

en

## ***Electric wheelchair***

*Model 1.610 / 1.611 / 1.612 / 1.614 / 1.615  
1.616 / 1.617*

---

## ***Maintenance and Service manual***

---



CE

**MEYRA**<sup>®</sup>  
We move people.

# Contents

<b>General</b>	7
Foreword	7
Requirements concerning workshop personnel	7
Customer support	7
Information to maintenance and service work:	8
Working on the vehicle	8
<b>Vehicle identification</b>	9
<b>Term definitions</b>	9
Service position	9
Setting the service position	10
Model 1.617	10
<b>Overview</b>	11
Model 1.610	11
Model 1.611 / 1.614	11
Model 1.612	11
Model 1.615	12
Model 1.616	12
Model 1.617	12
<b>Safety information</b>	13
Storage	13
<b>Required tools and aids</b>	13
<b>Adaptation and adjustment jobs</b>	14
<b>Leg support</b>	14
Mechanical leg support	14
Adjusting the height of the footplate	14
Angle adjustment of the footplate	14
Adjusting the angle of the footboard	15
Depth adjustment of the footboard	15
Depth adjustment of the leg supports	16
Electric leg support	16
Adjusting the depth of the calf pads	16
Adjusting the height of the calf pads	16
Leg support receptacle	17
Adjusting the leg support receptacle to the thigh length	17
Adjusting the height of the leg support receptacle	17
Central leg support	18
Adjusting the height of the footplate	18
Angle adjustment of the central leg support	18
Angle adjustment of the footboard	18

Model 1.617	19
Adjusting the height of the footboard	19
Angle adjustment of the central leg support	19
Angle adjustment of the footboard	19
<b>Arm supports</b>	20
Adjusting the height of the arm supports	20
Depth adjustment of the arm support pad	21
Adjusting the clothes guard	21
Depth adjustment of the arm support	21
Cable fitting	21
<b>Lighted clothes guard plates</b>	22
Refitting the lighted clothes guard plates	22
<b>Back support</b>	23
Mounting the push bar	23
Mounting the stabiliser rod	23
Adjusting the seat depth	23
Secure positions of the back support	24
Back support upholstery	25
Limit switch	25
Replacing the limit switch	25
Cable fitting	25
Replacing the push bar	25
<b>Head support</b>	26
Height adjustment and removal of the head support	26
Adjusting the position of the head support	26
Mounting the head support	26
<b>Seat width</b>	27
Adjusting the seat width over the arm supports	27
Adjusting the seat width through the seat frame	28
<b>Seat depth</b>	30
Adjusting the seat depth through the position of the back support	30
Position of the back support	30
Model 1.610 / 1.611 / 1.612 / 1.615	30
Model 1.614	31
Model 1.616	31
<b>Seat surface</b>	32
Model 1.610 / 1.611 / 1.615	32
Position of the cross brace bracket for the seat plate and seat systems	32
Position of the cross brace bracket for the seat strap	32

<b>Wheels</b>	33
Wheel change	33
Disassembly of the wheels	33
Assembly of the wheels	33
Adjusting the castor stem	33
Changing the tyres	34
Disassembly of the tyres	34
Assembly of the tyres	34
Steering wheels	35
<b>Support castors</b>	35
Replacing new support castors	35
<b>Fuses</b>	36
Main fuse	36
Model 1.617	36
Electronic security	36
Power module	36
Lighting module VR2	36
Lighting- / adjustment module R-Net	37
Particularities of the electric adjustment seatlift	37
<b>Lighting</b>	38
Headlight / front turn signal	38
Adjusting the headlights	39
Replacing the lighting fixture	39
Replacing the headlight / front turn signal	39
Replacing the back light	41
<b>Batteries</b>	43
Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616	43
Removing the battery case	43
Inserting the battery case	43
Model 1.612	44
Removing the battery case	44
Inserting the battery case	44
Model 1.617	45
Removing the batteries	45
Positioning the batteries	45
<b>Battery charger</b>	46
<b>Drive</b>	47
Removing the drive	47
Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616	48
Model 1.612	49
Model 1.617	50
Mounting the drive	50

Carbon brushes	51
Removing the carbon brushes	51
Mounting the carbon brushes	51
<b>Vehicle suspension</b>	52
Suspension of the chassis	52
Adjusting the seat suspension	52
Replacing the spring	53
Model 1.610 / 1.611 / 1.615 / 1.614	53
Model 1.612	53
Model 1.617	53
<b>USB connector socket</b>	54
<b>Electronic modules</b>	55
Power modules	55
Programming the driving behaviour	55
Standard setting of the VR2 driving parameters	56
Standard setting of the R-Net driving parameters, profile 1, 2, 8 w/o stability sensor (ESP)	57
Standard setting of the R-Net driving parameters, profile 1, 2, 3, 8 with stability sensor (ESP)	64
Power module, replacing the lighting, resp. lighting/adjustment module	67
Power module 1.610 / 1.611 / 1.614 / 1.615 / 1.616	67
Power module 1.612	67
Power module 1.617	67
Lighting- / adjustment module R-Net	68
Plug allocation of the lighting/adjustment module R-Net	69
Lighting module VR2	69
Electronic driving stability sensor (ESP)	69
Replacing the driving stability sensor	69
Electronic driving stability sensor (ESP)	70
Replacing the driving stability sensor	70
<b>Electrical adjustments</b>	71
Adjusting the angle of the back support	71
Replacing the adjustment for angle adjustment	71
Seat inclination (camber), model 1.610 / 1.611 / 1.614 / 1.615 / 1.616	72
Replacing the adjustment motor for seat inclination	72
Adjusting the front seat height, model 1.610 / 1.611 / 1.615	73
Adjusting the front seat height, model 1.614	74
Adjusting the front seat height, model 1.616	75
Seat inclination (camber), model 1.612	76
Replacing the adjustment motor for seat inclination	76
Seat inclination (camber), model 1.617	77
Replacing the adjustment motor for seat inclination	77

Seat height, model 1.617	78
Replacing the adjustment motor for seat height	78
Lifting rod, model 1.612	79
Removing the lifting rod	79
Mounting the lifting rod	80
Seat height, model 1.612	81
Adjustment of the seat height	81
Lifting rod with electric inclination	81
Lifting rod without electric inclination	84
Adjustment of seat inclination	84
<b>Mechanical seat inclination adjustments</b>	85
Seat inclination (camber), model 1.610 / 1.611 / 1.614 / 1.615 / 1.616	85
Replacing the telescopic tube of the seat inclination	85
Adjusting the front seat height, model 1.610 / 1.611 / 1.615	86
Adjusting the front seat height, model 1.614	87
Adjusting the front seat height, model 1.616	88
<b>Error indication</b>	89
Error indication R-Net	89
LCD-Display	89
R-Net LED and VR2	90
Error diagnostics	90
Information illustration through the battery gauge	92
Information illustration through the display of the speed preselection	93
<b>Functional checks</b>	94
Checking the cable layout	94
Inspection during standstill	94
Test drive	94
Braking distance	94
<b>Maintenance</b>	95
Reinstallment	95
Maintenance checklist of the annual maintenance jobs	96
DIN norms and guidelines	98
Torque according to DIN for screwed connections	98
<b>Circuit diagram</b>	99
Electronic type VR2	99
Electronic type R-Net	100
<b>Notes</b>	101

# GENERAL

## Foreword

This maintenance and service manual is intended for the specialist dealer and describes all adaptations and adjustments as well as the required service, maintenance, repair and replacement jobs.

📖 This maintenance and service manual is supplemented by the following documents:

the model dependent operating manual  
(an operating manual is supplied with each vehicle),

the model dependent operating manual < *Operating module* > ,

(an operating manual is supplied with each vehicle),

the safety and general handling instructions < *Electronic vehicles* > ,

the model dependent spare parts list,  
(the required spare parts list can be obtained through the specialist dealer access on our website).

All required documents as well as additional information to our products are located on our website under:

< [www.meyra.com](http://www.meyra.com) >.

## Requirements concerning workshop personnel

Special knowledge is required to carry out the maintenance and service work described in this maintenance and service manual and may therefore only be carried out by educated qualified personnel.

📖 We therefore offer vehicle specific courses that provide the specialised personnel with the required qualification.

### Attention:

! During all corresponding work there is always a danger of jamming or skin abrasions!

● Knowledge of this maintenance and service manual as well as the supplementing documents (view chapter foreword) is mandatory for the correct and safe execution of the work required on the wheelchair.

📖 The document, especially the chapter *Safety information* on page 13, must therefore be read carefully and observed by all persons, that are assigned to work on the wheelchair.

## Customer support

Technical questions will gladly be answered by your national Meyra distribution partner.

## Information to maintenance and service work:

- ☞ Every wheelchair should undergo inspection once a year.

The inspection increases the safety and extends the life span of the wheelchair.

- ☞ For highly strained wheelchairs for example in case of:

extreme strain,

user still growing,

users with changing disease patterns,

it is recommended to have the wheelchair checked, maintained and if required adjusted semi-annually.

Only original spare parts are to be used for all maintenance and service.

- ☞ Before beginning with the service work check the general condition of the wheelchair.

- ☞ All screwed connections, if not otherwise noted, tightened according to table *Torque according to DIN for screwed connections* on page 98.

- ☞ The maintenance schedule (Checklist) should serve as a master for copying. Maintenance schedules that have been filled out are to be kept on file and a copy handed to the customer!

## Working on the vehicle

- ☞ For maintenance and repairs the vehicle is to be switched off and secured against unintentionally rolling away.

- ☞ Additionally the main-/battery fuse is to be removed.

- ☞ Before working on electric parts, the plugged connection from the battery cable to the power module might also need to be disconnected.

- ☞ Before working on electric adjustment the corresponding plug of the connection cable is to be pulled.











## VEHICLE IDENTIFICATION

For a definite vehicle identification in case you have questions, or for spare parts orders, the following data can be read off of the type plate:

☞ view sample-type plate [1]

1. The model description (in the field Type resp. Typ)
2. The serial number (beside the field SN)

 <b>MEYRA</b> GmbH		Meyra-Ring 2 D-32689 Kalletal		
REF	<b>K 9232200005308</b>	Type	<b>2.322</b>	2013-52
SN	<b>5857098</b>	210	140	max. 15 km/h
 100 kg	 350 kg	 kg		 18 %  18 %
 (01) 04032766230977 (10) 0015857098				

## TERM DEFINITIONS

Here you will find explanations to the term used in this manual:

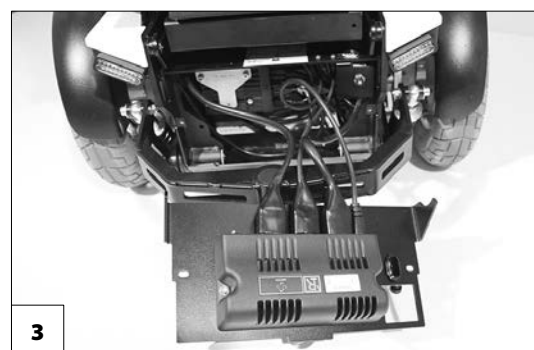
### Service position

The service position [2] describes a vehicle with corresponding seat position in order to enable e. g. unencumbered maintenance jobs.

☞ Access to electronic modules might require prior pulling out of the battery box as well as removing the rear revetment or battery cover [3] and removing the leg supports.

### Attention

- ! Only grab from the front underneath the seat plate to lower the seat unit.  
 • Danger of jamming when lowering the seat unit into the normal driving position.



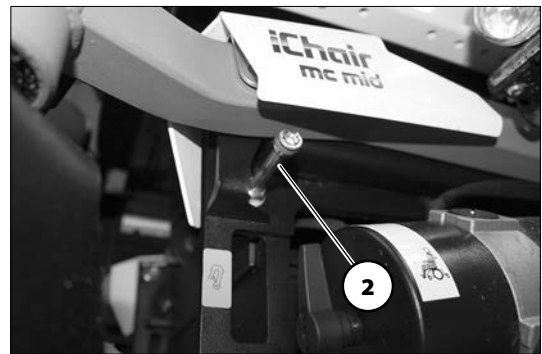
## Setting the service position

### Model 1.617

In order to be able to adjust the service position [1] unscrew the seat locking device (2) on both sides.

#### Attention!

- ! Unintentional lowering of the seat unit!
- Jamming the fingers, hands and arms are possible. Remove the leg supports before adjusting the service position.
- If the wheelchair is standing on a slope the seat unit is to be additionally secured against unintentional lowering!



# **OVERVIEW**

**Model 1.610**



**Model 1.611 / 1.614**



**Model 1.612**



**Model 1.615**



**Model 1.616**



**Model 1.617**



## **SAFETY INFORMATION**

- ☞ Wear suitable clothing during service-jobs as well as gloves and protective glasses when required.

Danger of injuries caused by inappropriate work clothes.

- ☞ Secure the product against unintentional rolling motions, tilting over or falling down e. g. from a mounting rack.

Damages due to a not secured wheelchair.

- ☞ Clean/disinfect the product before inspection.
- ☞ If necessary, observe the care instructions and product specific inspection instructions included in the corresponding operating manual as well as the safety and general handling instructions < *Electronic vehicles* >.

Damages due to neglected cleaning.

- ☞ Keep your workspace clean and only use clean cloths.

Damages caused by shavings and dirt particles.

- ☞ Use only suitable tools.
- ☞ View chapter *Required tools and aids* on page 13.

Damages caused by the use of incorrect tools.

- ☞ Replace loose screwed connections with thread safety with the respective nut or screw and new thread safety.
- ☞ If new screws or nuts with thread safety not be available, apply liquid thread safety compound with medium hardness e. g. Loctite® 241 or Euro Lock A24.20.

Damages caused by loose screwed connections.

## **Storage**

Dismantled parts are to be placed resp. stored safely and protected as well as sorted by commission.

## **REQUIRED TOOLS AND AIDS**

For adjustments and maintenance we recommend the use of high quality tools.

- ☞ High quality tools can prevent for example damages to the surface of the frame as well as minor injuries to the hand.

The tools required most frequently are:

Socket wrench

Open-end or ring spanner

Hexagon socket spanner

Phillips screwdriver

Slot screw driver

## **ADAPTATION AND ADJUSTMENT JOBS**

The following chapters describe the fitting of the wheelchair to the changing individual demands of the user.

### **LEG SUPPORT**

#### **Mechanical leg support**

##### **Adjusting the height of the footplate**

Remove the clamping screw (1) to adjust the height.

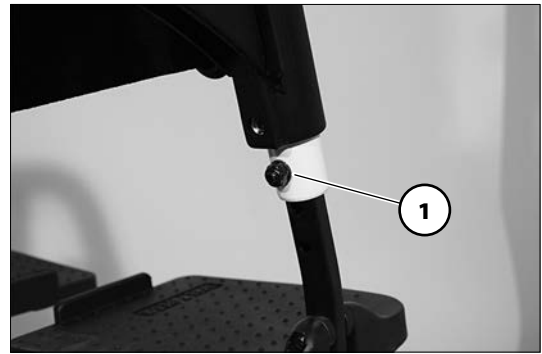
Telescope the footplate to the desired height and then secure it with the clamping screw (1).

##### **Angle adjustment of the footplate**

For this loosen the screw (2) so far that it no longer catches. Disconnect the tothing of the footplate and adjust the angle of the footplate.

Retighten the screw (2) of the footplate.

- 👁 In doing so the teeth of the angle adjustment must join again.



### Adjusting the angle of the footboard

Swivel the footboard down in order to adjust the angle of the footboard [1]. Afterwards loosen the screws (2) on both sides.

Tilt the footplate to the desired angle and retighten the screws (2) on both sides.

### Depth adjustment of the footboard

The depth adjustment of the footboard is done by repositioning the removable distancer pieces (3).

Lift the loose side of the footboard slightly.

Reposition the desired amount of distancer pieces on the lifted side.

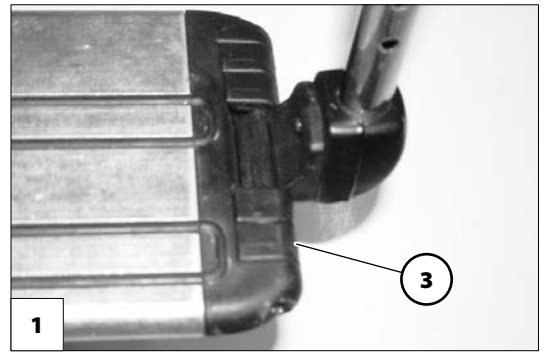
Pull/press the distancers that are to be repositioned on the right side of the footboard outward from the retaining rod [4].

#### **Note:**

In certain angle settings of the footboard it is possible that a removal or placing of certain distancer pieces is not possible. Then fold up the footboard.

Reposition the footboard and insert the distancer pieces back again as far as possible to the right retaining rod.

Swivel the footboard down and hook it into place.

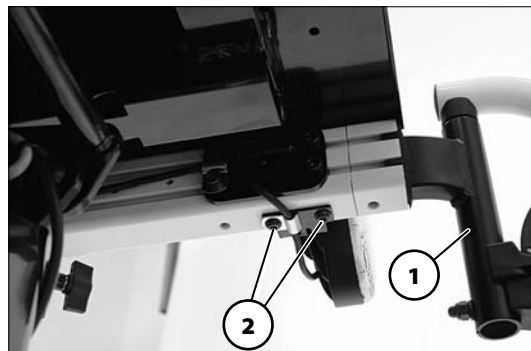


## Depth adjustment of the leg supports

Depth adjustment of the leg supports is achieved by repositioning the respective leg support receptacle (1).

For depth adjustment of the leg supports loosen the respective clamping screws (2).

- ☞ The headlight is also secured with the clamping screws.



## Electric leg support

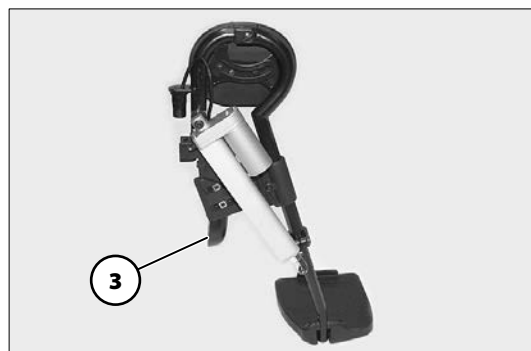
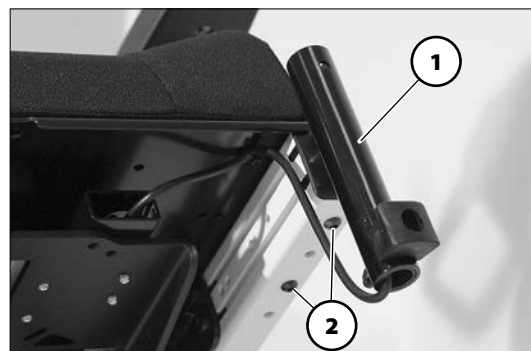
### Adjusting the depth of the calf pads

The calf pad (3) can be swivelled to the side and adjusted continuously in depth.

Loosen the screws (4) to adjust the depth of the calf pad.

### Adjusting the height of the calf pads

Loosen the clamping screw (5) to adjust the height of the calf pad.





## Leg support receptacle

For external seat systems the leg support receptacles (1) are to be adjusted to the amended seat height.

### Adjusting the leg support receptacle to the thigh length

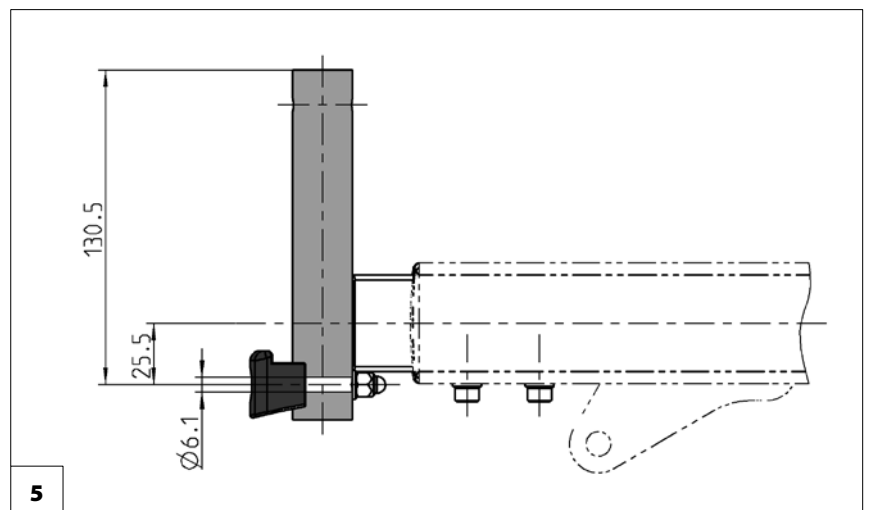
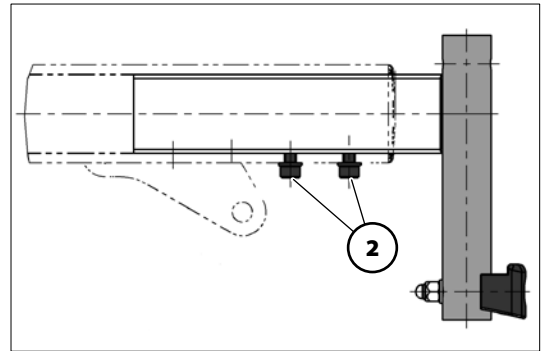
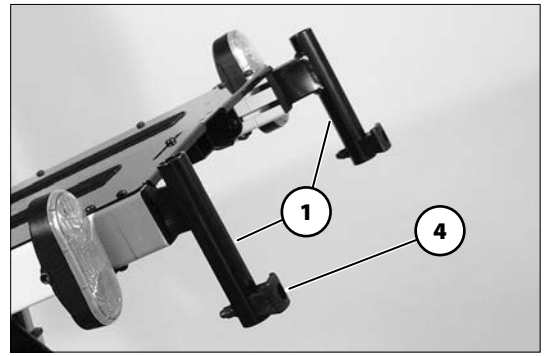
To reposition the leg support receptacle (1) into one of the other two screw positions, both screws (2) need to be removed.

☞ The distance of the screw positions is 3 cm each.

### Adjusting the height of the leg support receptacle

1. Therefore dismantle the respective leg support receptacle (1), turn vertically by 180° and reassemble on the opposite side [3].
2. Afterwards dismantle the leg support locking device (4), turn vertically by 180° and reassemble in the lowest screw position [3].

☞ If required the hole  $\varnothing 6.1$  mm is carried out acc. to drawing [5] during the assembly.  
All dimensions in [mm].



## Central leg support

### Adjusting the height of the footplate

Remove the clamping screw (1) to adjust the height.

Telescope the footplate to the desired height and then secure it with the clamping screw (1).

### Angle adjustment of the central leg support

Remove the screw (2) for angle adjustment of the central leg supports.

Swivel the leg support into a different position and remount the screws (2).

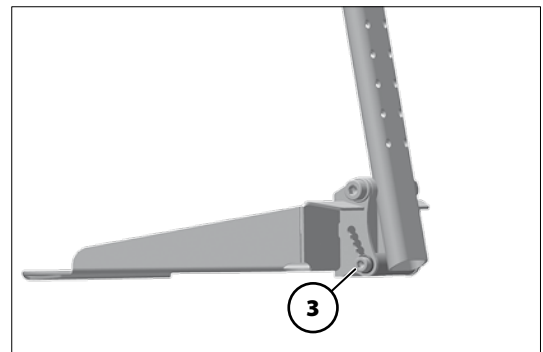
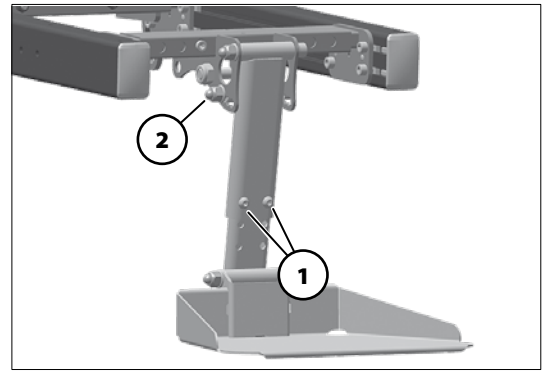
- ✎ The leg support can be adjusted stepwise into three further positions of 8.5° each.

### Angle adjustment of the footboard

Remove the screw (3) for angle adjustment of the footboard.

Swivel the footboard into a different position and remount the screws (3).

- ✎ The footboard can be adjusted stepwise into four further positions.



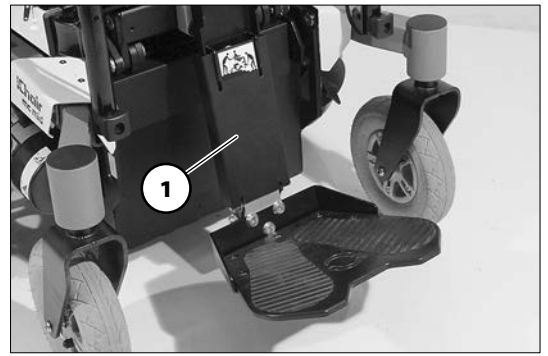
## Model 1.617

### Adjusting the height of the footboard

Remove the cover (1) (velcro fastener).

Remove the clamping screws (2) to adjust the height.

Telescope the footboard to the desired height and then secure it with the clamping screws (2).



### Angle adjustment of the central leg support

Screw the two locking screws (3) in or out, for angle adjustment of the central leg support.

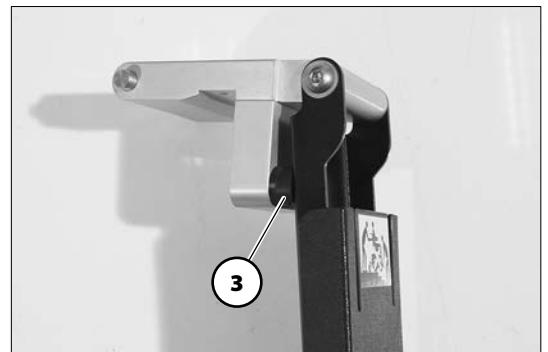
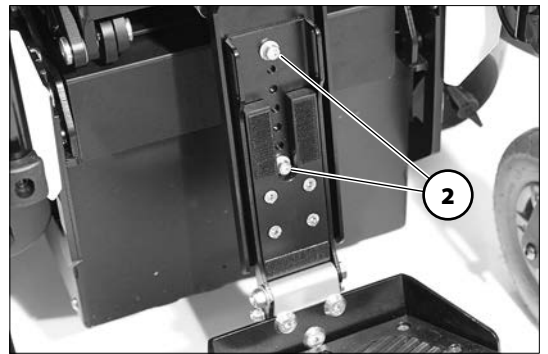
- ✎ Unscrew the locking screws (3) max. three threads outward.

### Angle adjustment of the footboard

Loosen the screw (4) for angle adjustment of the footboard.

Slide the screwed connection (4) in height, depending on the desired footboard angle and tighten it.

- ✎ The angle of the footboard is steplessly adjustable.



