassemble the power module and battery cable holder, it is fitted with two nuts. See fig. 462.
2. Reconnect the electrical connections to the R-net controller and wrap the cable according to fig. 462.
3. Reassemble the chassis covers, see4.2.1 *Covers*, Page 63.
4. Switch the main circuit breaker to OFF. See 4.3.5 *Main circuit breaker*, Page 160.

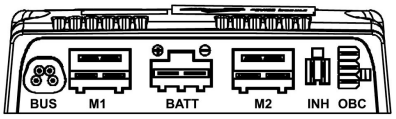


Figure 464. Power module cable connections (R-net PM120).

BUS	BUS
M1	Motor 1, Left
BATT	Battery
M2	Motor 2, Right
INH	Inhibit
OBC	External charger socket

4.3.4 ICS master module

4.3.4.1 Removing ICS master module

1. Switch off the main power switch on the control panel.

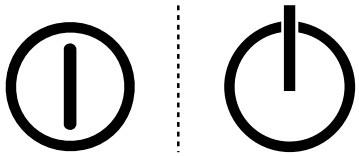


Figure 465. On/Off symbol depending on model.

2. Switch the main circuit breaker to OFF (OFF). See 4.3.5 *Main circuit breaker*, Page 160.
3. Remove the front chassis cover. See 4.2.1 *Covers*, Page 63.
4. Disconnect the electrical connections of the ICS master module, being attentive to their placement. See fig. 467.
5. Pull the master module straight out of its holder.
6. If the wheelchair is equipped with lights, remove the lid from the ICS master module and disconnect the lights cabling from the contacts on the circuit board. See fig. 467.

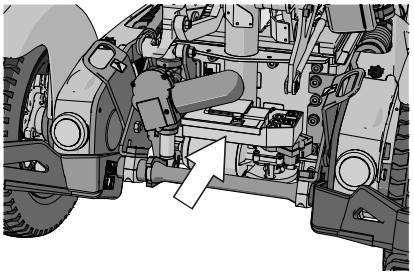


Figure 466. ICS master module.

4.3.4.2 Mounting ICS master module

Mount the ICS master module in the reverse order.

CAUTION!

Configure ICS master module

The ICS master module must be configured for the seat before mounting. Detailed information on configuration is provided in the Technical manual for the ICS control system.

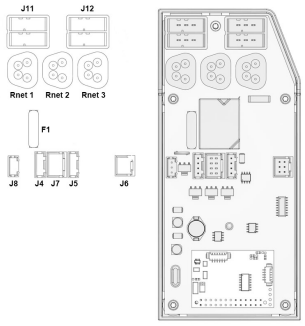


Figure 467. ICS master module.

1. If the wheelchair is equipped with lights, reconnect the lights cabling to the contacts on the circuit board and then fit the lid on the ICS master module.
2. Push the ICS master module straight in to its holder.
3. Reconnect the electrical connections of the ICS master module, being attentive to their placement. See also the sticker on the lid.
4. Refit the chassis covers. See 4.2.1 *Covers*, Page 63.
5. Switch the main circuit breaker to ON (ON). See 4.3.5 *Main circuit breaker*, Page 160.
6. Switch on the main power switch on the control panel.

R-net 1	R-net connector 1
R-net 2	R-net connector 2
R-net 3	R-net connector 3
J4	Left light or turn signal
J5	Right light or turn signal
J6	Serial channel (PC)
J7	Left and right light or turn signal
J8	Inhibit input
J11	ICS connector 1 & 2
J12	ICS connector 3 & 4
F1	Fuse (seat functions)

4.3.5 Main circuit breaker

4.3.5.1 Resetting main circuit breaker

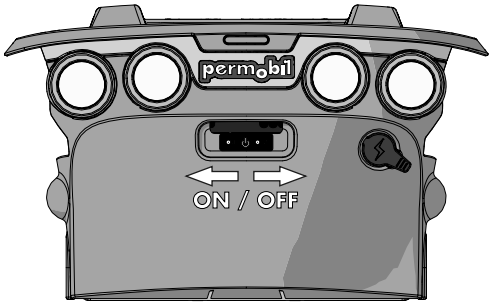


Figure 468. Main circuit breaker.

NOTICE

Investigate tripped main circuit breaker

A tripped main circuit breaker often indicates a major electrical fault. The cause of a tripped main circuit breaker must be carefully investigated and determined before resetting the circuit breaker.

The main circuit breaker also serves as a battery isolator but is normally referred to as a circuit breaker.

Main circuit breaker replacement is normally not required; it is of the automatic type that can be reset when tripped.

4.3.5.2 Replacing main circuit breaker

For this task the following tools are necessary:

- 1 Wrench 11 mm.

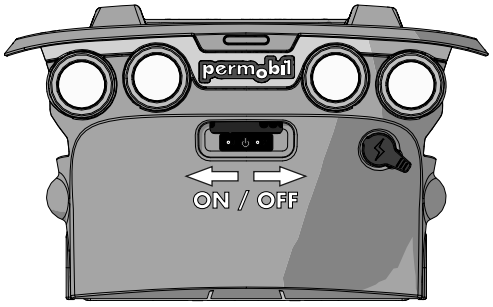


Figure 469. Main circuit breaker.

WARNING!

Avoid short circuit

Turn the main circuit breaker off before performing any work on the batteries to prevent any short circuit, damage to the wheelchair and/or bodily injury.

1. Switch the main circuit breaker to OFF.
2. Remove the chassis rear cover. See 4.2.1 *Covers*, Page 63.

Check the wheelchair to confirm the specified battery type.

If the wheelchair is equipped with 60 A batteries:

3. Disconnect the minus cable from the front battery.
4. Disconnect the plus cable from the rear battery.
5. Pull off the battery terminal covers from the cables.

If the wheelchair is equipped with 73 A batteries:

6. Disconnect the minus cable from the rear battery.
7. Disconnect the plus cable from the front battery.
8. Pull off the battery terminal covers from the cables.

If the wheelchair is equipped with 45 A batteries:

9. Disconnect the minus cable from the rear battery.
10. Disconnect the plus cable from the front battery.
11. Pull off the battery terminal covers from the cables.

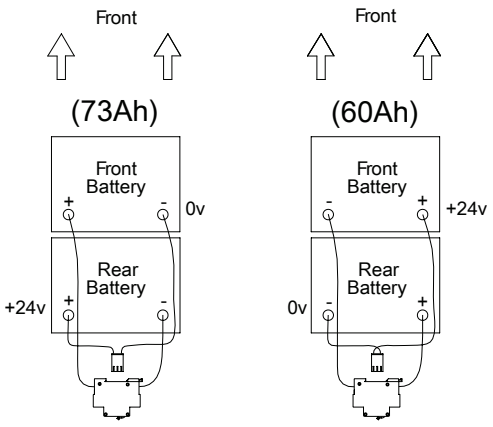


Figure 470. Battery connections relative to the battery capacity.

NOTICE

Pre mounted cables

Replacement main circuit breakers are delivered with pre-mounted cables that are tightened to the correct torque. Do not loosen, tighten or in any way adjust the pre-mounted cables.

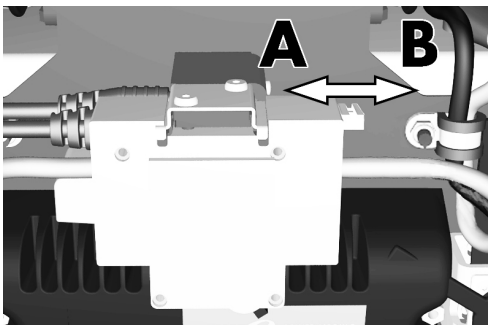


Figure 471. Main circuit breaker release handle.

12. Remove the cables from all the attachments between the batteries and the main circuit breaker. Note how they are attached for correct reassembly. See also page 115.

13. Release the main circuit breaker by pulling out the small handle on the right hand side. Pull it in direction B.

14. Set the replacement main circuit breaker to OFF position. Note the orientation of the new main circuit breaker with consideration to subsequent assembly. The On/Off positions must agree with the decal on the rear cover.

15. Pull out the small handle on the right hand side of the new main circuit breaker and position it onto the holder. Fix it in correct position by pushing in the small handle, direction A.

16. Mount the cables to their attachments.

17. Pull the terminal covers over the battery terminal connectors.

18. Reconnect the battery connection cables to the batteries.

19. Cover the battery terminals with the terminal covers.

20. Refit the chassis covers. See 4.2.1 *Covers*, Page 63.

21. Switch the main circuit breaker to On; see fig. 469.

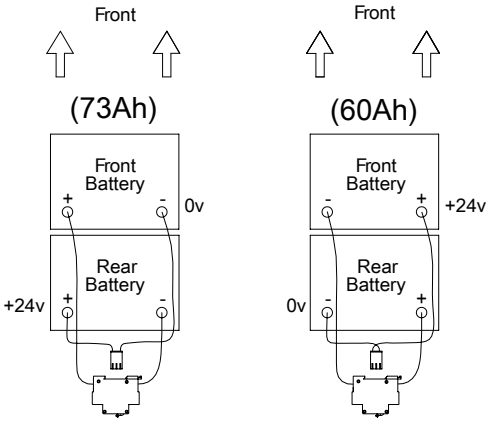


Figure 472. Battery connections relative to the battery capacity.

5 Adjustments

5.1 Seat

5.1.1 Seat width

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

The seat width can be adjusted to give the user optimal comfort. There are four fixed levels, each 1" apart.

1. Remove the seat cushion by lifting it straight up. It is attached by means of velcro on the rear of the cushion.
2. Remove the seat plates, which are held in place by four screws.

