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1 INFORMATION FOR USER

1.1 Instruction for use

Some parts of the wheelchair may be disassembled when being packed. To assemble the parts, please do the following:

- If seatback cushion and chassis is disassembled, do the following; remove the Allen screw fitted on the back frame. Put the seat back chassis against the back frame and push the plastic clips over the tubes on the seat back frame. Install the Allen screw through the seat back chassis and into the back frame. Install the seat back cushion by placing it in the chassis.

- If the joystick is disassembled from the armrest it must be installed in the bracket under the armrest. Put the bar on the joystick bracket into the mounting bracket and tighten the locking screw to position the joystick. The cable for the joystick can be connected to any of the two connectors in the joystick. Put the brake levellers on the drive motors in the lock position and push the on/off button on the joystick. Leave the wheelchair on for 10 seconds without using it, turn it off and wait for another 10 seconds. The joystick has now upgraded all the electronic modules. Turn the chair on again and it will be ready for use. (See also 2.3 Technical manual and owners manual; trouble shooting

- If the wheelchair is delivered without batteries, the seat lift has to be manually lifted to remove the body cover Ref 2.3.0. Removing the gold locking pin on the top of the lift motor does this. You will find this between the seatback and seat cushion. (See also owners manual page 20). The seat can now be lifted up manually. Disassemble the body cover and install the batteries in the battery boxes. Install the body cover and the gold locking pin on the lift motor.

1.2 Instruction for use

See attachment: Use and transport for Balder

1.3 Owners manual

See attachment: Owner's manual

2 TECHNICAL DOCUMENTATION

2.1 Definitions

Definitions and phrases we have used in this Manual.

User Instructions
A simple manual for installing and getting started up. Short description of flash codes and the address and phone no. to our dealer.

Owners manual
A manual for using the wheelchair. A tool for the user to get to know the wheelchair, its functions, use and maintenance.

Job specifications.
A short description for technicians, of how to change essential parts on the wheelchairs.

Documentation
Verification of facts by: Text, pictures, forms, calculations etc.

Routine Maintenance
The interval between two inspections.

Pink Catalogue
Product- and price summary publicised by National Health Care Department in Norway.

Special equipment
Special tools needed to do service and repairs on Balder wheelchairs

Construction
The chair is designed with the ergonomically principles described in NS-EN 12182,
EN 614-1 and general requirements for NS-EN12184.

Electric wiring diagram
A description of the different electric systems available on the Balder wheelchair.

2.2 Cleaning

Upholstery:
To maintain the upholstery in prime condition it is advisable to vacuum on a regular basis. Occasionally it may be advisable to use a proprietary upholstery shampoo.

Bodywork and Frame
- Remove larger objects by hand
- Blow away dust by easy use of blow pistol

Warning: Do not blow into the electrical components
- Wipe over with a damp soft cloth.

Disinfecting method
Disinfecting method is not described, since it is not relevant to this product.

Warning!
After cleaning, all removable points, grease with a lubricant of low viscosity, e.g. 5-56, WD40, CRC etc.

Warning!
Never wash the chair under high pressure or running water.

2.3 Description of work processes

The following pages contain a description of the most relevant matters concerning service and repair of the wheelchair. These descriptions are intended as guidance for technical personnel. It is assumed these personnel hold the necessary qualifications as the manufacturer has responsibility for the product. If they do not have the qualifications, it will impact on the manufacturer's product and guarantee responsibility.
In the case of doubt as to performance of the tasks concerning this wheelchair we request that the dealer/manufacturer is contacted.
In our opinion, coordination of this information with the information contained in chapter 2.4, provides all relevant information.

NB! Make sure the chair is switched off when doing service and repairs.

List of work processes:

2.3.0 Disassembly/assembly

Main cover F/J is fitted with 6 x rapid release clips for rapid disassembly/assembly. Turn these a quarter turn to the left, lift it up at the rear and disconnect any lights before lifting off. Assembly takes place in reverse order.

Main cover L is fitted with 2 x rapid release clips at the rear and 2 x finger screws in the front. Remove the screws in the front, turn the rapid release clip a quarter turn to the left, lift the cover up at the rear and disconnect any lights before lifting off. Assembly takes place in reverse order.

Cover for the back F/J/L is fixed with 2 x hex screws, unscrew these and lift off the back cover. Assembly takes place in reverse order.

Cover lifting arm F/J/L: Remove the main cover as described above. The cover for the lifting arm is fitted with 3 screws, 2 of which are in the profile and 1 in the rear when lifted. Lower the chair sufficiently to be able to twist out the cover. Assembly takes place in reverse order.

Gas spring: This is placed at the rear of the chair by the lift actuator. Raise the chair to the highest position, remove the lock pin in the top of the actuator and the gas spring lock. Lift the seat and place a safety protection between the lifting frame and floor. Remove the gas spring. Assembly takes place in reverse order.

Batteries: Remove the main cover as described above. Free the lift actuator if necessary. Cut the cable ties necessary to free the cables. Unscrew the screws on the battery clamps and remove the battery. Assemble in reverse order.

2.3.1 Actuators

Replacing the actuator for the electric back Balder F/L tilt:
Remove the cover behind the seat back. Secure the seat back against falling backwards or forwards. Remove the cables leading to the seat back actuator, cut the cable ties as necessary and remove the circlip on the upper and lower mounting axles. Take out the upper mounting axle, tip out the motor and remove the actuator from the lower bracket. Apply silicon grease to the lower mounting axle. Replace the actuator, connect the cables and replace cable ties where necessary. Test the function by running the actuator fully out and fully in. Replace the cover on the back.
NB! Ensure that the circlips are correctly fitted and that the cables are not trapped.

Replacing the actuator for electric back Balder J tilt:
Remove the cover behind the seat back. Secure the seat back against falling backwards or forwards. Remove the cables leading to the seat back actuator, cut the cable ties as necessary and remove the circlip on the upper mounting axles. Unscrew the screw for the lower actuator bracket (NB! O-ring). Remove the upper mounting axle, the motor is now loose. Replace the actuator, connect cabling and replace cable ties where necessary. Test the function by running the actuator fully out and fully in. Replace the cover on the back.

NB! Ensure that the circlip and O-ring are correctly fitted and that the cables are not trapped.

Replacing the actuator for the electric back Balder F/J stand up function:
Remove the cover behind the seat back. Secure the seat back against falling backwards or forwards. Remove the cables leading to the seat back actuator, cut the cable ties as necessary and remove the circlip on the upper and lower mounting axles. Take out the upper mounting axle, tip out the motor and remove the actuator from the lower bracket. Apply silicon grease to the lower mounting axle. Replace the actuator, connect the cabling and replace cable ties where necessary. Adjust the potentiometer for the standing function (see description). Test the function by running the actuator fully out and fully in. Replace the cover on the back.
NB! Ensure that the circlips are correctly fitted and that the cables are not trapped.

