HD rehab

HD motion

Technical Information | English

This document is available in PDF format at hdrehab.com.

WE MANUFACTURE QUALITY OF LIFE

HD Rehab helps people achieve an improved quality of life. Our products help make the lives of users, their families, and caregivers easier, safer, and more comfortable.

HD Rehab offers assistive products for people living with disability. Our primary product is wheelchairs, which we have been designing, developing, and manufacturing for over 40 years. We accept no compromises in quality. Precision, safety for user and caregiver, function, and design are our guiding principles. We are confident that you will feel the difference compared to any other wheelchair.

GLAD TO BE FLEXIBLE

Whether you are a user, a family member, or a caregiver we welcome your requests and opinions. Our designers and developers work closely with the production team at our facility on the island of Lidingö in Stockholm. Our creative employees use their specialist knowledge, experience, and inventiveness to find solutions for the unique needs of each individual.

CONTENTS

1. GENERAL INFORMATION

The product is a comfort wheelchair that comes in two versions, HD Motion 22 and HD Motion 16.

HD Motion 22 is intended for children/youth or small adults who can to some degree drive the wheelchair independently. It can also be used if the user is unable to drive independently. HD Motion 16 is only for users who cannot drive independently.

HD Motion is intended for users in need of excellent comfort and support when seated. The seat and back can tilt in various positions to give the user a variety of seating options for activity and rest.

Prescription by a medical professional is required before beginning to use HD Motion. This applies to new wheelchairs as well as when a used chair changes users. All prescription and adaptation of the wheelchair must be carried out by qualified personnel.

If the user has movement patterns or behaviour that strains the wheelchair excessively a reinforced model may be needed. This applies for example to users with increased tonus or spasticity.

The wheelchair is approved for use as a seat during transportation in vehicles.

HD Motion is a Class 1 Medical Device, CE-marked per EU 217/745 (MDR).

1.1 Important documents

It is useful to have the following documents at hand when working with HD Motion:

95431-1 **Information about custom-made products**

Information regarding regulations that apply for adaptations and modifications of medical products.

96711-1 **Risk Information - Special configurations and Accessories**

Information about increased risks when using certain special configurations and accessories.

96764-1 **Labelling**

Information about which labels are to be found on the wheelchair.

96730-1 **Maintenance Schedule**

Instructions for maintenance to maximise the life and performance of the wheelchair.

1.2 Lubricants and thread lockers

Table 1 details recommended lubricants and threadl ockers.

Table 1 - Recommended lubricants and thread lockers

Area of use	Lubricant type	Product used by HD Rehab
General lubrication of sliding surfaces etc.	Synthetic food grade grease	Fuchs Cassida EPS 2 Vendor: Ikaros AB
Locking of screws, permanent, e.g. wheel axle pin	High strength thread locker	Loctite 2700
Locking of screws to crossbars etc. that may be removed for repairs	Medium strength thread locker	Loctite 2400

1.3 Finishes

The following finishes are used on HD Motion:

- Powder coat painting, frames: Grey metallic, colour code RAL 7832, gloss 85.
  Orange, colour code RAL 2004, gloss 72.
  Green, colour code RAL 6037, gloss 72.
- Powder coat painting, details and accessories: Black, colour code RAL 9005, gloss 40.
- Anodizing: natural and black.
- Nitrocarburizing.
- Galvanizing.

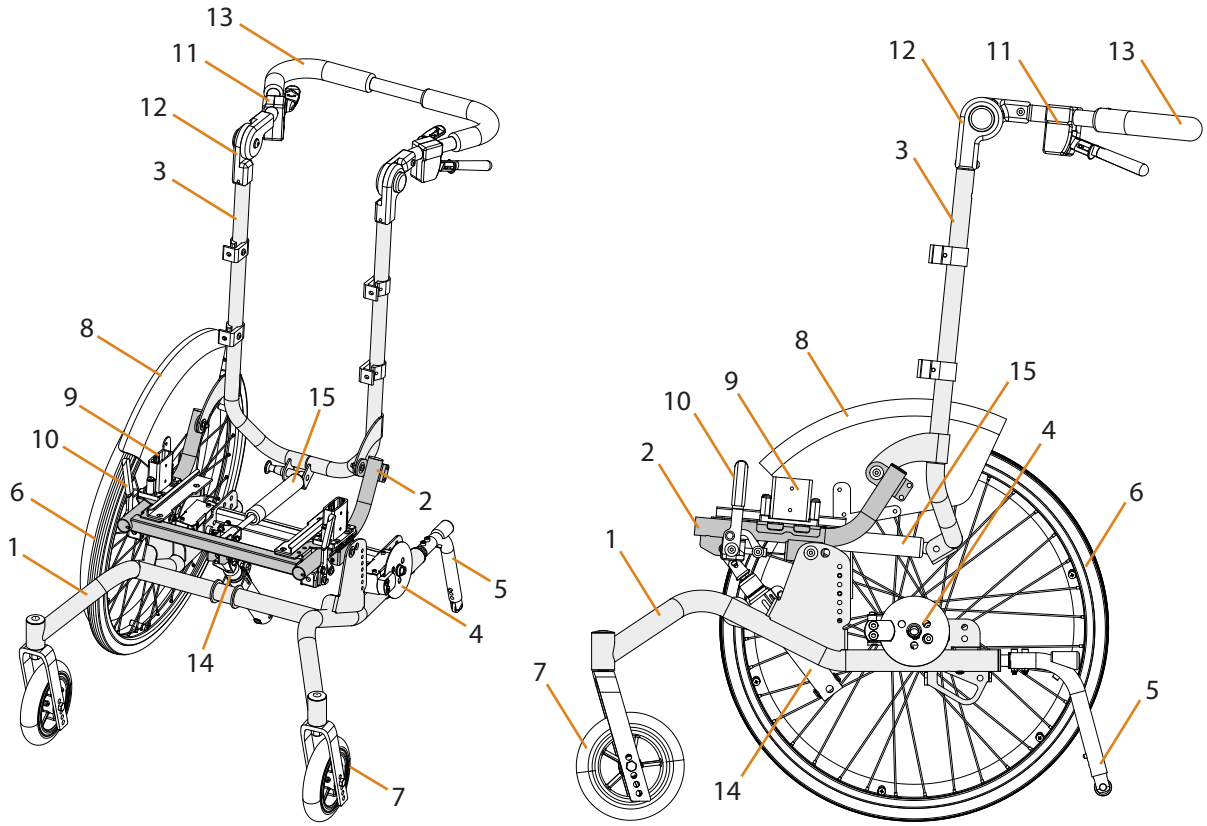
2. WHEELCHAIR CONSTRUCTION

HD Motion is built with a chassis that gives the fundamental characteristics, see section 2.1.

The chassis is complemented with different configuration accessories such as different backrest systems, leg rest options, armrests, and push bar.

In addition, the wheelchair can be equipped with a range of different accessories such as headrest, tray table, trunk support, and more.

Chassis components are named per Figure 1.



1	Wheel frame	**6**	Drive wheel	**11**	Controls
2	Seat frame	**7**	Castor	**12**	Angle joint
3	Back frame	**8**	Fender	**13**	Push bar
4	Wheel mount	**9**	Armrest mount	**14**	Gas spring, tilt
5	Tip protector	**10**	User brake	**15**	Gas spring, recline

Figure 1. Chassis components

2.1 Chassis construction

HD Motion has a chassis constructed of three interacting frames; wheel frame, seat frame, and back frame. These are attached to each other at a number of points and create the desired geometry for balance, recline, and seat tilt. The wheel frame and seat frame are connected at a point with some adjustment possible.

Adjustment of seat tilt and back recline are done with cable controls (11 in Figure 1) which are placed on the push bar.

The two models, 22 and 16, have identical chassis except for the wheel frame, where the brackets for wheel attachment and anchoring are different.

2.2 Chassis configuration options

The HD Motion chassis can be modified to change several basic characteristics of the wheelchair. The standard configuration is the reference point for all specified data regarding characteristics, functionality, measurements, and testing against relevant standards. Changes to the configuration of the wheelchair come with both positive and negative consequences. Therefore the standard configuration should be used wherever possible.

The following modifications can be made:

- Seat frame length, to achieve different seating depths. The type of wheelchair chosen when ordering determines the length, it cannot be modified later.
- Seat width can be adjusted by re-positioning the armrest mounts, see section 3.7.
- The tilt position of the seating unit can be adjusted, see section 2.5.
- Fixed back angle between 90° and 105° can be set by replacing the gas spring with a rod, as described in section 2.8.
- Seat height can be raised with an adapter, see section 2.11.
- Wheel mounting position has 3 possible settings. This determines the stability and driving characteristics of the wheelchair. See section 2.12.
- Size of drive wheels.
  Model 22: 22" is standard. 20" or 24" can be used. See sections 2.11, 2.13, and 2.14.
  Model 16: 16" is standard. This cannot be changed.
- Change of camber angle. Affects stability and driving characteristics.

2.3 Chassis attachment points

The back of the seat frame is attached to the side plates of the wheel frame with screws on both sides (3 in Figure 2). Each connection consists of a bushing, 2 washers, a screw, and a lock nut.

The front of the seat frame is attached to the gas spring for seat tilt via pin joints (5 and 6 in Figure 2). Each connection consists of a pin and 2 circlips. Note the pins have different lengths.

Generally the seat frame does not need to be replaced. If the need does arise, see section 2.10.

The back frame is attached to the seat frame with screws on both sides (2 in Figure 2). Each connection consists of a bushing, 2 washers, a screw, and a lock nut. **Note**: the bushings for the back connection (2) and the seat connection (3) are not the same.

The gas spring for back recline is attached to seat frame via a pin joint (4 in Figure 2). The connection consists of a pin and 2 circlips. The gas spring attaches to the bottom of the back frame via a spring-loaded pin (1 in Figure 2) that can be pulled out to release the back frame, allowing it to be folded down to a transport position.

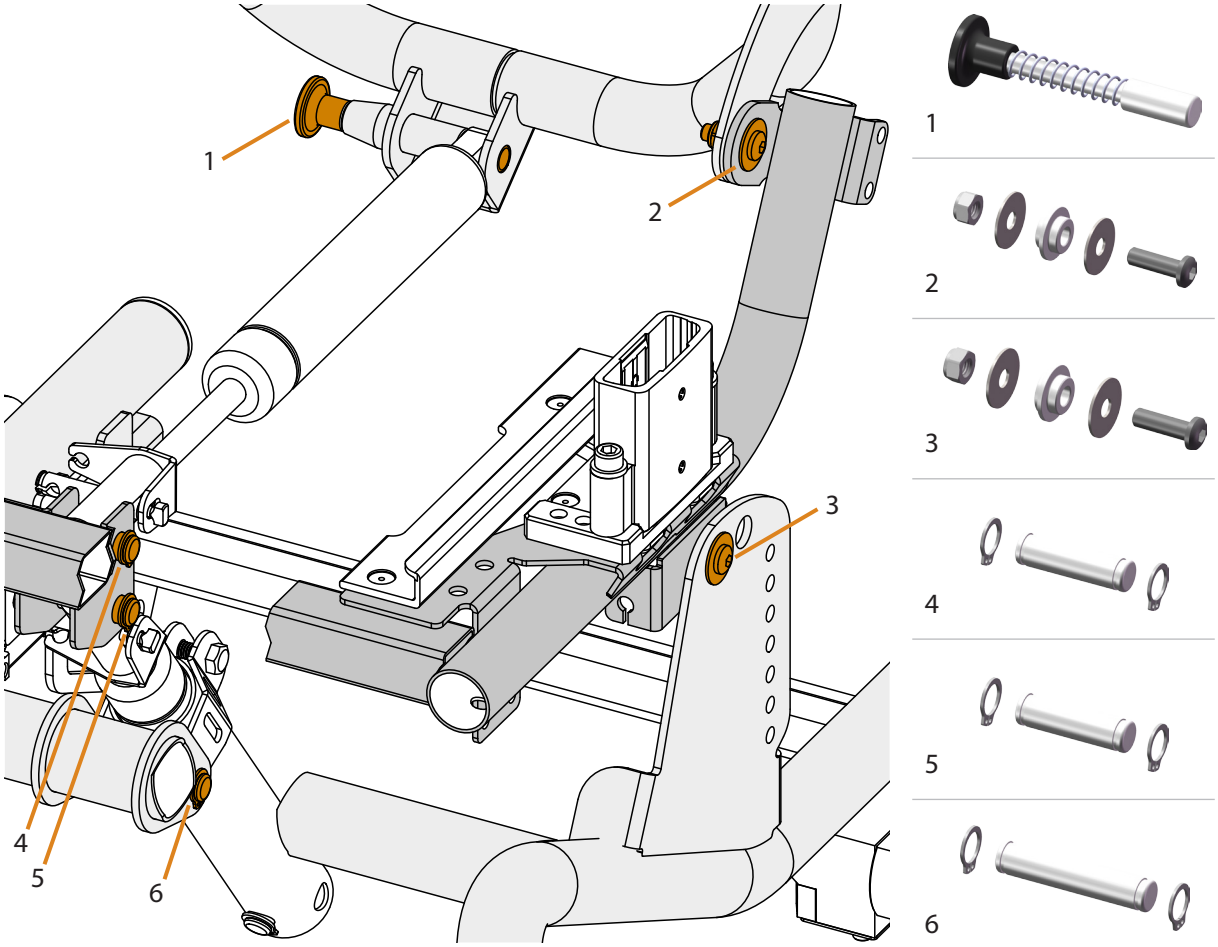


Figure 2. Chassis attachement points

See sections 2.4 - 2.7 for further information regarding the gas springs.