Figure 473. The seat plates are held in place by two screws at the back edge and two quick-assemble clamps at the front.

3. Remove the four screws securing the seat width adjustment unit.
4. Adjust the seat width by moving the right or left section of the seat frame to the required position. The rails with which the seat width is adjusted are marked with the settings for each potential position. The scale is marked with millimeters and inches.
5. Secure it at the required setting by replacing the four screws.
6. Reassemble the seat plates using four screws. See fig. 473.
7. Fit a cushion of a suitable length and width for this setting. See 6 *Customizations*, Page 184. Secure the cushion in place using the velcro on the back of the cushion.

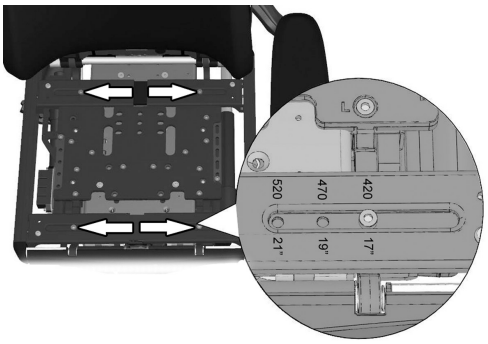


Figure 474. The seat width is fixed using four screws.

5.1.2 Seat depth

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

The seat depth can be adjusted to suit different users. There are seven fixed levels, each 1" apart.

Adjustment of the seat depth is performed by mounting the front section of the seat frame including leg rest and the rear section of the seat frame including backrest into desired positions according to the table on 7 and 8. When the seat depth is adjusted it may be necessary to replace cushions, seat plates and UniTrack rails for ones of the appropriate length. The mounting position for the seat on the seat lift or fixed seat tube may also need adjusting.

1. Remove the seat cushion by lifting it straight up. It is attached by means of velcro on the rear of the cushion.

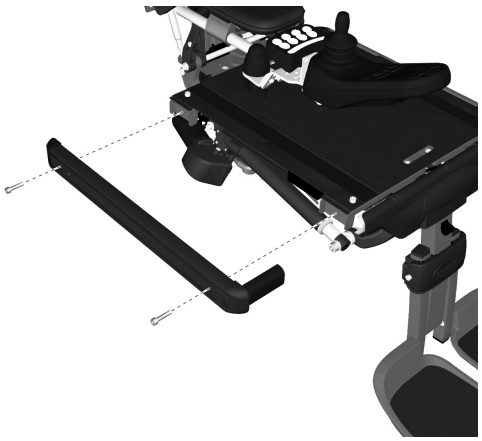


Figure 475. The UniTrack rails are fixed in place with two screws each.

2. Remove the seat plates, which are held in place by two screws at the back edge and two quick-mount clamps at the front. First remove the screws, then use your hand to carefully push the seat plate from below to release the quick-mount clamps at the front.
3. Remove the UniTrack rails which are each held in place by two screws.

Figure 476. The seat plates are held in place by two screws at the back edge and two quick-mount clamps at the front.

4. Adjustment of the front section of the seat frame (leg rest position); remove the five screws marked (L) securing the seat frames front section.

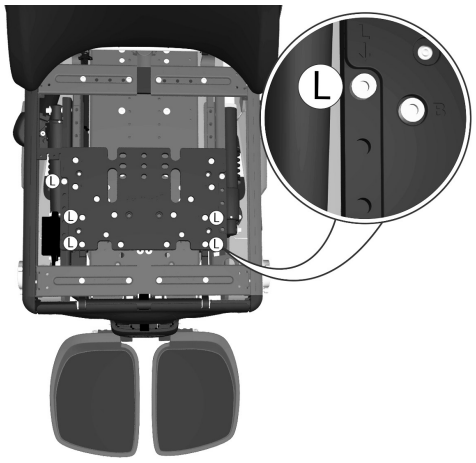


Figure 477. The position of the front part of the seat frame (leg rest position) is fixed by five screws, here marked with the letter L.

5. Adjust the seat depth by moving the front section of the seat frame to the required position. The rails with which the seat depth is adjusted are marked with the settings for each potential position.

Seat depth	Leg rest position
15"	0
16"	0
17"	+2"
18"	+2"
19"	+2"
20"	+2"
21"	+2"
22"	+3"
23"	+4"

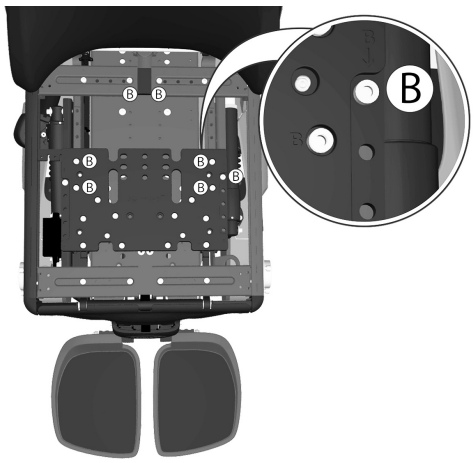


Figure 478. The position of the rear section of the seat frame (back rest position) is fixed by five screws, here marked with the letter B.

6. Secure it at the required setting by remounting the five screws.
7. Adjustment of the rear section of the seat frame (backrest position): remove the seven screws marked (B) securing the seat frames rear section, see fig. 478.
8. Adjust the seat depth by moving the rear section of the seat frame to the required position. The rails with which the seat depth is adjusted are marked with the settings for each potential position. The scale is marked with millimetres on one side and inches on the other.

Seat depth	Backrest position
15"	-4"
16"	-3"
17"	-4"
18"	-3"
19"	-2"
20"	-1"
21"	0
22"	0
23"	0

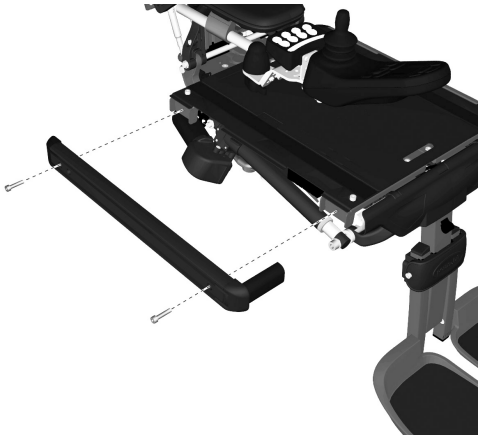


Figure 479. The UniTrack rails are fixed in place with two screws each.

9. Secure it at the required setting by remounting the five screws.
10. Remove the screw on the parallel armrest rod.
11. Adjust the parallel armrest rod to the corresponding seat depth. See 5.1.8 *Parallel armrest rod length*, Page 169.
12. Mount UniTrack rails of a suitable length for the seat depth setting. The rails are each held in place by two screws. Use a torque wrench to tighten the screws. Tightening torque 7.2 lb.ft.

13. Mount seat plates of a suitable length for the seat depth setting. The plates are held in place by two screws at the back edge and two quick-mount clamps at the front.
14. Fit a cushion of a suitable length and width for this setting. Secure the cushion in place using the velcro on the back of the cushion.

WARNING!

Risk of injury - check seat mounting position

After adjusting the seat depth, check that the seat's mounting position is in the correct position for the end user as the mounting position may need to be changed. Failure to check the seat mounting position after a seat depth adjustment may cause the chair seat to be in an incorrect position that could cause impaired driving, property damage, damage to the wheelchair and/or bodily injury.

Figure 480. The seat plates are held in place by two screws at the back edge and two quick-mount clamps at the front.

5.1.3 Backrest height

For this task the following tools are necessary:

- 1 Allen key 3 mm.

The backrest height can be adjusted to give the user optimal comfort. Adjustment is possible by moving the locking mechanism on the upper section of the backrest between six fixed stages 1" apart.

1. Remove the backrest cushion by pulling it straight forwards. It is attached by means of velcro on the rear of the cushion.
2. For access to the locking mechanism, set the backrest angle to its most upright position. Remove the upper section of the backrest by carefully opening the locking mechanism catch outwards while also pulling the upper section of the backrest straight up.

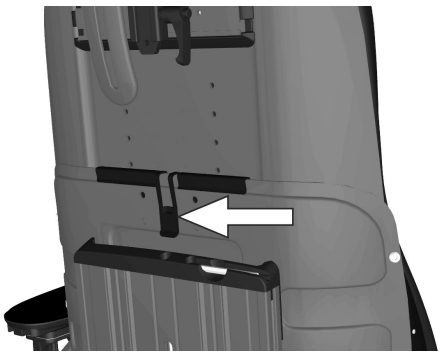


Figure 481. The upper section of the backrest is secured with a locking mechanism.

3. Remove the two screws holding the backrest locking mechanism in place.
4. Adjust the height of the backrest by sliding the upper section upwards or downwards to the required position. The upper backrest plate is marked with the settings for each potential position. The scale is marked with millimeters and inches.

Figure 482. The locking mechanism is held in place by two screws.

5. Lift up the upper section of the backrest enough that the locking mechanism can be assembled with its top edge in line with the required height on the backrest scale. Assemble the locking mechanism using the two screws.
6. Slide the upper section of the backrest down until secured in position by the locking mechanism. See fig. 481.
7. Fit a cushion of a suitable height/width for this setting. See 6 *Customizations*, Page 184. Secure the cushion in place using the Velcro on the back of the cushion.

Figure 483. The backrest locking mechanism assembled for backrest height 26 inches.

5.1.4 Armrest height

The following tools are necessary for this task:

- 1 Allen key, 5 mm.