Replacing the seat lift actuator Balder F/L/J:
Remove the lock pin, which is located at the top of the lift actuator. Note that the top frame with the seat will automatically begin to move. If the seat is in the lowest position, the lock pin can be reached from above between the seat back and the seat cushion. The seat frame will now be held up by the gas spring for the seat lift. Remove the main cover. Remove the battery cables and take out the right battery. If a clamp down unit is fitted, the handle for the manual release must be removed. Remove the circlip on the actuator's lower mounting bolt. Ensure that there is no tension on the actuator when it is removed.
Apply silicon grease to the lower mounting bolt. Fit the actuator. Fit the circlip to the lower mount bolt and the lock pin on the top of the lift (from the right). Connect the battery cables. Test the function by running the actuator fully out and

fully in. Fit the main cover and repeat the function test.
NB! Ensure that the circlips are correctly fitted and that the cables are not trapped.

Replacing the tilt actuator Balder F/L/J tilt:

Raise the seat lift to the upper position. Secure the tilt frame and seat from tipping forwards/backwards when the tilt actuator is removed. If possible, attempt to run the tilt actuator out so that the auxiliary spring is not under load during removal. Remove the cover on the back. Remove the cable to the tilt actuator. This is removed from the tilt relay situated in the back frame. Cut cable ties as necessary. Remove the circlips from the axles on the front and rear of the tilt actuator. It may be useful to remove the rear axle first, and then tip its upper part forward. Apply silicon grease to the axles. Replace the tilt actuator. Fit cables and cable ties as necessary. Test the function by running the actuator fully out and fully in. Fit the cover on the rear of the back.
NB! Ensure that the seeger rings are correctly fitted and that the cables are not trapped.

Replacement of the standing function actuator Balder F/J stand up function:

Raise the seat lift to the upper position. Secure the tilt frame and seat from tipping forwards/backwards when the standing function actuator is removed. If possible, attempt to run the standing function actuator out so that the auxiliary spring is not under load during removal. Remove the cover on the back. Remove the cable to the standing function actuator. This is removed from the tilt relay situated in the back frame. Cut cable ties as necessary. Remove the circlips from the axles on the front and rear of the standing function actuator. It may be useful to remove the rear axle first, and then tip its upper part forward. Apply silicon grease to the axles. Remember that the strut angle on the spring bracket for the stand function actuator must point downwards.
Replace the standing function actuator.
Fit cables and cable ties as necessary. Adjust the potentiometer for the standing function (see description). Test the function by running the actuator fully out and fully in. Fit the cover on the rear of the back.
NB! Ensure that the circlips are correctly fitted and that the cables are not trapped.

Replacing the foot rest actuator:

Raise the seat lift to the upper position. The seat may be removed for ease of access. Secure the foot rest so that it does not fall when the actuator is removed. Remove cable ties as necessary. Remove the cable to the foot rest actuators. Remove the strut on the rear mount axle on the foot rest actuators that adjusts the microswitches (locked by a set screw on the left hand side) and withdraw the rear mount axle together with the microswitches. Remove the front seeger rings and axle. Lubricate the rear mount axle with silicon grease. Fit new actuator. Fit cable ties as necessary. Test the function by running the actuator fully out and in.
NB! Ensure that the circlips are correctly fitted and that the cables are not trapped.
NB! Adjust the microswitches for the end stop of the actuator (see description).

Replacing the actuator for electrical length adjustment of the foot rest:

Raise the seat lift to the upper position. Raise the foot rest to a horizontal position. Remove the seat cushion and the seat cushion frame. Remove cable ties as necessary and disconnect the actuator cable. Remove the lower mount bolt on the actuator. Remove the screws on either side of the motor bracket. Replace the actuator, connect the cable and fit cable ties as necessary. Test the function by running the actuator fully out and in. Replace the seat cushion frame and cushion.
NB! Ensure that the cables are not trapped.

Replacing the actuator on the electric support wheels, standing function (From chassis no. F03121547):

Remove the main cover. Remove the covers over the actuator. Disconnect the support wheels actuator. Disconnect the cables to the microswitch (note to where they are connected). Remove the lock ring on the axle that is fitted to the lower motor bracket and push out the axle (NB! Parts may fall out). Remove and replace the actuator. Replace the axle and lock ring. Connect the cables to the microswitch. Connect the actuator and replace the cover. Test the stand up function.

Replacing the electric support wheels, standing function (From chassis no F03121547):
Remove the main cover. Disconnect the battery cables from the batteries. Disconnect the standing function electronics (disconnect the DX cable from PM). Remove the batteries. Disconnect the support wheels' actuator and the support wheel microswitch. Remove the support wheels (NB! Retain the washers when you remove the support wheels). Fit new support wheels (NB! Make sure that the washers are replaced in the same way as they were removed). Connect the motor and electronics. Connect the battery and replace the main cover. Test the standing function.

2.3.2 Microswitches

Adjusting the microswitches for actuator end stops:
3 microswitches are fitted on the rear right side, beneath the seat. These prevent the seat frame/back frame from conflicting with the cover and lift arm, when using the back/tilt/stand functions and the seat lift actuators. The basic settings of these are very important. These are set by adjusting the seat back at an angle of 90 degrees to the seat plate. Adjust the strut from back frame to the correct position on the bracket on the back frame, depending on the length of the seat. See annex. 2.3.6. The microswitch bracket must be nearly parallel to the seat frame, pointing slightly downwards. This is adjusted by loosening the set screw on the axle for the rear bracket for the foot rest motors on the left hand side of the chair. Carefully test the tilt/stand, lift and back actuators to the outer extremes without the seat frame/back frame and covers coming into contact with each other.

Adjustment of the speed reduction microswitch:
This microswitch is located on a bracket behind the lift motor, activated by a gas spring. Loosen the bracket on the chassis and raise the seat plate to 55 cm above floor level. Adjust the microswitch, so that this closes the switches at this height, and tighten the bracket. Test and control that the distance is correct.

Adjustment of the microswitch for the drive function during standing function up to F03021546:
This microswitch is positioned on the front of the lifting frame, under the front part of the seat frame. This prevents the wheelchair from being driven when the standing function has moved the seat frame more than approx. 15 degrees forward. When the switch is activated a line appears on the display for the selected drive program on the joystick. Adjustment takes place by bending the arm on the microswitch so that it activates when the seat frame is tilted forwards by around 15 degrees.
NB! This does not apply to standing function chairs from F03121547 onward

Adjustment of the floor height microswitch in the standing function from F03021547:
The switch is activated in the bracket fitted to the gas spring, raise the chair to the standing position and free the lift actuator. Screw the lift actuator to the desired height. Loosen the hex screws on the bracket and adjust so that the lamp lights on the standing function panel. Fit the lock pin in the lift actuator and test run.

When the user is sitting in the chair, we recommend a clearance between the floor and footrest of approx. 5-7cm.

2.3.3 Driving motors

Replacing motors:
Raise the seat lift to the upper position. Remove the main cover. Support the wheelchair so that the wheel connected to the motor that is to be changed can move freely. Remove the cables from the battery. Remove the battery on the same side as the motor to be replaced. Follow the cable to the motor, remove cable ties as necessary and disconnect the cable from the drive electronics. If a clamp down unit is fitted, the handle for the manual release must be removed (applies to right hand propulsion motor only). Remove the wheel and the motor. Fit new motor. Connect cable to the motor in the same way as to the old motor, and check clearance to all moving parts. Refit battery, connect battery cables, fit wheels and cover and trial run. It may be necessary to adjust directional stability following change of motor, see 2.3.5.
It may be necessary to carry out changes to the chassis of Balder F to fit new motors, see annex 2.3.6.

