



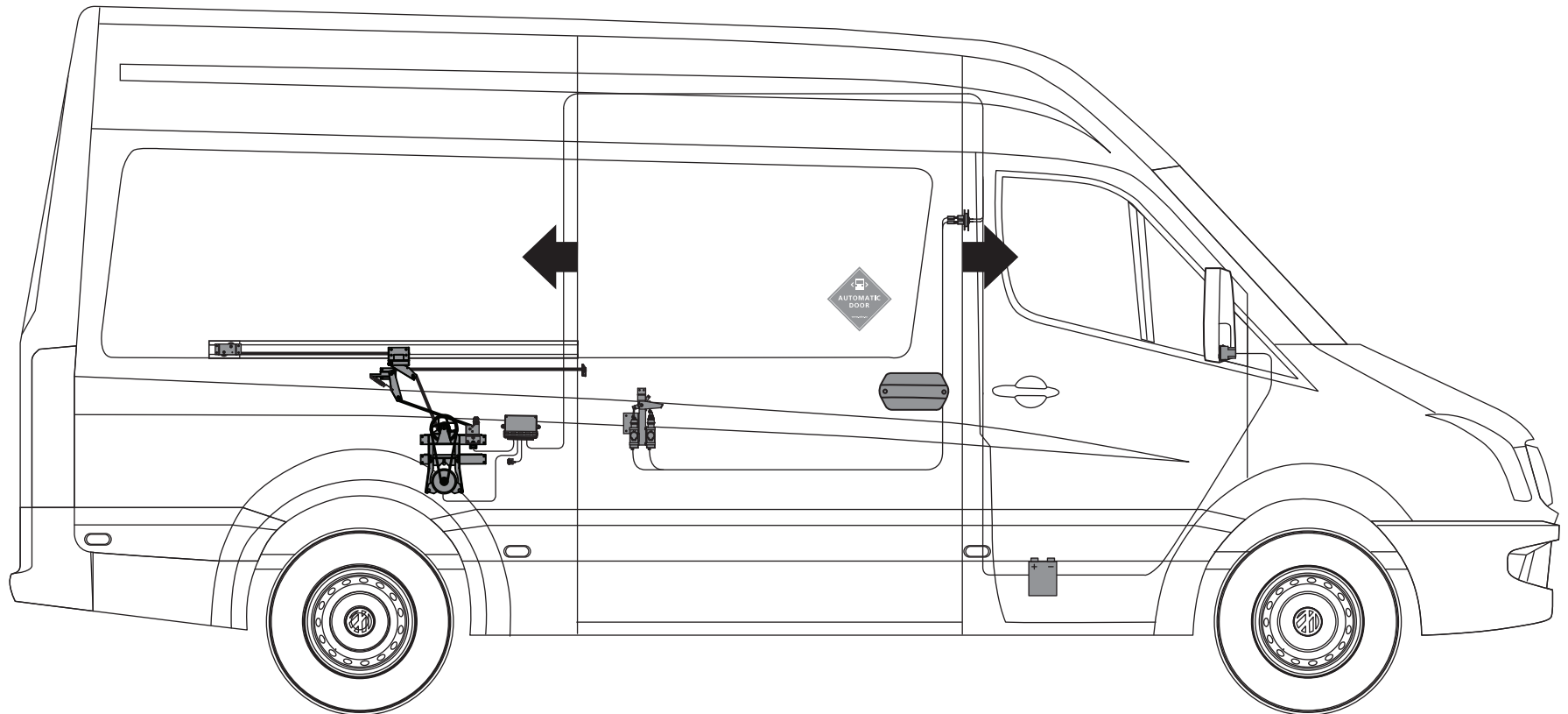
automatic
doors



TROC - CABLE DOOR OPENER

INSTALLATION MANUAL

MERCEDES SPRINTER (906) / VOLKSWAGEN CRAFTER



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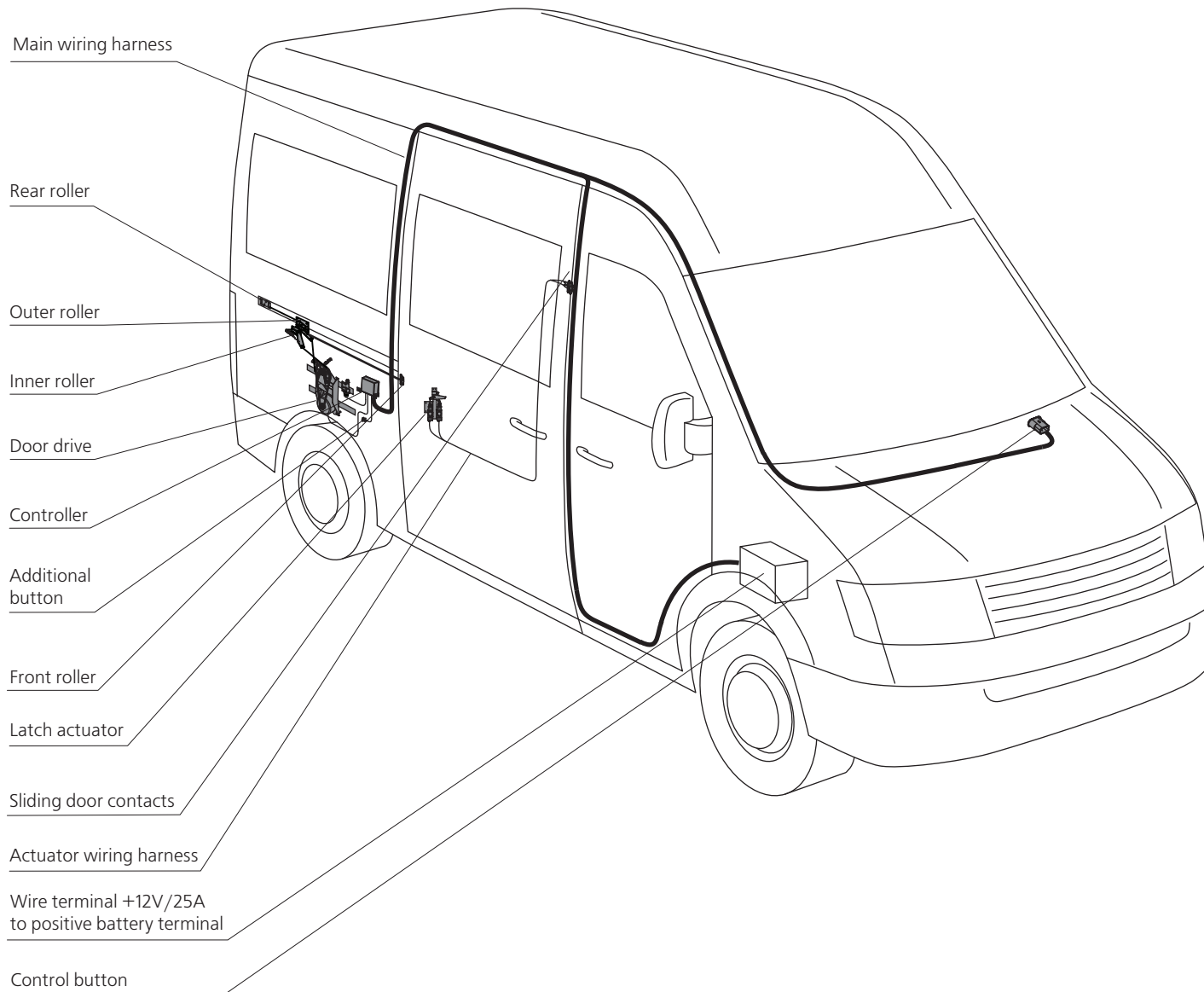
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The layout of the drive units is shown on the base of Volkswagen Crafter minibus. The layout for Mercedes Crafter (906) is analogous.

**NOTE**

This manual describes the installation of the cable-operated drive with the widest range of drive units. If you install the cable-operated drive without any options then you have to omit the corresponding items of our manual.











SPEC CHARACTERISTICS:

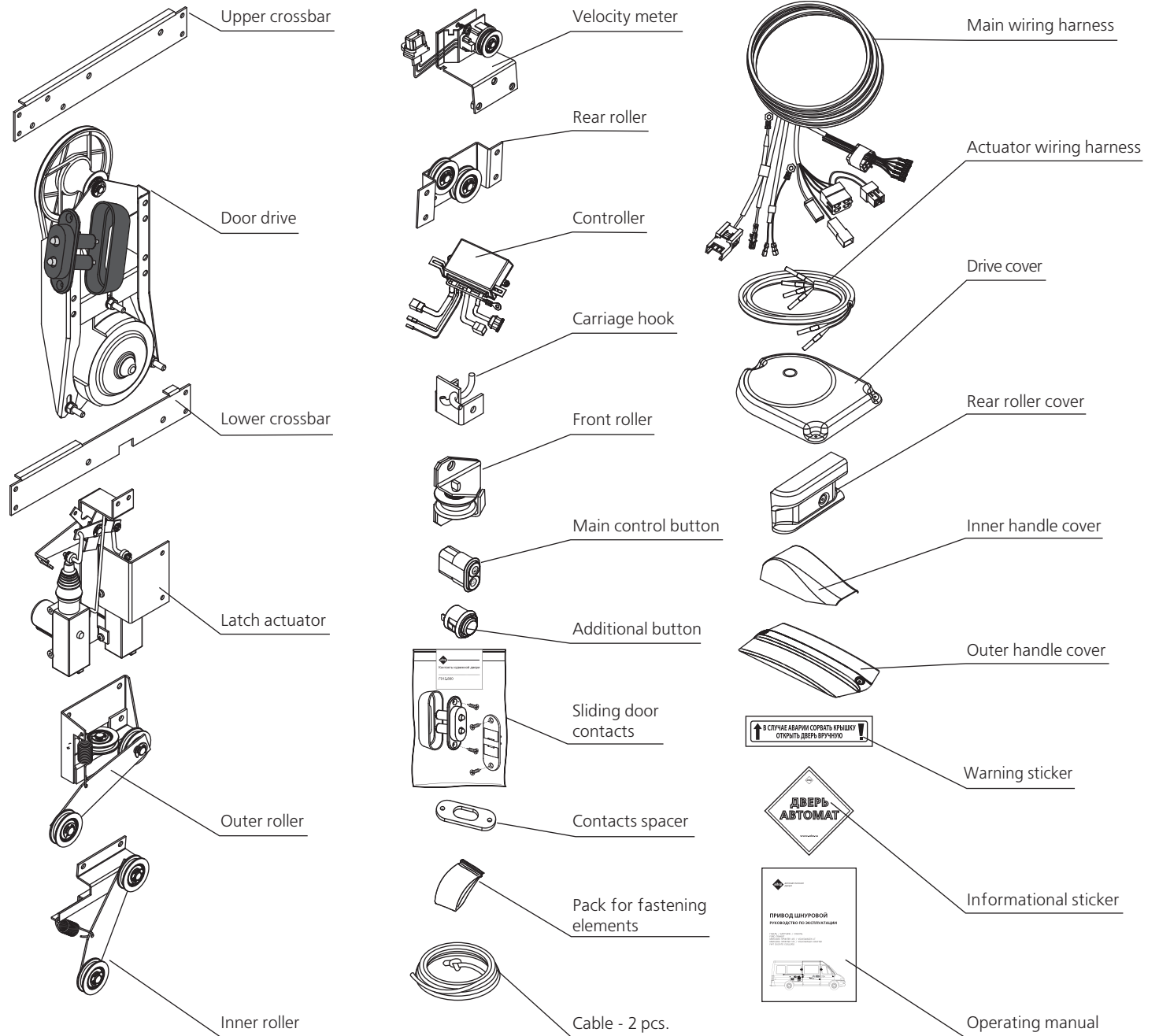
Power consumption (max), watt	150
Door-opening time, sec	1,2-3
Door-closing time, sec	1,5-3
Ambient temperature range, °C	from -40 up to +40
Performance (nominal)	500 cycles per 24 hours

