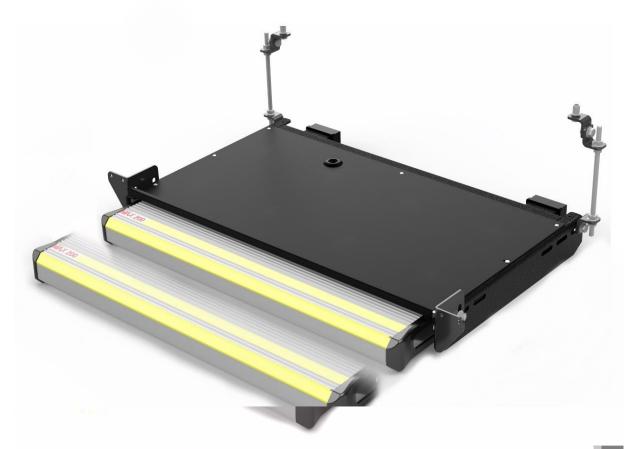




# Manual



ACDEOS BV Touwbaan 1A 2352 CZ Leiderdorp Netherlands WWW.ACDEOS.COM Date: November 2024 Vers: 8.0



#### Index

1 Environment	
2 Technical specifications	
<ul><li>3 Safety instructions</li><li>4 Constraints</li></ul>	
5 Controls	
5.1 Step Control	
5.2 Signals	
5.3 Legal requirement according R 107 UN Bus directive:	
5.4 Electrical Components	
5.5 Power	4
5.6 Current control	
5.7 Motor	
6 Operation	
6.1 Deploy Operation procedure	
6.2 Stow operation procedure	
7 Manual Operation	6
8 Mounting / Installation	
8.1 Mechanical Installation	
8.2 Electrical Installation	8
8.3 Installation of the LED (optional):	
8.4 Testing the Step:	
9 Periodic maintenance / Inspection	
9.1 Cleaning	
9.2 Periodic maintenance / Inspection	
9.2.1 Small maintenance	
9.2.2 Regular inspection	
9.2.3 Yearly maintenance / normal maintenance	
10 Repair	
<ul><li>10.1 Disassembly</li><li>10.2 Assembly</li></ul>	
11 Failure search	
<ul><li>11.1 Fault action and sound and light indication</li><li>11.2 Alarm indication Wake function</li></ul>	ZI 21
12 Certification	
13 Spare parts	
Appendix 1;	
Appendix 1 a;	
Appendix 2;	
Installation drawings:	
5	

### 1 Environment

The use of energy from the step is reduced to an absolute minimum.

The AXS - Step is made of durable materials which all can be recycled. All different materials can easily be separated from each other for separate recycling.



### 2 Technical specifications

Product description Installation	Electric operated step for mounting outside under the floor of a vehicle. Under the vehicle Floor at the front- middle or rear door
Dimensions	Step depth 300 mm - width depending on model 600 and 900mm.
	For detailed dimensions please refer to the installation drawings
Weight	total 24-28 Kg depending at model.
Load	Maximum load 200 Kg (2000 N) this is always labeled on the Step.
Materials	Frame; steel plate work, EP corrosion protected.
	Step: Aluminum profile plastic front edge and Plastic corner pieces.
Life cycle	Tested life cycle of the step is 100.000 cycles.
Electrical connection	Waterproof 4 pin connector (IP65) on the step.
Power consumption	max average 4 Amp short peak up to 15Amp, sleep current < 5mA
Drive	Electric motor 12V 20W (or optional 24V at special demand)
Electric signals	following electric signals are available: Step closed / stowed.
Safety functions	Motor switched off by current control.
Cycle time	Time required for opening or closing the step is approx 2,5 Sec
Legislation	The product fulfils R 107 UN Bus directive and 2006/42/EC / 98/37 EC Machine
	directive.

### 3 Safety instructions

#### These Safety instructions should always be with the step. The operator must be made aware of these instructions before operating the Step. Read these safety instructions carefully and follow them.

The step is constructed to be an extra step to enter a vehicle. It should be used appropriately by passengers as long as they are not heavier as the maximum load, to enter or exit a minibus, taxi, camper or other vehicle.

- 1. Before you can operate the step you have to stop the Vehicle and make sure that the hand or park brake is on.
- 2. Before you operate the step, make sure that there is no person or obstacle at or close to the step. Look out that there is no person or obstacle outside the vehicle in the motion direction of the step.
- 3. It is recommended that the step is only operated by the driver or other qualified operators.
- 4. The driver or operator must have a clear view at the step when he is operating the step.
- 5. It is recommended to step on the middle of the step platform.
- 6. NEVER drive away when the RED dashboard LED light is still on. The step is not properly stowed.
- 7. The step platform must be kept clean and free of oil and other slippery materials.
- 8. When you have any doubt about the safety of passenger when using the step make sure he is assisted.
- 9. For any questions about the safe operation of the step, directly contact the responsible persons.
- 10. Never use the step for any other use than here described.
- 11. Never overload the step.
- 12. The step should always be operated until it is fully in or out.
- 13. Repair and maintenance must be done by qualified and trained staff only.
- 14. Only use original parts if you have to exchange parts from the step.
- 15. If the anti-slip profile at the step becomes slippery because of wear, the step platform must be replaced.
- 16. Always use the recommended cleaning materials.
- 17. Report any unsafe condition of the step, or during it's operation, to the step supplier.



### **4** Constraints

The step has been designed to be functional and reliable. The product is made as simple and reliable as possible. It has been taken in consideration that the step will be mounted under a vehicle in severe environmental conditions

### 5 Controls

#### 5.1 Step Control

The step control is made as easy as possible. The controls comply with European 98/37 EC machine directives. Functions and measurements are compliant with the R 107 UN Bus directive.

The electric step is an automatic system controlled by opening and closing of the vehicle door or optionally by a driver operated switch.

#### 5.2 Signals

The following output signals are available from the step electronics:

• Step out.

This is a red LED to make clear to the driver that the step is not in the stowed position and that he cannot drive away safely. This signal will blink when the step is moving in or out

• Step in operation, moving in or out.

There is an audible signal when the step is moving in or out.

### 5.3 Legal requirement according R 107 UN Bus directive:

• Driver must have an indication that the step is fully stowed. It should be impossible to deploy the step when a safety device fails. Manual operation is allowed.

• The horizontal movement of a step shall be interrupted when it is loaded with a mass of 15 kg.

• Extension of the step in the horizontal direction shall be protected by a safety device. In the event of a safety devices coming into operation, the movement of the step shall immediately be stopped.

The Step On fulfils all these requirements.

#### 5.4 Electrical Components

All electrical components in or outside the step cassette are water resistant to IP 65.