The height of the armrest is adjustable for optimal comfort. Refer to the scale on the center of the backrest to see the current height of the armrest.

1. Loosen the four screws on the rear of the backrest that secure the height of the armrest.

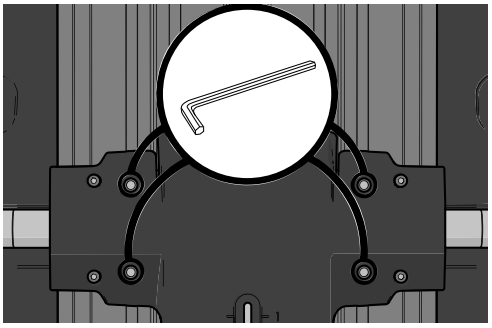


Figure 484. Adjusting the armrest height.

2. Remove the adjustment crank.

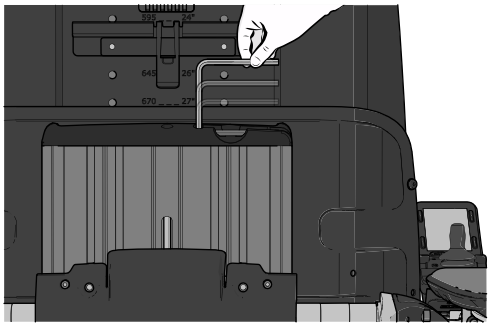


Figure 485. The adjustment crank is located in the backrest profile.

3. Adjust the armrests to the required position using the adjustment crank in the adjustment screw on the rear of the backrest.
4. Secure the height of the armrest by tightening the four screws on the rear of the backrest.

Figure 486. Use the supplied adjustment crank.

5.1.5 Armrest width

For this task the following tools are necessary:

- 1 Allen key 6 mm.

The distance between the armrests can be adjusted to give the user optimal comfort. Adjustment of the left and right armrests uses three fixed levels, each 1" apart.

1. Loosen the screw for armrest width adjustment approximately 3 turns.

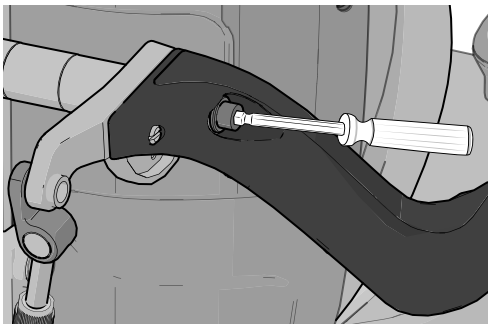


Figure 487. The armrest width is fixed using one screw.

2. Push in/pull out the armrest shaft to the desired position.
3. Secure it at the required setting by retighten the screw.

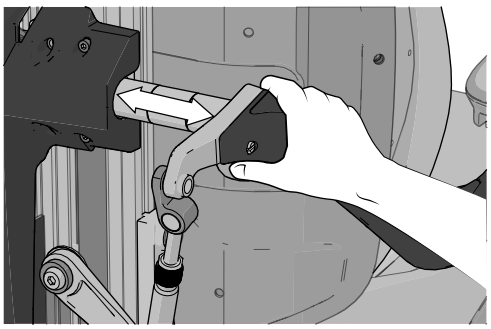


Figure 488. There are markings on the shaft to help with orientation.

5.1.5.1 Turning adjustment bar bracket

For this task the following tools are necessary:

- 2 Block spanners 10 mm.

With the armrests set both wide and low, the adjustment bar for the left armrest angle can touch the rear actuator bracket for the backrest angle. If this is the case, turn the adjustment bar bracket.

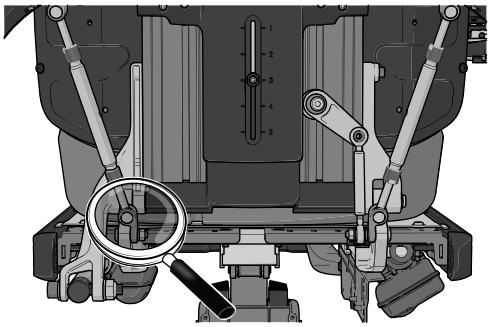


Figure 489. The location of the left adjustment bar.

1. Remove the lower bracket of the adjustment bar, which is secured with a screw, washer and nut.

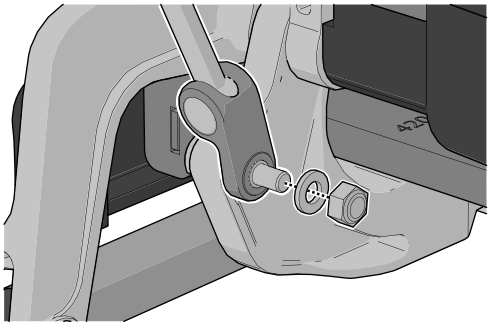


Figure 490. Hold the link bolt in place to be able to remove the nut.

2. Turn the bracket 180° so the adjustment bar is closer to the center of the seat.
3. Refit the lower bracket of the adjustment bar in its new position using the screw, washer and nut.

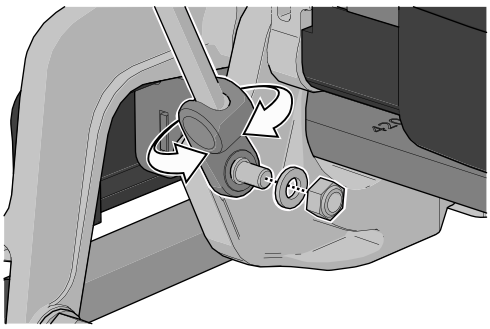


Figure 491. The adjustment bar needs to be closer to the center of the seat.

5.1.6 Armrest angle

The armrests are both individually foldable. The armrest angle can easily be adjusted for optimal comfort.

1. Loosen the two lock nuts on the adjustment bars.
2. Adjust the armrest angle by turning the adjustment bars.
3. Tighten the two lock nuts to secure the adjustment bars in position.

WARNING!

Risk of injury while adjusting armrests

Do not subject the armrests to load while adjusting.

Figure 492. Armrest angle adjustment bars.

5.1.7 Armrest height and angle

The following tools are necessary for this task:

- 1 Allen key, 8 mm.

The armrest height and angle is normally adjusted as described previously. However, for special needs, the armrests is adjustable individually for users who want a left and right arm rest at different heights and/or angles. The angle of the armrest is secured using a screw.

1. Loosen the two nuts (D) securing the position of the adjustment bar.
2. Adjust the armrest by turning the adjustment bar (C).
3. Secure into position by tightening the lock nuts (D).
4. Secure the armrest angle by moving the screw from a fixed position (A) to a flexible position (B).
5. Adjust the armrest to the required angle.
6. Secure by tightening the screw (B).

NOTICE

Armrest flexible position

This type of adjustment should only be made for special needs. It may have negative effects on the movement of the armrest when raising or lowering the backrest

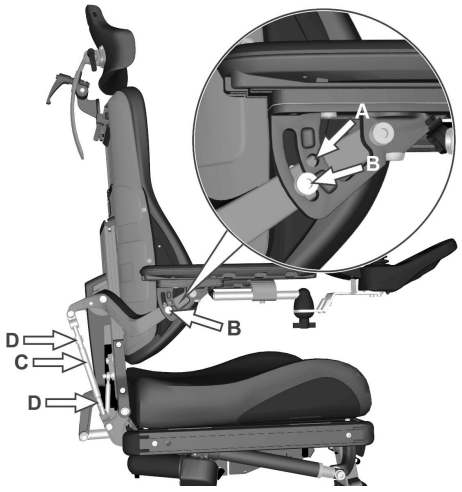


Figure 493. Adjusting the armrest height and angle.

WARNING!

Risk of injury while adjusting armrests

Do not subject the armrests to load while adjusting.

5.1.8 Parallel armrest rod length

For this task the following tools are necessary:

- 2 Philips screwdriver.

5.1.8.1 Adjustments

The parallel armrest rod should be adjusted corresponding to the seat depth.

1. Remove the screw fixating the length setting of the parallel armrest rod.

Figure 494. Remove the screw fixating the length setting of the parallel armrest rod.

2. Adjust the length of the parallel armrest rod and remount the screw in the hole marked with the corresponding seat depth.

Figure 495. The holes are marked with corresponding seat depth.

5.1.9 Panel holder

ⓘ The control panel holder can be mounted on the left or right armrest.

5.1.9.1 Rotational panel holder

The location of the control panel is adjustable lengthwise for the optimal driving position. It is also possible to adjust the angle of the panel sideways to facilitate getting in and out of the wheelchair.

Length adjustment

1. Undo the screw (A) on the panel joint and adjust the panel to the required position.
2. Tighten the screw.

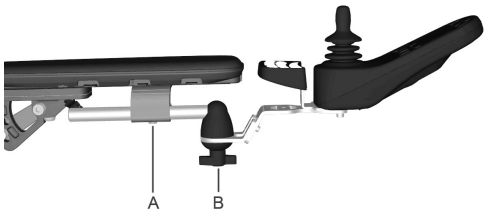


Figure 496. Rotational panel holder overview

Angle adjustment with friction joint

Using the knob (B) on the friction joint, it is possible to adjust how easily the panel can be pushed out to the side.