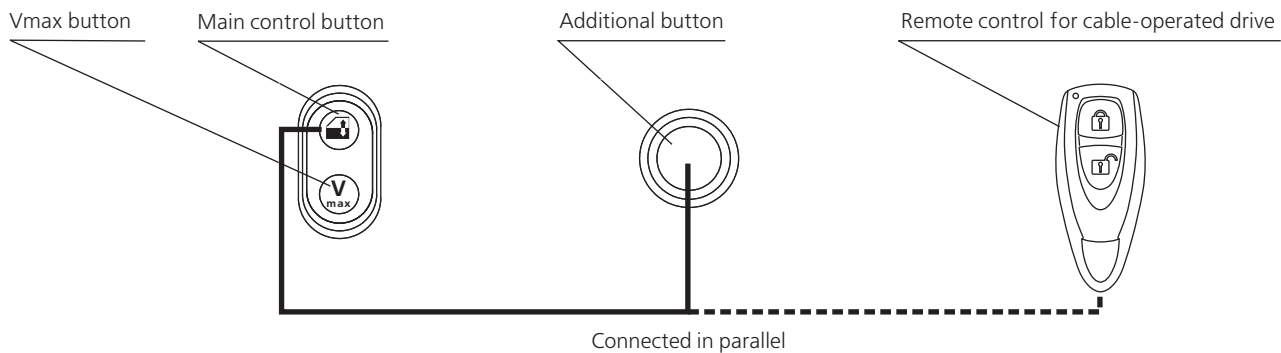
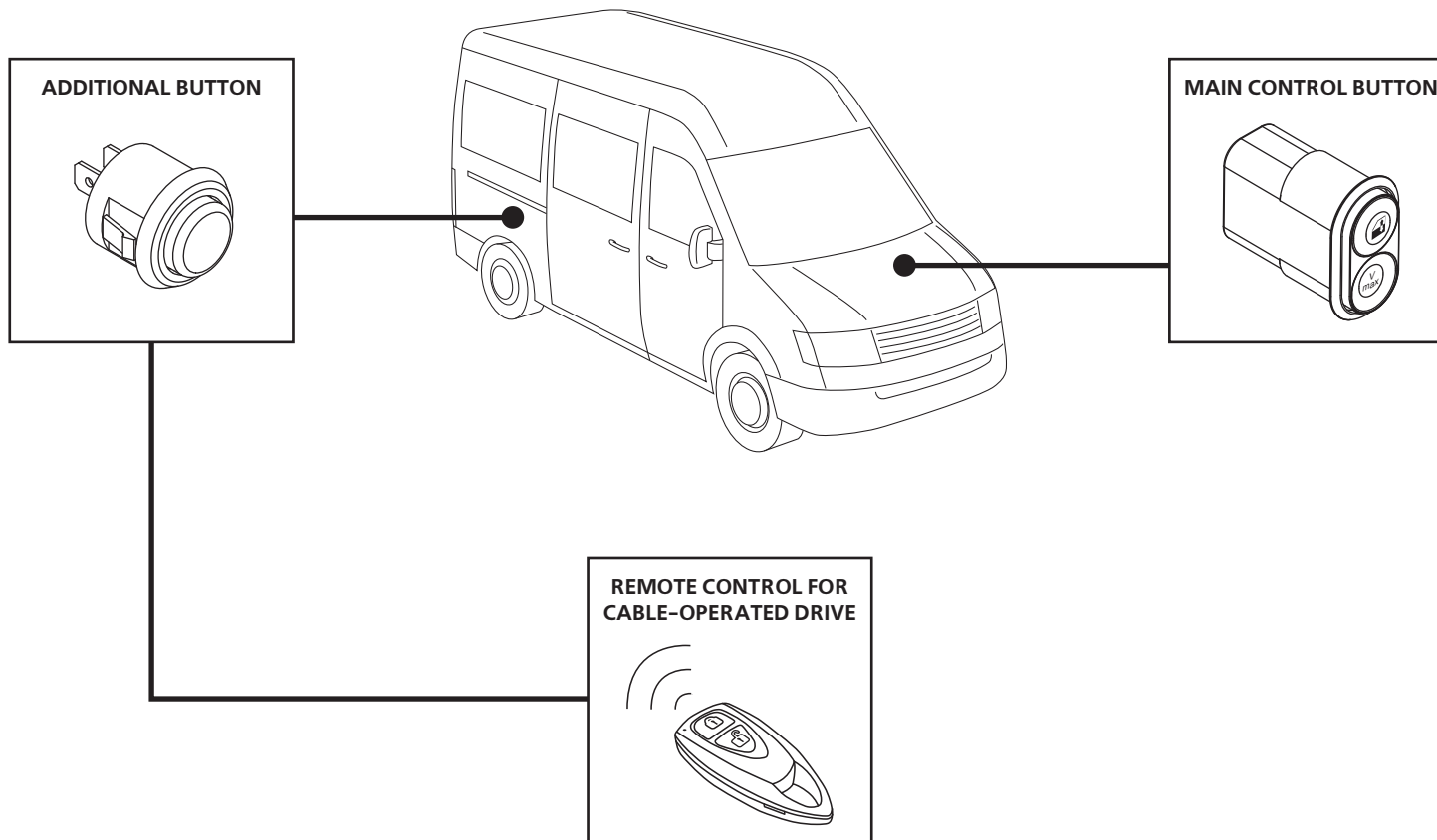
**NOTE**

Durability and failure-free operation of the manufacturer's drive depend directly on the quality of installation. That is why installations are performed in the specialized dealership centres of the manufacturer.

Fastening elements:

-  Self-tapping screw 4,2x16 - 7 pcs.
-  Bolt M6x14 - 9 pcs.
-  Toothed washer - 2 pcs.
-  Spring washer $\Phi 6$ - 7 pcs.
-  Nut M6 - 2 pcs.
-  Fuse 30A - 1 pcs.
-  Door hook - 1 pcs.
-  Shoe - 1 pcs.
-  Rivet 4,8x12 - 11 pcs.
-  Rivet 4,8x8 - 21 pcs.





1.3.1 OPERATION, CONTROLS

The manufacturer's drive is an electromechanical device powered from electric battery of a minibus. The drive consists of 2 parts: a latch actuator and a sliding door drive. The latch actuator opens its latch, the sliding door drive opens and closes its door. The drive is controlled with the help of:

- **Main control buttons**

These buttons are designed for controlling the door and system adjustment.

- **Vmax buttons**

These buttons are designed for switching Vmax function.

- **Additional control buttons**

These buttons are used only for adjustment after installation.

- **Remote control**

It is used for controlling the door.

All these buttons are connected in parallel, that is why there is no difference which one is used. The result will be the same.

1.3.2 FUNCTIONS OF THE DRIVE

- **Opening and closing**

Push a main control button or an additional button or a remote control momentarily in order to open or close the door.

- **Automatic rollback**

When encountering an obstruction, the door stops and comes back automatically.

- **Stopping**

Push the main control button or the additional button or the remote control momentarily in order to stop the door while it is moving.

- **Beep**

It accompanies the drive operation.

- **Adjustment of closing speed and opening width.**

It is adjusted with the main control button or the additional button. (The detailed instruction is given on page 8).

- **Vmax function**

It is used to close the door with maximum speed.

1.3.3 DOOR CONTROL

The door is controlled with the main control button, additional button and remote control. Push one of these buttons momentarily to open or close the door. They are connected in parallel. The additional button is used to adjust the door drive after installation. It is hidden under side panel trim.

The door starts moving after releasing the button. It is enough to hold the button pressed for 0,2-0,5 sec. The system will determine the direction of the door movement on its own provided that whether it is open or closed.

1.3.4 HOW TO CANCEL THE PROCESS OF OPENING/CLOSING

If you decide to cancel the process of opening or closing and you have already pushed the button, keep the button pressed for 2-2,5 sec. till it beeps. Then, release the button. The process will be cancelled.

1.3.5 STOPPING

If you want to stop the door when it is moving, push the button momentarily. When opening the door, it will be stopped. When closing the door, it will be stopped and returned back.

1.3.6 Vmax function

This function is used when there is an inclination and the door can not be closed completely with the ordinary speed.

Start closing the door and while it is moving, push and hold Vmax button. While you are holding the button, it moves with the highest speed.

!
NOTE
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Speed of closing and opening width must be adjusted before operation. The detailed description is on page 8.

1.3.7 OPERATING SAFETY

Drive installation is connected with some modification of minibus body. The parts of the body are mainly made of sheet metal that is why there is a great danger of getting injured for the reason of sharp edges appeared after modification, or because of the movable parts of your hand cutting tools. Observe safety regulations while installing the drive, provide adequate cleanness inside the bus. Arrange all the units and tools before assemblage, remove unnecessary things.

Failure-free operation and drive durability depend upon your observance of the installation instructions and also upon the correct positional relationship of the units and components. All the surfaces should be thoroughly marked before making mounting holes. Inspect the positional relationship of the units and components. Having fixed the unit, check up its location.

The drive is an electromechanical device thus one must observe electricity safety rules. Switch off the power before wiring harness laying. Keep contacts clean, failure-free operation and reliability depend on it.

1.3.8 LIST OF TOOLS

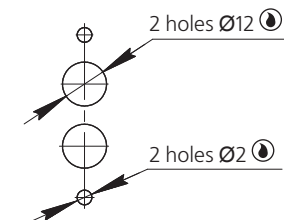
Hammer 500gr.....	1 piece
Center punch 120mm.....	1 piece
Round file 15x200	1 piece
Flat file 200mm	1 piece
Blade screwdriver.....	1 piece
Cross-slotted screwdriver.....	1 piece
Hand saw for metal.....	1 piece
Scriber.....	1 piece
Sliding calipers.....	1 piece
Tape line (not less than 1,5m).....	1 piece
Power drill (400watt or more).....	1 piece
Riveter (up to Ø 8 mm)	1 piece
Knife.....	1 piece
Angle grinder.....	1 piece

A bundle of steel wire is also required with diameter not less than Ø0,5 mm and length not less than 2 m as well as insulation tape with width not less than 10 mm (The usage of paper or transparent Scotch tape is prohibited.). You also need a kit of drills with diameter: Ø2 mm, Ø5 mm, Ø6,5 mm, Ø 12 mm, Ø16 mm.

There may appear some edge fin after making holes, finally it leads to the damage of the paint coat. There are symbolic notations on the places where some treatment is required:

- ☹ – Remove edge fin
- ☹ – Unedge
- ☹ – Treat with acid-free antirust liquid

For example, the indicated holes must be treated with antirust liquid





Adjust the drive only when the bus engine is on.

1.4.1 CLOSING SPEED ADJUSTMENT



One can adjust only closing speed. Opening speed is maximum and the same.

- Push and hold the main control button for 10 sec., release it after two beeps.
- Push the main control button momentarily to start closing or opening.
- In order to make speed higher one must push the main control button several times while opening the door. Each push increases speed gradually.
- In order to make speed slower one must push the main control button several times while closing the door. Each push reduces speed gradually.



Change parameters only while moving the door.

- In order to save the chosen speed, push and hold the main control button. Wait for 2 beeps (the first beep sounds when you have just pushed the button, the second beep sounds in 2-2,5 seconds). Then release the button and wait for a continuous beep. It means that your parameters are saved. The other way is not to push any buttons for 25 seconds. In this case your parameters are saved automatically.

1.4.2 ADJUSTMENT OF OPENING WIDTH

- Push the main control button and hold it for

20 sec. till triple beep sounds.

- Push the main control button momentarily to start closing or opening.
- In order to increase opening width it is necessary to push the main control button while opening the door. Each push increases opening width gradually.
- In order to decrease opening width it is necessary to push the main control button while closing the door. Each push decreases opening width gradually.



Change parameters only while moving the door.

- In order to save the chosen opening width, push and hold the main control button. Wait for 2 beeps (the first beep sounds when you have just pushed the button, the second beep sounds in 2-2,5 seconds). Then release the button and wait for a continuous beep. It means that your parameters are saved. The other way is not to push any buttons for 25 seconds. In this case your parameters are saved automatically.

When opening the door the adjustable parameter value is increased by one step (4% of maximum value) with each button push. It is accompanied with a short beep.

When closing the door the adjustable parameter value is decreased by one step (4% of maximum value) with each button push. It is accompanied with a short beep.

The process of opening and closing the door is the same for setting mode and for operating mode.

The difference is only in beeps. The movement of the door is not accompanied with beeps in setting mode. Besides, stopping function, automatic rollback function are switched off in setting mode.



The remote control is not used for the drive adjustment.

2.1 DOOR ADJUSTMENT

Adjust bus door before drive installation. Door adjustment influences drive operation.

2.1.1 Wash carriage guides with gasoline and wipe with dry cleaning cloth. Apply WD-40 lubricant on guides.

2.1.2 Wash door latch with gasoline, make it dry and apply WD-40 lubricant.

2.1.3 Remove door tenons.

2.1.4 Adjust door position relative to door aperture (it is adjusted with carriages). Closed door should not sag or be too tight.

2.1.5 Adjust tenon of the latch on the rear doorway pillar in such a way that the door closes with minimum possible speed.

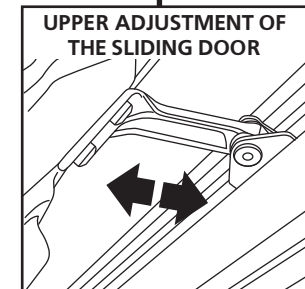
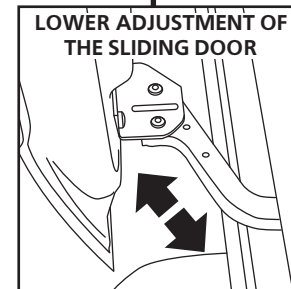
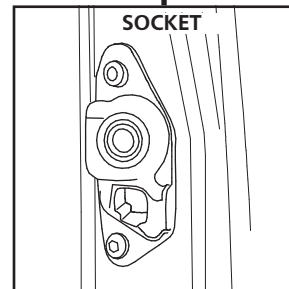
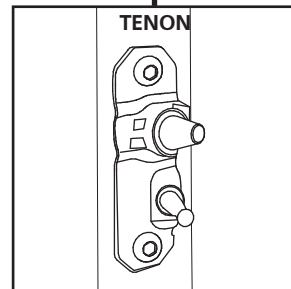
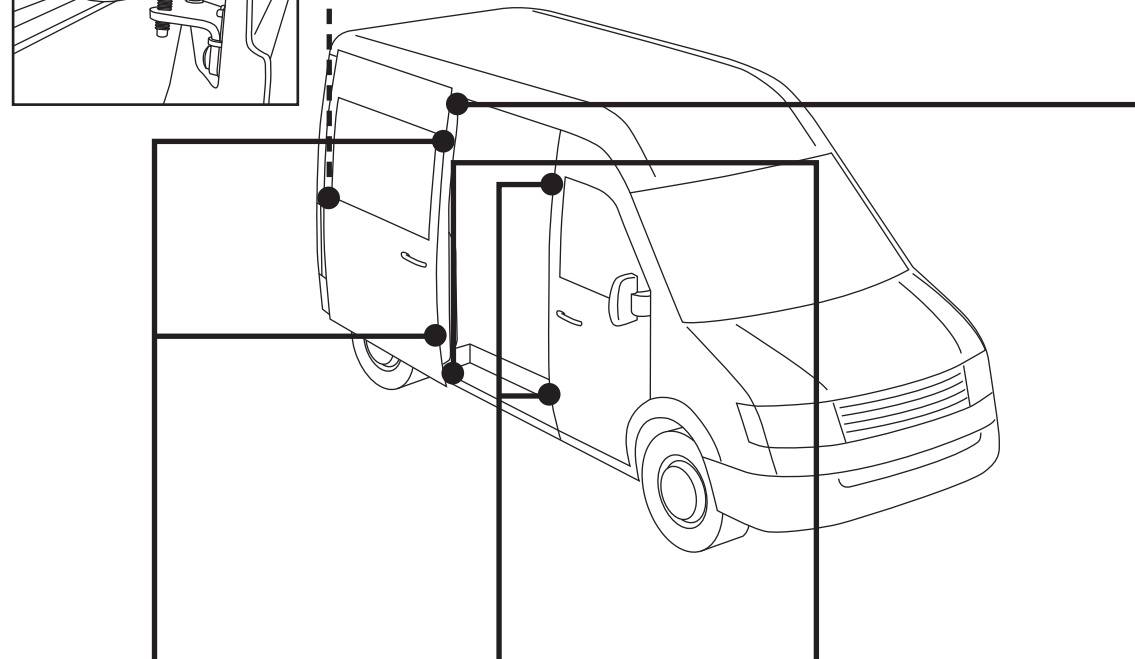
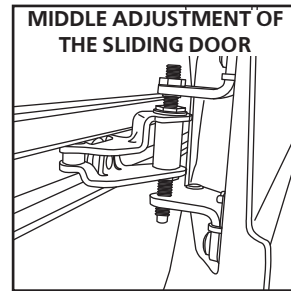
2.1.6 Check up sealing of the door aperture when the door is closed. It should not be too compact. Otherwise remove sealing in the too compact places and bend edge.