#### 5.5 Power

12-volt commercial vehicle electrical system. Such a system consists of a 12-volt battery and an alternator/generator system. The step performs all necessary functions when subjected to the normal fluctuations encountered in a normally functioning 12V DC, commercial vehicle electrical system. (optional 24 V system)

# IMPORTANT Note: The ECU is not protected against changing the polarity at the power lead. This will damage the ECU.

The power line needs to be protected by a 20 Amp fuse. This fuse is not included in the cable loom.

#### 5.6 Current control

The Step has a current control function. The step will stop with a load of max 150 N in front of the step. It will retract and then try again to continue its movement out. It will try three times to move out, then it will stay in the position where it was obstructed and fully returns when the door is closed or the driver closes the step by a driver operated switch.

#### 5.7 Motor

••••	
The motor specifications:	
Voltage	12V DC (or 24V optional)
Unloaded rotation speed	70 rpm
Unloaded current	2 A
Rated load	350 Ncm
Rated current	5-6 A
Locked torque	850 Ncm
Start / lock current	18 A
Current cut of by ECU	6,5 – 7.5 Amp

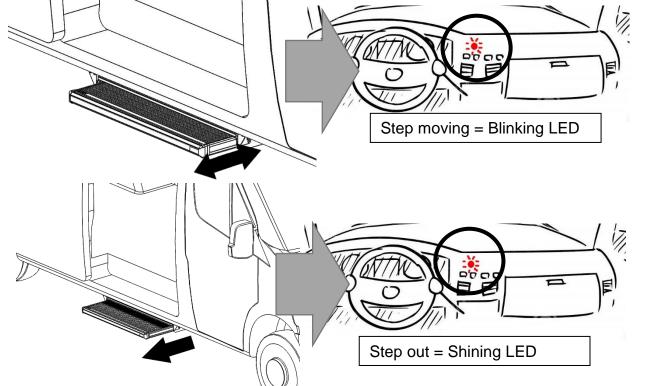
### 6 Operation

### 6.1 Deploy Operation procedure

The step must have clearance from the vehicle. The vehicle must have the parking brake on, and then the step can be safely operated.

The electronics receive a signal from the door switch or driver switch. If a door switch is installed the step will move out automatically once the door is opened.

Time for either the full deploy / out or the full stow / in cycle is approximately 2.5 seconds. When the step is moving the red LED on the dashboard will flash until the step is completely out.

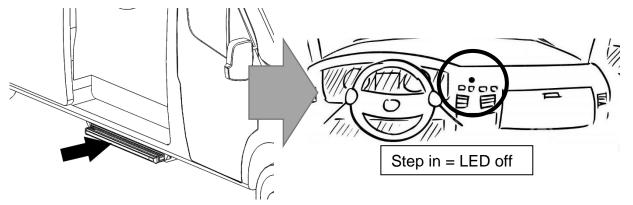


If the step encounters an obstacle it automatically stops. It will move backwards for a few centimeters and then move forward again. If there is still an obstacle it will repeat this procedure three times, then it will stop in the position where it encountered the obstacle.

#### 6.2 Stow operation procedure

To stow the step the door should be closed or the driver has to give a signal that the step should stow. The same rules apply as for moving out.

At closing a signal from the close switch will indicate that the Step is completely closed. This close signal will also give the vehicle the OK that it is safe to drive the vehicle away, the Red LED light at the dashboard will go off. If the step is not stowed properly the RED LED keeps blinking.





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### 7 Manual Operation

In case the step fails, it is possible to operate the step by hand. This is done by the following procedure:

1. Put a large screw-driver through the long hole in the bottom cover in the slot in the motor base plate.

2. Twist the screwdriver counterclockwise. This will unlock the driving mechanism. Now the step can be moved in or out by hand.

3. After moving the step in or out return the screw-driver in the slot to re-lock the step in the in or out position.

### 8 Mounting / Installation

The installation can only be done by a company that is well known with bodybuilding or modifying vehicles, which has the trained technical staff to do this job.

### 8.1 Mechanical Installation

For mounting the step you do not need to make any large vehicle adaptations. The step is placed under the floor in the middle of the front, middle or rear door. Chassis modifications are not needed.

Warning: Changing the vehicle chassis affects the strength of the vehicle. This kind of changes is only allowed after approval of the vehicle builder / constructor. You need to consult the vehicle builder for these kinds of changes. Acdeos cannot be made responsible or held accountable for any vehicle / chassis changes.

Exact measurements of the product should be taken from the official installation drawings. Ask Acdeos for the last revision and official installation drawing. Figures, drawings in this manual are only for indication.

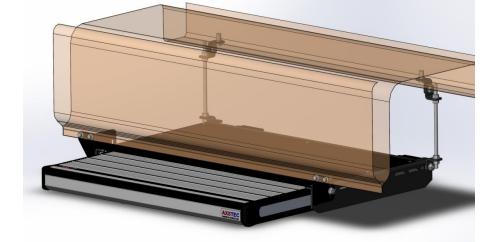
#### Installation:

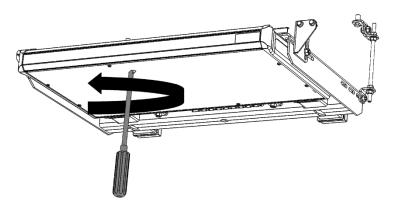
Create a safe working condition. Lift the vehicle to the appropriate working height.

Define the place where you want to mount the step under the vehicle. Make sure the cassette can be mounted on the required position without colliding with the chassis or other vehicle parts. **Make sure that the step is not to close to hot parts like the exhaust system. This can damage the step.** 

The picture below gives the basic principles for mounting the step.