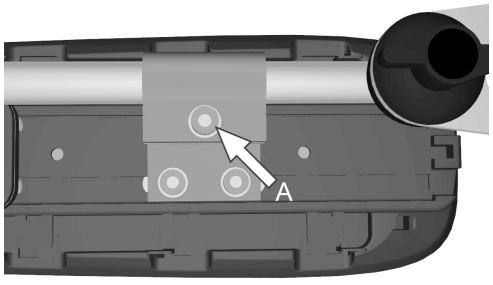


Figure 497. Screw for adjusting the panel holder length

Control panel sliding angle adjustment

1. Remove one of the screws. Choose the side that is desired to be sliding.

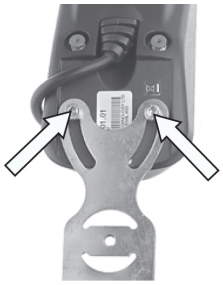


Figure 498. Only remove one of the screws.

2. Angle the panel.
3. Refit the screw. Tighten the screw to the preferred friction.

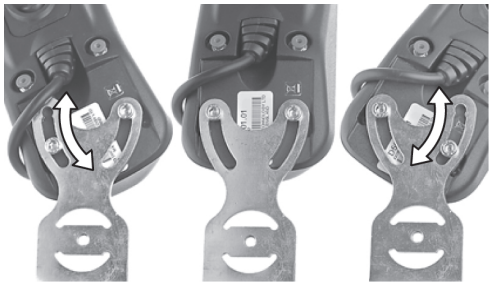


Figure 499. The slide tracks.

Panel holder height adjustment

1. Remove the control panel, see .
2. Remove the two screws.

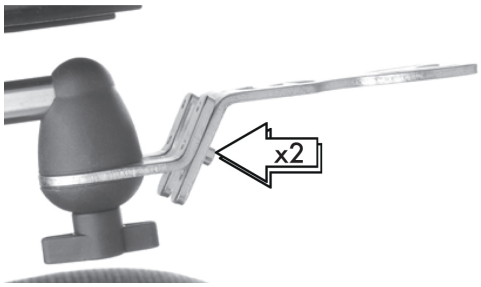


Figure 500. The two screws securing the front part of the panel holder.

3. Position the front part of the panel holder to the preferred height.
4. Screw in the two screws securing the front part of the panel holder.
5. Install the control panel, see .

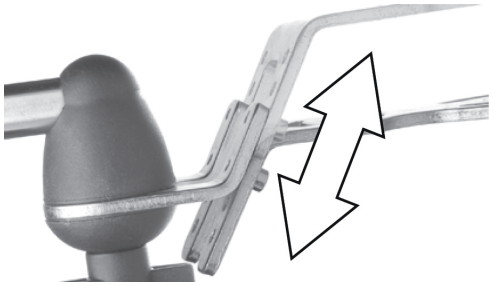


Figure 501. There are several positions for the panel height.

Panel holder base position

1. Remove the control panel, see .
2. Remove the two screws and the front part of the panel holder.

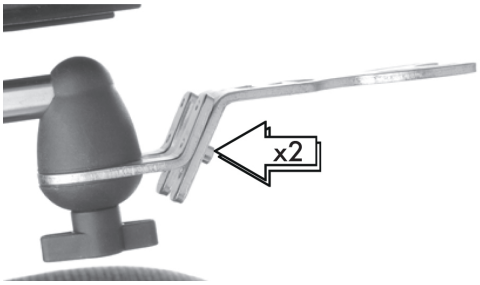


Figure 502. The two screws securing the front part of the panel holder.

3. Unscrew the handle until the joint is separated.

Figure 503. Exploded view of the panel holder's joint.

4. Flip the panel holder bracket making its base position low or high.
5. Screw together the joint parts with the handle.
6. Screw the two screws securing the front part of the panel holder.
7. Install the control panel, see .

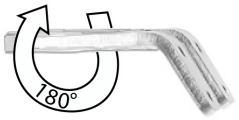


Figure 504. Flip the panel holder bracket.

5.1.9.2 Parallel panel holder

- Allen key, 4 mm.
- Allen key, 5 mm.

Length adjustment

1. Undo the screw(s) on the underside enough to slide the panel holder.

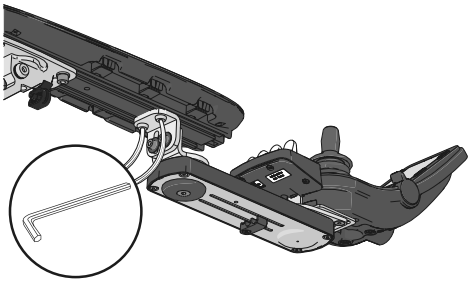


Figure 505. The position of the screws on the new model of the parallel panel holder.

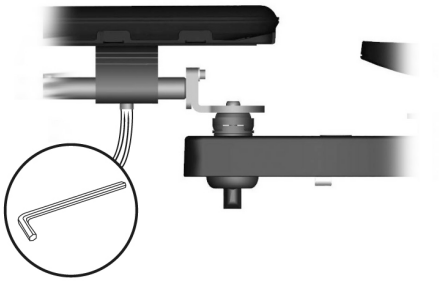


Figure 506. The screw's position on the earlier models of the parallel panel holder.

2. Adjust the panel to the preferred position. Leave at least a gap of 0.4 inches between the armrest and the panel.

3. Tighten the screw. Tightening torque 7.2 lb.ft.

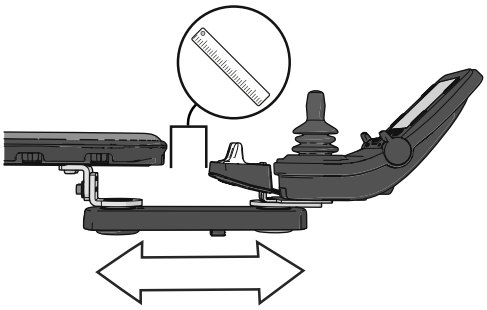


Figure 507. Adjusting the position on the new model of the parallel panel holder.

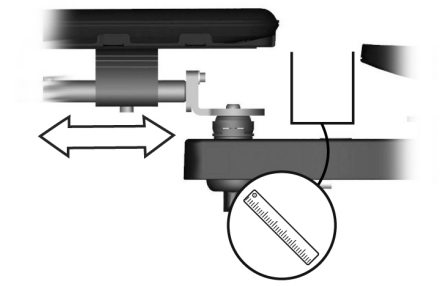


Figure 508. Adjusting the control panel position on the earlier models of the parallel panel holder.

Adjusting the friction joint

1. Undo the screw or the knob to make the friction joint more loose.

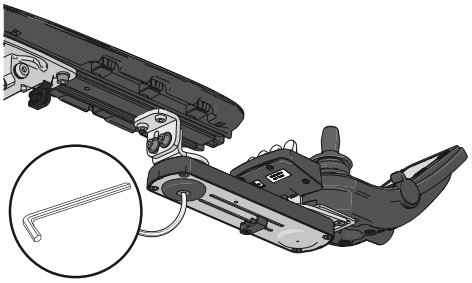


Figure 509. The screw's position on the new model of the parallel panel holder.

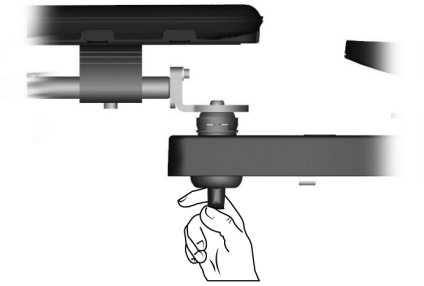


Figure 510. The knob position on the earlier models of the parallel panel holder.

2. Slide the panel to the preferred position.

3. Tighten the screw or knob to keep it in position.

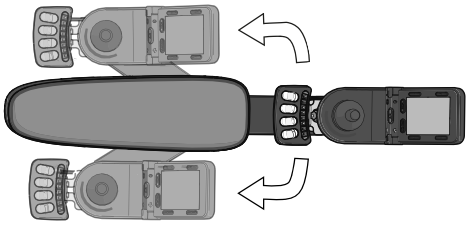


Figure 511. Slide the panel and the panel holder to preferred side of the armrest.

Control panel base position

1. Remove the panel holder, see 5.1.9 *Panel holder*, Page 170.

2. Remove the panel, see .

3. Remove the screws holding the two plates in place.

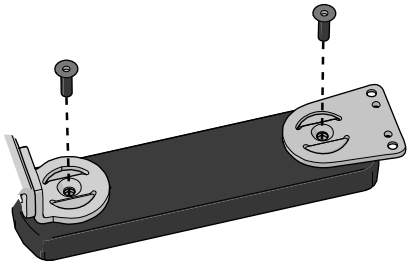


Figure 512. One screw on each end of the panel holder secures the bracket.

4. Remove the two plates.

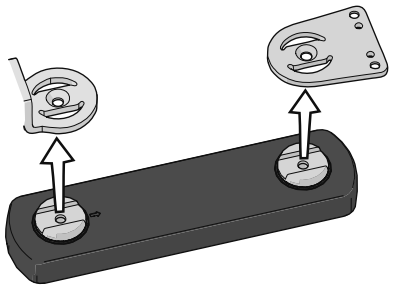


Figure 513. The two plates.

5. Turn the adjustment links to the preferred position.

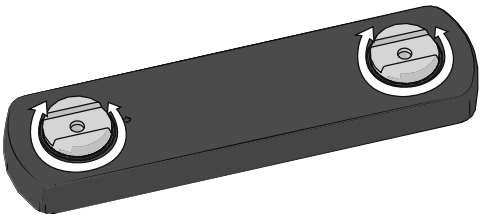


Figure 514. The adjustment links have teeth that mesh with a corresponding set of teeth in the panel holder.