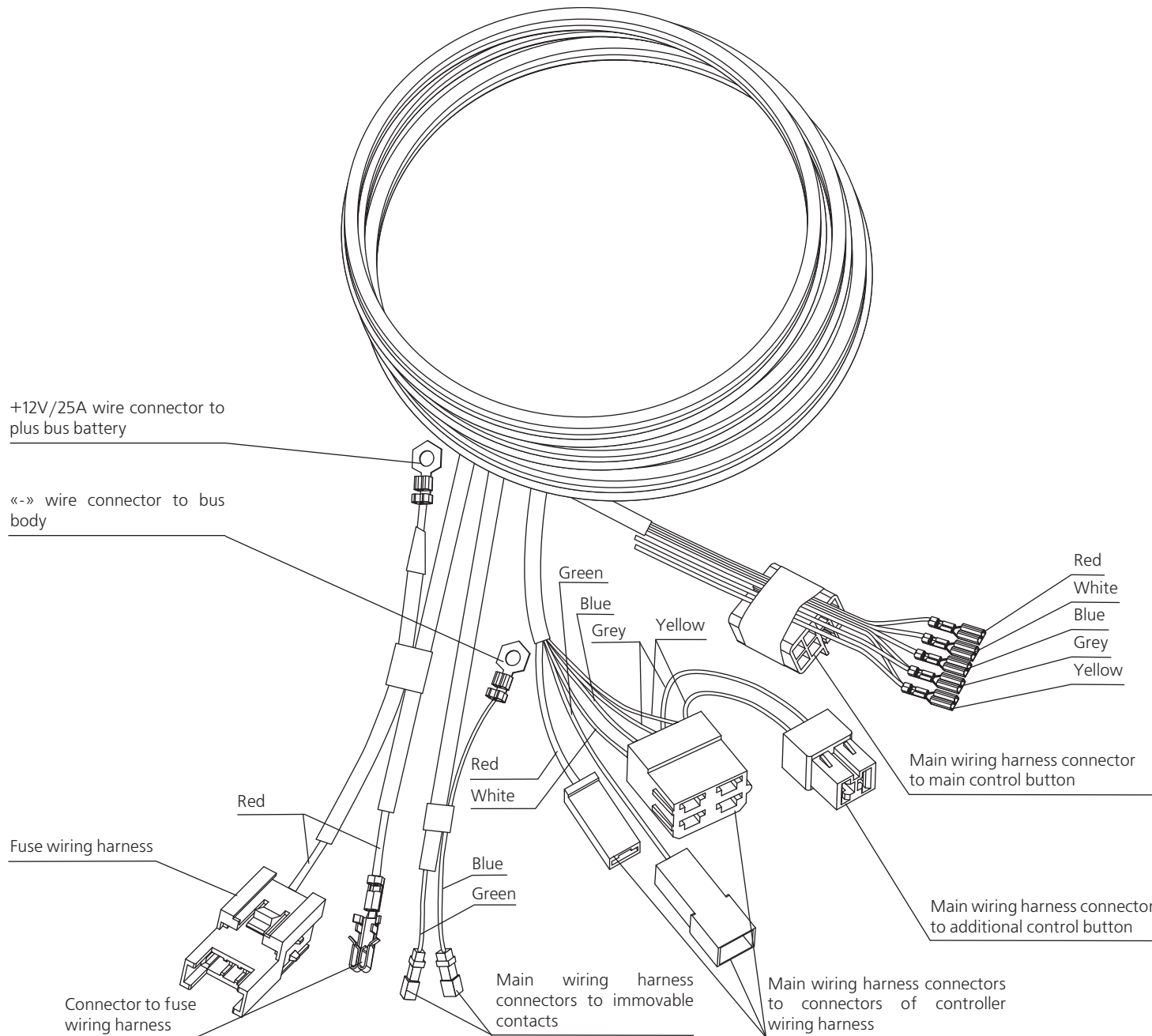
2.1.7 Install tenons of the door, adjust positions of the tenons.

2.1.8 Open and close the door when the bus is motionless.

2.1.9 Sliding door holders should be placed correctly and have no damages. Do not use minibus without holders or with damaged sliding door holders.

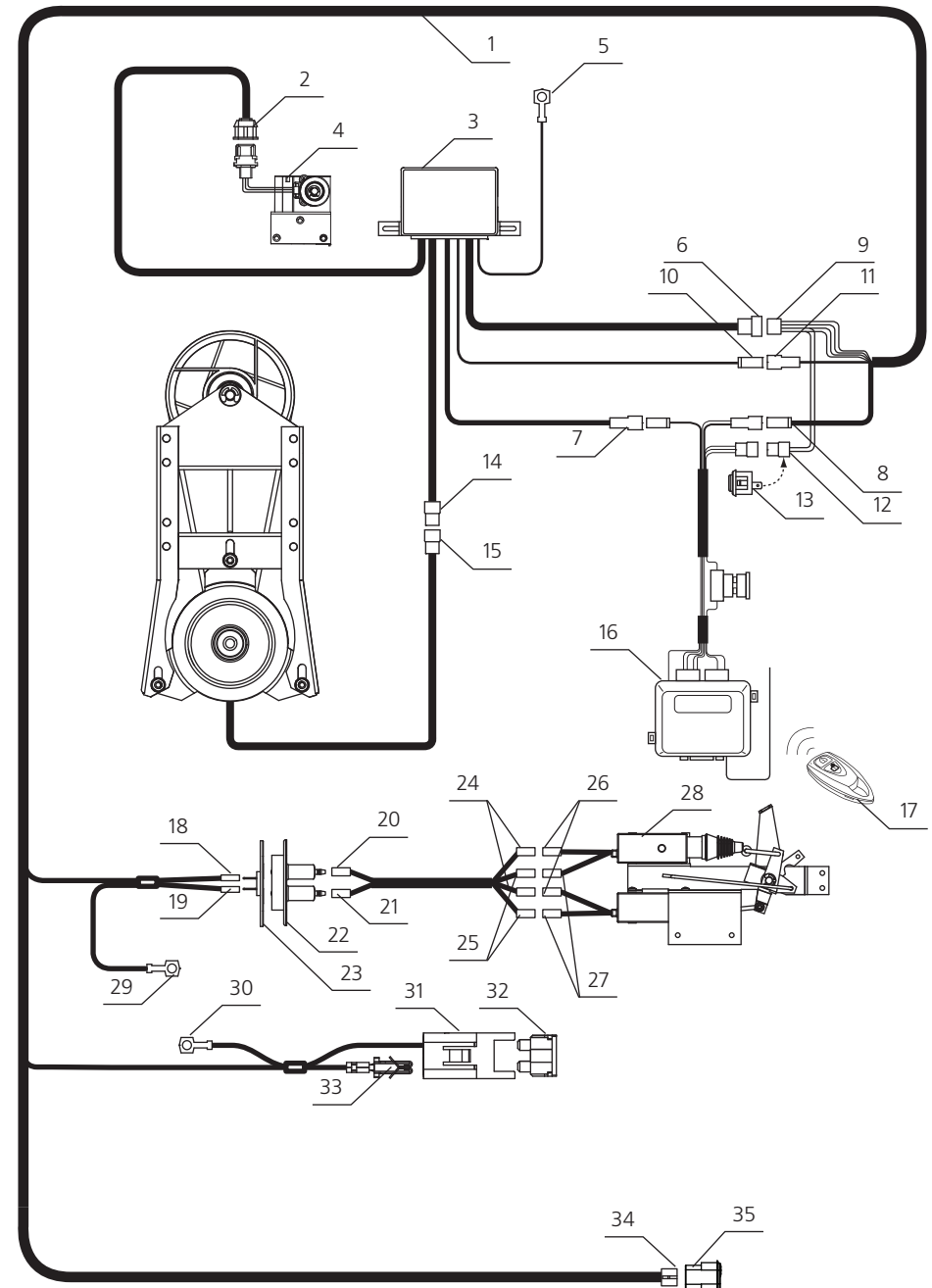
2.1.10 Check up upper, middle and lower door adjustments. Door must close and open freely without any jerks. The door adjusted correctly must have the same gaps.

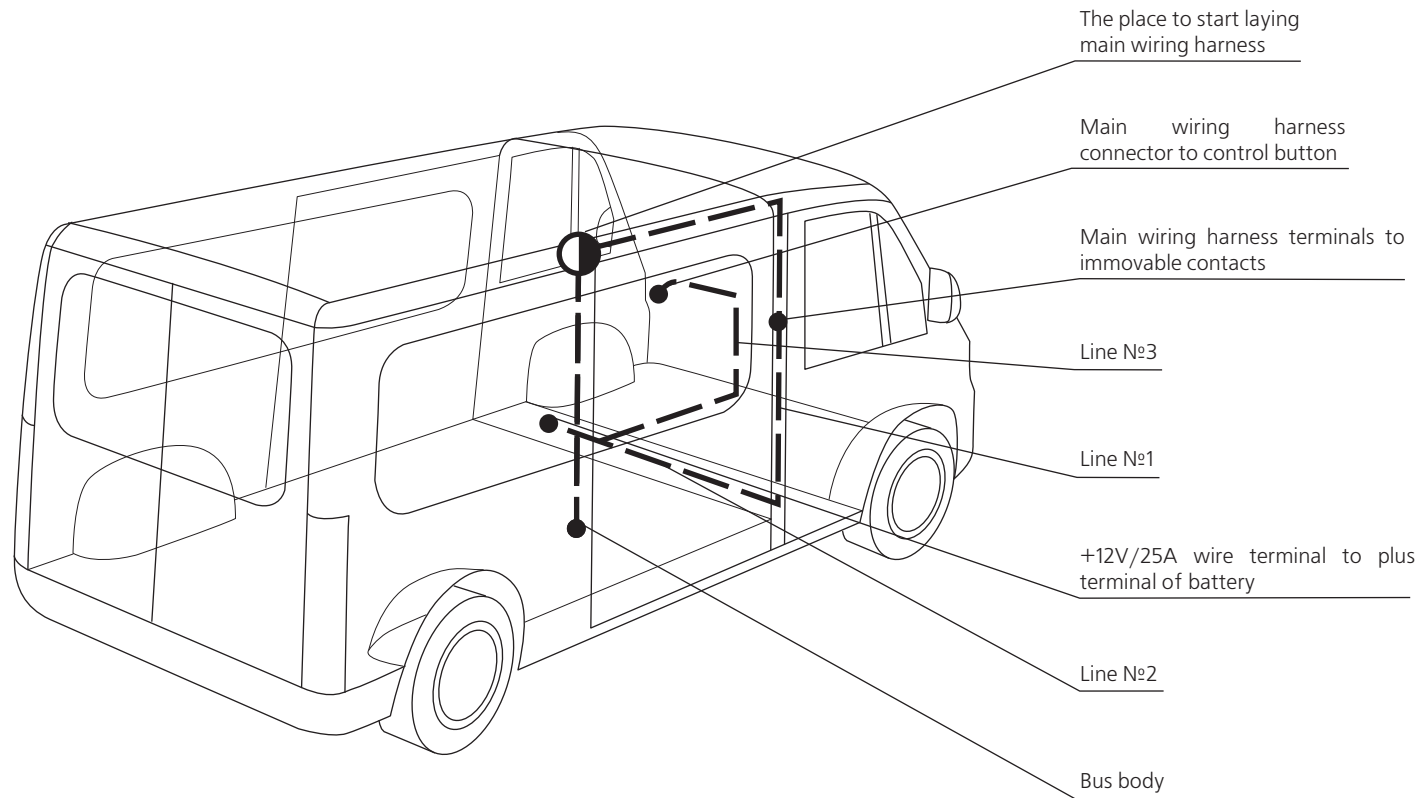




Connect the drive with electric circuit of the bus using the main wiring harness. Check the operation of the drive before installation.

