medemagroup

Service Manual
Mini Crosser X1

1533-2001-S ver. 1.0.0 - February 2019

GB

Serial number: ___-_____-_____-_____

Delivery date: _____ Year 20_____

This vehicle was supplied by: **Date:** /

Dealer:

For this product You can expect to find the following documentation:

- User manual
- Service manual
- Spare parts list
- Presell information.

Medema A/S

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DK-7400 Herning
Denmark

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Content

Introduction

This manual contains servicing instructions for the Mini Crosser X1 mobility scooter.

The Service Manual is a supplement to our Spare Parts Catalogue and User Manual.

You have now taken possession of an electric mobility Mini Crosser developed for outdoor driving by active users. It is what is called a Class C vehicle in according to the European classification of electric wheelchairs.

The Mini Crosser X1 is designed for safe travel for at least 10 years, up to a max. of 5,000 hours, providing it has service and safety inspections every third year, which is equivalent to around 1500 operating hours. The service must be carried out either by Medema A/S or an authorised workshop.

IMPORTANT! For safety reasons it is of the utmost importance that the servicing and safety check intervals are complied with, as this minimises the risk of brake failure and short-circuits in the wiring, which could generate heat and cause a fire.

If help is required with troubleshooting, Medema is always happy to provide telephone assistance. If the problem seems to be an electrical fault that prevents the scooter from working, please tell us the error code. This can be found on the battery indicator on the control panel. Read more about this in the section on Troubleshooting.

Please also have the scooter's serial number handy when contacting Medema A/S.

If you have any questions that are not answered directly by this manual, you are always welcome to contact us at:

Medema A/S
Phone: +45 70 10 17 55
E-mail: info@medema.com
Internet: www.medema.dk

NB: Errors and omissions excepted. Specifications subject to change.

Medema A/S also reserves the right to update the service manual in line with any modifications or improvements to the product.

Intended occupant

The intended occupant of the Mini Crosser X is a person with limited ability of walking themselves.

The occupant must be able to see in order to register traffic signals and other road users when driving in traffic. The occupant can be deaf and/or speechless.

The occupant must have a cognitive ability to understand the operation of a scooter and its buttons and icons.

The Mini Crosser can be driven with only one hand either left or right.

The maximum occupant weight is 175 kg.

Help for the visually impaired

If you have difficulty reading small print in the user manual, we recommend that you visit our website, where you can read this manual in PDF format. You can enlarge the PDF manual on your PC monitor to suit your needs and preferences.

If you find it difficult to understand the manual and have general questions about the product, please feel free to contact us. You can find our contact info on page two in this user manual.

You can find manuals for all our products on our web page www.medema.dk. Or contact Medema A/S, and we can send the manuals in a mail for you. Find the contact information on page two in this manual.

FSN (Field Safety Notice)

All information concerning safety can be found at www.medema.com, which is always updated with the latest safety information. In the event of important safety-related changes, we will notify our customers directly (FSN).

Symbols

Used in the manual to indicate sections describing situations where extra care is required owing to the risk of personal injury.

Used to indicate sections on electromagnetic compatibility (EMC).

Warning!

For safety reasons the vehicle must not be lent to persons who are not completely familiar with it. The vehicle is designed for one person only.

The Mini Crosser X1 has been designed for users weighing max. 175 kg. Can be supplied in a HD version as standard for a max person weight of 250 kg.

Contagion!

A standard Mini Crosser is equipped with tyres that does not contage, but if another type of tyres are used, it can sometimes rub off on floor coverings, particularly linoleum. Medema A/S assumes no responsibility in case of contagion.

To prevent this, we recommend that you protect delicate floors with some sort of driving surface.

Safe servicing

- To avoid injuries to both the service engineer and the subsequent user of the scooter, it is important to get to know the product before servicing it.

- Be particularly aware of the following:

- The Mini Crosser MUST be turned off at the main switch. If electrical components are being serviced, the positive terminal on the battery MUST also be disconnected.

- If the voltage needs to be measured in the course of troubleshooting, take great care not to short-circuit anything.

- Take great care not to short-circuit the battery terminals.

- Be careful not to lift heavy parts such as the seat, battery and motor gear incorrectly or drop them.

- Make sure to raise one rear wheel off the ground so that the scooter cannot drive off accidentally.

- Use professionally maintained tools.

- Where lock nuts are used, NEW ones MUST be fitted when the scooter is reassembled.

- Take care to fit new cable strips in the same way as the old ones. Make sure that no cables can be trapped by moving parts or stick out in such a way as to catch on things.

- End every service by making sure that the product is roadworthy:

  - Check that all the connectors are plugged in correctly.
  - Check that all the mechanical parts are properly secured.

- Turn the scooter on and check
  - that the magnetic brake clicks when the accelerator is activated.
  - When the accelerator is released, it must not be possible to push the scooter.

Tool list

The following tools are needed to service the scooter:

- Circlip pliers
- Allen keys
- Box spanners, 7-17 mm
- Open-ended spanners, 7-17 mm
- Phillips and torx screwdrivers, 10/15/20/25 slot
- Needle-nose pliers
- Side-cutting pliers
- Plastic hammer
- Set of punches
- Retractable knife
- Steel brush
- Water pump pliers
- Wire strippers
- Crimping tool
- Pliers for Molex 5556/5558 crimps
- Riveting pliers
- Small cable ties
- Multimeter
- Battery tester
- Tyre pressure gauge
- Tyre pump with Schrader valve
- Acid-free oil and grease
- Loctite El-zink = 2400, A2 = 2700, bearings = 6300
- Cable ties
- PC
- PC Programming package for S200

Storage

The Mini Crosser is designed for use in all types of weather. The scooter should, however, be stored and charged under cover at temperatures in excess of 0°C. The charger must also be kept dry.

If the scooter is not going to be used for a long time, it is advisable to protect the tyres by chocking the scooter up. It is also a good idea to cover the scooter to protect it from dirt, dust and sunlight.

Cleaning

The Mini Crosser should be cleaned with a damp cloth. A little washing-up liquid can be used if necessary. The plastic covers can be polished with an ordinary glass cleaner or car wax.

Note!
Using a high-pressure cleaner or hose may damage the Mini Crosser's electronics.

Declaration of conformity

Medema A/S hereby declares that:

Machine:	Electric mobility wheelchair
Use:	Transport of walking-disabled people
Model No:	Mini Crosser X1

Complies with the Medical Device Directive 93/42/EEC

The product is accredited tested according to standard DS/EN 12184 - Electrically powered wheelchairs, scooters and their chargers - Requirements and test methods.

The product is risk analysed in accordance with the harmonized standard DS/EN ISO 14971:2012 Medical devices - Application of risk management to medical devices.

Mini Crosser scooters can, for a fee, be taken to the nearest dealer for disposal in accordance with current environmental regulations.

Manufacturer:	Medema A/S
Address:	Enggårdvej 7, DK-7400 Herning
Tel.	+45 7010 1755
Date: 31.01.2018	Signature: _____

Managing director Finn Dose

Medema A/S Warranty

1:
There is a 2-year warranty, with the exception of worn parts such as tires, hoses, fuses, light bulbs, bushings and brake pads.

2:
If you want to make a claim for a part under the warranty, it must be intact. The warranty will be void if the product has been removed or appears to have been mishandled.

3:
There is a 5-year warranty against breakage and corrosion of the undercarriage.

4:
For the warranty to cover batteries, the charger used must be sold by Medema A/S.
The fabric, type and serial number must be indicated on the warranty specification, otherwise, warranty coverage may be denied.

5:
Items returned under a warranty claim must be suitably packaged to prevent damage during transport. Items damaged during transport due to poor packaging will not covered by the warranty.

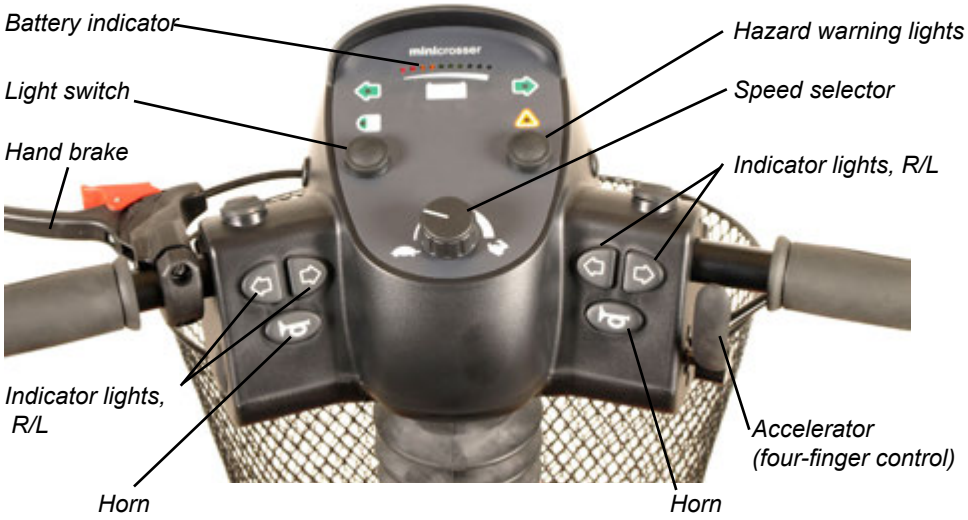
6:
The warranty does not cover freight costs.

7:
The warranty requires annual inspection and maintenance of the Mini Crosser by authorised professionals.

Control panel

Avoid subjecting the control panel to jarring and knocks. Take care when driving and avoid hitting obstacles.

The manufacturer accepts no liability in respect of the unauthorized opening, adjustment or modification of the control panel.



Designation	Description
Key switch	To start the vehicle: Turn the key to driving position (1) When the Mini Crosser is turned on, the control system performs a safety check of the electrical system. The check lasts half a second. If the accelerator is operated during this time, the Mini Crosser will not be able to move until you have turned the key to 0 and back to 1.
Speed selector	The tortoise in minimum position indicates the lowest speed range. 0-6 km/h The hare in maximum position indicates the highest speed range. Up to 15 km/h
Battery indicator	Lights up when the key is turned. Indicates, after half a second, the battery charge level. It gives a more precise indication after approx. 1 minute of driving. When the red, amber and green sections are lit, the batteries are fully charged. When the indicator is at the bottom of the amber section, the batteries should be charged as soon as possible. If only the red section is lit or flashing, the batteries must be charged immediately.
Hand brake	Acts on the rear wheel and should only be used as an extra / emergency brake and parking brake. It can be secured in locked position.
Accelerator (See picture below)	Activate the arm at the front slowly and the Mini Crosser will start to move forwards. The more the arm is pressed, the faster the Mini Crosser will move. When the arm is released, it will flip back to starting position of its own accord and the Mini Crosser will stop. Activating the rear arm will cause the Mini Crosser to reverse. The magnetic brake on the rear wheels will engage when the Mini Crosser is stationary and is equivalent to the parking brake on a car. The accelerator can also be used to control speed downhill. In this case the motor will act as a brake.
Light switch	Turns on the front and rear lights. The key switch must be in position 1 (driving position).
Hazard warning lights	Turns on all the indicator lights at once. Also works when the key is removed or turned to position 0 (stop position).
Indicator switch	Left arrow: indicator, left-hand side. Right arrow: indicator, right-hand side. Activate the same switch to turn the indicators off.
Horn	Powerful electric horn. Press the horn switch to activate.
Charging socket	Turn off the key switch during charging. Please note that it is not possible to drive the Mini Crosser while the batteries are charging. See also the section entitled “Batteries and charging”.

Accelerator back (thumb control)

Accelerator (four-finger control)

The accelerator forward and backwards are physically connected, which means that when one or the other is activated, the other will move the opposite way.

Warning!
When the handlebar is moved closer to your body, there is a risk for the leg to touch the accelerator by mistake.

Preparations / Adjustments prior to use

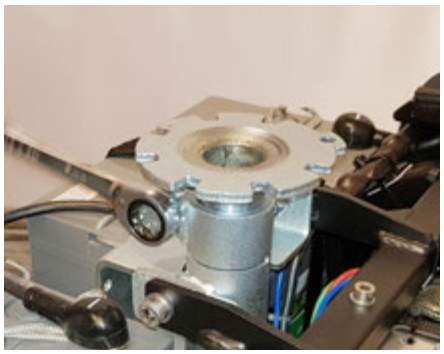
Adjusting the height of the seat

Lift both armrests up, and fold the seatback. Release the handle so the seat can turn. Turn a little and lift the seat off.

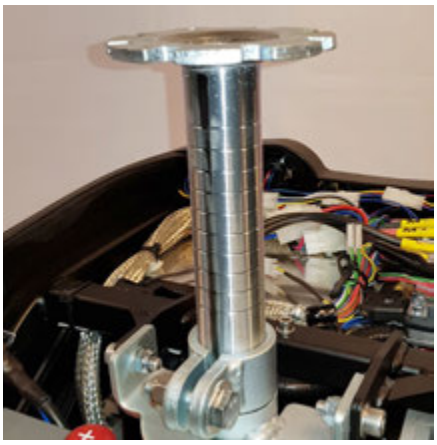
Make sure you keep your back straight when lifting the seat, which is very heavy.

Lift the seat off the seat tube.

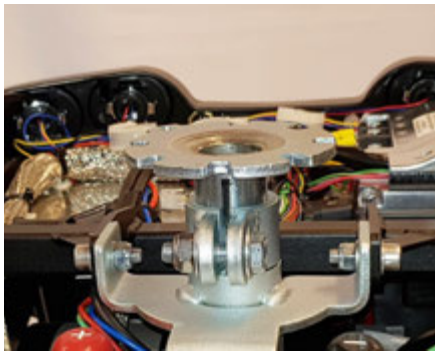
Hight adjustment seat post standard

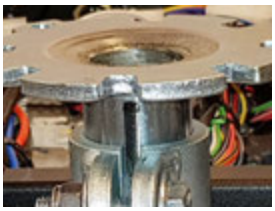


Loosen the counter nut.
Use spanner, 17 mm.



Adjust the seat post to the desired position. The seat post is marked with a ring at each centimeter.

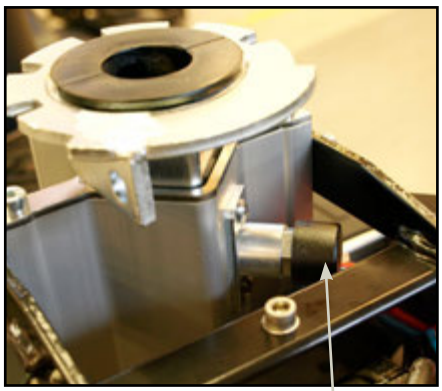




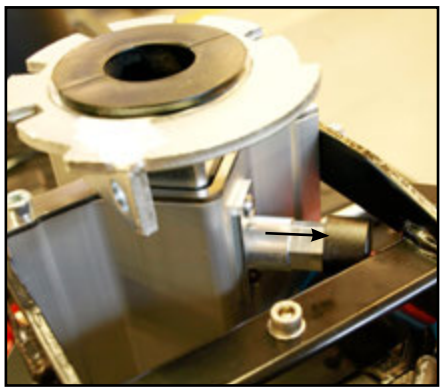
Be aware that the black line is holding its position after movement, so the seat is straight in front of the steering.

Tighten the screw, here after the counter nut.
Mount the seat. Adjust the lining if necessary.

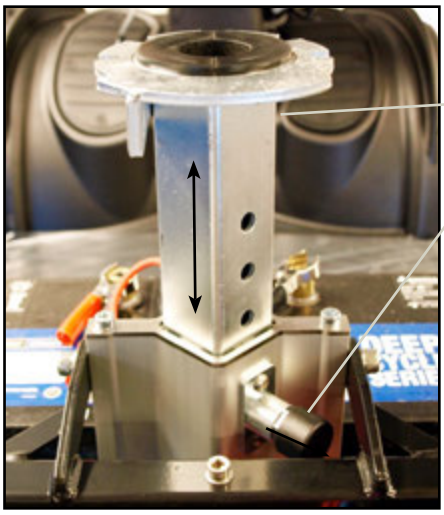
Hight adjustment seat post with position bolt (option)



The release button pressed in. Press the button out to release the seat tube.



Release button pressed out. Now the seat tube can be moved up/down to the height you wish. Press the release button again and make sure it is fitted in one of the 5 holes in the seat tube.



Seat tube in top position. There are five holes for adjusting the seat tube. The release must be in a hole for the seat to be stable.

Electric seat adjustment

The Mini Crosser can be fitted with electric seat adjustment as an optional extra.

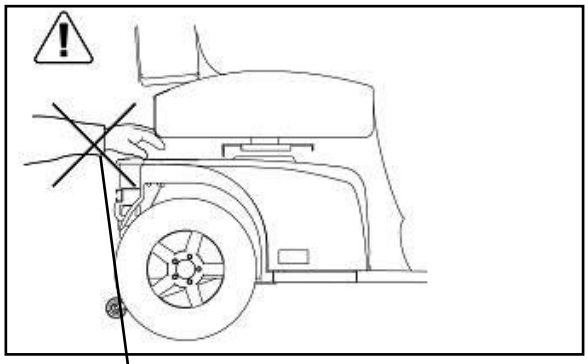
To raise the seat, press the switch up. To lower the seat, press the switch down. If the switch is released, the seat will stop automatically. (See figure below.)

For safety reasons, a switch has been incorporated that reduces the speed by 50% when the seat is raised more than 7.5 cm.

Electric seat adjustment. If the switch is pressed up, the seat is raised. If the switch is pressed down, the seat is lowered.

IMPORTANT!
The Mini Crosser is most stable when the seat is in its lowest position. Always drive carefully when the seat is raised. Never use the seat adjustment when driving on an uneven surface or in hilly terrain.

Take extra care when lowering the seat on a Mini Crosser using electric seat adjustment. Make sure that nothing is trapped in the space between the seat and the chassis.



Avoid trapping anything when lowering the seat.

Seat rotation

Pull the release lever back. The seat can be rotated 90° to either side. When the lever is released, it engages with the seat and holds it in place at 45° intervals.

Other seats that can be supplied for the Mini Crosser work on similar principles. The release lever is normally mounted on the right, but can be put on the left if so wished.

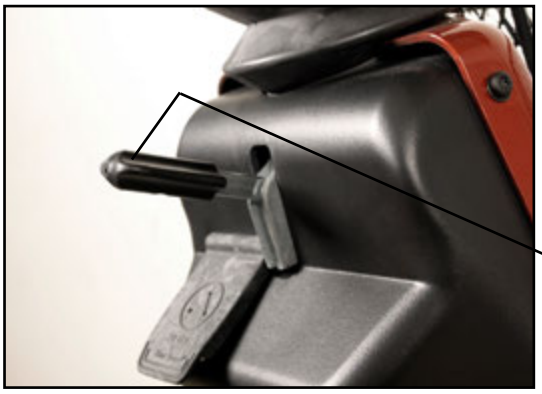
Release lever for seat rotation. Release lever for seat forward/back.

Steering column

Can be adjusted forward/back with the release lever. Pull down on the lever and pull the handlebars closer for a good driving position. Use the lever again and push the steering column forward to make it easier to get out.

The height of the steering column can be adjusted approx. 11 cm up/down. First remove the rubber plug covering the Allen screw. Adjust the height using a 4 mm Allen key.

This applies to both the 3W and the 4W model. Remember to retighten properly after adjusting.



Adjusting the angle of the handlebars. Applies to both the 3W and the 4W model.