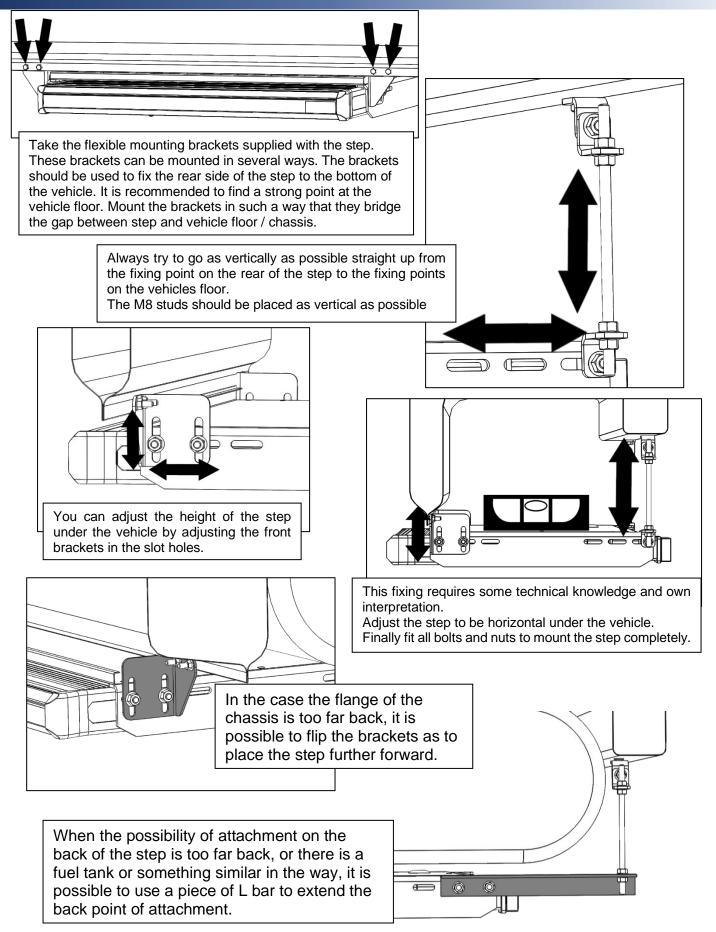
Define the place for the 4 mounting bolts on the front. The holes for this fixation should be drilled in the lower flange of the outer chassis bar of the vehicle. Drill the holes Ø6.5 mm. Always protect all drilled holes with zinc spray. Make sure there is enough material in the flange under the hole. Place the step with two bolts at the flange and support it at the rear.







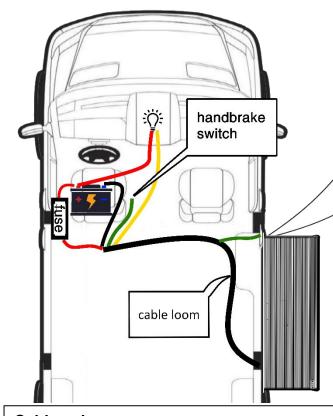




ACDEOS Simplicity in Accessibility

### 8.2 Electrical Installation

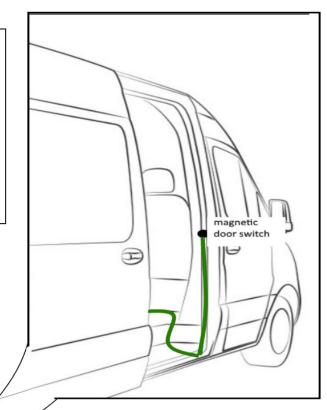
Find a good route for the cable to the front of the vehicle or to the area where it will be connected to the vehicles electrical system. The principal idea for the routing of the cable loom is as follows: cable should run under the vehicle to a place where you can enter the vehicle. Try to find a dry place for the 4 pin connector in the cable loom inside the vehicle to battery or power point and dashboard for dashboard light. The cable to the door switch should run directly to the door-pillar where the door switch is mounted. Please refer to the electrical diagrams in the rear of the manual appendix I.



Cable colours:			
black	Ground		
Red	Power (Use a 20 Amp fuse)		
Green	Ground signal for operating		
the step			



Please ensure that all visible connection points are greased to prevent corrosion. Use Vaseline or a similar product



There are two possible operations of the step.

1 - Door switch. Steps moves out automatically when the door opens

2 - Driver operated switch on the dashboard where the driver operates the step. In this case, it is still recommended that the door switch in installed. Without the door switch the driver could forget to close the step when the door is closed, and drive away with an open step.

Connect the green wire at the handbrake switch or other signal indicating that the vehicle is stationary. You need a signal when the vehicle is stationary. The handbrake switch is not supplied with the step.

For safety reasons we recommend this signal is used.

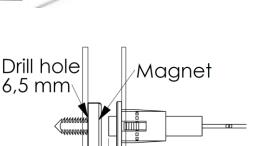
If you decide not to use this signal Acdeos cannot take any responsibility for any unsafe operation of the step. **Mechanical Installation of door switch:** Find the right place on the door to install the door switch, preferably around the area in the doorpost where you find the original door switch. Make sure there is minimum around 10-12 mm free space between the door and the door post when the door is closed.

Drill a hole of 12.5 mm at the selected place. The door switch is supplied as standard with the cable loom.

Lead the cable with the door sensor through the doorpost and stick the switch through the 12.5 mm hole Place the Switch in the plastic holder. This is a tight fit. You need to screw the holder around the switch.

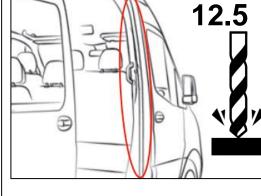
- Close the door. Measure the gap between the door and the door post. Adjust the switch so, when installed, there is 8.5 mm of space between the switch and the door or 3 mm between switch and magnet.
- Push the switch + plastic holder in the drilled hole and fix / seal with a bit of PU glue.
- Place the magnet on the opposite position on the door. Drill a hole of 6,5 mm and push in the black magnet holder with magnet .

Check that magnet does not touch the switch when door is closed with high speed and force (slammed)



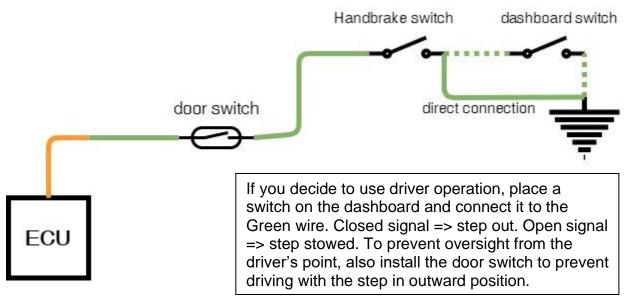






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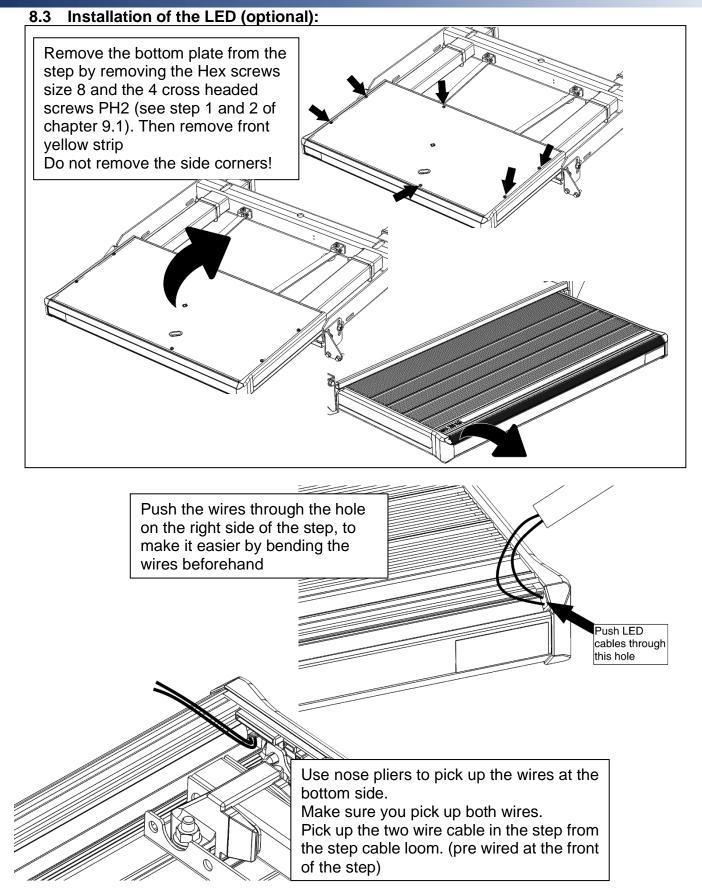