1. Main wiring harness
2. Controller wiring harness connector (grey, green and red wires) to ratemeter connector 4
3. Controller
4. Ratemeter
5. «-» grey negative wire terminal to minibus body
6. Controller wiring harness connector (grey, white, yellow and red wires) to main wiring harness connector (white, blue, 2 grey and 2 yellow wires, 9)
7. Controller wiring harness connector (red wire) to main wiring harness connector (red wire, 8)
8. Main wiring harness connector (red wire) to controller wiring harness connector (red wire, 7)
9. Main wiring harness connector (white, blue, 2 grey and 2 yellow wires) to controller wiring harness connector (grey, white, yellow and red wires, 6)
10. Controller wiring harness connector (red wire) to main wiring harness connector (green wire, 11)
11. Main wiring harness connector (green wire) to controller wiring harness connector (red wire, 10)
12. Main wiring harness connector (yellow and grey wires) to additional control button 13
13. Additional control button to main wiring harness connector (yellow and grey wires, 12)
14. Controller wiring harness connector (blue and grey wires) to wiring harness connector of the door drive (black and blue wires, 15)
15. Wiring harness connector of the door drive (black and blue wires) to controller wiring harness connector (blue and grey wires, 14)
16. Remote control of the cable-operated drive
17. Remote control device of the cable-operated drive
18. Green wire terminal of main wiring harness to immovable contacts 23
19. Blue wire terminal of main wiring harness to immovable contacts 23
20. Green wire terminal of actuator wiring harness to movable contacts 22
21. Blue wire terminal of actuator wiring harness to movable contacts 22
22. Movable contacts
23. Immovable contacts
24. Green wire terminal of actuator wiring harness to green wire terminal of latch actuator 26
25. Blue wire terminal of actuator wiring harness to blue wire terminal of latch actuator 27
26. Green wire terminal of latch actuator to green wire terminal of actuator wiring harness 24
27. Blue wire terminal of latch actuator to blue wire terminal of actuator wiring harness 25
28. Latch actuator
29. «-» negative blue wire terminal to bus body
30. Positive red wire terminal +12V/25A to standard positive terminal of bus battery
31. Fuse wiring harness
32. 30A fuse
33. Red wire terminal of main wiring harness to fuse wiring harness 31
34. Main wiring harness connector (blue, white, 2 grey, red, 2 yellow wires) to main control button 35
35. Main control button to main wiring harness connector (red, white, blue, 2 yellow, 2 grey wires, 34)



**NOTE**

All cables shall be well protected and securely attached to avoid the possibility of cutting, abrasion or wear.

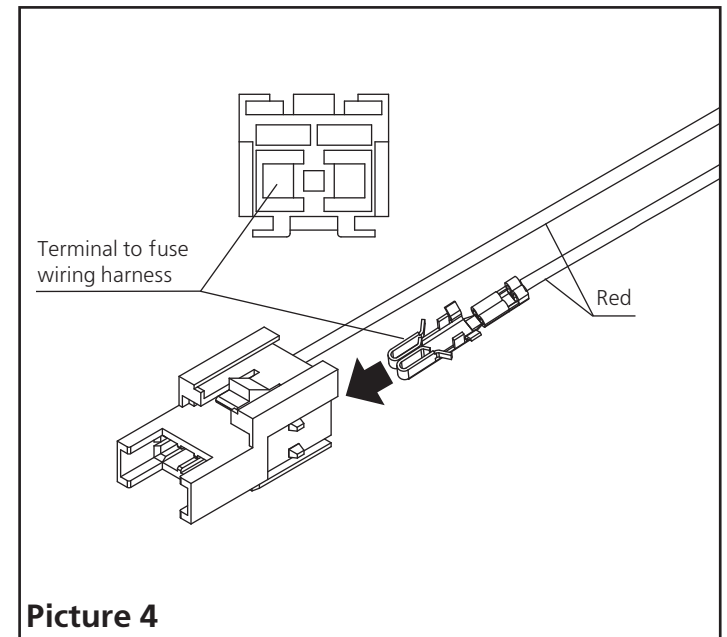
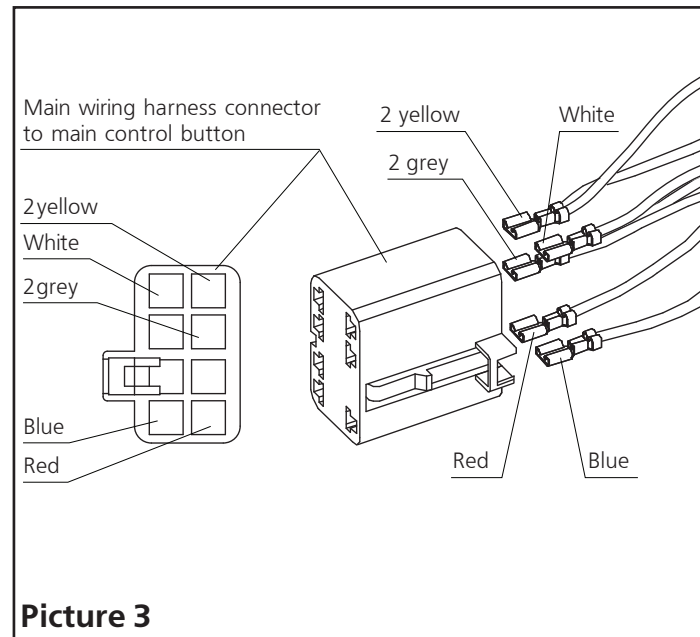
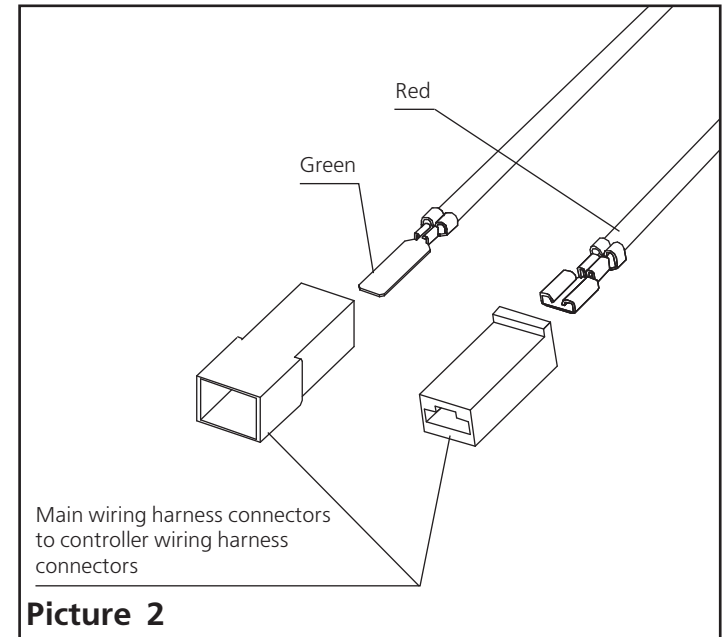
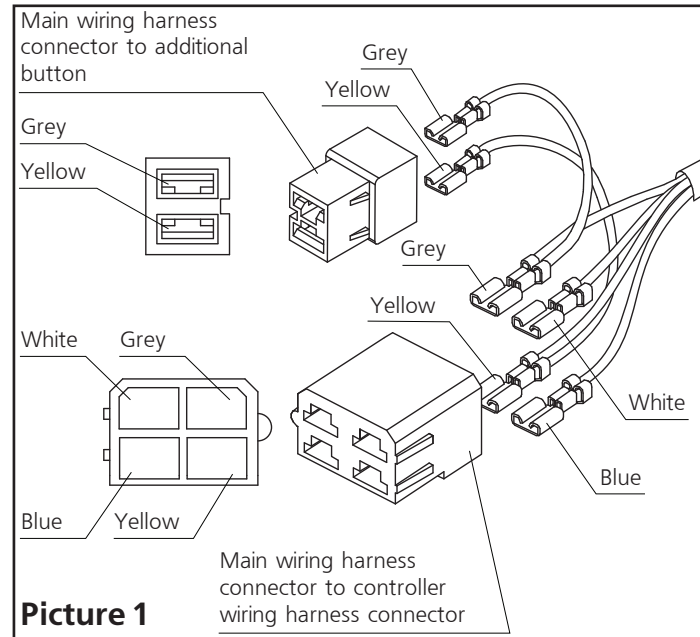
2.4.1 Use steel wire for laying main wiring harness in the hidden cavities. Main wiring harness layout is shown in the picture. While laying main wiring harness, be careful in order not to damage main wiring harness insulation.

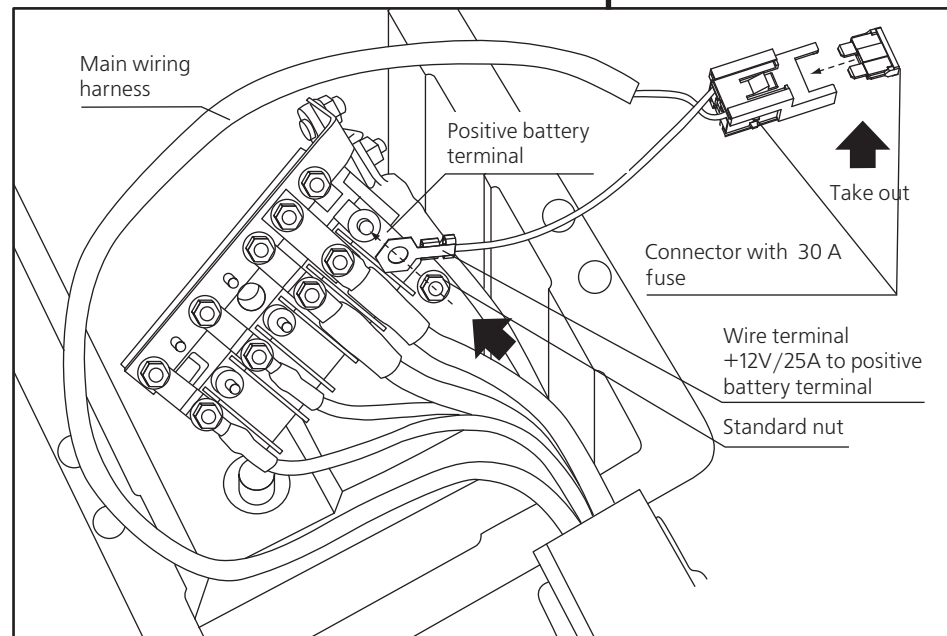
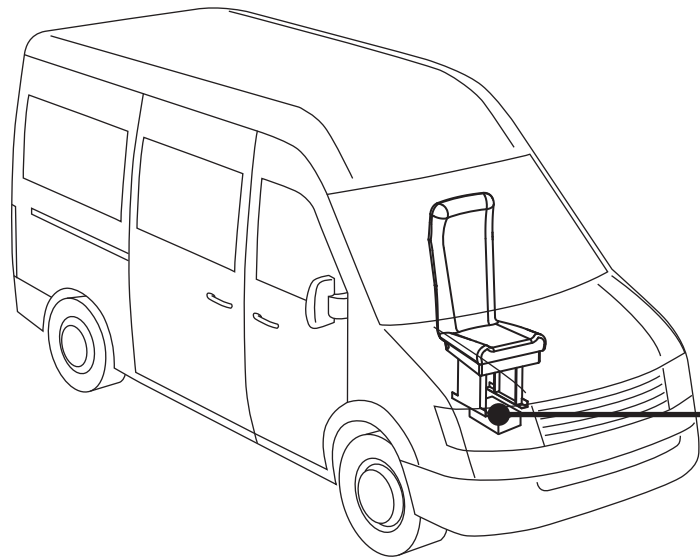
2.4.2 It is necessary to start laying main wiring harness from the place shown in the picture in the following order:

- lay line №1
- lay line №2
- lay line №3

2.5 MAIN WIRING HARNESS PREPARATION

Remove shown connectors from the main wiring harness before laying. Install them again after laying, if necessary put some marks (pic. 1, 2, 3, 4).





Connect positive wire terminal +12V/25A of main wiring harness with free positive battery terminal of the minibus using standard battery nut. The battery terminal is located in the lower side part of the driver's seat (pic. 12). Remove a fuse from the fuse connector before connecting positive wire.



ВНИМАНИЕ



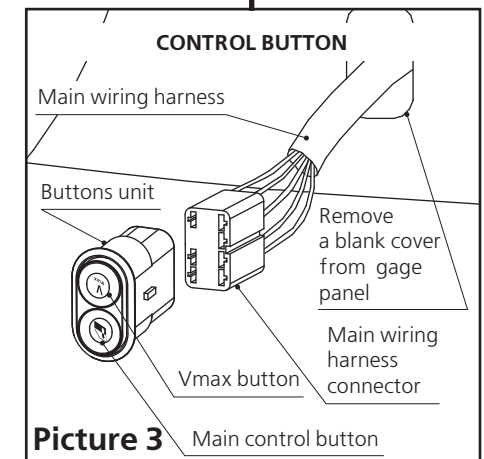
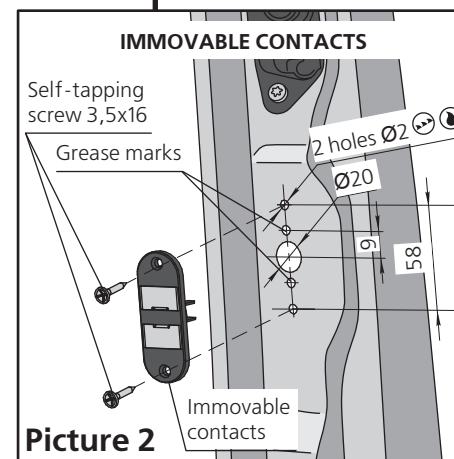
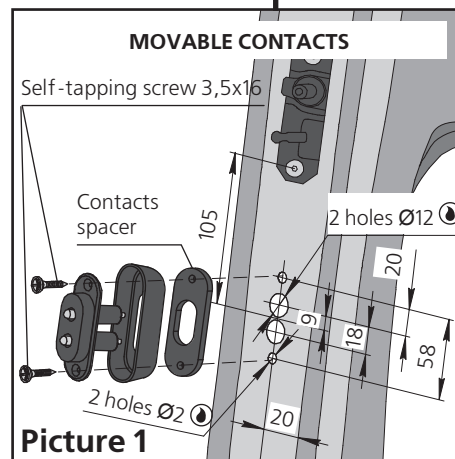
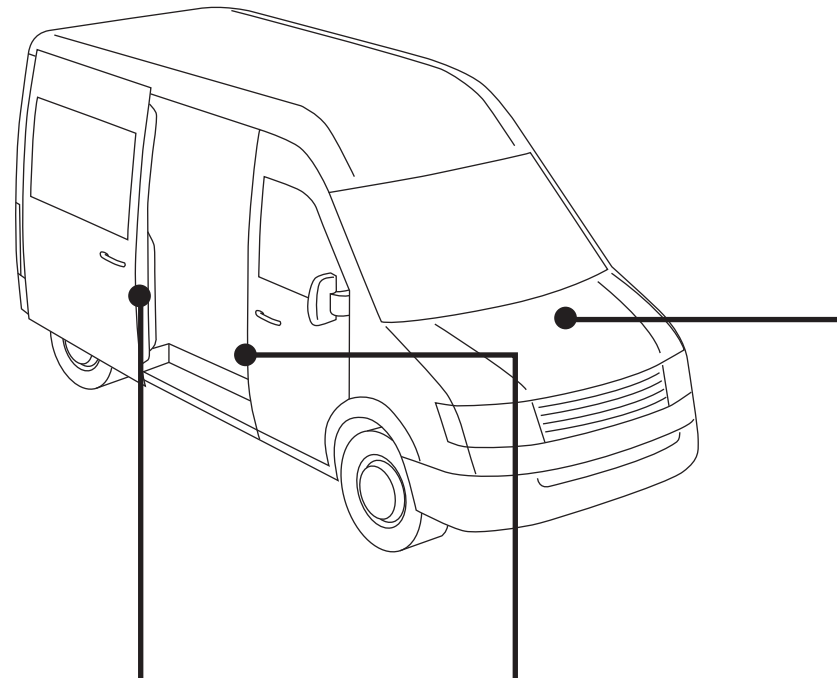
Connect positive wire terminal +12V/25A of main wiring harness with free positive battery terminal only. Do not use negative battery terminal, there is a hazard of short-circuit.