Lever for adjusting the angle of the handlebars

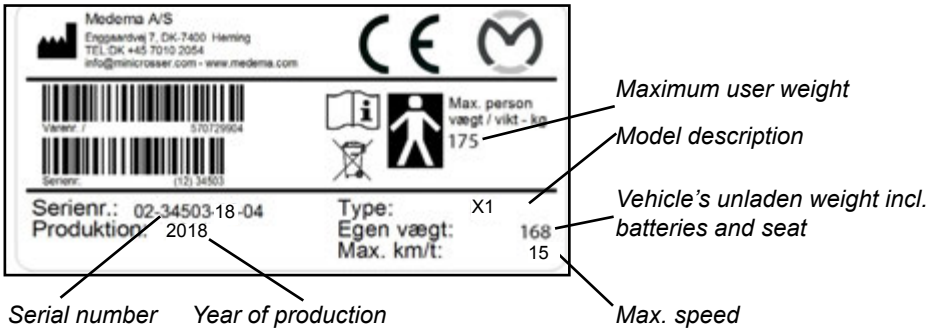
Adjusting the height of the handlebars. Applies to both the 3W and the 4W model.

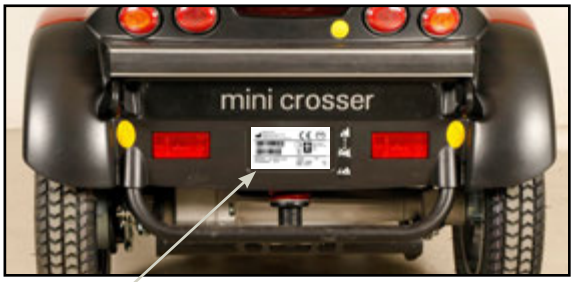
Allen screw for height adjustment

Serial number

All vehicles have a serial number plate showing the year of production and serial number. The same serial number can also be found on page two of this manual.

Please quote this number when making inquiries about servicing, spare parts, etc.





Position of serial number plate on vehicle.

Driving the Mini Crosser X1

Getting in and out

It is important to learn a safe technique for getting in and out of the Mini Crosser.

In general the following method should be followed:

- Make sure that the Mini Crosser X1 is off (switch turned to 0) when getting in and out, otherwise the Mini Crosser could start if the accelerator was touched inadvertently.
- Make sure that the brake is on. (Lever for disengaging motor in top position.)
- Put the steering column in vertical position.
- If necessary, turn the seat through 45° or 90° and make sure that it is locked in position (clicked into place).
- If necessary, raise the armrest.

For some users the assistance of an attendant can be recommended. The attendant should:

- Take care not to injure him/herself when lifting/lowering/supporting the user.
- Make sure that the Mini Crosser is stable and unable to move. Turn off the Mini Crosser and check that the brake is on and the seat has been rotated until it clicks into place at either 45° or 90°.
- Make sure that the seat the user is being moved to is stable.

IMPORTANT!
The Mini Crosser will turn itself off automatically after it has been stationary for 10 minutes even if the key has been turned to driving position. The battery indicator flashes with 6 lamps at a rate of about 3 seconds.

To restart the vehicle, the key must be turned to stop position (0) and then to driving position (1).

Turn the Mini Crosser off, return the steering column to upright position, rotate the seat and raise the armrest.

General safety advice

Make sure that the backrest is upright and the seat is as low as possible.

Positioning belts are recommended if the user is unable to maintain a good driving posture independently.

Adjust your driving to road conditions. Take account of light, traffic and weather. Be particularly careful when driving in the dark or in bad weather, such as rain or snow. Avoid driving on gradients with poor surfaces, such as: snow, ice, new-mown grass, wet grass and wet leaves.

Never drive when under the influence. This applies not only to alcohol, but also to drugs and medicines.
Reduce speed immediately if you feel you are losing control.

Always use the indicators when changing direction.

Check that lights and indicators are working before driving off. Use your lights when driving after lighting-up time.

As far as possible, grip the handlebars firmly with both hands.

Take care not to have anything in the basket at the front that might inadvertently operate the accelerator.

WARNING! Do not lower the handlebars so far that the accelerator can hit you on the leg when you turn the vehicle and so be operated in advertently. If the handlebars need to be very low, a twist grip accelerator is recommended. This is particularly relevant if leg supports are being used.

ALWAYS switch the Mini Crosser off when it is not in use. Turn the key to 0.

Driving

Even though the Mini Crosser is very stable, it can tip over. Avoid sudden changes of speed and direction when travelling at high speed, on poor surfaces and, not least, on slopes.

For short distances the Mini Crosser can drive up steeper gradients than it has been tested as dynamically stable for. The same applies to driving down such gradients. In such cases there is an increased risk of the Mini Crosser tilting and even tipping over. So be extra careful in following the driving tips given below.

Anti-tilt wheels are recommended for driving in very hilly terrain. (Optional extra)

New users are urged to practise the following in an area where there is no other traffic:

- Set the Mini Crosser to low speed. Drive forwards and backwards. Gradually turn the speed selector up and feel the change in the speed of the Mini Crosser.
- Practise starting and braking. Get used to the Mini Crosser’s response time.
- Practise driving in a narrow space, similar to inside a shop or through a door.
- Practise turning, and get a sense of how much space is required. Always drive slowly when turning. Practise reversing too.
- Practise cornering and driving over obstacles and on slopes. Always drive straight up/down kerbs and ramps. Never at an angle. See the illustrations on the following pages.
- Try braking at different speeds and notice the stopping distances.
- If possible, try driving on different surfaces (road, grass and gravel).
- Practise assessing how far you can drive on a single battery charge. Note how quickly the battery indicator changes from green to amber to red.

Note!
The driving distance of the Mini Crosser will be reduced when driving in hilly districts, into a head wind, in cold weather and with low tyre pressure.

Traffic regulations

The traffic legislation for Mini Crossers varies from country to country. Before starting to use the vehicle outdoors, it is the user's responsibility to familiarise him/herself with the relevant legislation.

Lap belt

Lap belt

If there is a need for it you can, as an accessory, mount a lap belt or harness belt on Mini Crosser X.

The belt is designed to stay safe to use for at least 10 years.

Electromagnetic compatibility

If the Mini Crosser starts making involuntary movements or if the brakes are released, turn the Mini Crosser off as soon as it is safe to do so. In certain circumstances a Mini Crosser can set off shop alarms.

The Mini Crosser satisfies the requirements for the use of Mini Crossers in an environment with electromagnetic noise. There may, however, be rare situations in which electromagnetic noise can affect the Mini Crosser. Sources of such noise include radio and television stations and amateur radio transmitters.

When driving in traffic...

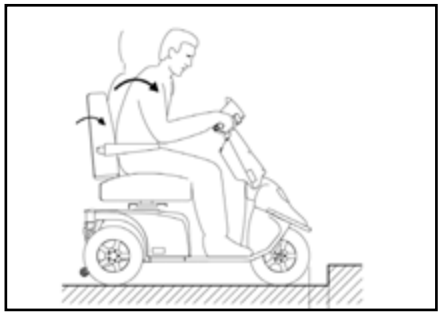
Be particularly aware of the following when driving in traffic:

- The Mini Crosser is a low vehicle and not always easy for other road users to see. Make quite sure that other road users have seen you before driving onto the highway.
- Keep an eye on traffic behind you. Keep well over to the side of the road when driving on busy roads.
- Turning right and left at crossroads. Be aware of cyclists and pedestrians. Follow the rules of the road for cyclists.
- How quickly things are happening. How long do the lights stay green? How quickly are cars approaching? etc.

Specific driving situations

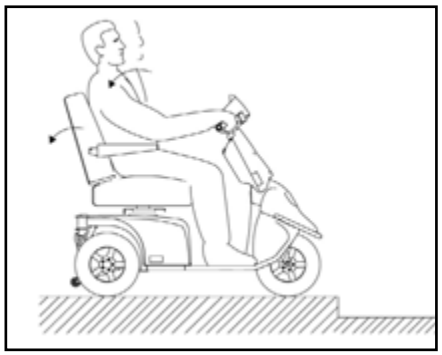
Up kerbs

- Stop at right angles to the kerbstone about 5-10 cm away from it. Keep an eye on other road users.
- Lean forwards.
- Accelerate moderately so that your vehicle can overcome the obstacle. Do not stop halfway, but reduce speed once the vehicle is up.
- If the kerb is too high, do not try again, but find an alternative route.



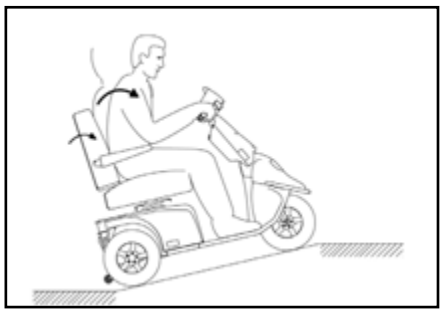
Down kerbs

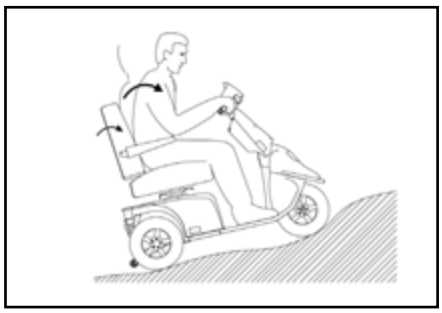
- Lean back.
- If you are driving onto a road with traffic, keep an eye on other road users.
- Drive forwards and down the kerb at low speed. Make sure that your anti-tilt wheels (if fitted) do not catch on the edge.



Up a ramp/hill

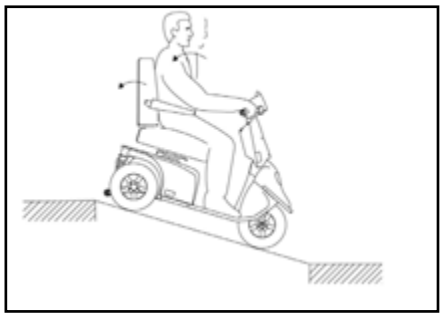
- There is a risk of tipping over backwards if the seat is pushed back when you start driving up a slope, e.g. a ramp.
- Pull the seat forward! Check that any ramp is stable.
- Lean forwards.
- Accelerate moderately so that your vehicle can overcome the obstacle. Do not stop halfway. Reduce speed once the vehicle is up. If you need to start on a hill, accelerate slowly so as not to tip over backwards.

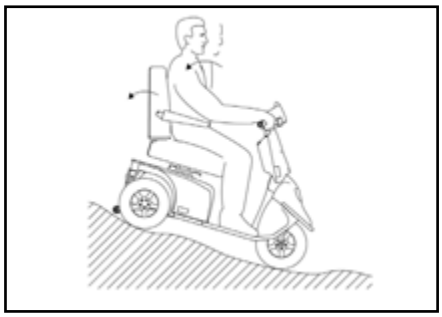




Down a ramp/hill

- Check that any ramp is stable.
- Lean back.
- Drive slowly down. Avoid stopping midway on short, steep slopes. On long hills, it is advisable to stop every now and again if you feel your speed is getting too high.





Warning!
Be aware that the stopping distance can be significantly longer, down hill, than on level ground.

Across a slope

- Lean into the slope.
- Avoid sudden and sharp movements. This is particularly relevant when reversing.
- Always drive at low speed.

Long hills/difficult ground

The Mini Crosser is at risk of overheating on very long and steep hills or on very soft ground, possibly also combined with high user weight.

To protect the Mini Crosser motor from overheating, there is a built-in thermos witch, which initially sets the Mini Crosser to half speed.

However, if you carry on moving over difficult ground, the Mini Crosser will at some stage stop completely. The Mini Crosser must be left to cool down for 3-5 minutes before it can start again.

To reset the fault, switch off the Mini Crosser then turn it on again.

If the Mini Crosser has not had long enough to cool down when it is restarted, it will initially only run at half speed.

Note:
The situation described above will never happen in normal use. It only happens if the conditions are extremely challenging.

Anti-tilt wheels / stabilisers

The Mini Crosser is a very stable vehicle. HOWEVER, in the case of incorrect weight distribution or careless driving there is a risk of tipping over.

We therefore recommend fitting anti-tilt wheels in such circumstances. (See picture below). Contact Medema for more info. Find contact information on page two in this manual.

Anti-tilt wheels

General care and maintenance

A Mini Crosser X1 does not require much maintenance. It should be kept in a generally good condition, however. The following should be checked regularly. Some tasks can be done by the user, others must be preformed by an technician:

- Tyre pressure (if pneumatic tyres are fitted)
- Tyre wear
- Keep the control panel, the charging socket and the electronics box under the seat dry.
- Battery charging

Never wash the Mini Crosser with a high-pressure cleaner or direct water jet! This could damage the Mini Crosser's electronics.

To keep the Mini Crosser in good condition safety-wise, we recommend the following regular checks:

Daily: (user)

- Test the indicators and driving lights before using the Mini Crosser in the dark or poor visibility.

Every three months: (user)

Test the brakes and motor disengagement
With the disengagement lever up, it must not be possible to push the Mini Crosser.

Test the brake disengagement function
When the brake disengagement lever is down, the battery indicator should flash to show an error if the Mini Crosser is turned on. In this case the Mini Crosser must not be able to move when the accelerator is activated.

Test the hand brake.
Apply the hand brake for a couple of seconds at low speed. This will ensure that the lever arm and brake shoes do not seize up.

Lubricate the lever arm on the brake hub with acid-free oil - left-hand rear wheel.

Service

The Mini Crosser X1 is designed for safe travel for at least 10 years, up to a max. of 5,000 hours, provided it is serviced and safety-checked every third year, corresponding to 1500 hours of operation. The service must be carried out by an authorised workshop.

IMPORTANT! For safety reasons it is of the outmost importance that the servicing and safety check intervals are complied with, as this minimises the risk of brake failure and short-circuits in the wiring, which could generate heat and cause a fire.

(For further information, consult the Service Manual.)

Insurance

In the eyes of the law a Mini Crosser X1 with a maximum speed of 15 km/h is a cycle, so separate insurance is not required.

Most contents/home insurance policies include third-party liability insurance for cyclists and so also cover Mini Crosser X1 users.

We recommend that you talk to your insurance company about this when the vehicle is delivered. If necessary, comprehensive insurance will have to be taken out separately.

Batteries

The Mini Crosser uses sealed, maintenance-free GEL or AGM batteries.

They do not generate gas and do not have to be topped up with water.

Battery weight

56 Ah = 21 kg
85 Ah = 27 kg

Charging

Please NOTE that the Mini Crosser can be equipped with several types of charger (ask your dealer for information on the various types).

IMPORTANT! Only ever use a charger designed for charging dry maintenance-free batteries. The max. charging current is 12 A.

If charging is to take place outdoors, an enclosed charger without a fan should be chosen.

The battery indicator shows how much power is available to the Mini Crosser.

- Red, yellow and green indicate that the batteries are fully charged.
- Red and yellow indicate that the batteries will soon need recharging.
- Red indicates that the batteries need to be recharged as soon as possible, otherwise the Mini Crosser will cut out.

The battery manufacturer recommends that the batteries are charged at a temperature of + 10° to +30° C in order to achieve a charging time as specified in the section Technical data.

The charging time will be extended by approximately 60% at a temperature of +5° C compared to a temperature of +20° C. This is because it is chemically more difficult for the battery to absorb the current.

Be aware that the capacity of the battery decreases with time, as well as at low temperatures. This means that vehicles with older batteries has a shorter driving distance, than vehicles with new batteries.

The battery capacity at -10°C is half of the capacity at +20°C. New batteries only achieve full capacity after about 20 charge/ discharge cycles.

Note!

The Mini Crosser should be charged when the vehicle is not in use. The type of charger supplied by the factory works in a way that it automatically switches over to trickle charging (very little electricity consumption) when the batteries are fully charged. The charger cannot overcharge the batteries. So let the charger stay connected until the Mini Crosser is used again.

The charger will flash until it is finished. Then the indicator on the charger will be constantly lit.

Note!

The charger must NOT be placed on the seat during charging.

Never use another charger without contacting the dealer or Medema A/S. Find contact information on page two.

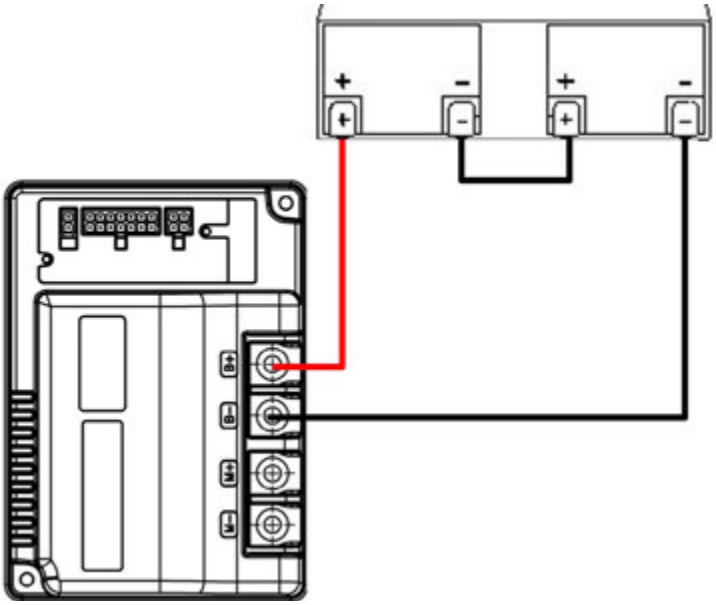
Battery disposal

Used batteries must be disposed of through your supplier or at a recycling centre.

Take care when handling any leaky batteries, as they contain corrosive acid.

INFO! New batteries can be purchased from Medema A/S.

It is important to fit the batteries correctly. The battery terminals are marked +/-. They must be fitted as shown in the sketch below. Make sure that the terminals are properly tightend. For the same reason there must not be any burrs on the cable terminals.

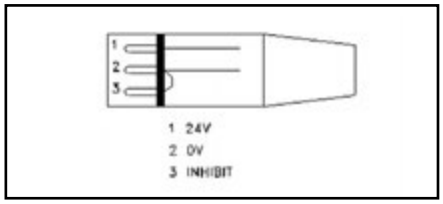


Be aware that the Mini Crosser can varies types of chargers. Contact your dealer for more information about the different types.

Do NEVER use other chargers than the one from the factory without contacting your dealer first.

NEVER use a charger that are not intended for charging dense, maintenance-free batteries.

Polarity of charging plug



NEUTRIK NC3MX charging plug

Connect the charging plug to the 3-pin socket on the steering column. The charging socket is located under the protective cover.

Note
If the battery is 100% discharged, it is not possible for the charger to start charging the battery.

There is no warranty on batteries that have been damaged as a result of deep discharging.

If you are not using the Mini Crosser for a longer period of time, for example during winter storage, you can choose to disconnect the one pole to the fully charged batteries. This way there will be no consumption of standby power.

Storage

The Mini Crosser should be stored and charged under cover preferably at temperatures above 0°C.

Note!
The charger must be kept dry, but should not be covered when in use.

In the case of long-term storage we recommend covering the Mini Crosser to protect it from dust, rain and sunlight.

Cleaning

Clean the Mini Crosser with a damp cloth. If necessary, wipe dry with a chamois leather.

Wipe the covers dry and polish with car wax.

IMPORTANT! Never use high-pressure cleaner or hose, as it could damage the Mini Crosser’s electronics.