2.3.4 Electronics

Replacing the joystick:
If there is a fault on the joystick, the selected drive program will flash. In order for a new joystick to have the same program setup, it may be useful to connect the joystick to the Wizard PC software and transfer the existing program. Turn off the wheelchair. Remove the main cover and disconnect battery cables. Disconnect the cable to the joystick and remove the joystick. Fit new joystick, connect cables, program the joystick, either with the old joystick or a new program (select the correct program based on the type of wheelchair and its equipment). If the joystick has been pre-programmed it can be fitted directly. Turn on the wheelchair, wait 10 seconds while fault code 1 is shown by the green light on the on/off switch, turn the wheelchair off and wait 10 seconds before finally turning the wheelchair on again. Fit the back cover and the main cover.
If other fault flashing occurs, see fault codes 2.5.2.
Trial run the chair and its functions. When a new joystick with new programs has been fitted, it is possible that the directional stability must be adjusted and the joystick should be calibrated (see adjustments 2.3.5).

General replacement of DX-Bus cables:
Turn the wheelchair off. Remove the main cover and disconnect battery cables. Press in the lock tab on the contact and withdraw the cable. Cut the cable ties that are necessary to free the cable and replace the cable. Assemble in reverse order.
Ensure that the cable is not pinched or stretched between moving parts.

Replacing the electronics for the drive / Power Module:
If there is a fault on the module, the indicator lamp on the module will not light. Raise the seat lift to the upper position. Remove the main cover, and if necessary the cover over the Power Module. Disconnect the battery cables. Note where the various cables on the Power Module are connected before disconnecting them. The Power Module is removed by unscrewing the two nuts/screws at each end of the module. Fit the new Power Module and connect cables. Trial run and fit main cover.

Replacing the electronics for actuators and lights / Clam:
This is located behind the seat back and can be reached by removing the cover behind the seat back. If there is a fault on the module, the module indicator lamp will not light. Remove the main cover and disconnect battery cables. Disconnect the cables from Clam. Clam is removed from the mounting clip by inserting a small screwdriver in the slot at the rear of the Clam (right hand side). Depress the lock on the mount clip and Clam may be removed by sliding it down the clip. Fit new Clam, connect cables and trial run. Fit back cover and main cover.

IMPORTANT: The standing function electronics must be changed to an upgraded version for wheelchairs with chassis numbers between F03021521 and F04092310 if CLAMB2 is installed during repair.

The old version of CLAMB has serial nos. 04Exxxxx, the new version has serial numbers beginning 04Fxxxxx.
The old version CLAMB will not be sold, but will be replaced by the new CLAMB2.
The upgraded standing function electronics will be marked REV 09/04 or REV 10/05
The old version of the standing function electronics is marked REV 06/03

Replacing standing function electronics (From chassis no. F03121547):
Remove the main cover and disconnect battery cables. Remove main cover. The electronics for the standing function are located behind the left battery. Disconnect the DX cable for the electronics from the PM. Remove all contacts from the electronics. Re-connect the cables, and finally re-connect the DX cable for the electronics to the PM. Trial run all functions.

Replacing potentiometers x and y (From chassis no. F03121547):
Potentiometer y is positioned in the back assembly on the right side and x is positioned in the lifting frame assembly on the left side. Remove the protective cover and the back cover.
Pull off the potentiometer gear. Loosen the potentiometer nut, and cut off the cable ties that are necessary to free the cable. When fitting a new potentiometer, ensure that it fits in the lock hole. Use lock fluid and screw the nut tight carefully.
Adjust the standing function according to point 2.3.5 Adjustments.

2.3.5 Adjustments

Adjusting the standing function electronics (From chassis no. F03121547):
Remove the back cover and the main cover. The electronics for the standing function are located behind the left battery. Disconnect the DX cable for electronics from the PM. Set dip switch 1 to OFF. Re-connect the DX cable to the PM. The electronics are now in manual mode, and can only be controlled by the joystick. Run the tilt and back actuators to the final position in raised position using the joystick. Connect the contacts from the potentiometer to the adjustment tool (ensure that X and Y are connected to the correct contacts). Adjust the potentiometer with a small screwdriver. Approximate values: Y=14 X=34. Run the chair back to the normal seated position. Disconnect the DX cable for the electronics from the PM. Set dip switch 1 to ON. Reconnect the DX cable to the PM. Run the chair using the standing function electronics, check whether the actuators run as far as the end position. If they reach the end position, the potentiometers must be finely adjusted using the same procedure. When the actuators can no longer be run to the end position the adjustment is complete.

Adjustment of directional stability:
When a propulsion motor or joystick is replaced it may be necessary to adjust the directional stability of the wheelchair. This is done by connected the Dynamic handheld programmer (HHP). Select "Technician Mode" with code 592, select "view or edit power module" and go the menu for "veer compensation" and adjust this to the right or left. Trial run the wheelchair at its maximum speed. Run it on a completely horizontal even surface. If the directional stability is correctly adjusted the wheelchair will drive straight ahead when the joystick is pressed straight forward. If it is not correctly adjusted it will veer more to one side than the other. Adjust the stability with HHP until the correctly stability is achieved. Remember to press "exit" on the HHP before disconnecting it from the joystick so that the values are saved.

Veer compensation

Veer Compensation is the adjustment of the neutral steering position so that the wheelchair does not veer due to unbalanced motors when the joystick is pushed directly forwards or backwards. This parameter should be adjusted when a motor is replaced. A positive value make the chair go to the right, while a negative value make the chair go to the left.

Calibrating the joystick:

This value defines the operational range of the joystick, and must be adjusted when a new joystick is fitted and the restrictor plate is replaced. The adjustment is carried out by connecting the Dynamic hand held programmer (HHP). Select "Technician Mode" with code 592, select "view or edit remote module" and go into the "calibration" menu. Press start and move the joystick in a circular motion covering the whole movement area. Release the joystick and press "end". Remember to press "exit" on the HHP before disconnecting it from the joystick so that the values are saved.

Function control:

