

LEVO C³

SERVICE MANUAL



This manual is for use by LEVO AG agents or their authorised dealers.

Read these instructions before servicing the wheelchair.

This service manual must be read in conjunction with the user manual.

Alterations in constructional and technical manner or to the electronic require the written authorisation of LEVO Ltd.; otherwise no warranty or product liability will be accepted.

Version 1.9

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1. Introduction

Apart from regular charging of the batteries and keeping the wheelchair clean the **LEVO C³** is maintenance-free and no attention is required by the user.

Because of the complexity of the wheelchair the **LEVO** agent or authorized dealer shall carry out a safety check at least once a year.

This service manual is to be used by the **LEVO** agent or authorised dealer. The manual gives information on how to perform a safety check and carry out repairs to the **LEVO C³**. This manual provides a good service to the persons in charge of the maintenance of the **LEVO C³**. And of course, the user appreciates the safety and the reliability of a well maintained wheelchair.

This manual must always be read and used with the user manual.

2. Health & safety

Accidents do occur. When working on or testing the wheelchair be aware of the dangers and take care to ensure your own and other peoples health and safety.

3. Adjustments

The majority of the adjustments can be carried out by the user or their family and are covered in the instruction manual. However, the **LEVO** agent must always adjust the wheelchair correctly when delivered so that it fits the user.

3.1. Seat depth

The adjustment of the seat depth can be done by the user or their family (see user manual, chapter 9.1.).

3.2. Armrest height

The adjustment of the armrest height can be done by the user or their family (see user manual, chapter 9.6.).

3.3. Adjustment of the knee support

The adjustment of the knee support can be done by the user or their family (see user manual, chapter 9.9.).

3.4. Electronic control system

The preset settings are chosen to ensure safe operation. The settings are in compliance with all relevant legal requirements regarding the entire operating range of the joystick and the speed control. In case the preset settings don't meet the needs of the user, the control system can be programmed individually; the maximum speed might be decreased for example.

Warning: Programming should only be conducted by healthcare professionals with in-depth knowledge of PG Drives electronic control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for the user. LEVO AG accepts no liability for losses of any kind if the drive or stability characteristics of the wheelchair are altered without prior notification and discussion with LEVO AG.

It is in the responsibility of the person programming the control system to make sure that the stopping distance requirement specified for the country in which the wheelchair will be used is satisfied. If the braking rate is low, the forward and reverse maximum speed settings may need to be re-programmed. It is in the responsibility of the person programming the control system to make sure that the settings are safe and to note any programming changes made.

3.5. Standard programming PGDT VR2 and R-net

The programming is done by dubbing the control software of a laptop or PC to the Controller of the wheelchair. Laptop / PC must be equipped with the appropriate PGDT software.

- Start the software on your laptop / PC.
- Insert the read-in between the cable ends of the control panel cable and the Controller; the interface is located below the armrest.
- Connect via the USB interface, the read-in on the laptop / PC.
- Transfer the program

The C^3 drive programs are made to give the user more ease of use and even better drive characteristics.

All C^3 will be fitted with standard programs that provide the user with different standard profiles programmed in the drive software.

The benefit for the user is that there is a more flexible way of speed and driving settings in the chair, for both indoor and outdoor use.

Because multiple profiles per ordered speed setting are used, you do not need to make the choice for the Standard, Classic and Fun at the order form anymore.

Motor setting improvements:

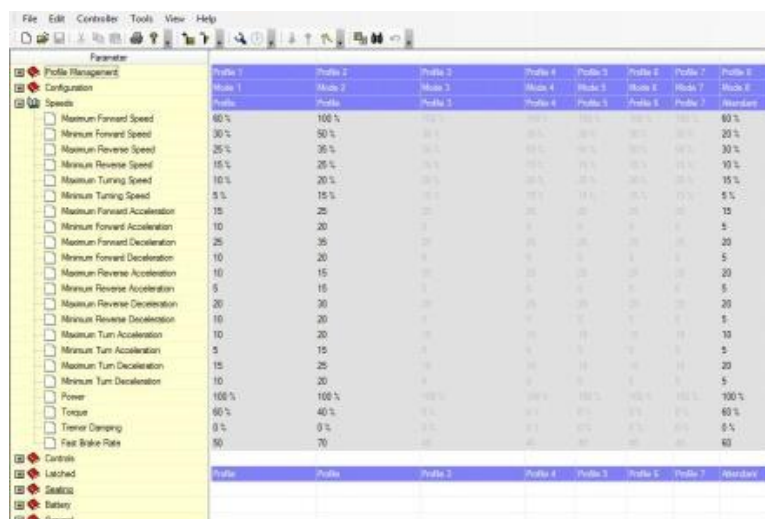
To optimize the current through the motors when they are pushed to their limits, we have improved some parameters in the motor settings section of the drive software.

Your benefits with these improvements are that the motors will be driven towards their limits in a less intense way, which gives the motors a more durable and longer life during extreme situations.

To perform a smoother start and stop of the C3 on slopes, we have optimized the motor compensation value. Now the user of the chair will experience nearly no rollback when coming to a full stop or when starting to drive on a slope.

Service Instructions:

The new programs can be downloaded from the secured Login section of the LEVO website: www.levo.ch



The screenshot shows the PGDT software interface with a table of motor parameters. The table has 8 columns for different profiles (Profile 1 to Profile 8) and a final column for 'Standard'. The rows list various parameters such as Maximum Forward Speed, Minimum Forward Speed, Maximum Reverse Speed, Minimum Reverse Speed, Maximum Turning Speed, Minimum Turning Speed, Maximum Forward Acceleration, Minimum Forward Acceleration, Maximum Reverse Acceleration, Minimum Reverse Acceleration, Maximum Reverse Deceleration, Minimum Reverse Deceleration, Maximum Turn Acceleration, Minimum Turn Acceleration, Maximum Turn Deceleration, Minimum Turn Deceleration, Power, Torque, Tremor Damping, and Fast Brake Rate. The values are percentages or numerical values depending on the parameter.

Parameter	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Profile 8	Standard
Maximum Forward Speed	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Minimum Forward Speed	50 %	50 %	50 %	50 %	50 %	50 %	50 %	50 %	50 %
Maximum Reverse Speed	35 %	35 %	35 %	35 %	35 %	35 %	35 %	35 %	35 %
Minimum Reverse Speed	15 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %
Maximum Turning Speed	10 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	15 %
Minimum Turning Speed	5 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %	5 %
Maximum Forward Acceleration	15	25	25	25	25	25	25	25	15
Minimum Forward Acceleration	10	20	20	20	20	20	20	20	5
Maximum Reverse Acceleration	25	35	35	35	35	35	35	35	20
Minimum Reverse Acceleration	10	20	20	20	20	20	20	20	5
Maximum Reverse Deceleration	10	15	15	15	15	15	15	15	20
Minimum Reverse Deceleration	5	15	15	15	15	15	15	15	5
Maximum Turn Acceleration	20	30	30	30	30	30	30	30	20
Minimum Turn Acceleration	10	20	20	20	20	20	20	20	5
Maximum Turn Deceleration	10	20	20	20	20	20	20	20	10
Minimum Turn Deceleration	5	15	15	15	15	15	15	15	5
Power	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Torque	60 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	60 %
Tremor Damping	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Fast Brake Rate	50	70	70	70	70	70	70	70	50

4. General instructions

Only a **LEVO** agent or their authorized dealers should carry out servicing and repairs to the **LEVO C³**.

- **Repairs:** For advice in all repairs in Switzerland contact **LEVO AG**, Switzerland. For all other countries contact your local **LEVO** agent. Addresses are given at the front of this service manual.
- **Major repairs:** For all major repairs, e.g. bent or damaged frame, always replace complete components. Never try to repair damaged steel work or components.
- **Replacement parts:** Factory replacement components should be used in all repairs; these are available from **LEVO AG**. To order parts see the parts list drawings and the correlative list, both available at **LEVO AG**.

5. Tools & torque settings

The following tools are required to service the wheelchair:

- Spanners and sockets: 8 mm through to 24 mm
- Hexagon key: 2 mm through to 8 mm
- Torque key: 1 Nm through to 50 Nm
- Phillips head screwdriver and slotted screwdriver
- Soft headed hammer

Torque settings:

Bolt size	Torque Nm
M4	3
M5	6
M6	10
M8	25
M10	50

6. Important points

- Do not reuse locknuts. Always replace with a new locknut.
- Always use thread locking compound.
- Always use recommended components and parts available from **LEVO AG**.
- Do not modify or repair the frame.
- **LEVO** is responsible for repairs on gas springs, motors and electronic parts.

7. Recommended safety checks

The following safety checks shall be carried out at least **once a year**. This should be done by a **LEVO** agent or authorized dealer. If a fault is found do not allow the wheelchair to be used until it has been corrected.

- Examine the backrest and possible accessories if they are fixed safely. Repair any fault found immediately.
- Examine the wheelchair frame for any damage. Replace any damaged or faulty components.
- Examine the condition of the seat cushion and the backrest cover and replace if necessary.
- Examine condition of all harnesses, straps and buckles and replace if necessary.
- Examine and operate the footrest mechanism. Replace any damaged or faulty components.
- Examine nuts, bolts, pivots and frame plugs for tightness and general condition. Replace any faulty components.
- Examine the rear wheel, the front wheels and their castors for free rotation and security. Optimize the rotation and repair any fault found.
- The tires are maintenance-free besides occasional cleaning. Use a damp cloth for cleaning. Tires must get replaced when the tire's profile is worn down. (For more information please consult sector 8.3. to 8.5.).
- Check the free wheel device and the motor disengaging lever for correct operation. Repair any fault found.
- Check the mechanical function of the motor disengaging lever. Pull the quick release bolt out and press the motor disengaging lever downwards. Now you should be able to push the wheelchair manually. Push the motor disengaging lever upwards and be careful that the quick release bolt is locked; the wheels should be locked now. If one wheel turns now, the magnetic brake of the motor is damaged. The motor has to be changed.
- Check the powered function of the motor disengaging lever. Switch on the joystick module and start driving forwards. Let of the joystick. As a reaction the wheelchair should stop and the solenoid brakes of the motor should snap in evidence. Repeat this check driving backwards and to each side. In case the motor brakes don't function correctly check the battery indicator on the joystick module for any failure indication. Consult the controller self help guide (user manual chapter 16 using VR2 or chapter 17 using R-net) for details about failure indications.