Service summary for Mini Crosser X1

Area	Component	Check and remedy
Suspension and wheels	Rear suspension	Check whether the rear of the scooter is drooping. The rear wheel must not rub on the mudguard with a load on the seat. Replace the shock absorbers/ springs behind the batteries. See the Spare Parts Catalogue. Check the shock absorbers for oil leaks. Check that the swivel axle/transaxle is securely mounted. Retighten or fit bolts/nuts.
	Check that no cables can be trapped by moving parts.	Fit cable ties.
	Check the wheels	Check the fastenings and the condition of the rims.
	Check the tyre pressure and tread.	Recommended tyre pressure: 2.8 bar (50 psi) The minimum tread depth for good grip is approx. 1 mm. See the Spare Parts Catalogue for disassembly. NB! The rear and front wheels on the 4W MUST always be removed using the five bolts. NEVER undo the actual flange using the bold in the centre. See the Spare Parts Catalogue. NB! ALWAYS let the air out of the inner tube before taking a wheel apart!
	Check that the handbrake is working.	Lubricate the lever arm on the brake hub with acid-free oil. Adjust the cable length using the adjusting nipple. If parts are defective: See the Spare Parts Catalogue.
	3W: Front fork. Suspension and straightness.	Check that the front fork can bounce. Is it crooked? Is there an oil leak? If there is a defect that needs to be repaired, replace the entire front fork. See the Spare Parts Catalogue.
	3W: Front wheel.	Check the ball bearings for play and wear.
	4W: Front suspension.	Check that the front wheels do not hit the underside of the front mudguards. Check that the rubber dampers are secure. They should just touch the axle beam. See the Spare Parts Catalogue.

Area	Component	Check and remedy
Suspension and wheels (contd)	Front wheel suspension.	Check that the guide rods and balls are in good condition and properly tightened. Check the ball bearings in the front wheels and guide spindles for play/ wear. Front wheel tracking. See the sketch for correct tracking if uneven tyre wear shows that adjustment is necessary.
Steering/Control panel	Lights, indicators, hazard warning and horn	Check functioning and the condition of the switches. If an indicator is not working: Check the connectors and the fuse in the control panel. Or change the bulb.
	Seals	Check that the rubber switch covers are intact and in good condition. Check that all the holes have plugs. Fit new ones if necessary. Check that the sign on the control panel is straight.
	Accelerator and handlebars	Check that the accelerator is mounted securely on the potentiometer shaft. Function test: Turn the scooter on while the accelerator is activated. The scooter must not be able to go. The battery indicator should go up and down. With the scooter turned on, press the accelerator forward a touch. When it is released, the scooter should stop completely and the brake should click. It must not be possible to push the scooter. Perform the same test again, but pressing the accelerator back.
	Max. speed potentiometer	Check that all the lamps come on when the batteries are fully charged. If there is no indication at all, try another controller, as the signal comes from there. If not, the card will have to be replaced. If a single lamp is not working, a diode is defective.

Area	Component	Check and remedy
Motor / gear / brake (Transaxle)	Wear	Check: That the motor runs smoothly and evenly. If not, the carbon brushes in the motor usually need to be replaced. The minimum length of the brushes is 1-1.5 cm. See the Spare Parts Catalogue for replacement. Check: The gear wheel in the transaxle for wear. Lift one rear wheel and measure the play around the periphery of the tyre. On a new machine the play is 16-18 mm. If the play is much bigger, replace the whole unit. See the Spare Parts Catalogue for replacement. Check: The rear wheel bearings in the gear for wear. Lift the rear of the scooter. Get hold of one wheel at a time. Lift it up and down to see if there is any play in the bearings in the transaxle. If there is, the whole unit should be replaced.
	Power consumption	Power consumption on a level road with a tyre pressure of 2.8 bar and 75-100 kg on the seat: 10 km/h = 20 - 25 A 13 km/h = 22 - 27 A 15 km/h = 24 - 29 A Measure on one of the battery cables using a clip-on ammeter.
	Brakes and disengagement Check function	When the disengagement lever is up: It must not be possible to push the scooter. It must be possible to drive normally when the scooter is turned on. When the disengagement lever is down: It must be possible to push the scooter. The scooter must not be able to go. Error 9 should appear when the accelerator is activated. The brake must be able to hold the scooter on a 15° (26%) slope with 75 - 100 kg on the seat. If not, it must be adjusted or replaced, depending on how much wear there is.

Area	Component	Check and remedy
	Braking distance	10 km/h - 2,0 m (10) 13 km/h - 2,8 m (10) 15 km/h - 3,5 m (10) The figures in brackets indicate the normal braking parameter when the scooter leaves the factory. It can be changed with the programming unit (forward deceleration). See below for more information. Please note that the braking distance must not be longer than specified in order to comply with official requirements.
Steering column	Play/wear	Check the following: - Universal joint - Pins in steering shaft/front fork - That the aluminium bottom section of the steering column is firmly secured to the steering shaft. Wear/rust on the bearings in the steering column. Top support bearing. The bearings in the head tube are protected by seal rings. If the front fork is a bit stiff, the seal rings can be lubricated with a little grease.
	Cables	Check that the cables cannot become trapped or be subjected to strain when the handlebars are turned or the steering column is folded down.
	Gas spring	Check: That the gas spring locks the steering column securely. Check that there is no play in the release lever and the bolts/bushes securing the gas spring.
	Key switch / charging socket	Check that the key switch does not wobble. Clean with a damp cloth or compressed air if dirty. If the contacts are corroded, clean them with contact spray or replace the charging sockets.
Chassis / seat / covers	Footplate	Check the plastic rivets securing the mat. Fit new ones if necessary.
	Seat post	Check that it is properly secured and in good condition.

Area	Component	Check and remedy
Chassis / seat / covers (contd)	Seat	Check that: The release lever locks the seat properly. The seat is firmly secured on the seat frame/plate. The seat tube is in good condition. If necessary, lubricate the tube with a little acid-free grease. The armrests are in good condition.
	Covers	Check that the plastic covers are in good conditions. Parts with sharp or projecting edges should be replaced. The same applies to covers with an operational function, e.g. the splash guard and battery cover. (water in the controller) Cleaning: See the section on Cleaning.
	Other mechanical components	Check that the other components work properly.
Electrical components	Control card	Check that it is dry and in a good condition. Check that all the connectors are firmly in place.
	Cables/plugs	Check that the cables are firmly in place and not sticking out in such a way as to catch on something or get trapped. Check that the plugs are firmly in place.
	Battery straps	Check that they are properly secured.
Batteries/charger (see also the section on Batteries)	Batteries	Check that there are no cracks in the batteries, that batteries look good and that the battery connections are firmly in place.
	Battery capacity	Check this with a battery tester. If it indicates that new batteries need to be fitted, take care to pair them with an accuracy of 0.1 V. Apply a little acid-free vaseline to the battery terminals before connecting them.
	Battery charger	Check that the indicator lamp on the battery charger changes to CHARGING when the scooter is connected. If necessary, measure the charging voltage during charging. It should be approx. 28.8 V. Leave the scooter to charge overnight. Disconnect the charger and measure the battery voltage after about 15 minutes. It should be approx. 27.6 V for fresh batteries. Check that the scooter cannot go while the battery charger is connected.

Troubleshooting

The following is a list of various problems that we are frequently asked about. Possible causes and solutions are given.

Problem	Possible causes	Solution
The Mini Crosser will not go. The battery indicator is not lit.	The key has not been turned to start. The batteries are completely flat. The control fuse has blown. The main fuse has burnt out.	Turn the key and wait 5 secs. before activating the accelerator. Charge the batteries. Change the fuse. Contact supplier.
The Mini Crosser will not go. There is a light in the battery indicator.	The Mini Crosser has been overloaded. The handbrake is on. There is a fault in the electronics. The batteries are flat. The charging plug has not been removed.	Wait approx. 1 min. before trying again. The vehicle must be turned off (See page 10, Driving the Mini Crosser) Release the handbrake. Contact supplier. Contact supplier. Remove the charging plug.
The Mini Crosser goes uneven, choppy while driving.	May be due to poor connection in the electricity.	Turn off the Mini Crosser immediately and search for authorized workshops. If you continue to drive, heat development may occur in the poor connection, with a risk of fire.
Driving speed is too low.	The speed selector is on slow. The electronics are overloaded. There is too little air in the tyres.	Change to a faster speed. Stop and wait a few minutes before starting. Pump the tyres up to the right pressure.
The driving distance per charge is too short.	There is a problem with the batteries. Low temperature. There is a problem with the charger. There is too little air in the tyres. The charging method is wrong.	Charge the batteries and check that the green lamps on the charger light up before driving off. Contact supplier. Pump the tyres up to the right pressure. Read the operating instructions.

Problem	Possible causes	Solution
The charging lamp on the charger does not light up when the charger is connected to the mains and Mini Crosser. (Read the operating instructions for the charger)	No power to the switch. Fault in cable. Fault in charger.	Turn the switch on. Contact supplier. Contact supplier.
The ready lamp on the charger does not light up even though the charger has been on for 10-12 hours. (Read the operating instructions for the charger)	There has been a power cut. The charger is doing a top-up charge. There is a problem with the batteries. There is a fault in the charging plug for the Mini Crosser	Reconnect the charger and repeat the charging process. Check again after half an hour. Contact supplier. Push the charging plug all the way in and repeat the charging process.
The ready lamp on the charger lights up even when partly discharged batteries are connected. (Read the operating instructions for the charger)	The fuse in the charger has blown. The switch in the charging plug is malfunctioning.	Contact supplier. Contact supplier.
The charging lamp indicates a fault: Read the operating instructions for the charger.	The charging plug has not been inserted or there is a mains fault. The battery voltage is too low for charging to start.	Push the charger plug in or contact the supplier. Contact supplier.

Electronic faults

If the vehicle has an electronic fault, the battery indicator will show what sort of fault it is. It is a good idea to be able to say how many diodes/lamps light up when contacting the supplier.

Number of lamps	Electronic fault
1 lamp	The batteries must be charged or there is a poor battery connection. Check all connections between the controller and batteries. If these are in order, try charging the battery.
2 lamps	There is a poor connection to the motor. Check the connection between the motor and the controller.
3 lamps	There is a short circuit from the motor to a battery connection.
4 lamps	Not in use
5 lamps	Not in use
6 lamps	The S200 is prevented from driving. Inhibit 2 is active. This may be due to the battery charger being connected, the plug to the thermal switches being disconnected, a fault in the thermal switch or the scooter is overheating.
7 lamps	A potentiometer error has occurred. Ensure gas regulation is in neutral when the Mini Crosser is switched on.
8 lamps	A controller fault has occurred. Check that all connections are sound.
9 lamps	There is a poor connection in the magnetic brake. Check the magnetic brake and the motor connections. Check that the control connections are sound. The scooter is disengaged or the disengager terminal is affected.
10 lamps	There is excess voltage in the controls This is usually due to a poor battery connection. Check the battery connections. It may also be due to excessive regeneration with fully charged batteries.
Running lights	Charger is connected. Remove charger.

Programming unit

The Mini Crosser's running characteristics can be partially altered using a type SP1B programming unit via PC and the PC programming package for S200.

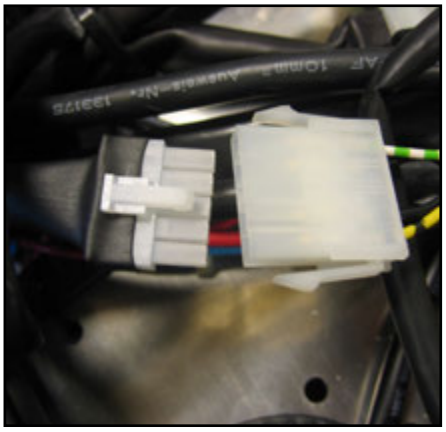
NB! SP1B cannot be used to change the speed, which can only be done using the PC program.

Please note that the speed, deceleration, throttle gain and motor compensation settings must not be increased. They have a major influence on user safety and the durability of the product.

If you have not received instruction in how to use the programming unit, we strongly advise against trying to make changes. The standard driving parameters for the various scooter models can be found on the next page.

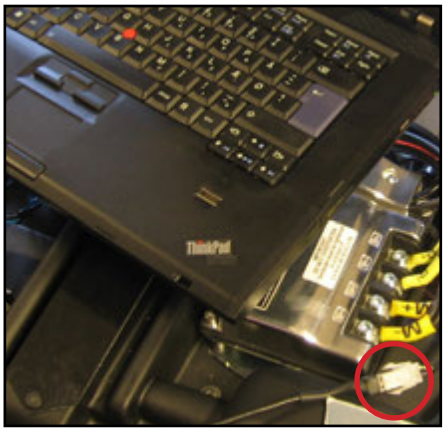
Programming via PC

There are two different versions of the PC program, an OEM version and a dealer version. The OEM version gives complete access to all settings parameters. The dealer version gives limited access.



Before programming can commence, the five-pin plug connecting the S200 to the thermal switches in the transaxle must be removed.

6 lights will flash in the scooter battery indicator.



Note that the programming connection in the red circle is led out of the S200 controller via a short cable with a 4-pin Molex connector on the end.

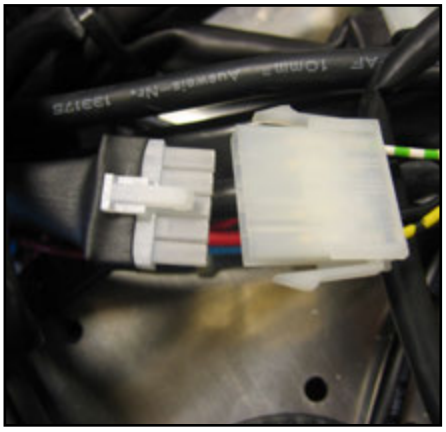
Connect the PC using the 4-pin Molex connector, PC cable and USB for serial adapter.

There is a complete package available containing PC program, cable and USB to serial adapter: SR-03030 PC PROGRAMMING PACKAGE FOR S200

The package is the OEM version, and will not initially be sold to dealers. The product number of the dealer version will be available at a later date.

The product number of loose cable is SR-03028 PC PROGRAMMING CABLE S200

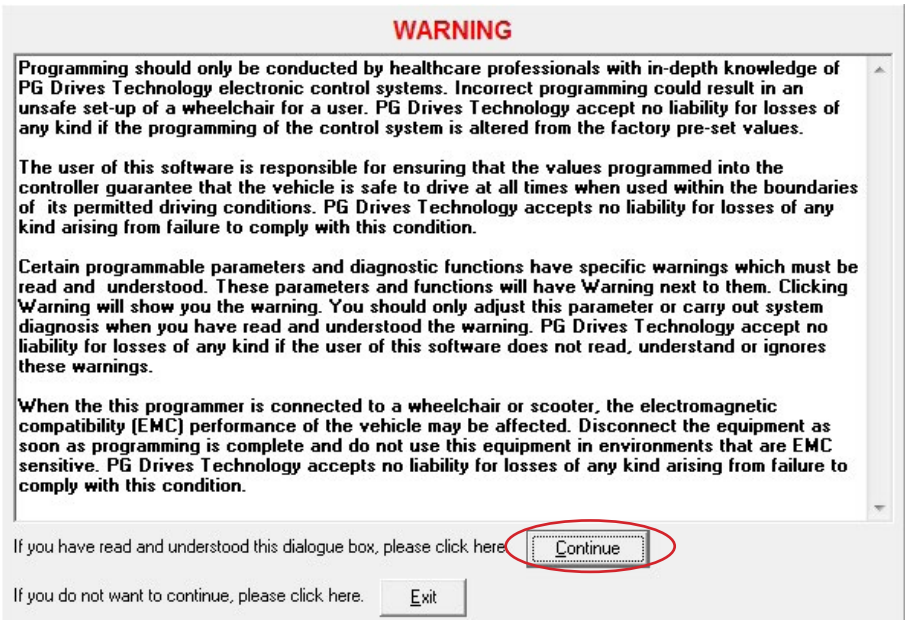
The product number of the USB serial adapter is SR-03029 USB FOR SERIAL ADAPTER

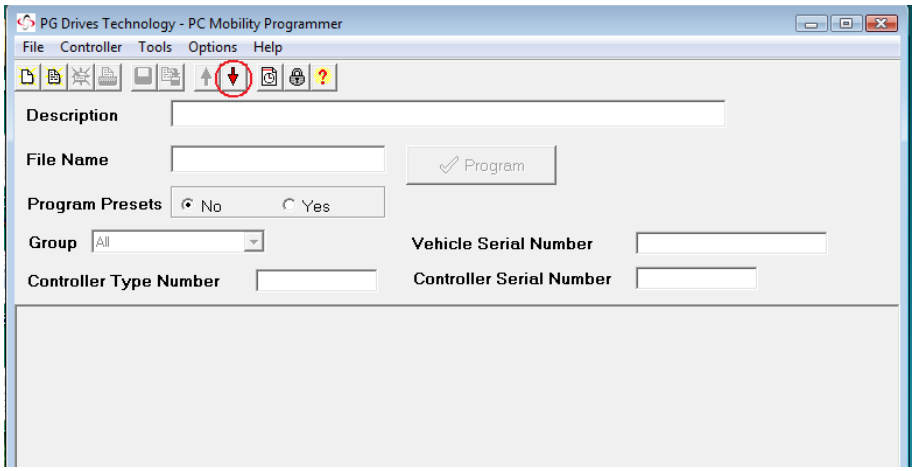


After programming, the scooter should be switched off with the key. After reassembling the 5-pin connector, the scooter can be switched on.

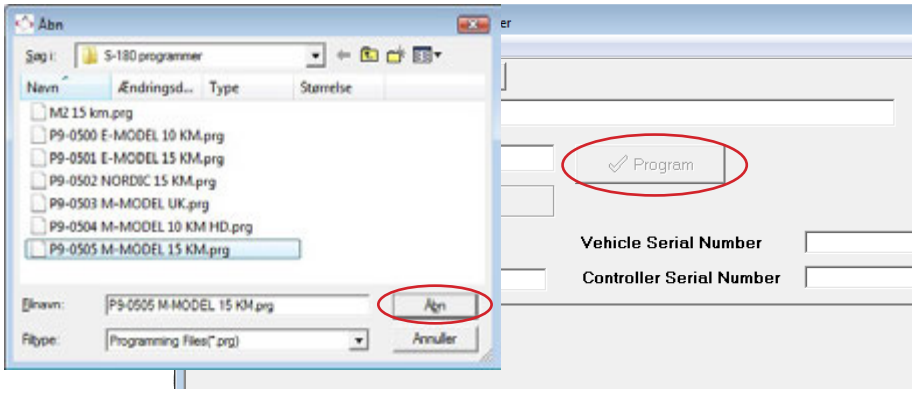
Information about the vehicle via PC

Double-clicking on the S200 program icon displays the following screen. Press Continue to continue.





The red down arrow shows that the program can see that the controller is connected. Press the red arrow to load the program from the controller.

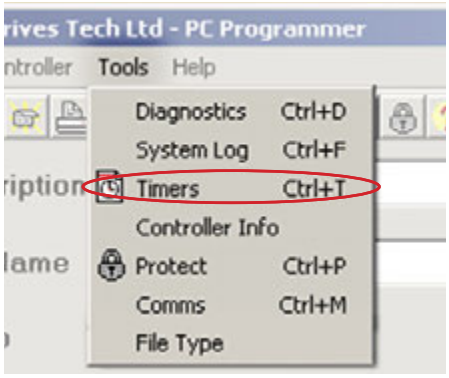


If you do not wish to load the file from the controller but instead a program in the PC, select “Files”, “Open”. Select the desired program, and press “Open”.