Generally the back frame does not need to be replaced. If the need does arise, see section 2.9.

2.4 Gas springs for seat tilt and back recline

Both gas springs are equipped with release mechanisms, with the cable for control attached as seen in Figures 3 and 4. The gas springs are activated from the cable controls on the push bar - back recline on the left side, seat tilt on the right side.

2.5 Adjustment of seat zero position

The gas spring for seat tilt is mounted in holder (Figure 3) which allow for adjustment of the zero position of the seat. Adjustment is done as follows:

1. Set the seat tilt all the way forward, which is to say the gas spring fully in, see Figure 3.
2. Loosen the nut (6) a few turns so that the gas spring is not held fast in the holder (15).
3. Loosen the nut (7) a few turns so that the gas spring can move in the holder.
4. Adjust the seat to the desired position. Depending on the wheels and tires, it can be adjusted between approximately -5° and +3°.
5. Tighten the nut (7) firmly.
6. Tighten the nut (6) just enough that the gas spring cannot rattle in the holder.
7. Tilt the wheelchair to check that the desired positioning has been set.

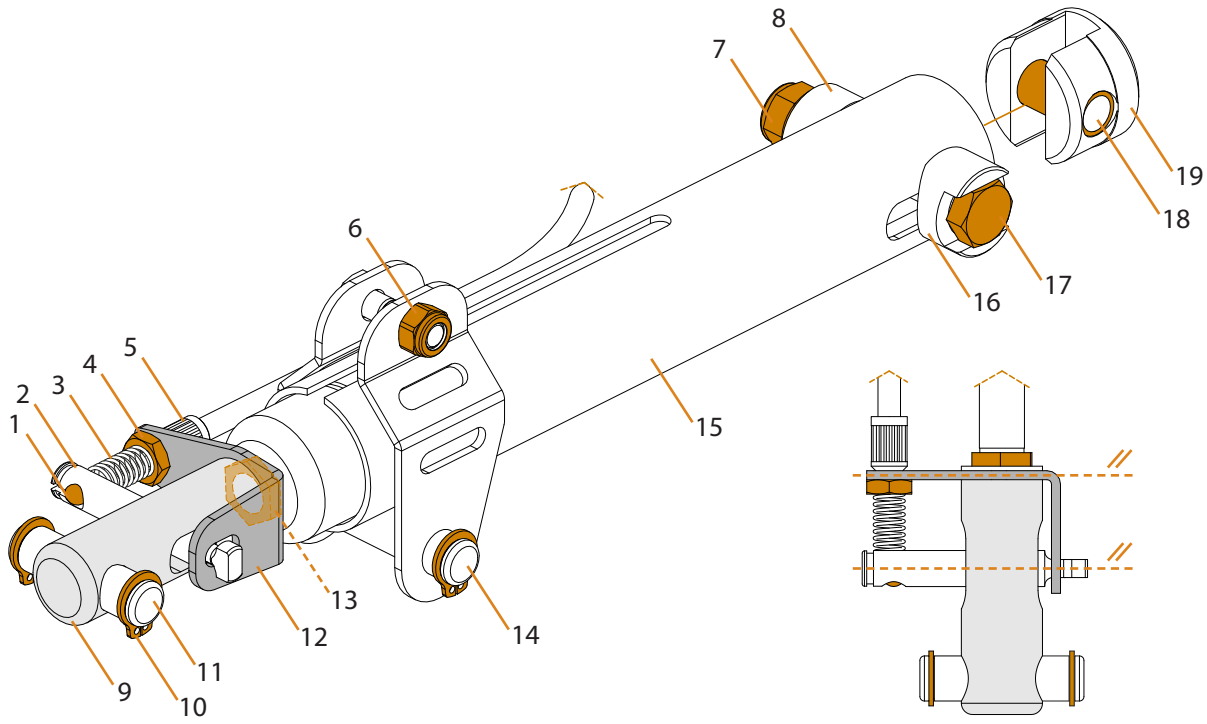


Figure 3. Gas spring for seat tilt

Figure 3.1. Pin parallel with bracket

2.6 Replacement of gas spring for seat tilt

1. Remove cushions, leg rests, and seat plate.
2. Remove the cable from the holder as follows (see Figure 3):

   Fully loosen the nut (4). Take the wire housing (5) out of the bracket (12) by pulling the end of the housing sideways to bring the wire out. Remove the wire nipple (1) from the pin (2). Take care not to lose the spring (3).
3. Remove the gas spring from the seat frame by removing a circlip (19) and then pulling or knocking out the pin (11). Be careful when removing the circlip. If it is opened too far it will be damaged and must be discarded.

   NOTE: When the pin is removed the seat unit can fall forward with risk for personal injury and damage to the wheelchair. Ensure the seat unit is properly supported. **Tip**: Fold the back frame forward so that all weight is forward and easier to control.
4. Remove the holder from the wheel frame by taking out the pin (14) in the same manner.
5. Remove the gas spring from the holder as follows:

   Loosen the nut (6) a few turns. Remove the nut (7) and take out the bolt (17) and spacers (8 and 16). Push the gas spring out of the holder far enough to free the end plug (19). Push the sleeve (18) out of the end plug, which can then be removed. Pull the gas spring out of the holder.
6. Loosen the nut (13) a little so that the gas spring can be threaded out of the rod (9). Hold all of the end pieces together so they do not fall apart. Thread the new gas spring into the rod. Check that all pieces are in place and that the nut (13) is fully threaded on to the gas spring shaft.
7. Adjust the gas spring position in the rod (9) so that the pin (2) is parallel with the bracket (12) when the spring is pressed (**lightly**) against the release pin of the gas spring. See Figure 3.1.
8. Tighten the nut (13) but not excessively.
9. Reassemble the gas spring in the holder and the holder to the wheelchair in the reverse order of steps 2-5 above. Do not forget the spring (3).
10. Reassemble the seat plate and check function. The cable for the seat tilt may need adjustment. Some adjustment for proper release of the gas spring can even be done by moving the gas spring slightly in the rod.

    See also section 3.3 Cable controls for more info.
11. Adjust the seat zero position per section 2.5.

2.7 Replacement of gas spring for back recline

1. Remove cushions and seat plate.
2. Release the gas spring from the back frame by pulling out the pin (6 in Figure 4), and then fold the back frame forward. Be careful as the back frame is free to fall when then pin is pulled out.
3. Loosen the nut (11) slightly so that the gas spring can be threaded out of the rod (7). Hold all of the end pieces together so they do not fall apart.
4. Thread the new gas spring into the rod. Check that all pieces are in place and that the nut (11) is fully threaded on to the gas spring shaft.
5. Adjust the gas spring position in the rod (7) so that the pin (2) is parallel with the bracket (10) when the spring is pressed (**lightly**) against the release pin of the gas spring. See Figure 4.1.
6. Tighten the nut (13) but not excessively. Turn the gas spring to the correct angle and attach it to the back frame with the pin (6). Check that the pin snaps into place correctly.
7. Check the back recline function. The cable may need adjustment. Some adjustment for proper release of the gas spring can even be done by moving the gas spring slightly in the rod.

   See also section 3.3 Cable controls for more info.
8. Reassemble the seat plate and cushions.

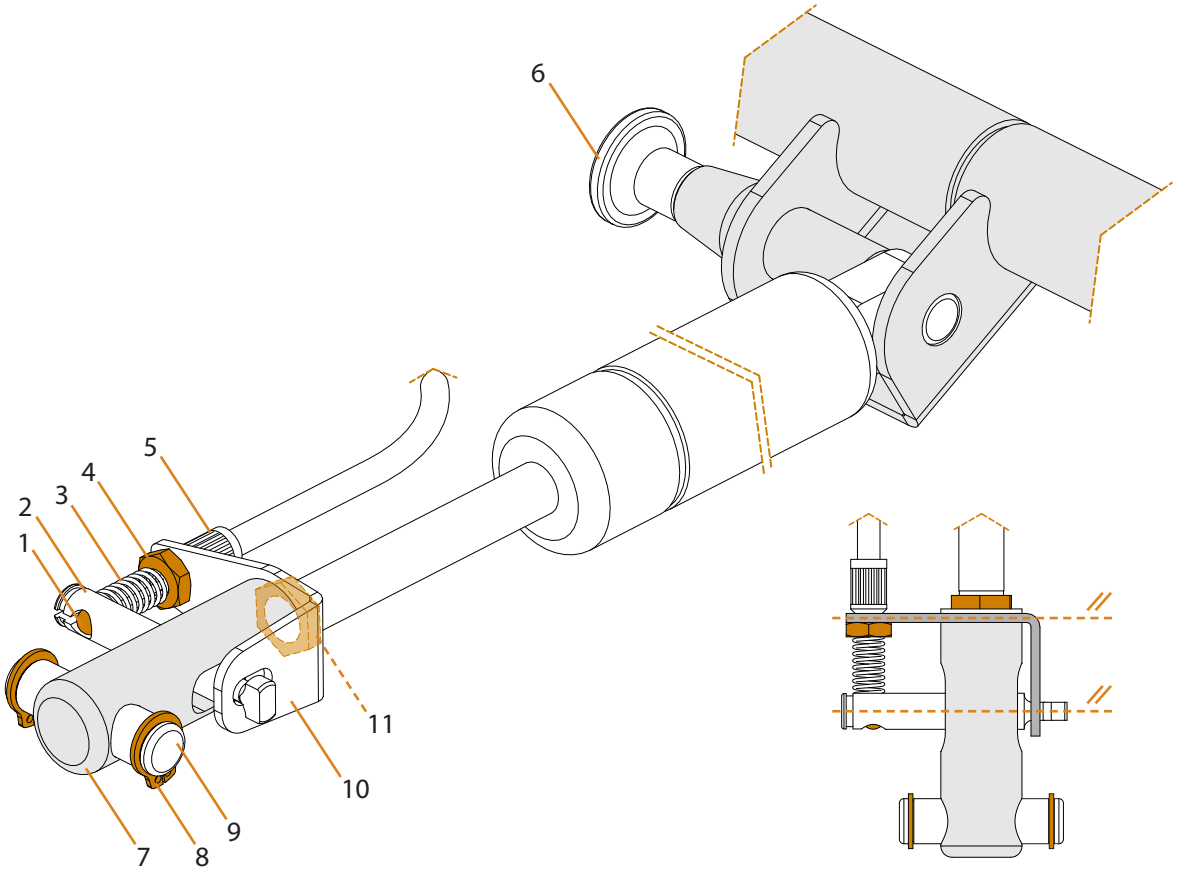


Figure 4. Gas spring for back recline

Figure 4.1. Pin parallel with bracket

2.8 Change to fixed back angle

The gas spring can be replaced with a Fixed back connector (Figure 5) for a fixed back angle. The back angle can be set between approximately 90° and 105°. Other angles are possible on request.