## ARM SUPPORTS

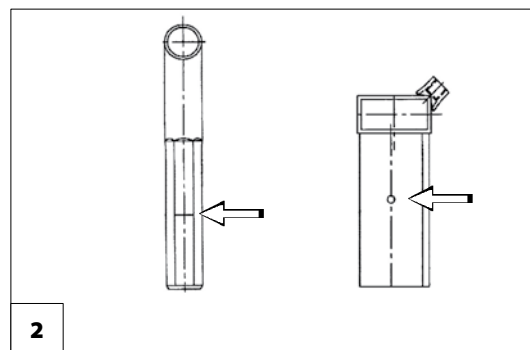
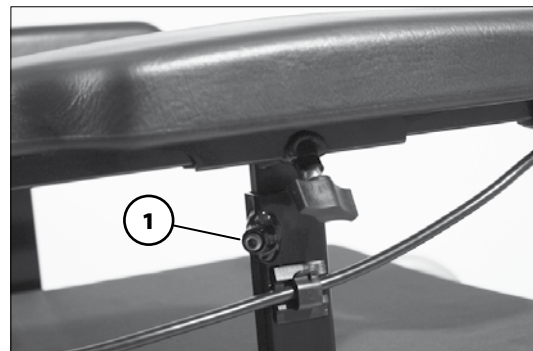
### Adjusting the height of the arm supports

To adjust the height of the arm support, loosen the clamping screw (1), hold the arm support in the desired height and retighten the clamping screw (1).

☞ Adjustment possibilities are reduced in combination with lighted clothes guard plates.

#### Attention:

- ! Before loosening the clamping screws (1) secure the arm support against falling down with your hand. – Danger of jamming with disassembled or too loosely screwed clamping screw (1)!
- During the adjustment the maximum arm support height is reached when a mark becomes visible above the receptacle tube [2].
- Ensure the tight fit of the clamping screw (1) in order to prevent the arm support from sliding down.



## Depth adjustment of the arm support pad

In order to adjust the support surface of the arm support pad, e. g. after changing the seat depth, the attachment screws (1) are to be dismantled.

## Adjusting the clothes guard

Loosen the clamping screws (2) to adjust the height of the clothes guard.

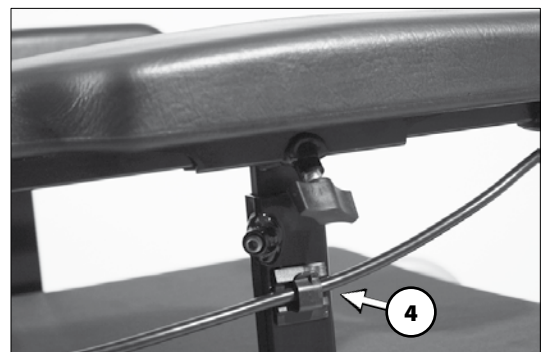
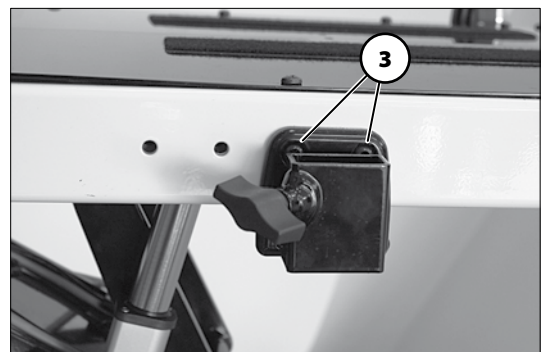
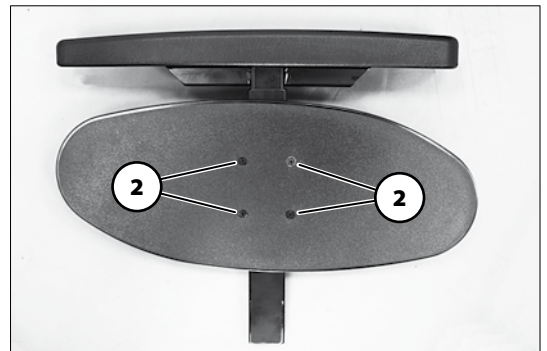
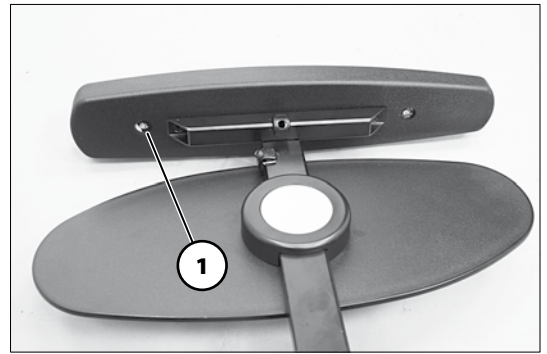
- ☞ Adjustment is no longer available in combination with lighted clothes guard plates.

## Depth adjustment of the arm support

In order to adjust the depth of the arm support, e. g. after changing the seat depth, the attachment screws (3) of the arm support bracket are to be dismantled.

## Cable fitting

- ☞ The cable of the operating module is fastened above the clothes guard with a cable clamp (4).



# LIGHTED CLOTHES GUARD PLATES

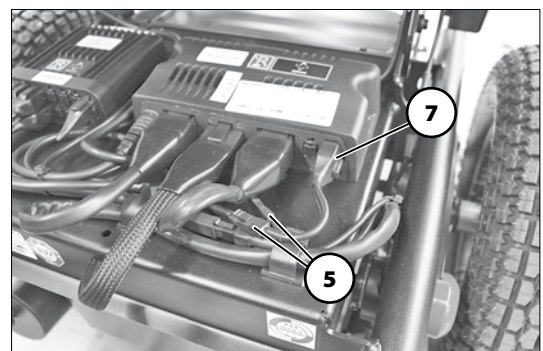
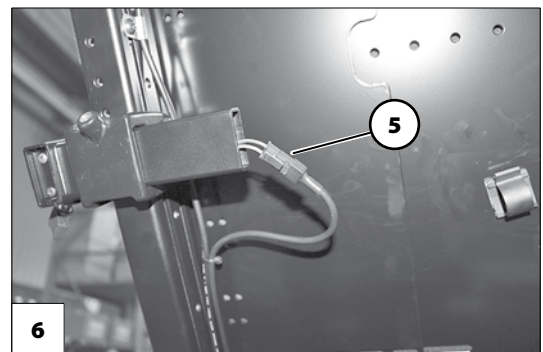
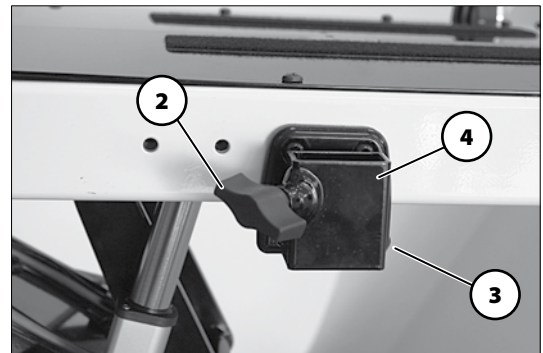
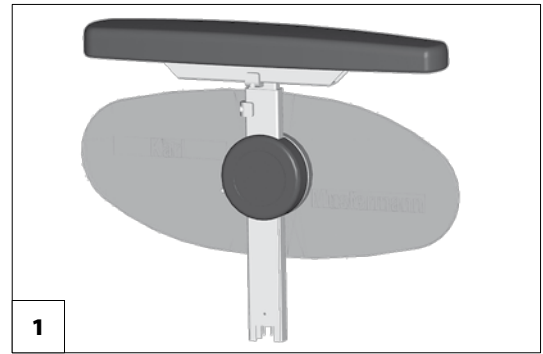
## Refitting the lighted clothes guard plates

The following is required for refitting:

- 1x set lighted clothes guard plates with arm supports
- 2x receptacle tube
- 1x Y-cable

### Assembly

1. Switch the electric wheelchair off and pull the mains fuse.
  - ⚠ For this observe chapter *Main fuse* on page 36.
2. Loosen the clamping screw (2) on both sides and remove the arm supports.
3. Loosen the screw (3) on each side.
4. Replace the receptacle tubes (4) with the new receptacle tubes on both sides.
5. Establish the electric connection (5) and guide the plugged- resp. interface connection safely through the receptacle tubes.
  - ⚠ For this observe chapter *Checking the cable layout* on page 94.
6. Insert the supply cable of the lighted clothes guard plates into a free plug of the Y-cable.
  - ⚠ In case of an existing USB-socket the blind plug is to be pulled from the Y-cable and this connection used!
7. Insert the Y-cable into the socket (7) of the power module.
8. Insert the arm supports [1] into the receptacle tubes.
9. Check all loosened screws for firm seat and conduct a functionality test.



## BACK SUPPORT

### Mounting the push bar

The single push handles [1] can be replaced by the push bar [2].

Therefore unscrew the screw (3) at both sides.

### Mounting the stabiliser rod

The stabiliser rod (4) can be mounted to the two attachment points (5) of the back tubes.

The seat width adjustment can be carried out after dismantling the screws (6). In doing so the brackets on both sides are to be repositioned at the same rate.

3 Stabiliser rods are available.

1. for seat width 30 / 34 / 38 cm
2. for seat width 38 / 43 / 48 cm
3. for seat width 48 / 53 / 58 cm

☞ The stabiliser rods can be adjusted within the indicated range of seat widths.

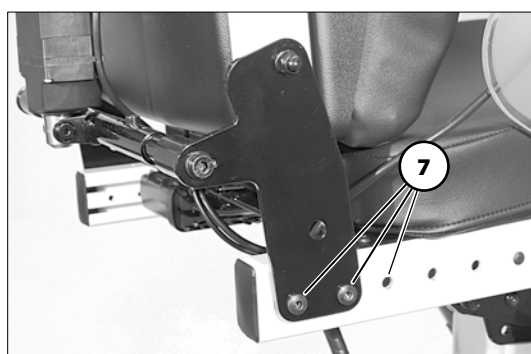
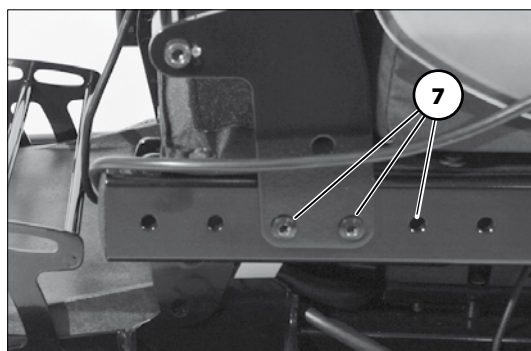
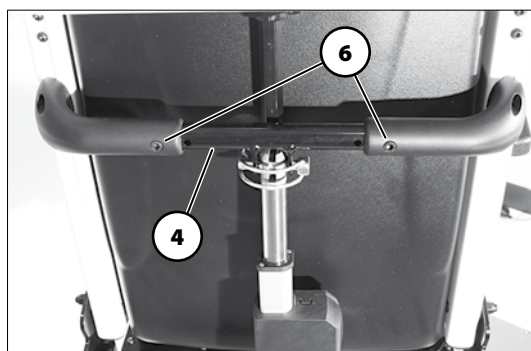
### Adjusting the seat depth

The seat depth can be changed by moving the back support to a different position.

For this the three attachment screws (7) are to be removed on both sides.

☞ Parallel repositioning of the back support.

- ☞ For this observe chapter *Depth adjustment of the arm support pad* on page 21 and chapter *Seat depth* on page 30.



## Secure positions of the back support

The diverse possible seat adjustments also includes such settings, that may only be used as resting positions, since they might lead to instable driving conditions in drive mode.

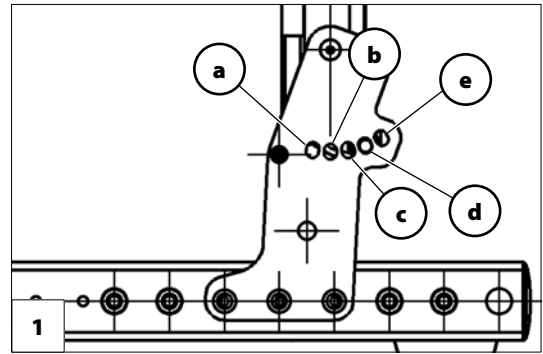
Depending on the set seat inclination you may only select certain back support adjustments for driving on hills [1].

**Note:**

For your safety you should have the set seat inclination confirmed by your specialist dealer and marked in the chart!

**Attention:**

- ! Any change to the seat inclination will lead to different safe back support adjustments!



**Example:**

Adjusted seat inclination:.....6°

The pressure bolt of the back support may only be in positions c, d, or e when driving on hills/slopes.

**Model 1.610 / 1.611 / 1.614 / 1.615**

Seat inclination	Adjusted seat inclination	safe position of the back support inclination [1]
0°		c, d
2°		c, d
4°	manufacturer setting	c, d
6°		c, d, e
8°		d, e
10°		d, e

**Model 1.612**

Seat inclination	Adjusted seat inclination	safe position of the back support inclination [1]
0°		c, d
4°	manufacturer setting	c, d
8°		c, d, e
12°		c, d, e



## Back support upholstery

After opening the velcro fastener the back support cushion [1] can be taken out of the back support shell.

## Limit switch

☞ (not with model 1.617 / 1.616)

The limit switch (2) prevents exceeding the back support angle in combination with the electric angle adjustment of the back support and electric camber of the seat unit.

## Replacing the limit switch

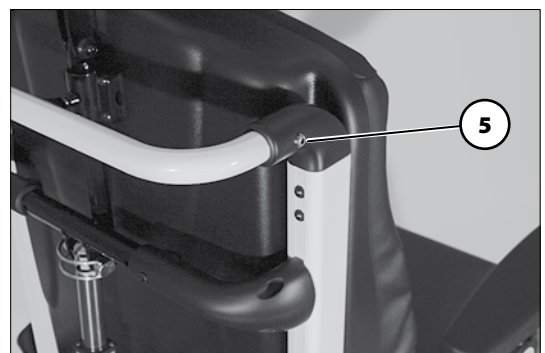
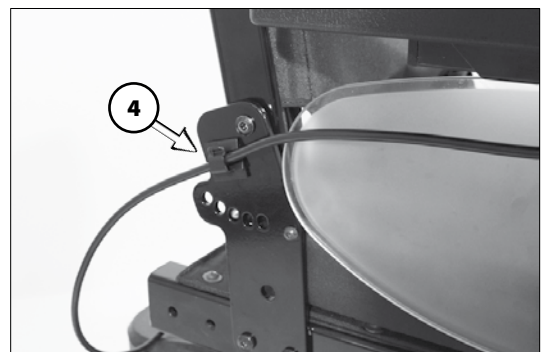
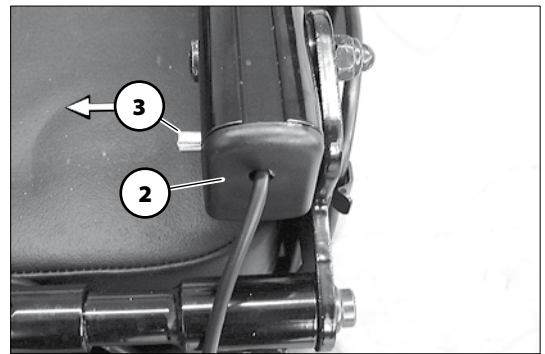
In order to replace the limit switch (2) the grooved pin (3) is to be removed.

## Cable fitting

- ☞ The cable of the limit switch is attached with a cable tie.
- ☞ The cable of the operating module is fastened back support bracket with a cable clamp (4).

## Replacing the push bar

In order to replace the push bar, e. g. order to change the seat width, the attachment screw on both sides (5) need to be removed.



## HEAD SUPPORT

The head support [1] is swivel proof, height and depth adjustable as well as removable.

### Note:

We recommend the fitting of two rear-view mirrors for driving with a head support.

### Height adjustment and removal of the head support

The head support can be detached or adjusted in height after the clamping screw (2) has been slackened.

#### Attention:

! The maximum height adjustment is indicated by the marking!

Afterwards retighten the clamping screw (2).

### Adjusting the position of the head support

Loosen the clamping screws (3) to adjust the position of the head support.

Afterwards retighten the screws (3).

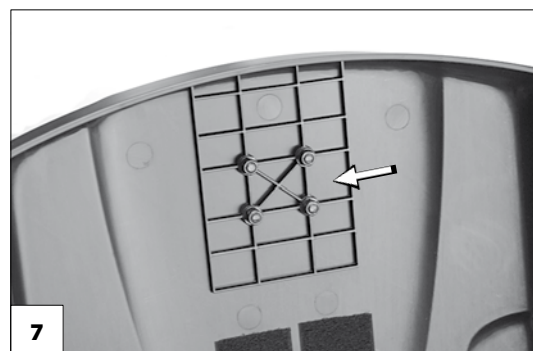
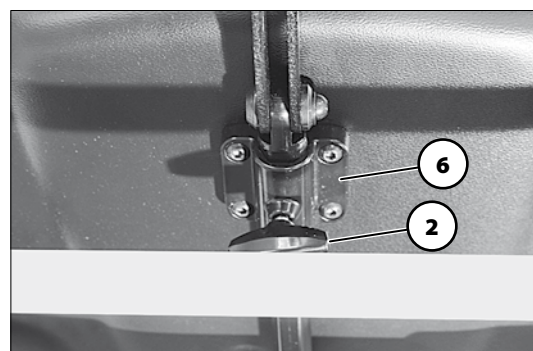
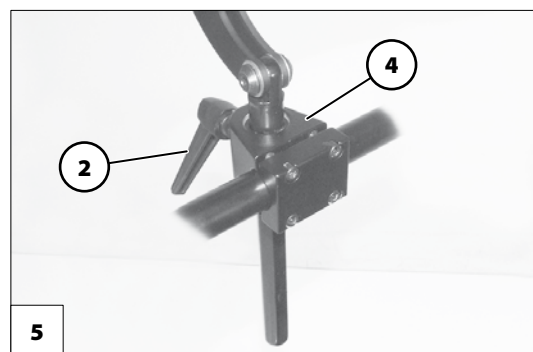
### Mounting the head support

Standard-/adjustable back support:

The bracket (4) of the head support is mounted in the center of the stabiliser rod [5].

ErgoSeat:

The bracket (6) of the head support is mounted from the back onto the designated position of the back support shell [7].



## SEAT WIDTH

### Adjusting the seat width over the arm supports

The seat width can be adjusted by a lateral displacement of the arm supports. Displace both arm supports by an equal distance after slackening the clamping screw (1) on both sides.

#### Attention:

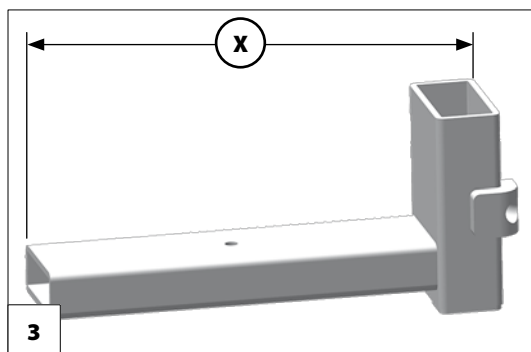
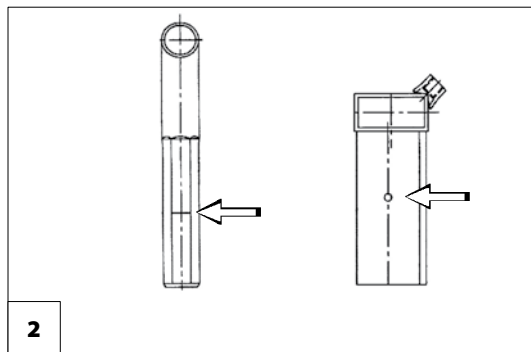
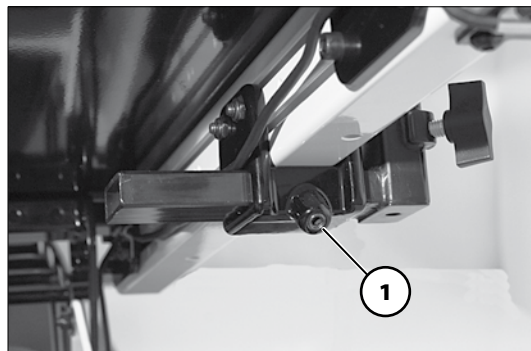
- ! The maximum seat width has been reached when a marking [2] is visible on the square tube.

Three arm support receptacles [3] are available:

short ( $X = 87$  mm),  
 medium ( $X = 112$  mm),  
 long ( $X = 140$  mm).

📖 The application can be viewed in the following table.

Table: Arm support receptacle [3]				
Model	Code	Arm support receptacle		
		short	medium	long
1.610	106		X <sup>3)</sup>	X
	4960		X <sup>3)</sup>	X
	21		X <sup>3)</sup>	X
1.611	106		X <sup>3) 5)</sup>	X <sup>5)</sup>
	4960		X <sup>3) 5)</sup>	X <sup>5)</sup>
	21		X <sup>3) 5)</sup>	X <sup>5)</sup>
1.612	106	X <sup>1) 4)</sup>	X <sup>2) 4)</sup>	X
	4960	X <sup>1) 4)</sup>	X <sup>2) 4)</sup>	X
	21	X <sup>1) 4)</sup>	X <sup>2) 4)</sup>	X
1.614	106			X
	4960			X
	21			X
1.615	106		X	X
	4960		X	X
	21		X	X
1.616	106		X	
1.617	106		X	X <sup>5)</sup>



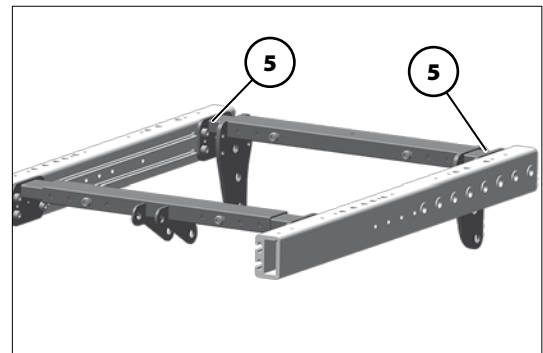
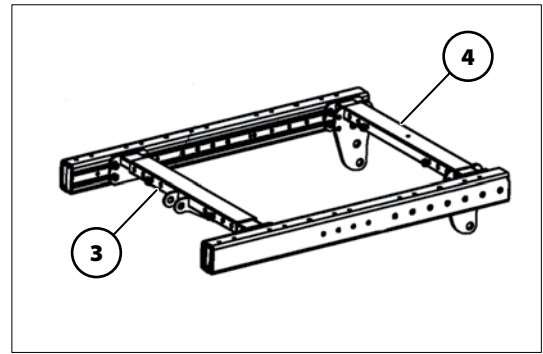
- 1) Only on seat width 38 cm in combination with Code 118 (electric seat inclination adjustment)
- 2) Only on seat width 43 cm in combination with Code 118 (electric seat inclination adjustment)
- 3) Only on Code 27 (crossbrace-lift-version)
- 4) On seat width 38/43 cm in combination with Code 118 (electric seat angle adjustment) and Code 773/774 (lighted clothes guard plates) possible as custom made
- 5) Not possible with 773/774 (lighted clothes guard plates) with Code 27 (crossbrace lift version)

## Adjusting the seat width through the seat frame

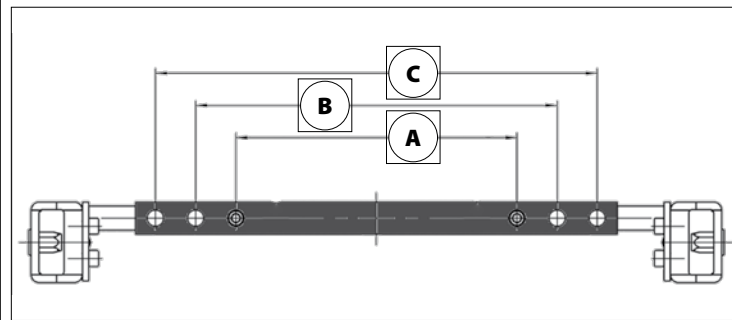
Parallel repositioning of the seat frame on both sides can readjust the seat width.

For seat width adjustment the horizontal bars (3)+(4) are to mounted in the corresponding assembly position.

- ☞ The assembly positions can be viewed in the following tables.
- ☞ On models 1.610 / 1.611 / 1.615 the adjustment tube (5) is no longer required for seat width 38 cm.

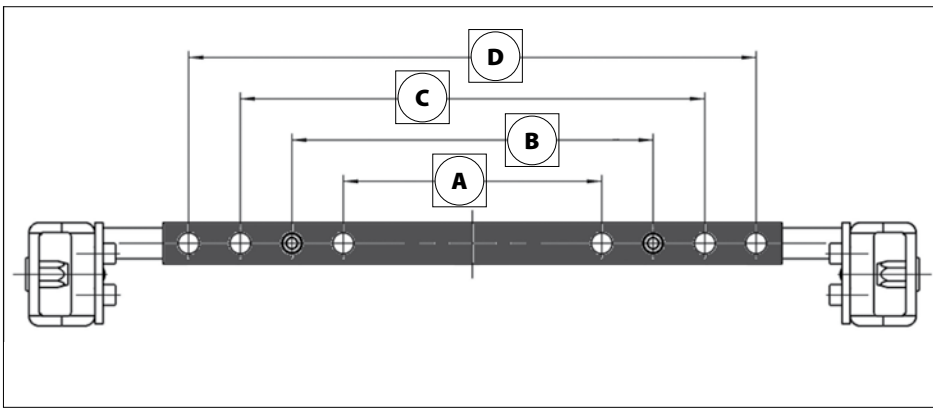


**Table: Assembly position of the cross braces (3)+(4) for model 1.616**



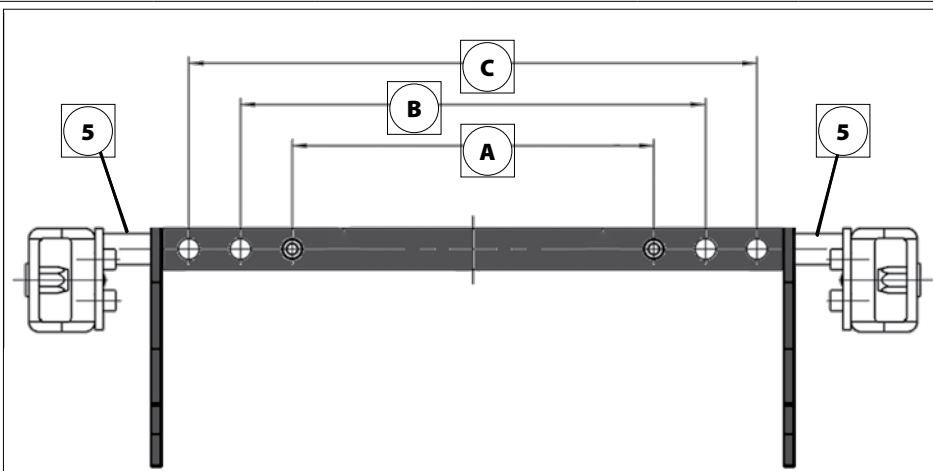
	Seat width [cm]		
Model	30	34	38
1.616	A	B	C

**Table: Assembly position front crossbrace (3)**



	Seat width [cm]				
Model	38	43	48	53	58
1.610	A	B	C	D	-
1.611 / 1.615	A	B	C	D	-
1.612	A	B	C	D	-
1.614	-	-	B	C	D
1.617	A	B	C	D	-

**Table: Assembly position rear crossbrace (4)**



	Seat width [cm]				
Model	38	43	48	53	58
1.610	A (w/o pos.5)	A (with pos.5)	B	C	-
1.611 / 1.615	A (w/o pos.5)	A (with pos.5)	B	C	-
1.612	A (w/o pos.5)	A (with pos.5)	B	C	-
1.614	-	-	A	B	C
1.617	A (w/o pos.5)	A (with pos.5)	B	C	-

# SEAT DEPTH

## Adjusting the seat depth through the position of the back support

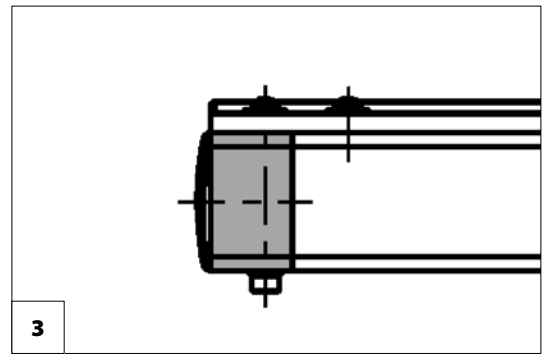
### Position of the back support

#### Model 1.610 / 1.611 / 1.612 / 1.615

The seat depth can be adjusted by repositioning the back support.