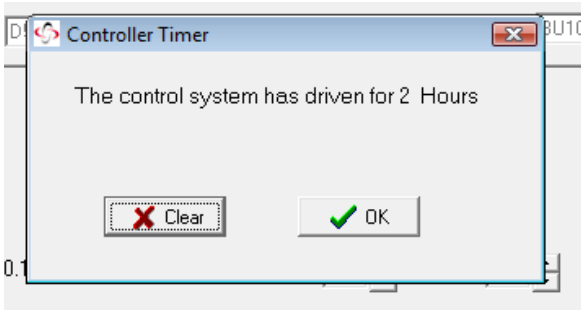
Having made changes to the program, use the “Program” button to return the program to the control box.

Timers

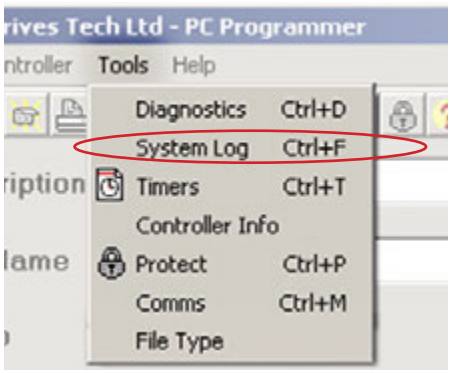
Information about how many hours the controls have been running. Select “Tools” – “Timers



The following message will be displayed.

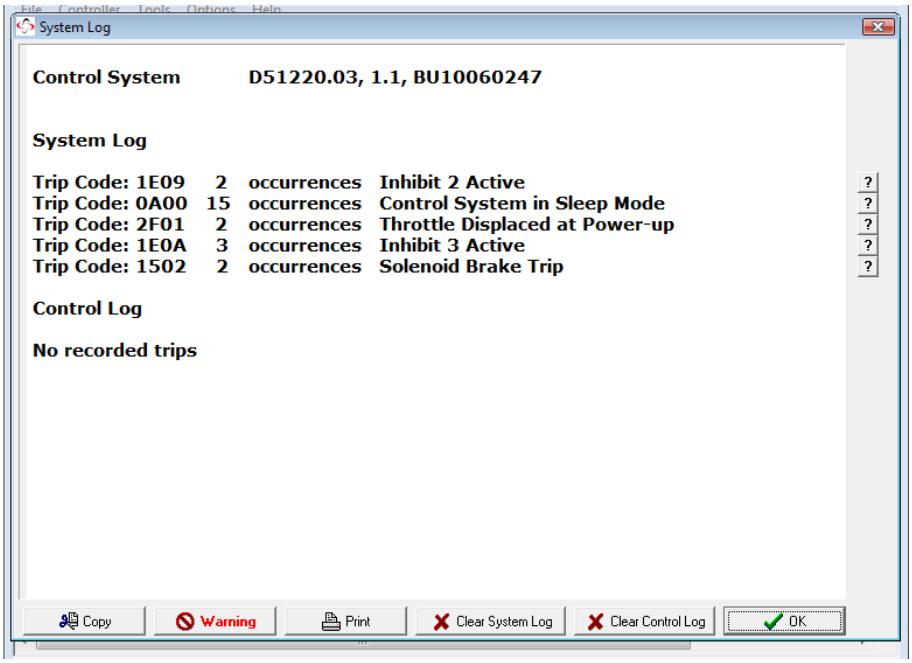


System log



The system log shows details about which controls are presently connected to the PC.

The log shows the last eight system errors registered. Every error has a Trip Code, and a short description of the error.



Descriptions of all the Trip Codes may be found “Help” – “Index”.

The menus at the bottom of the screen enable you to:

“Copy” – copy the log to another file.

“Warning” – It is important to read and understand warnings before attempting to correct any errors.

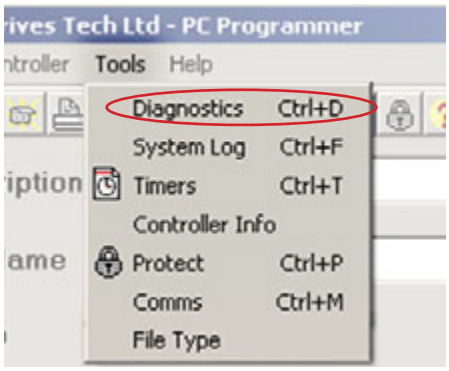
“Print” – print out to a printer

“Clear System Log” – Delete the system log on the PC.

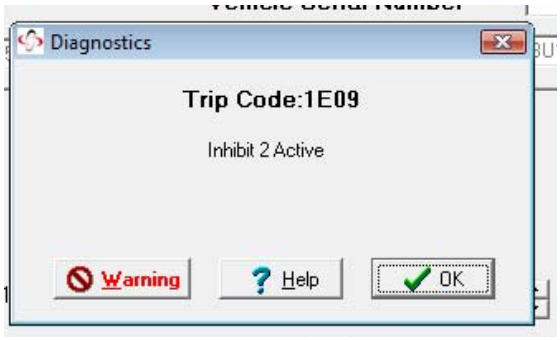
“Clear Control Log” – Delete the vehicle control log.

“OK” – Exit the system log and return to programming.

Diagnostics

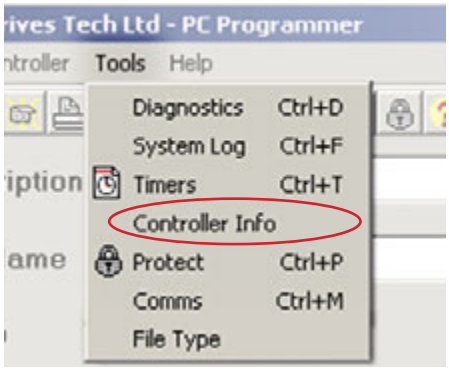


If the controller connected is in trip condition, information about the Trip Code and a description may be found using ”Diagnostics”.

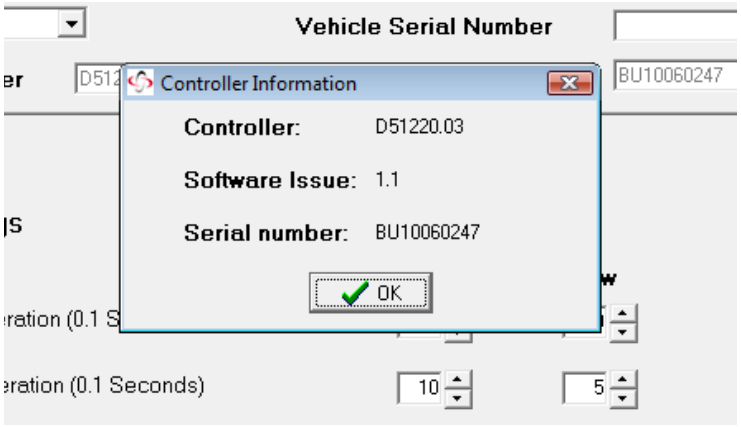


Example of trip condition.

The vehicle identity



Controller Info shows the controller's number, software version and serial number.



For additional information about the use of the PC program, refer to the online manual from PG Drives Technology. This may be found on the CD-ROM from which the program was installed.

Fuses

The Mini Crosser has the following protection systems:

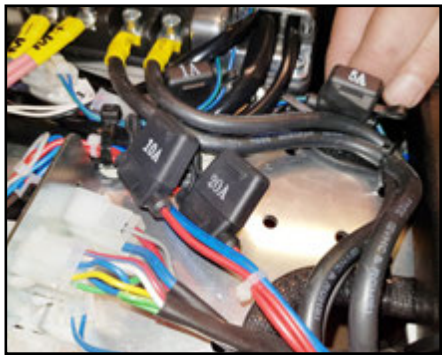
- Automatic overload protection, which limits the current to the motor. This protection is integral to the control system and cannot be adjusted. It prevents both the control system and the motor from being overloaded. In the event of overload the current to the motor is reduced - full speed and traction can be resumed after the motor has cooled down for 2-5 minutes.

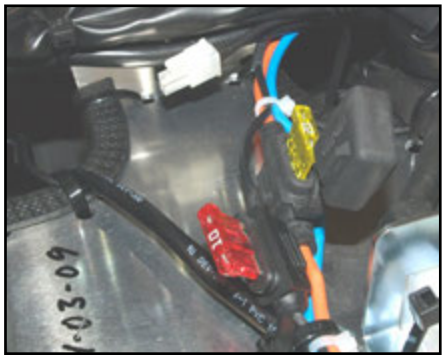
- The control fuse protects against mains faults. It is located under the rear cover.

- The main fuse protects against short-circuits in the main current circuit. The fuses are located under the rear cover behind the batteries. Fuse type DIN 2581.

- If the ignition key is turned at the same time as the accelerator is operated, the vehicle will not move off for safety reasons.

- The lights and horn are protected by electronic fuses, which protect against any short-circuiting that may occur. To prevent accidental short-circuiting when a light is changed, the Mini Crosser must be turned off when the new light is fitted and then turned on again afterwards.





Take the rear cover off. The plastic cover can be removed by squeezing the sides. Now the fuses can be replaced.

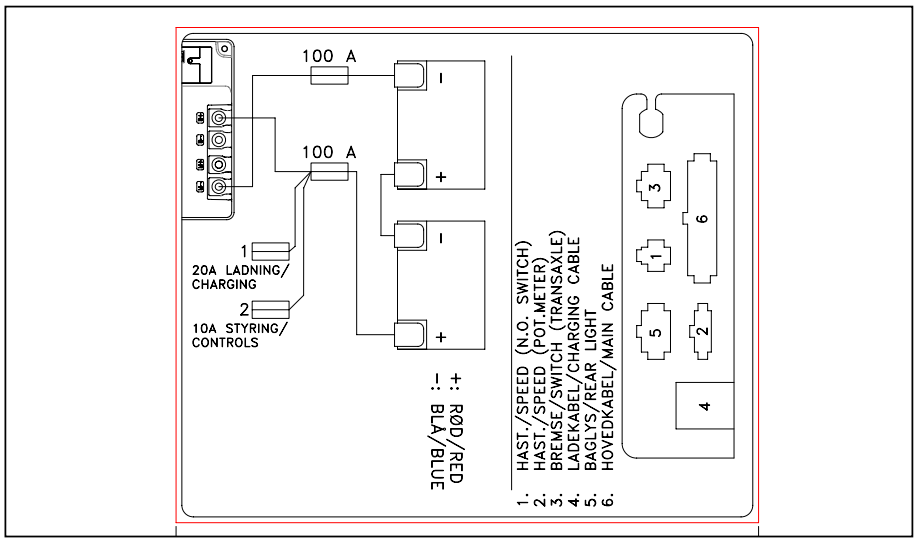
Fuse locations

Fuse 1	1 x 20 A fuse	Charging	Item No. 1505-1228 (20 A)
Fuse 2	1 x 10 A fuse	Control system	Item No. 1505-1225 (10 A)

Main fuses, 100 A, fuse type DIN 2581 - 100 A
Item No. 1505-1170

Summary of battery connections

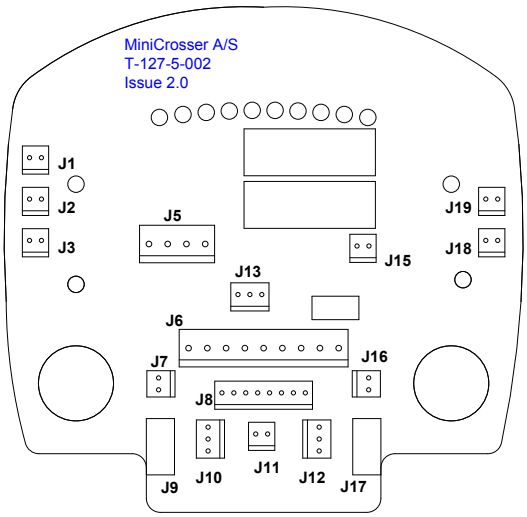
Fuses and extra sockets on card



Fuses on card in control panel. Use tweezers to replace.

F6 Horn - 5 A Littelfuse: 154 005.RA900

Sockets and control panel



Some of the sockets on the card are for optional extras. Some of them are connected at the factory and wired instead to the areas on the scooter where they are to be used.

The table on the next page, Open panel for access, shows when the control panel has to be opened.

The below numbers refer to the socket on the printed circuit in the control panel.	
1	Key switch
2	Reverse
3	Emergency stop
5	Headlight
6	Cable trunk
7	Hazard warning lights
8	Cable trunk
9	Indicator card R
10	Electric seat adjustment
11	Max. speed pot.
12	Corner speed reduction
13	Accelerator pot.
15	24 V horn
16	Light switch
17	Indicator card L
18	Parent key
19	Red. speed (N.O. switch)

Brakes

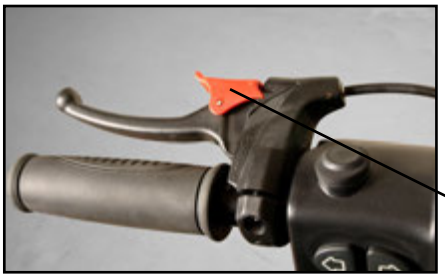
There are four braking systems on the Mini Crosser:

- Motor brake - adjusts vehicle speed also when going downhill.

- Magnetic brake - the magnetic brake is automatic and engages when the Mini Crosser stops. In an emergency, the Mini Crosser can be stopped instantaneously by turning the key switch. Please note that this will cause very sharp braking. The rear wheels will lock.
  Must NOT be used in the normal course of driving.
  The brake must never be disengaged mechanically using the disengagement lever on a slope. This function is only designed for use when pushing the Mini Crosser on a flat road.

- Electric safety brake - if the brake is somehow disengaged on a slope/hill, the Mini Crosser will brake automatically when it reaches a certain speed. There is an electric safety feature in the control system, which works even if the battery is disconnected. This is also the reason why the Mini Crosser cannot be towed at more than 5 km/h. See the section about towing.

- Hand brake - intended as an emergency brake and parking brake. It must be operated with caution when driving in slippery conditions and downhill.



When using the hand brake as a parking brake, lock it in braking position by pressing the button in while applying the brake.
To release the brake, press the button again.

Hand brake lock

Disengagement

Manual

The manual disengagement lever is placed underneath the back cover. Follow this procedure to use it.

- Turn the key to (0) position.
- Push the disengagement lever down.
  The motor brake is now disengaged and the vehicle can be pushed or towed, but not drive itself.

Electronic

The yellow electronic disengagement button is placed on the back of the vehicle. This only works when the scooter is turned on.

NOTE!
Don’t ever disengage on sloping terrain.

If the brake is somehow disengaged on a slope/hill, the Mini Crosser will brake automatically when it reaches a certain speed. There is an electric safety feature in the control system, which works even if the battery is disconnected. This is also the reason why the Mini Crosser cannot be towed at more than 5 km/h. See the section about towing.

Once the motor brake has been disengaged, the Mini Crosser can only be stopped with the hand brake.

Push the disengagement lever down to disengage (only hand brake works) and push up to reactivate the motor (normal driving now possible).

Electronic disengagement. Works only when the scooter is turned on.

Disengagement button.

Transporting by motor vehicle

The Mini Crosser must always be restrained and the hand brake locked during transport in a motor vehicle or trailer.

Avoid lifting by the seat, covers, handlebars and armrests

If you just need to lift the Mini Crosser slightly, take hold of it between the rear lights and by the front bumper.

Important!
If you drop the Mini Crosser from a height of half a metre or more, there is a risk that the gears in the transaxle will be destroyed.

Secure it in the vehicle with belts attached to the two eyes at the front and two at the back. All the eyes are marked in yellow. See the section entitled “Securing to vehicle floor with belts”.

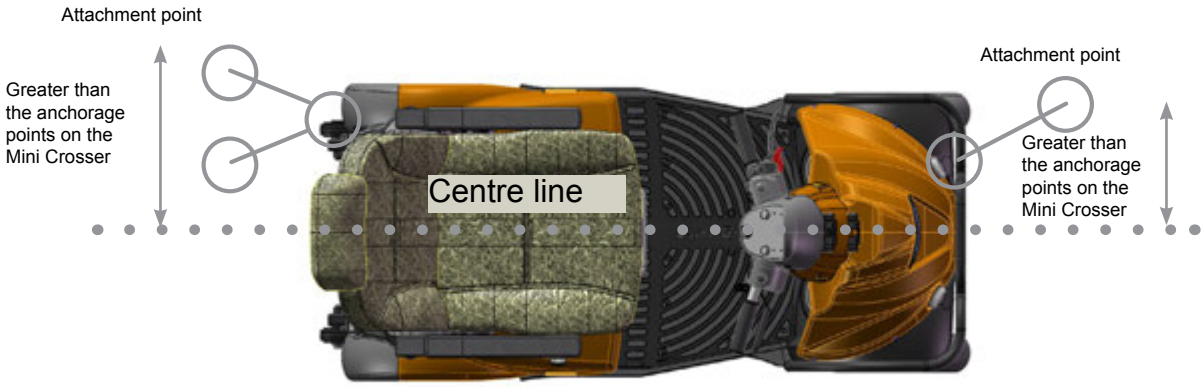
Securing to vehicle floor with belts

Dahl Engineering belt set for securing in motor vehicles.

ALWAYS use four belts at the back and two at the front.

The belts must always be attached to approved fittings in the vehicle and the four eyes welded to the Mini Crosser.

The belts MUST be attached within the angles shown in the picture for optimum security.

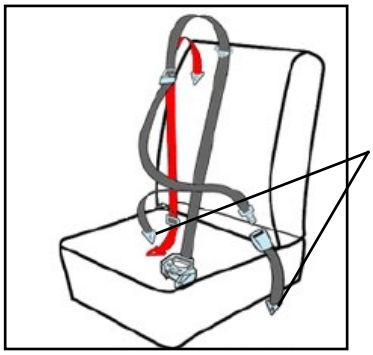

Attachment point
Greater than the anchorage points on the Mini Crosser
Centre line
Attachment point
Greater than the anchorage points on the Mini Crosser

For transport in an estate car, the seat and the handlebars are folded down. This reduces the maximum height to 69 cm.

The Mini Crosser can be used as a seat during transport in a van or bus, provided it is securely anchored to the vehicle with approved four-point belts attached to the restraint points provided on the Mini Crosser.
The Mini Crosser's restraint points have been tested and approved in accordance with ISO 7176-19.

The user must also always be independently restrained in the actual motor vehicle in accordance with traffic legislation rules. Contact your local dealer or Medemea A/S for more information.

Example



Restraining the passenger with a static 3-point seat belt:

Secure to the rearmost retractors.

The shoulder belt must rest against the collar bone and fall diagonally to the hip, where it is secured.

Tighten the belt by pulling on the loose strap. Undo it again by lifting the buckle. This is the same as on an aircraft.

Retractor with belt

Male and female parts of belt done up

Remember to turn the Mini Crosser off during transport. Turn the key to 0.

However, if at all possible, we recommend that the user occupies one of the seats in the motor vehicle. All other things being equal, this is safer.

Transporting by plane

If the Mini Crosser is to be transported by plane, the airlines require:

- the batteries to be flight-approved
- the air to be let out of the tyres
- the battery leads to be disconnected (not always, but frequently)

The seat and cover have to be removed to disconnect the battery leads.

A battery declaration for air travel can be requisitioned from Medema A/S. See contact informations on page two.