The replacement is done as follows:

1. Remove the seat cushion and seat plate.
2. Release the gas spring from the back frame by pulling out the pin (6 in Figure 4), and then fold the back frame forward. Be careful as the back frame is free to fall when then pin is pulled out.
3. Remove the cable as follows: Fully loosen the nut (4). Take the wire housing (5) out of the bracket (10) by pulling the end of the housing sideways to bring the wire out. Remove the wire nipple (1) from the pin (2).
4. Remove the gas spring from the seat frame by removing a circlip (8 in Figure 4) and then pulling or knocking out the pin (11). Be careful when removing the circlip. If it is opened too far it will be damaged and must be discarded.
5. Assemble the fixed back connector to the seat frame with the same pin and circlips. **NOTE**: check that the circlips are undamaged.
6. Adjust the length of the fixed back connector so that it gives the desired back angle. Secure it by tightening the nut (Figure 5).

Figure 5. Fixed back connector

The control lever for back recline then has no function. This can be handled in 2 ways:

1. The lever can remain in place. The cable should then be bound up and pinned in place under the wheelchair. It may be confusing for users to have a lever with no function.
2. The lever and cable can be removed from the cable control. The hole that is left in the cable control should then be covered with a plug. A plug is included in the conversion kit, see Assembly instructions *Fixed back connector*, doc nr 96810-1. See sections 3.3.2 and 3.3.3 for disassembly.

2.9 Replacement of back frame

1. Remove back cushion and disassemble backrest (Flexi-back or Solid back) and any accessories.
2. Remove all clips (2 in Figure 6) that hold the cables in place on the back frame.
3. Remove the push bar (entire unit) by removing the 2 screws (1) and pulling it fully out of the back frame. Be very careful to not damage the cables.
4. Release the gas spring at the back by pulling out the pin (4), fold the back frame forward.
5. Take apart the screw connections on each side (3) and remove the back frame.
6. Assemble the new back frame by following the same steps in reverse order. Be careful that the screw connections with their bushings are assembled correctly. See Figure 2.

It is very important that the cables are clipped in place correctly. See section 3.3.1.

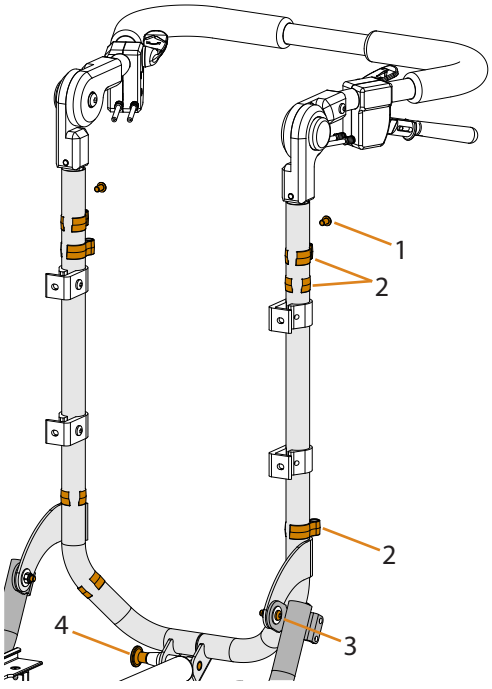


Figure 6. Replacement of back frame

2.10 Replacement of seat frame

1. Remove the back frame per section 2.9 steps 1-5.
2. Remove seat cushion, seat plate, leg rests, and armrests.
3. Release the gas spring for tilt per section 2.6 step 3.
4. Remove the gas spring for recline per section 2.8 step 3.
5. Remove both user brakes from the seat frame. They are attached with 2 screws from the inside of the seat frame (Figure 7). Be careful not to damage the brake cables.
6. Take apart the screw connections (see 3 in Figure 2) and remove the seat frame.
7. Assemble the new seat frame by following the same steps in reverse order. Check that the seat frame moves smoothly about the fastening points. **NOTE**: The seat frame is always mounted in the front holes of the wheel frame side plates.
8. Move the armrest mounts over if none are present on the new seat frame (see section 3.7.1).

   NOTE: Check that the new seat frame has the correct labelling; see *Labelling*, doc nr 96764-1. Correct labelling is required for CE-marking to be valid.

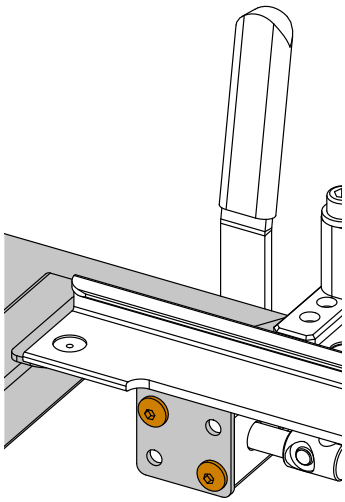


Figure 7. Screws for user brakes (seen from inside of seat frame)

2.11 Raising seat with adapter

HD Motion can be equipped with a seat raising kit to increase the seat height by 30 mm or 50 mm. The kit can be used with both HD Motion 22 and HD Motion 16.

The adapter plates are mounted between the joint plates of the seat frame and the side plates of the wheel frame with screw connections (Figure 8). The holder for the gas spring is replaced with a different version (Figure 9). The kit can be assembled on a wheelchair by following mounting instructions, but it is advantageous to assemble the kit directly on a newly ordered wheelchair.

The raising kit does not significantly increase the tipping risk but the wheelchair must be marked with the included decals and complementary information must be added to the user manual. It is important that the instructions are followed to use the correct configuration of tip protectors, particularly if 24" drive wheels are used. See section 2.14.

The adapter kit in combination with 24" wheels raises the seat so far that there can be conflicts in some configurations (maximum seat width). Wheel mounts without cambering are recommended in this case.

Table 2 shows the seat height for different configurations. Note that seat height is slightly affected by camber angle.

Table 2 - Seat height in different configurations [cm]

Drive wheel	Camber	Without adapter	Adapter 30 mm	Adapter 50 mm
16	0°	42	45	47
22	6°	42	45	47
24	6°	45	48	50
22	0°	43	46	48
24	0°	46	49	51

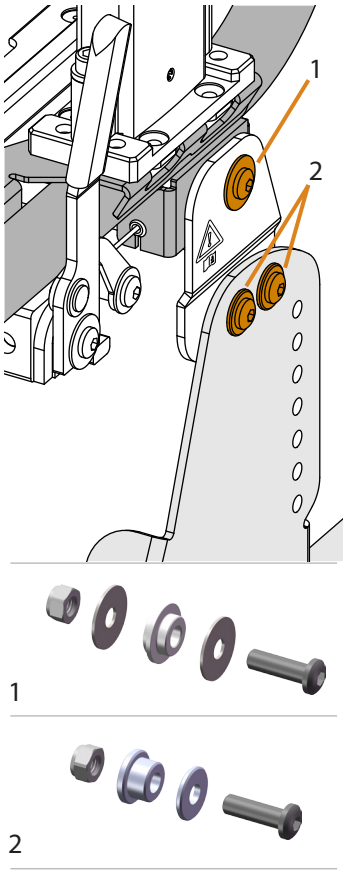


Figure 8. Adapter connection points

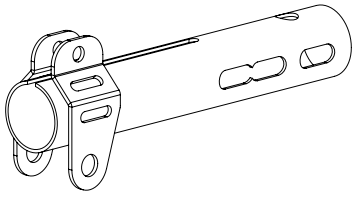


Figure 9. Gas spring holder

2.12 Drive wheel & Cross tube positions

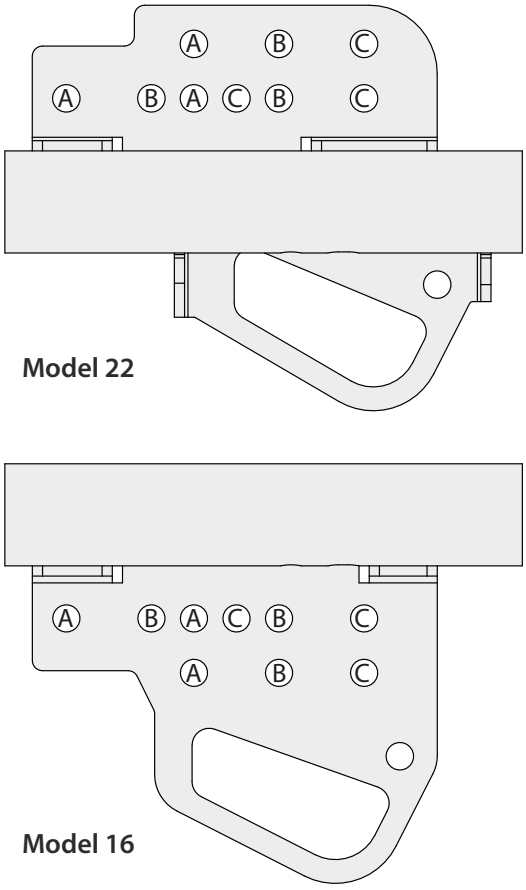
The drive wheel mount has three attachment positions with 25 mm spacing to allow variation in the wheelbase length. The middle position is the standard configuration. See Figure 10.

The cross tube is mounted with screws through holes in the back of the wheel mount. To simplify assembly these screws can be accessed through the large hole in the brake disc. Be careful when doing this assembly that the brake disc is not damaged. See Figure 11.

NOTE: The cross bar must always be in place.

NOTE: When the wheel mount is moved the fenders also need to move. See section 2.15.

NOTE: Thread locker (Loctite 2400 or equivalent) must be used on the screws.



A - Wheel mount 25 mm forward
B - Wheel mount mid position
C - Wheel mount 25 mm back

Figure 10. Attachment positions

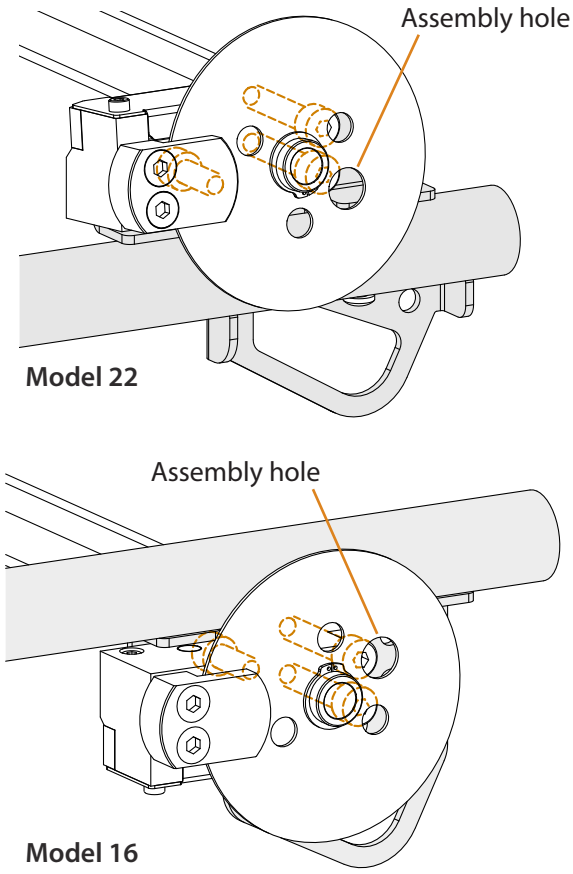


Figure 11. Screws for assembly

2.13 Drive wheels

With HD Motion model 22 drive wheels of size 20", 22", and 24" can be used, together with different tyre types. 22" is the standard size, all reference measurements and tests are based on this standard.

The size of drive wheels, tyre type, wheel mounting position, and camber angle all affect the driving characteristics of the wheelchair, as well as general characteristic such as length and total width.

2.14 Tip protectors

HD Motion is equipped with tip protectors, see Figure 12. The tip protectors are fixed in placed and cannot be removed without tools. By pushing inward with a foot or hand the tip protector can be turned up to an inactive position. The attachment for the wheel (6) can be adjusted to different positions with a snap lock (5) to give the desired tip protection. The same tip protectors are used for HD Motion 22 and HD Motion 16.