After removing the three attachment screws on both sides, the back support, depending on version strap or shell, can be positioned according to table < *Seat depth – Position of the back support* >.

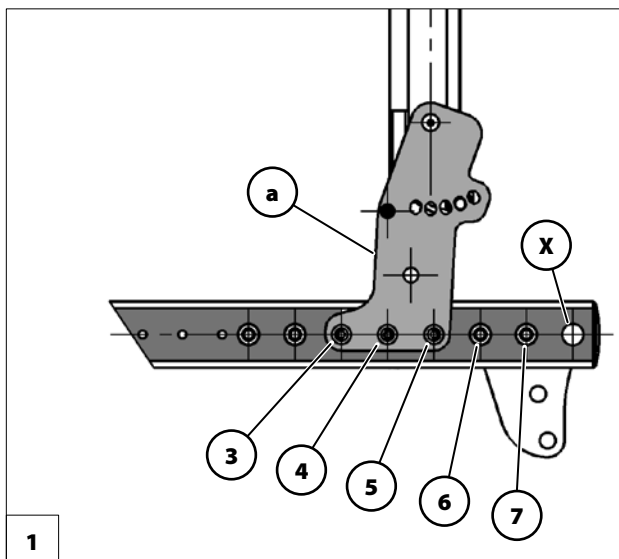
☞ The assemble hole that is not used (X) is fit with a cover cap.



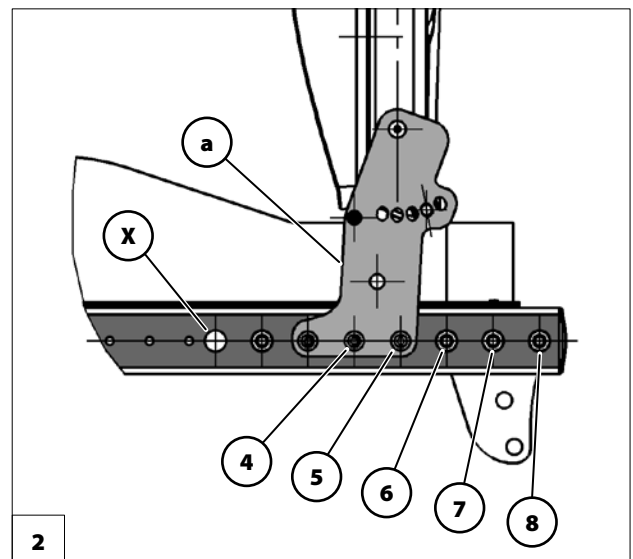
Seat depth [cm]	40	43	46	49	53	53	56
Pos. back support belt [1] *	3	4	5	6	7		7 with seat profile extension [3]
Pos. back support belt [1] * French regulation	3	4	5	6	X	6 with seat profile extension [3]	X
Pos. back shell [2] *	4	5	6	7	8		8 with seat profile extension [3]
Pos. back shell [2] * French regulation	4	5	6	7	X	7 with seat profile extension [3]	X

\* Corresponds to the rear hole of the adjustment plate (a)

Version: Back support strap



Version: Back support shell



## Position of the back support

### Model 1.614

The seat depth can be adjusted by repositioning the back support.

After removing the three attachment screws on both sides, the back support can be positioned according to table < *Seat depth – position of the back support* >.

Table: Seat depth – Position of the back support						
Seat depth [cm]	43	46	49	53	56	60
Pos. back shell [2] *	4	5	6	7	8	8 with seat profile extension [3]
* Corresponds to the rear hole of the adjustment plate (a)						

### Seat profile extension

With the seat profile extension [3], inserted on both sides into the seat profile tube, the adjusted seat depth is extended by 3 cm.

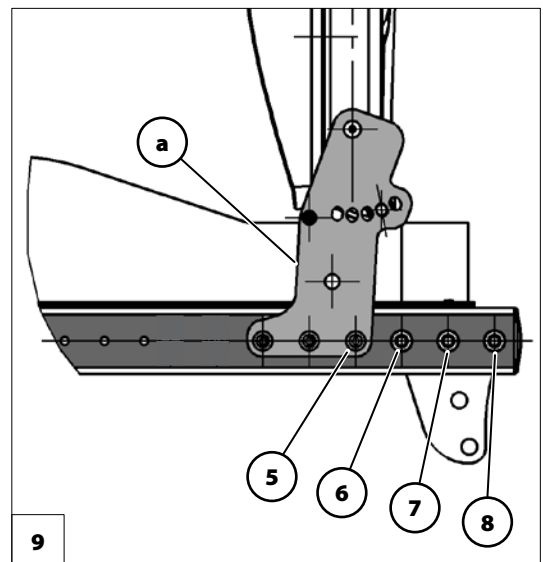
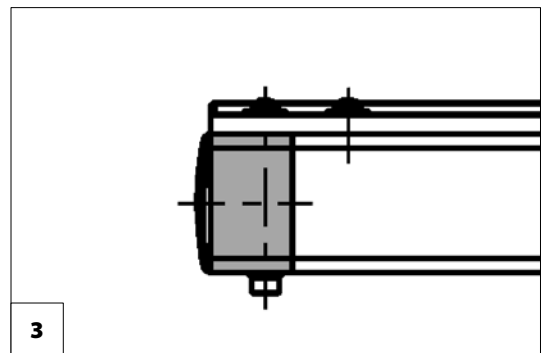
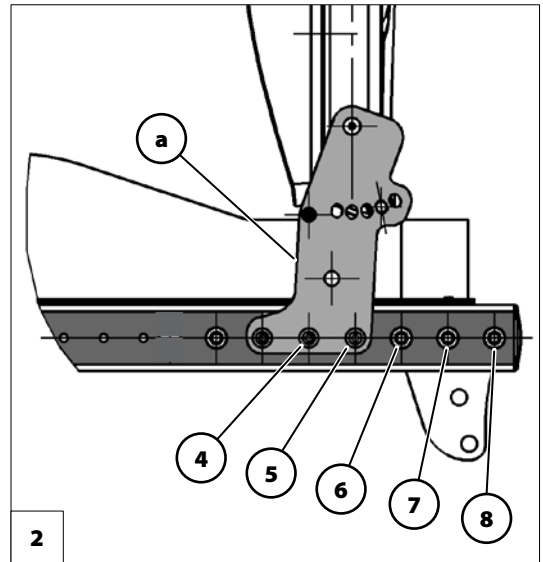
## Position of the back support

### Model 1.616

The seat depth can be adjusted by repositioning the back support.

After removing the three attachment screws on both sides, the back support can be positioned according to table < *Seat depth – position of the back support* >.

Table: Seat depth – Position of the back support				
Seat depth [cm]	30	33	37	40
Pos. back tube [9] *	5	6	7	8
* Corresponds to the rear hole of the adjustment plate (a)				



## SEAT SURFACE

### Model 1.610 / 1.611 / 1.615

By turning the cross brace bracket vertically by 180° and horizontally turning the front cross brace (1) by 180° you can switch from seat plate to seat strap.

#### Position of the cross brace bracket for the seat plate and seat systems

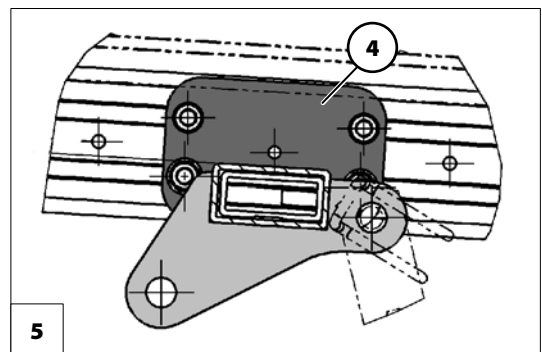
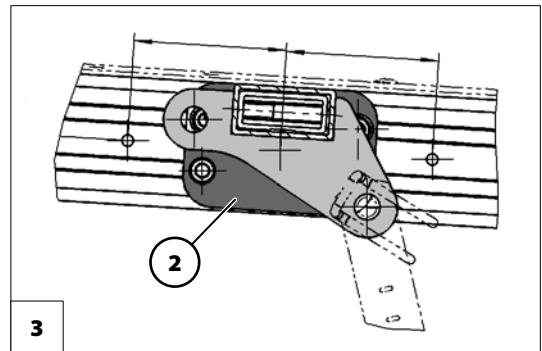
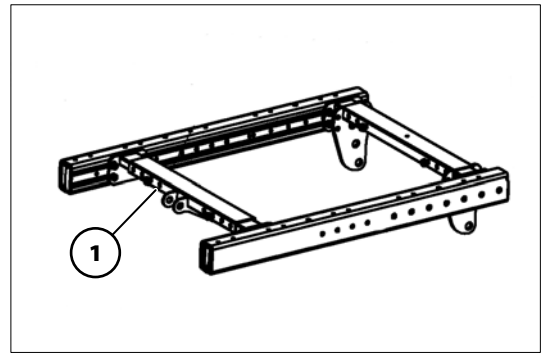
For the use of the seat plate and seat systems the cross brace brackets are mounted turned upward (2).

- ☞ The front cross brace (1) is turned so that the short flap faces to the front [3].

#### Position of the cross brace bracket for the seat strap

For use of the seat strap the cross brace brackets are mounted turned downward (4).

- ☞ The front cross brace (1) is turned so that the long flap faces to the front [5].





# WHEELS

## Wheel change

Before starting the disassembly work, support the frame to prevent the wheelchair from tipping over and secure it to prevent an unwanted movement or tipping over.

☞ Always change tyres in pairs.

### Attention:

- ! Never loosen the connection screws of the rim halves (1) to disassemble the wheel.
  - (1) to disassemble the wheel.
    - Danger of injury!

## Disassembly of the wheels

Before dismantling the drive wheels the respective cover in the middle is to be removed [2].

Take off the wheel by removing the respective wheel screw (3).

## Assembly of the wheels

After replacing/attaching the wheel secure the respective wheel screw (3) again with Loctite 243 and tighten.

☞ Therefore observe chapter *DIN norms and guidelines* on page 98.

## Adjusting the castor stem

If the steering fork is loose the castor stem needs to be adjusted.

☞ For this tighten the screw of the castor stem, so that the steering fork can still be turned, but the plate washers still have effect.



## Changing the tyres

### Disassembly of the tyres

1. Disassemble the wheel.
2. Completely deflate the tyre.

#### Attention:

- ! Never loosen the rim half connection screws (1) in order to disassemble the tyre before previously completely deflating the tyre!

☞ Danger of injury!

3. Unscrew the rim-half connection screws (1).

### Assembly of the tyres

#### Attention:

- ! During assembly the rim halves may not damage the tube or let it be jammed.

1. Place the tyre cover with crease free tube between the rim halves.
  - ☞ In doing so observe the running direction of the tyre (view running direction arrow (2) ).
2. Tighten the rim-half connection screws (1) evenly.
  - ☞ Therefore observe chapter *DIN norms and guidelines* on page 98.
3. Assemble the wheel.
  - ☞ Therefore observe chapter *Assembly of the wheels* on page 33.

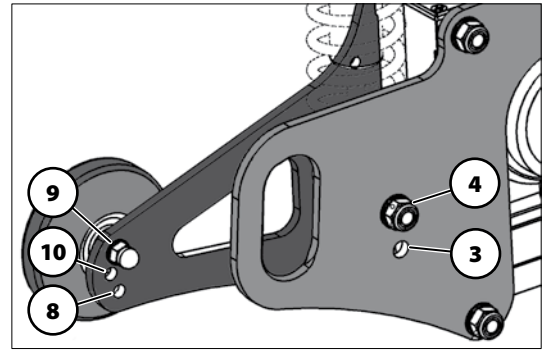
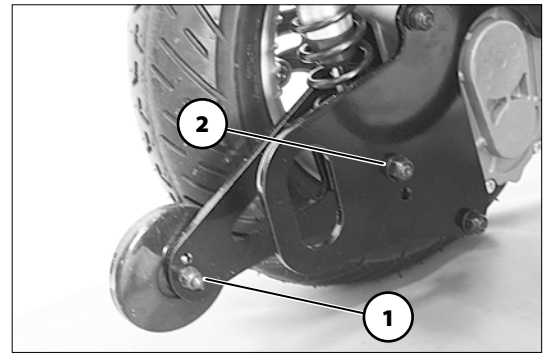


## Steering wheels

Depending on the size of the steering wheel the screwed connection (1) of the support castor and the lower screwed connection (2) of the spring are mounted according to the following table.

☞ (not with model 1.617)

Steering wheel	Position of the support castor	Position of the spring
∅ 203 mm (8")	(8)	(3)
∅ 229 mm (9")	(9)	(4)
∅ 254 mm (10")	(10)	(4)

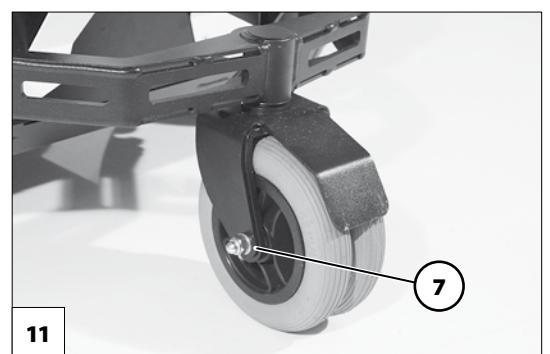
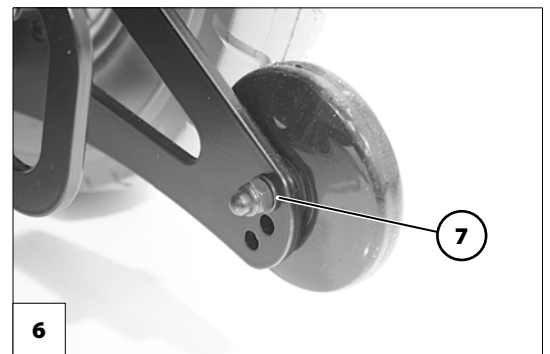
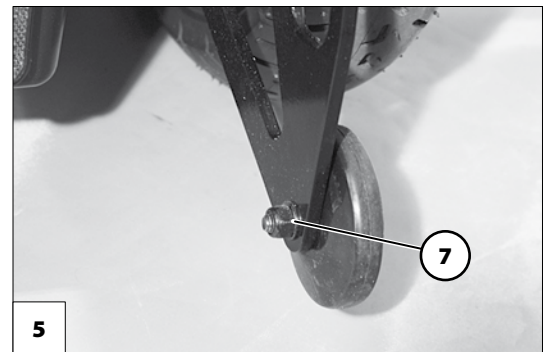


## SUPPORT CASTORS

### Replacing new support castors

- ☞ Support castors [5], [6], [11] with extreme wear, such as cracks, missing material of one sided worn running surface should be replaced.
- ☞ Missing support castors are also to be replaced.

In order to replace the support castor the respective screwed connection (7) is to be removed.



# FUSES

## Main fuse

The main-/battery fuse is switched in line between the two batteries and is inserted in the top left of the fuse holder of the battery case (1).

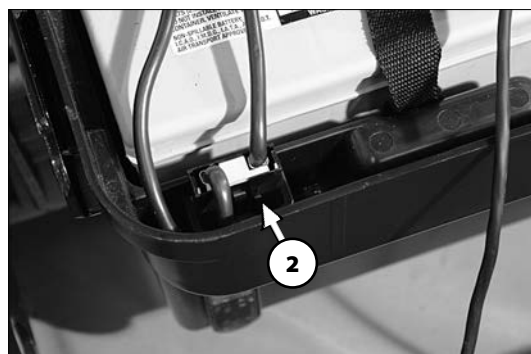
The main fuse holder (2) is located inside the battery box at the back.



## Model 1.617

On model 1.617 electronic safety is achieved through the circuit breaker with securing button (3).

The circuit breaker is located behind an angle, on the right side of the back of the electronic housing (4).

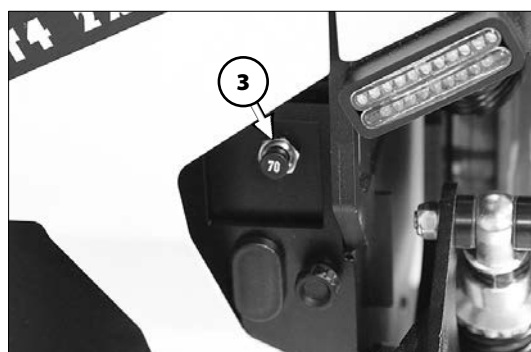


## Electronic security

In case of a shortage only the defective component is deactivated. All other components (e.g. all other lights except for the defective one) remain available. After removal of the shortage, the affected component is automatically activated again.

## Power module

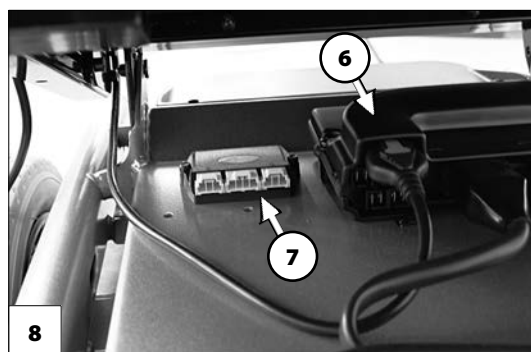
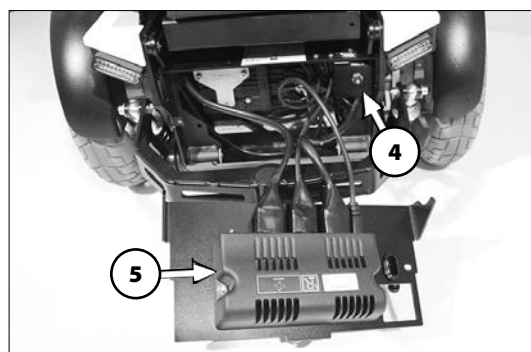
All electrical components (except for the batteries) are electronically protected by the power module R-Net (5) resp. VR2 (6). The power module also sees to a power limitation of the motors.



## Lighting module VR2

☞ (not with model 1.617)

The lighting module VR2 (7) is applied in combination with the operating module VR2 and mounted beside the power module (6) [8].



## Lighting- / adjustment module R-Net

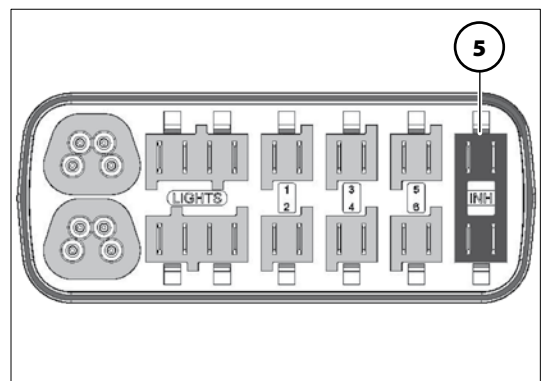
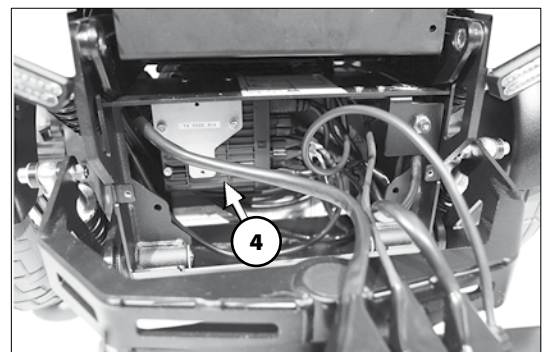
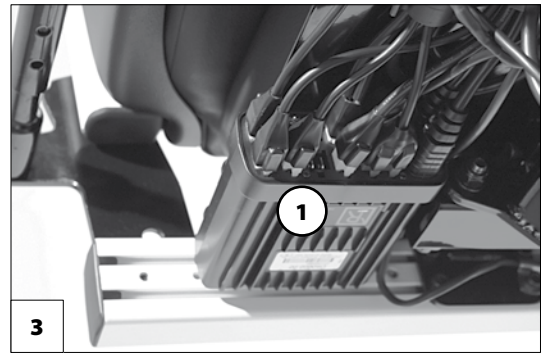
All electric adjustments are secured electronically through the adjustment module (1) as well as the combined lighting-/adjustment module.

The corresponding adjustment module is, depending on model, either mounted beside the power module [2] or at the rear left, underneath the seat plate [3].

On model 1.617 the adjustment module is located behind the rear revetment on the left side of the electronic housing (4).

## Particularities of the electric adjustment seatlift

- ☞ On the wheelchair version with seatlift the blind plug item-no. 1071617 is to be removed from socket < Inhibit 4 > (5) in order to activate the speed reduction.
- ☞ On the wheelchair version without seatlift the bridge item-no. 1071617 must be inserted into socket < Inhibit 4 > (5).



## LIGHTING

The lighting (1)+(2) is equipped with longlife LED-technology.

🔧 **Note:**

If a turn-signal is defective, the remaining one blinks at double frequency.

**Attention:**

! It is to be observed that the cables are not damaged or bent when being placed.

🔧 Otherwise danger of fire through short circuits!

🔧 Previously removed cable ties are to be replaced.

🔧 Then carry out a function test.

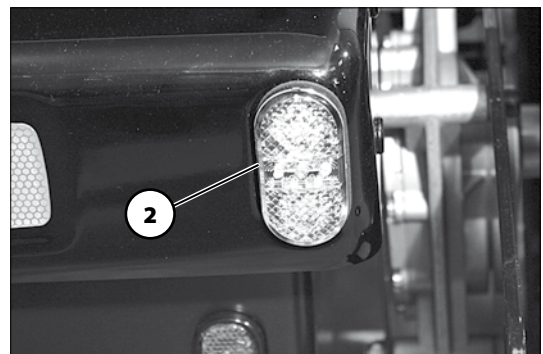
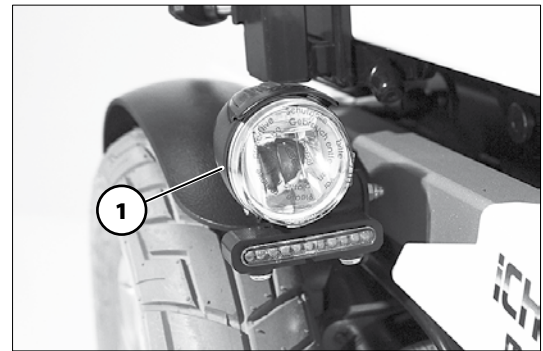
🔧 Therefore observe chapter *Functional checks* on page 94.

### Headlight / front turn signal

The headlights (1) should be set in such a way that the light cone is visible on the road. – The lower edge of the light cone should be set at distance of 3 meters to the front of the electric wheelchair.

🔧 **Note:**

The headlights might need to be readjusted after mechanical adjustment of the seat angle.



## Adjusting the headlights

In order to adjust the headlight, loosen the attachment screw (3) and adjust the lighting fixture (1)+(2) accordingly.

## Replacing the lighting fixture

A defective lighting fixture can only be exchanged completely.

- ☞ For safe identification of the defect (lighting fixture or lighting module) switch the plugs on the lighting module for left, resp. right lighting.
  - ☞ The defect switches sides. – The lighting module is defective.
  - ☞ The defect remains on the same side. – The lighting fixture is defective.

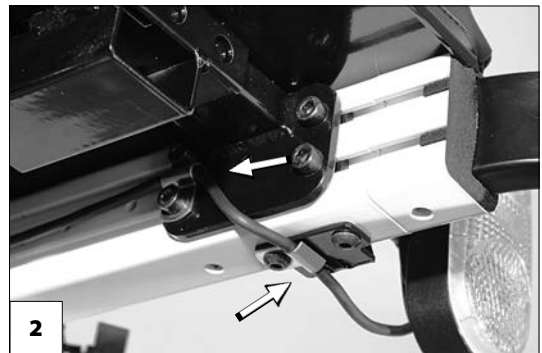
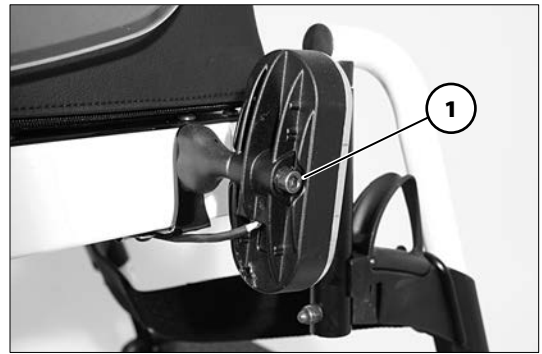
## Replacing the headlight / front turn signal

Model 1.610 / 1.611 / 1.612 / 1.614 / 1.615 / 1.616:

In order to replace the headlight / front turn signal, first disconnect the electric and loosen the cable clips, then remove the attachment screw (1).

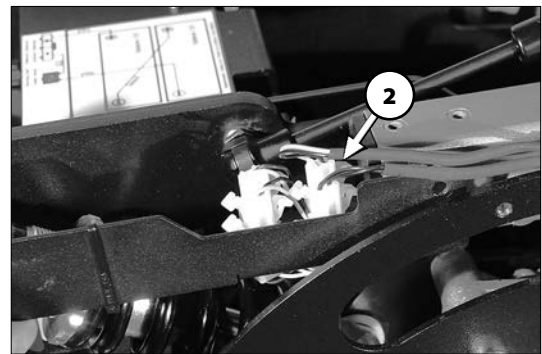
After assembly of the new headlight / front turn signal the electric connection needs to be re-established.