Towing

If you should be unfortunate enough to break down, the Mini Crosser can be towed or pushed. The Mini Crosser must always be turned off and the motor brake disengaged during towing. See the section on Brakes.

If the Mini Crosser is to be towed, secure a rope to the tow fitting on the front - marked with a yellow “hook mark”. Do not tow faster than 5 km/h. The Mini Crosser will generate electricity when it is towed, with the motor acting as a dynamo. If it is towed at more than 5 km/h, there is a risk of the motor generating enough electricity to damage the Mini Crosser and, in the worst case, cause a fire.

The Mini Crosser will try to brake if it is towed at more than 5 km/h.

Changing the wheels

If you get a puncture in one of the pneumatic tyres or if a tyre is so badly worn that it needs to be replaced, follow the instructions below.

Tyres and inner tubes can be purchased from the authorised dealer who supplied the Mini Crosser.

The Mini Crosser must be TURNED OFF before you start.

Changing the wheels on the 4W model

Remove the hubcap.

5 mm Allen key

- Undo the five bolts.
- Take the wheel off.
- When the wheel is put back on, the spring washers must be refitted between the wheel rim and bolts.

The bolts must be done up tightly.

Remove the valve cap and use a screwdriver or similar to open the valve so that the air can be released.

Important!
There is a risk of explosion of the wheel, if the two rims are being taken apart with air in the tire.

REMEMBER!

- to let all the air out before taking the wheel apart to repair a puncture
- to secure the bolts with spring washers

Remove the flange with the 5 screws (5 mm Allen key).

Replace or patch the tube. Ensure that there are no foreign objects in the tyre before the tube is re-placed.
Pump air into the tube so that it is positioned cor-rectly in the tyre, but do not fill it up completely yet.

In this way the tube will not get jammed, when the flange is mounted again.

Put the flange back on.

Pump up the tyre to the correct pressure. (See technical data)

Put the wheel onto the Mini Crosser again.

REMEMBER!
The spring washers be-tween the screws and the wheel rim.

Changing the wheels on the 3W model

Rear wheels: Take off in the same way as described in the section Changing the wheels on the 4W model.

Front wheels:
17 mm fork spanner
6 mm Allen key
5 mm Allen key

Unscrew on both sides.

Remove the centre axle by unscrewing the 5 screws here.

The centre axle removed.

Remove the valve cap and use a screwdriver or similar to open the valve so that the air can be released.

Important!
There is a risk of explosion of the wheel, if the two rims are being taken apart with air in the tire.

REMEMBER!

- to let all the air out before taking the wheel apart to repair a puncture
- to secure the bolts with spring washers

Remove the flange with the 5 screws (5 mm Allen key).

Replace or patch the tube. Ensure that there are no foreign objects in the tyre before the tube is replaced.
Pump air into the tube so that it is positioned correctly in the tyre, but do not fill it up completely yet.

In this way the tube will not get jammed, when the flange is mounted again.

Put the flange back on.

Pump up the tyre to the correct pressure. (See technical data)

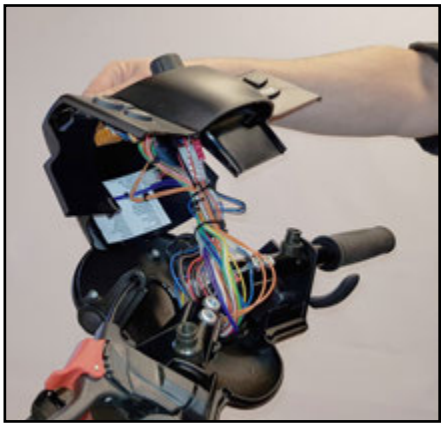
Put the centre axle on again.

Put the wheel onto the Mini Crosser again.

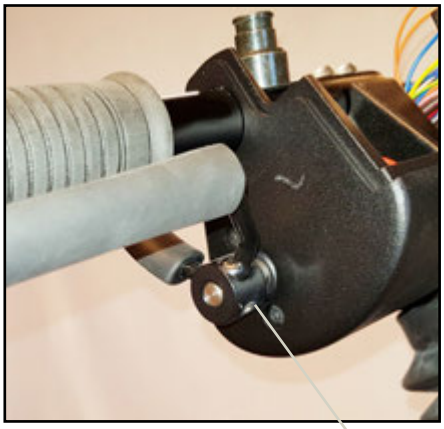
Replace the wigwag potentiometer

Start by removing the rubber caps or side mirrors if fitted.

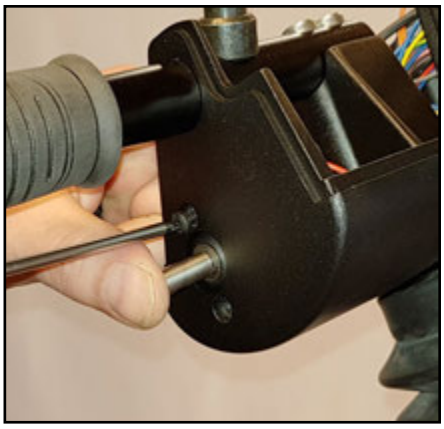
Four screws are removed.



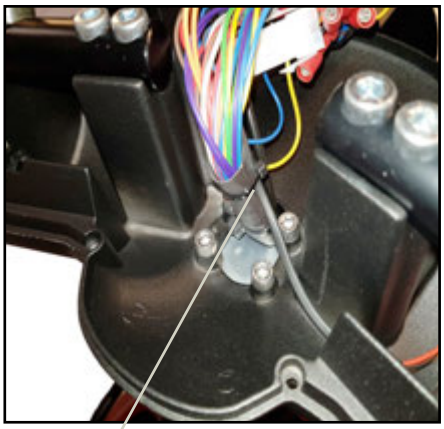
The panel can now be lifted.



Remove the gas grip. First loosen the stop screw.



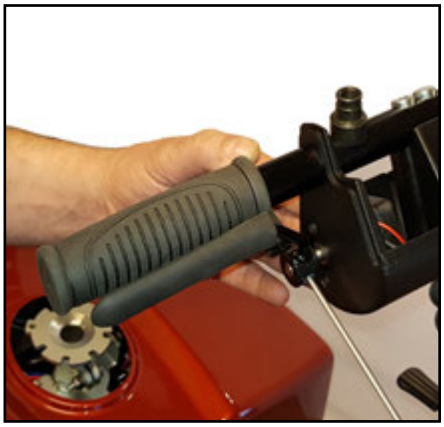
Remove the potentiometer.



Cut the cable ties.

The plug from the potentiometer is now free.

New potentiometer. Mount in reverse order.



When the throttle handle is mounted, hold it in position ”full speed” when you tighten the stop screw again.

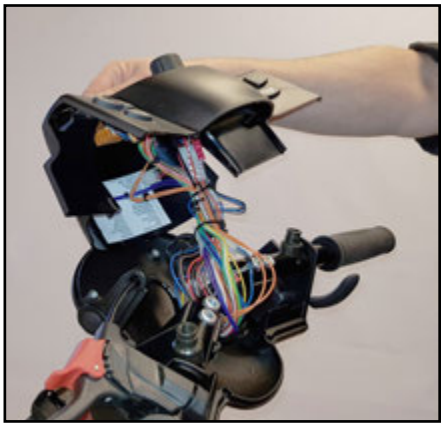
This means that the four-finger grip should touch the handle while tightening.

Check that all functions are working correct.

Replace the speed potentiometer

Start by removing the rubber caps or side mirrors if fitted.

Four screws are removed.



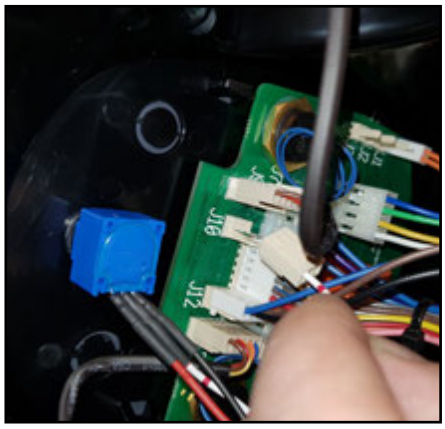
The panel can now be lifted.

Lift the cover off with a screwdriwer.

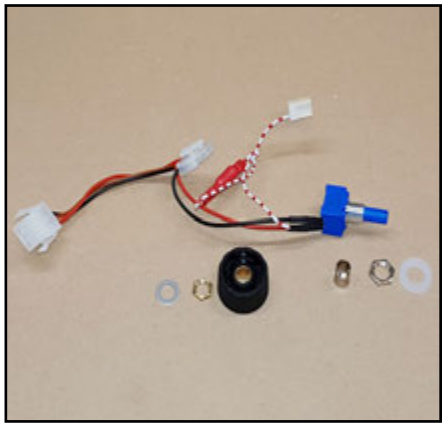
Use a 10 mm ring key to loosen the nut.

Use a 12 mm key to loosen the nut.

Undo the plug.



Undo the contact J10 on the circuit board.



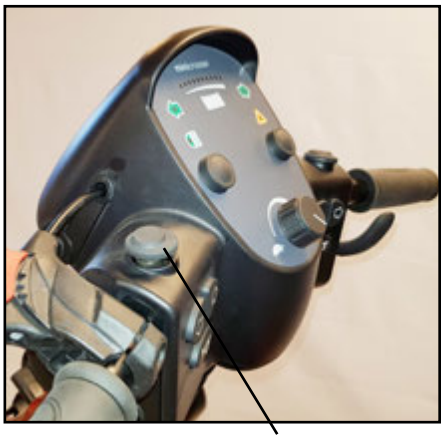
New speed potentiometer set. Mount in reverse order.

First the washer, then the nut, and last the threaded rod.

Mount the knob with washer and nut.

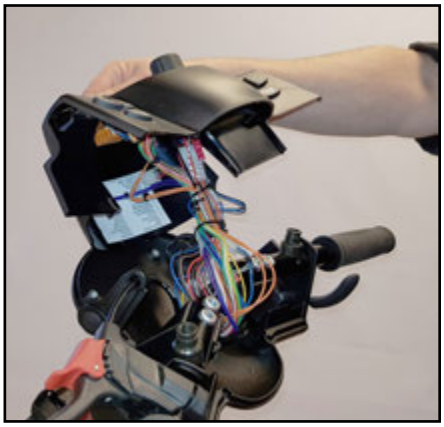
Turn the knob all the way to either the hare or the turtle before mounting the cover in correct position.
Check that all functions are working.

Replace the head

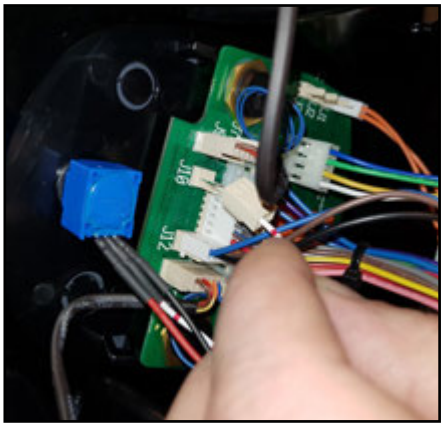


Start by removing the rubber caps or side mirrors if fitted.

Four screws are removed.



The panel can now be lifted.

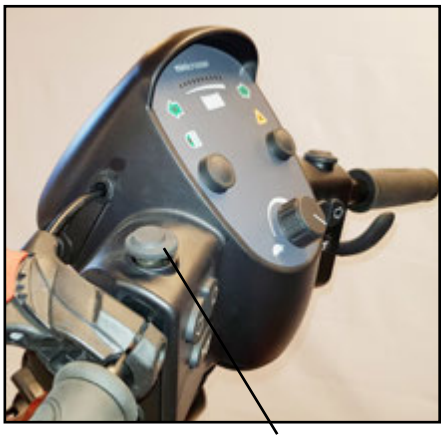


Dismantle the nessecary plugs from the board. All plugs has numbers. Follow the Scheme on the inside of the head when mounting the new head.

Mount the new head in reverse order.

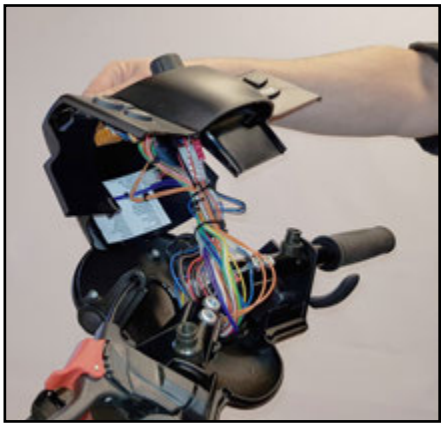
Check that all functions are working.

Replace the circuit board

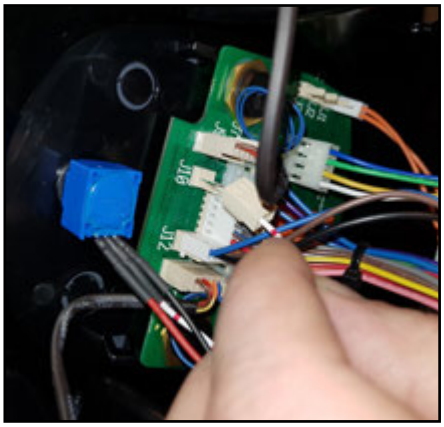


Start by removing the rubber caps or side mirrors if fitted.

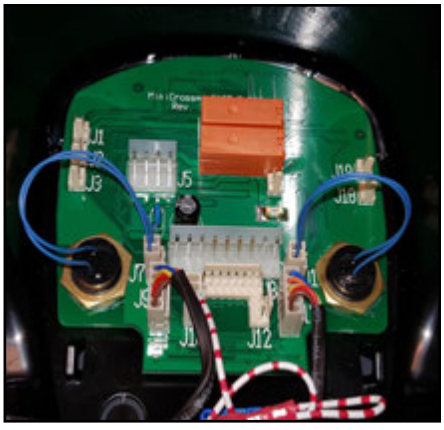
Four screws are removed.



The panel can now be lifted.

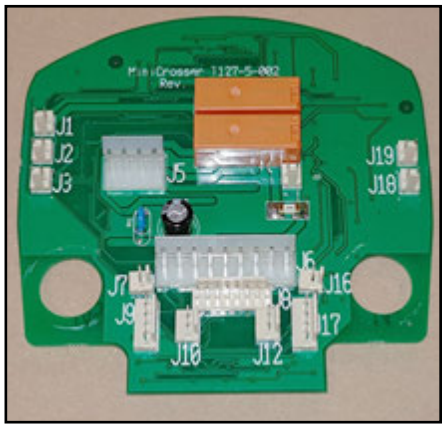


Dismantle the necessary plugs from the board. All plugs has numbers. Follow the Scheme on the inside of the head when mounting the new head.

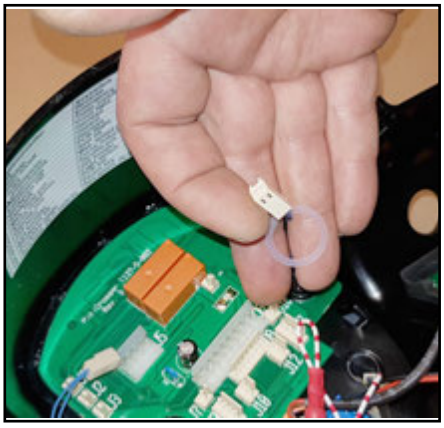


Dismantle the plugs for lights, warning blinkers, blinkers and horn.

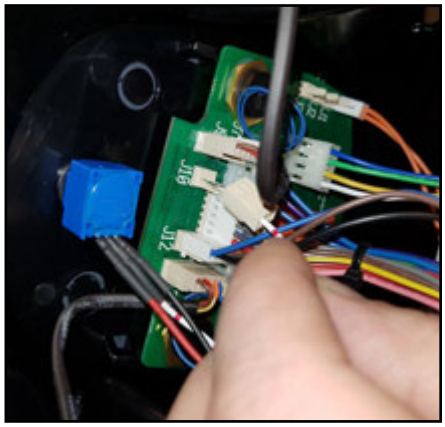
Remove the two nuts that keeps the circuit board in place. Note that they also keep the buttons for lights and warning blinkers in place.



The circuit board is now free. Mount a new print in reverse order.



Remember the plastic washers under the nuts when mounting.

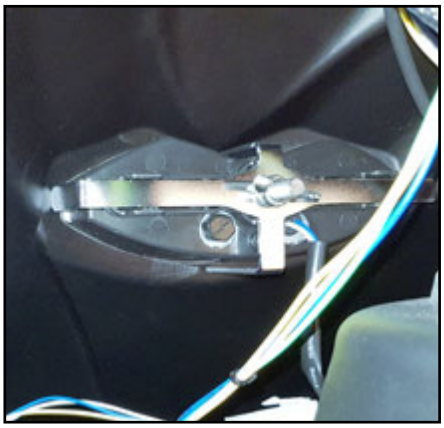


Mount the plugs in the circuit board again. Follow the Scheme on the inside of the head.

Check that all functions are working.

Replace headlights

If the headlight stops working, replace the entire headlight.



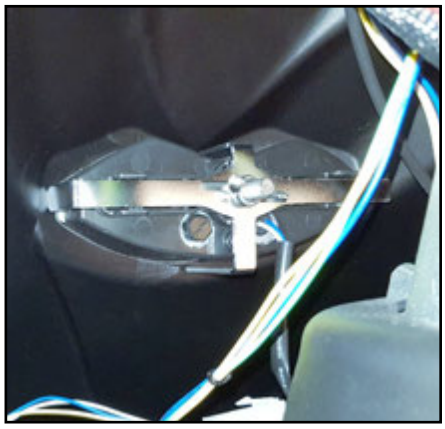
The headlight is attached with a fitting on the back of the screen. A single finger screw holds it firmly in place. Remove the screw.

Remove the headlight. Detach the plug, and it is free to change.

New headlight set.

Mount the plug.

Note that the bracket is facing the short side up when the lamp is mounted again. Place the bracket on the inside of the cover.

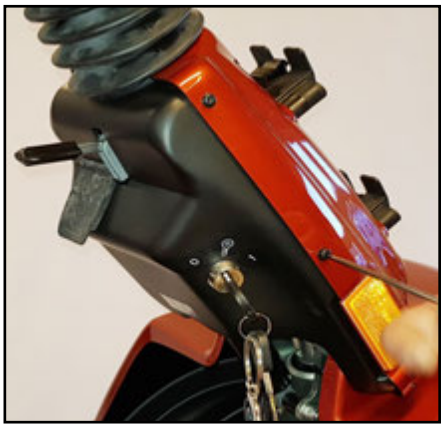


Mount the finger screw again.

The headlight can be adjusted up/down by turning this screw.

Adjust the headlight so it isn't blinding, but lights up well.

Replace gas spring for steering collumn



Remove the six screws that keep the cover in place.

When the cover is loosened, turn it almost 90°, and slide it of the handle. The cover is still attached by a cable, but there is access to the gas spring.

Dismantle the gas spring in the top area.

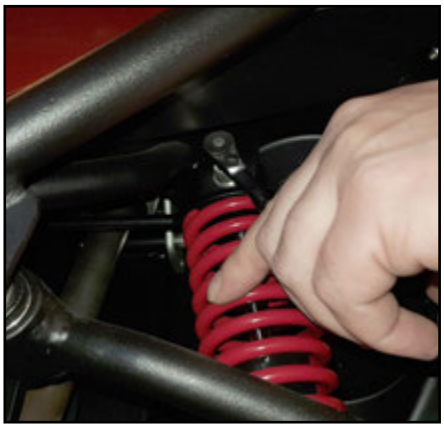
And in the bottom.