If the entire tip protector is to be replaced remove the screw (8) from the underside of the wheel frame. **NOTE**: When assembling a new tip protector the spring washer (7) must be oriented correctly, with the convex side facing upward.

NOTE: The tip protectors have left-hand and right-hand versions.

If HD Motion 22 is equipped with a different wheel size than the standard 22" the tip protectors need to be modified as follows:

20" drive wheels:

The tip protector can be retained, but to keep the same setting options the tip protector tube (4) is replaced with a shorter version as follows:

1. Remove the screws and nuts (1).
2. Replace the tube (4).
3. Re-assemble the screws and nuts.
4. Move the wheel attachment (6) to the new tip protector.

24" drive wheels:

Replace the wheel attachment (6) with a longer version. This compensates for the height difference to the ground.

NOTE: If the wheel attachment is not replaced the tip protector will not be as safe in all positions as it is in the standard configuration.

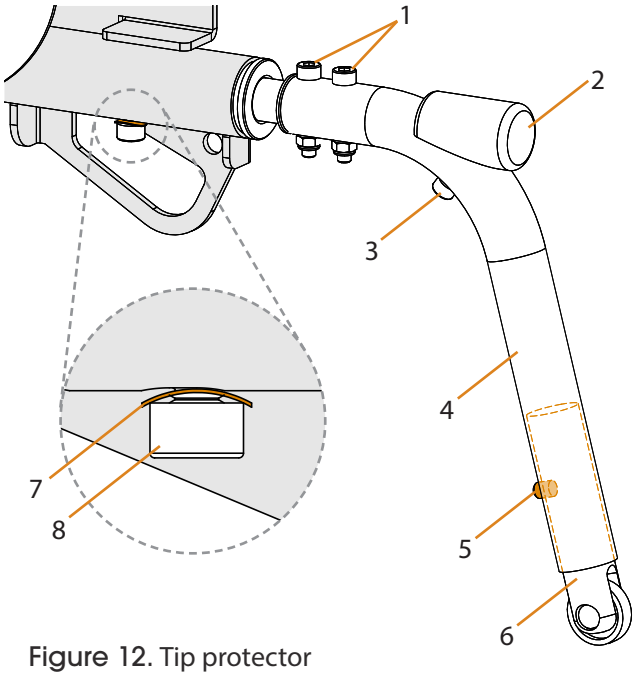


Figure 12. Tip protector

2.15 Fenders

Fenders (model 22 only) are fixed with 2 screws and lock nuts to the side plates of the wheel frame, See Figure 13. The positioning is determined by wheel size and wheel mount position.

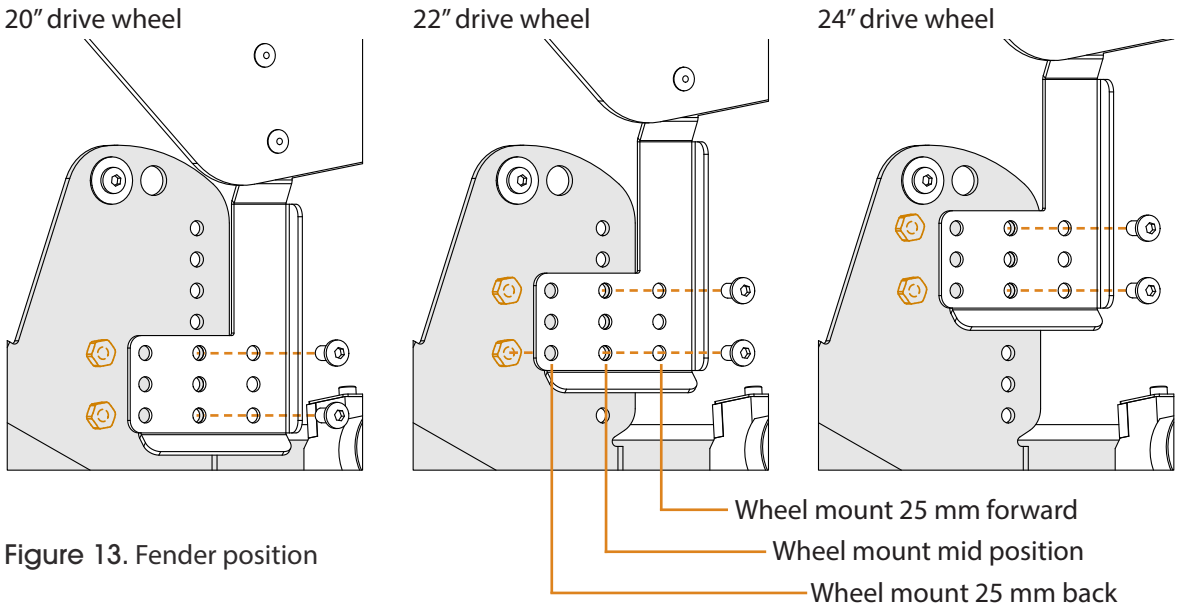


Figure 13. Fender position

2.16 Castors

2.16.1 Replacement of castor fork

The castor fork is replaced by removing the cap (6 in Figure 14) and then removing the circlip (7) that secures the axle (8). Pull out the fork and replace with the new one and assemble it in the same way.

2.16.2 Replacement of castor

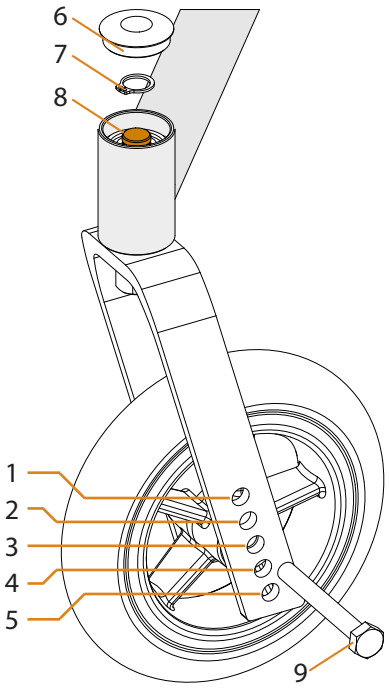
Change the castor by removing the bolt (9 in Figure 14) and replacing the castor. Reassemble in the same way; do not forget the washer on each side.

The castor fork has 5 holes to mount the castor. Which hole should be used is specified in Table 2. The position is determined by the size of the castors and the size of the drive wheels.

Standard castors are 150 mm in diameter. Note that other sizes of castor can affect the driving characteristics of the wheelchair, and that some sizes may come in to conflict with the footrests.

Table 2 - Castor positioning

Drive wheel (inches)	**Tyre type**	**Castor** (mm)	**Position** (Figure 14)
16	PUR	150	3
16	Pneumatic	150	3
20	PUR	150	1
20	Pneumatic	150	1
22	PUR	150	3
22	Pneumatic	150	2
24	PUR	150	5
24	Pneumatic	150	5



Figur 14. Castor

3. CONSTRUCTION OF VARIOUS COMPONENTS

3.1 Disc brake system

The disc brake system is integrated with the wheel mount (Figure 15). The brake consists of a disc (10) with 3 holes that connect to the drive wheel. The brake disc is pushed against the brake pad (9) by a padded piston (7). This action is controlled by the brake handles on the push bar and by the user brake handles (for wheelchairs equipped with user brakes). There are separate cables for each brake handle. The cables are connected to an actuating plate (3) which drives the brake piston. The brake cables are of fixed length, with adjustment screws and nipples at each end.

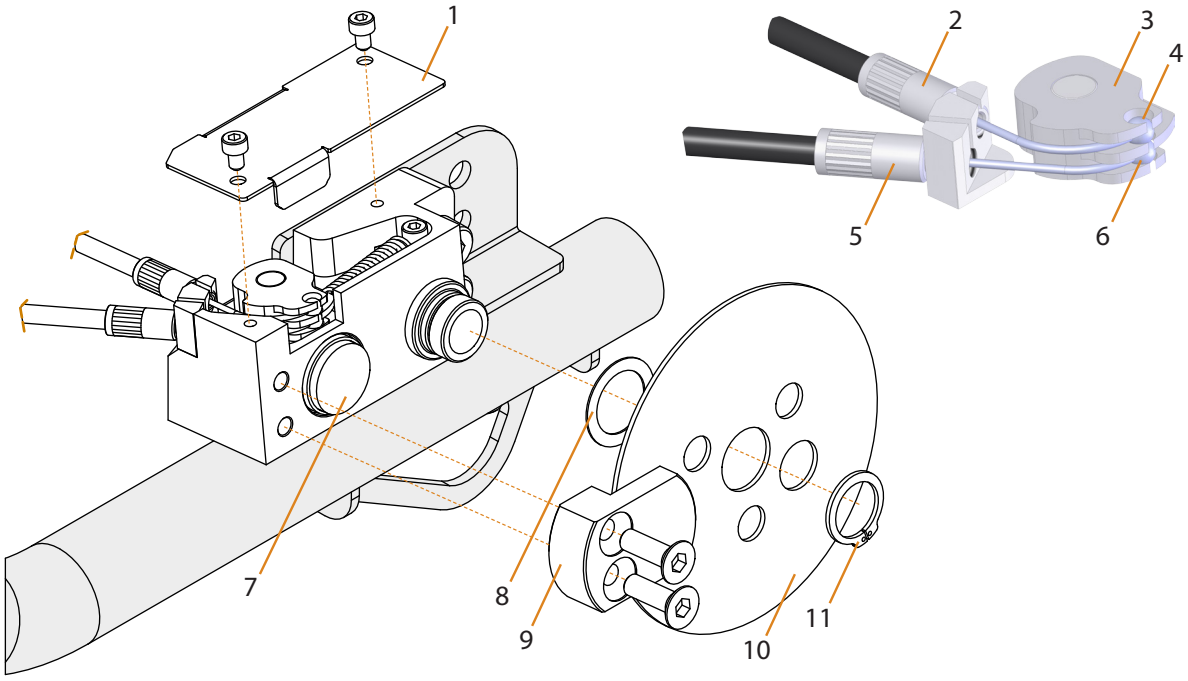


Figure 15. Disc brake system

3.1.1 Adjustment of disc brakes

Because the disc brakes are activated by both the caregiver brakes and the user brakes, they must be adjusted at the same time.

1. First locate the adjustment screw. The adjustment screws for user brakes (N and O in Figure 16) on the right and left side respectively. Adjustment screws for caregiver brakes (C and D in Figure 19). **Note**: The adjustment screw for the caregiver brake on the **right** side is found on the **left** side of the back frame, and vice versa.
2. Loosen the nut (2 in Figure 16) on all adjustment screws and thread in the sleeves (1) a few turns to slacken the brakes.
3. Check that all cables are correctly routed and clipped in place (see Figure 19).
4. Adjust the caregiver brakes first. Adjust by threading the sleeve (1 in Figure 16) - screw it out for more braking force, in for less braking force. Tighten the nut (2) after adjusting.
   NOTE: The brakes must always be adjusted such that the braking force is correct with the caregiver brakes in the parking position. Verify this is the case.
5. Adjust the user brakes in the same manner.
   NOTE: The brakes must always be adjusted such that the braking force is correct with the caregiver brakes in the parking position. Verify this is the case.

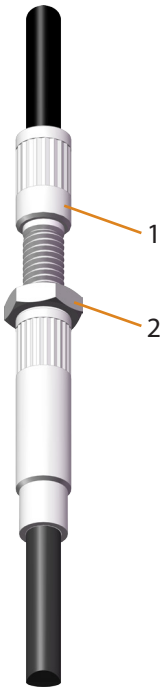


Figure 16. Adjustment screw

3.1.2 Replacement of brake cable

A damaged brake cable must be replaced immediately, as follows:

Replacement of brake cable for caregiver brakes:

1. Remove the drive wheel and support the wheelchair so that it sits in a stable position.
2. Remove the 2 screws and the cover plate (1 in Figure 15) from the wheel mount.
3. Loosen the nuts on the adjustments for both the caregiver brake and the user brake (see 3.1.1 steps 1 and 2). Thread in the sleeve on the adjustment screw a few turns.
4. Unscrew the end sleeve of the cable (2 in Figure 15) from the wheel mount. Pull gently outward and sideways to free the wire from the guide. Turn the wire such that the nipple (4) can be removed from the actuating plate (3).
5. See section 3.3.3 for replace of cable in the cable control.
6. When the new cable is assembled in the controls it must be routed correctly along the back frame and be clipped in place, see Figure 19 and section 3.3.1.
7. Fit the nipple (4 in Figure 15) into the actuating plate (3), turn it up so that the wire can be placed in the wire guide, screw in the end sleeve (2) fully.
8. Follow the instructions in section 3.1.1 steps 4 and 5 for adjustment of braking force.
9. Check the brake function and that all cables are correctly clipped in place on the back frame (see Figure 16). Also check that the push bar can be adjusted through the full range without affecting the brake cables.