- Make sure all the connectors are properly inserted, that the brake solenoids are energized and that the solenoid coil is not open or short-circuited by testing the two bigger pins on the motor lead plug. If necessary, replace the motor.
- Check all electrical cables and wires for chafing and clamp spots. Replace if necessary.
- Clean the batteries and terminals. Test the battery capacity and advise the customer of their condition. Charge the batteries before returning the wheelchair to the customer.
- Check all lights and indications. Replace components with failures.
- Check the front wheel lowering cable and mechanism regarding suitable clearance to the floor while sitting and correct movement by changing into stand-up configuration (the middle wheel must be lifted up in standing configuration).
- Use all functions and drive the wheelchair as a final check. In case you notice any kind of problems arrange final repairs.

7.1. Brake Test

These tests should be carried out on a level floor with at least one meter clear space around the wheelchair.

- Switch on the control system.
- Check the display remains on, or flashes slowly, after one second.
- Push the joystick slowly forwards until you hear the parking brakes operate. The wheelchair may start to move.
- Immediately release the joystick. You must be able to hear each parking brake operate within 2 seconds.
- Repeat the test a further three times, pushing the joystick slowly backwards, left and right.

7.2. Drive Test

With the maximum speed control in the minimum position, drive the wheelchair in all directions, ensuring the drive is comfortable and easy to control for the user.

Repeat the above but with the speed control set to maximum.

7.3. Gradient Test

Before carrying out this test ensure another person is present to prevent the wheelchair from tipping backwards.

Drive the wheelchair forwards up its maximum rated gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied.

Deflect the joystick forwards and continue driving up the slope. Ensure the pick up is smooth and positive.

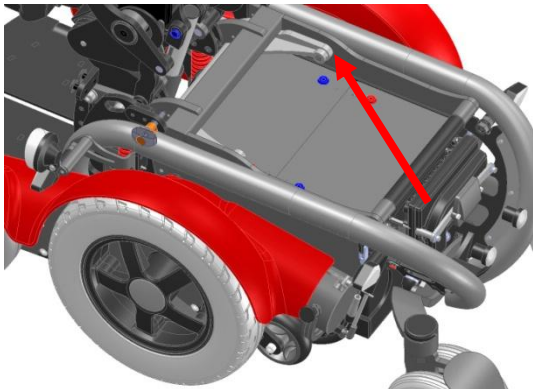
Stop the wheelchair and reverse down the gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied.

7.4. Lubrication

There is no need, to lubricate the moving parts and the joints on the chair.

There are 3 exceptions:

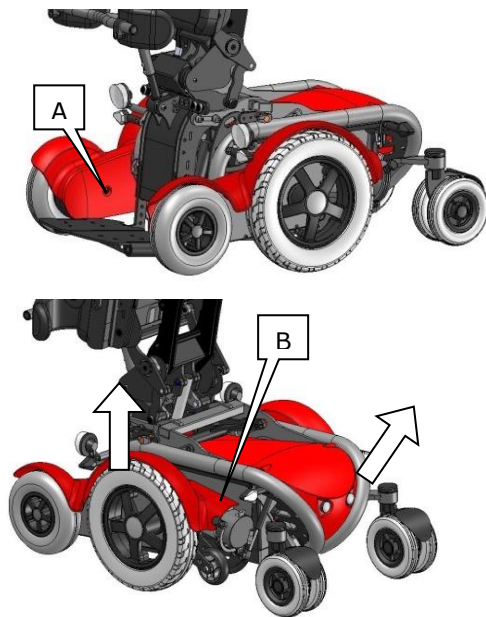
- At the conversion support (if the chair is equipped with option tilt in space), it is necessary to put on some grease, **once a year**.



- At the back rest assembly, **once a year** use an oil spray to lubricate the back rest tubes.
- If there is some noise while stand-up or tilt in space activity, then you may use an oil spray to lubricate the causing part/location.

8. Exchanging components

8.1. Exchanging/Removing the covers



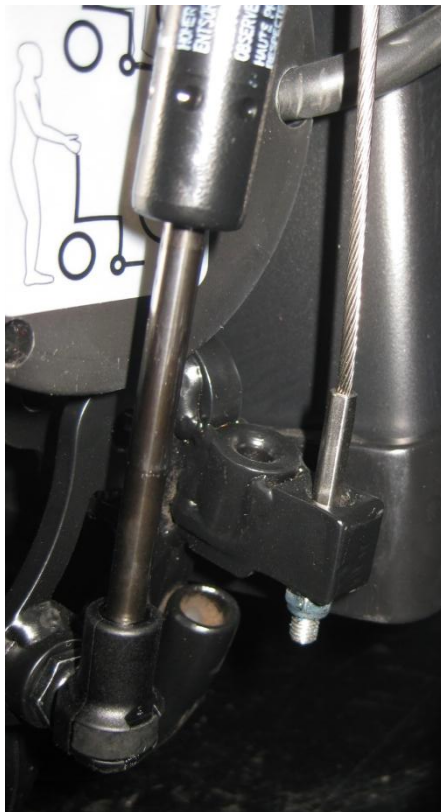
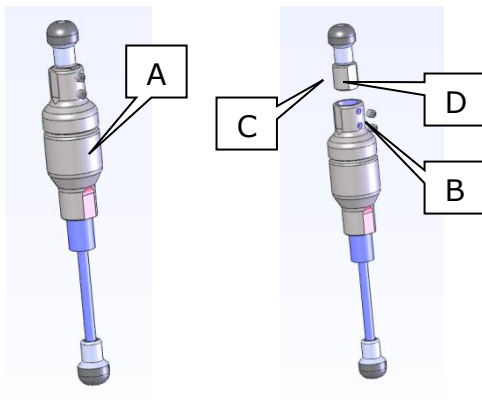
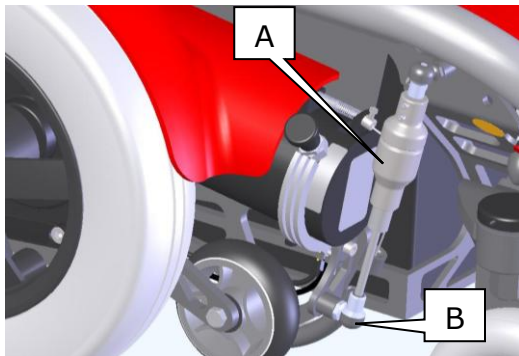
The covers are attached with screws, clips and velcro.

To remove the collateral covers, unscrew (A,B) at the front on the inside and at the rear first, and then take the cover upwards to remove it.

To remove the rear cover, lift the cover at rear bottom and take it off the Velcro, now you can lift the cover upwards to remove it.

If your wheelchair is equipped with light, you have to unplug the lights as well to remove the cover.

8.2. Adjusting the front wheel clearance / suspension



Adjusting the length of the shock absorber (A) will allow a fine tuning of the front wheel to the floor clearance as well as the suspension of the chair. Make sure the chair is in seating position.

Dismount the shock absorber (A) from the motor ball connection (B). Use a lever towards the absorber to relax the absorber's pressure.

Release the two allen key pins (B). The top part of the shock absorber has a threat (C), which allows rotating the lower part.

Rotating "anti clock wise" the shock absorber gets shorter → less front wheels to floor clearance.

Rotating "clock wise" will extend the absorber → more front wheels to floor clearance.

If more clearance is requested than you can reach, the cable tension either on the front or the back end of the cable must be loosened.

The cable ends in the support, which is attached at the end tube.

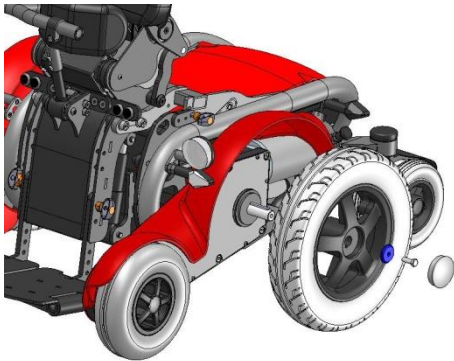
The cable tension has to be adjusted in sitting position and only must be light or soft, so that the cable is nearly straight.

If it's too hard, the standing actuator may stop.

After adjustments, assure the allen key pins are tightened directly to the flat surface (D) of the top part (C).

Reassemble the whole shock absorber the opposite way you dismantled it.

8.3. Exchanging the middle wheel

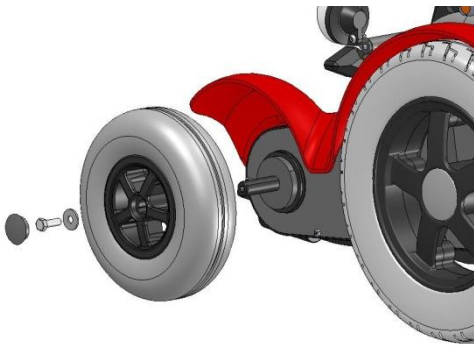


Bring the chair into the standing position to lift the middle wheels off the ground.

Remove the cover cap in the middle of the wheel; lift the cap with a small screwdriver. Afterwards unscrew the screw and take off the wheel.