6. Refit the two plates.

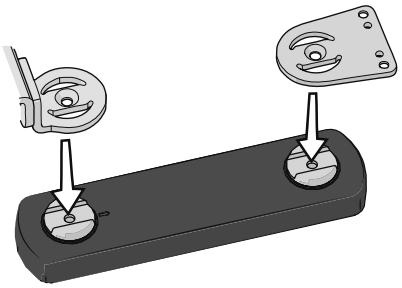


Figure 515. The two plates.

7. Reinstall the two screws securing the plates. Tightening torque 7.2 lb.ft.
8. Install the panel holder, see 5.1.9 *Panel holder*, Page 170.
9. Install the panel, see .

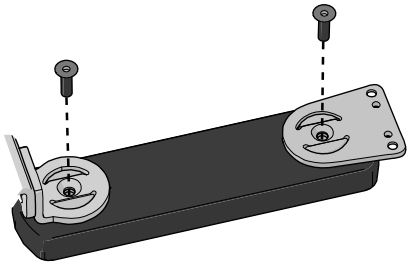


Figure 516. The two screws securing the plates.

Panel holder base position

1. Remove the panel holder, see 5.1.9 *Panel holder*, Page 170.
2. Remove the two screws securing the panel holder to bracket.

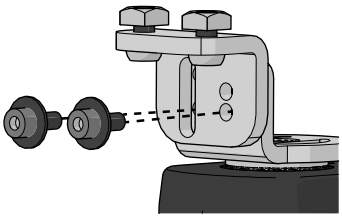


Figure 517. The two screws with washers on the new parallel panel holder.

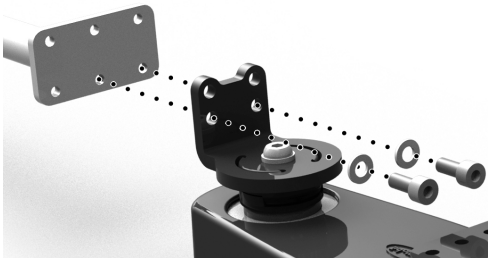


Figure 518. The two screws with washers on the earlier models of the parallel panel holder.

This adjustment applies only to earlier models of the parallel panel holder.

The panel holder can be installed under either the right or left armrest, the holes closest to the seat is supposed to be used for the panel holder. Rotate the bar 180° to make it left- or right compatible. It can also be adjusted for a high (A) or low (B) position.

When the preferred position is reached, tighten the two screws together with the two washers. Tightening torque 4.2 lb.ft.

Install the panel holder, see 5.1.9 *Panel holder*, Page 170.

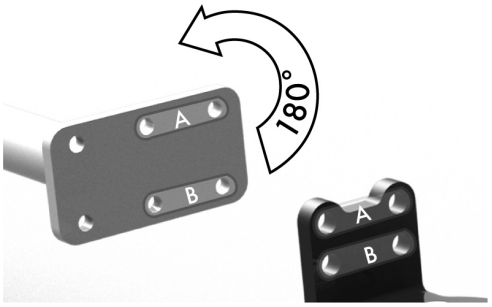


Figure 519. There are several settings depending on preferred position.

This adjustment only applies to the new parallel panel holder.

The panel holder bracket is adjustable height wise. The panel holder bracket can also be flipped to alter the base position further.

When the preferred position is reached, tighten the two screws together with the two washers. Tightening torque 4.2 lb.ft.

Install the panel holder, see 5.1.9 *Panel holder*, Page 170.

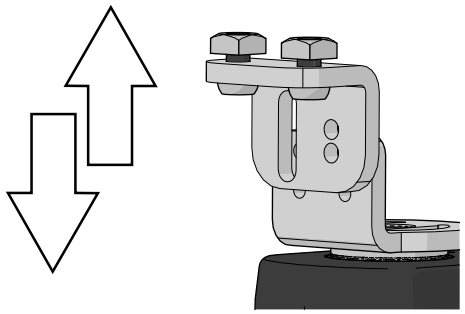


Figure 520. Height adjustment.

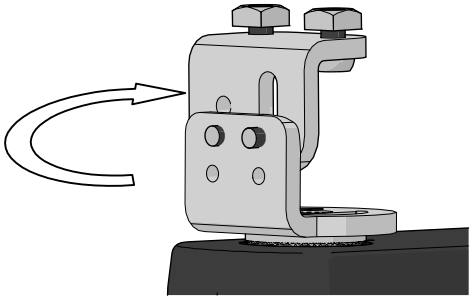


Figure 521. Flipping the bracket.

5.1.10 Chest support height

For this task the following tools are necessary:

- 1 Allen key 3 mm.

1. Release the Allen screws (1) on the locking ring on either side of the chest support.
2. Adjust the chest support to a suitable height, but never so high that the fixing is not visible at the lower edge of the sleeve (2).
3. Tighten the Allen screws on the locking ring.

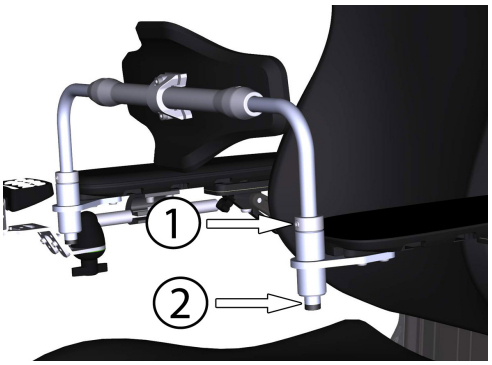


Figure 522. Setting the height of the chest support.

5.1.11 Chest support depth

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Allen key 4 mm.

1. Loosen the two screws on the chest support.
2. Position the chest support on a suitable depth.
3. Secure into position by tightening the two screws; torque 17.7 lb.ft.

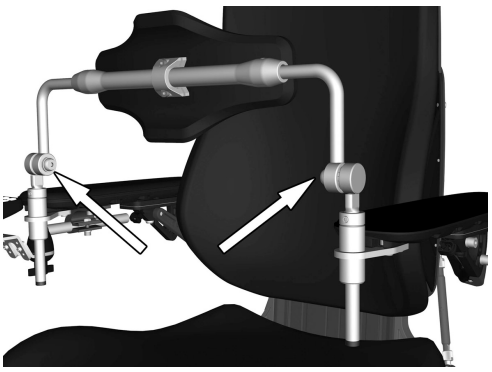


Figure 523. The depth of the chest support is secured with two screws.

5.1.12 Trunk support height

For this task the following tools are necessary:

- 1 Allen key 5 mm.

The height of the trunk support can be adjusted to give the user optimal comfort.

1. Loosen the screw for trunk support height adjustment approximately 2 turns.
2. Slide the trunk support up/down to the desired position.
3. Secure it at the required setting by retighten the screw.

Figure 524. The trunk support height is fixed using one screw.

5.1.13 Thigh support

The position of the thigh support can be adjusted forwards or backwards to give the user optimal comfort. Slide the thigh support forwards or backwards to the desired position.

Figure 525. The position of the thigh support can be adjusted.

5.1.14 Knee support

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

WARNING!

Leg rest actuator – do not solely use

You can not solely operate the leg rest actuator when the knee support is fitted. If the actuator is solely operated while the knee support is fitted it may lead to serious injury.

WARNING!

Adjustment by authorized technician

This product has to be adjusted by an authorized service technician. If the product is wrongfully adjusted it can cause damage to the user and/or the product.

5.1.14.1 Knee support depth

The depth of the knee support can be adjusted to give the user optimal comfort.

Rotate the knob clockwise, or counter clockwise, to adjust the knee support to a suitable depth.

It should be approximately 1 inch of space between the knee support and the leg when adjusted correctly in a seated position.

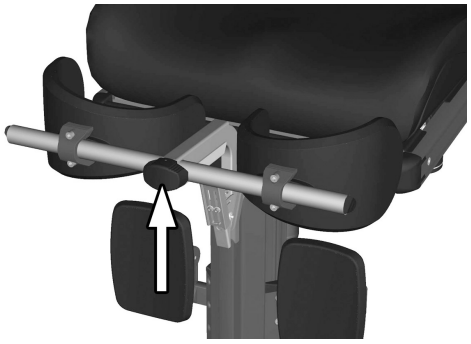


Figure 526. Adjusting the knee support depth.

5.1.14.2 Knee support width

The width of the knee supports can be adjusted to give the user optimal comfort.

Loosen the two screws and adjust the knee support pad to a suitable position. Retighten the screws to fix into position.

You can customize how embracing the knee pads are by bending it with your hands.

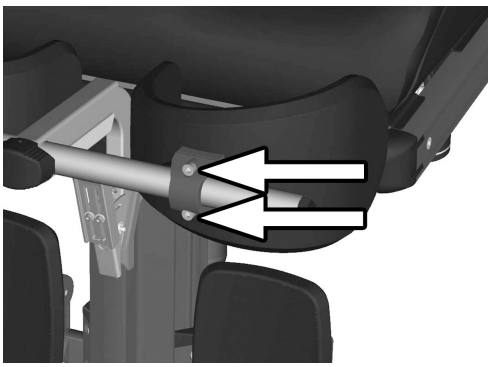


Figure 527. Adjusting the knee support width.

5.1.14.3 Knee support height

WARNING!

Risk of injury - check tube lock

Check that the tube is locked in position by pulling on the support frame upwards. Failure to lock the tube correctly may lead to personal injury.

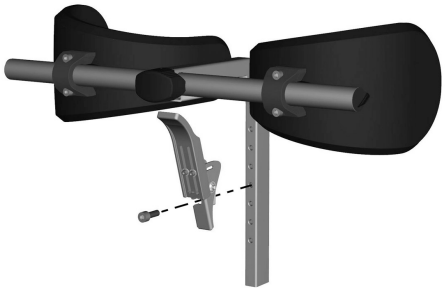


Figure 528. Adjusting the knee support height.