3.1.3 Replacement of brake pad and disc

Worn or damaged brake pads or brake discs are replaced as follows (see Spare part list for details):

1. Remove the drive wheel and then unscrew the brake pad (9 in Figure 15).
2. Remove the circlip (11) with circlip pliers and remove the brake disc (10). Note the plastic washer (8) that must always be assembled between the brake disc and the wheel bushing.
3. The brake piston (7), brake disc, and brake pad can now be replaced with new parts.
4. Light greasing inside the brake piston is recommended, but be careful that no grease gets on the brake disc or brake pads.
   NOTE: The brake pads can be cleaned but must be perfectly flat to function properly.
5. Reassemble in reverse order. Check that the circlip (11) and replace it if damaged.
6. Check the brake function and adjust the cables as necessary per section 3.1.1.

3.2 User brakes

User brakes must always be equipped on HD Motion 22, and can optionally be added to HD Motion 16. The brakes are mounted on the seat frame and activate the disc brakes via cable.

The user brakes are in left-hand and right-hand versions and are attached to the seat frame with 2 screws from the inside (1 and 3 in Figure 17).

3.2.1 Adjustment

Adjust by threading the sleeve (1 in Figure 16) - screw it out for more braking force, in for less braking force. Tighten the nut (2) after adjusting.

NOTE: The brakes must always be adjusted such that the braking force is correct with the caregiver brakes in the parking position. Verify this is the case.

NOTE: Caregiver brakes must always be adjusted before user brakes.

3.2.2 Replacement and repair

If the brake lever needs to be replaced, both the lever and the brake arm must be replaced as they are riveted together. Remove the screws (2 and 4 in Figure 17). See also page A7.1 in Spare Parts, doc nr 96740-1.

NOTE: The screws may be difficult to turn as they are secured with Loctite.

When mounting a new lever Loctite should be used.

NOTE: Ensure no Loctite runs out as it may negatively affect the braking function.

Normally the entire brake unit is replaced.

3.2.3 Replacement of brake cable

1. The cable for the caregiver brake needs to first be removed from the wheel mount. Follow steps 1-4 in section 3.1.2.
2. See Figure 17, the assembly of the user brake as seen from inside the seat frame. Fully unscrew the nut (6). Pull the end sleeve (7) back so it can be pulled free from the bracket.
3. Remove the nipple of the wire (5) from the brake lever unit.
4. Unscrew the end sleeve (5 in Figure 15) from the wheel mount. Pull gently outward and sideways to free the wire from the guide. Turn the wire such that the nipple (6) can be removed from the actuating plate (3).
5. Reassemble in the same manner. Check first that the adjustment screw (1 in Figure 16) on the new cable is fully screwed in for maximum slack, this makes assembly easier.
6. Fit the nipple (6 in Figure 15) into the actuating plate (3). Then screw in the end sleeve (5).
7. Fit the nipple (5 in Figure 17) into the brake unit. Fit the end sleeve (7) into the wire bracket and tighten in place with the nut (6).
8. Check that everything is correctly in place.
9. Adjust the brakes per section 3.1.1 and 3.2.1. Start as always with the caregiver brakes.

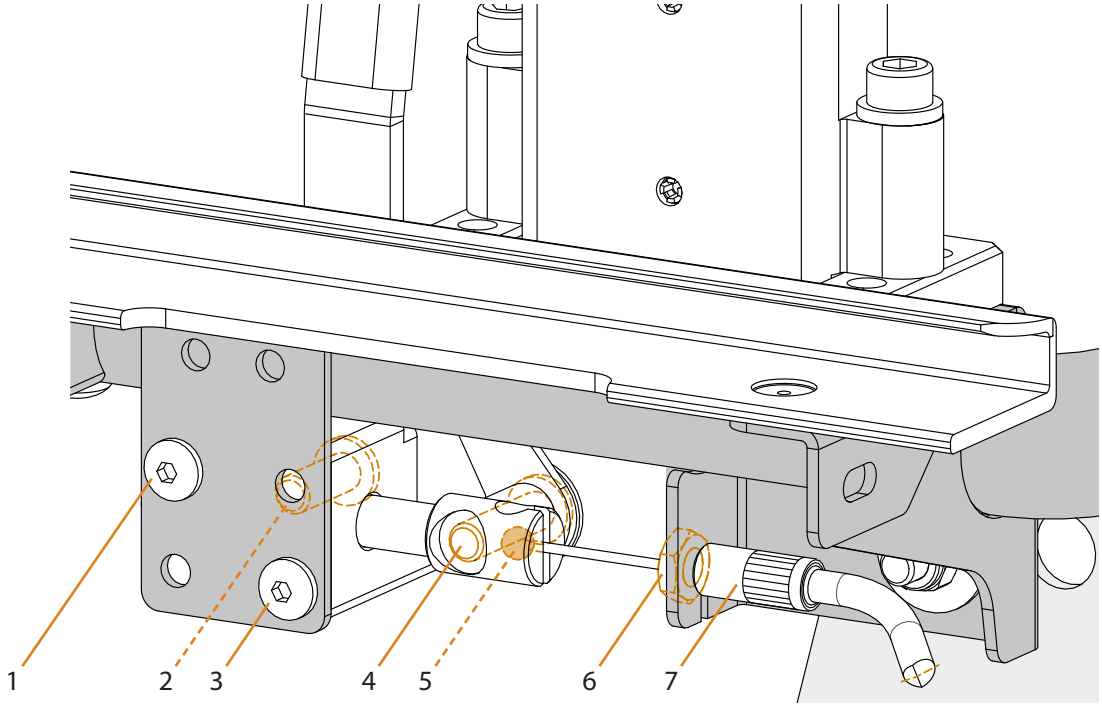


Figure 17. User brake (view from inside the seat frame)

3.3 Cable controls

Cable controls are located on the right and left side of the push bar (Figure 18).

Right side:

The brake handle (2) controls the brake on the right drive wheel. The green lever controls the gas spring for seat tilt.

Left side:

The brake handle (4) controls the brake on the left drive wheel. The grey lever controls the gas spring for back recline.

Each cable control consists of an outer half, with the brake handle, and an inner half, with the control lever. The two halves clamp together in place on the push bar.

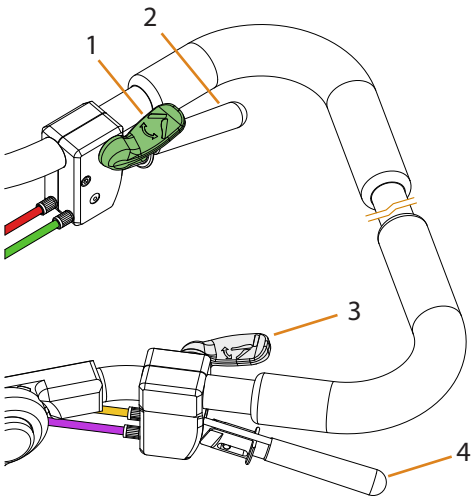


Figure 18. Cable controls

3.3.1 Cable routing

Figure 19 shows the routing of all wire cables on HD Motion. From the cable controls on the push bar cables connect for caregiver brakes, back recline, and seat tilt.

A	Back recline
B	Seat tilt
C	Caregiver brake LH
D	Caregiver brake RH
E	Cable strap
F - M	Cable clip (8 st)
N	User brake LH
O	User brake RH
P	Cable strap

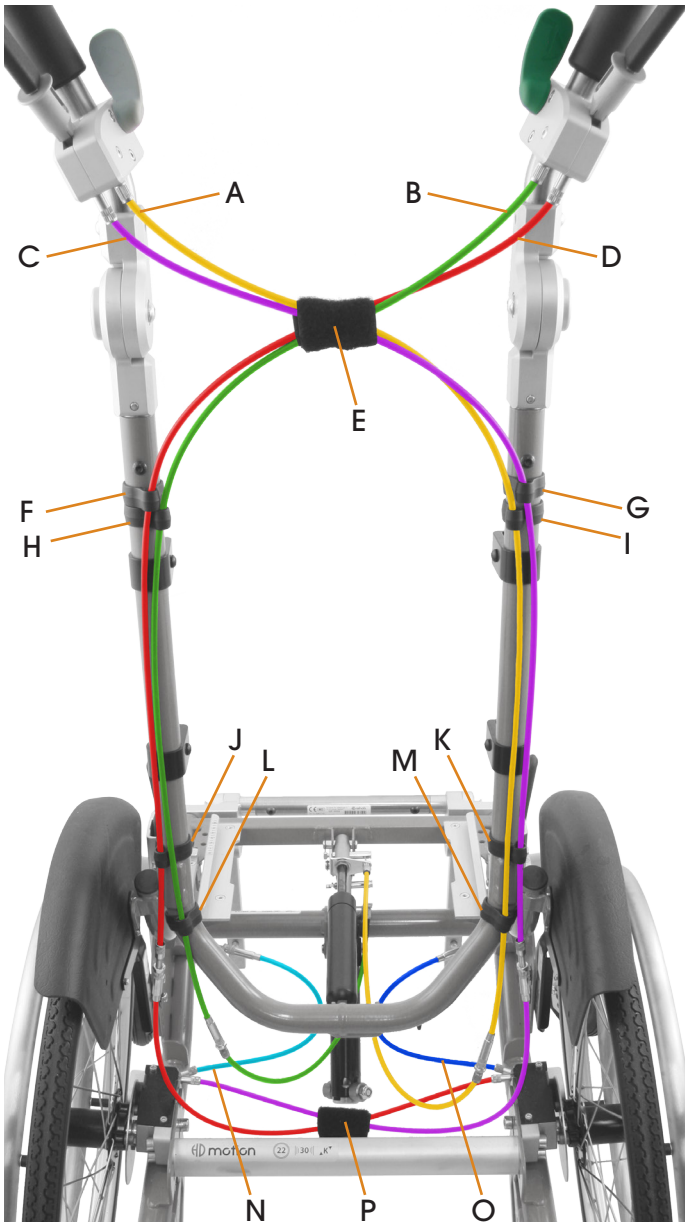


Figure 19. Cable routing

Note how the cables are drawn in a bow over to the opposite side of the back frame and then back again. This allows the push bar to be adjusted up and down without affecting the cables.

The cables must always be clipped to the tubes of the back frame, and clip positioning is important.

Example: The left-hand caregiver brake cable (C) arcs over to the right side where it is clipped (G) at the top, then along the tube to a clip (K) just above the joint plate of the back frame, and finally over to the wheel mount on the left side.

The back recline cable (A) arcs in the same way, over to the right side where it is clipped (I) directly under the brake cable clip (G) and held to the inside from the brake cable. The cable continues down to clip (M) on the bend of the back frame tube directly below the joint plate, then on to the gas spring.

The cables on the right side are routed in a mirror image of the left side.

Cables from the cable controls are held together with a wire strap (E) in an even bow. A smaller cable strap (P) holds the brake cables together under the seat.