• Place the red LED in the dashboard in the direct view of the driver. Connect the free wire to 12 V power. The LED lights up red when the step is out and flashes when the step is moving in or out.

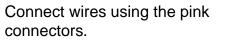


- Connect the black wire to ground.
- Connect the red wire to 12V power. You need to add a fuse of 20 Amp between the battery and the power cable. Decide whether to connect the step to constant power or to power behind the main switch. We recommend placing the step behind the main switch. The step ECU has a sleep mode using less than 1 mAmp in standby mode
- 20 AMP
- Connect the cable loom to the step with the connector. Place this connector preferably inside the vehicle in a dry area.
- The step is now ready for operation.



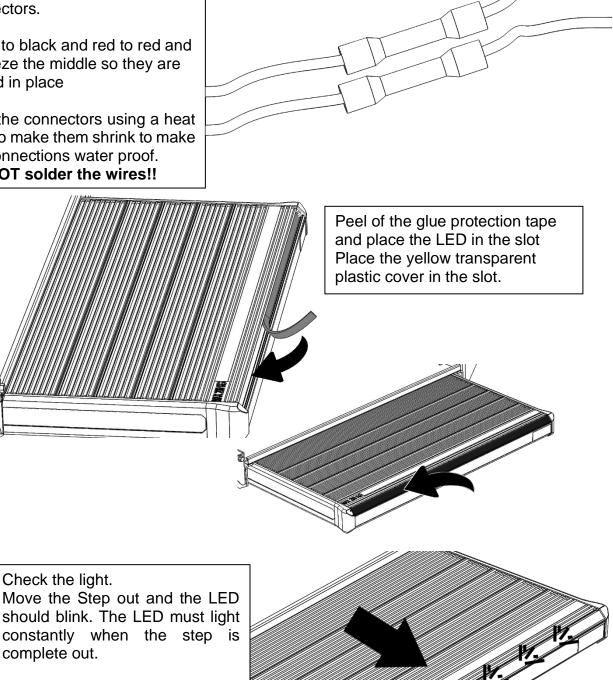




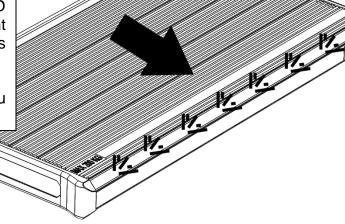


Black to black and red to red and squeeze the middle so they are locked in place

Heat the connectors using a heat gun, to make them shrink to make the connections water proof. DO NOT solder the wires!!



Close the bottom cover and you are done.





### 8.4 Testing the Step:

You should test the step after installation. Follow these instructions:

- 1. MOUNTING Check that all the mounting bolts are in place and tightened.
- 2. MOUNTING Bring the step out and have 2 people (Max 200kgs) step on it. Check whether the mounting of the step is strong enough for this weight. The construction of the step means that with a weight of 200 Kg the step will give slightly this is normal !!
- ELECTRICAL INSTALLATION Move the step in and out electrically. Check for unusual noises or uneven movement whilst the step is moving. Check that the step stops automatically at the end of the stroke. Check that the red LED on the dashboard turns red when the step is out. Check that the buzzer works while the step is moving in or out. (If not disconnected)
- 4. SAFETY FUNCTION Move the step out and try to stop it with your hand. The step should stop, move back, and come out again. It will try this 3 times, then it will stop. It should go back in after closing the door.
- 5. INTERLOCK VEHICLE Release the vehicle handbrake, then try to operate the step. It should not be possible to operate it. (unless the handbrake interlock is not installed)

If this small test procedure is followed with success the step is ready to be used. If one of the tests fails the problem should be resolved before putting the step in to use.

### 9 Periodic maintenance / Inspection

### 9.1 Cleaning

To prevent severe damage to the step, the step must be cleaned thoroughly in the normal cleaning schedule of the vehicle, depending on the use of the vehicle and the filthiness of the operation. Therefore, especially in wintery situations when salt is being sprinkled on the road, it should be cleaned more regularly. Normal non-aggressive cleaning materials, as used for cleaning the other parts of the vehicle, should be used.

It is not recommended to use high-pressure water cleaners.

Do not use aggressive solvents; these could affect the paint, rubber and glue used on the step.

### 9.2 Periodic maintenance / Inspection

#### 9.2.1 Small maintenance

The product is very low maintenance. This means that it is not necessary to grease any of the moving parts on a monthly basis, apart from the yearly maintenance.

#### 9.2.2 Regular inspection

Following the vehicle inspection schedule, check following points:

- 1. **MOUNTING** Check that all the mounting bolts are in place and tightened.
- 2. **MOUNTING** Bring the step out and have 2 people (Max 200kgs) step on it. Check whether the mounting of the step is strong enough for this weight. The construction of the step means that with a weight of 200 Kg the step will give slightly this is normal !!
- ELECTRICAL INSTALLATION Move the step in and out electrically. Check for unusual noises or uneven movement whilst the step is moving. Check that the step stops automatically at the end of the stroke. Check that the red LED on the dashboard turns red when the step is out. Check that the hugzer works while the step is moving in er out. (If not disco

Check that the buzzer works while the step is moving in or out. (If not disconnected)

- 4. **SAFETY FUNCTION** Move the step out and try to stop it with your hand. The step should stop, move back, and come out again. It will try this 3 times, then it will stop. It should go back in after closing the door.
- 5. **INTERLOCK VEHICLE** –Release the vehicle handbrake, then try to operate the step. It should not be possible to operate it. (unless the handbrake interlock is not installed)

#### 9.2.3 Yearly maintenance / normal maintenance

A thorough maintenance check should be done once every year or at least every 10.000 cycles.