New gas spring. Mount en reverse order.

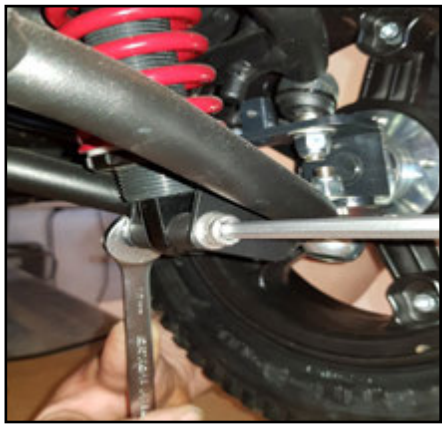
Mount the cover again.

Replace the front springs

It is not necessary to remove any covers to replace the front springs.



Remove the screws at the top.

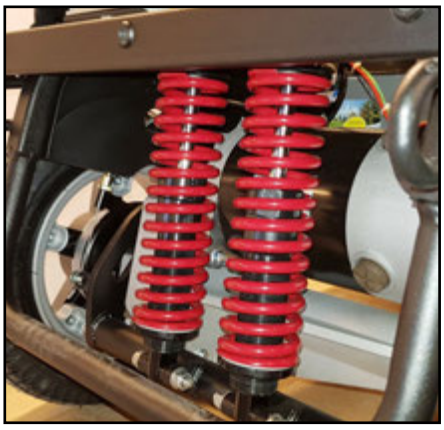


And on the bottom. Now the spring can be replaced. Don't remove both front springs at the same time. It will cause the vehicle to collapse.

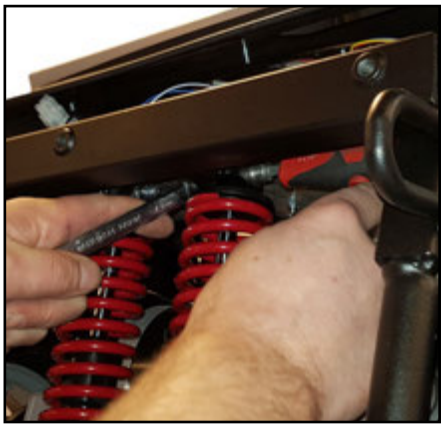
Mount a new spring in reverse order.

Replace rear spring

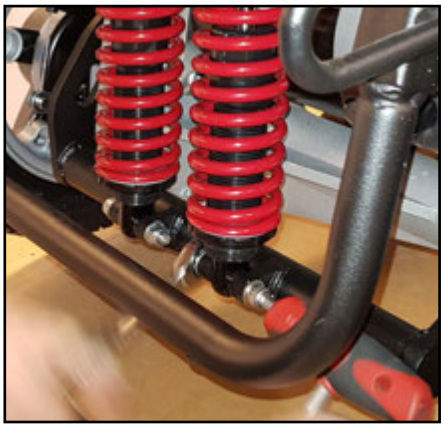
Remove the rear cover. Remove the stopper, and slide of the rubber. Unscrew the three screws. Unplug all electric connectors and the cover is free.



Avoid removing both springs at once. It will cause the vehicle to collapse.



Remove the screws in the top.



And then in the bottom.

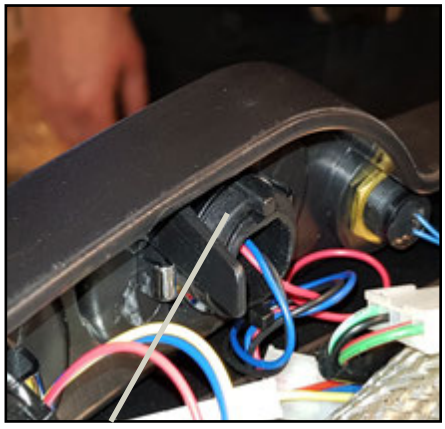
The spring can now be removed and replaced with a new.

Mount the new spring in reverse order.

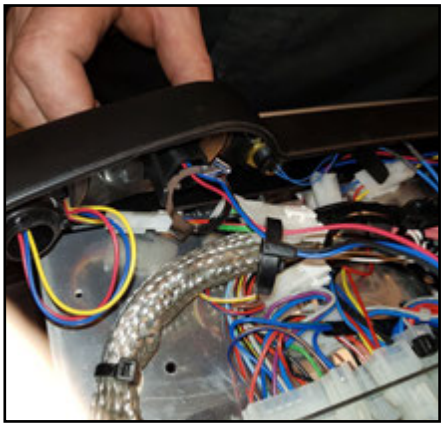
Replace tail light

Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

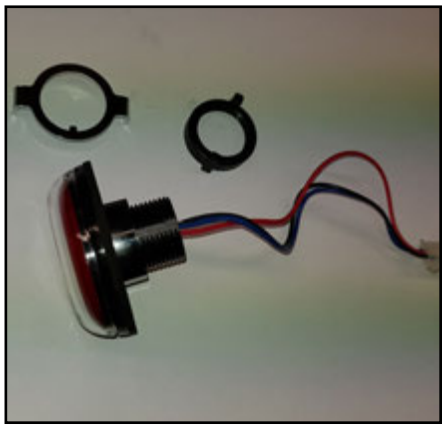
Remove the thumbscrew and remove the battery cover.



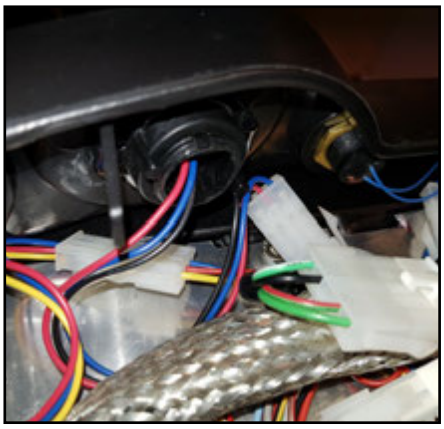
Turn the nut until the tail light is loose.



Remove the plug and pull the cables through the hole.



Mount the new light in reverse order.



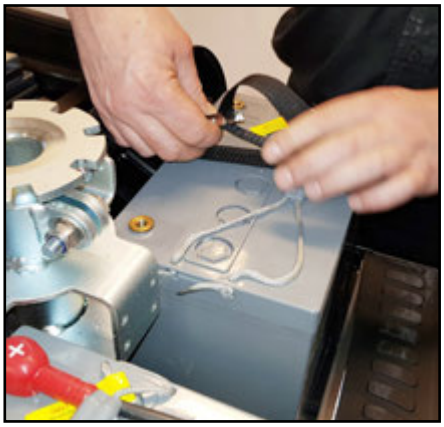
Connect the plug again.

Replace batteries

Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

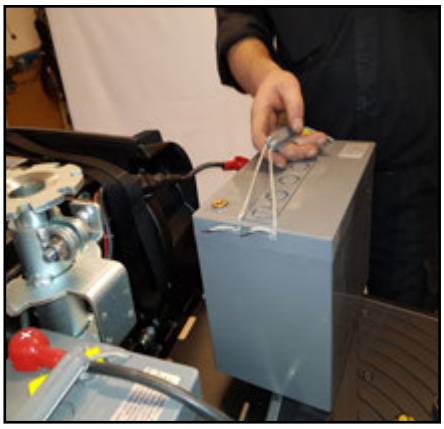
Remove the thumbscrew and remove the battery cover.

Disconnect the poles.



Remove the battery straps.

Tilt the spacer, and pull the strap trough.

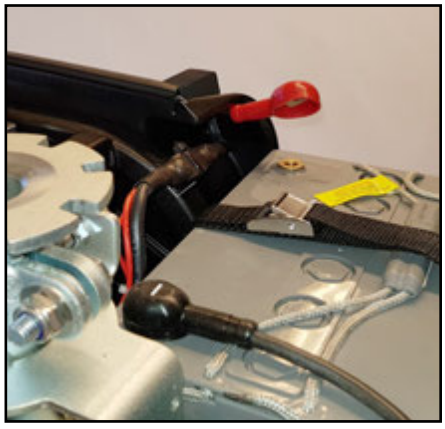


The batteries are now free to be replaced with new ones. Mount in reverse order.

Replace transaxle

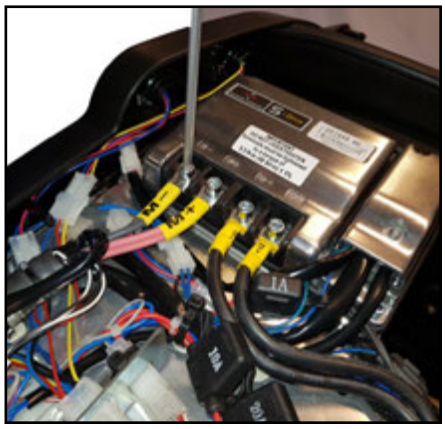
Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

Remove the thumbscrew and remove the battery cover.

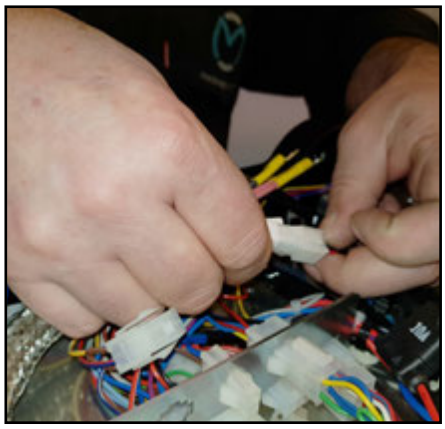


For safety reasons - disconnect one of the poles.

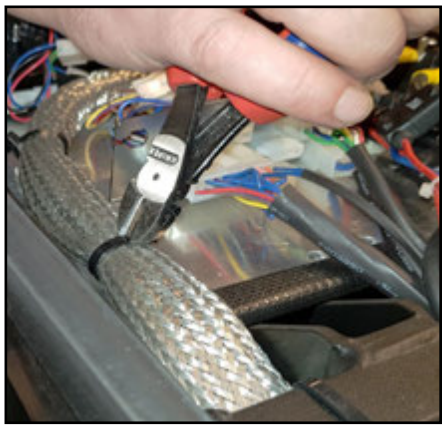
Raise the rear end so the wheels are lifted of the ground.



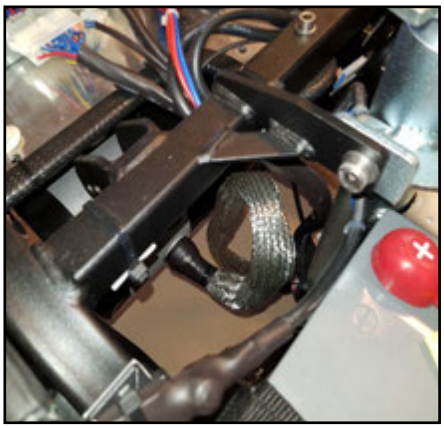
Disconnect M- and M+.



Disconnect the main cable plugs.



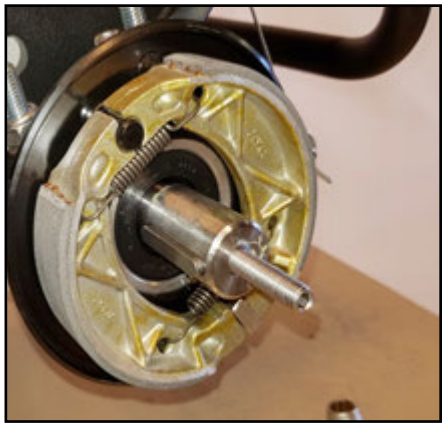
Cut the cable ties that keep the cable in place. Remember new cable ties when mounting again.



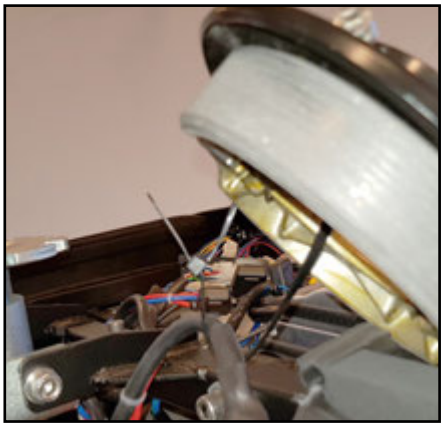
The cable is free.

Remove both rear wheels.

Remove the cover (key 17)

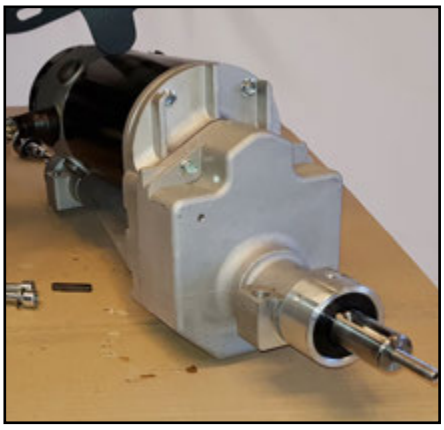


Remove the three screws that hold the brake disc.



Use a long cable tie, to keep the brake dick away from the working area.

In one side the transaxle is laying on top of the rear suspension. In the other side it is fixed from beneath. Remove the screws from this side first.

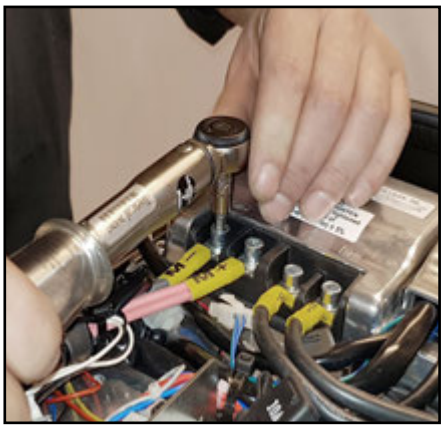


When all four screws are removed, the transaxle can be removed and replaced with a new one. Mount in reverse order.

On a new transaxle, the note is taped in place.

Remove the tape and coat it with bearing grease.

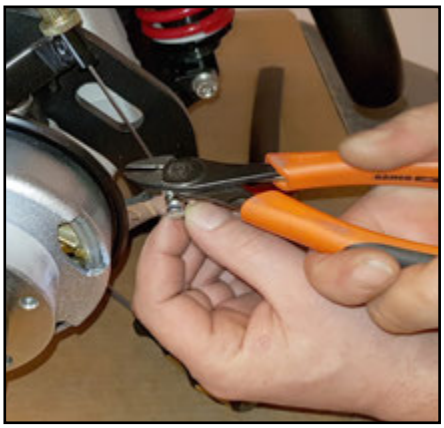
Remount the brake disc. The three screws should be tightened with 4 Nm.



The plugs should be tightened with 5 Nm. Remember to mount new cable ties.

Replace cable for hand brake

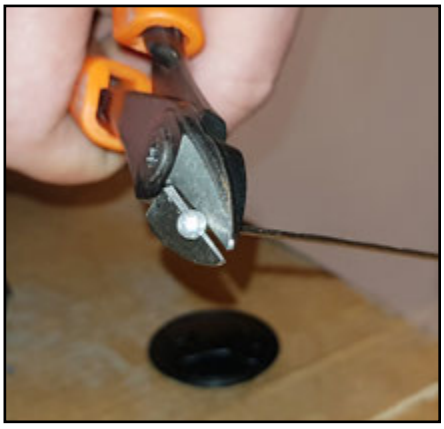
Raise the rear end so the wheels are lifted of the ground. Remove the rear wheel.



Cut the brake cable.

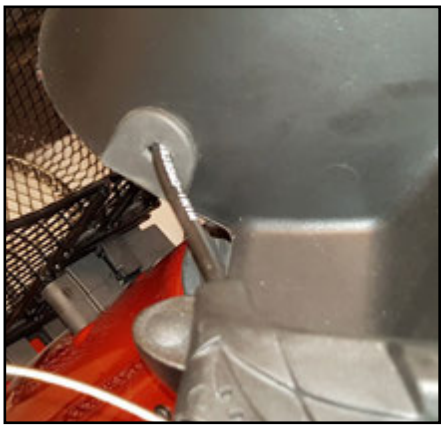
Press the hand brake once. The brake cable will poke out. Grab the cable and pull it out.

A new bake cable. Mostly only the inner cable need to be replaced. Pull the inner cable out.

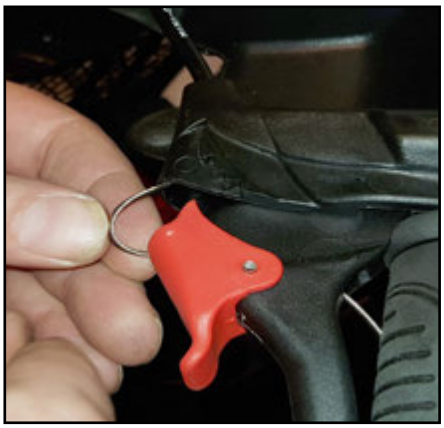


Cut the end stop off.

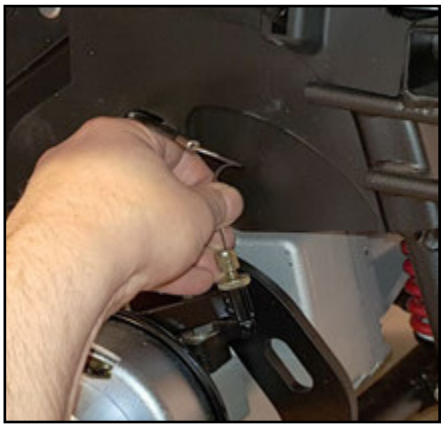
Pusch the cable through the hand brake handle and into the outer cable. Loosen the outer cable from the hand brake, for easier access.



Mount the outer cable again.



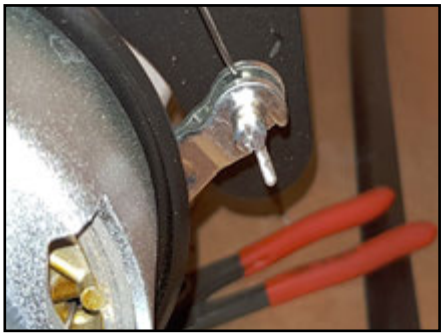
Push the cable all the way through the outer cable until it is visible by the rear wheel.



Lead the cable through the adjustment screw.

And through the small hole. Adjust the brake with the tool, while turning the hub. There must be no sound from the hub. When the hub just turn without sound, the cable can be tightened.

Fine tune the brake with the adjustment screw.



Shorten the brake cable, and fit a cable termination. Check that the brake function is working as it should.

Replace the magnetic brake

Raise the rear end so the wheels are lifted of the ground.

Remove the cover - three screws.

Now there is access to the magnetic brake.

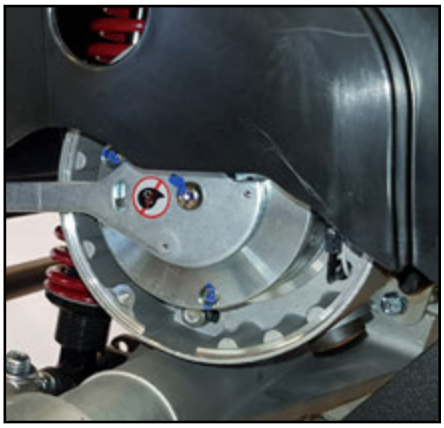
Remove the three screws to dismantle the magnetic brake. They where all greased with locktite when they were mounted.