3.3.2 Replacement of control

Replacement of cable control, complete with cables:

1. Remove the screws (Figure 20) to release the cable control from the push bar.
2. Remove the clips that hold the control cable to the back frame (see section 3.1.1).
3. Release the control cable from the gas spring (see section 2.6 step 2 for seat tilt and/or section 2.8 step 3 for back recline).
4. Screw the new cable control in place on the push bar (Figure 21). It should be placed 30-40mm from the joint and angled outward 2-3°.
5. Draw the cables down to their respective connection points. Follow section 3.3.1 and Figure 19 carefully.
6. Adjust the control cable per section 3.3.4.
7. Connect the brake cable per section 3.3.1, seat tilt cable per section 2.6 step 2 (reverse order), and back recline cable per section 2.8 step 3 (reverse order).
8. Adjust brake cable per section 3.1.1.
9. Check all brake and tilt functions, and cable routings (see Figure 19).
10. Assemble the wire strap (E in Figure 19) to hold the cables together.

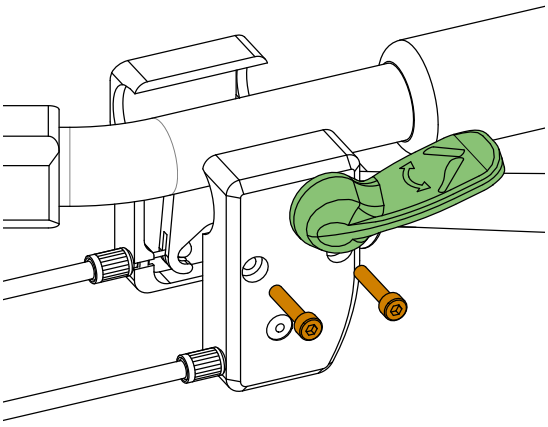


Figure 20. Screws for controls

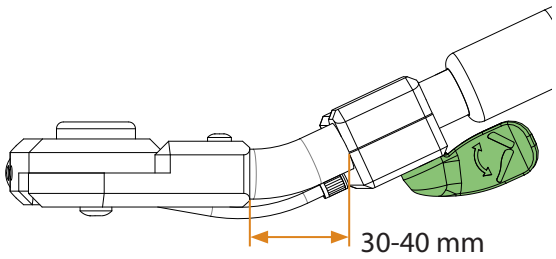


Figure 21. Control positioning

3.3.3 Replacement of cable

Replacement of brake cable:

1. Remove the screws (Figure 20) to release the cable control from the push bar.
2. Release the cable from the wheel mount, see section 3.1.2.
3. Remove the cable clips, see section 3.3.1.

The brake lever and cable are assembled in the outer half of the control, see Figure 22 (RH side shown).

4. Push the nipple (2) forward. The wire can then be removed from the slot in the lever.
5. Unscrew the end sleeve (3) fully.
6. Assemble the new wire in the same manner, starting by placing the wire in the slot of the lever.
7. Screw in the end sleeve (3) fully.
8. Move the brake handle and check that everything is functioning as it should.
9. Assemble the other end of the cable in the wheel mount per section 3.1.2 step 7.
10. Assemble the cable clips.

    NOTE: Be careful that the cable routing and clipping are done correctly, see section 3.3.1.

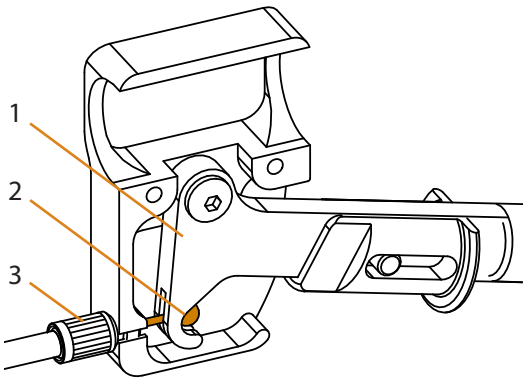


Figure 22. Brake lever and cable

Replacement of cable for seat tilt or back recline:

1. Remove the screws (Figure 20) to release the cable control from the push bar.
2. Release the cable from the gas spring for seat tilt (see section 2.6 step 2) or back recline (see section 2.8 step 3).
3. Remove the cable clips, see section 3.3.1.

The control lever and cable are assembled in the inner half of the control, see Figure 23 (LH side shown).

4. Loosen the screw (1 in Figure 2) a few turns. Push the screw down gently. This loosens the arm (3) from the lever. Fully remove the screw.
5. Take the arm out of the lever. The wire can then be removed from the slot in the arm.
6. Screw out the end sleeve (5) of the cable. The nipple can then be pulled out through the hole.
7. Assemble the new cable in the same manner. Feed the wire in through the hole and fir the nipple into the slot of the arm.
8. Check that the wire follows around the ring (4). Place the arm in the pocket of the lever. Screw in the screw (1). **NOTE**: Do not over-tighten.
9. Screw in the end sleeve (5) fully.
10. Move the control lever and check that everything is functioning as it should.
11. Assemble the other end of the cable as applicable in the gas spring for seat tilt (section 2.6 step 2 in reverse order) or the gas spring for back recline (section 2.8 step 3 in reverse order).
12. Assemble the cable clips.

    NOTE: Be careful that the cable routing and clipping are done correctly, see section 3.3.1.

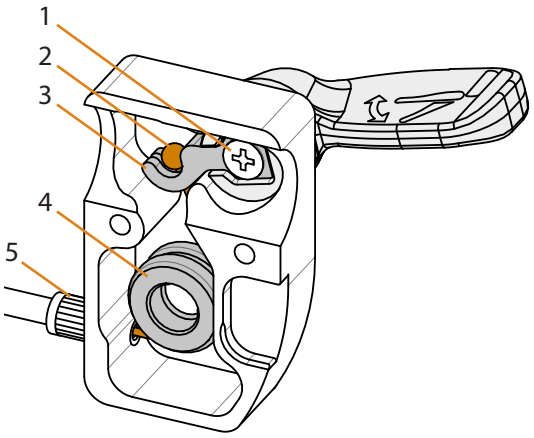


Figure 23. Control lever and cable

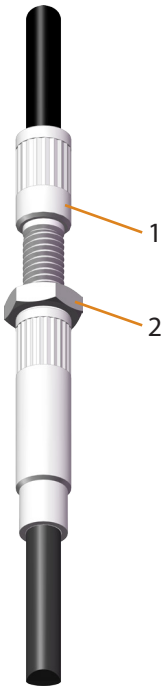
3.3.4 Adjustment of cable

Adjustment of brake cables is done per sections 3.1.1 and 3.2.1.

Adjust cables for seat tilt and back recline as follows:

1. First identify where the adjustment screw is under the back frame. See Figure 19. **NOTE**: The adjustment screw for the seat tilt lever on the *right* side of the push bar is found on the *left* side of the wheelchair, and vice versa for the back recline lever.
2. Loosen the nut (2 in Figure 24) on the adjustment screw and screw the sleeve (1) in or out to the correct adjustment.
3. Tighten the nut.

NOTE: There should always be some play in the lever so that the gas spring is never released unintentionally. The gas spring should release when the lever is fully depressed.



Figur 24.
Justerskruv

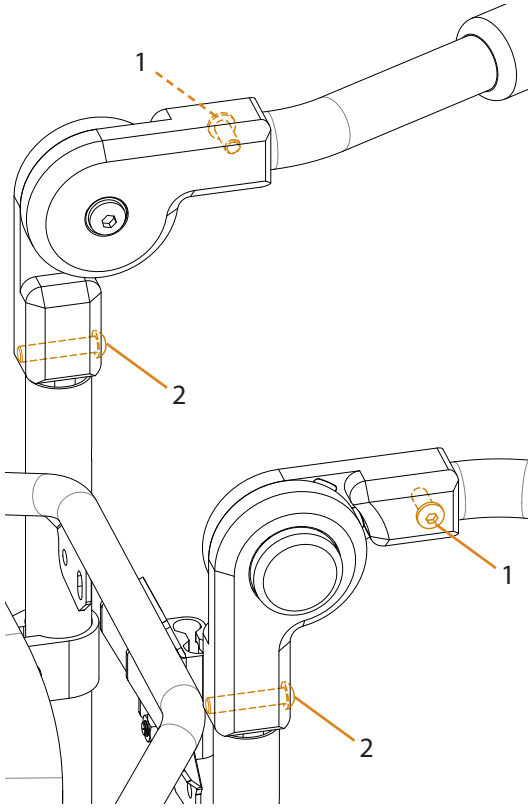
3.4 Push bar

3.4.1 Replacement of push bar

1. Remove the screws (Figure 20) to release the cable controls on both sides of the push bar.
2. Remove the screws from the angle joint (1 in Figure 25) on both sides, pull the push bar out.
3. Assemble the new push bar and put the controls back in place in the same manner.
4. Check that all cables are routed and clipped in place correctly, see section 3.3.1.
5. Test the braking function and adjust cables as necessary per section 3.1.1. Also check seat tilt and back recline function and angle adjustment of the push bar.

3.4.2 Replacement of angle joint

1. Remove the screws from the angle joint (1 in Figure 25) on both sides.
2. Carefully pull the push bar out, watch that no cables are damaged.
3. Remove the screws from the back frame (2) and pull out the angle joints on each side.
4. Assemble the new angle joints and re-assemble the push bar following steps 1-3 in reverse order.
5. Check that all cables are routed and clipped in place correctly, see section 3.3.1.
6. Test the braking function and adjust cables as necessary per section 3.1.1. Also check seat tilt and back recline function and angle adjustment of the push bar.



Figur 25. Skruvar till körbygel

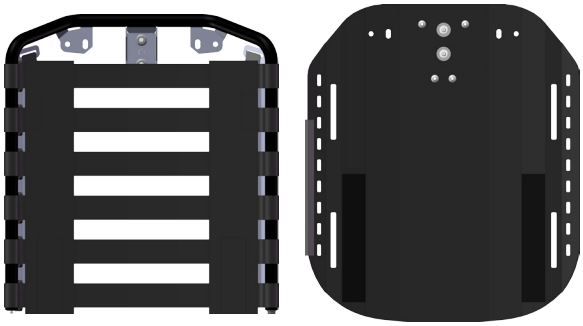
3.5 Backrest system

Two backrest systems are available for HD Motion, Flexi-back and Solid back. Both come in 3 different heights and have built-in attachment points for trunk support mounts, chest harness mounts, and belt mounts. A headrest mount is included as standard.

The backrest system, whether Flexi or Solid, is attached to the back frame by 4 brackets, see Figure 27. The lower brackets are normally placed at the same point regardless of backrest height (a = 75 mm). The upper clamps are positioned to suit the backrest height.

The backrest is mounted with carriage bolts from the inside, through slots in the frame. The slots give a height adjustment range of 60 mm. A plastic washer is used between the back frame and the backrest brackets. See page 0.1 in the Spare Parts list for details.

When assembling a Flexi-back, start by releasing all of the straps. Tightened straps can affect the width of the Flexi-back such that it does not match exactly with the back frame and thus assembly is made more difficult.



Figur 26. Flexirygg och Planrygg

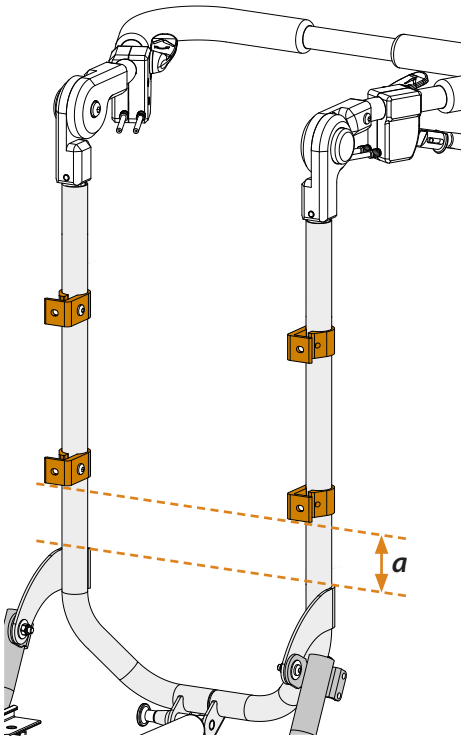


Figure 27. Backrest brackets

3.5.1 Back spacers

When a shorter seat depth is needed HD Motion can be equipped with back spacers, see Figure 28. Back spacers 20 mm in length can be used without further modification to the wheelchair. Longer back spacers require modified armrests such that the armrest pad can be moved further forward. Modified armrest can be ordered from HD Rehab. When backrest spacers are used it is possible to move the backrest brackets down (Figure 21). How much they can be moved depends on the length of the spacers.