The height of the knee supports can be adjusted to give the user optimal comfort.

Remove the screw and position the quick lock to a suitable position. Refit the screw to fix into position.

5.1.15 Footplate height

For this task the following tools are necessary:

- 1 Allen key 5 mm.

The height of the footplates can be adjusted individually and steplessly. They are secured with two screws each.

1. Undo the two screws on the footplate.
2. Adjust the foot plate to the required height and secure by tightening the screws.
3. Check that the footplates are fully secured.

WARNING!

Risk of injury while adjusting footplates

Do not place any weight or load on the footplates while adjusting the footplates.

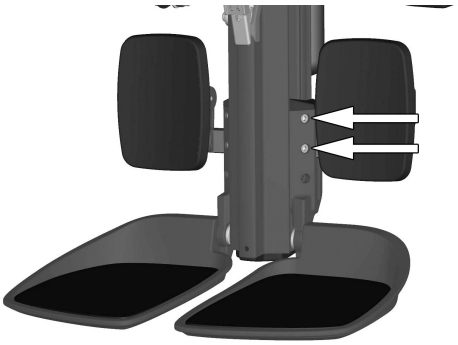


Figure 529. The footplate height are secured with two screws

WARNING!

Risk of injury - adjust floor to footplate distance

After adjustment, and with the seat lift in its lowest position, make sure there is sufficient space, at least 1 inch, between the ground and the footplates at all times when maneuvering the leg rest in or out and when using the standing function. Perform this test with the user sitting in the wheelchair loading the footplates.

Using the wheelchair with the footplates set too low might result in personal injury or damage to the wheelchair and its surroundings.

5.1.16 Footplate angle

For this task the following tools are necessary:

- 1 Allen key 5 mm.
- 1 Spanner 10 mm.

The angle of the footplates is adjusted using stop screws under each footplate.

1. Tilt up the footplate.
2. Undo the lock nut.
3. Set to the required angle by screwing the screw in or out.
4. Lock the stop screw in the required position using the lock nut.

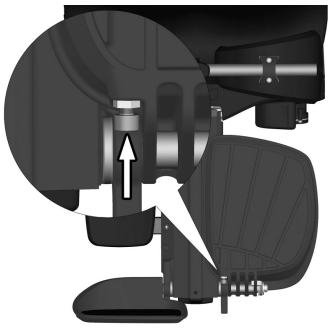


Figure 530. Adjusting the footplate angle

WARNING!

Risk of injury while adjusting footplates

Do not place any weight or load on the footplates while adjusting the footplates.

5.2 Chassis

5.2.1 Friction brakes

For this task the following tools are necessary:

- 1 Spanner 13 mm.

NOTICE

Use the correct tools and spare parts

Do not use a pneumatic impact wrench.

Do not use other types of screws or washers.

Do not use any other type of thread lock.

This adjustment does not apply if the wheelchair is equipped with the new revision of the friction brake.

Figure 531. This friction brake is not adjustable.

1. Remove the cover (1) on the link arm.
2. Adjust the friction brakes by tightening or loosening the lock nut (2).
3. Drive the chair. If any of the casters flutter, tighten the caster's lock nut ¼ turn. If any casters have difficulty turning, loosen the lock nut ¼ turn. Drive the chair again. Adjust the lock nut until the casters behave as desired.
4. Fit the cover (1) on top of the link arm.

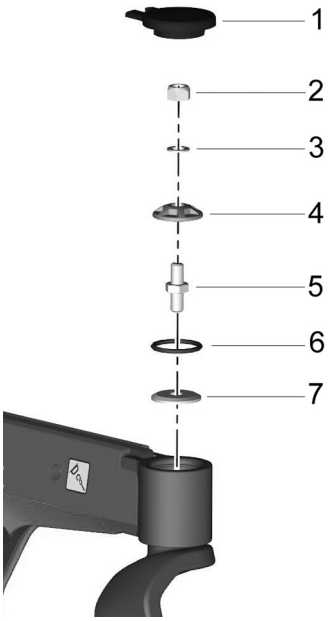


Figure 532. Friction brake.

5.2.2 Shock absorber

For this task the following tools are necessary:

- 1 Shock absorber adjustment tool

The spring force of the shock absorber must be adjusted to the correct value.

The spring force can be adjusted to suit different body weights by means of the adjusting nut (A). To get the best comfort and performance the shock absorber should be adjusted according to the table below.

Weight	Setting front	Setting rear
<154 lbs	26 mm	19 mm
154 — 198 lbs	28 mm	21 mm
199 — 265 lbs	31 mm	25 mm
266 — 330 lbs	34 mm	29 mm

Remove the chassis covers to facilitate adjustments of the shock absorbers.

1. Measure to define the present spring force setting of the shock absorbers.

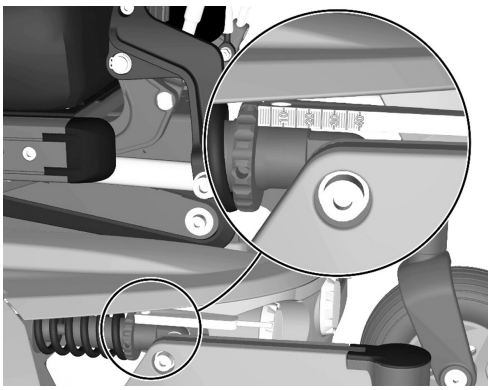


Figure 533. Measure the spring force setting of the shock absorbers.

2. Use the tool to rotate the nut clockwise or counter clockwise to increase or decrease the spring force.

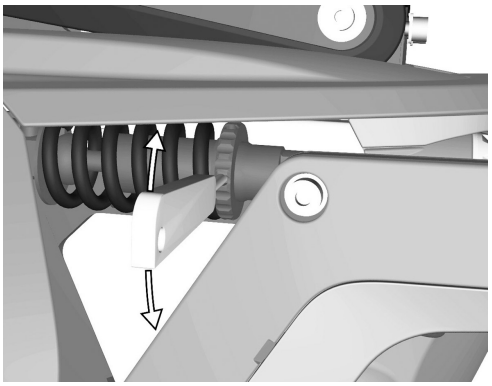


Figure 534. Use the tool to adjust the spring force.

3. Measure to make sure that the required setting is achieved. If not, go back to step two. Make sure to perform this procedure on all shock absorbers.

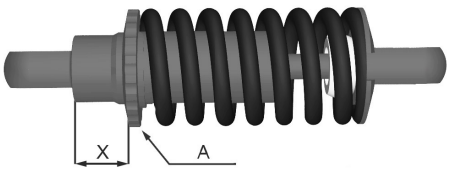


Figure 535. Shock Absorber.

5.3 Control panel and electronics

5.3.1 R-net control system

The wheelchair control system can be programmed to optimize wheelchair performance while also maintaining a high level of safety regardless of the wheelchair's other settings and equipment. The control system can also be programmed to make adjustments needed for a specific user. Standard parameter files can be downloaded from the Permobil website; www.permobil.com.

For more information on programming or adjustment of the R-net control system and obtaining parameter files refer to the technical manual.

6 Customizations

6.1 Seat cushions, seat plates and UniTrack rails

Seat depth	Seat width	Cushion, length	Cushion, width	Seat plate, length	UniTrack rail, length
15”	17”/19”/21”	17”	= Seat width	15”	15” – 17”
16”			= Seat width	15”	15” – 17”
17”			= Seat width	17”	15” – 17”
18”			= Seat width	17”	18” – 20”
19”		19”	= Seat width	19”	18” – 20”
20”			= Seat width	19”	18” – 20”
21”		21”	= Seat width	21”	21” – 23”
22”			= Seat width	21”	21” – 23”
23”			= Seat width	23”	21” – 23”

6.2 Backrest cushions

Backrest width	Backrest height	Cushion, width	Cushion, height
14.5”	Low, height not adjustable	14.5”	19.5”
	22”		22” – 24”
	23”		
	24”		
	25”		25” – 27”
	26”		
	27”		
16.5	Low, height not adjustable	16.5”	19.5”
	22”		22” – 24”
	23”		
	24”		
	25”		25” – 27”
	26”		
	27”		
18.5”	Low, height not adjustable	18.5”	19.5”
	22”		22” – 24”
	23”		
	24”		
	25”		25” – 27”
	26”		
	27”		

7 Troubleshooting

7.1 Troubleshooting guide

The following troubleshooting guide describes a number of faults and events which may occur when you use the wheelchair, together with suggested remedies. Note that the guide cannot describe all the problems and events which may occur and you should always contact your service provider or Permobil in case of doubt.

Event	Possible cause	Remedy
The wheelchair does not start.	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main circuit breaker switched to off position after e.g. battery replacement.	Reset the main circuit breaker. See page 160.
	Main circuit breaker tripped.	See page 160.
The wheelchair cannot be driven.	Battery charger connected.	Stop charging. Disconnect the charging cable from the wheelchair charger socket.
	Brake release activated.	Reset the brake release.
	Wheelchair locked.	Unlock the wheelchair.
The wheelchair switches itself off after a certain period of inactivity (1 - 30 min).	The electronics' energy saving mode has been activated.	Switch the wheelchair on again using the start button on the control panel.
The wheelchair stops while being driven.	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main circuit breaker tripped.	See page 160.
The wheelchair can only be driven at reduced speed.	Seat lift or seat angle raised too high. Applies only to power seat lift and seat angle.	Lower the seat lift or seat angle.
The wheelchair cannot be charged.	Main circuit breaker switched to off position after e.g. battery replacement.	See page 160.
	The charging circuit breaker has tripped.	Wait five minutes, the circuit breaker will automatically reset.