- ☞ In doing so place the cable in a protected manner and secure it in place [2]+[3].



Model 1.617:

1. Remove the cover plate on the side (1).
2. Remove the cable ties.
3. Disconnect the electric connector (2) of the defective bulb.
4. remove the screws for the driving headlights (3) resp the attachment screws of the front turn signals (4).
5. Mount the new bulb [5].
6. Re-establish the plugged connections for the power supply (2).
7. Guide the cable carefully and secure it with cable ties.
8. Screw the cover plate on the side (1) back into place.





## Replacing the back light

Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616:

1. In order to replace the back light (1) first disconnect the electric.
2. Afterwards press down the to springs at the side (2) and take out the back light.

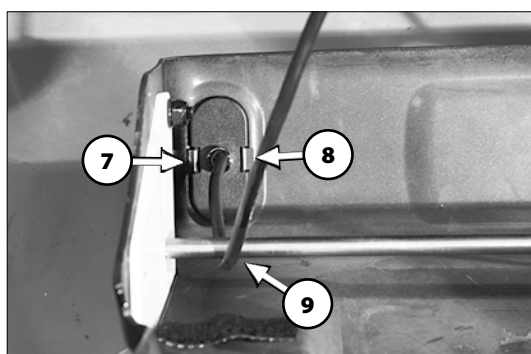
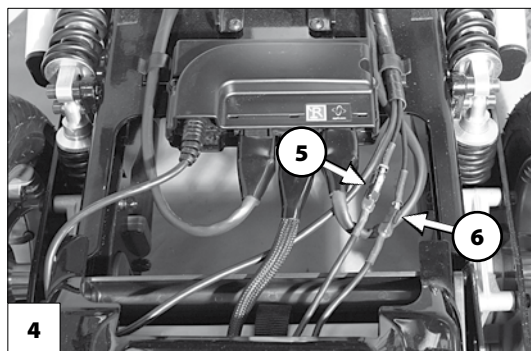
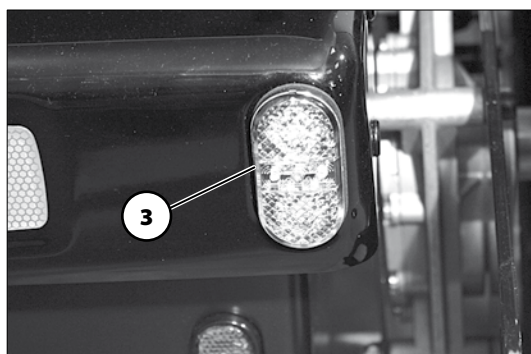
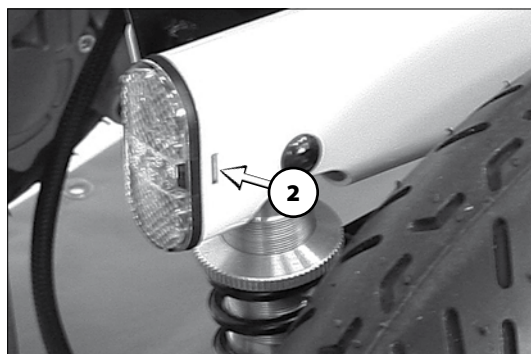
After assembly of the new back light the electric contact needs to be re-established.

Model 1.612:

1. In order to replace the back light (3) first remove the battery lid [4].
2. Afterwards disconnect the plugged connection (5)/(6) of the defective back light.
3. Press down the to springs at the side (7)+(8) and take out the back light.

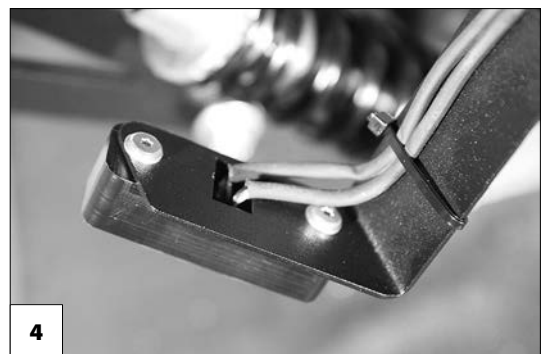
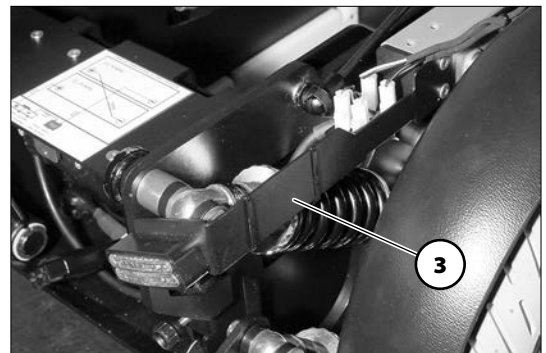
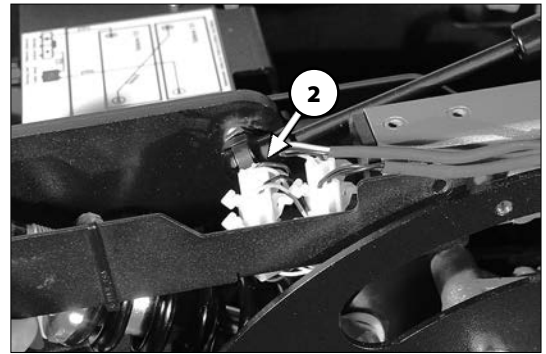
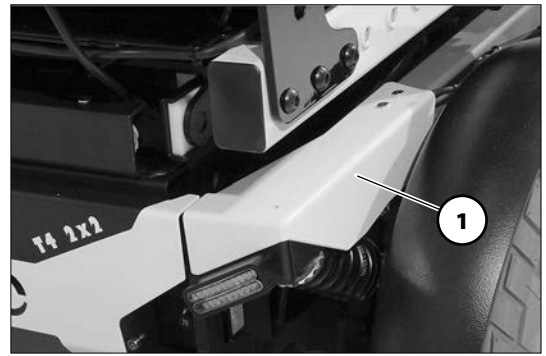
After assembly of the new back light the electric contact needs to be re-established.

- ⚠️ Protect the cable while placing it (9).



Model 1.617:

1. Remove the cover plate on the side (1).
2. Remove the cable ties.
3. Disconnect the electric connector (2) of the defective bulb.
4. Screw off the attachment plate (3) of the rear lighting.
5. Replace the defective bulb [4].
6. Re-establish the plugged connections for the power supply (2).
7. Screw the attachment plate (3) of the rear lighting back on.
8. Guide the cable carefully and secure it with cable ties.
9. Screw the cover plate on the side (1) back into place.



# BATTERIES

After lifting out the battery case the batteries can be replaced.

## Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616

### Removing the battery case

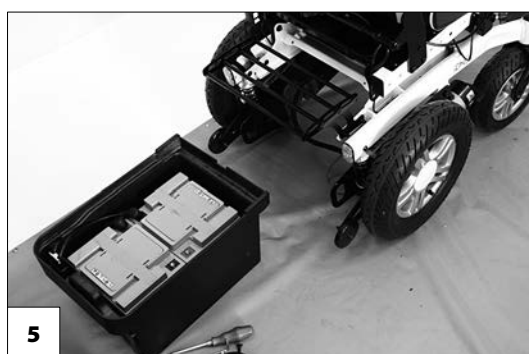
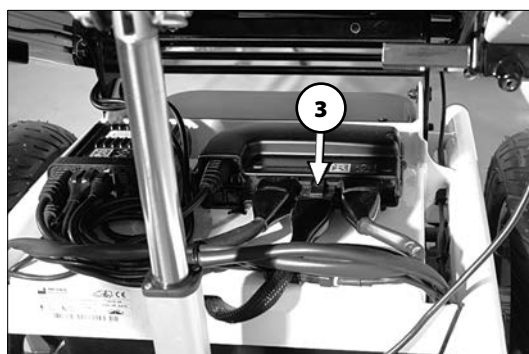
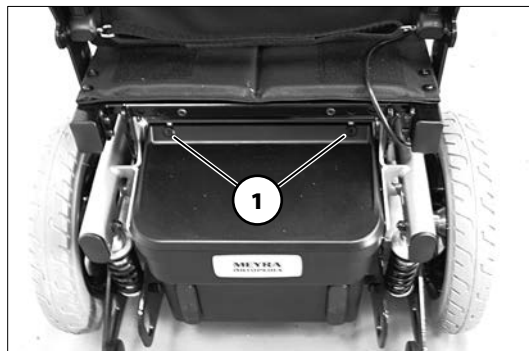
1. Remove the attachment screws (1).
2. Lift the battery case slightly over the rear grip edge and pull it out towards the back [2].
3. Pull the battery connection plug (3) from the power module.
4. If necessary lift the lid off of the battery case [4].
5. First lift the battery case slightly over the front grip edge and then lift it out towards the back [5].

### Inserting the battery case

The replacement of the battery case is carried out analogue in reverse order to chapter *Removing the battery case* on page 43.

#### Attention:

- ! It is to be observed that the pole clamp cover is fastened correctly above the battery poles.
- ⚠ Otherwise danger of fire through short circuits!



## Model 1.612

### Removing the battery case

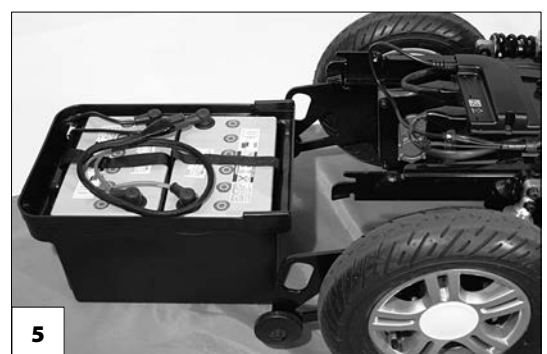
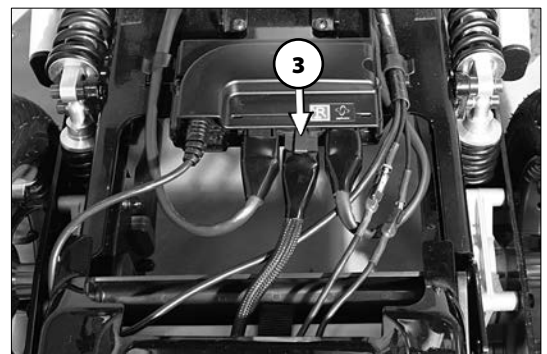
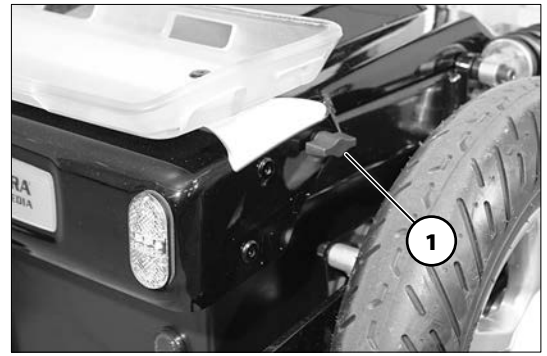
1. Remove the attachment screws (1).
2. Lift the lid off of the battery case [2].
3. Pull the battery connection plug (3) from the power module.
4. Lift the battery case slightly over the rear grip edge and pull it out towards the back [4].
5. First lift the battery case slightly over the front grip edge and then lift it out towards the back [5].

### Inserting the battery case

The replacement of the battery case is carried out analogue in reverse order to chapter *Removing the battery case* on page 44.

#### Attention:

- ! It is to be observed that the pole clamp cover is fastened correctly above the battery poles.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Then carry out a function test.
- ☞ Therefore observe chapter *Functional checks* on page 94.



## Model 1.617

### Removing the batteries

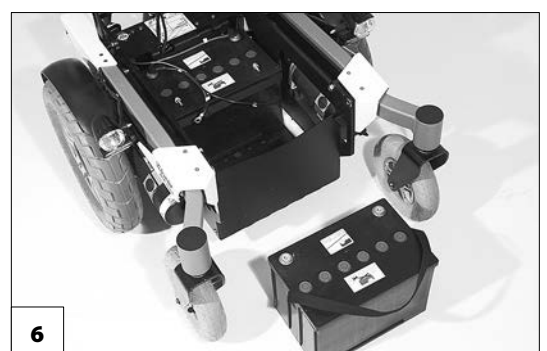
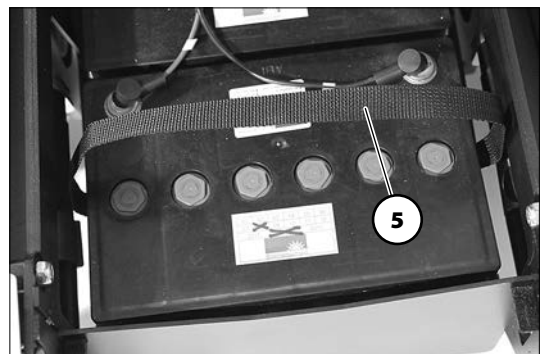
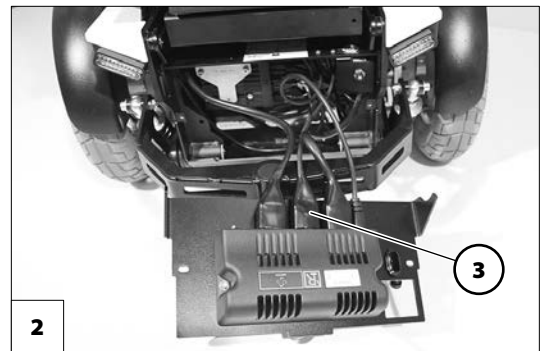
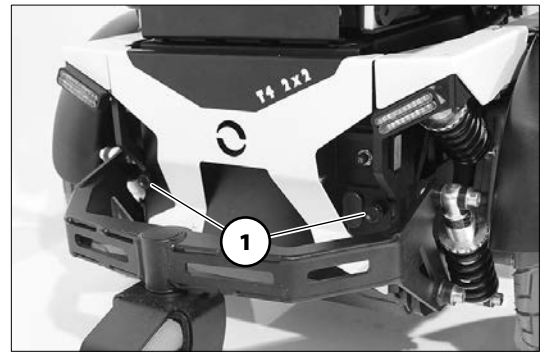
1. Unscrew the attachment screws (1) of the rear cover.
2. Fold the rear cover open and place it to the side [2].
3. Pull the battery connection plug (3) from the power module.
4. Set into service position [4].
  - ☞ Therefore observe chapter *Setting the service position* on page 10.
5. Unscrew the pole clamps.
6. Lift out the battery with help of the carrying strap (5) [6].

### Positioning the batteries

The replacement of the battery is carried out analogue in reverse order to chapter *Removing the batteries* on page 45.

#### Attention:

- ! It is to be observed that the pole clamp cover is fastened correctly above the battery poles.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Then carry out a function test.
- ☞ Therefore observe chapter *Functional checks* on page 94 .



# BATTERY CHARGER

## Note:

- When changing to batteries with considerably different capacity also use a corresponding charger, so that the charging periods remain limited and the batteries are charged completely.
- When replacing the secondary plug [B] (part-no. 206 917 100) a bridge (4), view inside view of the plug, must be welded between the contacts 2 (earth) and 3.

Marginally increased transition resistance ( $> 0.2 \text{ Ohm}$ ) in the charging cables and -plugs already prevent a complete charging. Plugs that become hot during charging are to be replaced.

## Technical requirements:

for the following drive batteries,  
max. charging voltage: 28.5 V

For sealed drive batteries:  
up to 40 Ah – 5 h / 50 Ah – 20 h  
Charging current: 6 A alternatively 5 A

For open/sealed drive batteries:  
from 40 Ah – 5 h / 50 Ah – 20 h  
Charging current: 8 A

from 65 Ah – 5 h / 82 Ah – 20 h  
Charging current: 12 A

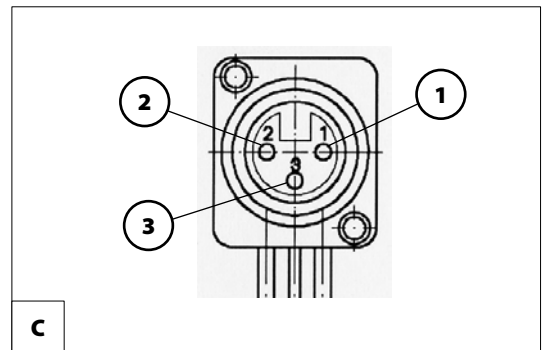
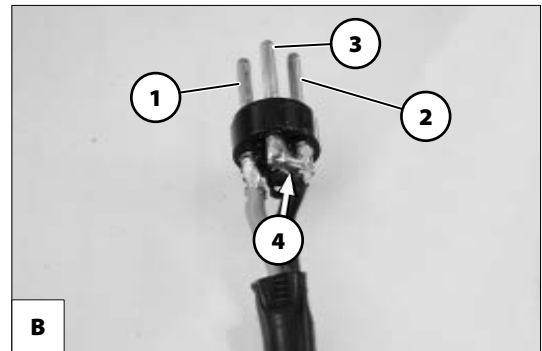
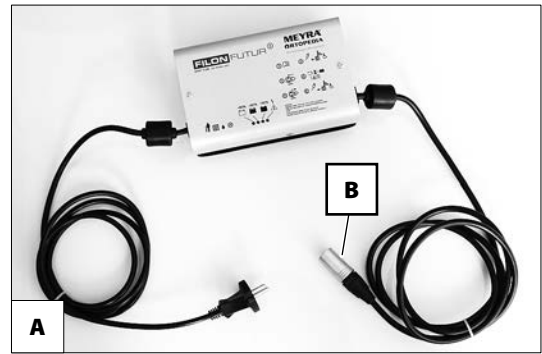
## Pin assignment of the charging plug (B):

- Pin 1: +24 V (Conduit red)
- Pin 2: minus (Conduit black)
- Pin 3: minus (Bridge on Pin 2 – view arrow)

- Therefore observe the operating manual of the charger!

## Pin assignment of the charging socket (C):

- Pin 1: +24 V (Conduit red)
- Pin 2: minus (Conduit blue)
- Pin 3: Lock (Conduit black)



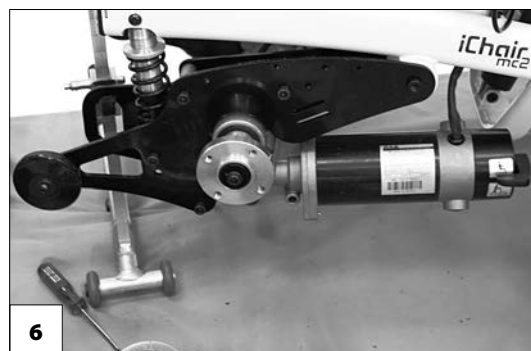
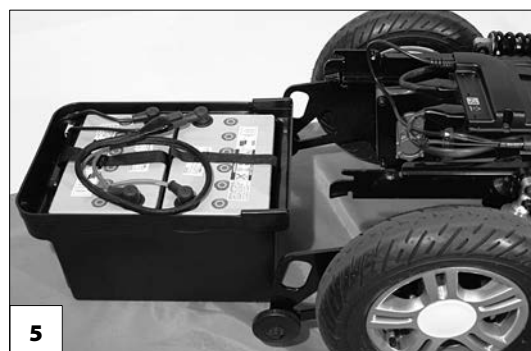
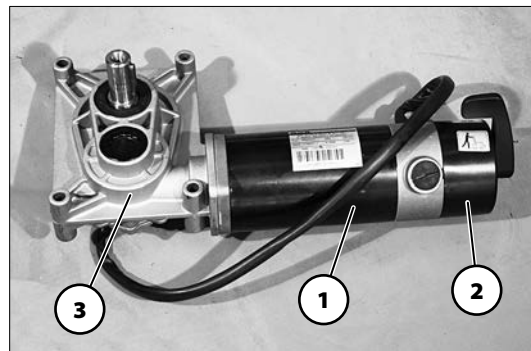
## DRIVE

The vehicle is fitted with a drive on each side. The drive consists of the motor (1), the magnetic brake (2) and the worm gear (3). The drive can only be replaced completely.

### Removing the drive

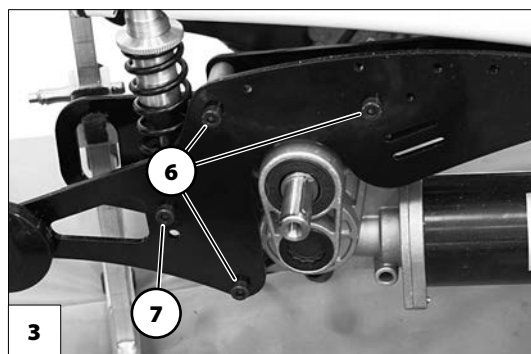
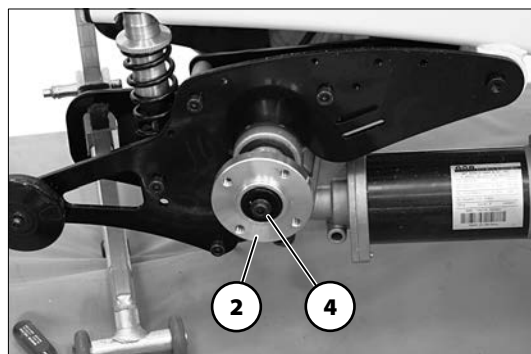
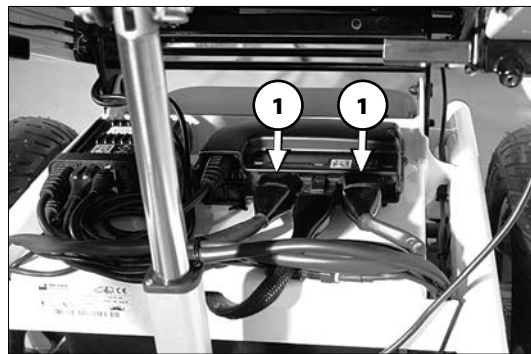
The following describes the replacement of the right drive. The replacement of the left drive is to be done accordingly in the same fashion.

1. Remove the battery case.
  - Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616 [4]
  - Model 1.612 [5]
2. Unscrew the drive wheel [6].



### Model 1.610 / 1.611 / 1.614 / 1.615 / 1.616

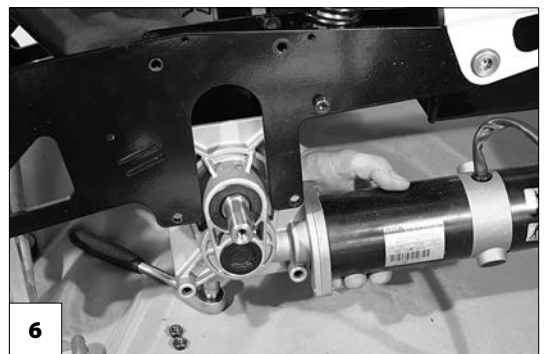
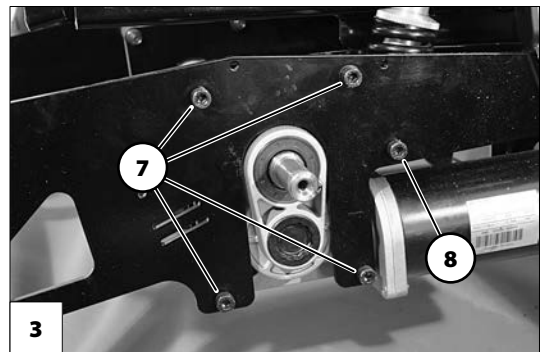
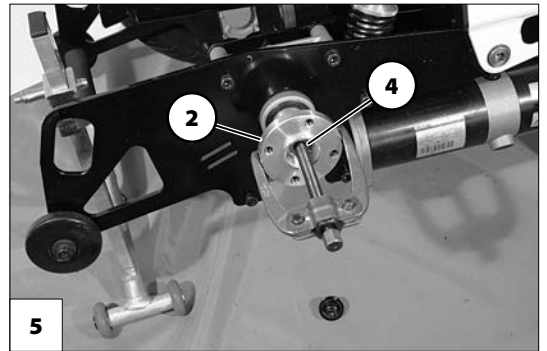
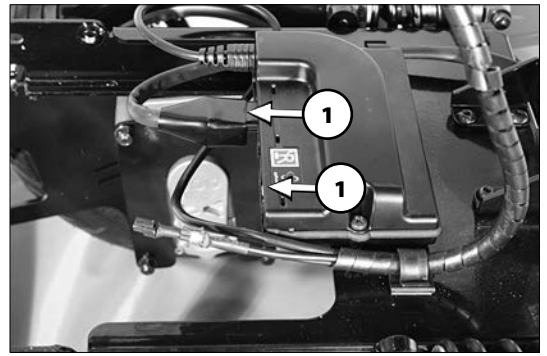
1. Pull the motor connector plug leaving the drive (1) off of the power module.
2. Pull the wheel flange (2) [3].
  - ☞ For this disassemble the screws (4).
  - ☞ An extractor might be required for this.
3. Remove the drive toward the bottom [5].
  - ☞ For this disassemble the screws (6).
  - ☞ It might be necessary to additionally loosen the lower screw (7) of the spring in order to be able to lift out the drive.





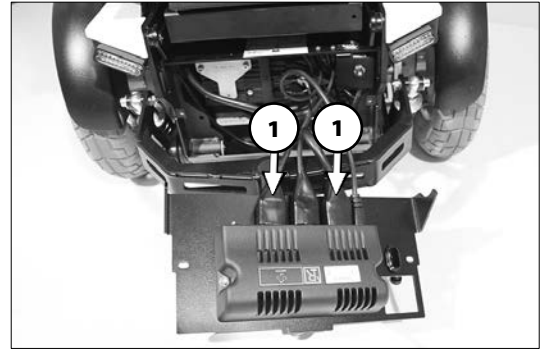
## Model 1.612

1. Pull the motor connector plug leaving the drive (1) off of the power module.
2. Pull the wheel flange (2) [3].
  - ☞ For this disassemble the screws (4).
  - ☞ An extractor might be required for this [5].
3. Remove the drive toward the bottom [6].
  - ☞ For this disassemble the screws (7).
  - ☞ It might be necessary to additionally loosen the lower screw (8) of the spring in order to be able to lift out the drive.



## Model 1.617

1. Pull the motor connector plug leaving the drive (1) off of the power module.
  - ☞ For this disassemble the screws (3).
  - ☞ An extractor might be required for this.
3. Remove the splash guard and drive [5].
  - ☞ For this disassemble the screws (4).