Check the distance to the magnet. If the measure is more than 0,35 mm, It is worn, and has to be replaced. The distance on a new magnetic brake is 0,15 mm.

Disconnect the four plugs, and the magnetic is free to be removed.

When the new magnetic brake is mounted, be aware to tuck the cable away before mounting the screws.

Use locktitie on the screws. Tighten the screws with 4 Nm.
Locktite No 2400.

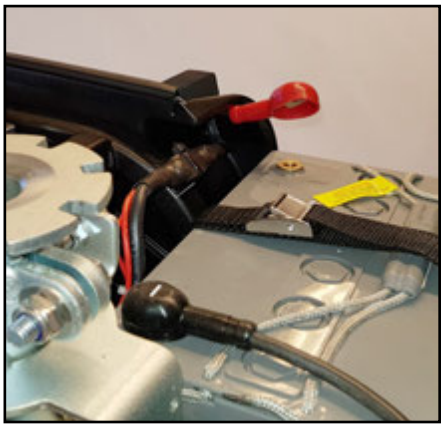


Mark the screws with blue paint.

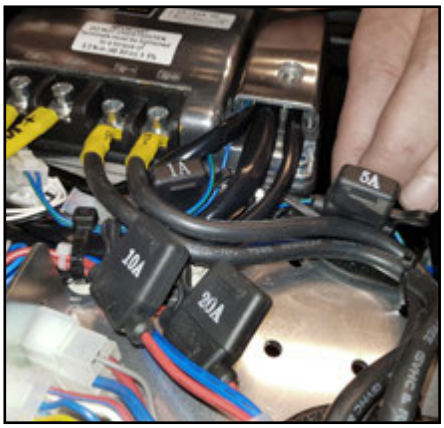
Replace fuses

Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

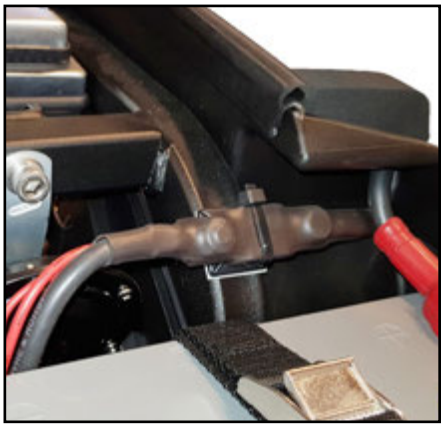
Remove the thumbscrew and remove the battery cover.



For safety reasons - disconnect one of the poles.



Fuses 1A (hour meter), 5A (Horn), 10A (light), og 20A (charging) are placed on the electric plate.



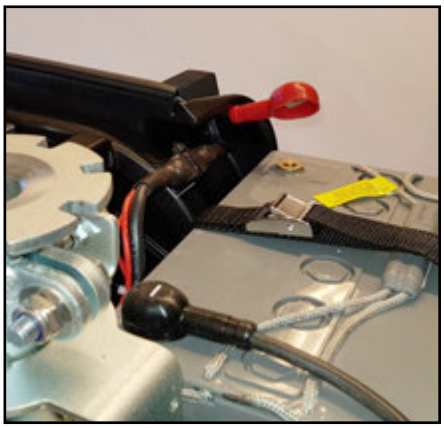
In both sides is a main fuse, fixed with cable ties. When replaced a new protection is heated in place .

Sikring str.	Sikring for
1A	Hour meter
5A	Horn
10A	Light
20A	Charging

Replace coal

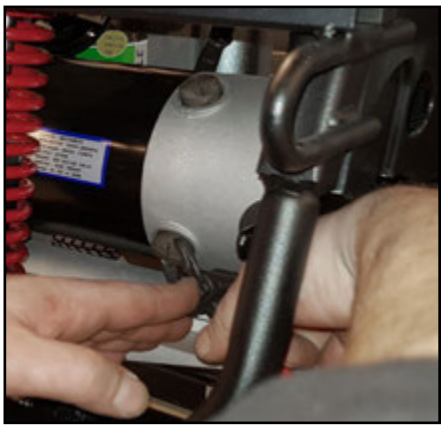
Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

Remove the thumbscrew and remove the battery cover.



For safety reasons - disconnect one of the poles.

Remove the rear cover. Remove the stopper, and slide of the rubber. Unscrew the three screws. Unplug all electric connectors and the cover is free.



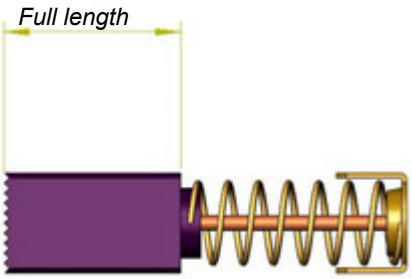
There are four coals. Turn of the lit.

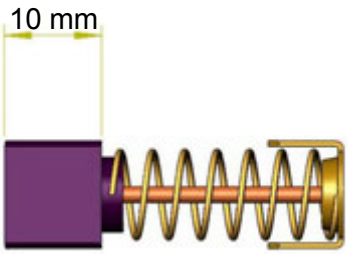
Blow the hole clean before a new coal is fitted. The coal should move effortless forth and back. If needed the coal can be slightly grinded on the side until it fits perfectly.

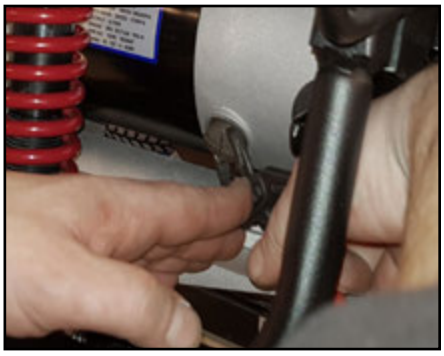
Ready to mount the lit again.

Check the coal length to see if it needs replacing.

No matter if it is a Schmid or Mini Crosser transaxle, the rule is, that a coal should be replaced if worn down to 10 mm.





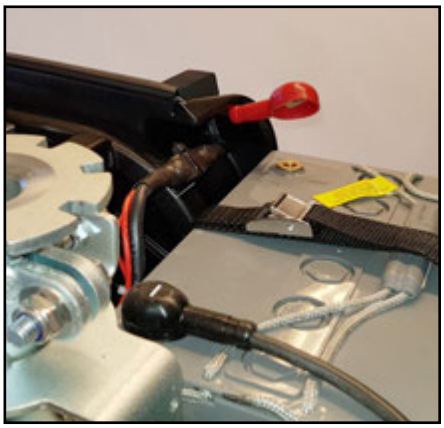


Turn the lit on again.

Replace the controller

Lift the armrests up, and fold the seat completely. Release the seat turn - turn the seat a little and lift it of.

Remove the thumbscrew and remove the battery cover.

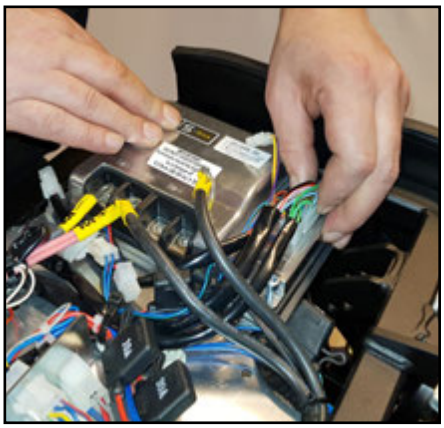


For safety reasons - disconnect one of the poles.

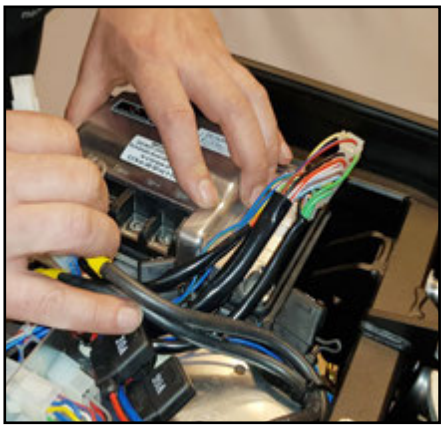
Remove the rear cover. Remove the stopper, and slide of the rubber. Unscrew the three screws. Unplug all electric connectors and the cover is free.

The controller is fixed with screws i two corners.

Remove the cover by loosen these two screws.



Dismantle all the plugs.

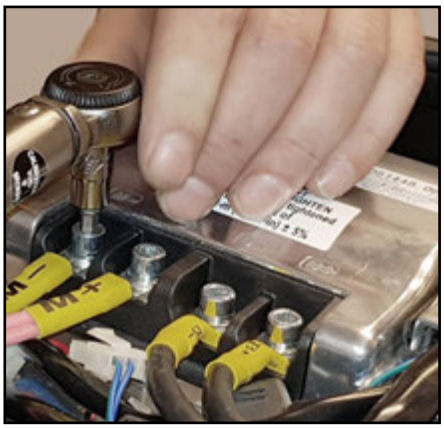


The controller are to be removed now. Mount a new controller in the same place. Mount all the plugs again.

When the cover is to be mounted again, avoid pinching the cables.

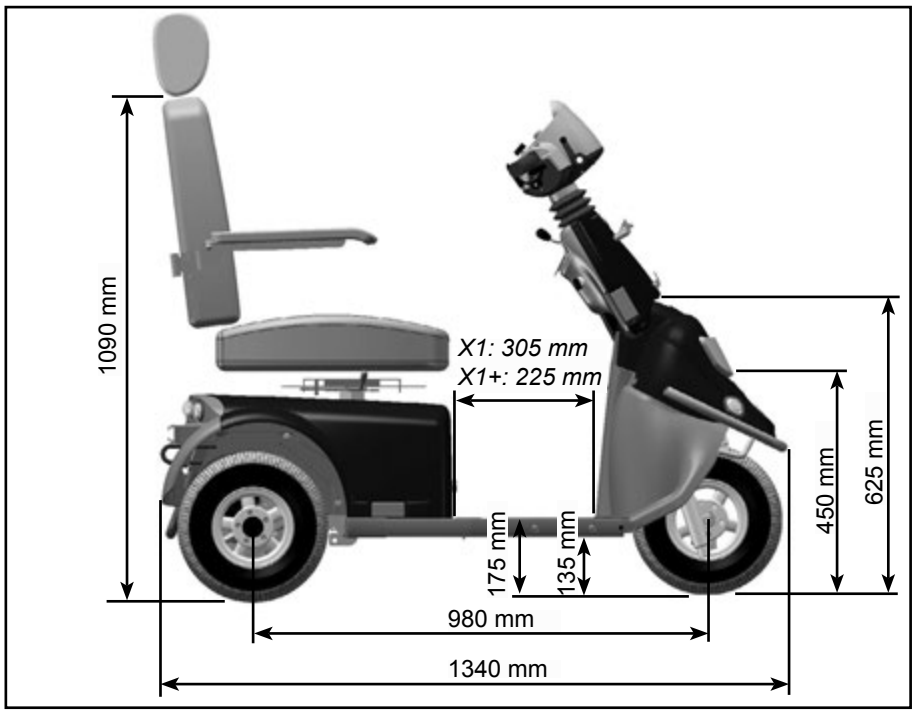
Make sure to move the cables, so the screw has access to the mounting hole.

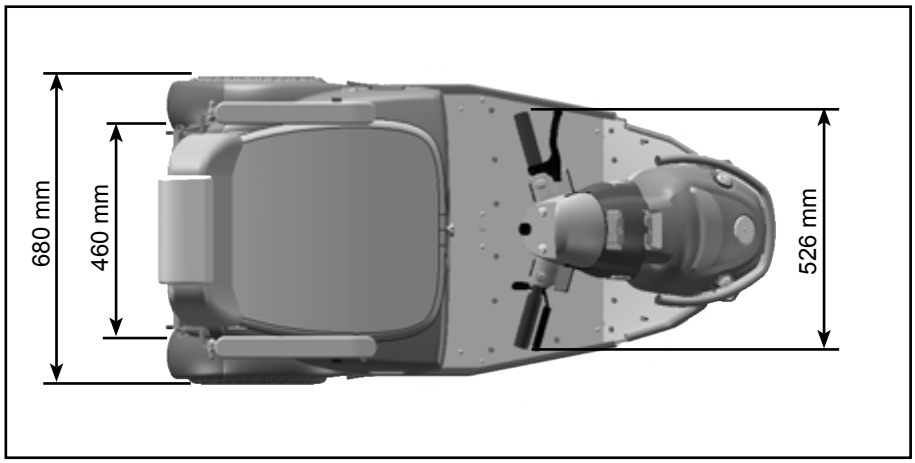
Fix the cover.



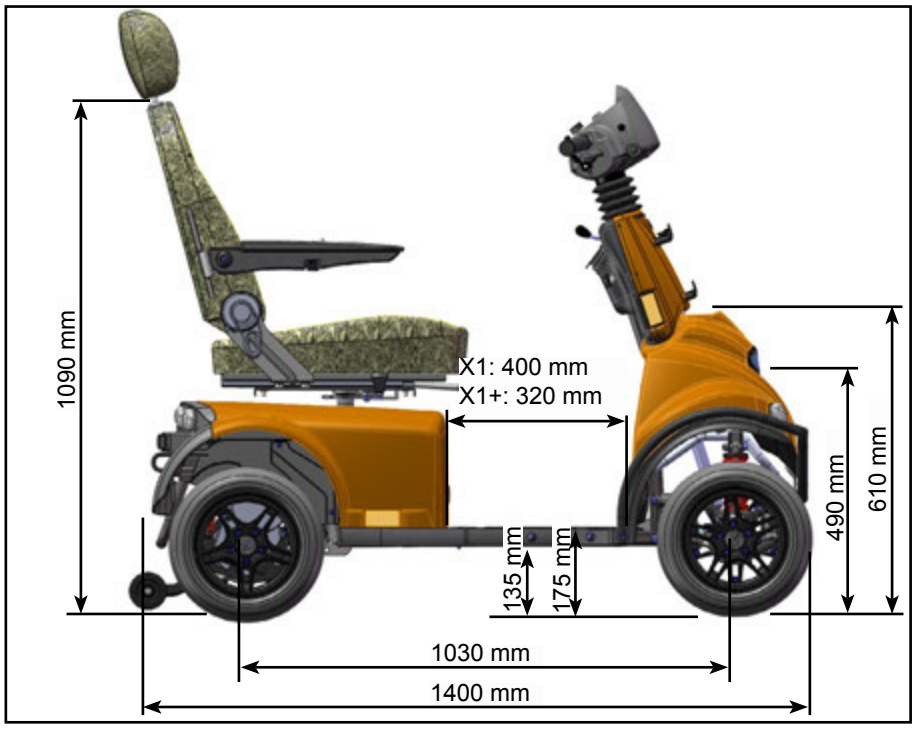
Mount the other plugs. Tighten with 5 Nm.

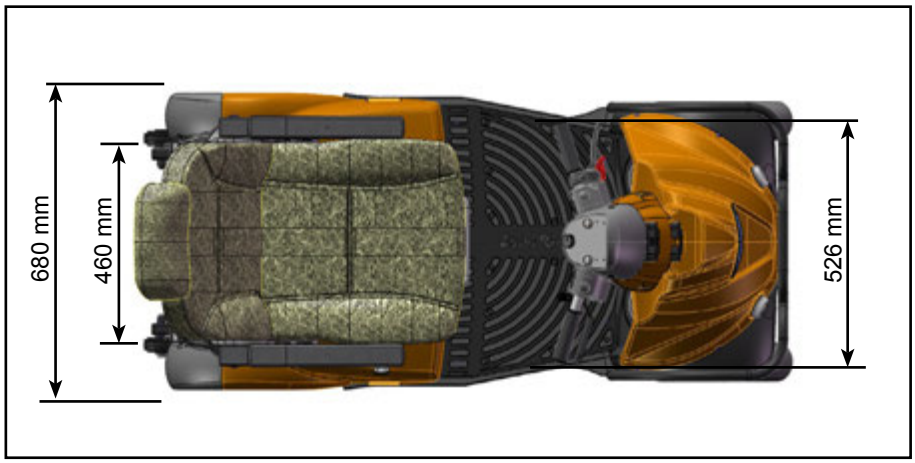
Dimensioned drawing, Mini Crosser X1 3W





Dimensioned drawing, Mini Crosser X1 4W





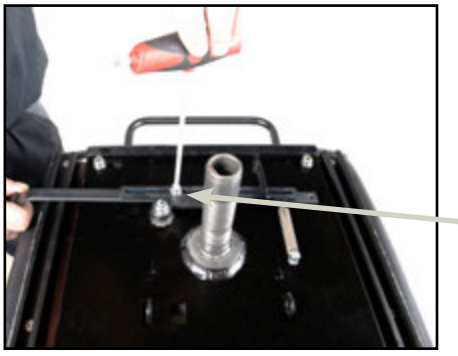
Introduction to the Ergo2 seat

The Ergo2 seat is designed to stay safe to use for at least 10 years.

Lever for rotating the seat

The lever must be pulled back to rotate the seat. The seat can then be rotated to each side, locking at each 45°.

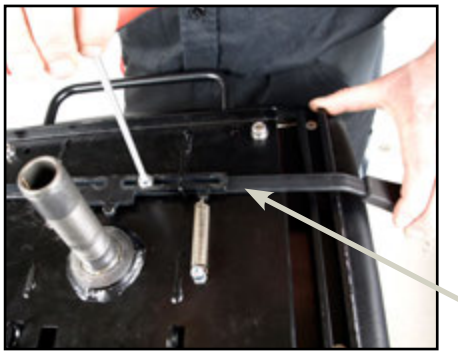
The lever is spring-loaded, and the seat is locked automatically when the lever is released. This lever is located on the right side as standard, but can also be positioned on the left side.
When the lever is located on the left-hand side, it must be pushed forward in order to rotate the seat instead of pulling back.



Out / in adjustment of the lever for rotating the seat

Lift the seat off the vehicle.

Loosen the two Allen screws and the lever can now be adjusted out and in to the desired position.



Placement of lever for rotating the seat on the left-hand side

Remove the two Allen keys and pull the lever out.
Insert the lever from the left-hand side and tighten the Allen screws.
When installing the lever on the left-hand side, the lever must be pushed forward to rotate the seat..

Mount the seat again

In order to ensure that the seat returns to the correct position, the lever for rotating the seat must be released in order to place the seat.

Lever for fwd/bw adjustment of the seat.

Pull the lever up to release the seat on the slide rail.

Then the seat can be moved forward or backward as desired with 200 mm of travel.
When the lever is released, the seat will automatically lock into place in the closest position.

Height adjustment of armrest

Unzip the zipper on the side of the backrest and the backrest itself.

Unscrew the Allen screw and the armrest can be pushed up or down as needed.
It can be adjusted 140 mm.

Width adjustment of armrest

Each armrest can be adjusted 25 mm on each side.
Loosen the Allen screw and the armrest can be adjusted longitudinally.

Adjusting the angle of the armrests

The adjustment screw makes it possible for the armrest to be adjusted 60°.

The armrest can be tilted up to facilitate entry and exit.

Adjusting the angle of the backrest.

The angle of the backrest can be adjusted 45° backward and 90° forward. This is done by pulling the lever on the right-hand side of the seat.

Backrest tilted 45° backward.

Backrest tilted 90° forward.

This is why the seat does not necessarily need to be re-moved during transport, e.g. in a car.

Backrest forward / back.

Loosen the specified screws on both sides.