7.2 Diagnostics R-net LED control panel

7.2.1 Battery voltage indicator

Each time the wheelchair is started, parts of its electronics are checked. When a fault occurs in these parts, it is displayed on the control panel battery voltage indicator and the indicator for speed or driving profile in the form of one or more flashing LEDs.

Troubleshooting and repairs must always be performed by qualified personnel with good knowledge of the wheelchair's electronics.

NOTICE

Error signals

Error messages are not displayed on the indicators while the wheelchair is being driven. They appear when it is next started.

7.2.2 Steady

Everything is in order. The number of LEDs that light up depends on the charge remaining in the batteries. If the batteries are fully charged, all the LEDs light up.

7.2.3 Slowly flashing red LEDs, 1–2 LEDs

The batteries must be charged immediately.

7.2.4 Rapidly flashing, 1–10 LEDs

A fault has been detected in the wheelchair's electronics and the wheelchair may not be driven.

1. Switch off the wheelchair.
2. Check that all visible cables and the cable to the control panel are connected correctly.
3. Switch the wheelchair on again. If the fault persists, count the number of flashing LEDs and check for a possible cause and remedy in the following table.
4. Do not use the wheelchair until the problem has been remedied or you have received other information from your service provider.

WARNING!

Performing diagnostics

Diagnostics may only be performed by personnel with knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make the wheelchair dangerous. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that occur due to incorrect or poorly performed repairs.

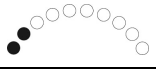
NOTICE

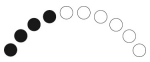
Unapproved replacement of parts

If any part is replaced without approval from Permobil, the wheelchair warranty will become void. Permobil accepts no liability for any loss that occurs as a result of a control system component being opened, adjusted or modified without permission.

If any part is replaced without approval from Permobil, the warranty will become void. Permobil accepts no liability for any loss that occurs as a result of the being modified without permission.

7.2.5 Example of error messages and remedies

Event	Indication	Remedy
1 LED Low battery voltage		Check the condition of the batteries. Check the contact between the battery and the control unit.
2 LEDs Failure in left drive motor		Check the connection of the left drive motor.

Event	Indication	Remedy
3 LEDs Short circuit in left drive motor		Check the left drive motor's contacts and cables.
4 LEDs Failure in right drive motor		Check the connection of the right drive motor.
5 LEDs Short circuit in right drive motor		Check the right drive motor's contacts and cables.
6 LEDs Battery charger connected		Disconnect the battery charger.
7 LEDs Joystick error		Check that the joystick has not been moved when starting the wheelchair.
8 LEDs Control system error		Check the contacts to the output stage.
9 LEDs Failure in brake circuit		Check the contacts to the magnetic brakes.
10 LEDs High battery voltage		Check the battery and the contacts between the battery and the output stage.
7+5 LEDs Communication error		A communication error has been detected. Check that the cable to the control panel is not damaged and is correctly inserted.
Actuator indicator Actuator error		An actuator error has been detected. Contact authorized service for help.

7.3 Diagnostics R-net LCD control panel

7.3.1 General

When an error or a fault occurs in the wheelchair's electronics, information about it is displayed in the control panel display. This information can then be used to diagnose where the error, or fault, occurred and its cause.

Troubleshooting and repairs must always be performed by qualified personnel with good knowledge of the wheelchair's electronics.

7.3.2 Diagnostic screens

7.3.2.1 Current diagnostic screen

When the control system's integrated protection circuits have tripped so that the control system can no longer operate the wheelchair, a diagnostic screen is displayed in the control panel display.

This indicates a system fault, i.e. R-net has detected a problem somewhere in the wheelchair's power system.

NOTICE

The diagnostic screen displays error occasionally

If the fault is in a module not currently in use, it may still be possible to drive the wheelchair, but the diagnostic screen will display occasionally.

Switch off the wheelchair and leave it switched off for a few minutes. Restart the wheelchair. If the fault persists, you must switch off the wheelchair and contact your service provider. Write down the information displayed in plain text in the control panel display and pass it on to your service provider.

Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service provider.

WARNING!

Performing diagnostics

Diagnostics may only be performed by personnel with knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make the wheelchair dangerous. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that occur due to incorrect or poorly performed repairs.

NOTICE

Unapproved replacement of parts

If any part is replaced without approval from Permobil, the wheelchair warranty will become void. Permobil accepts no liability for any loss that occurs as a result of a control system component being opened, adjusted or modified without permission.

If any part is replaced without approval from Permobil, the warranty will become void. Permobil accepts no liability for any loss that occurs as a result of the being modified without permission.

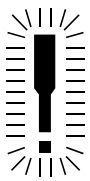
7.3.3 Example of a screen showing system fault

7.3.3.1 Identified module

The system fault indicator is displayed on the screen when the control system module has detected a problem. The codes below indicate where the problem is located.

PM = Power module

JSM = Joystick module



PM
Low Battery

2C00

Figure 536. Screen showing system fault indication.

7.3.3.2 Error message

The error message displayed in the bottom left corner of the screen provides a brief description of the error type.

7.3.3.3 Error code

The four-digit code displayed in the bottom right corner of the screen indicates which protection circuit has tripped.

7.3.4 Example

The view shown displays the following information:

Identified module: PM; power module error.

Error message: Low Battery.

Error code: 2C00; means the battery needs charging or that it is not connected properly.

- Check the battery connections. Attempt to charge the battery if it is properly connected.

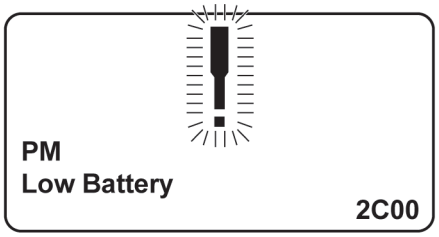


Figure 537. Example view.

7.3.5 System log

All errors are saved in the system log regardless of whether or not they have been remedied or are still active. The system log saves the error messages and the number of times they arise. The errors are saved in their respective modules in the system.

The system log is accessed by means of programming directly in the system (On Board Programming, OBP).

Contact Permobil for more information on OBP.

Go to OBP mode

- Select System from the menu.
- Select Diagnostics from the menu.
- The diagnostics screen will now appear, showing the connected modules and version history.
- If a module has experienced no errors, the message No Entries will be displayed.

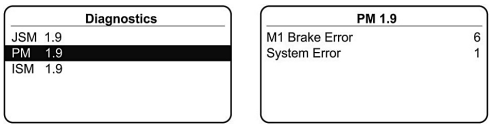


Figure 538. The diagnostics view.

7.3.6 Definitions of diagnostics messages

When an error message has been displayed and the defective module has been identified, use the following definitions to determine the possible cause of the error and the remedial action required to correct it.

Error message as shown on display	Description
Joystick Error	Go to section 7.3.6.1 *Joystick Error*.
Low Battery	Go to section 7.3.6.2 *Low Battery*.
High Battery	Go to section 7.3.6.3 *High Battery*.
M1 Brake Error	Go to section 7.3.6.4 *Brake Error*.
M2 Brake Error	Go to section 7.3.6.4 *Brake Error*.
M1 Motor Error	Go to section 7.3.6.5 *Motor Error*.
M2 Motor Error	Go to section 7.3.6.5 *Motor Error*.
Inhibit Active	Go to section 7.3.6.6 *Inhibit Active*.
Jstick Cal Error	Go to section 7.3.6.7 *Joystick Calibration Error*.

Error message as shown on display	Description
Latched Timeout	Go to section 7.3.6.8 *Latched Timeout*.
Brake Lamp Short	Go to section 7.3.6.9 *Brake Lamp Short*.
Left Lamp Short	Go to section 7.3.6.10 *Lamp Short*.
Right Lamp Short	Go to section 7.3.6.10 *Lamp Short*.
L Ind Lamp Short	Go to section 7.3.6.11 *Indicator Lamp Short*.
R Ind Lamp Short	Go to section 7.3.6.11 *Indicator Lamp Short*.
L Ind Lamp Failed	Go to section 7.3.6.12 *Indicator Lamp Failed*.
R Ind Lamp Failed	Go to section 7.3.6.12 *Indicator Lamp Failed*.
DIME Error	Go to section 7.3.6.13 *DIME Error*.
Memory Error	Go to section 7.3.6.14 *Memory Error*.
PM Memory Error	Go to section 7.3.6.15 *PM Memory Error*.
Bad Cable	Go to section 7.3.6.16 *Bad Cable*.
Bad Settings	Go to section 7.3.6.17 *Bad Settings*.
Module Error	Go to section 7.3.6.18 *Module Error*.
System Error	Go to section 7.3.6.19 *System Error*.
Gone to Sleep	Go to section 7.3.6.20 *Gone to Sleep*.
Charging	Go to section 7.3.6.21 *Charging*.

7.3.6.1 Joystick Error

The most common cause for this error is joystick movement away from its central position just before or at the moment the control system was switched on. The moved joystick view is displayed for 5 seconds. If the joystick is not released during this time, a joystick error is registered. Even if an error screen is not displayed, the error and the number times it arises is registered in the system log.

- Ensure that the joystick is in the central position and start up the control system.

If the error persists, the joystick or joystick module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.2 Low Battery

This occurs when the control system detects that the battery voltage is lower than 16 V.

- Check the batteries and their connection to the control system.

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.3 High Battery

This occurs when the control system detects that the battery voltage is higher than 35 V. The most usual causes for this error are battery overcharging or a poor connection between the control system and the batteries.