If the number of cycles per year is less than 10.000 the maintenance interval can be extended to 1.5 years. **normal maintenance** 

Bring the step in the out position. Remove the bottom plate screws. Remove the bottom plate by lifting it with a flat head screwdriver.

- Check all moving parts like, arm gears, push rods and wheels for excessive play. If there is excessive play on moving parts it is recommended to replace these parts.
- Check the adjustment of the in and out switch.
- Check wires and electrical connections for possible failures.

- Clean all parts
- Grease moving parts with MOTIP White PTFE grease or normal bearing grease.

Close the bottom plate.

With step still in out position remove ty-rap at the rear of the step from both rubber end caps.

Spray a good grease in the tube or use normal bearing grease with a long brush. This is the most important part of the maintenance.

Close rubber caps again and fit with a new Tie-wrap

We strongly recommend MOTIP White PTFE grease part nr 090204 for all parts in the step, **do not** use WD40 or silicon sprays Other similar PTFE grease sprays can also be used.

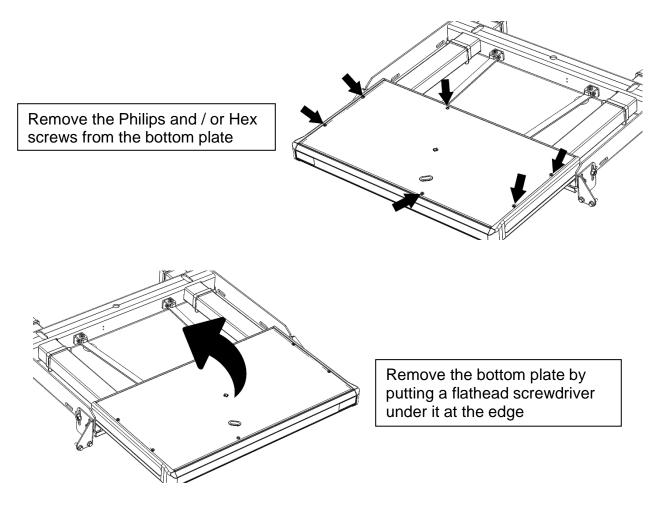
This spray is also available at Acdeos under part number S150 310

### 10 Repair

The repair of the step is simple and can be done with the normal available workshop equipment.

The most repairs can be done under the vehicle, but this manual describes a full assembly of a step removed from the vehicle. We always recommend to remove the step from the vehicle as that save time.

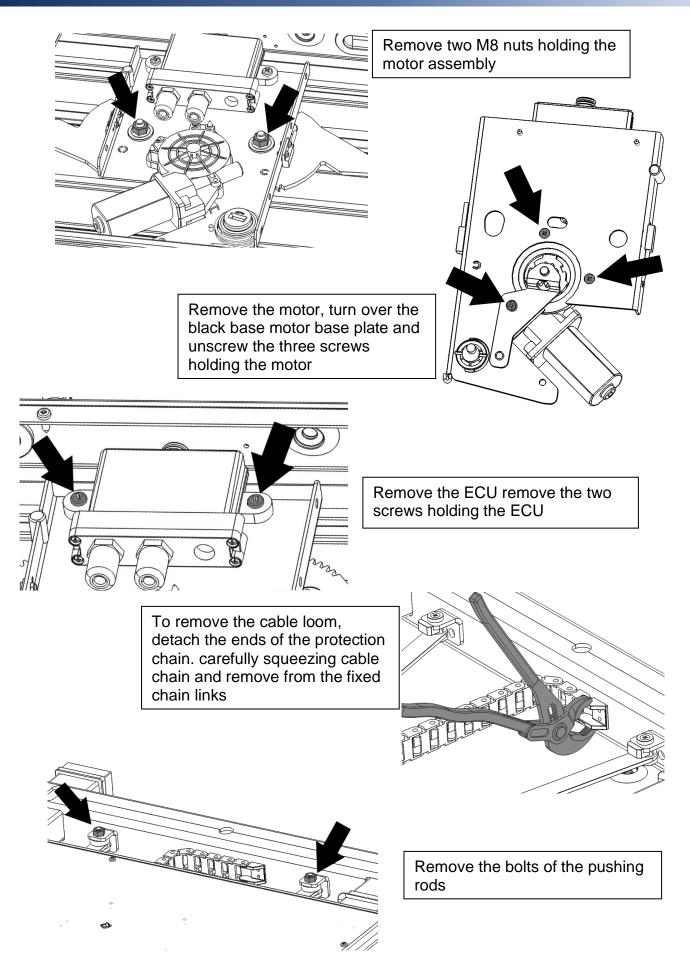
### 10.1 Disassembly



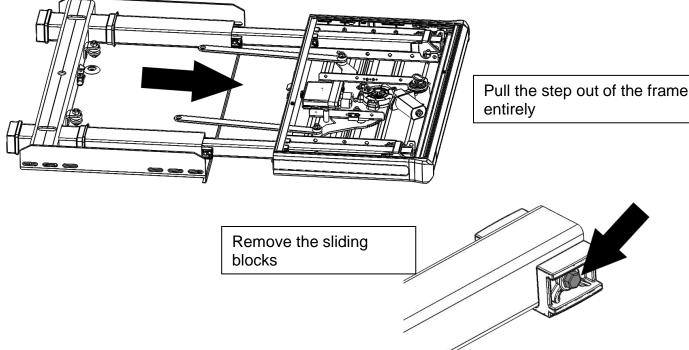












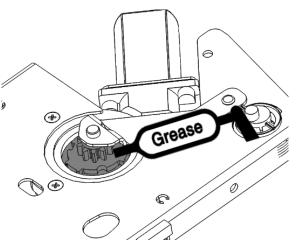
### 10.2 Assembly

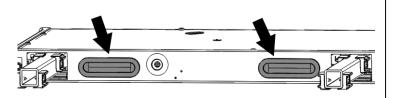
Most of the assembly is just the reverse version of the disassembly described above, however there are some points to note, these are described below

When putting the motor back in place

- Put a firm bit of grease at the gear.
- Place the nylon washer at the gear and place the reinforcement plate.
- Let the motor run and check the Amps. Nominal 2,5 Amp - max 2,8 Amp

Fit the two Magnetic switches at the motor base plate. Motor assembly is now ready for final assembly.