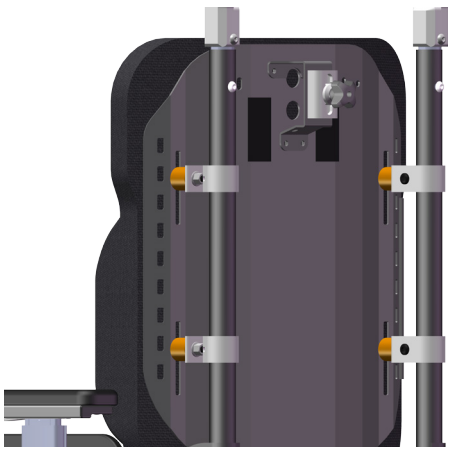


Figure 28. Back spacers

3.6 Armrests

Armrests are available in 3 versions: Armrest Standard, Armrest Low, and Armrest Angle Adjustable. Table 3 list the height adjustment range for each model. The armrest pad for angle adjustable armrests can be set to 4 positions: -12°, 0°, +12°, and +24°.

Table 3 - Armrest height (Figure 29) [cm]

Model	***b*** min	***b*** max
Standard	22	30
Low	18	23
Angle Adjustable	24	30

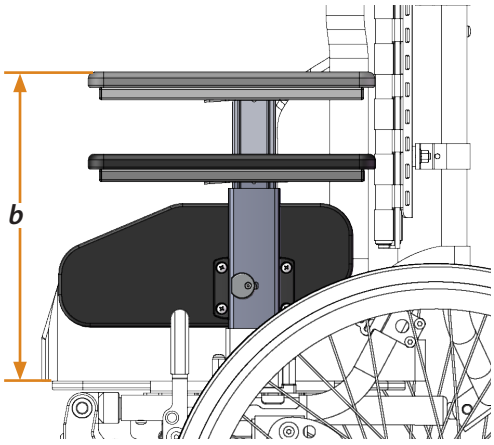


Figure 29. Armrest height

3.6.1 Height adjustment mechanism

The mechanism that controls the height setting of the armrest consists of a spring-loaded pin that locks in a number of slots (1 in Figure 30) in the inner profile. When the button (2) is pushed to the side the pin is released and the inner profile can slide up and down. When the button is released the pin snaps into a locked position. The button is attached by a screw, with the screw head hidden under the button label. The button can be replaced if damaged.

NOTE: If the button is replaced a new label must be applied. For repair of internal components detailed information is required.

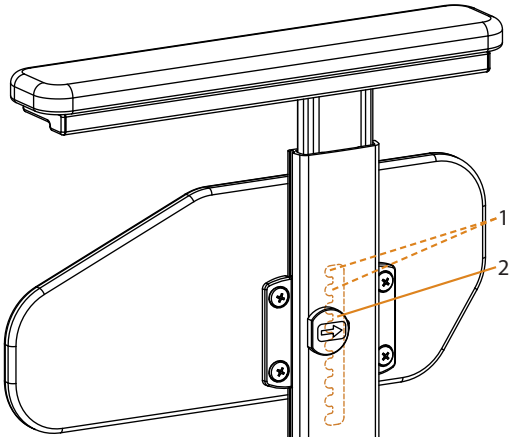


Figure 30. Armrest height adjustment

3.6.2 Depth adjustment mechanism

The mecahanism that controls the depth of the armrest pad consists of a spring-loaded latch (5 in Figure 31) that locks in a number of holes (6) in the armrest profile. The armrest profile is identical for all armrest models but the latch mechanism is different for standard versus angle adjustable models.

For detailed information refer to the Spare Parts list, page E2.1 for standard armrests and page E2.3 for angle adjustable armrests.

3.6.3 Replacement of armrest pad

The armrest pad is removed by unscrewing the screws (2 in Figure 31). It is important that the new armrest pad is assembled correctly, it is not symmetric. Note that the end caps (1) are fastened with the same screws that hold the pad in place, check that the caps remain in place when re-assembling.

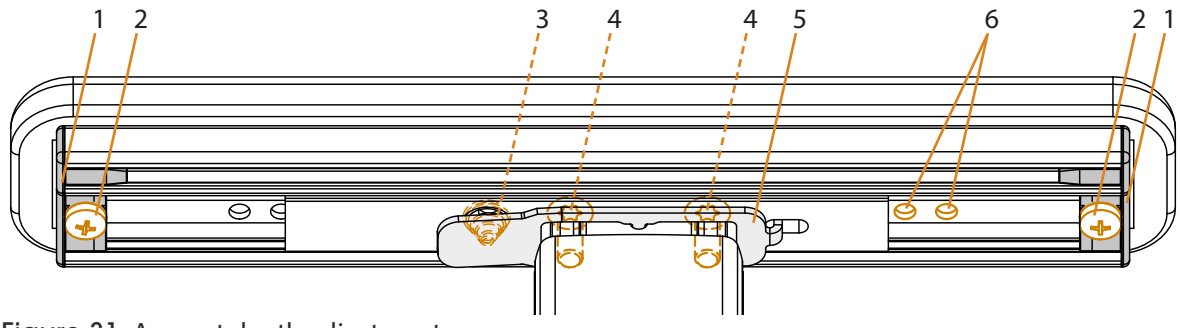


Figure 31. Armrest depth adjustment

3.6.4 Replacement of side support

The side support is replaced by unscrewing the screws (2 in Figure 32) that hold the mounting tabs (1). The entire support can be replaced or just the cover. If the cover alone is changed holes for the screws must be made in the material. Ensure that the cover is properly fitted before making holes.

Be sure that the mounting tabs are properly seated in the grooves of the armrest post when re-assembling.

Be sure that the side support is at the correct height before tightening the screws. If it is mounted too high it may interfere with the depth adjustment latch. If it is mounted too low the side support may collide with the armrest mount. The armrest post must always bottom out in the armrest mount.

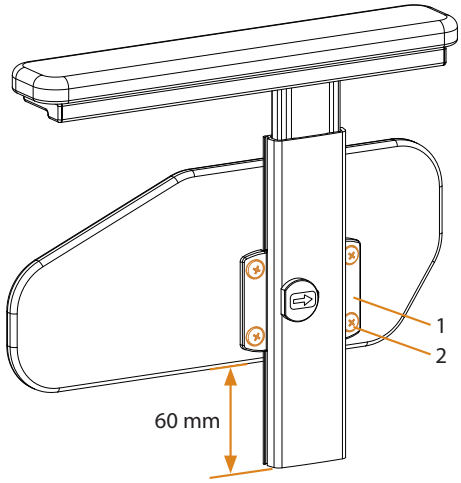


Figure 32. Side support

3.7 Armrest mount

The seat width is determined by the position of the armrest mounts, see Figure 33.

Table 4 - Seat width in each position [cm]

Model	Inner position	Middle position	Outer position
HD Motion sw 30	28	30	32
HD Motion sw 34	32	34	36

Setting the seat width:

1. Unscrew the two screws that secure the armrest mount (Figure 33).
2. Move the armrest mount to the desired position.

NOTE: The mount is not symmetric inside, the flat side faces inward.

3. Set the washers in place and tighten the screws.
4. Repeat the same steps with the other armrest mount.

NOTE: **Right-hand and left-hand armrest must always be in the same position**.

NOTE: If the wheelchair is equipped with belt mounts different screws are used, together with spacers. See Assembly instructions 96802-1 for more information.

Seat width can in some cases be adjusted with the user sitting in the wheelchair, but extra attention is required.

Two plastic glide plates are found inside the armrest mount. They can be replaced if damaged or worn, snapping in place in 2 holes each. Care is required not to damage them when assembling.

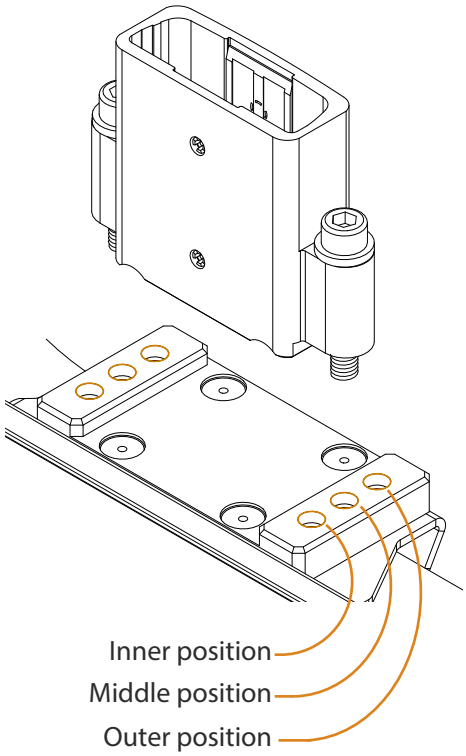


Figure 33. Left-hand armrest mount

3.8 Leg rests

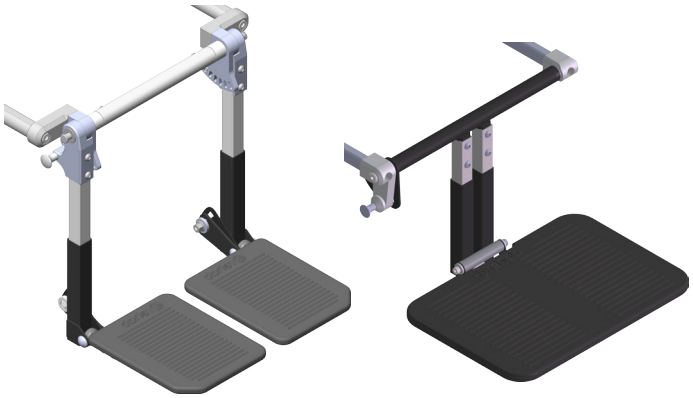
HD Motion can be equipped with two types of leg rest, see Figure 34.

A. Centre leg rest

B. Separate leg rests

The leg rests consist of these components:

- Leg rest mount
- Leg rest tubes
- Footrest
- Calf support (optional)



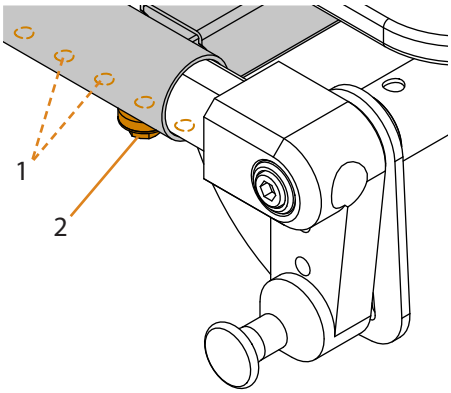
Figur 34. Benstöd Delat och Benstöd Center

3.8.1 Leg rest mount

Both types of leg rest have a leg rest mount that docks in the seat frame and is secured with screws (2 in Figure 35). The depth position of the leg rests can be adjusted with the different holes in the telescoping rods (1 in Figure 35).

NOTE: Always use the original screw (2) as it has a special washer attached to protect the seat frame from damage.

Note: The leg rest mounts differ between sw30 and sw34.

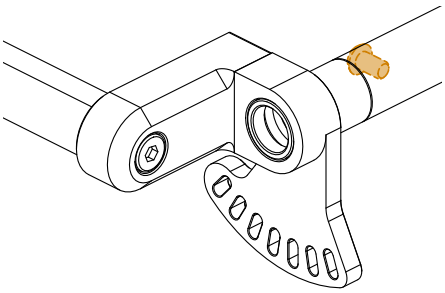


Figur 35. Benstödsinfästning

A. The centre leg rest mount is somewhat flexible in width which makes it easier to fit the telescoping rods into the seat frame when assembling.

The mount can be angled to different positions and locks in place with a spring-loaded pin.

See Spare Parts list page D1.5 for detailed information.



Figur 36. Benstödsfäste delat breddjusteringsskruv

B. The separate leg rests mount is not flexible. To make initial assembly to the seat frame easier follow these steps:

1. Loosen the screws (Figure 36) a few turns. The width between the rods can then be adjusted slightly.
2. Insert the leg rest mount to the desired depth.
3. Secure with screws (2 in Figure 35)
4. Tighten the screws from step 1 (Figure 36).