- Check the batteries and their connection to the control system.

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.4 Brake Error

This occurs when the control system detects a problem in the solenoid brakes or the connections to them.

1505 - M1 Brake Error (M1; motor connected to M1 on the power module).

1506 - M2 Brake Error (M2; motor connected to M2 on the power module).

- Check the solenoid brakes, their cables and the connections to the control system.

If the error persists after the checks listed above, the power module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.5 Motor Error

This occurs when the control system detects that a motor has been disconnected.

3B00 - M1 Motor Error (M1; motor connected to M1 on the power module).

3C00 - M2 Motor Error (M2; motor connected to M2 on the power module).

- Check the motors, their cables and the connections to the control system.

If the error persists after the checks listed above, the power module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.6 Inhibit Active

This occurs when one of the inhibit signals is active and is in blocked mode.

The last two digits of the error code indicate the active inhibit signal. The code is hexadecimal.

1E01 - For inhibit signal 1.

1E09 - For inhibit signal 9.

1E0A - For inhibit signal 10.

- Switch power off and on. This will deactivate the block mode, which may remedy the error.
- Check all connections and switches for the indicated inhibit signals.

7.3.6.7 Joystick Calibration Error

This occurs when joystick calibration has been unsuccessful.

- Go to OBP (on board programming) mode and recalibrate.

If the error persists, the joystick module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.8 Latched Timeout

This occurs when the control system detects that the programmed block time has been exceeded. This may be due to insufficiently frequent use of the signal units (joystick, main steering device, suction and blowing device, etc.)

The error reference provides information on why the control system has left block mode.

- Switch power on and off.
- Activate block mode.

If the error persists after the checks listed above, the signal unit may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.9 Brake Lamp Short

This occurs when the control system detects a short circuit in the brake light electrical circuit.

- Check the brake lamps, their cables and the connections to the control system.

7.3.6.10 Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the lights.

7205 - Short circuit left-hand lamp.

7209 - Short circuit right-hand lamp

- Check the lamps, their cables and the connections to the control system.

7.3.6.11 Indicator Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the turn signals.

7206 - Short circuit left turn signal.

720A - Short circuit right turn signal.

- Check the turn signals, their cables and the connections to the control system.

7.3.6.12 Indicator Lamp Failed

This occurs when the control system detects an error in the electrical circuit of one of the turn signals. This usually means the turn signal needs replacing.

7207 - Error in left turn signal.

7208 - Error in right turn signal.

- Check the turn signals, their cables and the connections to the control system.

7.3.6.13 DIME Error

This occurs when the control system detects an ID conflict between two modules in the system.

If a new module has been added:

- Disconnect the new module and switch power off and on.
- If no error occurs, connect the new module to the system and switch power off and on.
- If the error recurs, the new module must be the cause of the problem.

If no new modules have been added:

- Disconnect one module at a time and switch power off and on.

If the error persists after the checks listed above have been performed, contact Permobil.

7.3.6.14 Memory Error

This is a non specific memory error that may be caused by any of the system modules.

- Check all cables and connections.
- Switch power off and on.

If the error persists and the system includes third-party modules:

- Disconnect all modules that do not come from Penny & Giles Drives Technology and switch power off and on.

If this has rectified the error:

- Connect one third-party module at a time and switch power off and on each time.
- If the error recurs when the power is switched on, the last module to be connected is defective.

If the error persists after the checks listed above, the power module may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.15 PM Memory Error

WARNING!

Incorrect programming may make the wheelchair unsafe

Programming should only be performed by persons with knowledge of control systems from Penny & Giles Drives Technology. Incorrect programming may mean that the wheelchair is unsafe. Permobil cannot be held responsible for losses of any kind if the control system factory settings are altered by programming.

This is a specific error in the power module.

- Check all cables and connections.
- Reprogram the control system with the help of R-net PC programmers.

This should be done with either the latest specific program file for the wheelchair or the original Permobil program file.

If the error persists after the checks listed above, the power unit may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.16 Bad Cable

This occurs when the control system detects a connection error in the communication cables between the modules.

- Check all cables and connections to ensure there are no breaks.
- Replace any cables with visible damage. Turn the power off and on.
- Disconnect one cable at a time from the system and turn the power off and on after each disconnection.

If the error persists after the checks listed above, the power unit may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.17 Bad Settings

This occurs when the control system detects incorrect or invalid program settings.

- Check all parameter settings and then reprogram the control system with the help of R-net PC programmers.
- Make a note of the current parameter settings and then reset the control system to the default settings.
- Reprogram the required settings in small groups and turn the power off and on after each group to see if the error recurs.

If the error persists after the checks listed above, the power unit may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.18 Module Error

This occurs when the control system detects an error in a specific module.

- Check all cables and connections.
- If the error persists after the checks listed above, the module specified may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.19 System Error

This occurs when the control system detects an error that cannot be ascribed to a specific module.

- Check all cables and connections.
- Switch power on and off.

If the error persists and the system includes third-party modules:

- Disconnect all modules that do not come from Penny & Giles Drives Technology and switch power off and on.

If this has rectified the fault:

- Connect one third-party module at a time and switch power off and on each time.
- If the error recurs when power is switched back on, the last module connected is defective.

If the error persists after the checks listed above, the system from Penny & Giles Drives Technology may be defective. Read more in 7.4 *Repairing defective units*, Page 197.

7.3.6.20 Gone to Sleep

The system has gone into energy saving mode. This occurs when the system has not been used for a period that exceeds the Sleep Timer parameter used for setting the energy saving mode. Each time this occurs it is registered in the system log.

7.3.6.21 Charging

This occurs when the control system detects that a charger has been connected to either inhibit contact 1 or inhibit contact 3.

The battery charging view is displayed when a charger is connected.

Each time this occurs it is registered in the system log.

When using an integral charger:

- Disconnect the charger from the mains.

When using an external charger:

- Disconnect the charger from the power wheelchair.

If the error persists after the charger has been disconnected, the joystick module may be defective. Read more in
7.4 *Repairing defective units*, Page 197.

7.3.7 Basic test

WARNING!

Always perform safety tests after maintenance

The tests described are minimum recommendations. It is the responsibility of the service technician to perform other tests on the basis of the original error source and the wheelchair model. Permobil cannot be held responsible for losses of any kind that may arise when these tests are conducted, or that arise as a consequence of further relevant tests not being conducted.

These tests should be conducted in an open space, and some kind of restraining device, such as a safety belt, should always be used. Permobil cannot be held responsible for losses for any kind arising due to the non-observance of these recommendations.

After a repair has been completed, the following test should be performed. These are minimum recommendations. Depending on the original error source, further tests may be necessary.

7.3.7.1 Basic inspection

Check that all contacts are properly connected.

- Check all cables and contacts to ensure there is no visible damage.
- Check that the rubber gaiter around the base of the joystick is not damaged. Inspect the gaiter visually. It should not be handled manually.
- Ensure that all components of the control system are securely installed.
- Do not over-tighten the mounting screws.

7.3.7.2 Brake test

These tests should be carried out on an even surface with at least one meter of free space around the wheelchair.

- Switch on the control system.
- Check that the screen remains on after start-up.
- Move the joystick slowly forward until you hear the park brakes release. In some cases the wheelchair may begin to move.
- Release the joystick immediately. Both park brakes must be engaged within 2 seconds.
- Repeat the test three times, bringing the joystick slowly backwards, to the left and to the right.

7.3.7.3 Test run

Set the highest permitted speed to the lowest value and run the wheelchair in all directions while checking that it runs smoothly and is easy to maneuver.

Repeat the test with the speed control set to the highest possible value.

7.3.7.4 Gradient test

WARNING!

Prevent tipping during test

When this test is conducted, an additional person must be present in order to prevent the wheelchair tipping over backwards.

Run the wheelchair forwards up its steepest permitted gradient. Release the joystick when the wheelchair is moving up hill; check that the wheelchair stops and that the brakes function as intended without the front wheels lifting from the ground.

Move the joystick forward and continue uphill. Check that the wheelchair moves gently forwards.

Stop the wheelchair then back it downhill. Release the joystick when the wheelchair is moving downhill; check that the wheelchair stops and that the brakes function as intended without the front wheels lifting from the ground.

7.3.7.5 Testing lights, turn signals and warning lights

If the wheelchair is equipped with lights:

- Check that they all light up as intended.
- Check that they all light up as intended and that the flashing frequency is 1.5 Hz ± 0.5 Hz.
- Remove the bulbs in turn and check that the remaining bulb on the same side flashes at a frequency of 3 Hz ± 0.5 Hz.

If the wheelchair is equipped with hazard lights:

- Check that all bulbs light up as they should and that the flashing frequency is 1.5 Hz ± 0.5 Hz.

7.3.7.6 Testing adjustment device

If the wheelchair is equipped with an adjustment device:

- Check that all motors move in the right direction.
- Make sure that the mechanical end stops are secured and that they stop the adjustment device motors, and thus use the automatic end stop tracking that is in the seat and light module (ISM).

7.3.7.7 Testing inhibit signal

Connect a suitable battery charger or equivalent inhibit connecting device in the charging contact on the joystick module and check that the wheelchair is prevented from running.

If inhibit contacts 2, 3, 4 and 5 are used for inhibiting or restricting speed, suitable test must be performed in order to check that they are functioning as intended.

7.4 Repairing defective units

Apart from specific OEM-approved spare parts, there are no replaceable parts in the R-net control system. Contact Permobil for further information on OEM-approved spare parts. Defective units must be sent for repair to Permobil or an authorized Permobil service center.

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