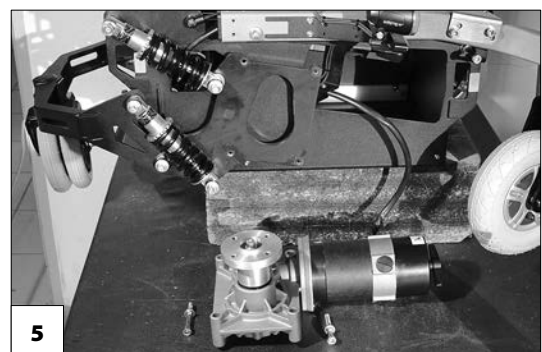
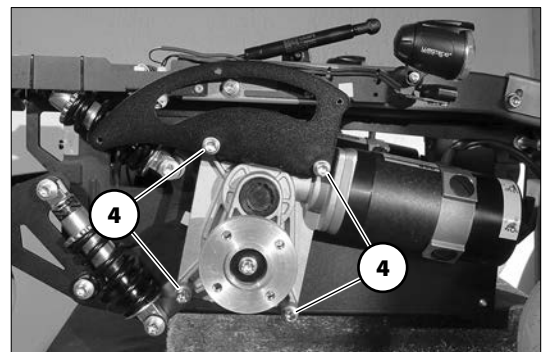
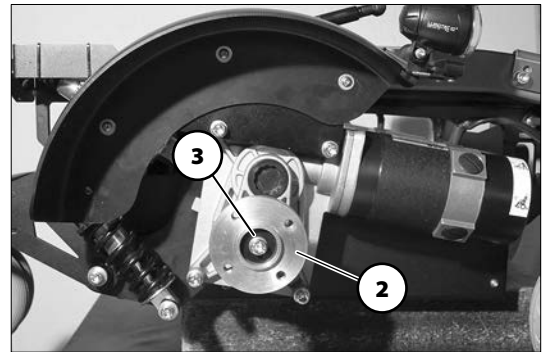


## Mounting the drive

Assembly of the drive is carried out analogue in reverse order to model dependent chapter *Removing the drive* on page 47.

### Attention:



- ! It is to be observed that the cables are not damaged or bent when being placed.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.



## Carbon brushes

The carbon brushes (1) are supplied as a set and are to be replaced as a set.

### **Note:**

-  Do not touch the friction surface of the carbon brushes!
-  The carbon brushes are worn when they are used up to 8 mm length.  
They are also to be replaced when the contacts appear black and dull. – On intact carbon brushes the contacts are anthracite coloured and shining.

## Removing the carbon brushes

### Version 1:


1. Unscrew the locking cap (2) of the carbon brush counter-clockwise.
2. Pull the pressure spring with the carbon brush (1) out of the guide shaft [3].

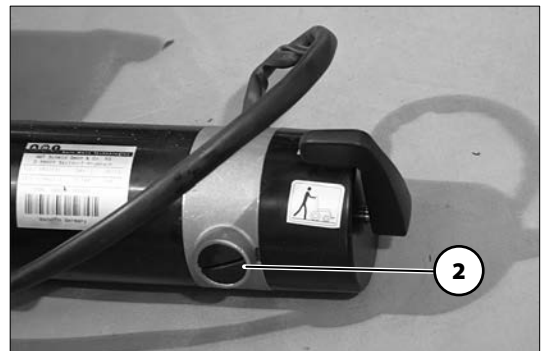
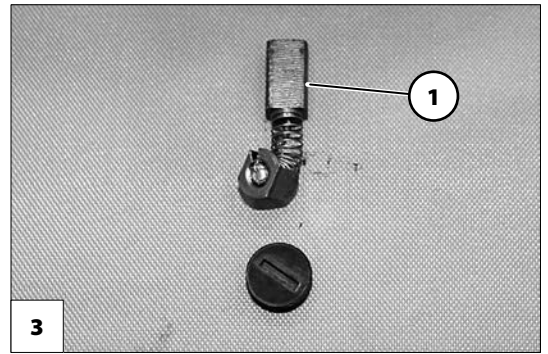
### Version 2:

1. Slide the cap (4) of the carbon brush out towards the back [5].
2. Pull the pressure spring with the carbon brush out of the guide shaft [6].

## Mounting the carbon brushes

Assembly of the carbon brush is done analogue in reverse order to chapter *Removing the carbon brushes* on page 51.

-  When mounting the carbon brush after a visual check, observe that the carbon brush receives the same position as when being removed.



# VEHICLE SUSPENSION

## Suspension of the chassis

For optimal sitting comfort the suspension (1) can be adjusted according to the desire of the user.

### Attention:

! Make sure that the adjustment ring sits securely before starting to drive.

☞ Screw a loose adjustment ring (2) tight enough, until the pressure of the spring prevents further loosening.

## Adjusting the seat suspension

On models 1.611 / 1.612 / 1.615 / 1.617 you can select between a harder (suspension up to 120 kg user weight) and a softer spring (suspension up to 160 kg user weight).

Furthermore the pretension force of the pressure spring can be changed through an adjustment ring (2) on all models.

For adjustment of the suspension the adjustment ring (2) is screwed forward or backward accordingly.

In doing so the following indications are valid:

Adjustment ring slightly screwed

### **a – soft suspension**

☞ Also for people with little user weight.

Manufacturer setting:

Adjustment ring regularly pre-tightened

### **b – medium suspension**

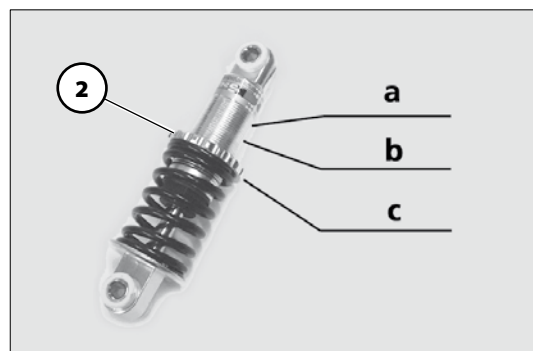
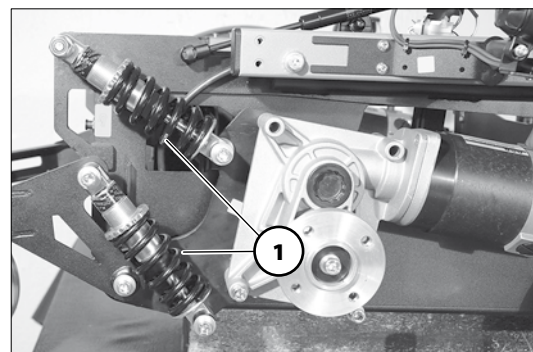
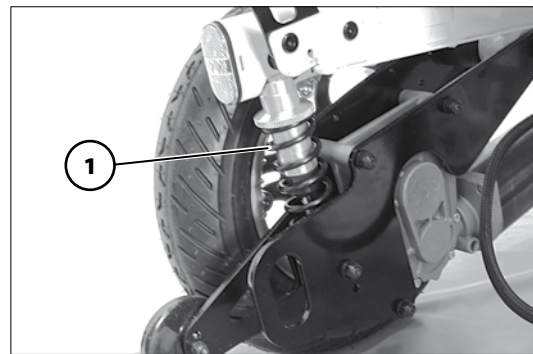
☞ For regular sitting comfort.

Adjustment ring extremely screwed

### **c – hard suspension**

☞ Also for people with high user weight.

☞ In Position "c" at least three screw threads must be visible!



## Replacing the spring

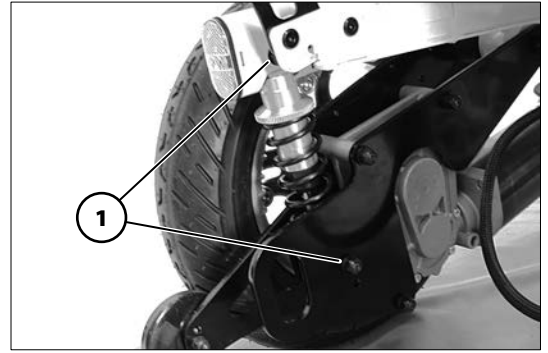
☞ For this observe chapter *Steering wheels* on page 35.

### Attention:

! The spring might be under extreme pressure.

### Model 1.610 / 1.611 / 1.615 / 1.614

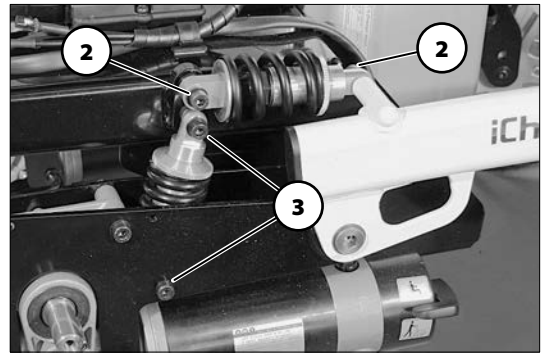
Remove the screws (1) to replace the spring.



### Model 1.612

For replacement of both springs for the front rocker the screws (2) on both sides are to be removed.

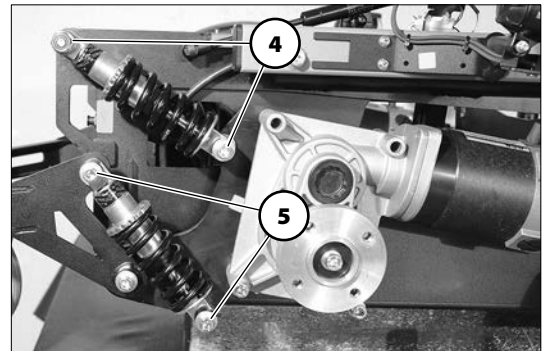
For replacement of both springs for the chassis the screws (3) on both sides are to be removed.



### Model 1.617

For replacement of both springs for the sitting comfort the screws (4) on both sides are to be removed.

For replacement of both springs for the chassis the screws (5) on both sides are to be removed.



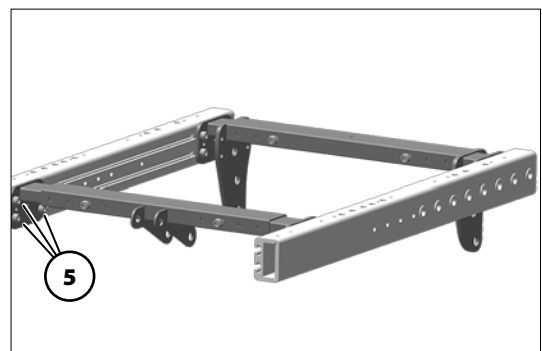
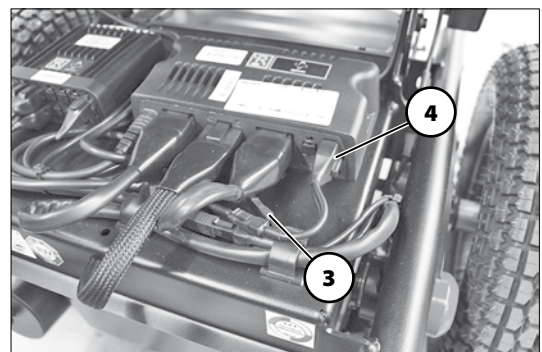
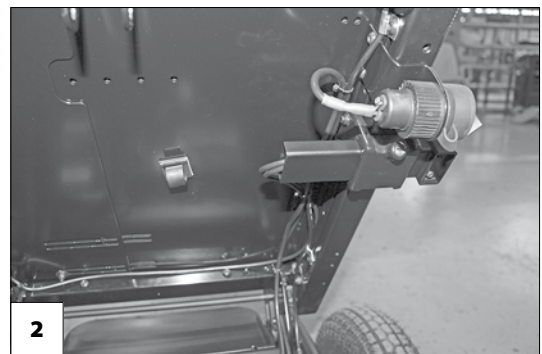
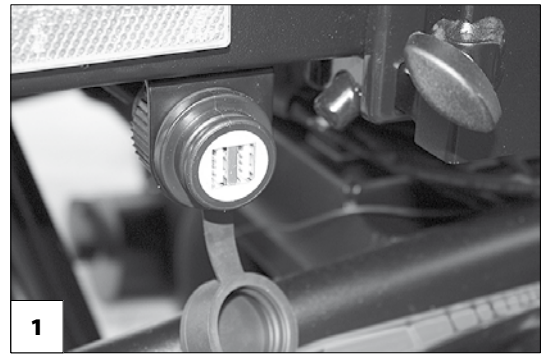
## USB CONNECTOR SOCKET

The USB-connection socket [1] is maintenance free.

### Assembly

Assembly of the USB-connection socket is done with the help of an angle bracket that can be positioned individually on the seat frame tube of the electric wheelchair [2].

- ☞ The angle bracket is attached with a clamping piece.
1. Depending on the desired assembly position, the leg support receptacle might need to be removed.
    - ☞ Therefore observe chapter *Leg support receptacle* on page 17.
  2. Remove the attachment screws (5) of the horizontal crossbeam.
  3. Insert the clamping piece into the seat tube profile and slide it to the desired assembly position of the USB-connection socket.
  4. Screw the holding angle of the USB-connection socket onto the clamping piece [2].
  5. Reassemble the previously removed screws (5) of the horizontal beam.
  6. guide the connection cable of the USB-socket carefully.
    - ☞ Therefore observe chapter *Checking the cable layout* on page 94.
  7. Establish the plugged connections for the power supply (3).
  8. Insert the Y-cable into the socket (4) of the power module.
    - ☞ In case of an existing lighted clothes guard plate the blind plug is to be pulled from the Y-cable and this connection used!
  9. Conduct a function test.



# ELECTRONIC MODULES

## Power modules

The power module < R-Net >[1] resp. VR2 [2] stores the settings of the driving parameters and adopts as the power electronic the addressing of the drive motor respectively on two motor wheelchairs the addressing of both drive motors. The inlets and outlets of the power module are short circuit proof, so that the lead fuse is not applicable.

## Programming the driving behaviour

The driving behaviour of the electronic vehicle can, vehicle dependently be adjusted through a programming device.

The parameter values of the delivery configuration are selected in such a fashion that the requirements of the EG-directive 93/42 (CE-marks) are fulfilled. Programming that differs from these requirements might not fulfil the regulations.

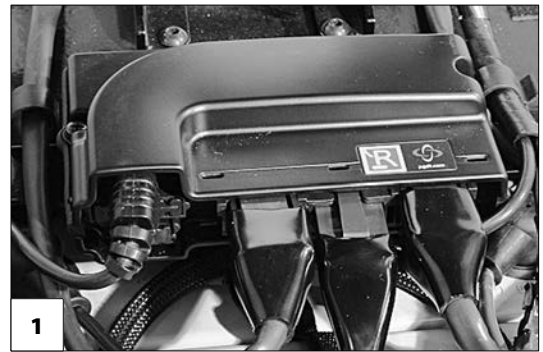
The driving behaviour of the wheelchair should be adjusted to the individual requirements and the learning process of the respective user at regular intervals.

In doing so the driving experience, the physical limits of the user and the main field of operation must be considered:

- ☞ When programming the delay value observe that on one hand extreme braking can endanger the driver, on the other hand the braking distance must correspond to the maximum values of EN 12184 (view chapter *Braking distance* on page 94).
- ☞ The programming must be specially tailored to the user. The capacity of reaction, the constitution as well as physical and psychical abilities are to be considered. A talk with the doctor or therapist can be very helpful.
- ☞ An adjustment to the manufacturer settings of the driving parameters changes the optimal driving behaviour of the vehicle.

Independent of this the safety of the wheelchair and especially the driver must be guaranteed after a change of the parameters.

- ☞ All changes to the parameters underlie solely the responsibility of the person making the modifications.
- ☞ Parameters can accidentally be adjusted to settings that cannot generally exempt hazards.



## Standard setting of the VR2 driving parameters

The parameter values in the following tables are selected so that the inspection requirements of the CE certification are fulfilled.

<b>Standard setting of the VR2 driving parameters up to 6 km/h</b>					
Number of Drive Profiles	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Acceleration (Acceleration speed forward)	2	4	6	8	10
Deceleration (Deceleration speed forward)	0	10	25	40	60
Turn Acceleration	3	6	9	12	15
Turn Deceleration	10	13	16	19	22
	<b>maximum / minimum</b>				
Forward Speed [%]	20 / 10	40 / 13	60 / 15	80 / 19	95 / 22
Reverse Speed [%]	15 / 10	20 / 15	25 / 20	30 / 25	35 / 30
Turn Speed [%]	8 / 4	11 / 7	14 / 10	17 / 13	20 / 16
Power [%]	100	100	100	100	100

<b>Standard setting of the VR2 driving parameters up to 10 km/h</b>					
Number of Drive Profiles	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Acceleration (Acceleration speed forward)	2	4	6	8	10
Deceleration (Deceleration speed forward)	20	30	40	50	60
Turn Acceleration	3	6	9	12	15
Turn Deceleration	10	15	20	25	30
	<b>maximum / minimum</b>				
Forward Speed [%]	20 / 20	40 / 20	60 / 20	80 / 20	100 / 20
Reverse Speed [%]	10 / 5	13 / 8	16 / 11	19 / 13	22 / 17
Turn Speed [%]	10 / 5	11 / 6	12 / 7	13 / 8	14 / 9
Power [%]	100	100	100	100	100



### Standard setting of the R-Net driving parameters, profile 1, 2, 8 w/o stability sensor (ESP)

The parameter values in the following tables are selected so that the inspection requirements of the CE certification are fulfilled.

Profile allocation	Profile
Universal	1
Omni	2
Accompanying person	8

Standard setting of the R-Net-driving parameter up to 6 km/h (only model 1.610 / 1.611 / 1.612 / 1.615 / 1.616) w/o stability sensor (ESP)					
Number of enable Drive Profiles	1	2			8
	maximum / minimum				
Forward Speed [%]	90 / 15	90 / 15			90 / 15
Reverse Speed [%]	30 / 10	30 / 10			30 / 10
Turn Speed [%]	20 / 10	20 / 10			20 / 10
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	60 / 5	50 / 5			60 / 5
Reverse Acceleration	10 / 0	10 / 0			10 / 0
Reverse Deceleration	20 / 0	20 / 0			20 / 0
Turn Acceleration	15 / 3	15 / 3			10 / 3
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	100	100			100

**Standard setting of the R-Net-driving parameter up to 6 km/h (only model 1.614) w/o stability sensor (ESP)**

Number of enable Drive Profiles	1	2			8
	maximum / minimum				
Forward Speed [%]	95 / 15	95 / 15			95 / 15
Reverse Speed [%]	30 / 10	30 / 10			30 / 10
Turn Speed [%]	20 / 10	20 / 10			20 / 10
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	60 / 5	50 / 5			50 / 5
Reverse Acceleration	10 / 0	10 / 0			10 / 0
Reverse Deceleration	20 / 0	20 / 0			20 / 0
Turn Acceleration	10 / 3	10 / 3			10 / 3
Turn Deceleration	20 / 5	20 / 5			20 / 5
Power [%]	100	100			100
Torque [%]	100	100			100

**Standard setting of the R-Net-driving parameter up to 6 km/h (only model 1.617) w/o stability sensor (ESP)**

Number of enable Drive Profiles	1	2			8
	maximum / minimum				
Forward Speed [%]	50 / 10	50 / 10			50 / 10
Reverse Speed [%]	30 / 5	30 / 5			30 / 5
Turn Speed [%]	15 / 5	15 / 5			15 / 5
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	30 / 5	30 / 5			30 / 5
Reverse Acceleration	10 / 5	10 / 5			10 / 5
Reverse Deceleration	10 / 5	10 / 5			10 / 5
Turn Acceleration	20 / 5	20 / 5			20 / 5
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	50	50			50

**Standard setting of the R-Net-driving parameter up to 10 km/h (only model 1.611 / 1.612 / 1.616) w/o stability sensor (ESP)**

Number of enable Drive Profiles	1	2			8
	maximum / minimum				
Forward Speed [%]	95 / 10	95 / 10			95 / 10
Reverse Speed [%]	20 / 10	20 / 10			20 / 10
Turn Speed [%]	14 / 5	14 / 5			14 / 5
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	60 / 10	60 / 10			60 / 10
Reverse Acceleration	10 / 0	10 / 0			10 / 0
Reverse Deceleration	10 / 5	10 / 5			10 / 5
Turn Acceleration	10 / 3	10 / 3			10 / 3
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	100	100			100

<b>Standard setting of the R-Net-driving parameter up to 10 km/h (only model 1.614) w/o stability sensor (ESP)</b>					
Number of enable Drive Profiles	<b>1</b>	<b>2</b>			<b>8</b>
	<b>maximum / minimum</b>				
Forward Speed [%]	95 / 10	95 / 10			95 / 10
Reverse Speed [%]	20 / 10	20 / 10			20 / 10
Turn Speed [%]	15 / 5	15 / 5			15 / 5
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	60 / 10	50 / 10			50 / 10
Reverse Acceleration	10 / 0	10 / 0			10 / 0
Reverse Deceleration	10 / 5	10 / 5			10 / 5
Turn Acceleration	10 / 5	10 / 5			10 / 5
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	100	100			100

**Standard setting of the R-Net-driving parameter up to 13 km/h (only model 1.615) w/o stability sensor (ESP)**

Number of enable Drive Profiles	1	2			8
	<b>maximum / minimum</b>				
Forward Speed [%]	100 / 10	100 / 10			46 / 10
Reverse Speed [%]	20 / 10	20 / 10			20 / 10
Turn Speed [%]	15 / 5	15 / 5			15 / 5
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	50 / 10	50 / 10			50 / 10
Reverse Acceleration	10 / 0	10 / 0			10 / 0
Reverse Deceleration	10 / 5	10 / 5			10 / 5
Turn Acceleration	10 / 5	10 / 5			10 / 5
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	100	100			100

<b>Standard setting of the R-Net-driving parameter up to 10 km/h (only model 1.617) w/o stability sensor (ESP)</b>					
Number of enable Drive Profiles	<b>1</b>	<b>2</b>			<b>8</b>
	<b>maximum / minimum</b>				
Forward Speed [%]	80 / 10	80 / 10			80 / 10
Reverse Speed [%]	30 / 5	30 / 5			30 / 5
Turn Speed [%]	15 / 5	15 / 5			15 / 5
Forward Acceleration	10 / 0	10 / 0			10 / 0
Forward Deceleration	30 / 5	30 / 5			30 / 5
Reverse Acceleration	10 / 5	10 / 5			10 / 5
Reverse Deceleration	10 / 5	10 / 5			10 / 5
Turn Acceleration	20 / 5	20 / 5			20 / 5
Turn Deceleration	15 / 5	15 / 5			15 / 5
Power [%]	100	100			100
Torque [%]	50	50			50

## Standard setting of the R-Net driving parameters, profile 1, 2, 3, 8 with stability sensor (ESP)

☞ Stability sensor (ESP) only in combination with LCD-operating module or OMNI operating module

The parameter values in the following tables are selected so that the inspection requirements of the CE certification are fulfilled.

Profile allocation	Profile
Universal	1
Omni	2
ESP-Sensor off	3
Accompanying person	8

<b>Standard setting of the R-Net-driving parameter up to 6 km/h (only model 1.610 / 1.611 / 1.612 / 1.615 / 1.616) with stability sensor (ESP)</b>					
Number of enable Drive Profiles	1	2	3		8
	maximum / minimum				
Forward Speed [%]	90 / 15	90 / 15	90 / 15		90 / 15
Reverse Speed [%]	30 / 10	30 / 10	30 / 10		30 / 10
Turn Speed [%]	20 / 10	20 / 10	20 / 10		20 / 10
Forward Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Forward Deceleration	60 / 5	50 / 5	60 / 5		60 / 5
Reverse Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Reverse Deceleration	20 / 0	20 / 0	10 / 0		20 / 0
Turn Acceleration	15 / 3	15 / 3	15 / 3		10 / 3
Turn Deceleration	15 / 5	15 / 5	15 / 5		15 / 5
Power [%]	100	100	100		100
Torque [%]	0	0	100		100



**Standard setting of the R-Net-driving parameter up to 10 km/h (only model 1.610 / 1.611 / 1.612 / 1.616) with stability sensor (ESP)**

Number of enable Drive Profiles	1	2	3		8
	<b>maximum / minimum</b>				
Forward Speed [%]	95 / 10	95 / 10	95 / 10		95 / 10
Reverse Speed [%]	20 / 10	20 / 10	20 / 10		20 / 10
Turn Speed [%]	14 / 5	14 / 5	14 / 5		14 / 5
Forward Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Forward Deceleration	60 / 10	60 / 10	60 / 0		60 / 10
Reverse Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Reverse Deceleration	10 / 5	10 / 5	10 / 5		10 / 5
Turn Acceleration	10 / 3	10 / 3	10 / 3		10 / 3
Turn Deceleration	15 / 5	15 / 5	15 / 5		15 / 5
Power [%]	100	100	100		100
Torque [%]	0	0	100		100

**Standard setting of the R-Net-driving parameter up to 13 km/h (only model 1.615) with stability sensor (ESP)**

Number of enable Drive Profiles	1	2	3		8
	maximum / minimum				
Forward Speed [%]	100 / 10	100 / 10	100 / 10		46 / 10
Reverse Speed [%]	20 / 10	20 / 10	20 / 10		20 / 10
Turn Speed [%]	15 / 5	15 / 5	15 / 10		15 / 5
Forward Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Forward Deceleration	50 / 10	50 / 10	50 / 10		50 / 10
Reverse Acceleration	10 / 0	10 / 0	10 / 0		10 / 0
Reverse Deceleration	10 / 5	10 / 5	10 / 5		10 / 5
Turn Acceleration	10 / 5	10 / 5	10 / 5		10 / 5
Turn Deceleration	15 / 5	15 / 5	15 / 5		15 / 5
Power [%]	100	100	100		100
Torque [%]	0	0	100		100

## Power module, replacing the lighting, resp. lighting/adjustment module

1. Before replacing a module all plugged connections are to be disconnected.
  - ☞ In doing so it is recommended to place each plug that is pulled directly into the new module.
    - ☞ This prevents establishing incorrect plugged connections.
2. Afterwards remove the screws of the defective module.
3. Remount the new module analogue in reverse order.

### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.

### Power module 1.610 / 1.611 / 1.614 / 1.615 / 1.616

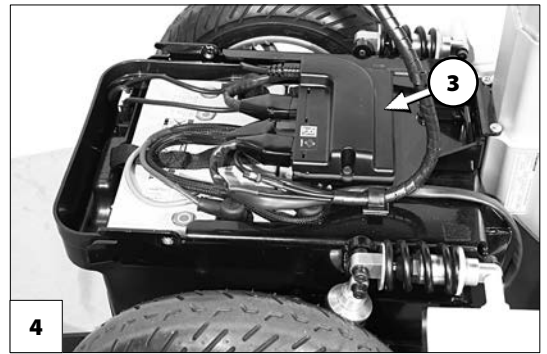
The power module (1) is mounted according to the hole order onto the frame plate [2].

### Power module 1.612

The power module (3) is mounted in front of the battery cover onto the frame plate [4].

### Power module 1.617

The power module is mounted from the inside onto the rear cover [5].



## Lighting- / adjustment module R-Net

All electric adjustments are electronically protected through the adjustment module (1).