To fit the new wheel, mount the parts in the reverse order, use thread locker to mount the screw.

8.4. Exchanging the front wheel



Make sure the wheelchair is in the sitting position, that the front wheels are lifted off the ground.

Remove the cover cap in the middle of the wheel; lift the cap with a small screwdriver. Then loosen the screw and take off the wheel. To fit the new wheel, mount the parts in the reverse order, use thread locker to mount the screw.

8.5. Exchanging the back rotatable wheel



Remove the cover cap in the middle of the **7" twin wheel** by using a fine screw driver to lift the cover cap off, do that with both wheels. Unscrew the screw going through both wheels and now remove the worn wheel. Now mount all pieces back together, the other way round.



Remove the cover cap of the **8" single wheel**. Unscrew the screw going through the fork and remove the worn wheel. Now mount all pieces back together, the other way round.

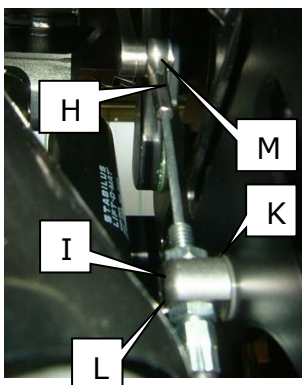
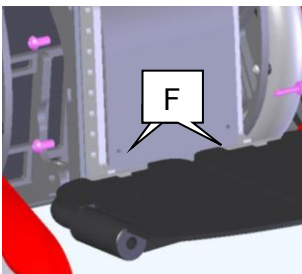
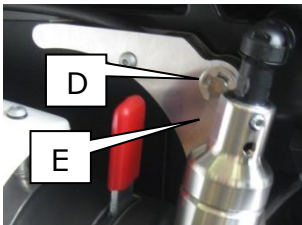
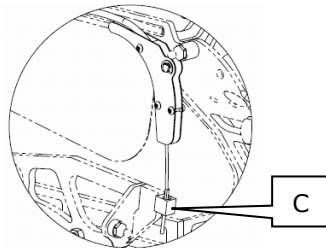
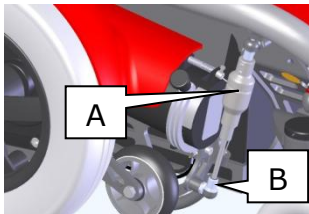
8.6. Exchanging the rear caster



Remove the cover cap by pushing upwards. Unscrew the nut until it could be taken out.

Make sure you fasten the swiveling fork with a screw locking device.

8.7. Exchange the front wheel lowering cable



Bring the seat in a seating position and in tilt backward position.

Dismount the shock absorber (A) from the motor ball connection (B) as described in 8.2..

Unscrew the nut (C) at the cable end at the rear.

Release the C-clips (D) which holds the cable support. Take off the cable assembly (E).

Dismount the front cover (G) loosening the screws (F).

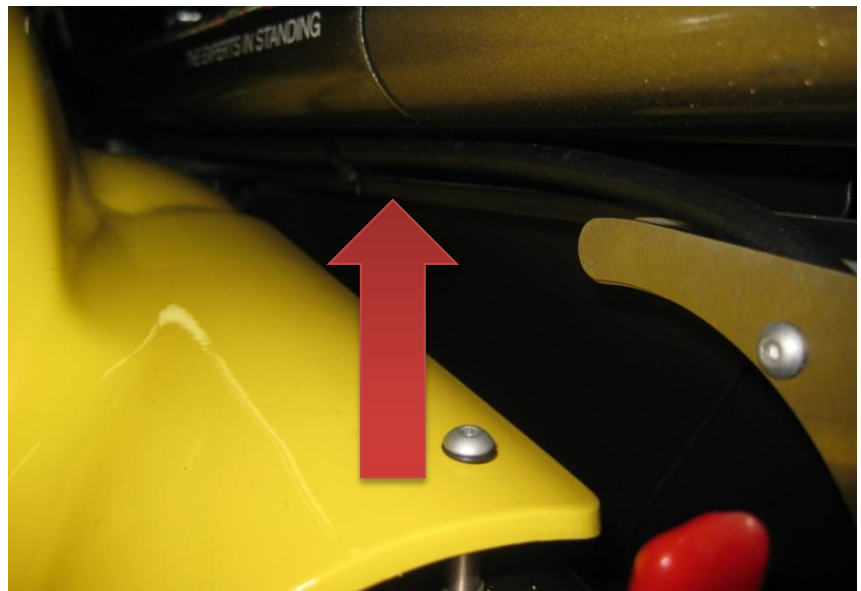
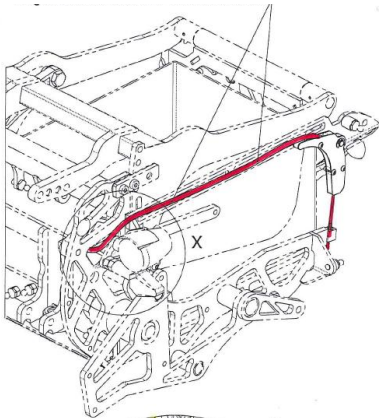
Release the metal ear (M) which holds the head of the front end cable (H) and take off the cable head. Loosen the screw of the cable hose tension adjustment (I) and bring it off the holder (K) through the open gap (L).

The whole cable assembly can now be replaced. Assure that you line up the cable hose the same. Reassemble and adjust the cable, the front cover and the shock absorber the opposite way.

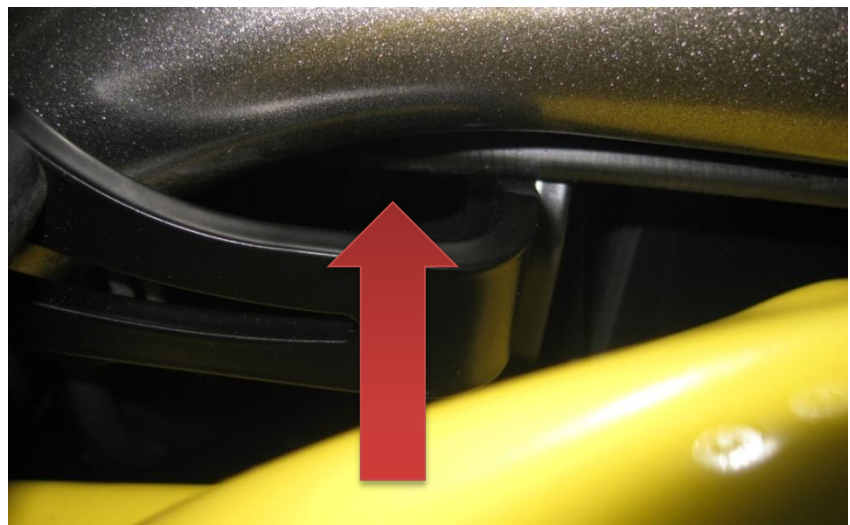
Once the cables are replaced, assure the front wheel to the floor clearance is as described in 8.2.

The following pages would describe the cable routing more detailed:

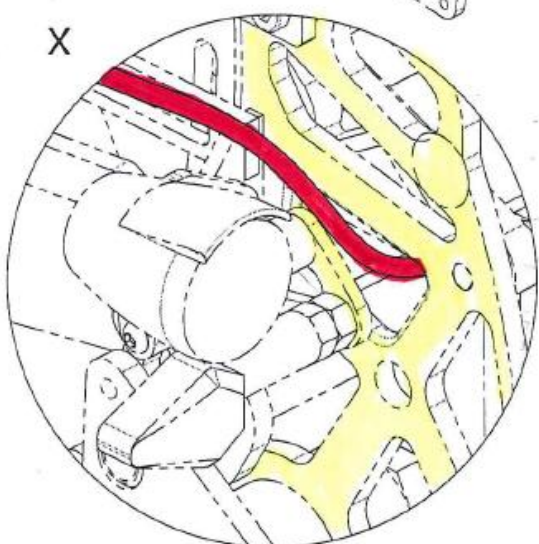
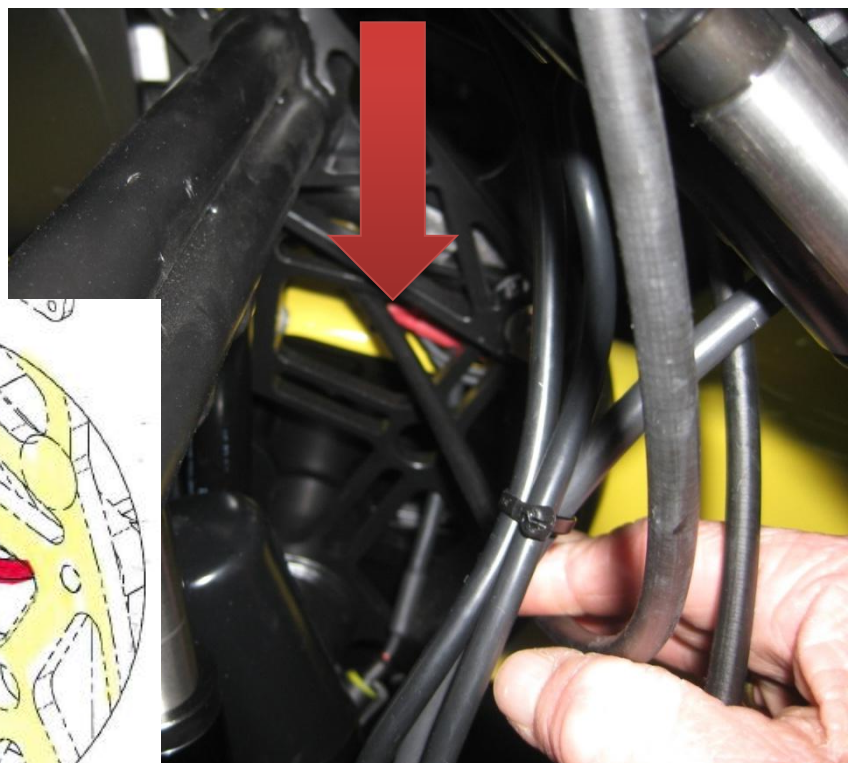
The routing is beneath the design tubes