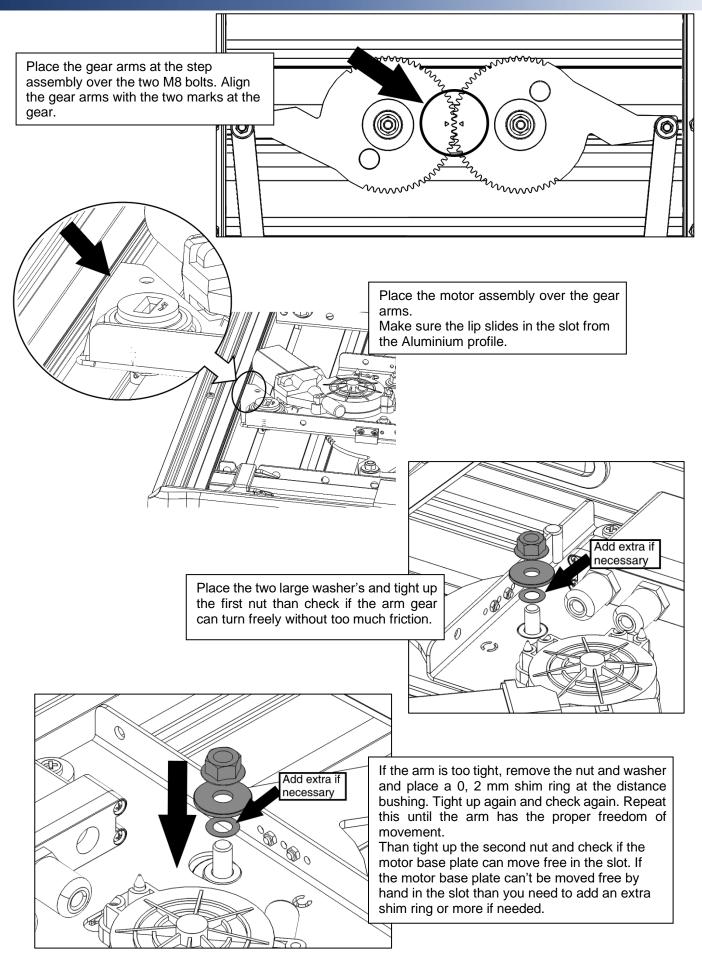




When placing the two round rubber grummets in the opening of the rear step profile, Use liquid soap to make the job go easy.

Take the two arm gears; take a paint brush with a firm bit of grease. Grease the gears from the gear arms. Put grease at the nylon rings and place them at the gear arms. Slide the distance bushing in the nylon rings.





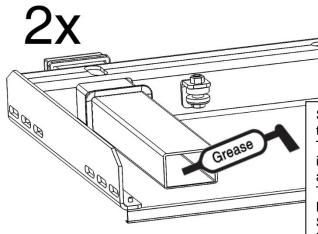


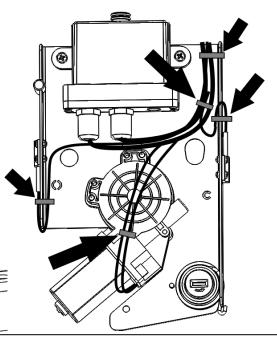
After that both turning points have been adjusted connect to power again and let the motor run in both directions. Motor current must be below 3 Amp.

Strap electric cable loom

Connect the 5 straps at the points for fixation.

Now the step assembly is ready for final assembly



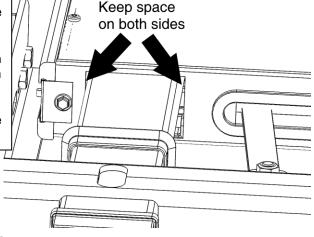


Slide a sliding assembly with 4 sliding shoes through the tube and check if it runs free. Take a long small paint brush and grease the tube inside at the front and the rear. Place the welding assembly upside down at a table and fixate it. Take the step assembly and slide it in the chassis. Make sure the push rods are completely retracted. Slide the assembly a few time's in and out, feel if it runs free. Then slide in

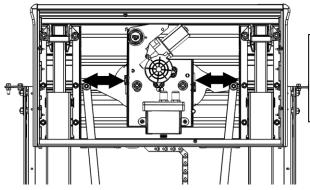
Check if the rear and front profile are aligned at the side.

Check if the tubes from the chassis in the holes in the rear profile are in the centre. The Aluminium must be free at least 1 mm from the steel tube

Check if the sliding chassis is in the centre of the tube at the front side.

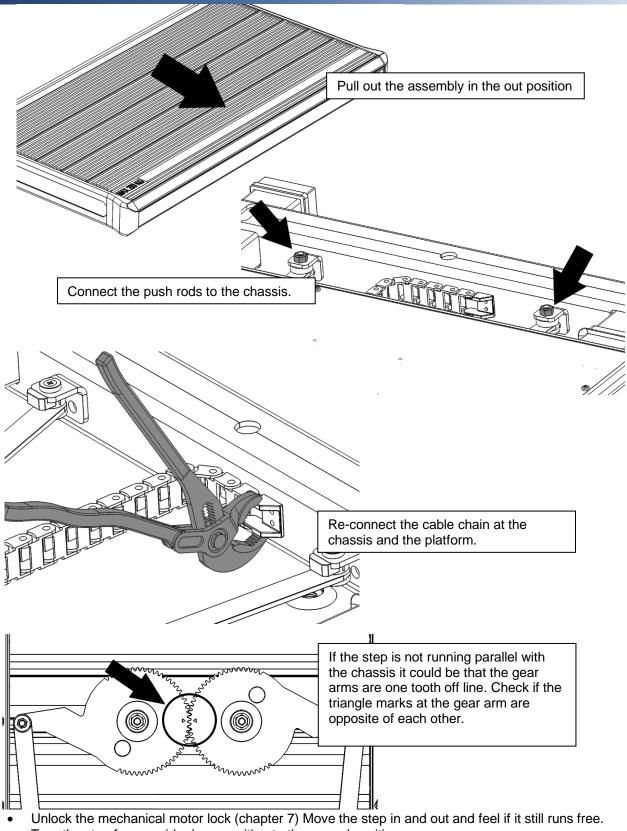


Make sure motor assembly is exactly in the middle



Loosen the two nuts from the motor assembly. Adjust the motor assembly to the centre of the step. Measure from the left and right sliding bar from the sliding assembly.

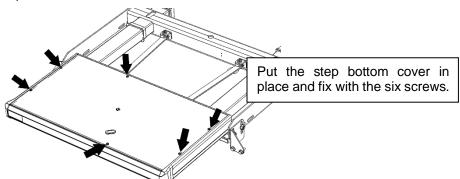




- Turn the step from upside down position to the normal position.
- Connect the cable loom to the power source and let the step move in and out by the motor.
- In closed position the step should stay on the plastic end lock of the sliding assembly and the tube's of the chassis.
- Let the step run in and out and check the motor current. Ideally the step should move in and out with a motor current below 4 amps. Maximum allowed motor current in this situation is 4,5- 5 Amp.
- If motor current is above max Amp check if any parts are colliding during the movement of the step. Find the source of resistance and repair it.