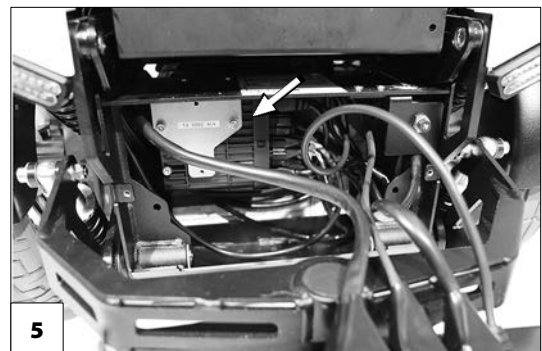
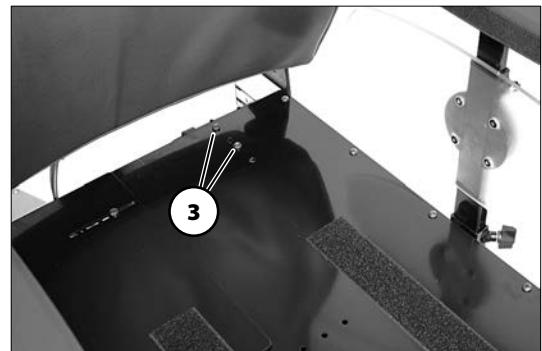
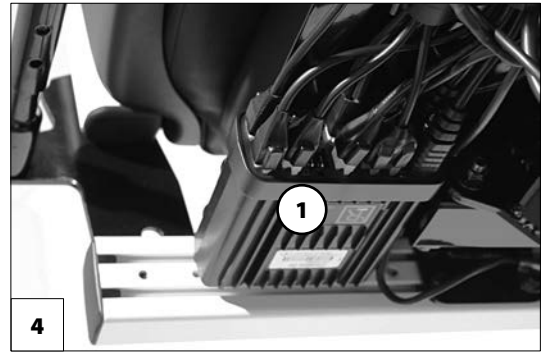
- ☞ If the wheelchair is not equipped with seatlift, the blind plug item no. 1071617 of the old module must be inserted into socket < *Inhibit 4* > [6] of the new module.

The adjustment module is mounted, depending on model, as follows:

Model 1.610 / 1.611 / 1.614 / 1.615  
beside the power module [2].

Model 1.612 / 1.616  
on the left underneath the seat plate [4], with two screws (3).

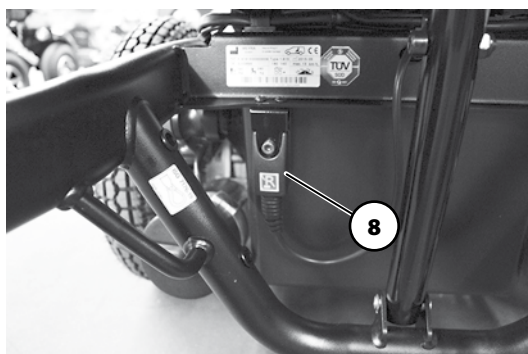
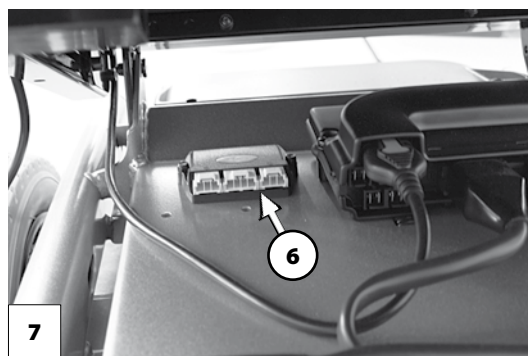
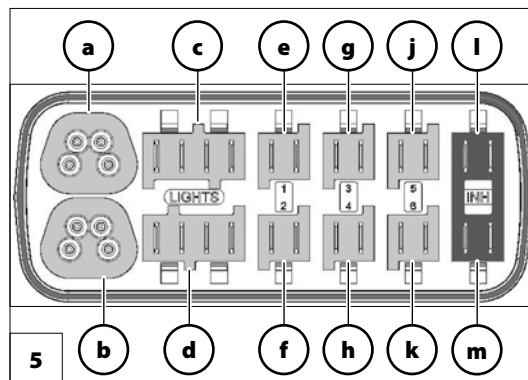
Model 1.617  
behind the rear cover, left onto the angle tin of the control housing [5].



## Plug allocation of the lighting/adjustment module R-Net

Overview of the plug allocation of the lighting/adjustment module R-Net [5]:

- (a) R-Net Bus
- (b) R-Net Bus
- (c) left lighting
- (d) right lighting
- (e) adjustment motor: electric back support
- (f) adjustment motor: camber
- (h) adjustment motor: left leg support
- (g) adjustment motor: right leg support
- (j) adjustment motor: seatlift
- (k) adjustment motor: Recaro 12 V
- (l) Inhibit 4: switch seatlift (without seatlift the blind plug item no. 1071671 must be inserted)
- (m) Inhibit 5: Tilting switch



## Lighting module VR2

The lighting module VR2 (6) is used in combination with the operating module VR2 and mounted beside the power module onto the frame plate (model 1.610 / 1.611 / 1.615 / 1.616) [7] resp. fastened onto the power module with velcro straps (model 1.612).

## Electronic driving stability sensor (ESP)

The driving stability sensor (ESP) is attached to the front right onto the main frame with angled mounting plates (8).

- 🛠 Retrospective fitting of the electric wheelchair with a driving stability sensor may only be carried out at our site!

## Replacing the driving stability sensor

1. Pull the connector cable of the driving stability sensor.
2. Unscrew the driving stability sensor onto the main frame with the angled mounting plate.
3. Mount the new driving stability sensor with the angled mounting plate in the same place.

### Attention:

- ⚠ Assembly of the driving stability sensor is only permitted in the assembly position shown. Other assembly positions lead to a malfunction of the driving stability sensor!
4. Re-establish the electric connection.
  5. Switch the electric wheelchair off and on again.
  6. Conduct a driving test.

## Electronic driving stability sensor (ESP)

The driving stability sensor (ESP) is attached to the front right onto the main frame with angled mounting plates [1]

- ✎ Retrospective fitting of the electric wheelchair with a driving stability sensor may only be carried out at our site!

### Replacing the driving stability sensor

1. Pull the connector cable of the driving stability sensor.
2. Unscrew the driving stability sensor onto the main frame with the angled mounting plate.
3. Mount the new driving stability sensor with the angled mounting plate in the same place.

#### Attention:

- ! Assembly of the driving stability sensor is only permitted in the assembly position shown. Other assembly positions lead to a malfunction of the driving stability sensor!
4. Re-establish the electric connection.
  5. Switch the electric wheelchair off and on again.
  6. Conduct a driving test.



# ELECTRICAL ADJUSTMENTS

## Adjusting the angle of the back support

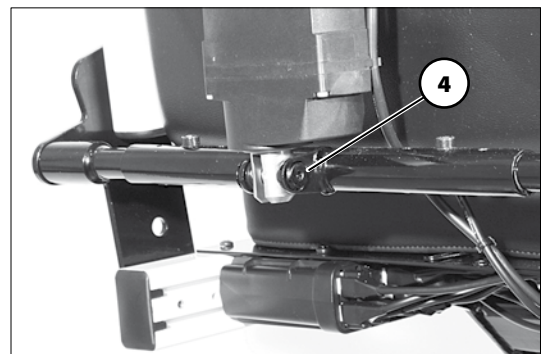
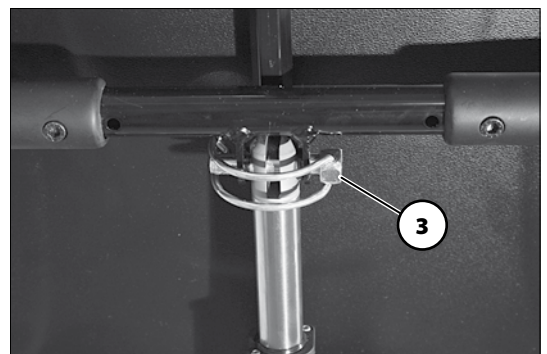
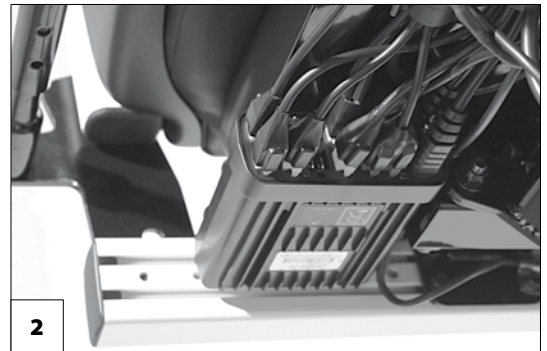
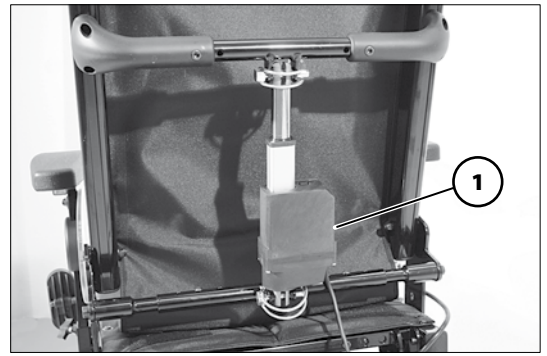
### Replacing the adjustment for angle adjustment

1. Pull the connection plug of the adjustment motor (1) for angle adjustment out of the adjustment module underneath the seat plate [2].
  2. Remove the tube folding plug (3) and screw (4) for attachment of the adjustment motor for angle adjustment.
- ☞ In doing so watch for cables that might still be attached.
    - If required, remove corresponding cable binders.

Assembly of the adjustment motor is done analogue in reverse order.

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.



## Seat inclination (camber), model 1.610 / 1.611 / 1.614 / 1.615 / 1.616

### Replacing the adjustment motor for seat inclination

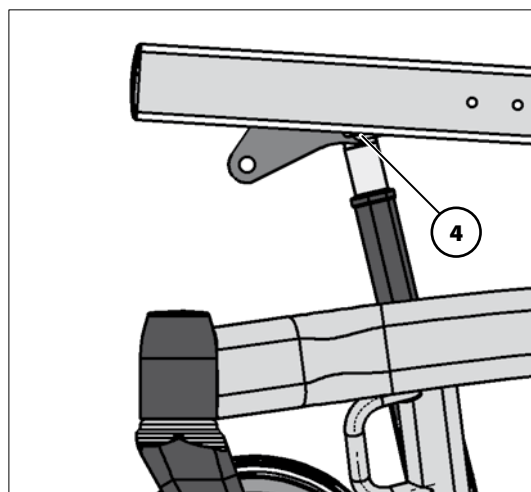
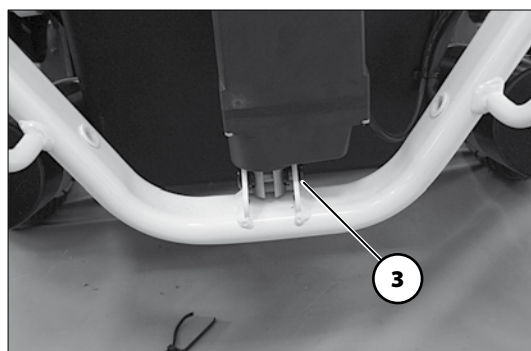
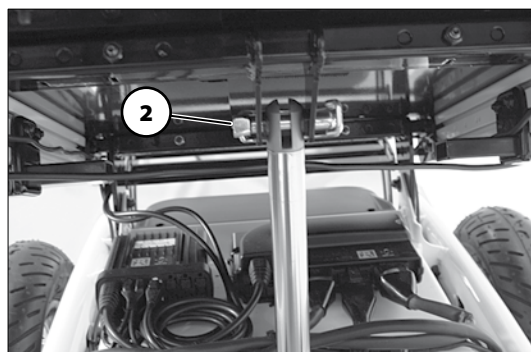
1. Pull the connection plug of the corresponding adjustment motor for seat inclination [1] out of the adjustment module and guide it to the front.
  2. Remove the tube folding plug (2) as well as screw (3) for attachment of the adjustment motor for seat inclination.
- ☞ In doing so watch for cables that might still be attached.
    - If required, remove corresponding cable binders.

Assembly of the adjustment motor is done analogue in reverse order.

- ☞ Only mount the lifting rod to the rear attachment position (4).

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
- ☞ Otherwise danger of fire through short circuits!
  - ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.





## Adjusting the front seat height, model 1.610 / 1.611 / 1.615

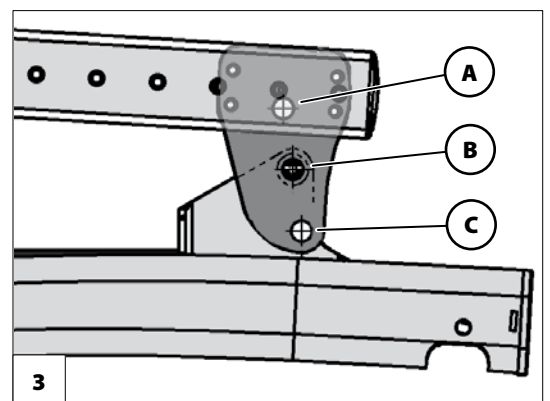
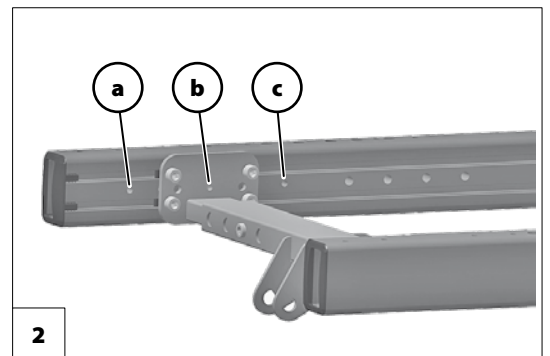
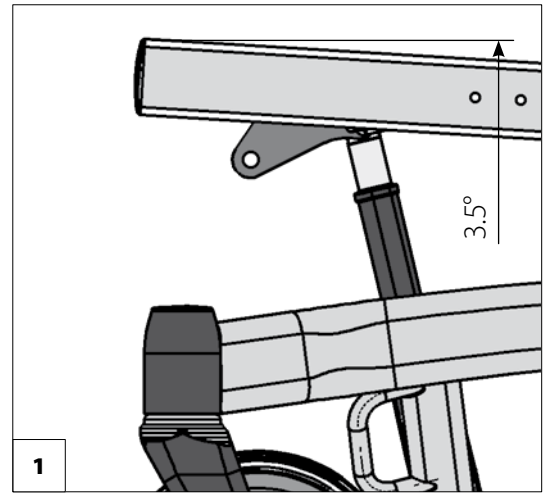
The front seat height can be determined from table < *Front seat height* >, depending on the size of the steering wheel, position of the horizontal beam [2] and rear seat frame position [3].

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

**Table: Front seat height**

Front seat height in (mm) with 3.5° seat inclination [1]				
rear seat frame position [3]	Position horizontal beam [2]	Steering wheel 8" ø 203 mm	Steering wheel 9" ø 229 mm	Steering wheel 10" ø 254 mm
A	a	430	440	460
B	b	<b>470</b>	<b>480</b>	<b>500</b>
C	c	500	510	530

✎ Bring the center hole of the horizontal beam in line with the corresponding hole in the seat frame [2].



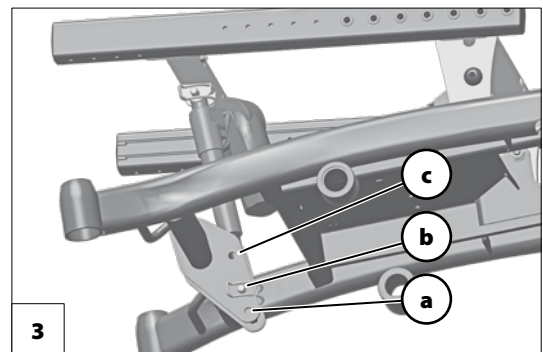
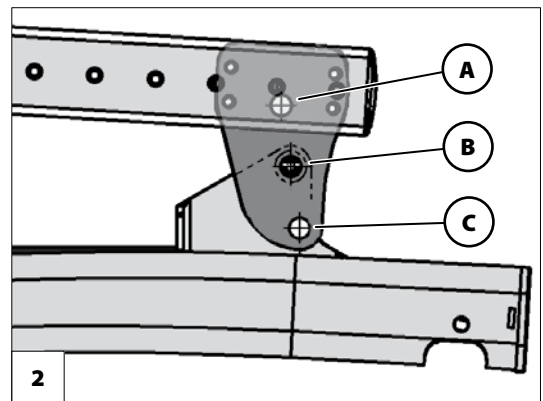
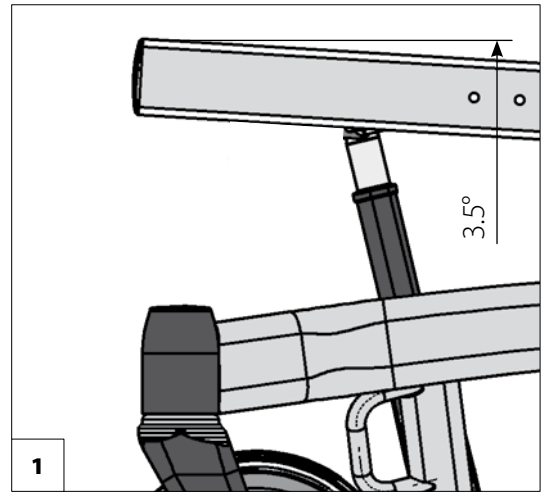
## Adjusting the front seat height, model 1.614

The corresponding front seat height can be assigned from table < Front seat height >, depending on the rear seat frame position [2] and the position of the adjustment motor.

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

**Table: Front seat height**

Front seat height in (mm) with 3.5° seat inclination [1]		
rear seat frame position [2]	Position adjustment motor [3]	Steering wheel 10" ø 254 mm
A	a	460
B	b	<b>510</b>
C	c	560



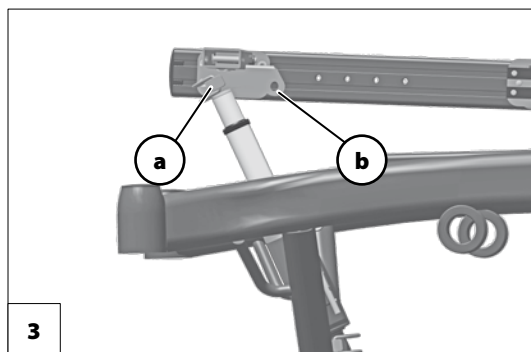
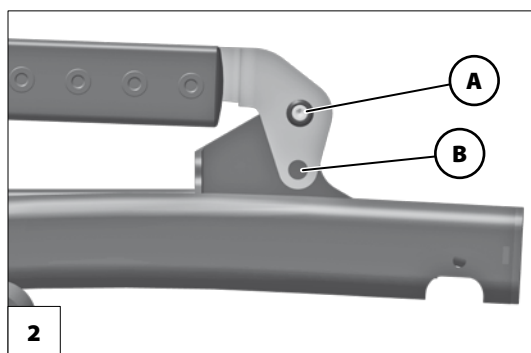
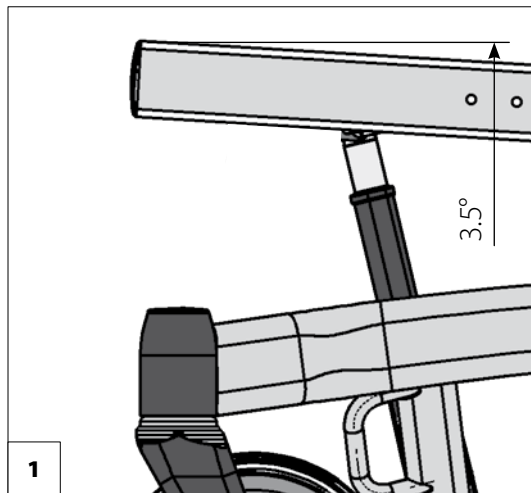
### Adjusting the front seat height, model 1.616

The front seat height can be determined from table < *Front seat height* >, depending on the size of the steering wheel, the rear seat frame position [2] and the position of the adjustment motor [3].

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

**Table: Front seat height**

Front seat height in (mm) with 3.5° seat inclination [1]			
rear seat frame position [2]	Position adjustment motor [3]	Steering wheel 8" ø 203 mm	Steering wheel 9" ø 229 mm
A	a	<b>430</b>	<b>440</b>
B	b	470	480



## Seat inclination (camber), model 1.612

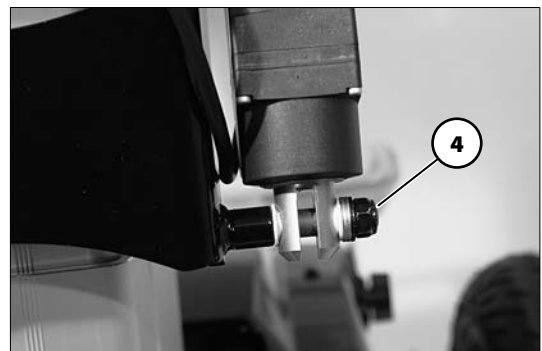
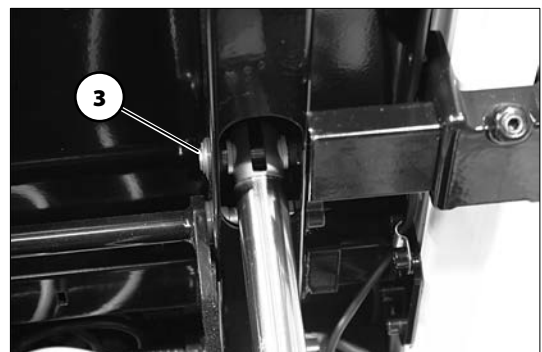
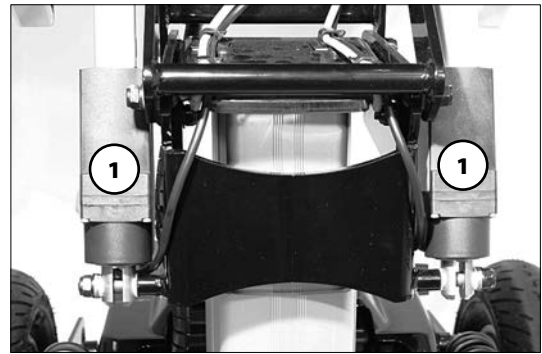
### Replacing the adjustment motor for seat inclination

Drive the lifting rod into the highest position in order to replace the adjustment module (1) for seat inclination.

1. Pull the connection plug of the respective adjustment motor (1) out of the adjustment module underneath the seat plate [2] and guide it forward.
  2. Remove the respective screw (3) + (4) for attachment of the adjustment motor for seat inclination.
- ☞ In doing so watch for cables that might still be attached.  
– If required, remove corresponding cable binders.
3. Assembly of the adjustment motor is done analogue in reverse order.

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed [5].
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.



## Seat inclination (camber), model 1.617

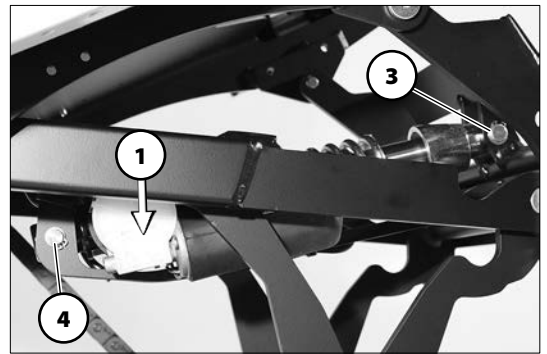
### Replacing the adjustment motor for seat inclination

Drive the seat into the highest position in order to replace the adjustment module (1) for seat inclination.

1. Pull the connection plug of the corresponding adjustment motor (1) off of the adjustment module [2].
  2. Remove the respective bolt (3) + (4) for attachment of the adjustment motor for seat inclination.
- ☞ In doing so watch for cables that might still be attached.  
– If required, remove corresponding cable binders.
3. Assembly of the adjustment motor is done analogue in reverse order.

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
- ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
- ☞ Therefore observe chapter *Functional checks* on page 94.



## Seat height, model 1.617

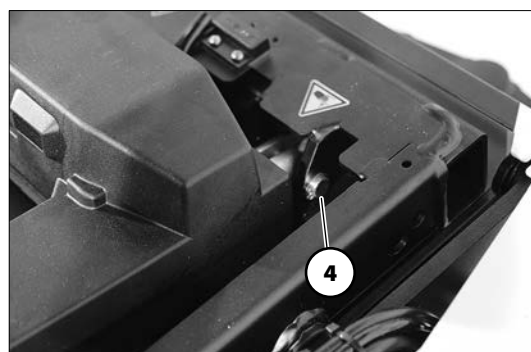
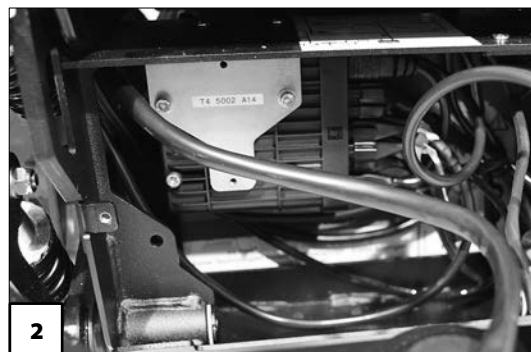
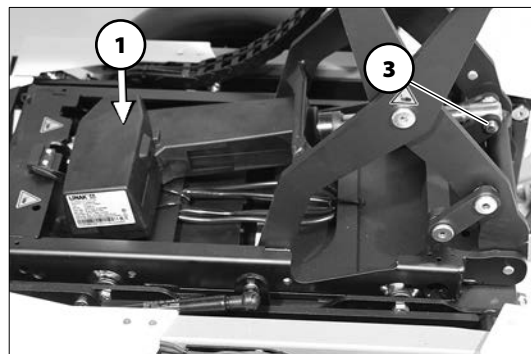
### Replacing the adjustment motor for seat height

Drive the seat into the highest position and secure it in place in order to replace the adjustment module (1) for seat height.

1. Pull the connection plug of the corresponding adjustment motor (1) off of the adjustment module [2].
  2. Remove the respective bolt (3) + (4) for attachment of the adjustment motor for seat inclination.
- ☞ In doing so watch for cables that might still be attached.  
– If required, remove corresponding cable binders.
3. Assembly of the adjustment motor is done analogue in reverse order.

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
  - ☞ Otherwise danger of fire through short circuits!
- ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.