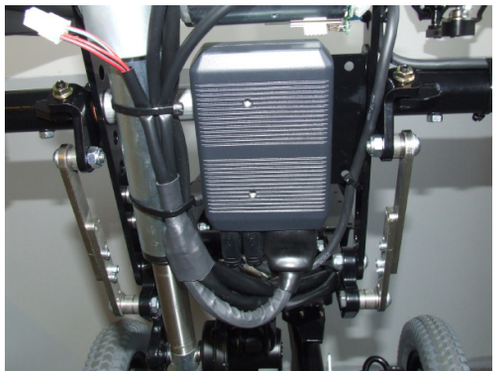
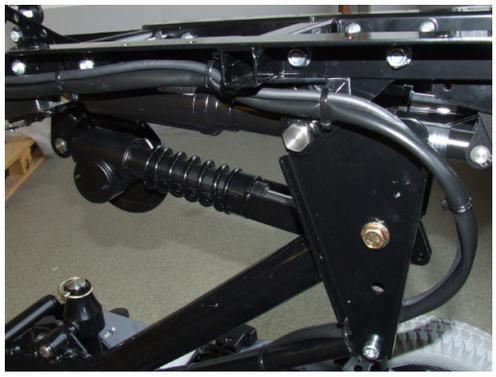
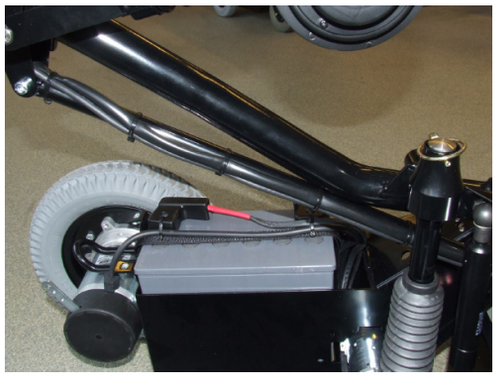
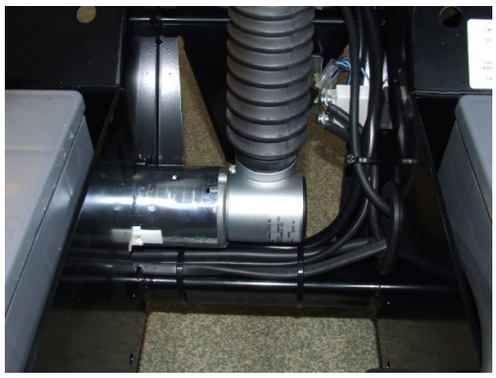
Check that all manual functions appear satisfactory (e.g. parallel function on the joystick, raising armrests, manual release of the chair mount, etc.).
Check that all electrical functions appear satisfactory (e.g. electric back, seat lift, foot rest etc.). Run the functions to their extremes and check that there are no faults or conflicts.
Check directional stability (if necessary adjust) and that the drive programs work as expected.
Carry out a functional test of the brakes on the driving motors and their free position.
Carry out a function test of the speed limiter. This is done by raising the seat to 55 cm above the surface that the chair is on. This should give fault code 2 on the joystick, and it should not be possible to drive the chair at more than 40 percent of full speed in the selected program.
Carry out a function test of the standing function.
Check air pressures in tyres and any tyre wear.
Check battery capacity.
Check the battery charger function.

Periodic checks:

See item 2.4; Maintenance routines.

2.3.6 Cabels for Balder powered wheelchairs

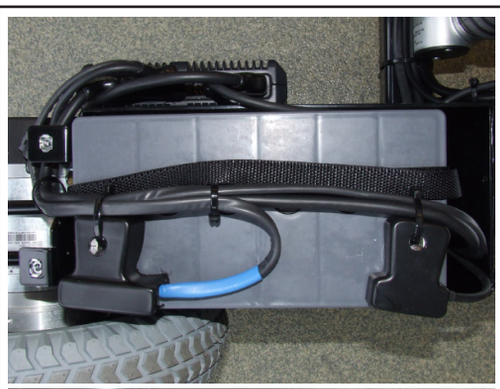
When it is decided where to place the back, and after the wiring is placed, all the cables must be fastened as described below.

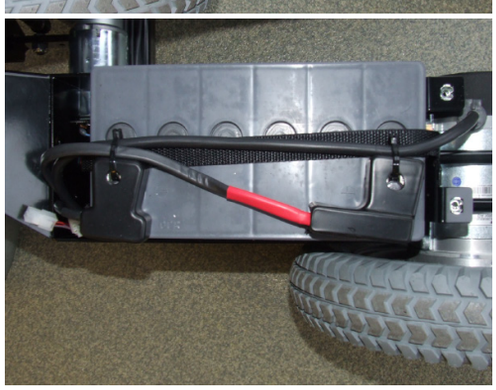
Back Fasten the cables in the back alongside the actuator for the back. Thereafter, do a curve underneath the back frame and over the back bracket on the right hand side seen from behind. Attach a strap around the cable, in the middle of the curve, ecxept from the DX BUS-cable from the clam module. Make sure that the cables have adequate length so that they do no become too tight with concern og the movement area of the back.	
Seat frame Fasten the cables along the right side and underneath the seatframe. Use on strap right after the back frame, one in the middle and one before the transversing square tube at the seat frame. Then fasten with a strap on the gap lever. From here, lead the cables in a loose curve in front of the seat frame, and in through the fastening point between the lifting arm and the parallell arm.	
Gap lever/ parallell arm Fasten the cables with a strap on the upper side and on the top of the parallell arm. Lead the cable on to the left side of the parallell arm and fasten with a strap ca. 70mm below the previous. Another two straps are fastened with equal distance before the curve on the gap lever, and one should be fastened right after the curve.	
Chassis Lead the cables further in a curve to the back of the lifting actuator and down to the left side where the speed restrictioner and the main fuse is mounted. Attach a strap to the cable loop at the rear of the lifting actuator. Fasten the cables from the main fuse with a strap.	

Battery cables

Lead the cables from the wiring, long cable from the main fuse and + cable from the powermodule, to the right and across the transversing square tube between the battery boxes and in beneath the motor part on the lifting actuator and in to the battery box on the right hand side. Also, the motor cable from the right driving motor should be lead over to the left battery box, following the cable path over to the left battery to the power module.
The short cable from the main fuse and the BUS-cable to the power module should be put thourg the hole on the inside of the left battery box. Here comes also the +cable out for the right battery.

On this stage, all cables will be fastened on a standrard Balder F/L with tilt function. The cables shall be arranged so that they are lying flat together on the transversing tube between the battery boxes. Fasten the cables with straps around the cables and the tube.
Lead the battery cables from the power module in a loop forwards and then across the left battery. Fasten the cables with straps to the fastening bow. Then, fasten the cables to the battery electodes together with the protectors. Same procedure shall be repeted for the right battery.





Especially for chairs with stand up function

Balder powered wheelchairs with stand up function has an extended set of cables. Nevertheless, the cable path is in general the same as for a Balder with tilt function except:
Electronic, stand up function
Cable from potetionmeter tilt and back
Cable from the actuator for support wheels
Cable from panel for stand up function

Electronic stand up function

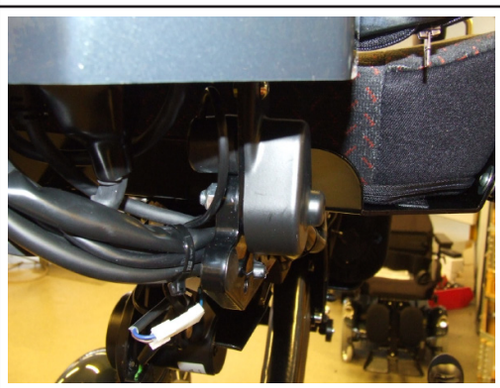
It is important that the cables in the area around the electronic box for stand up function are fastened together and that they do not build up too much. If this is not done, the plastic cover will be pressed to hard against the cables and it will be difficult to lock in its right place.

Potentiometer tilt

Microswitch for support wheels/ tilt. The cable from the potentiometer for tilt comes out of a tube in the lifting frame and is fastened with strips and clips together with the cable from microswitch for support wheels. Make a loop of the cables in this area and lead the cables in the the same path as the cables from the back, along the underside of the seat frame.