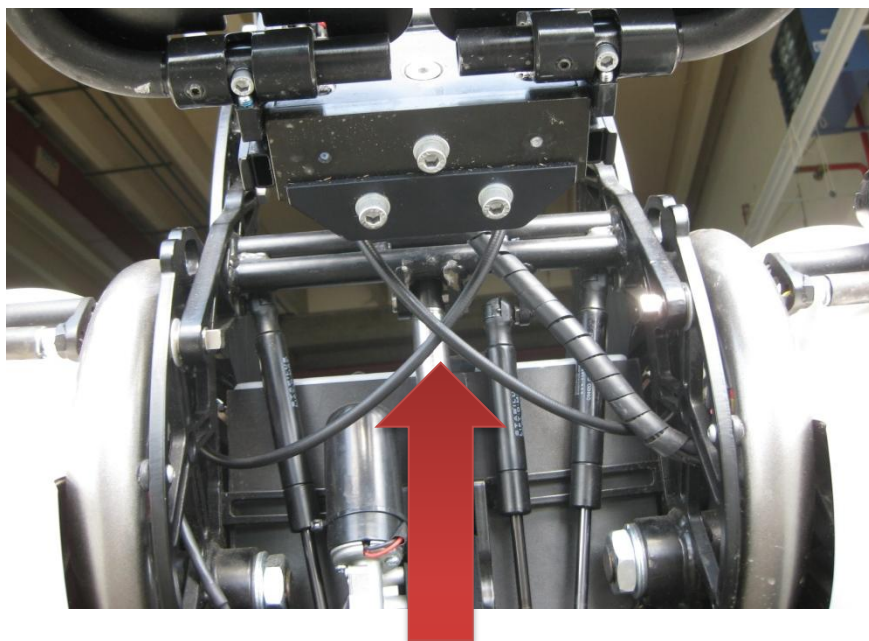
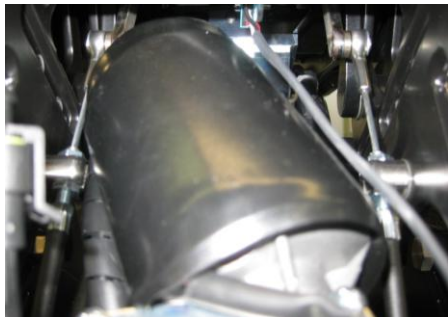
The routing is above the light and indicator support . The deviation starts from this point.



The cable will be routed through the chassis above the cross.

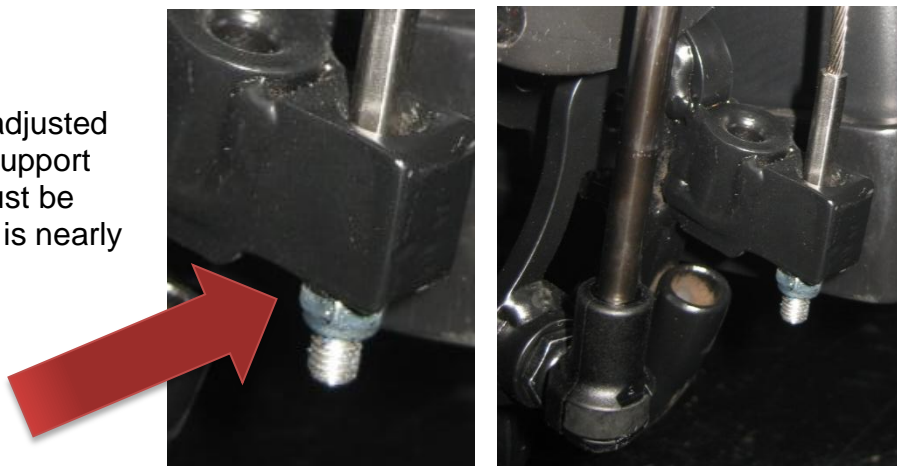


The left cable will be overcrossed to the right cable and fitted to the actuator unit respectively attached at the levers of the Rosta element.



Important Cable Tension

The cable tension has to be adjusted Due the nut underneath the support in sitting position and only must be light or soft, so that the cable is nearly straight.



Further details on the spare part list

Umbausatz Kabelführung

Erstellt Geändert Überprüft Geplant Abgelehnt Status	10.01.2012 PW - - 11.01.2012 BM - -	Benennung / Description Kabelführung ab Okt. 2011 Cabeling since Okt. 2011
LEVO.d THE EXPERTS IN STANDING		LEVO AG CH-5610 Wohlen www.levo.ch
C3		50.072.0123
Blatt / Anz. 1 / 1		17

8.8. Gas spring exchange for tilt in space

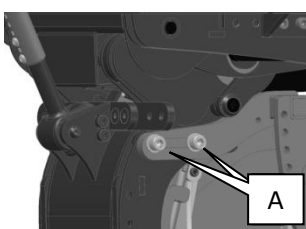


Make sure the wheelchair is in the highest position of the tilt in space function.

Take a screw driver and put it between the plastic heading and the metal clasp, push the clasp a couple of millimeters away from the heading but be careful that the clasp does not come off. After you have lifted the clasp a bit, you should be able to remove the gas spring. Afterwards do the same thing on the other side.

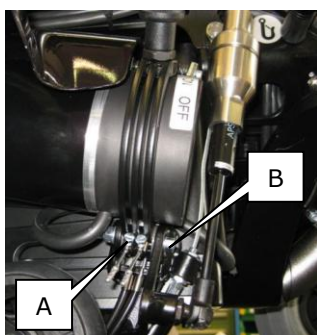
The new gas spring can just be pushed on the ball head.

8.9. Moving the seat to the front or back



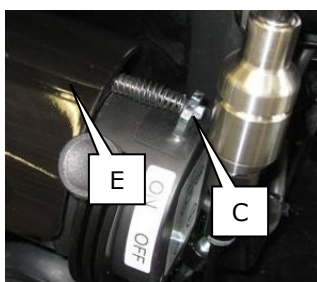
Unscrew the 4 screws (A), and then slide the seat back or forth. When you reach the required position, put the screws back in and tighten them again.

8.10. Exchanging the brake release cable (only if one hand device / special)

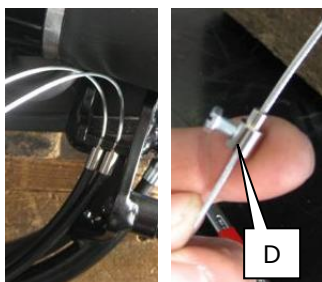


Unscrew the two clasp screws (A), cut off the end cap of the cable and take the cylinder head (D) off. Now loosen the screw (B) that is holding the brake release lever. Pull the lever from the bolt and pull the cables off.

Now pull the cables from the other end (C) through the magnetic brake levers on the motor top end.

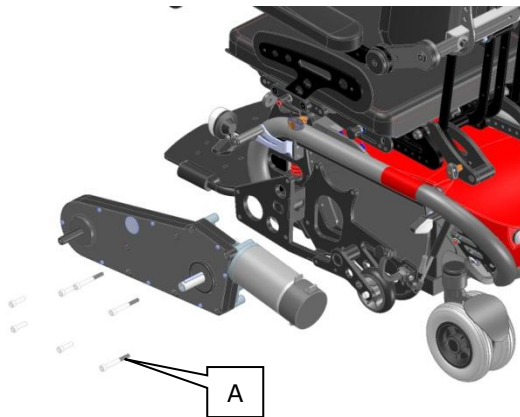


Enter the new cables the other way around and mount the brake release lever again. Now bring the cylinder head (D) to the position closely to the brake release lever where the cables are getting through and fasten the clasp screw (A) of the cylinder head (D) again.



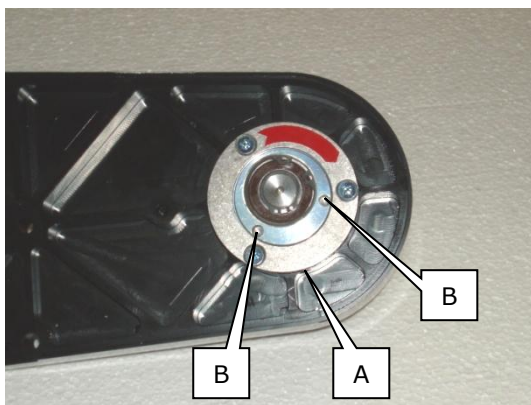
If you now use the brake release lever, you should hear a „click“ in the middle of the braking distance. If this is not the case, adjust the tension of the cable by adjusting the cylinder head (D).

8.11. Exchanging the drive motor



Place something under the wheelchair so the drive wheels are off the ground. Remove the middle wheel (see chapter 8.3.) and the front wheel (see chapter 8.4.) Unscrew the 7 screws (A) and now you can remove the driving motors and mount new ones.

8.12. Tightening the drive chain

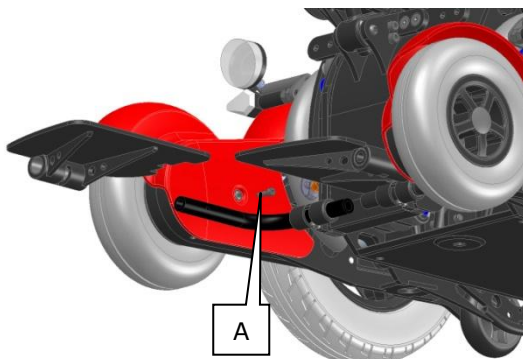


To control the tension of the drive chain, you can remove the rubber cover cap between the front wheel and the middle wheel.