## Lifting rod, model 1.612

For disassembly of the seat unit it is recommended to take off all removable parts [1]

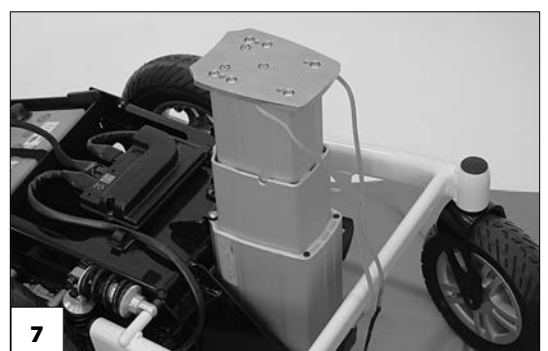
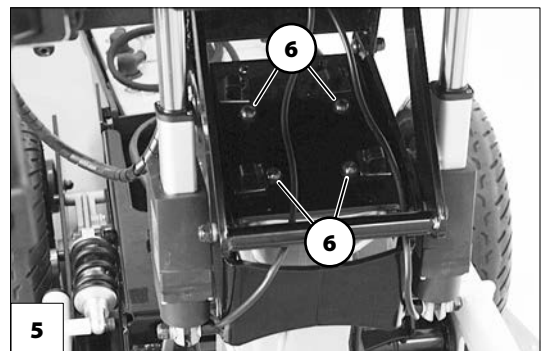
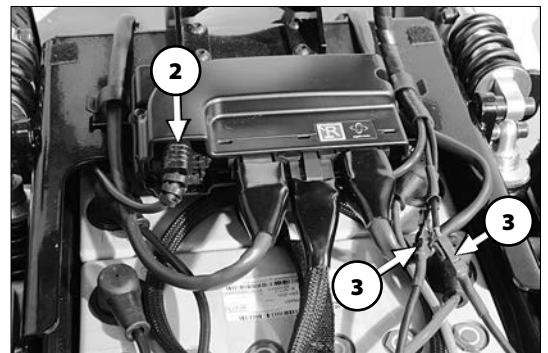
### Removing the lifting rod

For removal, drive the lifting rod and inclination into the respective highest position [1].

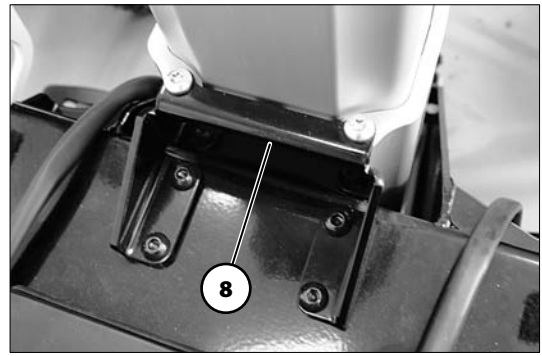
1. Pull the connection plug of the adjustment module (2) off of the power module.
2. Pull the plugged connections of the back lights (3) and place the cable harness to the top onto the seat plate.
3. Pull the connection plugs from the micro switch, for height regulation of the lifting rod, off of the adjustment module underneath the seat plate [4] and guide it to the front [5].

☞ Therefore observe chapter *Power module, replacing the lighting, resp. lighting/adjustment module* on page 67.

4. Disassemble the screws (6) for attachment of the seat frame.
5. Carefully remove the seat unit [7] and put it aside.



- ☞ In doing so watch for cables that might still be attached. – If required, remove corresponding cable binders.
6. Remove the four lower screws of the lifting rod.
    - ☞ While doing so have someone help you secure the actuator against unwanted tilting.
  7. Dismantle the clamp (8).
  8. Carefully lift out the actuator and place it to the side.
- ☞ **Note:**  
During disassembly of the lifting rod the connection cable is on the left-hand side, in driving direction.



### Mounting the lifting rod

Assembly of the lifting rod is done analogue in reverse order to chapter *Removing the lifting rod* on page 79.

- ☞ Make sure that the collar (9) fits correctly and that distancers are located underneath the lower clamp (8).



### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed (10).
- ☞ Otherwise danger of fire through short circuits!
  - ☞ Previously removed cable ties are to be replaced.
- ☞ Then carry out a function test.
  - ☞ Therefore observe chapter *Functional checks* on page 94.





## Seat height, model 1.612

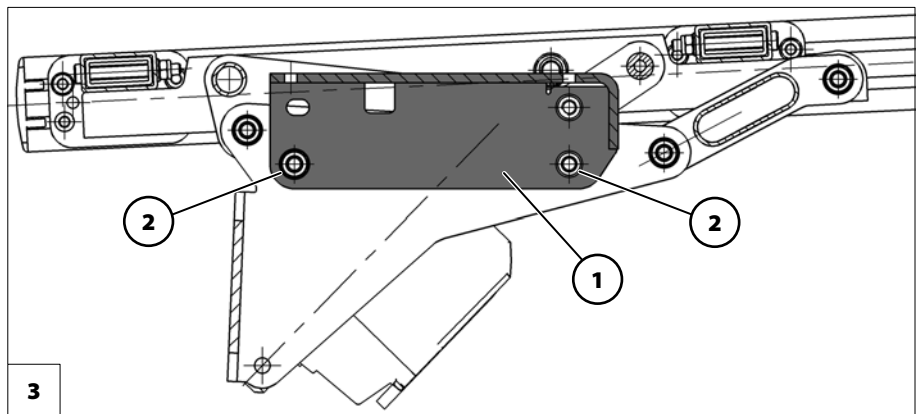
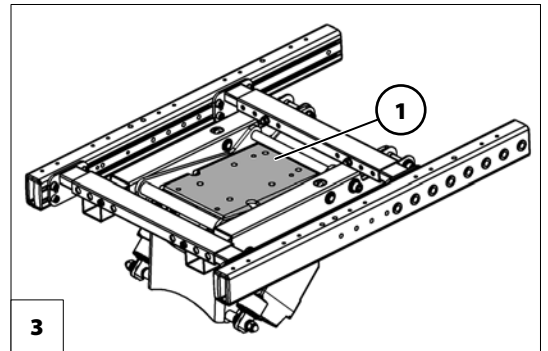
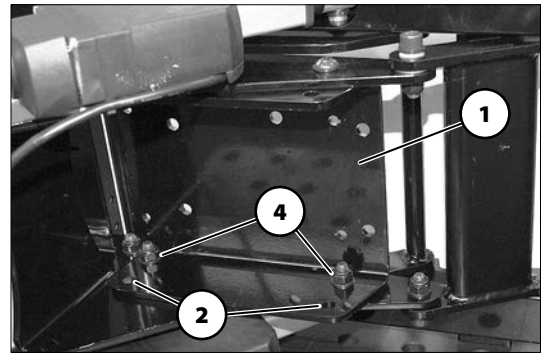
### Adjustment of the seat height

#### Lifting rod with electric inclination

To adjust the seat height the attachment plate (1) is to be positioned as follows:

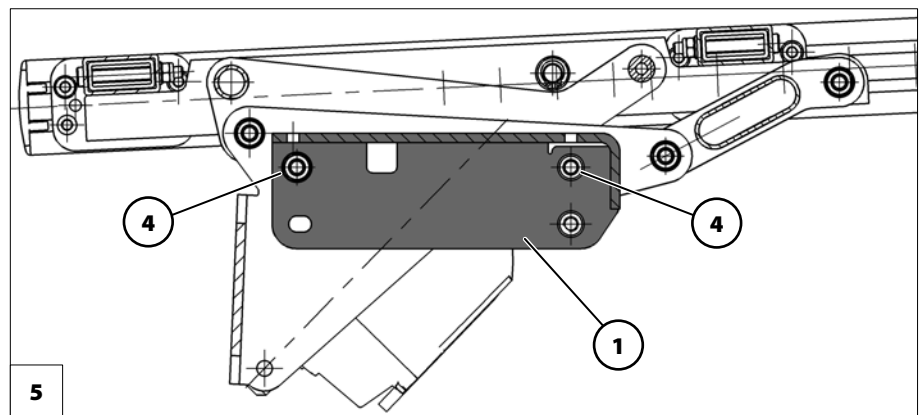
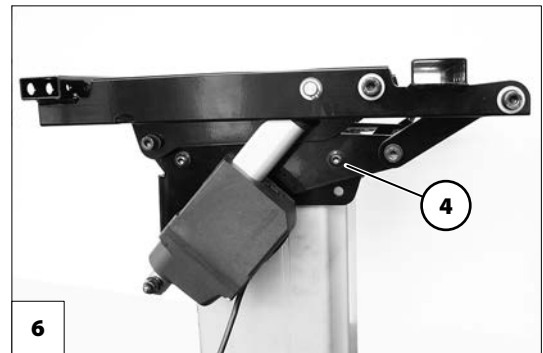
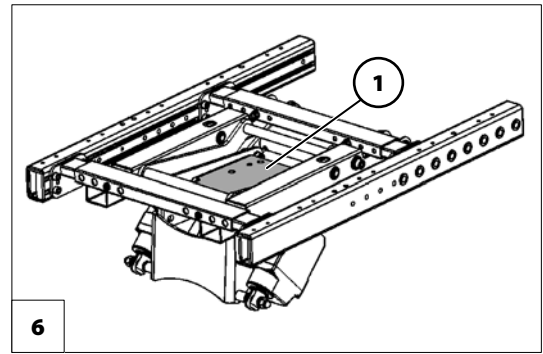
#### Seat height 45 cm

The attachment plate (1) is mounted to the lowest attachment hole (2) [3].



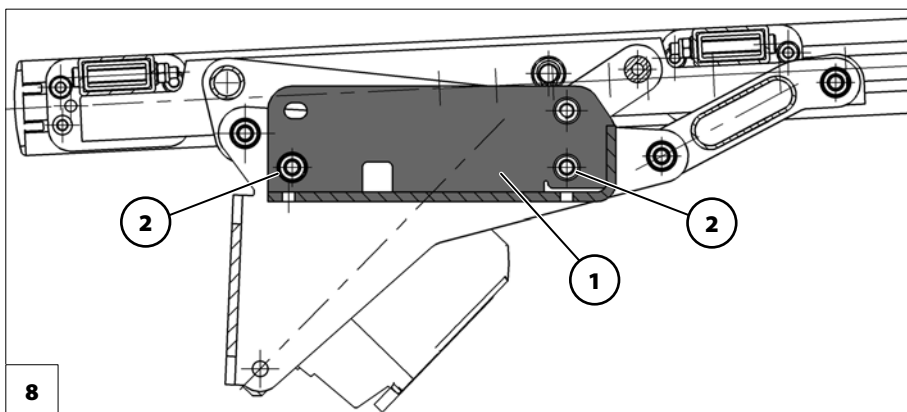
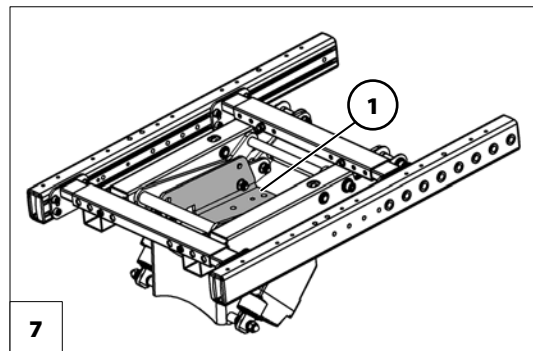
Seat height 48 cm

The attachment plate (1) is mounted to the topmost attachment hole (4) [5]+[6].



Seat height 51 cm

For this the attachment plate (1) is mounted turned vertically by 180° to the attachment holes (2) [7]+[8].



### Lifting rod without electric inclination

To adjust the seat height the attachment plate (1) is to be positioned as follows:

#### Seat height 45 cm

The attachment plate (1) is mounted to the topmost attachment hole (2) [3].

#### Seat height 48 cm

The attachment plate (1) is mounted to the lowest attachment hole (4) [5].

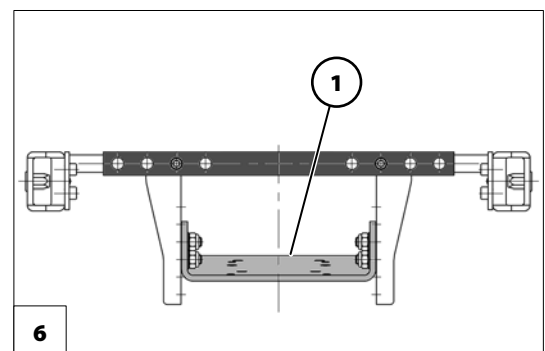
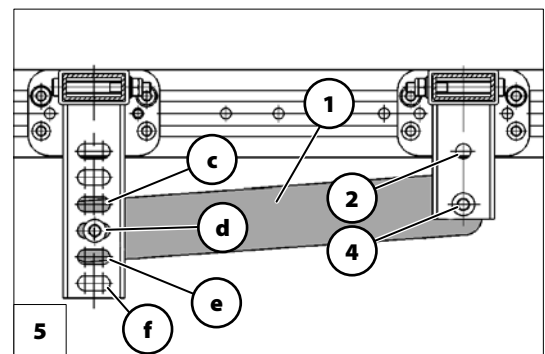
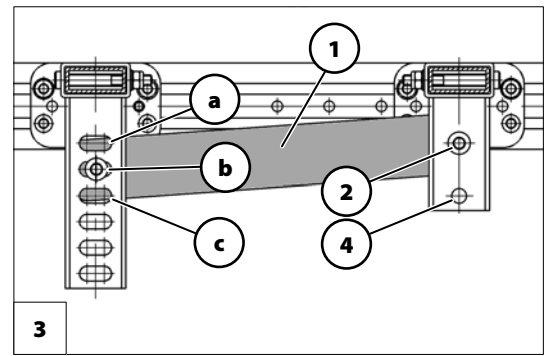
#### Seat height 51 cm

For this the attachment plate (1) is mounted turned vertical-ly by 180° to the attachment holes (4) [6].

### Adjustment of seat inclination

The following seat inclination angles are possible by repositioning the front screws:

	Seat angle			
Seat height	0°	4°	8°	12°
[cm]	Assembly position			
45	a	b	c	
48	c	d	e	
51		d	e	f



## MECHANICAL SEAT INCLINATION ADJUSTMENTS

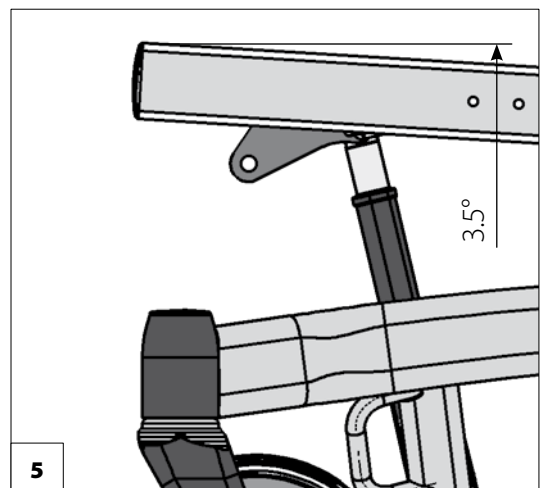
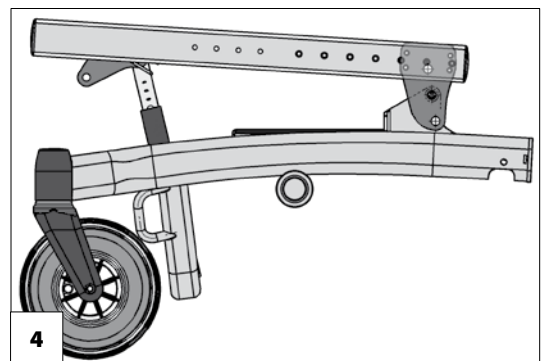
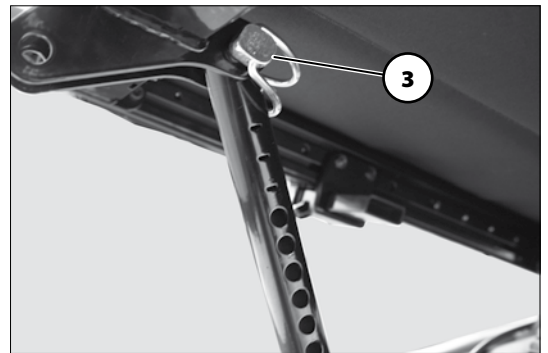
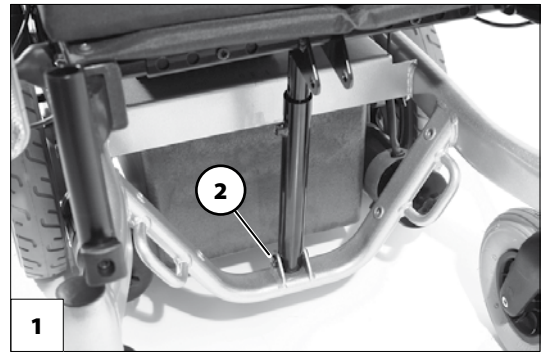
Seat inclination (camber),  
model 1.610 / 1.611 / 1.614 / 1.615 / 1.616

### Replacing the telescopic tube of the seat inclination

To replace the telescopic tube of the seat inclination [1] remove the lower bolt (2) and the upper spring bolt/tube folding plug (3).

Assembly of the adjustment [4] is done analogue in reverse order.

- Only mount the telescopic tube to the rear attachment position (3).
  - Therefore observe the table of front seat heights as well as pic. [5] + [6] + [7].
  - The front seat heights in the tables are all determined with 3.5° seat inclination [5].
- Then carry out a function test.
  - Therefore observe chapter *Functional checks* on page 94.



## Adjusting the front seat height, model 1.610 / 1.611 / 1.615

In order to adjust the front seat height the corresponding screw (Z) needs to be removed.

The hole in the telescopic tube [1] (column Pos.) for the screw [Z] can be determined from the table < Front seat height >, depending on the steering wheel size, the rear seat frame position [2] and the position of the horizontal beam [3] for the corresponding front seat height.

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

Pic. [1] shows the telescopic tube with marks and holes for an exact adjustment.

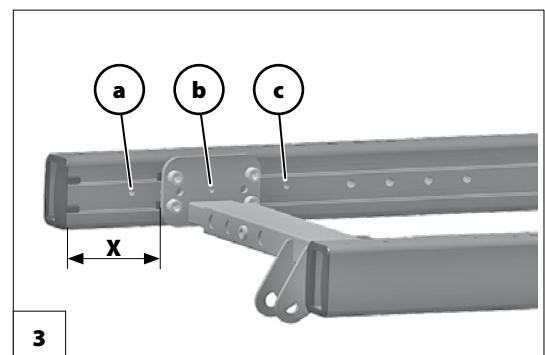
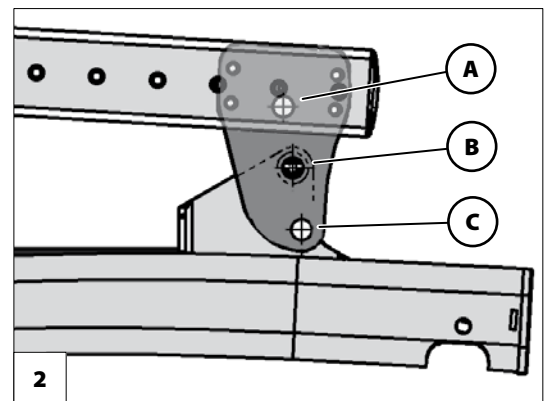
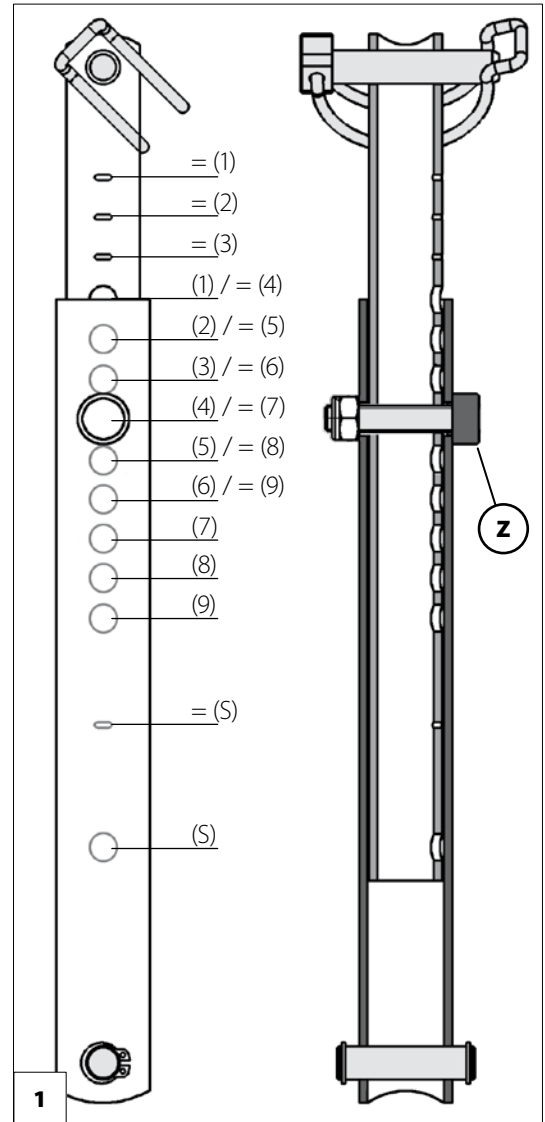
☞ Symbol descriptions:

- = Mark for the hole ( )
- ( ) Pos. of the hole
- = (S) Mark for the service setting
- (S) Hole for the service setting

**Table: Front seat height**

Front seat height in (mm) with 3.5° seat inclination									
Pos. [1]	Steering wheel 8" ø 203 mm			Steering wheel 9" ø 229 mm			Steering wheel 10" ø 254 mm		
	A - a	B - b	C - c	A - a	B - b	C - c	A - a	B - b	C - c
1							460		
2				440				<b>500</b>	
3	430				<b>480</b>				530
4		<b>470</b>				510			
5			500						
6									

☞ Bring the center hole of the horizontal beam in line with the corresponding hole in the seat frame [3]. The hole of pos. b corresponds to dimension X = 72.5 mm. The further holes are 60 mm in front or back.



## Adjusting the front seat height, model 1.614

In order to adjust the front seat height the corresponding screw (Z) needs to be removed.

The hole in the telescopic tube [1] (column Pos.) for the screw [Z] can be determined from the table < *Front seat height* >, depending on the steering wheel size, the rear seat frame position [2] and the position of the telescopic tube [3] for the corresponding front seat height.

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

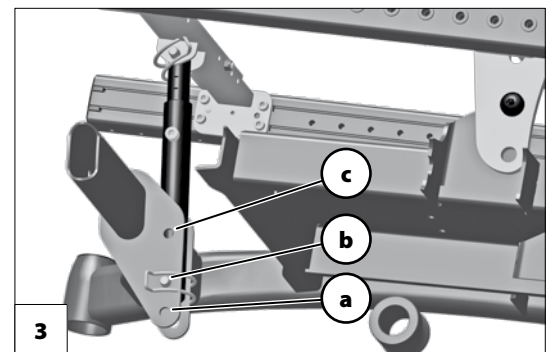
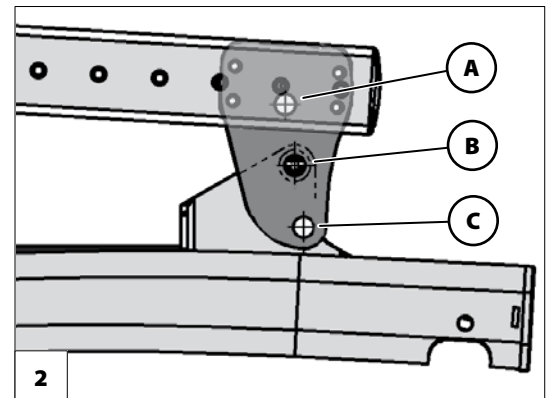
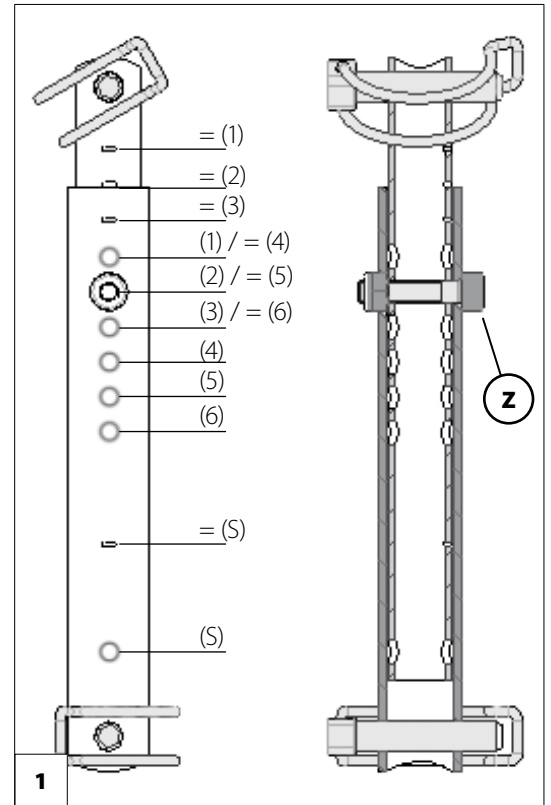
Pic. [1] shows the telescopic tube with marks and holes for an exact adjustment.

☞ Symbol descriptions:

- =      Mark for the hole ( )
- ( )     Pos. of the hole
- = (S)   Mark for the service setting
- (S)     Hole for the service setting

**Table: Front seat height**

Front seat height in (mm) with 3.5° seat inclination			
	Steering wheel 10" ø 254 mm		
	rear seat frame position [2] – position telescopic tube [3]		
Pos. [1]	A - a	B - b	C - c
1	460		
2			
3		<b>510</b>	560
4			
5			
6			



## Adjusting the front seat height, model 1.616

In order to adjust the front seat height the corresponding screw (Z) needs to be removed.

The hole in the telescopic tube [1] (column Pos.) for the screw [Z] can be determined from the table < *Front seat height* >, depending on the steering wheel size, the rear seat frame position [2] and the position of the telescopic tube [3] for the corresponding front seat height.

The bold printed figures for height (in mm) within the table correspond to the manufacturer setting.