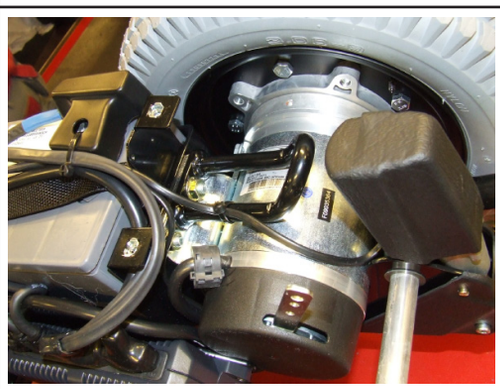
Potentiometer for the back

Curve the cable from potensiometer at the back function, and put it in the same path as for the cables from the back.
Fasten with straps to these, up to the connetion contacts behind the back cover.



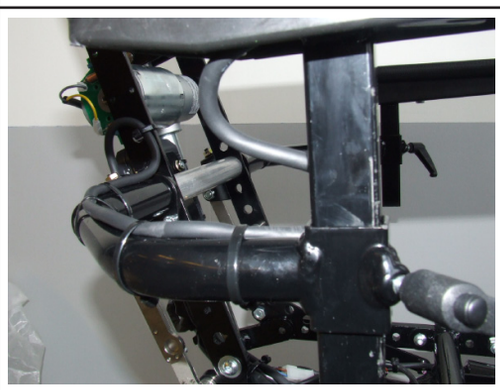
Cable from the actuator for support wheels

The cable for the actuator for support wheels should be curved slightly befor it is lead over the left driving motor where it is fastened to the strap bow on the left side. The cables are from here lead over the left battery, and the cable is fastened with straps.
Connect thereafter with the contact for the electronics for the stand up funtion.



Cables from armrests to the back

The cables for joystick and panels from armrests and back shall be fastened under the armrest pad and further down alongside the upper side of the arm rest tube. Fasten with straps, following the curves of the armrest tube. At the fastening point with the back frame, make a loop with the cable and fasten it in the upper fixing hole. Make sure that the cables are not too tight to avoid stretching or other kind of damage when flipping up the armrest.
If the armrest is heigth adjustable, make a loop with the cable in the adjustable area to compensate for the heigth adjustment movements.



Cables from panels

When it comes to cables from panels for stand up function and clamp down unit, there is a track in the bracket through which the cable should be lead. This is to make sure that the cable will not get on the outside of the armrest, this is to touce risk of being damaged.

Especially for Balder Junior 230-235

Since the Balder Junior has shorter brackets for back , the cables from the back will make a loop on the outer side of the back bracket where after they are fastened under the right hand side of the seat fram as normal.

2.3.7 Annexes

See attachment for Fitting instructions.

Fault-finding standing function

Software revisjon 1009
From chassisnr. F09105871

Flash code= number of quick green flashes in operating panel.

Fault	Cause	Remedy
One flash, support-wheel down, not in position.	Support-wheel blocked, defect limit-switch in mechanics, or defect actuator	Remove the blocking of support-wheel. Adjust or replace limit-switch. Replace actuator.
Two flashes, support-wheel up, not in position	Defect actuator or damaged wiring	Repair/replace wiring. Replace actuator.
Three flashes, tilt-switch on lift-frame do not activate in expected range.	Out off position/defect switch, or misadjusted pot.meter for tilt(x).	Adjust or replace switch. Adjust pot. meter for tilt.(x).
Four flashes, unintended running on output for tilt/back.	Internal fault in output module for back/tilt.	Electronics have to be repaired or replaced.

Software revisjon
Till chassisnr. F09105871

Flash code= number of quick green flashes in operating panel.

Fault	Cause	Remedy
There is no yellow light on the panel.	The switch that acts with the gas spring does not work. Check status light on the electronics.	Adjust or replace the switch. Replace the electronics.
Green lamp flashes on the panel, the chair has tilted forward, Safety wheels do not lower.	Safety wheel actuator fault.	Check the wiring loom, replace actuator if necessary.
Back does not correct precisely.	Incorrectly adjusted. Wiring loom fault.	The standing function must be adjusted up, replace potentiometer if necessary. Check wiring loom.
Green lamp flashes on the panel, the chair has tilted forward. Safety wheels are lowered.	The switch that senses whether the safety wheel is down has not been activated.	Check the switch for damage, replace if necessary or adjust it.
Safety wheels do not lower.	Check the microswitch in the right side assembly.	Adjust or replace this.
Green lamp flashes 5 times. Safety wheels do not raise.	Safety wheel actuator fault.	Replace safety wheel actuator.
From chassis no 06013012 Green and yellow lamps flash alternately.	Internal fault in the standing function electronics.	Replace electronics.
From chassis no F08024556. Green and yellow lamps flash simultaneously	Switch at the lifting frame is not activated or damaged	Check or change the switch

Stud torque for screws, Balder F/L/J

Size	Description	Finish	Placing	Nm
M10x20	Screw - Durlock	Gold chromatized	Chassis- lift	50 Nm
M8x12	Allen screw, low head	El.zink.	Par.arm-footrest	25 Nm
M8x16	Allen screw, lens	El.zink.	Toggle bracket	30 Nm (tighten on nut)
M8x20	Allen screw, lens	El.zink.	Bracket, back	35 Nm (tighten on nut)
M8x25	Allen screw, lens	El.zink.	Back frame	35 Nm (tighten on nut)
M10x70	Allen screw, low head	El.zink.	Fitting, armrest	40 Nm
M8	Nut, nylock	El.zink.	Seat frame	35 Nm
	Special screw toggle bracket	Stainless	Toggle bracket	25 Nm (remove varnish, use green lock tight)

INFO: Stainless screws have a reduced maximum stud torque. Make sure you have the correct screw.

Lock tight points Balder F/L/J

Size	Description	Position	Lock-tite type
M10x70	Allen screw, low head	Armrest	Red Lock-tite 222
Special	Nut, gliding back	Gliding back	Red Lock-tite 222
M10x20	Screw - Durlock	Lift	Wurth Blue
M8x12	Allen screw, low head	Lift	Wurth Blue
M5x8	Screw, sink	Footrest	Wurth Blue
M10x20	Screw - Durlock	Front end assembly L	Wurth Blue
M10x45	Allen screw	Clamp down unit	Wurth Blue
1024	Lifting sleeve	Lift	Wurth Blue
M6x30	Allen screw	Assembly fixture, Recaro	Wurth Blue
M8x50	Allen screw	Armrest fitted to back, Recaro	Wurth Blue
Special	Screw, toggle bracket	Seat frame	Wurth Green
Actuator fitting point	Actuator for rev. clamp down unit	Clamp down	Wurth Blue
Actuator fitting point	Actuator for support wheels stand-up function	Support wheels	Wurth Blue
Actuator fitting point	Actuator footrest with el. length comp.	Footrest	Wurth Blue

Installation instructions drive motors Balder F

Because of change to common motors on Balder F and L, there has been a change on the brackets on the drive motors. This will have an effect when changing drive motors on Balder F with chassis no. before 00120600. These chassis can be identified by having only four holes for mounting the drive motors. All wheelchairs with later chassis no. have been modified to take the new motors and can be identified by having 8 holes in the chassis for the drive motors.