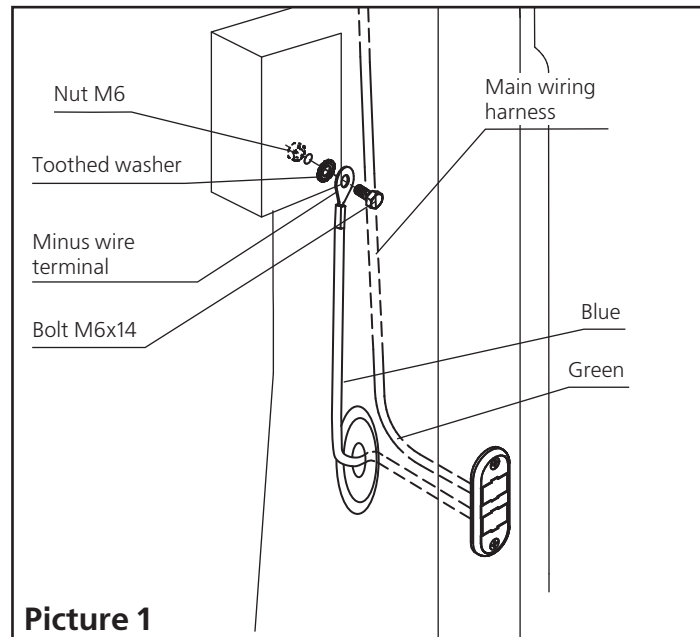
2.7.1 Remove one of the blank covers from the gage panel (or make holes according to your marking for mounting a control button on the gage panel if there are no blank covers or these blank covers are located in wrong places). After connecting main wiring harness connector with control button, insert the button into the gage panel, look at picture 3.

2.7.2 Fix movable contacts using 2 self-tapping screws 3,5x16. Make two holes $\varnothing 12$ mm and two holes $\varnothing 2$ mm (pic.1). Insert contacts spacer under movable contacts. Connect actuator with movable contacts using actuator wiring harness (actuator blue wire to blue wire of actuator wiring harness, green to green). Connect the green wire of actuator wiring harness to the upper contact of movable contacts, blue wire to lower contact, as shown in the picture on page 11.

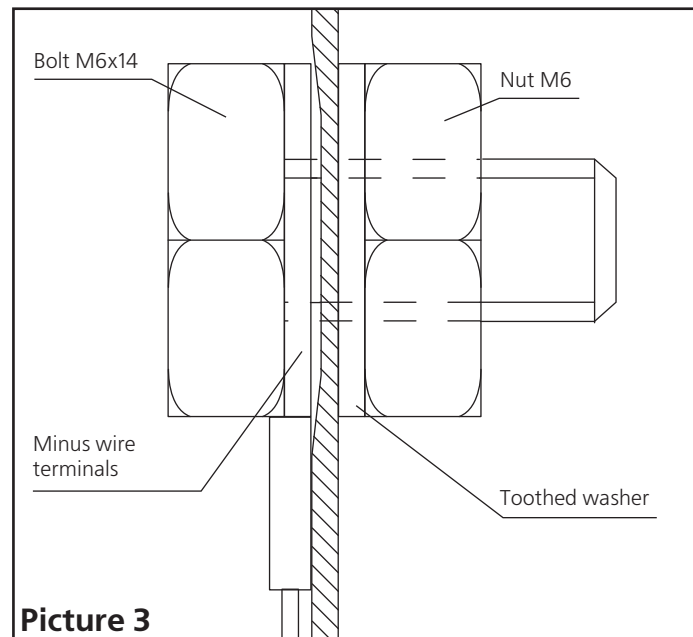
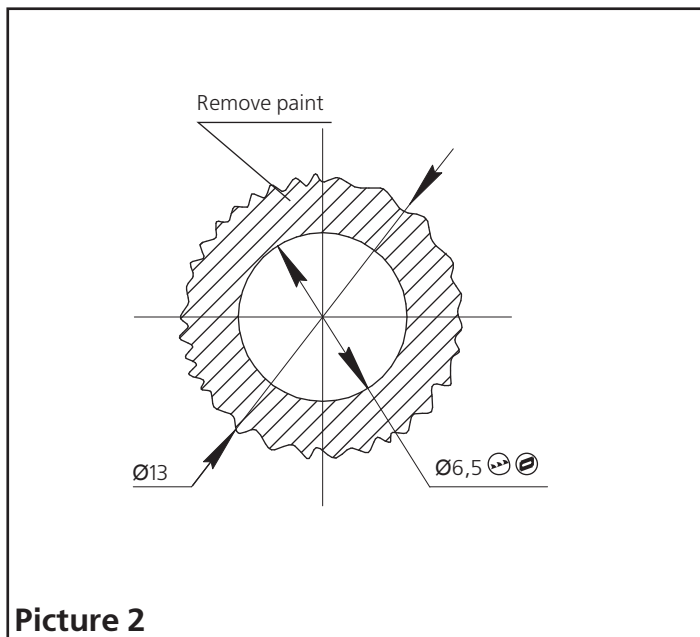
2.7.3 Apply some motor grease on the movable contacts. Close and open the door. Using grease marks left on the doorway pillar, make some marking and then make 2 holes $\varnothing 2$ mm and 1 hole $\varnothing 20$ mm. Immovable contacts are fixed with 2 self-tapping screws 3,5x16 (pic. 2).

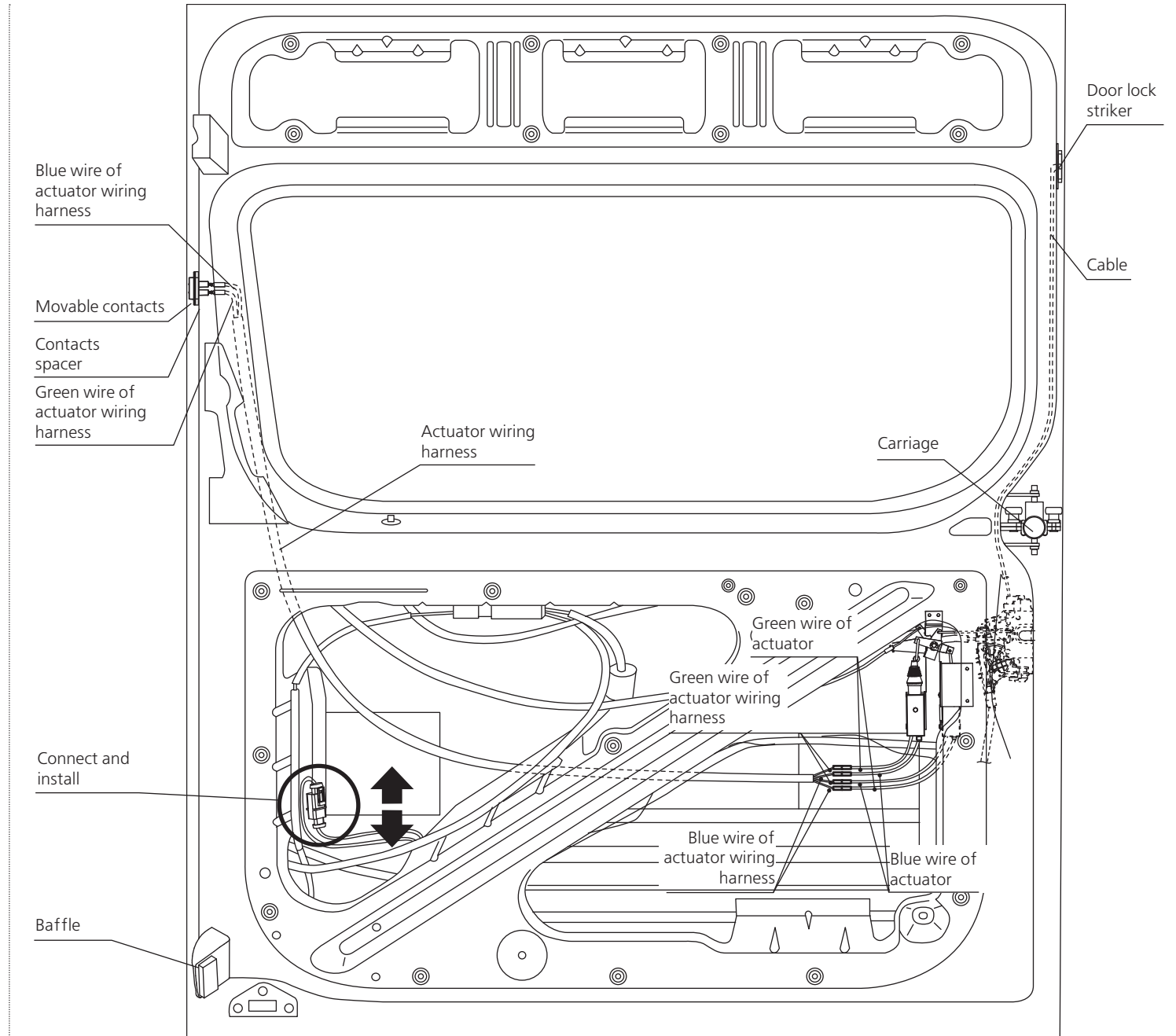
2.7.4 Connect green wire terminal of the main wiring harness to immovable contacts in such a way that it comes in contact with green wire terminal of actuator wiring harness (attached to movable contacts) when the door is closed. Blue wire of the main wiring harness should come in contact with blue wire of the actuator wiring harness correspondingly.

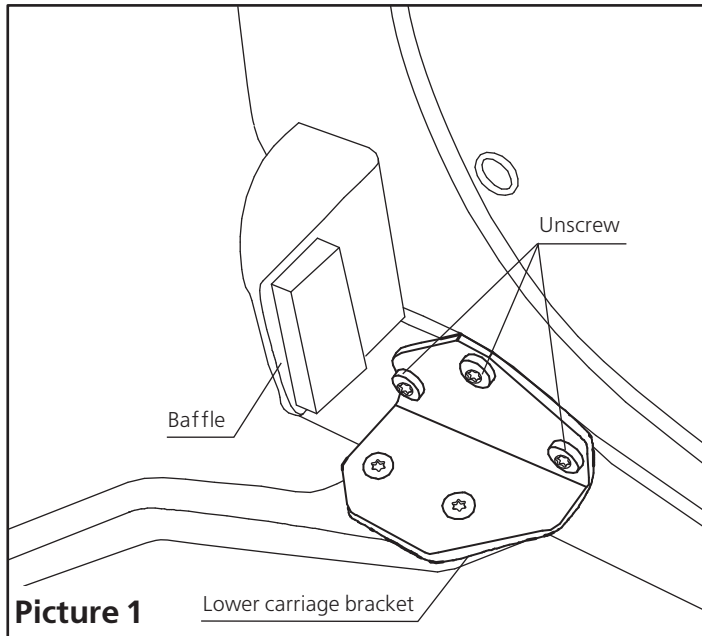




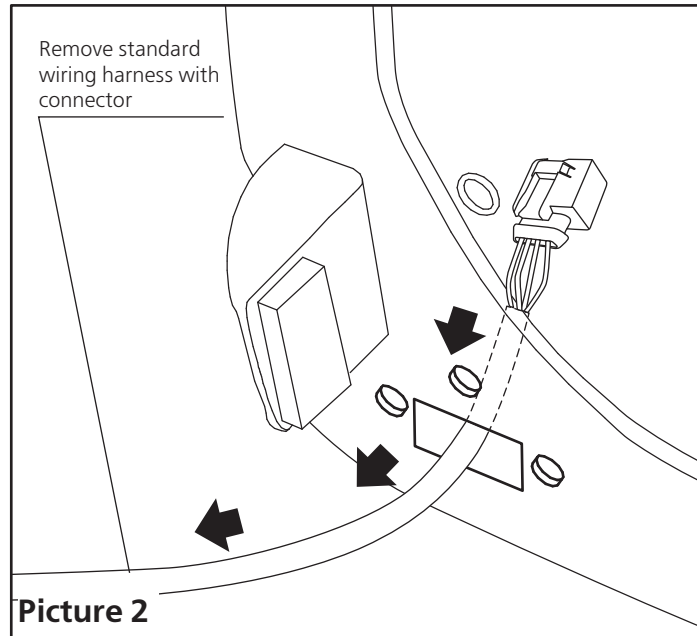
3.1.1 Make a hole $\varnothing 6,5$ mm at any place of the inner side of the pillar near the drive as shown in picture 1. Remove paint in order to provide a good contact as shown in picture 2. Use bolt M6x14, toothed washer and nut M6 to fix negative wire terminal «-» as shown in picture 3. After tightening bolt M6, apply antirust liquid on the damaged area.