The width adjustment is only needed the first time the leg rest mount is assembled to the seat frame.

The separate leg rest mount is fixed, angle adjustment of the leg rests is done with the leg rest tubes.

See Spare Parts list page D1.5 for detailed information.

3.8.2 Leg rest tubes

A. Centre leg rest tubes

The leg rest tubes are attached to the centre stay with 2 screws each (Figure 37). Tubes come in 3 lengths and include a snap-lock for attaching a footrest. Note: Tubes are the same for sw30 and sw34.

Replacing leg rest tubes:

1. First remove the footrest and any calf supports.
2. Remove the screws (Figure 37) and remove off the tube.
3. Assemble the new tube and fasten the screws but do not tighten at this point.
4. Mount the footrest and check that the foot rest tubes telescope smoothly on the leg rest tubes.
5. Tighten the screws.

See Spare Parts list page D1.5 for detailed information. For measurements and settings refer to Info Sheet 96901-1.

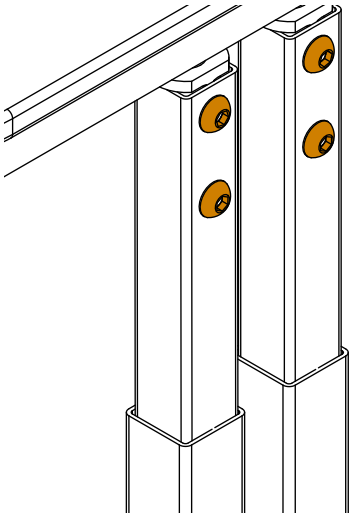


Figure 37. Center leg rest - Screws for leg rest tubes

B. Separate leg rest tubes

Each leg rest tube consists of a joint block and a tube. The leg rest tube has a button for quick release from the leg rest mount. It can be angled to different positions and locks in place with a spring-loaded pin. The complete leg rest tube with joint block can be replaced, or the tube can be replaced separately.

Note: with separate leg rests it is possible to have different leg rest tube lengths on each side.

Replacement of leg rest tube:

1. First remove the footrest and any calf support.
2. Remove the screws (Figure 38) and take the tube out of the joint block.
3. Place the new tube in the joint block and screw in place.

See Spare Parts list page D1.3 for detailed information. For measurements and settings refer to Info Sheet 96902-1.

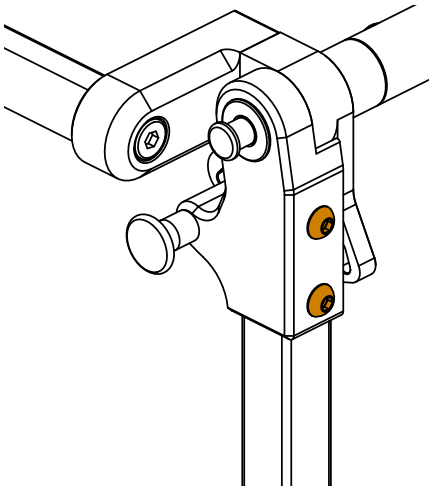


Figure 38. Separate leg rests - Screws for leg rest tubes

3.8.3 Footrests

A. One-piece footrest (Centre leg rest)

The footrest consists of a foot plate mount, an aluminium foot plate, and polyurethane (PUR) cover. The foot plate is riveted to the foot plate mount.

The rubber cover is easily replaced. The foot plate has holes and slots for foot straps. Slots can be cut in the cover with a knife, or the cover can be ordered with slots pre-cut from HD Rehab.

The footrest plate can be folded up. The friction when folding up can be adjusted by tightening the nut on the mount (Figure 39).

Note: The footrest differs between sw30 and sw34.

See Spare Parts list page D3.2 for detailed information. For measurements and settings refer to Info Sheet 96901-1.

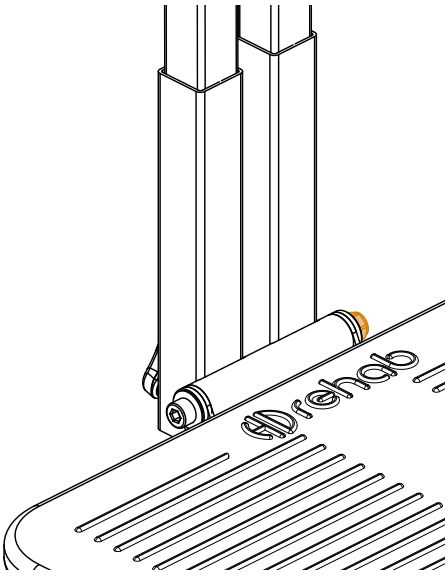


Figure 39. Nut for folding of foot plate

B. Separate footrests (Separate leg rests)

The footrest consists of a footrest mount, an aluminium foot plate, and a PUR cover (right hand and left hand models).

The foot plate is riveted to the footrest mount. The cover is easily replaced.

The foot plate has slots cut in it for foot straps. Matching slots can be cut in the covers with a knife, or the covers can be ordered from HD Rehab with holes already cut.

The foot plate can be folded up. The desired friction for folding is adjusted by tightening the nut (Figure 40) in the footrest mount.

Note: Footrests are different models for sw30 and sw34.

See Spare Parts list page D3.1 for detailed information. For measurements and settings refer to Info Sheet 96902-1.

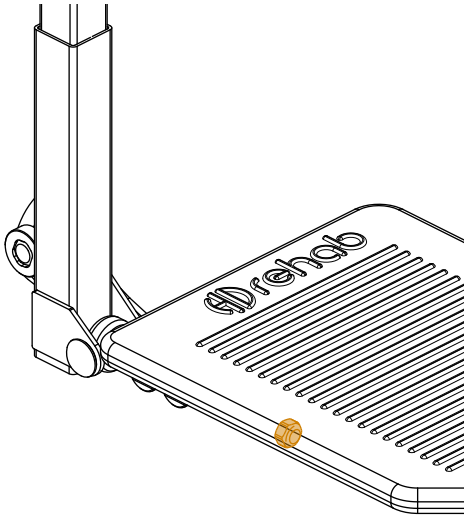


Figure 40. Nut for folding up of foot plate

3.8.4 Foot box

Foot box can be used with Centre leg rest. The foot box consists of a modified one-piece footrest with sides and a one-piece calf support. These are screwed in place on the underside of the foot plate.

The foot plate cover is easily replaced, and can have slots cut in the same manner as the one-piece footrest.

The foot plate cannot be folded up but can be adjusted slightly in angle.

The covers of the sides and calf support can be replaced.

Note: Foot boxes are different models for sw30 and sw34.

See Spare Parts list page D3.3 for detailed information. For measurements and settings refer to Info Sheet 96901-1.

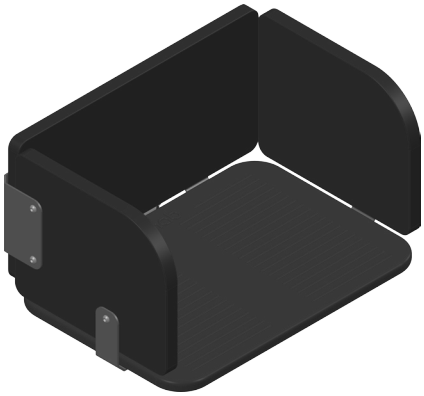


Figure 41. Foot box

3.8.5 Calf support

Calf supports can be used with both Centre leg rest and Separate leg rests. They are available in 2 sizes, with the larger version primarily for sw34 models and the smaller primarily for sw30 models. It is possible to use both versions with both sw30 and sw34.

The calf support covers can be replaced.

See Spare Parts list page D2.1 for detailed information. For measurements and settings refer to Info Sheets 96901-1 and 96902-1.

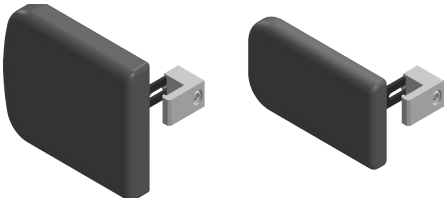
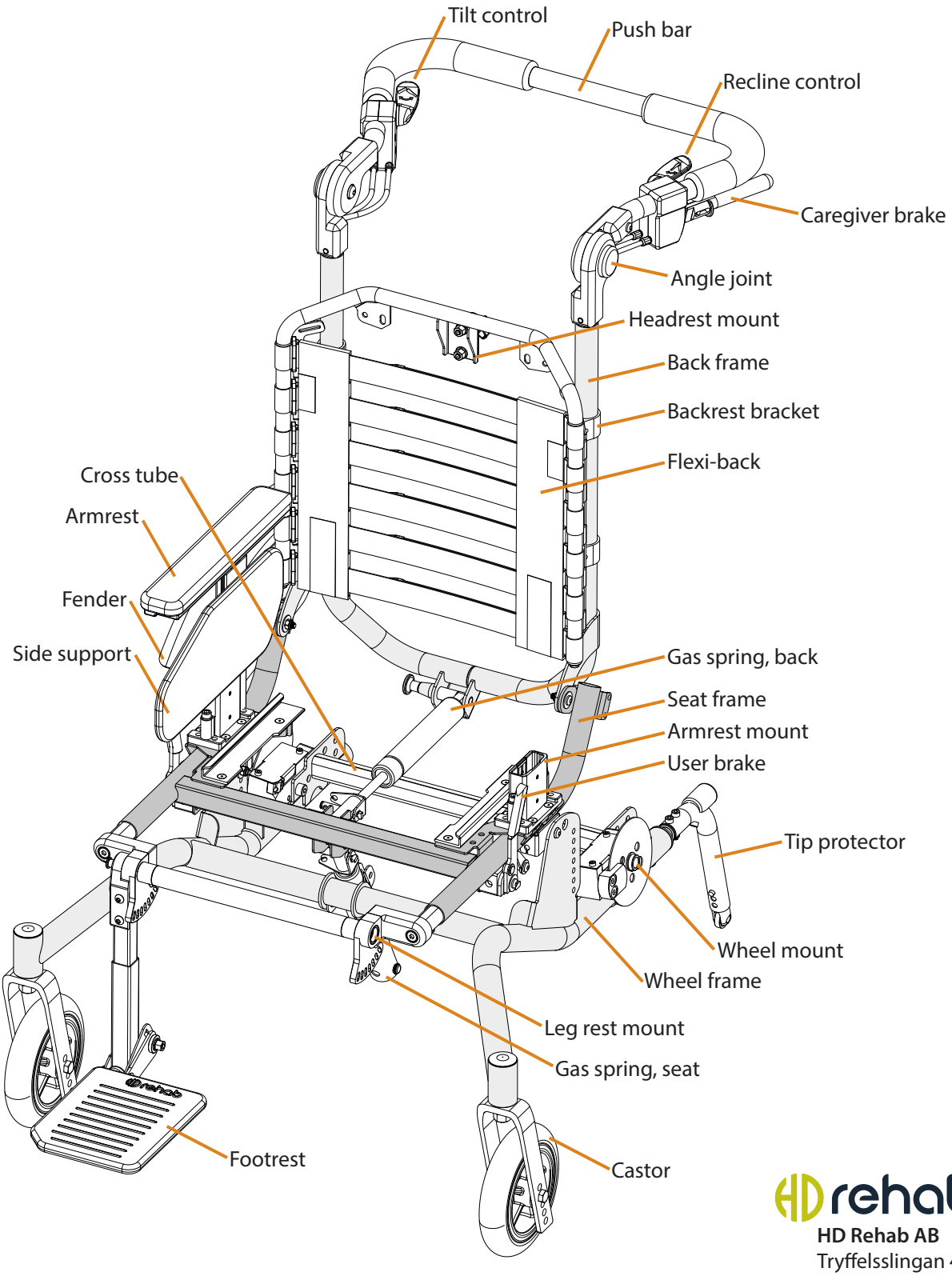


Figure 42. Calf support, large and small



HD Rehab AB
Tryffelsslingan 4
181 57 Lidingö
SWEDEN

+46 - 8 - 767 04 80

info@hdrehab.se

www.hdrehab.com

Technical Information
HD Motion
Doc nr 96720-1 Rev A
2021-07-09