To adjust the tension, loosen grub screw (A). Take two metal bolts and place them in the two holes (B), push a screw driver between the two bolts and turn the excentric around the chain to tighten or loosen it.

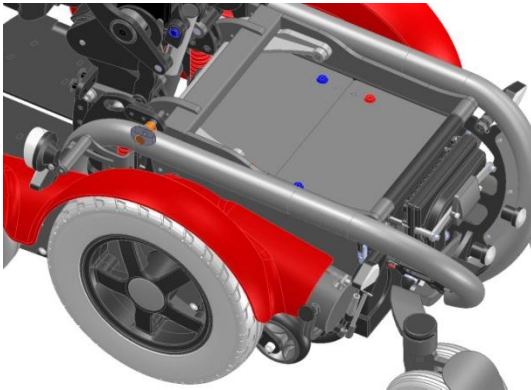
When you reach the wished tension, tighten the grub screw again.

8.13. Exchanging the foot plate



Unscrew the screw (A) below the foot plate, now you can remove the foot plate from the tube. Mount the new foot plate and put the screw back in place and tighten it.

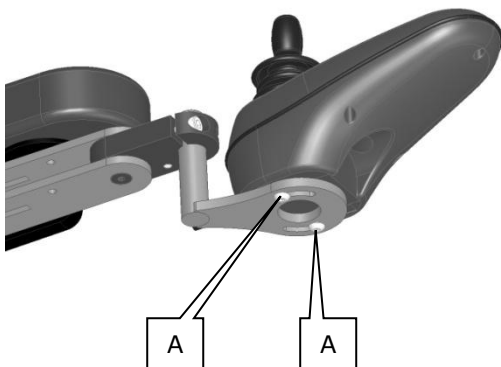
8.14. Exchanging the batteries



Raise the wheelchair into the standing position and remove the middle cover in the back (see chapter 8.1.). Push the pole cover back and unscrew the screws on the battery poles. Now you can lift out the batteries. Put the new batteries in and fasten the cable to the right battery poles.

If the batteries are not working, please follow up the instructions at chapter **8.21**.

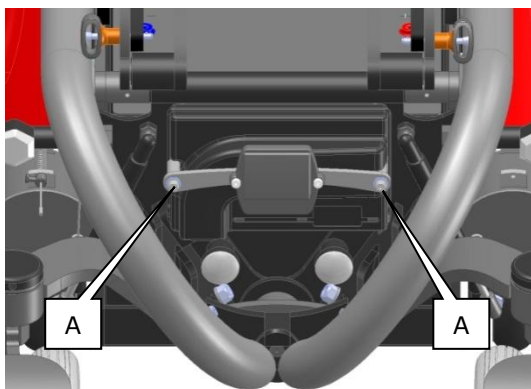
8.15. Exchanging the joystick module



Remove all cable cords from the joystick cable all the way down to the seat pan and unthread the cable. Unscrew both screws (A) under the joystick, now you can replace the joystick module.

Fasten the module again with both screws on the joystick-holder, thread the joystick cable and plug it in and fasten it with cable binder on to the armrest, to the back and under the seat.

8.16. Exchanging the power module



Remove the back cover in the middle first (see chapter 8.1.). Unscrew the screws (A), and then you can tip the power module back. Unplug all plugs from the power module. Switch the power module and plug in the plugs again. Mount the new power module on the wheelchair with the two screws.

8.17. Exchanging the standing actuator unit – general preliminaries



CAUTION – The seating system is tension loaded for standing configuration and is held back by the standing actuator. Before loosening the standing actuator, assure the seat is secured by a tightening system.

If the chair is more in standing position, secure it over the seat front side. If the chair is more in seating position, secure it at the back.



Take off and unplug the battery cover

To improve the access to the retrofit area, bring the seat system into full tilt position. Disassemble the knee support, the foot rest, the cover of the leg rest assembly, and the cushion.



The speed limit switch has to be disassembled and unplugged.



CAUTION – Before working on the standing actuator, the chair has to be brought into a full standing and tilted position to release the system.

If this is impossible by power, follow the instruction «Exchanging the standing actuator in seating position»

Option: If you have an external power unit, you can plug it in directly by the stand up actuator behind the leg rest unit.



8.18. Exchanging the standing actuator in standing position

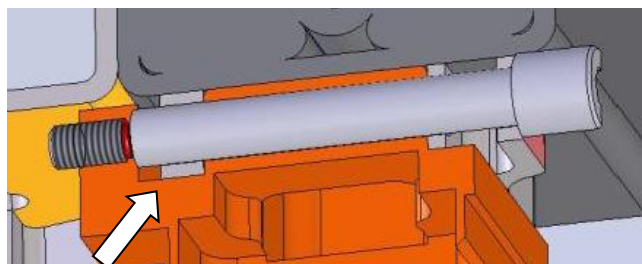
CAUTION: During movements assure nobody has their fingers or hands inside the seating system or main frame.

If the chair is more in standing position, secure it over the seat front side or by an assistance, which may help.



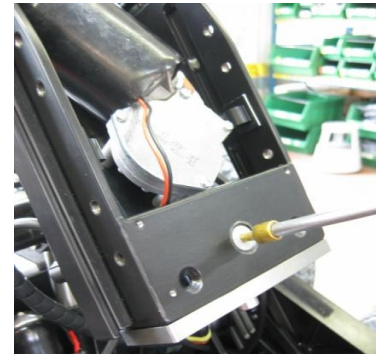
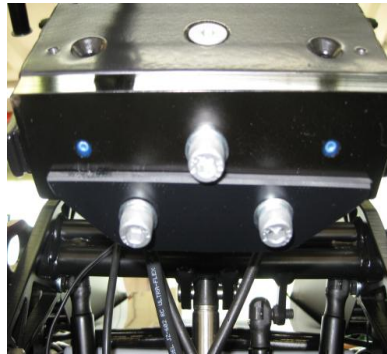
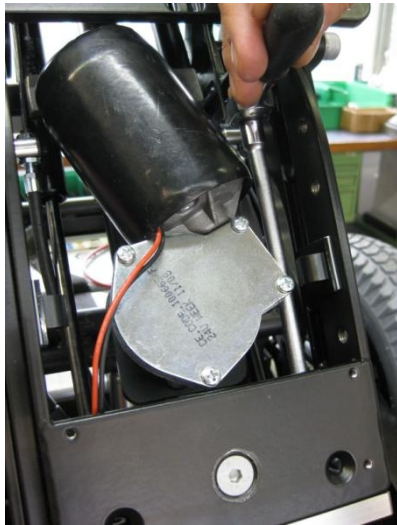
Loose the coupling bolt at the base underneath the seat so that it could be unscrewed later by hand.

But ensure that the bolt is still properly attached to the frame.



The cables of the joystick and the lights have to be unplugged and the tilt switch has to be unscrewed. Push respectively feed out the cables out of the actuator unit towards the front.





Unscrew the two allen screws of the base plate inside the leg rest assembly.
Unscrew the two allen screws and disassemble the cable guidance.
Release the countersunk screw in the front and then at least the support screw from below the leg rest assembly.



Pull the seat in most standing position to enforce the actuator unit



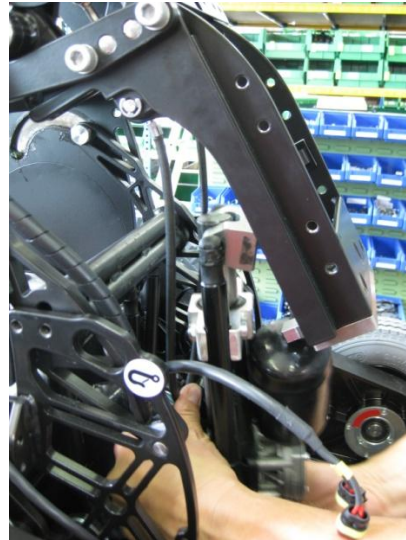
Push the actuator unit towards the lowering cables. Take a tool to feed it to protect your hand and fingers!



Hold the seat to release the tight down system and let it down slowly towards the neutral respectively the non-tension position



Move your position to the left or right side of the chair to hold the actuator in one hand and to unscrew completely the coupling bolt underneath the seat.
If necessary, manually soft movements up and down of the back rest may help.



The stand up actuator unit can be taken off from underneath the leg rest assembly. Assure that the front wheel cables are behind the unit.

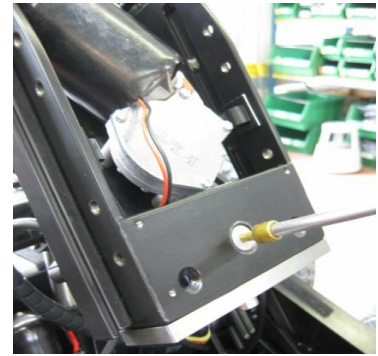
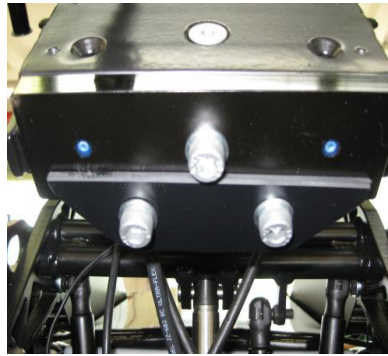
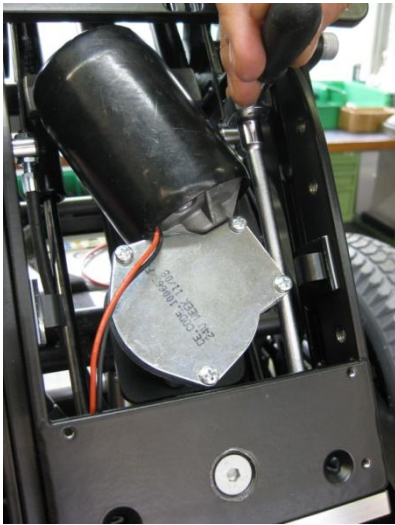
8.19. Exchanging the standing actuator in seating position

CAUTION: During movements assure nobody has their fingers or hands inside the seating system or main frame.