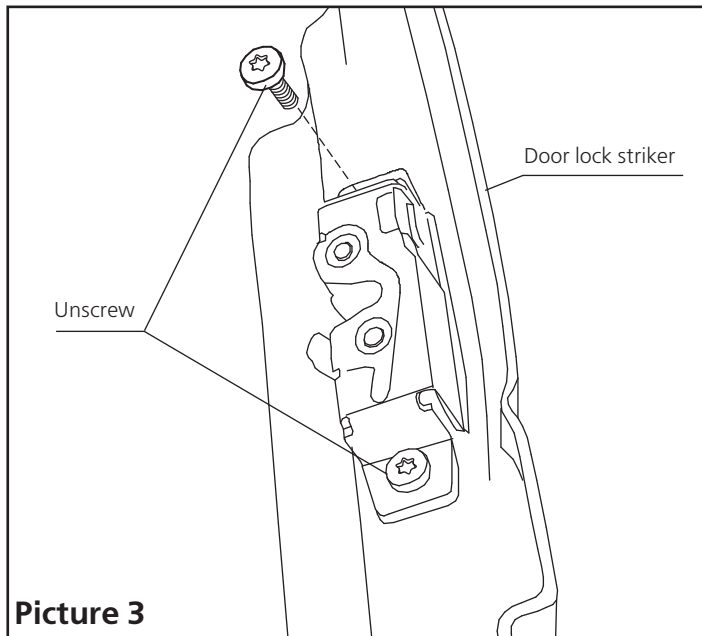




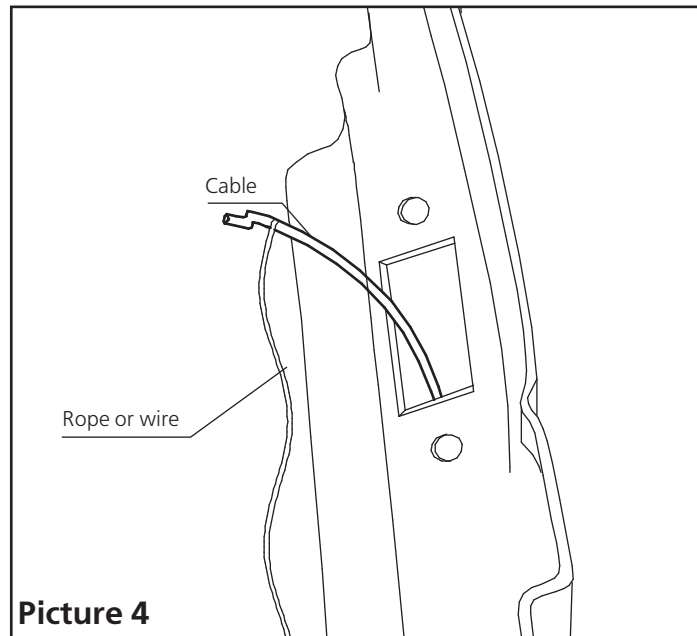
Picture 1 Lower carriage bracket



Picture 2



Picture 3



Picture 4

3.1.1 Remove the door. Disconnect standard wiring harness connector as shown in the picture on page 17.

3.1.2 Remove the baffle. Unscrew a bracket of the lower carriage (picture 1). Remove the wiring harness using the hole (picture 2).

3.1.3 Unscrew the door lock striker and disconnect the cable (picture 3). Tie a rope, one meter long, or a wire to the cable (picture 4).

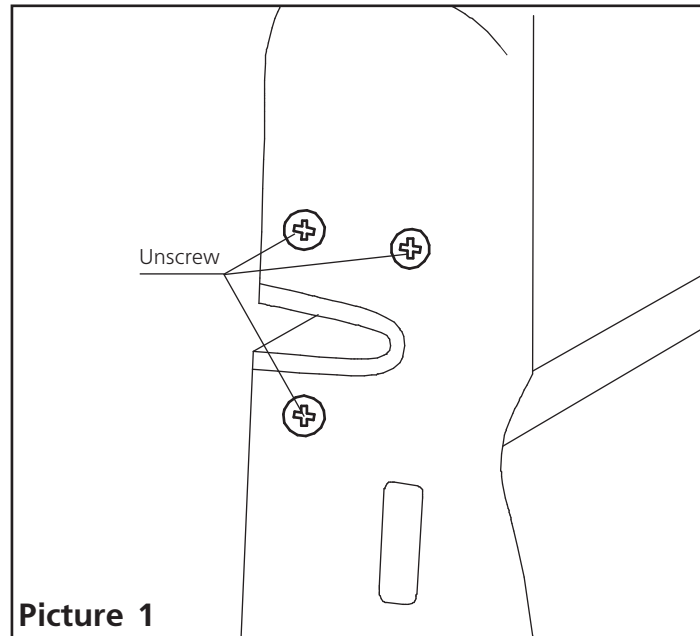
3.1.4 Dismantle a door latch. Unscrew it (picture 1).

3.1.5 Remove the latch from the door cavity. Disconnect the cable (picture 2). Install a rod instead of the cable (picture 3). Install the latch of the door together with the latch actuator. Fix it with 3 screws. Pull out the cable of the door lock striker using a rope or a wire. Connect it to the door lock striker and install the door lock striker back.

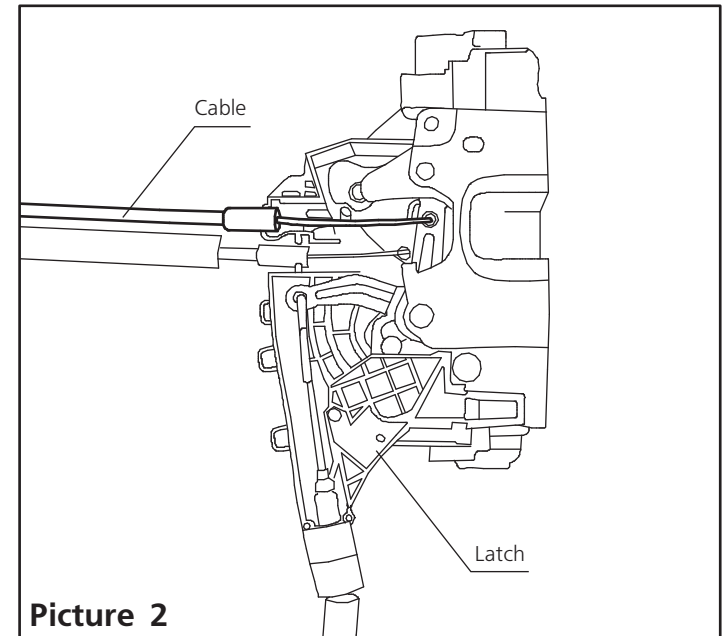
3.1.6 Adjust the tension of the latch actuator rod moving it rightwards and leftwards. Mark 4 mounting holes $\varnothing 5$ mm. The latch actuator is fixed with 4 rivets 4,8x8 (picture 4).

NOTE
The door lock striker and cable must be removed before the latch.

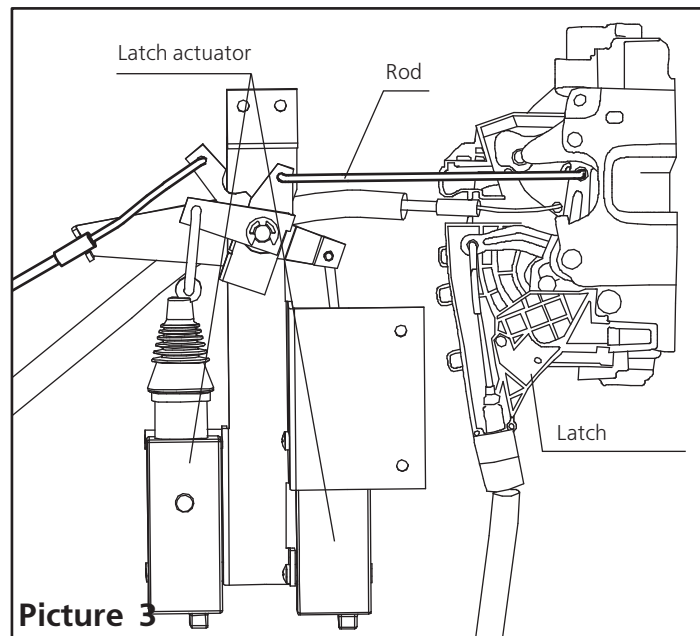
NOTE
It is necessary to install the baffler back.



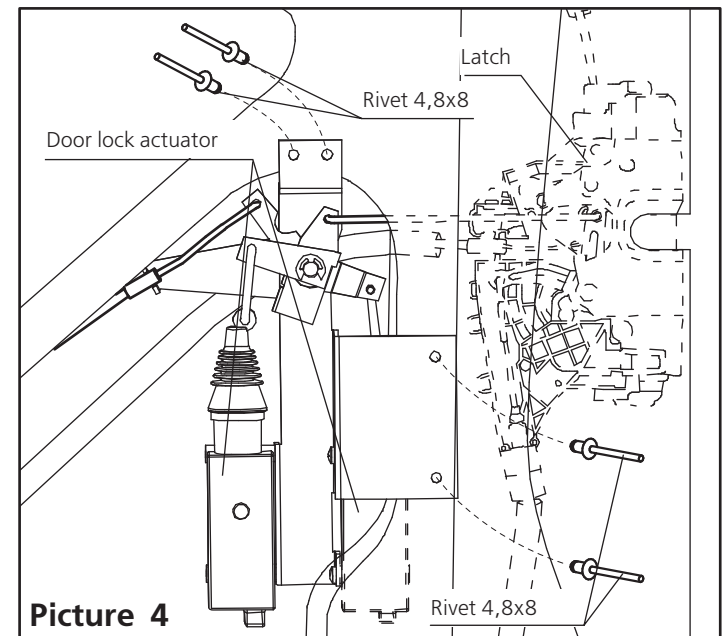
Picture 1



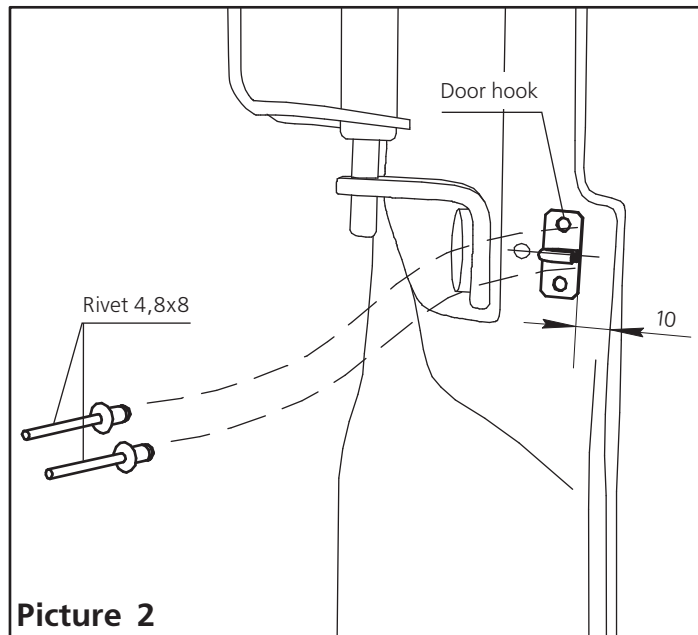
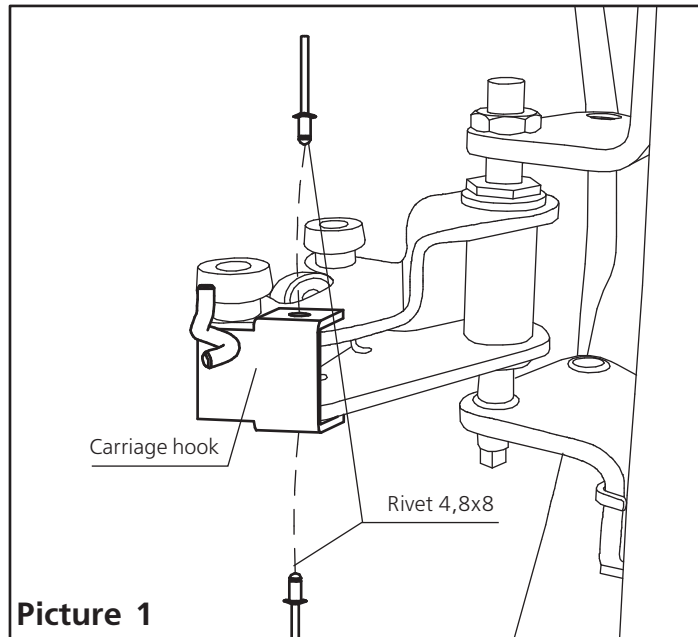
Picture 2