Disassembling:

Put the seat lift in its highest position and take off the body moulding. If the chair has the electric security adaptation for the stand-up function, the actuator has to be driven down to get the body moulding off. Put something under the wheelchair to lift the wheel up from the surface. Disassemble the wheel from the drive motor. Take off the cables attached to the battery and isolate the terminals. Take out the battery from the chassis. Follow the cable from the drive motor to the power module and disconnect it. When changing the right drive motor, it is an advantage to remove the seat-lift actuator. Disassemble the drive motor, bracket for body moulding and the fixing bar. If the chair is equipped with clamp down unit, the screw in the front of the chassis must be removed.

If the chair is equipped with the security adaptation for the stand-up model, this has to be removed completely from the chassis

Preparations:

The chassis needs to be modified by drilling 3 new holes (Ø 8,2mm) for each new drive motor. Use the enclosed template and attach it to the existing holes for the drive motor in the chassis. Drill the new holes with Ø5mm first. Remove the template and drill with Ø 8,2mm. See also attached drawing.

If the wheelchair has the electric adaptation for the stand-up function, new holes have to be drilled for this too. Use the enclosed template and drill 2 holes with Ø5mm first, remove template and then finally drill with Ø8,2mm.

Assembly:

New drive motors can now be fitted. Fit the drive motor, the bracket for the body moulding and the fixing bar on the upper and outermost hole. Use the non-modified holes as references. Check that the drive motor is in the correct position by aligning the back cover of the drive motor with the inner wall of the battery cage of the chassis. Install the rest of the fixing screws, attach the cable to the power module and install the battery. Install the battery cables and the body moulding.

If the wheelchair has a clamp down unit, the screw in the front has to be fitted before the battery is installed.

If the wheelchair is equipped with electric adaptation for the stand-up model, this has to been installed in the new holes. The adaptation must be moved 14mm out towards the wheel. Because of this, use the enclosed shorter fixing bar. In addition, the plastic body moulding must be cut to fit.

If the bracket for the body moulding has only 2 holes, use the enclosed new bracket with 4 holes

Inspection and adjustment:

When the installation of new drive motors has been done, a function test has to be done. Because of new motors, the veer compensation has to checked and adjusted. This is done using the Dynamics Hand Held Programmer. See technical manual for instructions.

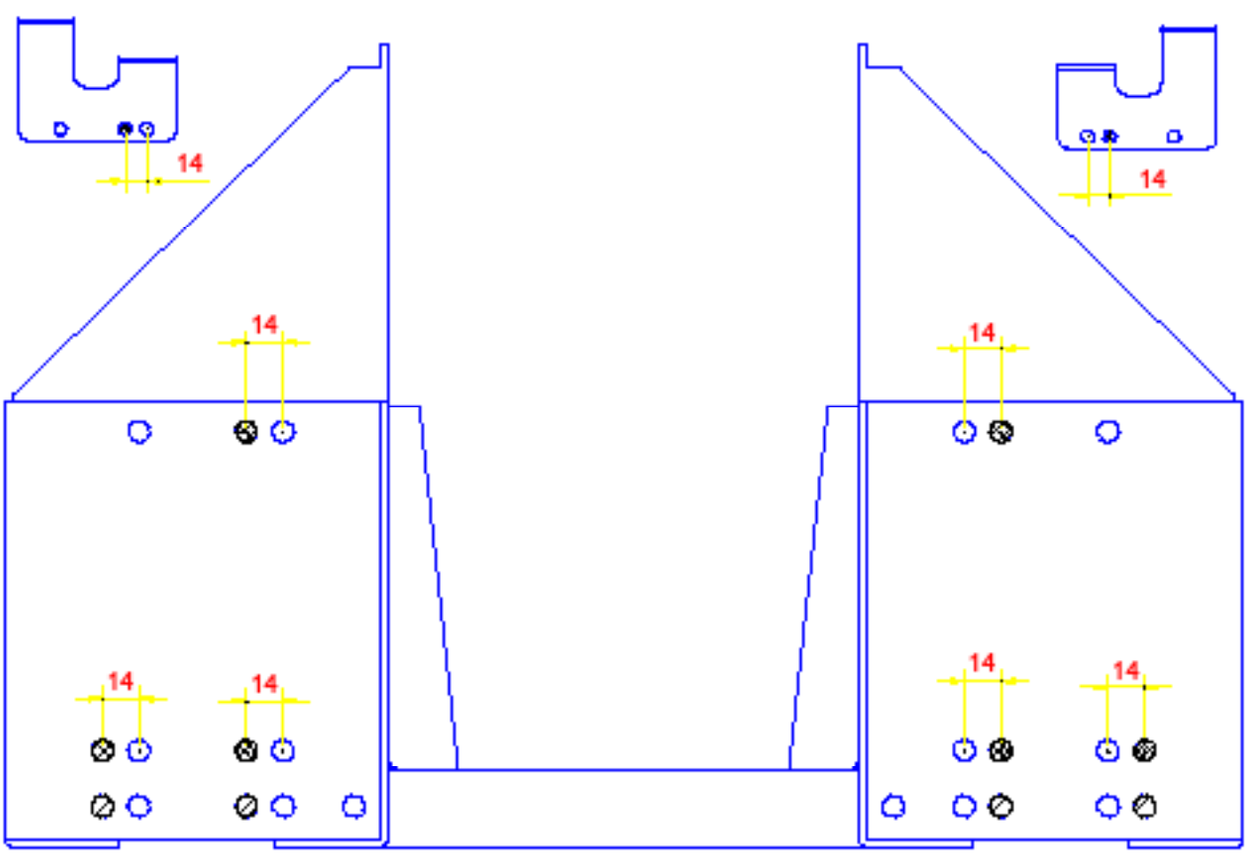
Modifisering av chassis for montering av nye drivmotorer på Balder F med chassis nummer, før 0012 0600.

Modifications of chassis when installing new drive motors on Balder F with chassis number before 00120600

- Eksisterende hull for gammel drivmotor og tippesikring
  Existing hole for old drive motors and el. security adaption for stand up function

- Nye hull for nye drivmotorer - ø8,2 mm
  New holes for new drive motors - ø8,2 mm

- Nye hull for tippesikring - ø8,2 mm
  New holes for el. security adaption for stand up model - ø8,2 mm



2.4 Routine Maintenance and General Care

See 2.4 Routine Maintenance chart.
See 2.3 Job specifications.

Recommended interval for Maintenance will vary with the user care and general use.
Chairs that have hard usage and neglected will have a different need to maintenance.

Etac AS recommends a check every two years for chairs with "normal use", or every 2500 hours.

In addition to Routine Maintenance Etac AS recommends a check one month after delivery. This is a quality insurance check and also validates if the user is maintaining the product to the manufactures recommendations.

Life calculation

With intended use the estimated life of the Balder F&L is 10 years. This will vary with the use of the product and maintenance intervals. See declaration of conformity for details.

Intended use

Balder F: 40/60-distribution out/in, with an operating time of 4 hours per day.
Balder Junior; 40/60 distribution out/in, with an operating time of approx. 4 hours per day.
Balder L: 60/40-distribution out/in, with an operating time of 4 hours per day.

Preparation for rebuilding the wheelchair for new customers

See 2.4 Routine Maintenance chart.
See 2.3 Job specifications.
It's recommended to check the wheelchair according to the routine maintenance chart. We also recommend a check one month after delivery to insure that the quality is according to the checklist.

Routine maintenance

Chassis no.:..... Date:.....