If the chair is in seating position, assure the seat is secured by a tightening system to not go up. But it has not to be tight down more than the position is given by the actuator. Otherwise the assembling will be more tension loaded. Secure it between the seat/back frame and the rear wheel axle



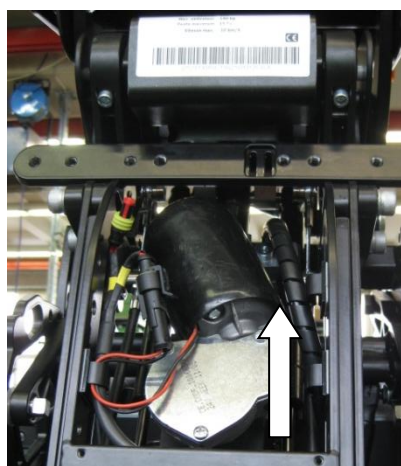


Unscrew the two allen screws of the base plate inside the leg rest assembly.
Unscrew the two allen screws and disassemble the cable guidance.
Release the countersunk screw in the front and then at least the support screw from below the leg rest assembly.



If the standing actuator is unscrewed, release the tight down system slowly and carefully.
If the tight down gets loose to fast, the seat may catapult upwards.

Check and avoid no cables will be stressed or damaged.

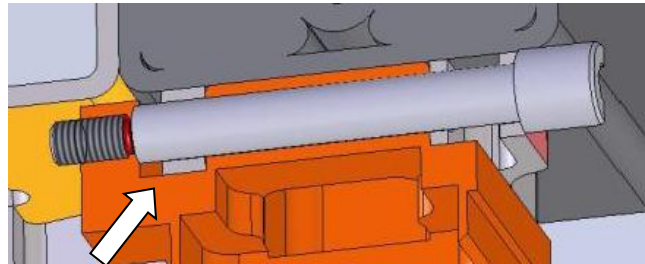


Now the actuator unit raise up towards the cable supports. If necessary, feed the actuator slowly towards the neutral respectively the non-tension position. Take a tool to feed it to protect your fingers!
CAUTION: Keep your fingers out of this area during movements!!

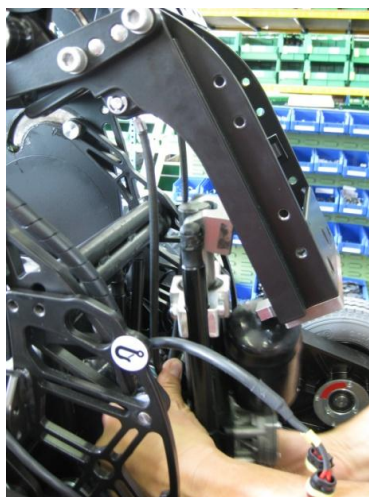
The cables of the joystick and the lights have to be unplugged. Feed out the cables out of the actuator unit towards the front respectively out of moving parts.



Loose the coupling bolt at the base underneath the seat so that it could be unscrewed later by hand. But ensure that the bolt is still properly attached to the frame.



Move your position to the left or right side of the chair to hold the actuator in one hand and to unscrew completely the coupling bolt underneath the seat. If necessary, manually soft movements up and down of the back rest may help.



The actuator is now fully released and can be taken off from underneath the leg rest assembly including the gas cylinders. Some turning movement would help feed out it easy.

8.20. Assembling of the stand-up actuator unit



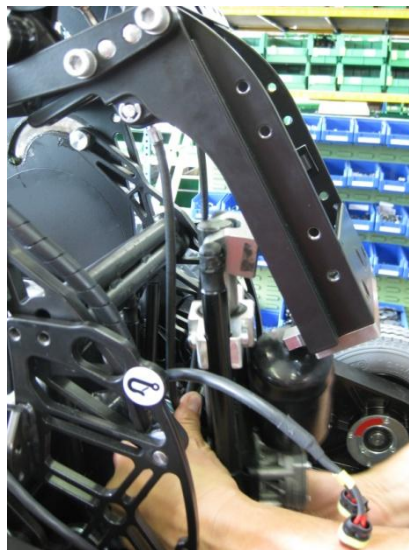
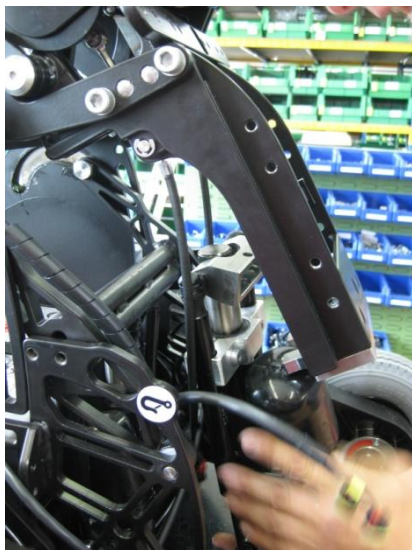
Plug in the Actuator unit at the control and move it in as short as possible

The chair has to be fully tilted to get space to feed in / up the stand-up unit from below.

Feed in the actuator from below of the leg rest assembly.

Note: The cables have to be behind the actuator.

Feed up the stand-up actuator unit step by step and keep the cables behind of it. Turning of the actuator unit may help to feed up.

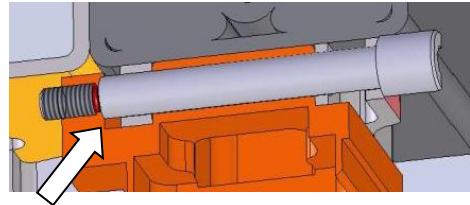


Place the actuator support into the leg rest assembly.



Move your position to the left or right side of the chair to hold the actuator in one hand and set the coupling into the coupling base underneath the seat.

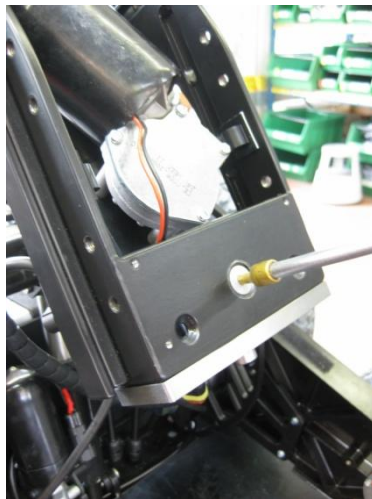
Set the coupling bolt, which has to be **medium locked** into the base and the coupling. Ensure that the bolt is properly in touch to the base and not tighten too much.



Assembly the base-plate of the actuator support.

THE SCREWS HAS TO BE MEDIUM LOCKED!!

The screws are only soft tightened from inside of the leg rest assembly. They will be fully tightened later when all screw of the support are placed.

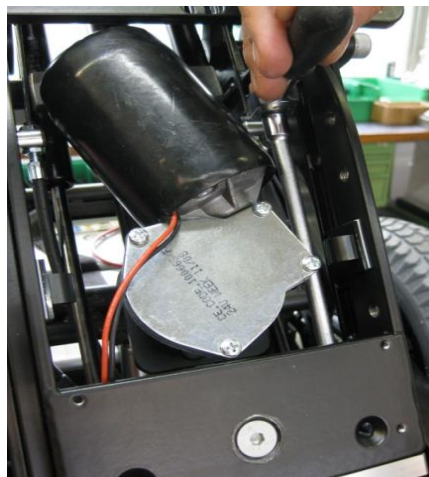


Plug in the Actuator and drive it out till the support fits to the leg rest assembly.



The screws has to be positioned. But only tighten it when every screw is placed.

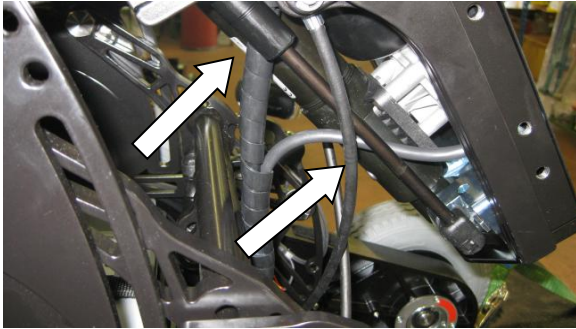
Start with the front counter sunk screw and after the allen screws from below.



If the support is positioned properly, tighten as first the base plate and then counter sunk screw and after the allen screws.

Cable routing

To protect the cables, the routing is through the gas-spring and actuator section.



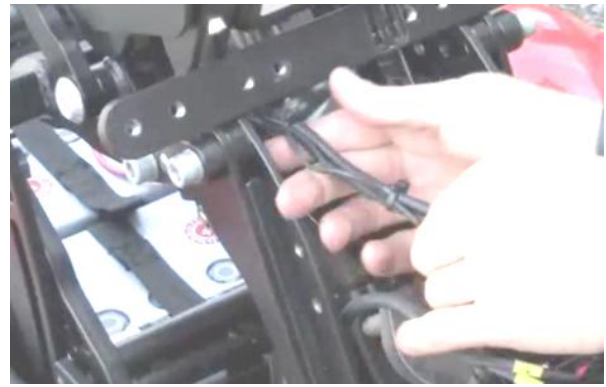
The cable has to be routed from behind between the lowering cables and gas-spring and actuator towards the front (at least to the rear) respectively the actuator plug.