Picture 3



Picture 4



3.2.2 Carriage hook is fixed with 2 rivets 4,8x8 using holes $\varnothing 5$ mm made before (picture 1).

3.2.2 Door hook is fixed with 2 rivets 4,8x8 using holes $\varnothing 5$ mm made before (picture 2).

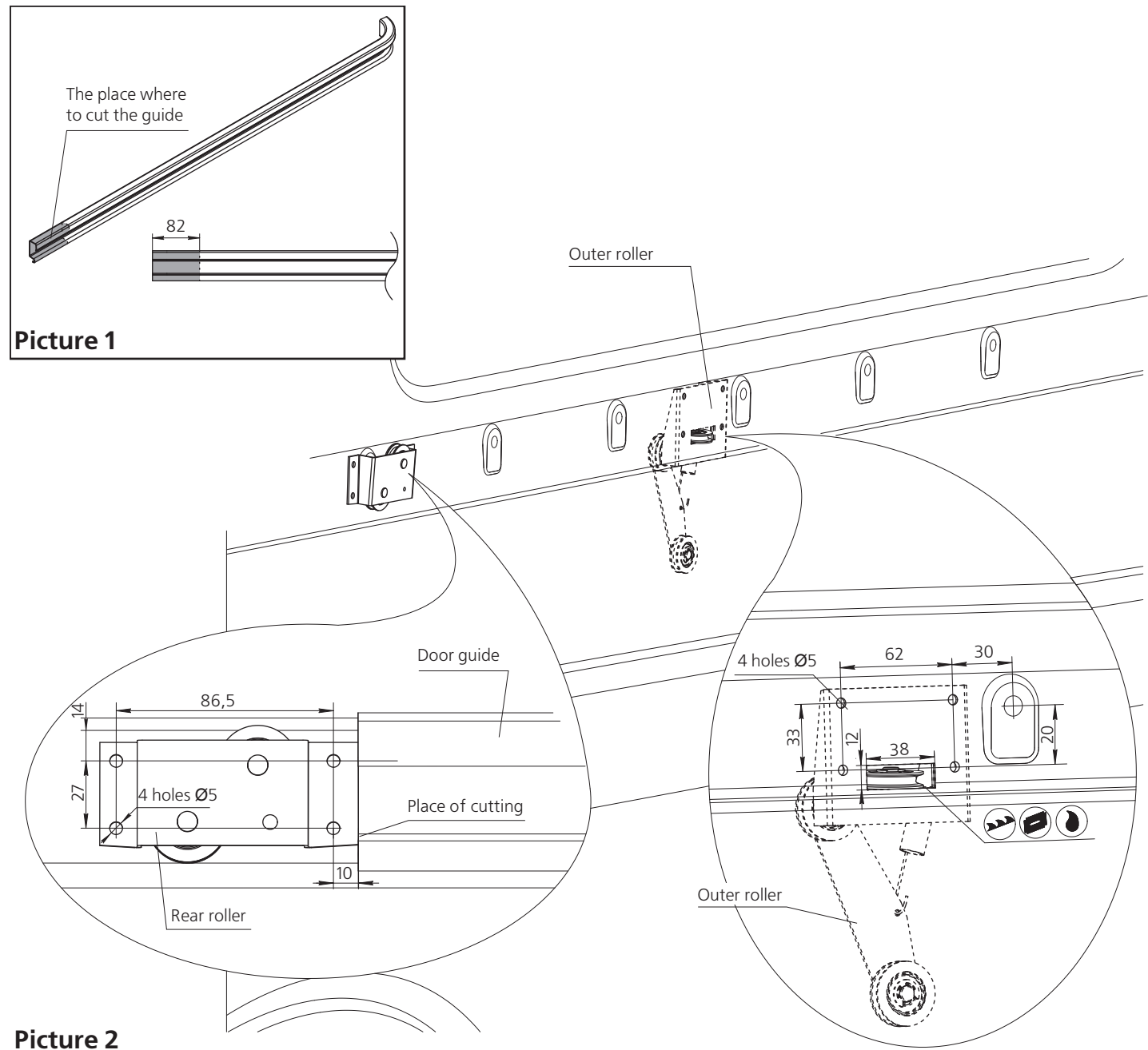
3.3.1 Remove the middle guide of the door. Measure a distance of 82 mm from the rear part of the guide and cut it (picture 1).

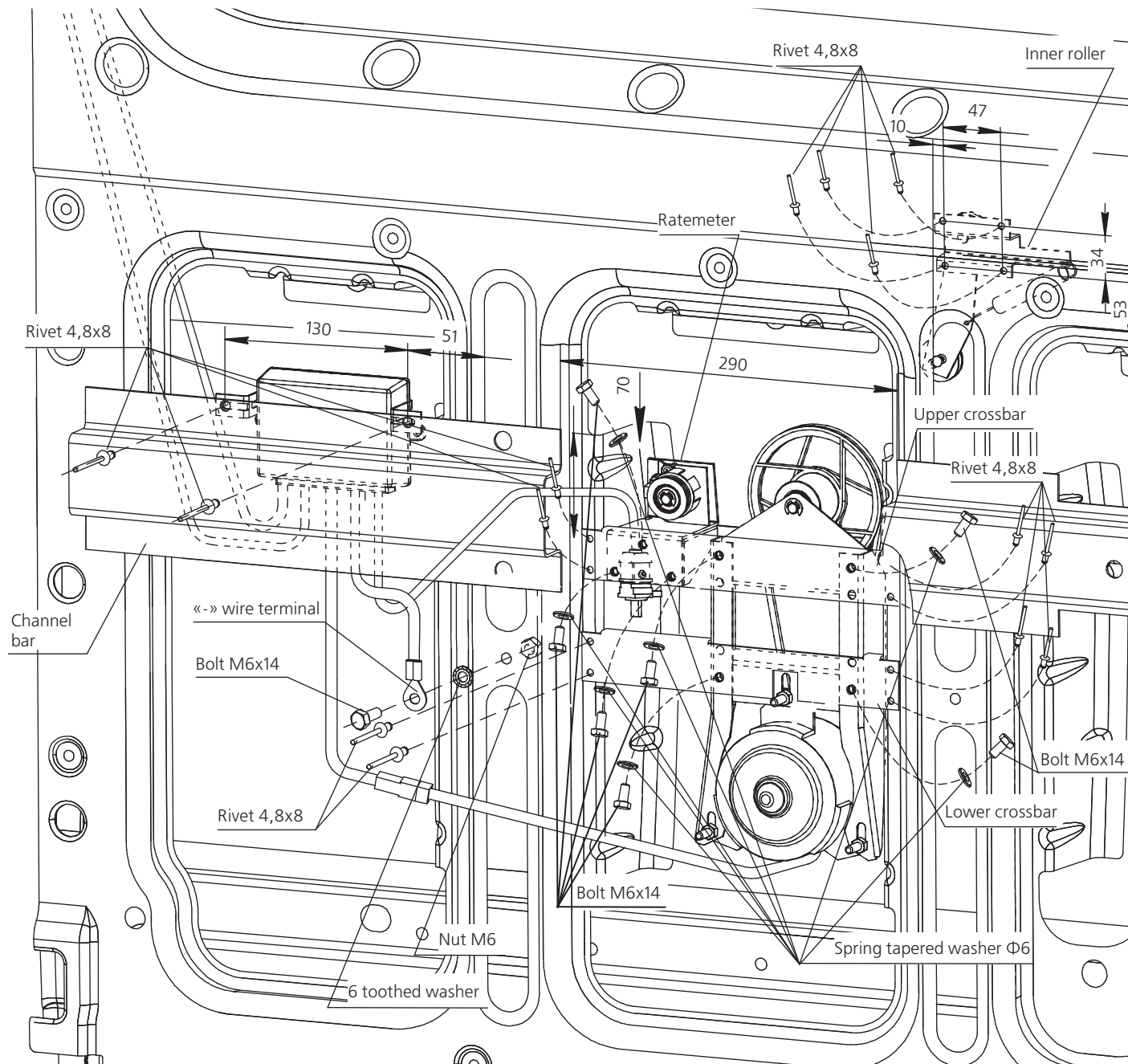
3.3.2 Install the door guide on the bus, make marking and make holes to fix the rear roller (picture 2)..

3.3.3 Remove the door guide. Make marking and make holes for the outer roller (picture 2).

3.3.4 Install rear and outer rollers using rivets.

3.3.5 Fix the door guide in its place.





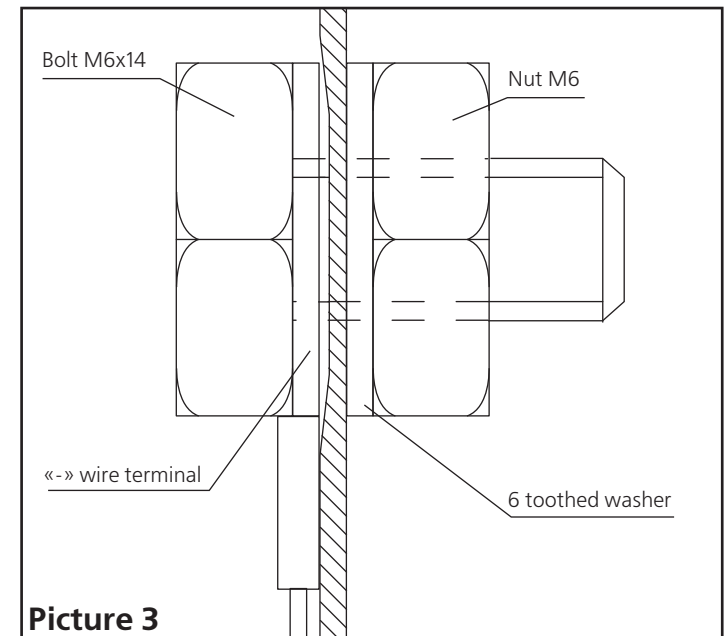
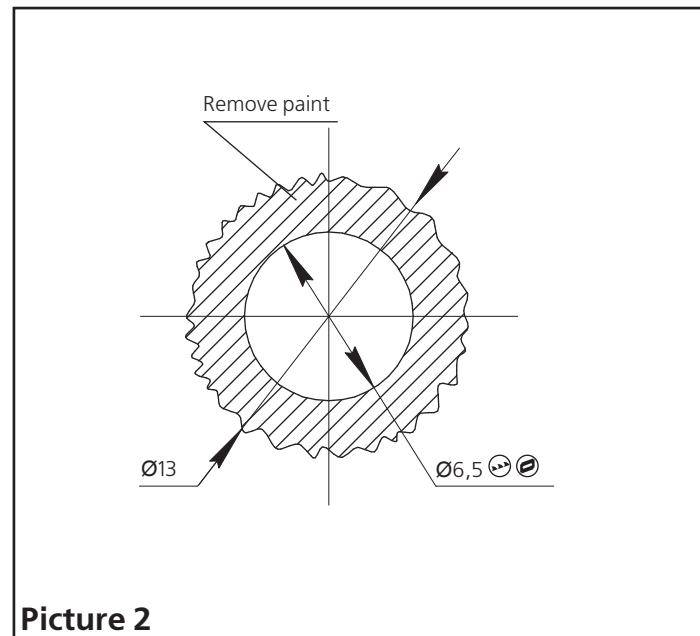
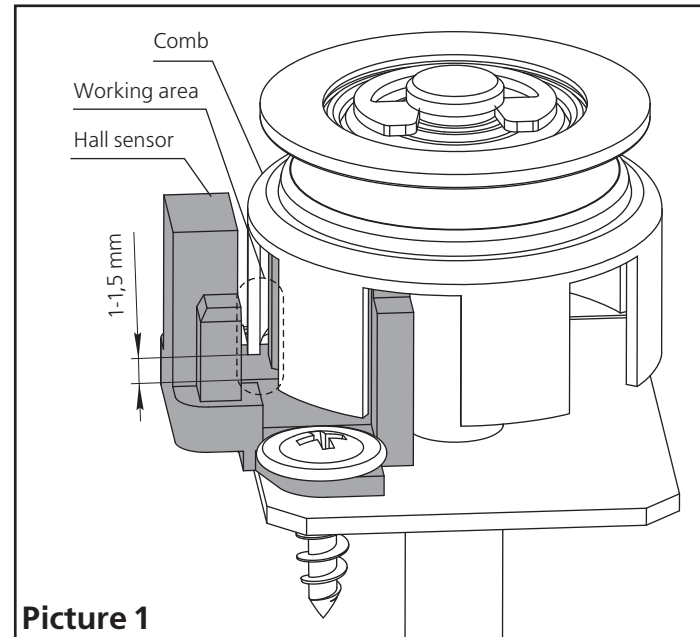
3.4.1 If your bus has a channel bar for mounting the seats, it is necessary to cut it in a shown place. After installing the units return the cut part of the channel bar back to its place using welding. The place of welding must be painted.

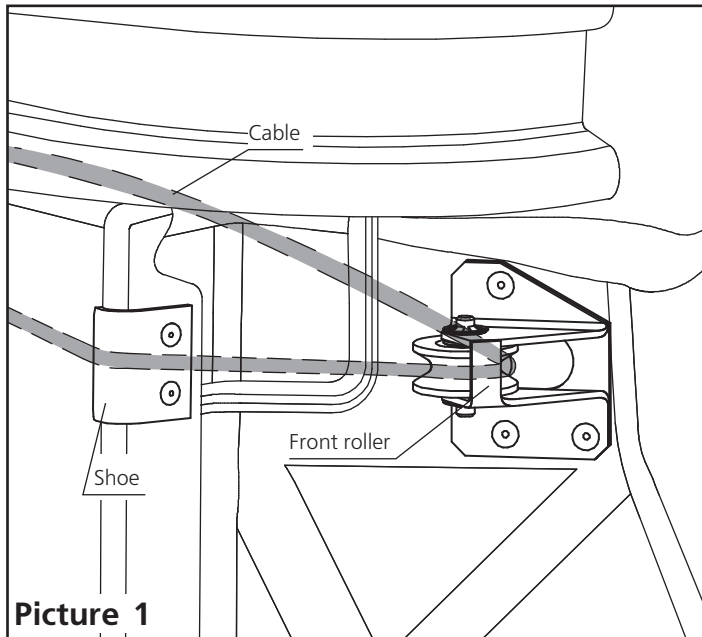
3.4.2 Mount two crossbars, upper and lower. These crossbars are fixed with 4 bolts M6X14. Bolts have spring tapered washers $\Phi 6$. Ratemeter is fixed on the upper crossbar with 3 bolts M6X14. Bolts have spring tapered washers $\Phi 6$. The ratemeter is fixed on the upper crossbar with 3 bolts M6X4 and spring tapered washers $\Phi 6$. Verify that there is no metal swarf in the working area of Hall sensor. Do it before installation. The distance between Hall sensor and a comb must be not more than 1 – 1,5 mm (picture 1 page 23). Insert the assembled unit into the cavity and leave it at the height shown in the picture. Mark 8 holes $\Phi 5$ mm, make holes and fix the assembled unit with rivets 4,8x8.