- Turn back to upside down position.
- Check once more if al nuts and bolts have been tighten up to the right torque.
- Also check the screws from the magnetic switches.
- Check if al cables have been tight up properly and are free from moving parts. Check if the two cables for the LED are not tight between the motor housing and the aluminium step profile. This is a course of high motor Amps.



• Step is ready for operation again.

### 11 Failure search

Failure	Problem	Solution
Step makes a rattling noise before is close completely. Step sometimes doesn't move out	Close switch not working.	Replace close switch
Step makes a rattling noise before is close completely. Step sometimes doesn't move out	Motor lock mechanism not closed properly.	Put Screwdriver in the motor lock and turn it clockwise while step is moving in or out
Step does not come out when door is open	Hand brake not applied	Put the vehicle at the handbrake. This can only be the case when the step is installed with a handbrake interlock.
At the end of the out movement; step starts moving in and out.	Open switch defect.	Replace end switch.
Step does not move out.	Fuse burned.	Replace fuse . (20 Amp)
Step does not move out.	Step damaged by stroke from a curb stone or speed bump	Check for deformation in the mechanical system and repair / replace these.
Step does not move in when door is closed	Door switch broken:	Replace door switch.
Step does not move in when door is closed	Door switch not properly adjusted.	Check adjustment.
Step does not move in when door is closed	Magnet from door lock moved away from original position.	Place magnet back opposite door switch and secure with glue.
Step stops during movement and goes back and forward than stops.	Step is encountering an obstacle.	Remove obstacle. This can be dirt or ice inside the step.
Step does not move	Bad electrical contact.	Check cable loom and connectors
Step moves out and does not come back. Buzzer is making a fast beep	Close switch broken	Replace close switch.



### **11.1 Fault action and sound and light indication**

- Limit switch failure: buzzer and dashboard led alarm on mode 5
- Action limited time protection:
  - 1) Step retraction timeout: buzzer and dashboard led alarm on mode 0
  - 2) Step extension timeout: buzzer off and dashboard led constantly on
- Encountering obstacles when starting extension at the minimum position, experienced 3 times retries and still failed finally: buzzer and dashboard led alarm on mode 1
- Encountering obstacles in extending process, experienced 3 times retries and sill failed finally: the buzzer is muted and the dashboard led is constantly on
- Encountering obstacles when starting retraction from maximum position, experienced 3 times retries and still failed: buzzer and dashboard led alarm on mode 3
- Encountering obstacles during stowing, experienced 3 times retries and still failed: buzzer and dashboard led alarm on mode 4

### **11.2 Alarm indication Wake function**

Sequence Number Buzzer Alarm Control	Alarm mode:
0	"Beep-beep-beep" is a group of four short beeps, cyclic alarm
1	"Beep-beep-beep" is a group of two short sounds and one long sound, cyclic alarm
2	"Beep-beep-beep " is a group of four short beeps and one long beep, cyclic alarm
3	"Beep-beep-beep " two short beeps and two long beeps in one group, cyclic alarm
4	"Beep-beep-beep " four short and two long sounds in one group, cyclic alarm
5	"Beep-beep-beep " high-frequency sounds for a few seconds, later "-beep-beep" nine long beeps, cyclic alarm



### **12 Certification**

# Certification

Product Type

### **Product description**

AXS STEP Electrical Sliding step AXS FL 600 A AXS FL 900 A

Company Address City Country Website Legal represented by

#### Production under responsibility of Acdeos BV Touwbaan 1A 2352 CZ Leiderdorp Netherlands WWW.ACDEOS.COM Mr. A de Moes

#### Conformity

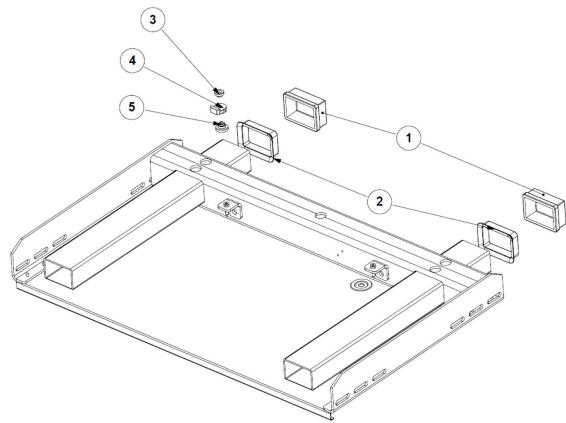
Product is designed, tested and produced confirm: The loading recommendations in the Machine directive 98/37/EG Step is tested for a maximum weight of 200 Kg

#### On behalf of producer: Name / Function A de Moes / Engéneering Date 15 September 2009 Place Leiderdorp, Netherlands



### 13 Spare parts

Chassis



Part	Part number
Rubber cap	S150 193
Rubber seal	S150 192
Distance piece	S150 119
Fixation point rear	S150 115
Turning point	S150 114
	Rubber cap Rubber seal Distance piece Fixation point rear

The turning- fixation- and distance pieces can be replaced with the newer S150 01 046 (page 25)

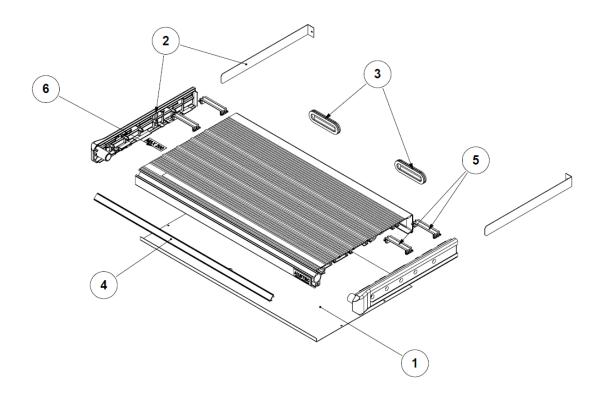




item	Part	Part number	
1	Mounting parts	S150 01 001	
2	Mounting bracket right	S130 01 004	
3	Mounting bracket left	S130 01 005	

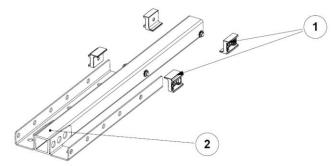


Step assembly



item	Part	Part number
1	Bottom cover 600 mm	S150 207
1	Bottom cover 900 mm	S150 226
1	Bottom cover 1000 mm	S150 231
2	End cap kit	S150 01 037
3	Rubber grummet	S150 014
4	Front edge black 600 mm	S150 187
4	Front edge black 900 mm	S150 223
4	Front edge black 1000 mm	S150 232
5	Sliding part	S150 206
6	Max weight sticker	S150 202