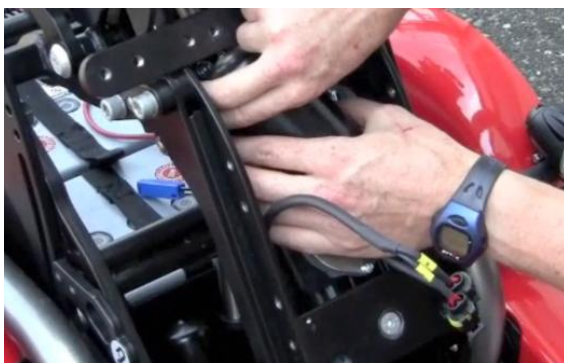
Now the cables will be feed from the front to the rear between the gas-cylinder and the actuator.



Feed in the cables on the left side of the actuator motor.



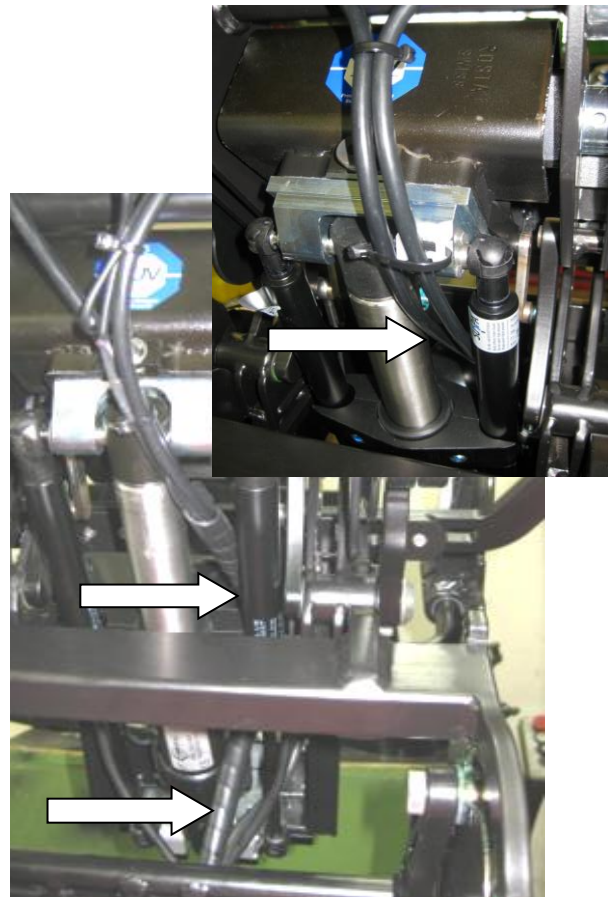
Push the cable behind the actuator motor and pull it from behind.



The cables have to be plugged in.



The cables are now protected installed and would not be squeezed anymore.



Final check

Now, the chair has to be driven at min. 2 times in standing and seating Position. After that, tighten the crews at the actuator unit again

Now the stand-up function could be tested and checked. Assure that the front wheel lowering cables were behind the gas-springs and move along the guidance and do not get to be squeezed.

Final works



Positioning and adjustment of the speed limit switch. Bring the chair into the most seating position.

Hold with 1 finger the holder from underneath and only soft tighten it with 2 screws. Now you can move the switch easily. Move the switch upwards, until you hear a **click**. So, the switch is adjusted.

Now the whole function could be tested and checked.

If everything is OK, assemble the cover of the leg rest assembly, the knee support, the foot rest and the cushion.

Go into un-tilted position and plug in and position the battery cover.

8.21. Assembling of the tilt actuator unit

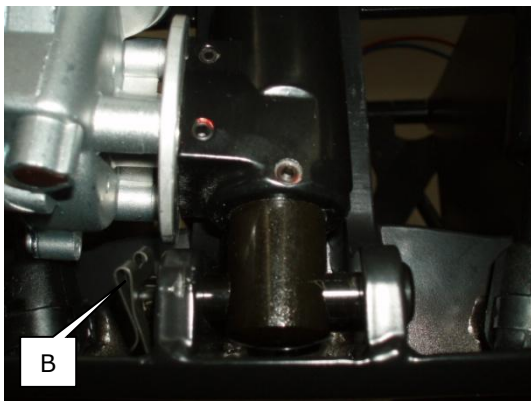


Set the wheelchair in the highest position possible of tilt in space, so that the gas springs are relieved.

Then unplug the actuator. Remove the spring lock (A) on the top bolt and remove the bolt.

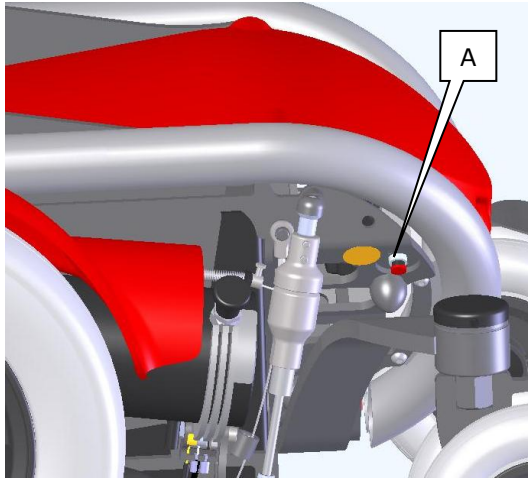
Now you can equip the actuator and replace it with a new one.

Put the new actuator in and mount the lower bolt, and then plug in the actuator and raise the chair as far up as possible, until the top hole of the actuator is superposed with the ear so you can insert the upper bolt. Mount the shaft locking clip (A).



8.22. Exchanging of the fuse

Cut out version until March 2011

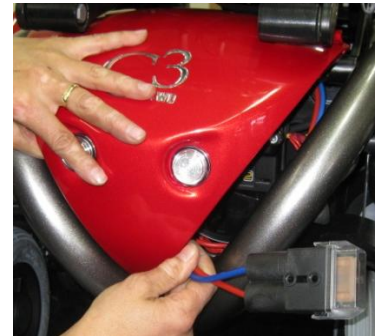


Put the wheelchair in the standing position and remove the back cover (see chapter 8.1.).

Turn off the circuit breaker respectively the cut out and unscrew the nut (A) to remove the circuit breaker. Unscrew the screws on the battery poles to exchange the circuit breaker completely with the cables.

Take the new circuit breaker and plug in the red cable to the + pole and the blue cable to the - pole on the battery. Mount the circuit breaker with the nut (A) and put the cover back on.

**Fuse version
since April 2011**



The main fuse housing is under the chair cover in the rear. To get access, carefully open the cover as shown above.



Open the fuse cover, insert the fuse which is delivered in a separate plastic bag and snap the fuse cover back. Now the chair can be brought into standing position to get access to the fuse cabling. Store the fuse cabling properly above the batteries and the main fuse housing below the control system under the chairs cover.

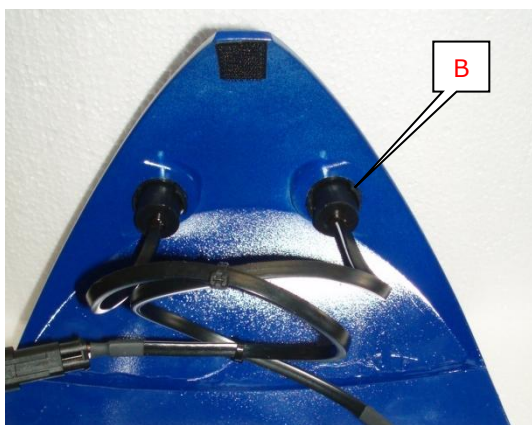
8.23. Exchanging the lights



Head lights:

The head lights are LED lights and can only be replaced complete.

Disconnect the cabling from the main chassis and unscrew the nut (A) holding the head light in place. Mount and connect the new head light the same way as you dismantled the old one.



Rear lights:

The rear lights are LED lights and can only be replaced complete.

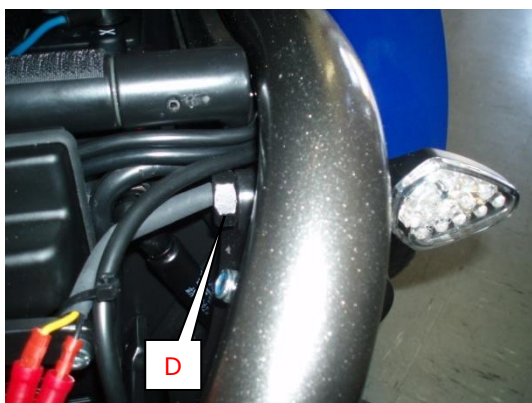
Put the chair in the standing position and remove the back (chapter 8.1.). Unplug the rear lights. Now press the snap fastener (B) of the rear light together, dismount and disconnect the back light. Mount and connect the new rear light the same way as you dismantled the old one.



Front indicator:

The indicators can only be replaced complete.

Unplug the cables from the indicator. Remove the nut (C), now you can replace the indicator. Fasten the new indicator with the nut (C) and plug in the cables afterwards.



Rear indicator:

The indicators can only be replaced complete.

Unplug the cables from the indicator. Remove the nut (D), now you can replace the indicator. Fasten the new indicator with the nut (D) and plug in the cables afterwards.

8.24. How to get battery access without power

The chair has to be almost in standing position. Take off the rear cover and get access to the battery box.

If this is impossible by power, follow the instruction «Exchanging the standing actuator» Chapter 8.17 – 8.20.

Finally the seat stays almost in standing, now take off the rear cover and get access to the battery box.

Exchanging the Batteries Chapter 8.14

Option: If you have an external power unit, you can plug it in directly by the stand up actuator behind the leg rest unit.

9. Function control

Always perform full functional tests on the wheelchair when repairs have been completed and before it is returned to the customer. Return the wheelchair to the client after all faults have been rectified and not before.