Check list periodical maintenance/preparation for recirculation

		OK	Changed	Adjusted	Repaired	Sign.
Visual check of the chair						
	Body moulding					
	Lights					
	Painting					
	Tyres					
Control of the functions						
	Electrical functions					
	Driving characteristics					
	Speed restrictions					
Mechanical Control						
	Rear/front fork					
	Circlips					
	Set screws					
	Drive motors					
	Magnetic brake					
	Micro Switch					
	Motor brackets					
Grease points						
	Back actuator fixing bolts					
	Lift actuator screw					
	Lift actuator lower bolt					
	Length comp actuator screw					
	Footrest arms					
Electrical Control						
	Electronic fault log					
	Battery					
	Cables					
	Charger					
	Main cables					
	Connections power module/ clam unit					
	Connection actuators					
Miscellaneous						
	Wash and clean					
	Adjustments for the user					
	Users manual					

2.5 Use of special equipment

The following special equipment is recommended:

- DX Wizard computer program.
- DX HHP Hand Held Programmer.
- Multimeter.
- Battery tester and/or capacity tester.
- Tool for adjustment of the potmeter

2.5.1 Summary from manuals published by Control Dynamics Ltd.

FAULT HISTORY

Fault history displays all faults and warning conditions recorded for the wheelchair since the Fault History was last erased. Some conditions logged in the Fault History are not caused by actual faults, but are only temporary conditions e.g. a motor lead was not connected when the DX System was turned on and driving was attempted, producing a Motor Fault.

To view the Fault History:
This is carried out in wizard 5.0 by selecting "tools" and then "Diagnose controller", in wizard 3.x you select man. Select "Diagnose Faults" From the "Modules Attached" menu, select "UCM Remote" and "Power Module".

Below are listed the Fault History codes and probable causes of these faults. If the suggested action does not remove the fault, contact authorised personnel.

CPU / GENERAL FAULT

Cause:
Internal fault.
Action:
Change master remote (e.g. joystick REM G90, REM 34 or REM G80), or contact authorised personnel.

ADC FAULT

Cause:
Internal fault.
Action:
Change master remote (e.g. joystick REM G90, REM 34 or REM G80), or contact authorised personnel.

CAN SHORT FAULT

Cause:
Short between CANL and CANH (cables in DXBUS cable).
Action:
The short may be in a module, or in a DX cable, or the exposed DXBUS contacts may be shorted by foreign material. Ensure that all DXBUS contacts are clean. Check that all module status lights are on and steady. Replace modules if they indicate faults.
Warning:
Open circuit breaker or disconnect from PM before probing around DXBUS Connectors.
Disconnect any optional modules and turn on the master remote. If the fault still occurs, the fault is in connected system. Identify the fault by changing modules and DX cables one by one until the faulty cable or module is identified. Replace the faulty part.
If the fault remains, try replacing the master remote and the Power Module.

If the fault cannot be reproduced, check all cables and DX connectors for foreign material or damage.

CAN L FAULT
Cause:
CANL failure in the DX cables or modules.
Action:
Check for a short from CANH to another DXBUS wire, or a short from CANL to DXBUS- or DXBUS+. The fault can also be internally in one of the modules. See also CANH fault.

JS OONAPU OCCURANCE
Cause:
The joystick was Out Of Neutral At Power Up. This is a fault condition produced if the DX System is turned on while the joystick is not in the neutral or non-driving position.
Action:
Allow the joystick to return to neutral and turn the DX System off then on again.

POWER BUTTON FAULT
Cause:
ON/OFF knob has been held down too long, have a short or open circuit.
Action:
Turn the chair OFF then ON again.

JOYSTICK FAULT
Cause:
The Joystick may need to be recalibrated.

Action:
See 2.3.5 Adjustments and consult authorised personnel.

2.5.2 Flash codes

Dynamics DX
Any fault condition on the DX system will cause the System Status LED to flash. This is the small green light near the on/off button on the user remote. Flashing occurs in bursts of flashes separated by a two second pause. The number of flashes in each burst is referred to as the Flash Code and indicates the nature of the fault. Faults that have an influence on the safety will make the chair stop, while the LED light will only indicate less critical faults and the wheelchair can be used normally. If the wheelchair only drives slowly, a fault has occurred and the electronics has gone to a limp home mode.

Faults that effect the safety of the chair will cause the chair to stop while less critical ones will be indicated but allow the chair to continue driving. Some faults will automatically clear when the fault condition is removed, in which case the System Status LED will become steady and the wheelchair may be driven normally. Others faults are latched and must be cleared by turning the DX System off, waiting for two seconds, turning it back on again.

The title of the Flash Code fault is also displayed by the HHP if connected to the faulty wheelchair.

When the DX wizard computer program is used, the status of the system can be read, and by pushing the INFO button a description of the fault will be available.

FLASH CODE 1
DX Module Fault (See also Limp Mode)

Cause:
An Auto Download has occurred.

Action:
Wait 10 seconds while it is flashing, turn off the chair and wait a further 10 seconds before the chair is ready for use.

Cause:
Not correct programming of joystick.

Action:
Reprogramming the joystick

Cause:
Connection between DX Modules may be faulty, or there may be an internal fault in a module.

Action:
Check DXBUS cable and connections and replace where necessary. If the Status LED on another Modules is not on, replace the Module. Check the program to see if there are modules defined in the system but not represented in the system. Reprogram with appropriate program.

FLASH CODE 2
DX Accessory Fault

Cause:
The seat is in a high position and the chair drives slowly.
The Slow/Stop input on the CLAM or TAM is not connected, or is set to slow or stop.

Action:
Lower the seat to a low position under 55 cm. Control the Slow/Stop function.

Cause:
There is a fault in an accessory device attached to a DX Module (excluding the PM, CLAM or joystick). Example of faults in accessory devices may be: the clutch is, or has been, disengaged; a light bulb is short or open circuit; an actuator, actuator terminal or actuator wire has a open circuit..

Action:
Check all accessory devices connected to your DX System. Disconnect all accessories and test the system. Connect one and one accessory to isolate the problem.

FLASH CODE 3
Left Motor Fault M1

Cause:
Fault in left drive motor, wiring to the motor or the Powermodule (M1). The connection is either open or short circuit.

Action:
Disconnect the left motor plug and check continuity between the motor pins on M1. Check the motor itself and the power module.

FLASH CODE 4
Right Motor Fault M1

Cause:
Fault in right drive motor, wiring to the motor or the Powermodule (M2). The connection is either open or short circuit.

Action:
Disconnect the left motor plug and check continuity between the motor pins on M1. Check the motor itself and the power module.

FLASH CODE 5
Left Park Brake Fault

Cause:
Fault in left hand park brake on the drive motor, wiring to the park brake or a faulty Powermodule. The M1 plug connection to its associated Park brake is either open or short circuit.

Action:
Disconnect the M1 plug and check continuity between the two Positronic park brake pins. Check the park brake itself and the Powermodule.

FLASH CODE 6
Right Park Brake Fault

Cause:
Fault in right hand park brake on the drive motor, wiring to the park brake or a faulty Powermodule. The M2 plug connection to its associated Park brake is either open or short circuit.

Action:
Disconnect the M2 plug and check continuity between the two Positronic park brake pins. Check the park brake itself and the Powermodule.

FLASH CODE 7
Low Battery Fault

Cause:
The battery charge is not sufficient to allow safe driving. It has fallen below 17V.