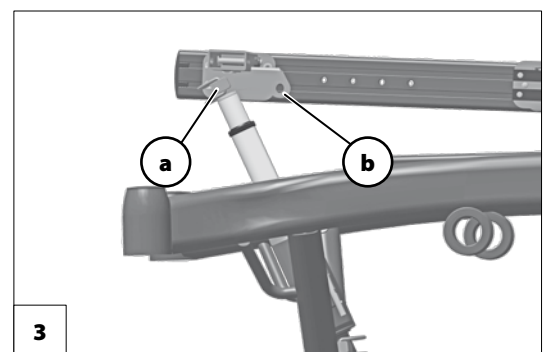
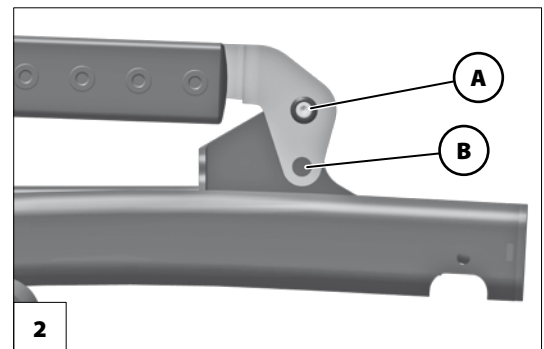
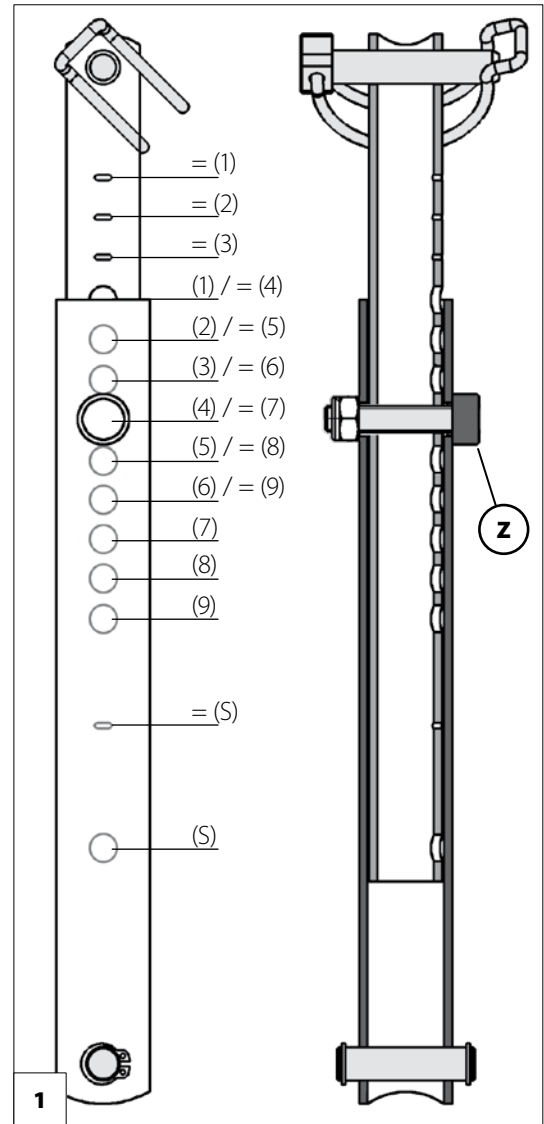
Pic. [1] shows the telescopic tube with marks and holes for an exact adjustment.

☞ Symbol descriptions:

- = Mark for the hole ( )
- ( ) Pos. of the hole
- = (S) Mark for the service setting
- (S) Hole for the service setting

**Table: Front seat height**

Front seat height in (mm) with 4° seat inclination				
Pos. [1]	Steering wheel 8" ∅ 203 mm		Steering wheel 9" ∅ 229 mm	
	rear seat frame position [2] – position telescopic tube [3]			
	A - a	B - b	A - a	B - b
1				
2				
3			<b>435</b>	
4	<b>420</b>			470
5		455		
6				





# ERROR INDICATION

## Error indication R-Net

### LCD-Display

Errors will be shown in the LCD-display (15) of the operating module in the following error code.



- (a) Shows the cause of the error.
- (b) Shows the error code.

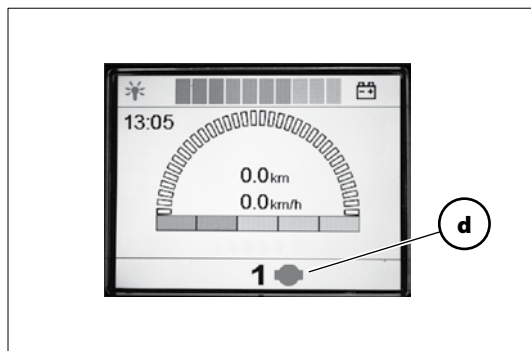
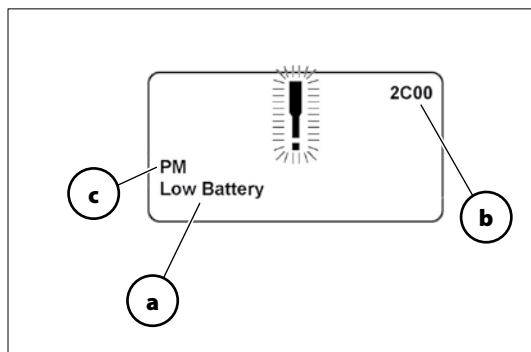
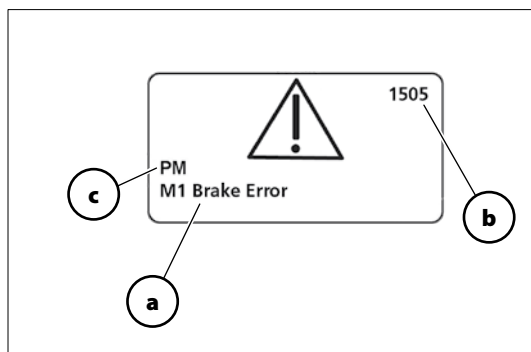
Error-Code	Cause of error
1E01	The battery charger is still connected.
2C00	Battery discharged.
1505 1506	A magnetic brake is disengaged and the push mode activated.
3800 3C00	A motor or its cable connection is defect.
7205	Lamp short circuit, left side
7209	Lamp short circuit, right side
7206	Short circuit in cable, left side
720A	Short circuit in cable, right side
7207	No connection signal, left side
7208	No connection signal, right side

- (c) Shows the location of the error.

Display	Location of error
JSM	Operating module
PM	Power module
ISM	Lighting / Adjustment module
STLM	Lighting / Steering module
DUAL	Control unit for accompanying person

- (d) Shows the type of error.

Display	Type of error
	Overload of the drives
	System performance reduced. Self protection against overheating



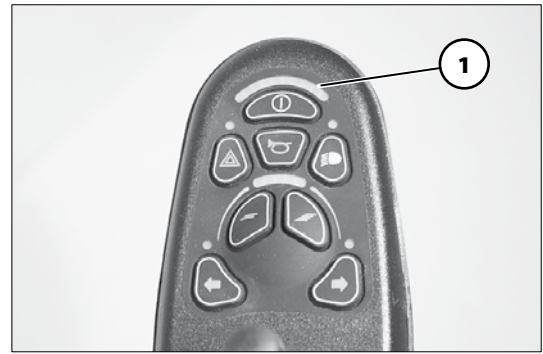
## R-Net LED and VR2

In case of an error the number of blinking light segments (1), (2), (3) indicate the possible cause of the malfunction.

☞ Therefore observe table < *Error diagnostics* >.








☞ **Note:**

If the malfunction cannot be repaired and the vehicle no longer operated, contact your national Meyra-Ortopedia sales partner.



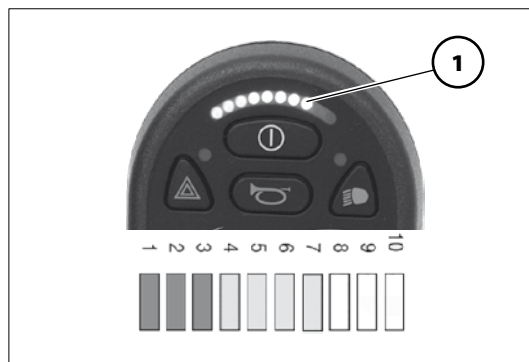
### Error diagnostics

LED	Cause of error	Fault correction
<b>1 LED</b> ●	The battery voltage is too low.	Check the plug on the operating module and the battery connections. Charge the batteries.
<b>2 LED</b> ●●	The electrical connection to the left motor is open-circuit.	Check the motor connection cable, motor cable plug and motor.
<b>3 LED</b> ●●●	The electrical connection to the left motor is defective (short-circuit).	Check the motor connection cable, motor cable plug and motor.
<b>4 LED</b> ●●●●	The electrical connection to the right motor is open-circuit.	Check the motor connection cable, motor cable plug and motor.
<b>5 LED</b> ●●●●●	The electrical connection to the right motor is defective (short-circuit).	Check the motor connection cable, motor cable plug and motor.
<b>6 LED</b> ●●●●●●	The drive disable function is active.	The drive disable function is an electronic security function that prevents the wheelchair from being driven when a battery charger is connected.

LED	Cause of error	Fault correction
<b>7 LED</b> 	A system or joystick error.	Operating- or power module defective. Movement of the joystick during ignition, resp. during the test phase of the operating module can also lead to this error indication.
<b>8 LED</b> 	Defective power module or a system fault.	Check cables and connecting plugs.
<b>9 LED</b> 	Fault on the magnetic brakes of the motor.	Check cables and connecting plugs. This fault indication appears also if the lever of the drive motors is in the push mode position. – Move the lever to the drive mode position.
<b>10 LED</b> 	The battery voltage is too high (downhill driving) or the electrical connections are not O.K.	Check the plug on the operating module and the battery connections.
<b>7 LED+ (2)</b> 	The joystick communication is defective.	Check the connector cable.
	R-Net: An electric adjustment is defective.	With two electric adjustments check which one is not working and then check the cables on this adjustment.
<b>8 LED+ (3)</b> 	VR2: An electric adjustment is defective.	

## Information illustration through the battery gauge

For information illustration the light segments of the battery gauge (1) blink slowly. The number of blinking segments indicates the type of information.



Information	Cause	Remedy
Running lights up/down	Joystick moved too early.	Release the joystick, switch off the operating module and switch it back on.
Running lights up	Charger attached	Pull off the charger after the charging procedures completed.
1 segment blinks	The battery is discharged.	Recharge batteries as soon as possible. 👉 The wheelchair can still be driven.
2 segments blink	The battery is discharged.	Recharge batteries as soon as possible. 👉 The wheelchair can still be driven.

## Information illustration through the display of the speed preselection

For information illustration the light segments of the display for the speed preselection (1) blink.



Information	Cause	Remedy
Running lights up/down	The anti-theft function is activated.	Switch off the anti-theft function. ☞ Therefore view chapter < Anti-theft function >.
Slow blinking	The automatic speed reduction is active.	Put the electric adjustment into base position. ☞ The wheelchair can be driven.
Fast blinking	The wheelchair is automatically put out of order.	Put the selection lever drive/push into driving position. ☞ The wheelchair cannot be driven.

## FUNCTIONAL CHECKS

### Checking the cable layout

After replacing defective parts and during maintenance always check the correct cable layout.

#### Attention:

- ! It is to be observed that the cables are not damaged or bent when being placed.
- Otherwise danger of fire through short circuits!
- In doing so the cable may not extend over the contour of the vehicle.
- The cable may not be jammed or twisted.
- ✎ Previously removed cable ties are to be replaced.

### Inspection during standstill

Check all screws, attachments and connections in the area of the assembly or service work carried out.

Do a visual check of the complete vehicle.

Switch to push mode and check the free movement of the wheelchair.

Switch to drive mode, switch the vehicle on and check the battery charging voltage.

Check all lighting components and electric adjustments for function.

### Test drive

Initially drive carefully and observe if the driving behaviour of the vehicle has changed.

Watch for unusual sounds.

After a short drive check the temperature of the motor, worm drive and magnetic brake.

Conduct a braking test.

### Braking distance

When programming the delay value observe the maximum value of the braking distance of EN 12184.

Maximum braking distance of EN 12184	
Speed	max. braking distance
6 km/h	1.0 m
8 km/h	1.5 m
10 km/h	2.1 m
12 km/h	2.9 m
13 km/h	3.4 m
15 km/h	4.5 m

## MAINTENANCE

Wheelchairs are *medical devices of the class I-MDD*. As a medical device they underlie the operator provision and are to be maintained regularly. We recommend at least once a year. The work done and replacement of essential components is to be documented.

For the documentation in the course of the maintenance the itemised maintenance checklist can be used.

The maintenance checklist is intended for copying. The filled in maintenance checklists are to be added to the documentation.

With the signature the undersigned declares to have duly performed the measured declared in the maintenance checklist.

Before reimplementation the wheelchair is to undergo a complete inspection.

- ☞ The hygienic measures required for reinstallation are to be carried out in correspondence with the validated hygienic plan.
- ☞ A revision/renovation or particular amendment to the vehicle, without the use of original spare parts, may mean a renewed placing of the vehicle into the market.
- ☞ This will further entail that new conformity assessments and tests might need to be conducted.

## Reinstallation

Designation:

Maintenance/Inspection date:

SN-No. (Serial-no):

Maintenance/Inspection done by:

Year of construction:

Signature:

Stamp of the executing workshop:

<b>Maintenance checklist of the annual maintenance jobs</b>	
	<b>Preparation for visual check</b>
<input type="checkbox"/>	Removed seat and back support elements, leg supports, arm support units. If necessary, clean the vehicle or the modules before the visual check.
	<b>Visual check coachwork</b>
<input type="checkbox"/>	Checked the frame, add-on components and accessories for damage, corrosion and damaged paintwork.
<input type="checkbox"/>	Covers and revetments are free of dents and tears.
<input type="checkbox"/>	Checked function of the designated attachment points such as screws or velcro straps.
	<b>General checks</b>
<input type="checkbox"/>	Checked the securing screws for tightness.
<input type="checkbox"/>	Checked the securing of all add-on parts and elements.
<input type="checkbox"/>	Checked the attachment of the plastic parts, handgrips, add-on parts and accessories.
<input type="checkbox"/>	Checked bowden cables for damages.
	<b>Chassis</b>
<input type="checkbox"/>	Checked steering and drive wheel attachment.
<input type="checkbox"/>	Checked the quick release axle, if existent.
<input type="checkbox"/>	Wear of axle bushing: The axles of the drive wheels do not show radial run-out and run easily.
<input type="checkbox"/>	Wheel forks are not bent or torn.
<input type="checkbox"/>	Checked the condition, functioning and smooth-operation of the steering wheel suspension.
<input type="checkbox"/>	Screws, with which the drive is attached to the vehicle, are tightened with the torque according to DIN.
	<b>Tyres and rims</b>
<input type="checkbox"/>	Tread pattern depth of the tyres is greater than 1.5 mm.
<input type="checkbox"/>	The tyres are free of damages or alien objects and are not porous.
<input type="checkbox"/>	Checked tyre pressure front and rear.
<input type="checkbox"/>	Hubs do not show tears or raptures.
<input type="checkbox"/>	The lateral lag of the rims is max. 2 mm.
<input type="checkbox"/>	Wheel attachment screws are tightened with torque according to DIN.



<b>Maintenance checklist of the annual maintenance jobs</b>	
	<b>Batteries</b>
<input type="checkbox"/>	No dirt or outer damage to the batteries.
<input type="checkbox"/>	Checked the screwed connections of the battery poles.
<input type="checkbox"/>	Poles and attachment clamps are clean and greased with Vaseline or Acid protector grease.
<input type="checkbox"/>	Cover caps are placed onto the battery poles.
<input type="checkbox"/>	Operation capability of the batteries ensured (capacity check conducted).
<input type="checkbox"/>	The battery case is not damaged, the batteries are secured correctly.
	<b>Electrical conduits and alignment</b>
	Control- and charging cable as well as battery and cable are:
<input type="checkbox"/>	a) undamaged
<input type="checkbox"/>	b) laid out without tension and dents (according to chapter < <i>Inspection of the cable plan</i> >)
<input type="checkbox"/>	Plugged connectors are undamaged and not corroded.
<input type="checkbox"/>	The holders for the charging and controller fuse as well as the main fuse are filled correctly.
<input type="checkbox"/>	The cables to the lighting units and sensors are undamaged and attached correctly.
	<b>Control panel / Control</b>
<input type="checkbox"/>	The operating pad keys function bounce-free.
<input type="checkbox"/>	Checked the control displays for function.
<input type="checkbox"/>	The keypad symbols are visible.
<input type="checkbox"/>	The director (e. g. joystick) functions easily and returns to its original position from any motion.
<input type="checkbox"/>	The zero sector (the sector within which, even when the director is moved, no driving impulses are transmitted) for forward and backward driving are equal.
	<b>Lighting</b>
<input type="checkbox"/>	Checked function of all components of the lighting equipment.
<input type="checkbox"/>	The dispersion discs of the lights are undamaged.
<input type="checkbox"/>	The headlights are adjusted correctly.
<input type="checkbox"/>	Passive lighting (reflectors) complete, clean and undamaged.

<b>Maintenance checklist of the annual maintenance jobs</b>	
	<b>Brakes</b>
<input type="checkbox"/>	Checked the function of the brakes.
<input type="checkbox"/>	The maximum braking distance corresponds to EN 12184.
	<b>Oil/Grease</b>
<input type="checkbox"/>	Checked turning points and bearing areas of operating levers and moveable parts for easy functioning.
<input type="checkbox"/>	Checked bowden cables for function and easy running.
	<b>Final check</b>
<input type="checkbox"/>	Checked the lighting and signalling devices.
<input type="checkbox"/>	Conducted brake-/steering-/driving test on inclinations and slopes.
<input type="checkbox"/>	Conducted a general function test of the mechanical adjustment units.
<input type="checkbox"/>	Conducted driving test.
<input type="checkbox"/>	The inspection certificate filled out in the operating manual.

### DIN norms and guidelines

The torque according to DIN for screwed connections can be extracted from the table at the side.

#### Tyres

Filling pressure front: ..... min. 2.5 / max. 3.5 bar (35 psi)

Filling pressure rear: ..... min. 2.5 / max. 3.5 bar (35 psi)

Minimal profile depth acc. to STVO: ..... 1.5 mm

#### Items with order number

Loctite 243 (medium hard) ..... 205 638 800

### Torque according to DIN for screwed connections

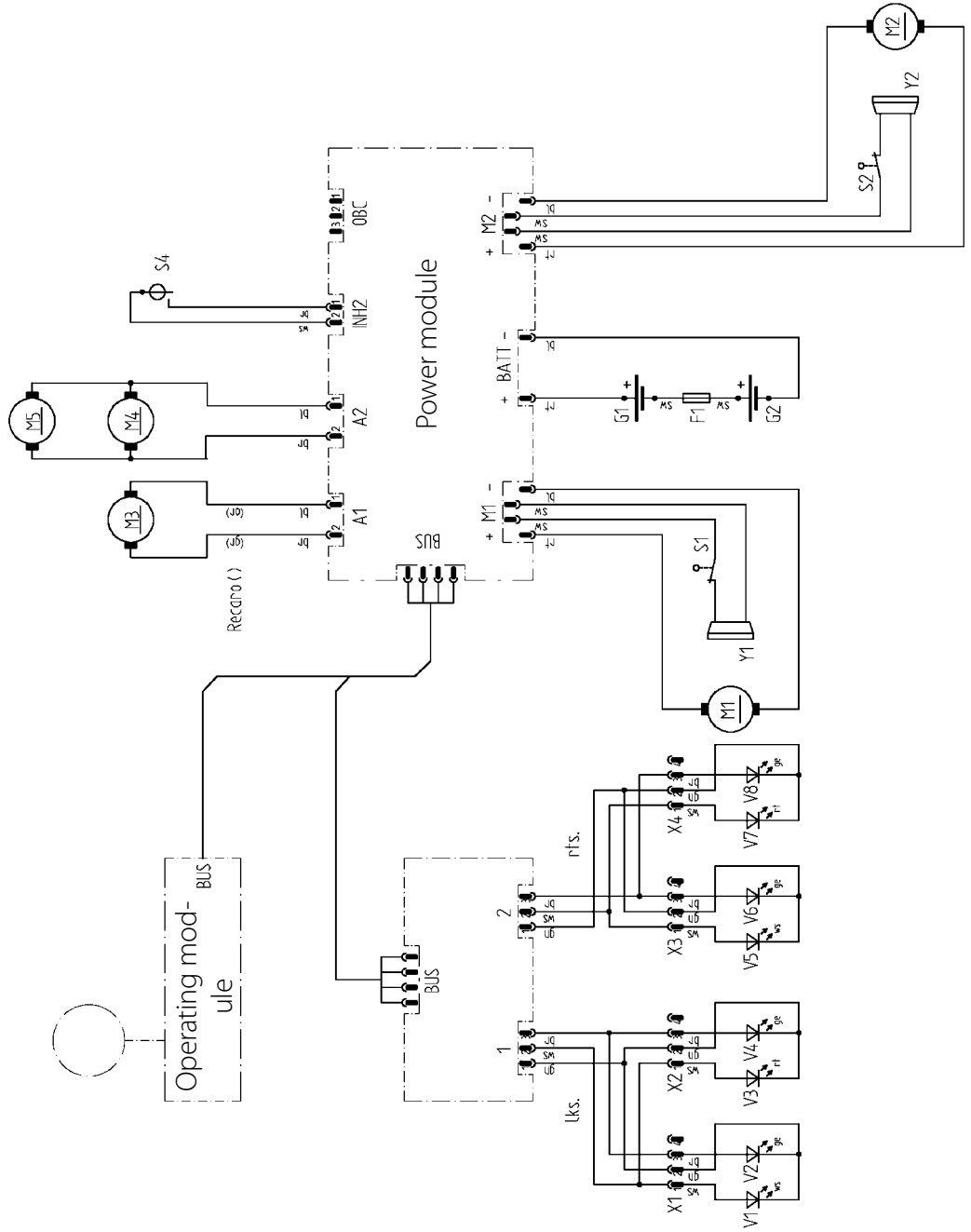
Thread diameter	Tightening torque
M 4	3 Nm
M 5	5 Nm
M 6	10 Nm
M 8	25 Nm
M 10	50 Nm
M 12	85 Nm

# CIRCUIT DIAGRAM

## Electronic type VR2

### Legend:

- F1 Battery fuse
- G1 Battery
- G2 Battery
- M1 Driving motor left
- M2 Driving motor right
- M3 Back support adjustment motor
- M4 Seat inclination motor
- M5 Seat inclination motor (only on model 1.612)
- S1 Drive/push switch left
- S2 Drive/push switch right
- S4 Tilt switch
- V1 Headlight left
- V2 Indicator front left
- V3 Left rear light
- V4 Indicator rear left
- V5 Headlight right
- V6 Indicator front right
- V7 Right rear light
- V8 Indicator rear right
- X1 plugged contact lighting front left
- X2 plugged contact lighting rear left
- X3 plugged contact lighting front right
- X4 plugged contact lighting rear right
- Y1 Left magnetic brake
- Y2 Right magnetic brake



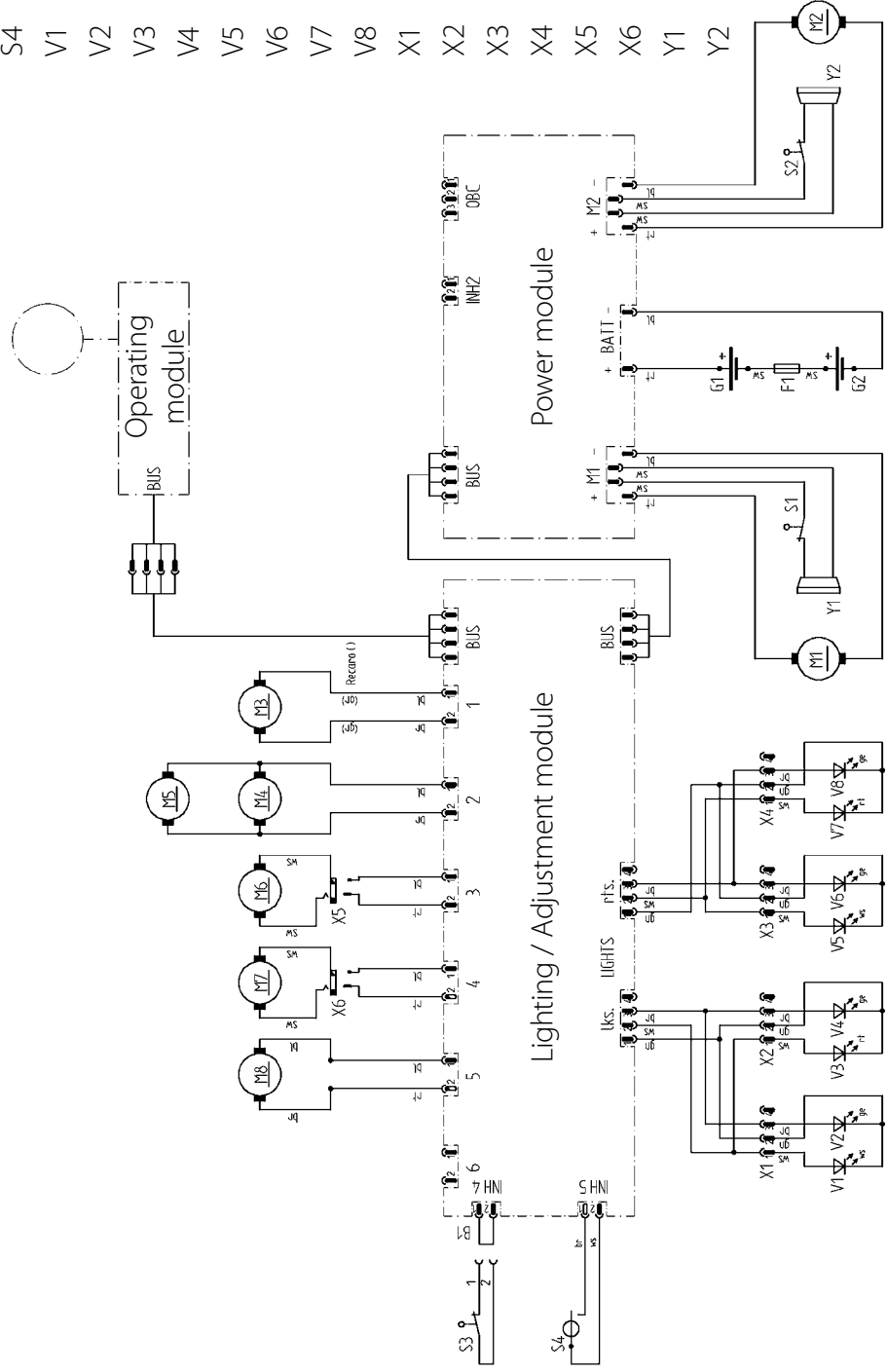
# CIRCUIT DIAGRAM

## Electronic type R-Net

### Legend:

- B1 Bridge (not valid with seat lift)
- F1 Battery fuse
- G1 Battery
- G2 Battery
- M1 Driving motor left
- M2 Driving motor right
- M3 Back support adjustment motor
- M4 Seat inclination motor

- M5 Seat inclination motor (only on model 1.612)
- M6 Leg support motor left
- M7 Leg support motor right
- M8 Seat lift motor
- S1 Drive/push switch left
- S2 Drive/push switch right
- S3 Switch for speed reduction seat lift
- S4 Tilt switch
- V1 Headlight left
- V2 Indicator front left
- V3 Left rear light
- V4 Indicator rear left
- V5 Headlight right
- V6 Indicator front right
- V7 Right rear light
- V8 Indicator rear right
- X1 plugged contact lighting front left
- X2 plugged contact lighting rear left
- X3 plugged contact lighting front right
- X4 plugged contact lighting rear right
- X5 plugged contact leg support left
- X6 plugged contact leg support right
- Y1 Left magnetic brake
- Y2 Right magnetic brake



## **NOTES**

---

## NOTES

---

## NOTES

---

Your specialist dealer


---

---

---

### **MEYRA GmbH**

 Meyra-Ring 2  
D-32689 Kalletal-Kalldorf

 Tel +49 5733 922 - 311  
Fax +49 5733 922 - 9311

 [info@meyra.de](mailto:info@meyra.de)

[www.meyra.de](http://www.meyra.de)

---