The depth of the seat can now be adjusted by sliding the seatback forward and back.

Shown here with 320 mm seat depth.

The seatback can then be moved backward to the edge of the rail and forward to the desired position. Tighten the screws after adjusting.

Shown here with 550 mm seat depth

Height adjustment of headrest.

Press the button and the headrest can be raised and lowered as needed.

Adjustment of the headrest forward and backward.

The headrest can be tilted forward and backward as needed.

Basket in front

Mount the basket on the brackets (Click on) and now it is ready for use.

Baskets are part of a wide range of accessories. Contact your local dealer or Medema A/S. Se contact information on page two in this manual.

Basket on seatback

Mounting of basket on the seat.
(Optional accessory)

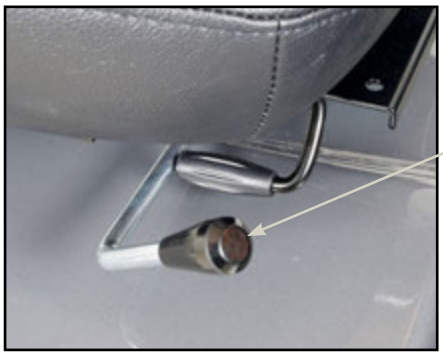
Complete mounting kit for basket.
Two brackets and four Allen screws.

Unzip the zipper and position the brackets in front of the two predrilled holes.

Mount the basket on the brackets and now it is ready for use.
Remember to insert a locking split after mounting.

Baskets are part of a wide range of accessories. Contact your local dealer or Medema A/S. Se contact information on page two in this manual.

Introduction to the Eblo seat



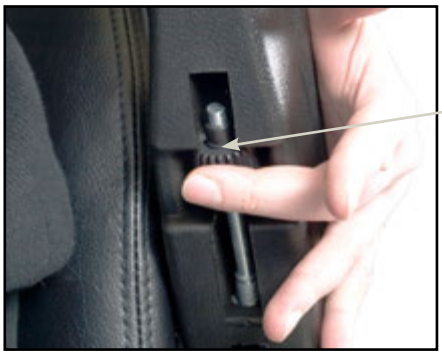
The lever for turning the seat.

Pull the lever up to release the seat. The seat can then be rotated 90° to each side, locking at each 45°.
The lever is spring-loaded, and the seat is locked automatically when the lever is released.

This lever is located on the right side as standard, but can also be positioned on the left side.

Lever for fore/aft adjustment of the seat.

Pull the lever up to release the seat on the slide rail. Then the seat can be moved forward or backward as you wish. When the lever is released, the seat will automatically lock into place in the closest position.
There is a stop on the front and the back of the slide rail.



Adjusting the angle of the armrests

The angle of the armrests can be adjusted by turning this screw.

Adjusting the angle of the backrest

The angle of the backrest can be adjusted approximately 140°. This is done by lifting this lever.

Adjusting the lumbar support:

The lumbar support can be adjusted by turning the handle counter-clockwise.

Headrest:

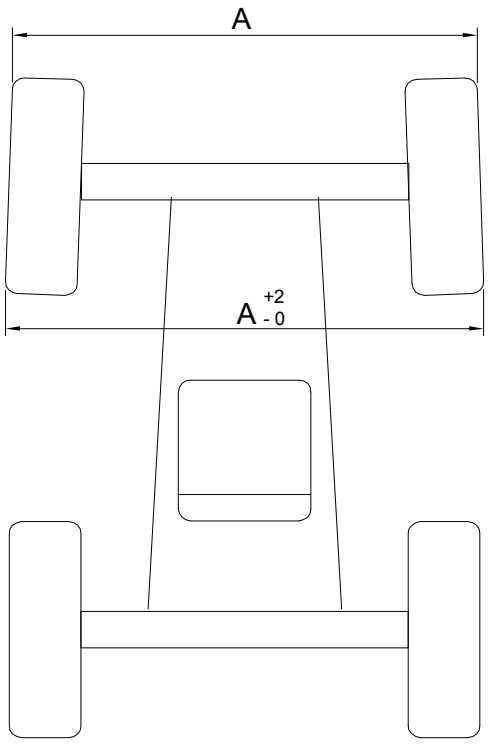
The headrest can be adjusted up/down in steps.

Flame resistance

The Mini Crosser seat's flame resistance has been tested in accordance with DS/EN 1021-2:2014 Furniture - Assessment of the ignitability of upholstered furniture - Part 2: Ignition source match flame equivalent.

Warning!
The seat may become very hot if exposed to direct sunlight. Similarly, the seat will become very cold if it is exposed to cold temperatures, e.g., frost.

Front wheel alignment, 4W



Front wheel alignment (toe-in), 4W

Technical data

	X1 3W	X1 4W
General information		
Overall length	1340 mm	1400 mm
Overall length with anti-tilt wheels	1420 mm	1480 mm
Overall width	680 mm	680 mm
Overall height:	1090 mm	1090 mm
Folded length	-	-
Folded width	-	-
Folded height	690 mm	690 mm
Total mass incl. batteries and Ergo2 seat.	158,5 kg	169,5
Total mass incl. batteries, without seat.	133 kg	144 kg
Mass of the heaviest part (chassis)	79 kg	90 kg
Static stability all directions	15° - 27%	15° - 27%
Energy consumption (Distance) 56 Ah 85 Ah	 35 km (*) 45 km (*)	 35 km (*) 45 km (*)
Dynamic all directionsl	13° - 23%	13° - 23%
Obstacle climbing forward Obstacle climbing rearward	110 mm 110 mm	110 mm 110 mm
Maximum speed forward	15 km/h	15 km/h
Minimum braking distance from max. speed 10 km/h 13 km/h 15 km/h	 2,0 meter 2,8 meter 3,5 meter	 2,0 meter 2,8 meter 3,5 meter
Measured sound power level (1 m. distance)	60db	60db
Max user weight - standard	175 kg	175 kg
Max user weight - HD version.	------	250 kg
Weight of test dummy	175 kg	175 kg
Seats		
Seat plane angle	0°	0°
Effective seat depth Ergo2 child Ergo2 standard + HD Eblo	 20-43 cm 32-55 cm 43 cm	 20-43 cm 32-55 cm 43 cm
Effective seat width Ergo2 child Ergo2 standard Ergo2 HD Eblo	 35 cm 40, 45, 50 cm 60, 70 cm 50 cm	 35 cm 40, 45, 50 cm 60, 70 cm 50 cm
Seat surface height from footrest to front edge Ergo2 (barn, standard og HD) Eblo	 42 - 52 cm 44 - 54 cm	 42 - 52 cm 44 - 54 cm

	X1 3W	X1 4W
Seat surface height from ground to front edge Ergo2 (barn, standard og HD) Eblo	 59 - 69 cm 61 - 71 cm	 59 - 69 cm 61 - 71 cm
Backrest angle Ergo2 (barn, standard og HD) Eblo	 -90° til +48° -54° til +80°	 -90° til +48° -54° til +80°
Backrest height Ergo2 barn Ergo2 standard + HD Eblo	 44 cm 54 cm 52 cm	 44 cm 54 cm 52 cm
Seat cushion angle	3°	3°
Leg to seat surface angle	90°	90°
Armrest to seat distance	150 mm - 300 mm	150 mm - 300 mm
Front location of armrest structure	350 mm	350 mm
Minimum turning diameter / radius	265 cm / 132,5 cm	330 cm / 165 cm
Wheels		
1503-1003 Wheel, model-X, 2,50-3,30-8”. complete with rim and tyre.	2,8 bar 	2,8 bar 
1503-1114 13x5.00-6” ext. Ø325 mm Wheel Norway black - T, E, Nordic, MaxX, MaxX HD, M and X	4,1 bar 	4,1 bar 
1503-1115 13x5.00-6” ext. Ø325 mm Wheel Norway black w/spikes - T, E, Nordic, MaxX, MaxX HD, M and X	4,1 bar 	4,1 bar 
1503-1336 13x3.00-8” ext. Ø340 mm Wheel black - T, M and X	3,5 bar 	3,5 bar 
1503-1273 13x3.00-8” ext. Ø340 mm Wheel black puncture free - T, M and X	PUR 	PUR 
Lighting:		
Bulb, headlight	LED	LED
Diode, rear light	LED	LED
Diode, indicator	LED	LED

	X1 3W	X1 4W
Standard colours Option 1 Option 2	 Orange - metallic Black - metallic	 Orange - metallic Black - metallic
Miscellaneous		
Front basket, max weight	8 kg	8 kg
Rear basket, max weight	15 kg	15 kg
Wheel bolt tighten max: Dry Greased with fat	 12 Nm 6 Nm	 12 Nm 6 Nm
The Mini Crosser X1 complies with the following standards:		
The Mini Crosser has been tested for the requirements described in:		EN 12184
ISO 7176-15 Annex A a) requirements and test methods for static, impact an fatique strengths (ISO7176-8) b) Power and control systems for electric wheelchairs, requirements and test methods. (ISO 7176-14) c) climatic test in accordance with ISO 7176-9		 Conforms Conforms Conforms
ISO 7176-19 Wheeled mobility devices for use as seats in motor vehicles.		Conforms
Mini Crosser X1 is Crash tested with belts from Dahl Engineering		Passed

(*) Driving distance is depending on: temperature, wind, terrain, tyre pressure and user weight.

Weight of the seats

This is our standard Ergo2 45 cm seat, the heaviest part of the X1 to remove. The label showing the seat's weight is located as shown above.

Seat model	Weight
Eblo seat 45 cm	19 kg
Ergo2 seat 35 cm	20 kg
Ergo2 seat 40 cm	26 kg
Ergo2 seat 45 cm	27 kg
Ergo2 seat 50 cm	29 kg
Ergo2 seat 60 cm	36 kg
Ergo2 seat 70 cm	37 kg

Checklist for servicing X1:

Mini Crosser X1 - 3W and 4W	Date performed	Sign.
Area:		
Suspension and wheels		
Rear suspension		
No cables caught in moving parts		
Wheels – tightening and wheel rims		
Tyre pressure and tyre thread		
Functioning of hand brake		
3W – Front fork – suspension and alignment		
3W – Front wheels		
4W – Front suspension		
Front wheel mounts		
Controls – control unit		
Lights, blinkers, emergency stop lights and horn		
Seals		
Gas regulation and control lever		
Max speed potentiometer		
Motor / gears / brake (transaxle)		
Wear and tear		
Power consumption		
Brakes and freewheel function		
Braking distance		
Brush length		
Transaxle – oil leaks/noise		
Steering column		
Play/wear		
Cables		
Gas springs		
Keylock switch/charging plug		
Chassis / seat / covers		
Footplate		
Seat column		
Seat		
Windscreen		
Other mechanical components		
Electrical components		
Controls on electric panel		
Cables / plugs and sockets		
Battery straps		

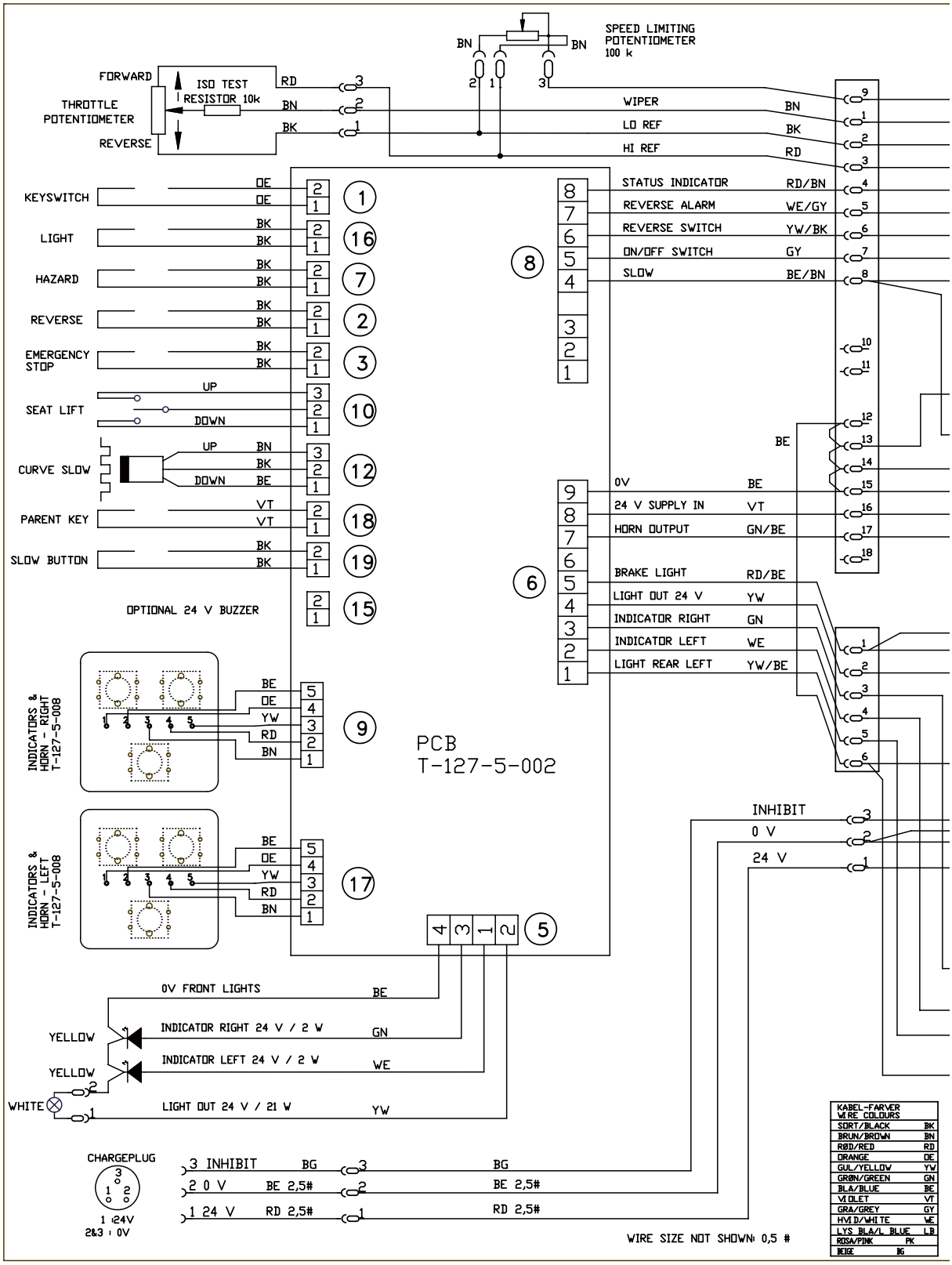
Mini Crosser X1 - 3W and 4W	Date performed	Sign.
Batteries/charger		
Batteries – pitting and battery terminals		
Battery capacity		
Battery charger		
Accessories		
The functioning of all accessories must be tested. Replace missing screws and handles. Replace defective parts.		

For more details about the above see the section entitled Service Review X1 Mini Crosser model.

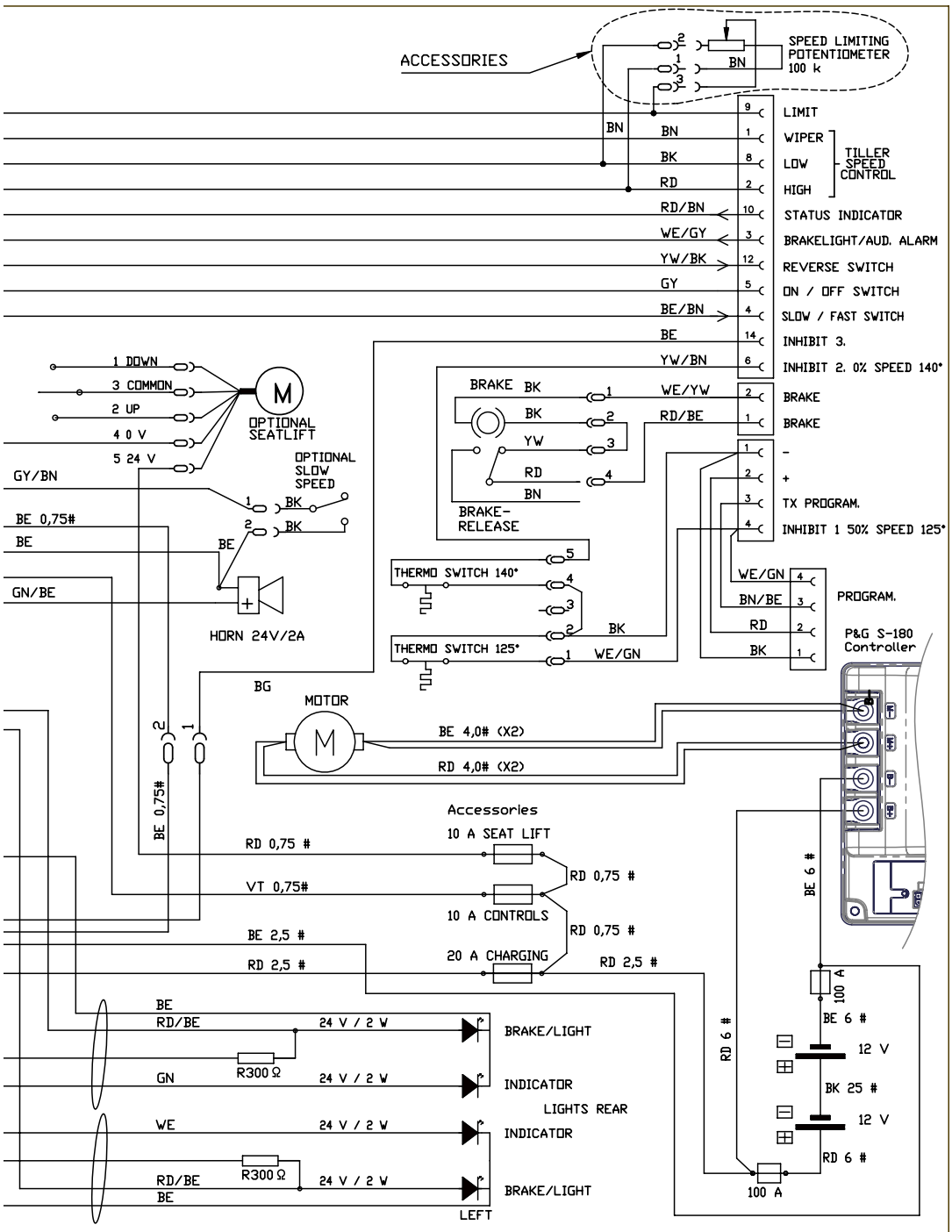
Test all functions in their inner and outer positions. Test drive the vehicle at its approved maximum load.

For reasons of safety, it is crucial to comply with the service and safety review intervals in order to minimise the risk of brake failure and short circuits in wiring, which may possibly result in overheating and fire.

In case of doubt, ask! Spørg



vis der er tvivl!



eneral tolerances	Geometrical toleran.	Welding tolerances	Min. general roughness: Ra 3.2
SO 2768-1-m	ISO 2768-2-K	EN/ISO 13920-AE	Material

edema Production A/S	Dimensions in mm	European projection	Scale:	
nggaardvej 7 K-7400 Herning f.: 70 10 17 55 ax.: 97 16 85 82 ail: info@minicrosser.com ww.minicrosser.com	Beskrivelse El-diagram MiniCrosser M1 (PG S-180)		Sign:	JOM
			Date:	190810
	Description Circuit diagram MiniCrosser M1 (PG S-180)		Dwg. no. M-127-5-050	Issue C

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