Action:
Check battery connection and terminals. The battery voltage should be similar when the battery is on charge, and when it isn't. Check the manual for the charger to see if it works correctly.
Check that fuses have not blown, or circuit breakers tripped.
Replace battery if worn out or if capacity is insufficient for the user's need.

Note:
The wheelchair will behave sluggishly and the Battery Gauge will flash indicating low battery voltage prior to the display of this fault.

Cause:
Broken DX cables or DX cables with random fault.

Action: Check and replace DX cable

FLASH CODE 8
Overvoltage Fault

Cause:
The Battery voltage has exceeded 32V.

Action:
If this fault occurs during battery charging, the battery charger is defective or incorrectly adjusted. Check the battery chargers open circuit voltage is in accordance with the battery manufacturers limits, and is less than 32V.

Cause:
The battery connector is making intermittent contact when the wheelchair is stopped, or travelling down a slope.

Action:
Check that the battery wiring and terminating is secure.

Cause:
Broken DX cables or DX cables with random fault.

Action:
Check and replace DX cable

FLASH CODE 9
CANL Fault - (controller area network low line)

Cause:
An invalid voltage has been detected on the DXBUS CANL line. Communicating is not possible using the CANL wire. A fault in the DX modules can also create this fault.

Action:
Check the continuity of the DXBUS cable. Check for shorts between DXBUS pins. An open or short circuit on another DX Module can cause this fault. Check also the module status lights on the DX modules for faults.

FLASH CODE 10
CANH Fault - (controller area network high line)

Cause:
An invalid voltage has been detected on the DXBUS CANH line. Communication is not possible using the CANH wire, or the CANH and CANL wires have shorted together.
Hazard lights were turned on when the DX System was turned on.
The CANH is used to generate a Kill signal by any DX Module, which detects an unsafe condition, or by an external device such as an emergency stop switch.
The CANH wire is pulled to either Battery + or Battery - and causes the DX System to shut down.
A fault in the DX modules can also create this fault.

Action:
Check the continuity of the DXBUS cable.
Check for shorts between DXBUS pins. An open or short circuit on another DX Module can cause this fault.
If the Hazard Lights were already switched on when the DX System was turned on, Flash Code 10 and Limp Mode (slow driving) may result.
To clear this fault, turn the Hazard Lights off, and then turn the DX System off, then on again.
If generated by a Kill signal, the cause of the fault is severe. Contact authorized dealer.
Check also the module status lights on the DX modules for faults.

FLASH CODE 11
Stall Timeout Fault
Cause:
The motor current has been at, or close to, current limit for longer than the Stall Timeout parameter value 2.1.10 is set in the program for the power module.

Action:
Turn the DX System off, wait until motors and power modules has cooled down and then push the on button again.

FLASH CODE 12
Module Mismatch
Cause:
There is a compatibility problem between DX Modules in the System. The wheelchair will be disabled.

Action:
Contact authorised personnel.

Cause:
The data held by the user remote is corrupt or incompatible with that of the other modules in the system.

Action: Reprogramming the wheelchair system may correct this problem.

2.5.3 Dynamic's abreviation

ACU	Attendant Control Unit. A DX Module containing a joystick that is used by someone other than the person in the wheelchair to control the wheelchair.
ARC	Actuator Remote Control. A DX Module consisting of switches to control up to five actuators.
CAN	Controller Area Network.
CANH	Controller Area Network High Line. One of the four wires which make up the DXBUS.
CANL	Controller Area Network Low Line. One of the four wires that make up the DXBUS.
CLAM	Combined Lighting and Actuator Module. A DX Module for five actuators and lighting outputs.
DX	Dynamics Control Modular Mobility System.
DXBUS	The DX System communication CAN communication lines plus 24V power supply to DX Modules.
ESD	Electrostatic Discharge.
HHP	Hand Held Programmer. The HHP can be used to change certain parameters in the DX systemet. Technician code is 592.
WIZARD	Computer program with access to all programming parameters and diagnostics.
OONAPU	Out Of Neutral At Power Up. A fault condition produced if the DX System is turned on while the joystick is not in the neutral (non-driving) position.
VEER	A parameter for adjusting the veer when driving the wheelchair.
PM	DX Power Module. The DX Module that produces the DX System output to the motors and park brakes.
RJM	Remote Joystick Module. A DX Module that contains a joystick only, and can be used to control the wheelchair instead of the DX Remote used in the DX System.
MASTER	The main part of the DX system. Master remote, DX remote or users remote are other names used.
SECONDARY	A remote joystick that is dependent to have a master remote to function.

2.6 Electric equipment

2.6.1 Electrical wiring diagram

See attachment: Wiring diagrams

2.6.2 Fault finding

Fault finding in the electrical/electronic system is done in three different levels:
Level 1:
Fault finding using "flash codes" on joystick and the description in (2.4) in the manual, or using the DX Wizard computer program and it's diagnostics system.
Level 2:
Fault finding using the modules system status lights and the description (2.4) in the manual, or using the DX Wizard computer program and it's diagnostics system.
Level 3:
Fault finding using the electric wiring diagram, multi-meter and general knowledge about electric wiring and electric actuators.

2.6.3 Electric system structure

The system is build up around the Dynamics DX modulated system. The system has three main modules; joystick (master joystick), the module for actuators and lights (Clam) and the module for driving (Power module). Communication is done by connecting the modules with CAN Bus system. The system is powered by two 12 volts batteries connected in series producing 24 volts. Different actuators suited to the separate functions are powering electrically. The actuators are limited with micro-switches and programmable limit parameters in the electronics. Tilt/stand-up actuator has in addition a relay for quick stopping of the actuator itself. The driving system consists of two drive motors, a micro-switch for reducing speed with a high seat position. The power module controls the driving and is fully programmable. To make the system complete, a standard wiring harness is also fitted to the system.

3 PRODUCT INFORMATION

3.1 Technical Date on the Balder F/L

Chassis		
	Steel	Domex 500 Steel
	Rust preventive	Irondioksyd
	Varnish	Epoxy Powder varnish
Chassis/covers		
	Body moulding	ABS plastic 5mm
	Black plastic details	Polycarbonate
Motors/Actuators		
	Drive motors	Micro Motor 24V DC –300W
	Lift actuator	CATR 33Bx125x1kv/D24 CNM
	Tilt actuator	CATL 33x100 x1kv/D24CWM
	Seat back actuator	CATL 33x100 x1kv/C24CWNM
	Footrest actuator (angle)	ELETTROMECCANICA MOD. L-01
Electronics		
	Driving electronics	Dynamics DX-PMB2 - 80 AMP
	Electronics for equipment	Dynamics DX-Clam
Batteries		
		Sonnenschein A-500C GF12044Y
	Capacity	2 x 12V, 50Ah
	Battery electrode	Round
	Dimensions (limits)	H=260mm L=260mm B=135mm
Charger		
	Type	Ladac 3021c/3031 Eltek SMPS 300ME Medico CCC931/932 Swede WPC-500
	Charging socket	Controls Dynamic

For further technical information we refer to the section of dimensions in the brochure.

You can find further information in chapter 2.3, 3.2, 3.4 and in the Users Manual

3.2 Exploded views

See attachment: Exploded views

3.3 Price Lists