10. Cleaning

Before returning the wheelchair to the customer ensure the wheelchair is clean and well presented:

- If there is any dirt it should be cleaned off using a damp cloth and then dried thoroughly.
- For more stubborn stains wipe with a damp cloth using a mild solution of warm water and soap.
- Never use furniture polish or any fluids containing alcohol to clean the frame.
- In case of dirt on the seat cushion cover or the back rest cover, you can remove both of it and wash it softly. Do not wash it warmer than **40 degree Celsius or according the cleaning instructions on the label inside the cushion cover.**

Caution: Never use high pressure water cleaner.

11. Technical information

11.1. General information

Driving wheels Tires	dimensions 3.00-8" only airless tires
Front wheels Tires	dimensions 2.80/2.50-4" airless tires
Rear wheels Tires	dimensions 7x1 3/4" airless tires
Speed	0 - 10 km/h precision control (In certain countries there are regulations, considering speed limits for wheelchairs)
Drive motors Actuators	24 V DC
Batteries 48Ah or 73Ah	Maintenance-free lead accumulator in fleece or GEL technology 2 pcs. 12V/48 Ah, Type MK Battery 12V 45HR2000S 2 pcs. 12V/73 Ah, Type MK Battery 12V M24 SLD G FT Size: 260x135x230 mm/battery, Weight: 18 kg/Battery for Range approx. 25 km or 35 km
Range	Note: Range is affected by the loaded weight, hills climbed and temperature.
Maximal tolerable gradient (static)	10° (22%)
Maximal curb climbing ability	80mm
Charger	24 V DC - 8Amp
Maximal load including all objects carried along	140 kg
Wheelchair category	B

11.2. Measurements (metric)

Model	S – XL
Seat width	32 / 36 / 40 / 44 / 48 / 52 cm
Seat depth adjustable (incl. leg protector)	38 - 66 cm
Seat height	48 cm
Armrest height (from top of cushion)	15 - 36 cm
Footrest height (from top of cushion)	30 - 50 cm
Back height (incl. standard backrest)	40 cm (or any other optional heights)
Overall width	63 cm
Overall length	105 cm
Smallest turning circle (diameter)	110 cm
Overall height (incl. standard backrest)	100 cm
Speed	0 - 10 km/h
Range (55 Ah batteries)	25 km
Max. gradient (sitting position)	10°
Max. gradient (standing position)	3°
Kerb climbing ability (sitting position)	8 cm
Kerb climbing ability (standing position)	2 cm
Measurements LxWxH (not incl. backrest)	105 x 68 x 92 cm
Max. weight (incl. options)	180 kg
Max. load	140 kg

11.3. Measurements (british)

Model	S – XL
Seat width	12.6 / 14.2 / 15.8 / 17.4 / 18.9 / 20.5"
Seat depth adjustable (incl. leg protector)	15 - 26"
Seat height	19"
Armrest height (from top of cushion)	5.9 – 14.2"
Footrest height (from top of cushion)	11.8 – 19.7 "
Back height (incl. standard backrest)	15.75" (or any other optional heights)
Overall width	26.8"
Overall length	41.3"
Smallest turning circle (diameter)	43"
Overall height (incl. standard backrest)	39.4"
Speed	0 - 6mph
Range (55 Ah batteries)	16 Miles
Max. gradient (sitting position)	10°
Max. gradient (standing position)	3°
Kerb climbing ability (sitting position)	4"
Kerb climbing ability (standing position)	0,8"
Measurements LxWxH (not incl. backrest)	41.3 x 26.8 x 47.2"
Max. weight (incl. options)	380 Pound
Max. load	310 Pound

11.4. Electromagnetic Interference (EMI)

For important information about electromagnetic interference consult chapter 5 of the user manual.

Advice:

By following the advice listed below, it should reduce the chance of unintentional brake release or powered wheelchair movement.

Do not operate hand-held transceivers (transmitters-receivers), such as citizens band (CB) radios.

Do not switch on personal communication devices, such as cellular phones, while the powered wheelchair is turned ON.

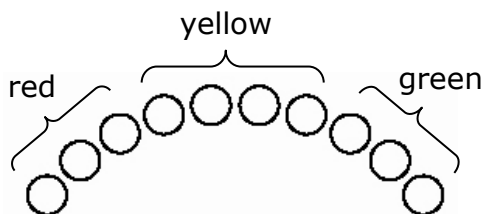
Be aware of any nearby radio or TV station transmitters and try to avoid coming close to them.

If unintentional movement or brake release occurs, turn the powered wheelchair OFF as soon as it is safe to do so. Report all incidents of unintentional movement or brake release to your dealer, and note whether there was a radio wave source nearby.

Finally, be aware that adding accessories and components, or modifying the powered wheelchair, may make it more susceptible to EMI. LEVO AG will not take any responsibility for the effects of EMI, if your wheelchair has been altered in any way.

12. Controller self help guide VR-2

The battery indicator provides information in case a fault occurs, to the wheelchair's electronic system. An appropriate number of light bars, start to flash on the display for a particular fault. Please see below:

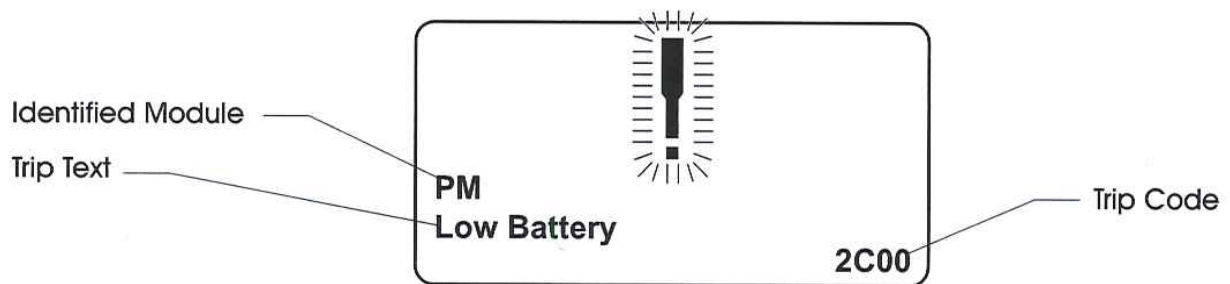


Number blinking bars		
10 green	Height of battery voltage	An excessive voltage has been applied to the control system. This is usually caused by a poor battery connection. Check battery and power module connections. If the fault remains contact your dealer.
9 green	Fault on the motor breaks	The parking brakes have a bad connection. Make sure all connectors are plugged in properly. If the fault remains, contact your dealer.
8 green	Power module fault	A power module fault is indicated. Make sure all the power module connections are plugged in properly.
7 yellow	Joystick module fault	A joystick fault is indicated. Make sure the joystick is in the rest position before switching on.
6 yellow	Charger connected	The battery charger is plugged into the wheelchair. Unplug the charger from the joystick module.
5 yellow	Right motor wiring fault	The right-hand motor has a short circuit to a battery connection. Contact your local agent.
4 yellow	Right motor disconnected	The right-hand motor has a bad connection. Make sure the motor connector is plugged in properly.
3 red	Left motor wiring fault	The left-hand motor has a short circuit to a battery connection. Contact your local agent.
2 red	Left motor disconnected	The left-hand motor has a bad connection. Make sure the motor connector is plugged in properly.
1 red	Low battery voltage	The battery needs charging or there is a bad connection in the battery. Check connections to the battery, power module and joystick module.

If the fault is not rectified after following the recommended instructions, please contact your local dealer for advice. Please provide your dealer with the serial number, which is noted on the warranty card. This number is important in case of any questions of the manufacturing company **LEVO AG**.

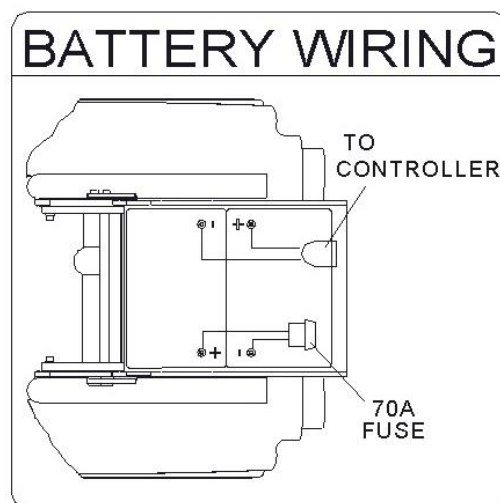
13. Controller self help guide R-net

The joystick module has its own error-management-system. If an error occurs, a message is indicated on the display, for example this could look like that:



If you can't solve the problem, just with the showed message, you can enter the trip code on the PG Drives homepage (<http://www.pgdt.com/diagmob/diagnostic.asp>), there you'll get some more information about the error and how you can solve it. If you can't solve the problem, please get in touch with your **LEVO**-dealer.

14. Battery - Wiring



15. Version-Management

Version-No.	Date	Description	Author
1.0	2008.07.10	First released version	T. Meier
1.1	2008.12.09	Additions for Handicap Institute	T. Meier
1.2	2009.02.05	Miscellaneous changes in chapters	T. Meier
1.3	2010.01.01	Miscellaneous changes in chapters	T. Räber
1.31	2010.05.27	Additional information Standing Actuator	H. Bögli
1.4	2010.07.12	New Stand-up Actuator Unit	H. Bögli
1.5	2010.10.27	New Actuator Coupling	H. Bögli
1.6	2011.04.01	New Main Fuse version	H. Bögli
1.7	2012.04.12	Improvements	H. Bögli
1.8	2013.03.01	Programming	H. Bögli
1.9	2014-06-20	TÜV Certification Updated finalized	H. Bögli