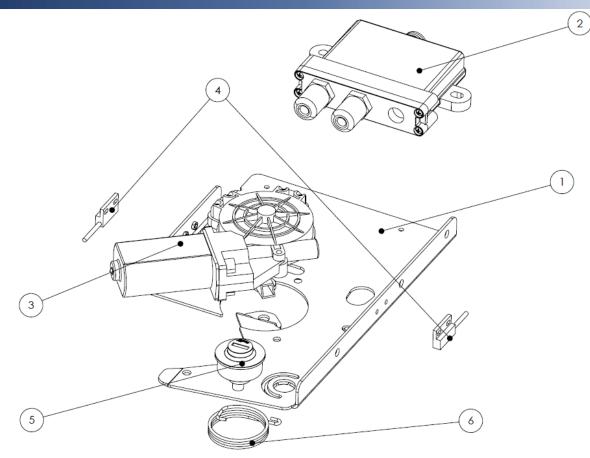
Sliding assembly



item	Part	Part number
1	Sliding shoe	S150 216
2	Sliding chassis	S150 01 022

Motor assembly

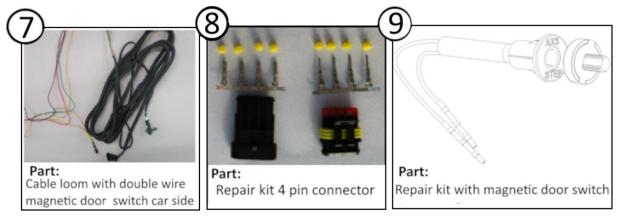




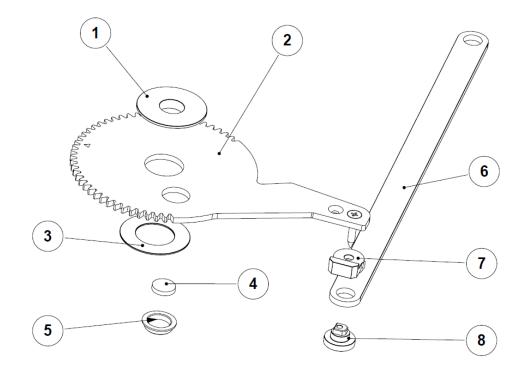
item	Part	Part number
1	Motor base plate	S150 220
2	ECU replacement + int cable loom	S150 293
3	Motor	S150 101
4	Magnetic switch	S132 016
5	Ex centre part	S150 166
6	Lock spring	S150 165

#### Cable loom parts

item	Part	Part number
7	Cable loom with double wire magnetic door switch Car side	S150 001 - 2
8	Repair kit 4 pin connector	S150 019
9	Repair kit with magnetic door switch	S150 01 016

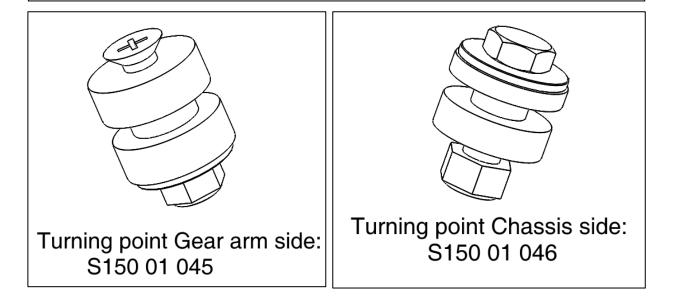






item	Part	Part number	
1	Washer	S150 039	
2	Gear arm	S150 208	
3	Ring	S150 042	
4	Magnet	S150 151	
5	Nylon magnet holder	S132 017	
6	Push rod	S150 116	
7	Fixation point rear	S150 115	
8	Turning point	S150 114	

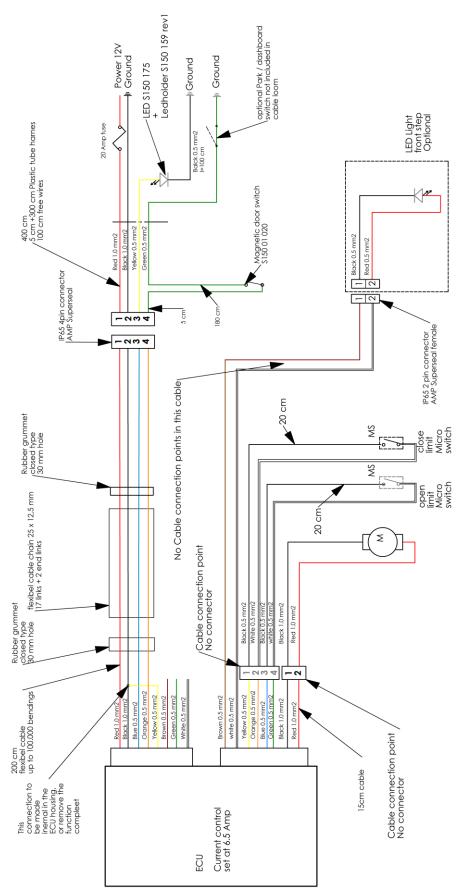
# Old (S150 114 and S150 115) and new (below) turning points are interchangeable.





### Appendix 1;

Electric schedule serial number < 11000

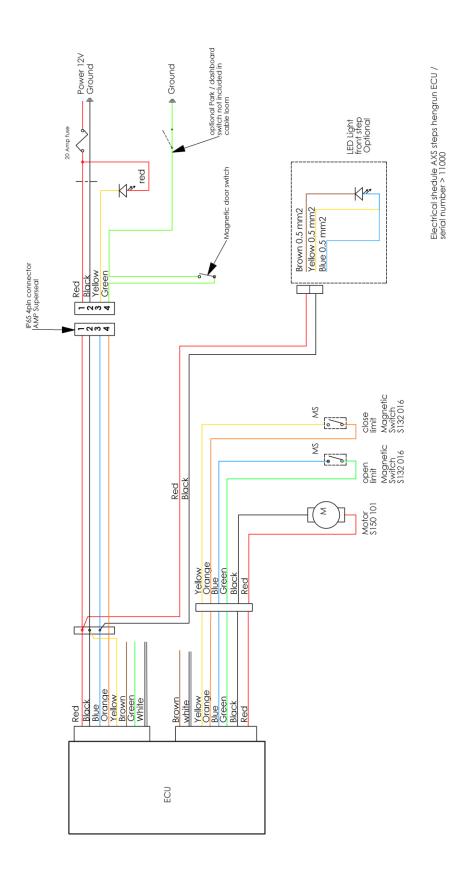






### Appendix 1 a;

Electric schedule serial number > 11000





Appendix 2; Installation drawings: AXS FL600A, AXS FL900A