3.4.3 Insert inner roller into 4 holes $\Phi 5$ mm as shown, fix it with rivets 4,8x8.

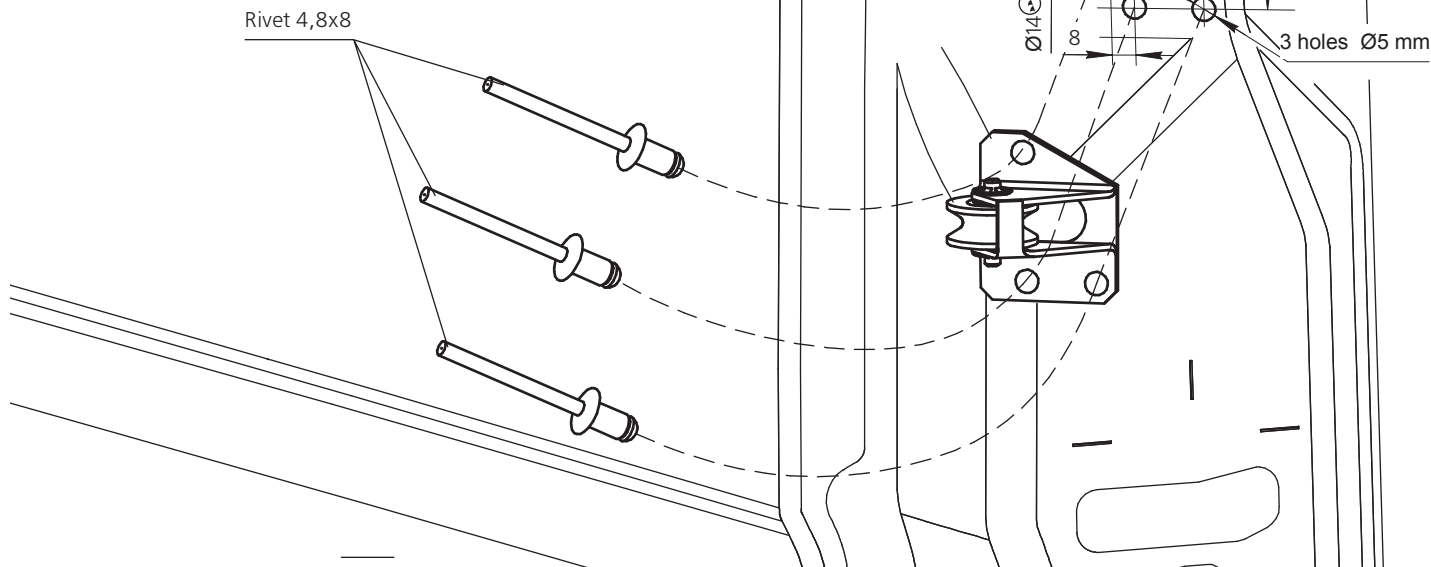
3.4.4 Make 2 holes $\Phi 5$ mm and fix the controller with rivets 4,8x8. Connect the wires to the controller.

3.4.5 Make a hole $\Phi 6,5$ mm at any place of the inner side of the bus body near controller. Remove paint in order to provide a good contact as shown in picture 2 page 23. Use bolt M6x14, toothed washer and nut M6 to fix negative wire terminal «-» as shown in picture 3 page 23. After tightening screw coat the damaged area with acid-free antirust liquid.





Picture 1



3.5.1 Mark hole $\varnothing 14$ mm in the shown place of the pillar. At first use drill $\varnothing 6$ mm with working surface not less than 150 mm.

3.5.2 Drill out the hole at first $\varnothing 6$ mm horizontal through the minibus pillar. There are 3 steel barriers inside the pillar. These barriers have to be drilled out as well with the same drill ($\varnothing 6$ mm). Then make the holes in the pillar with drill $\varnothing 14$ mm. The axis of the holes must be in parallel with horizontal and longitudinal planes of the bus as shown.

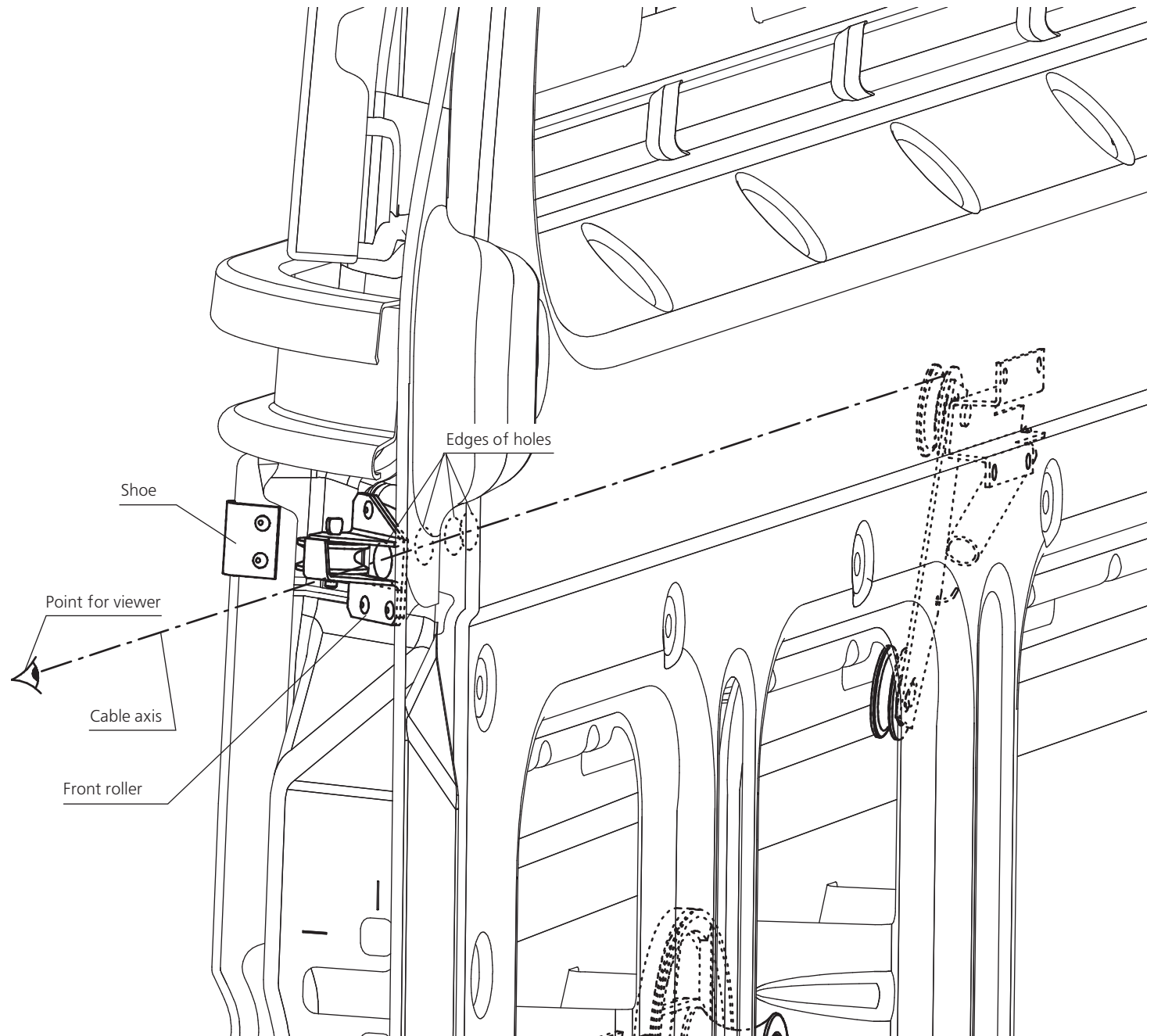
3.5.3 Remove edge fins from the holes using a file or a drilling machine. It is recommended to fix a cable on the inner roller relatively to the drilled hole. Then bring the cable outside through the hole in the pillar, insert the cable into the front roller and choose the position of the front roller in which the cable comes through the holes as close to the centers as possible (as shown in the picture).

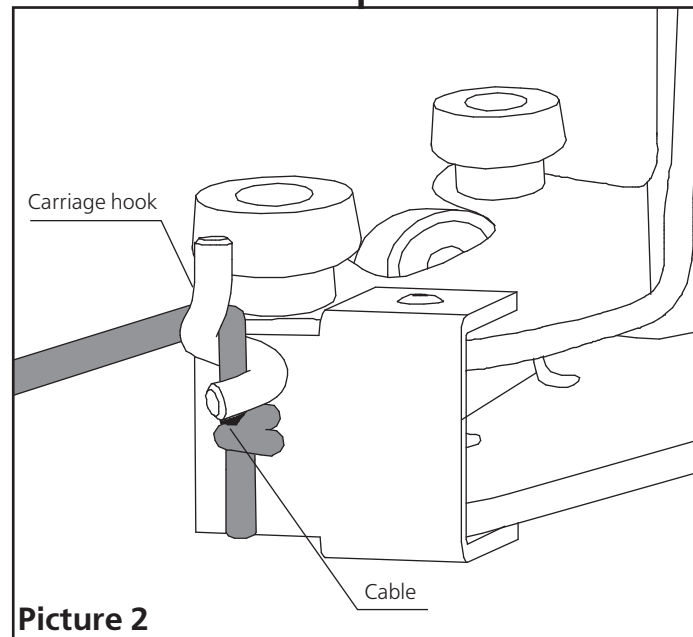
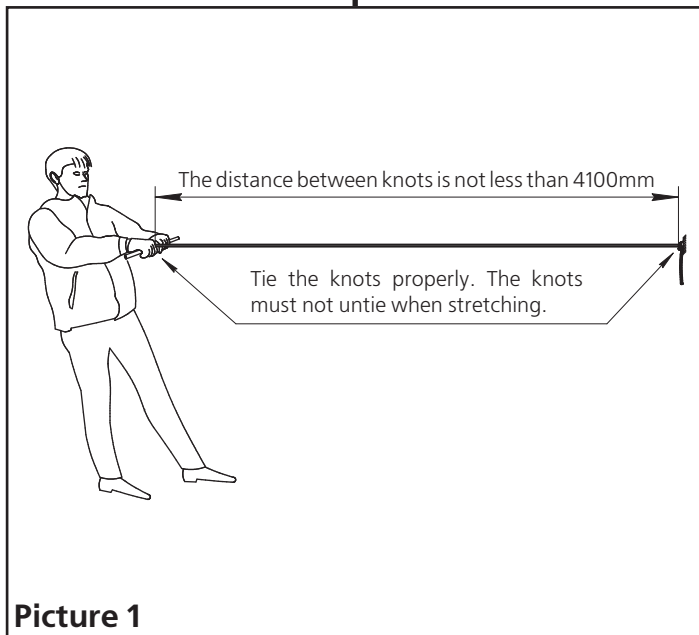
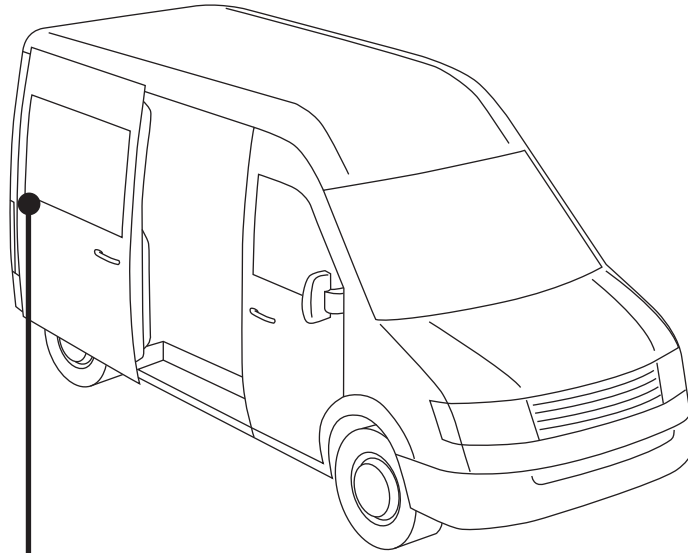
3.5.4 After that make 3 holes $\varnothing 5$ mm to fix the front roller with rivets 4,8x8 as shown.

3.5.5 The shoe is placed in such a way that the cable coming from the front roller passes the shoe center (picture 1). Then make 2 holes $\varnothing 5$ mm and fix it with rivets 4,8x8.

3.5.6 Check up the free rotation of the front roller. If it does not rotate freely the reason must be found out and eliminated.

3.5.7 Pay attention that the cable that goes through the axis shown in the picture does not scrape against body parts, drive units or sharp edges of the holes as shown.





Prepare the cable before installation as shown in picture 1. You have to install the cable during 5 minutes after preparation.

3.6.1 Measure the length of the cable (pic.1).

3.6.2 Stretch the cable as shown in picture 1.

3.6.3 Compare the length of the stretched cable with the length of the cable before stretching. If the stretched cable length is 100 mm more than the length before stretching, then it is ready to be installed. If not, return to item 3.6.2.

Installation steps:

3.6.4 Attach the cable to the carriage using a knot and a carriage hook (pic.2).

3.6.5 This picture shows the positions of the rollers relatively to each other.

Installation steps:

3.6.6 Attach the cable to the carriage hook using the knot as shown in the picture.

3.6.7 The cable is passed through the rear roller as shown in the picture.

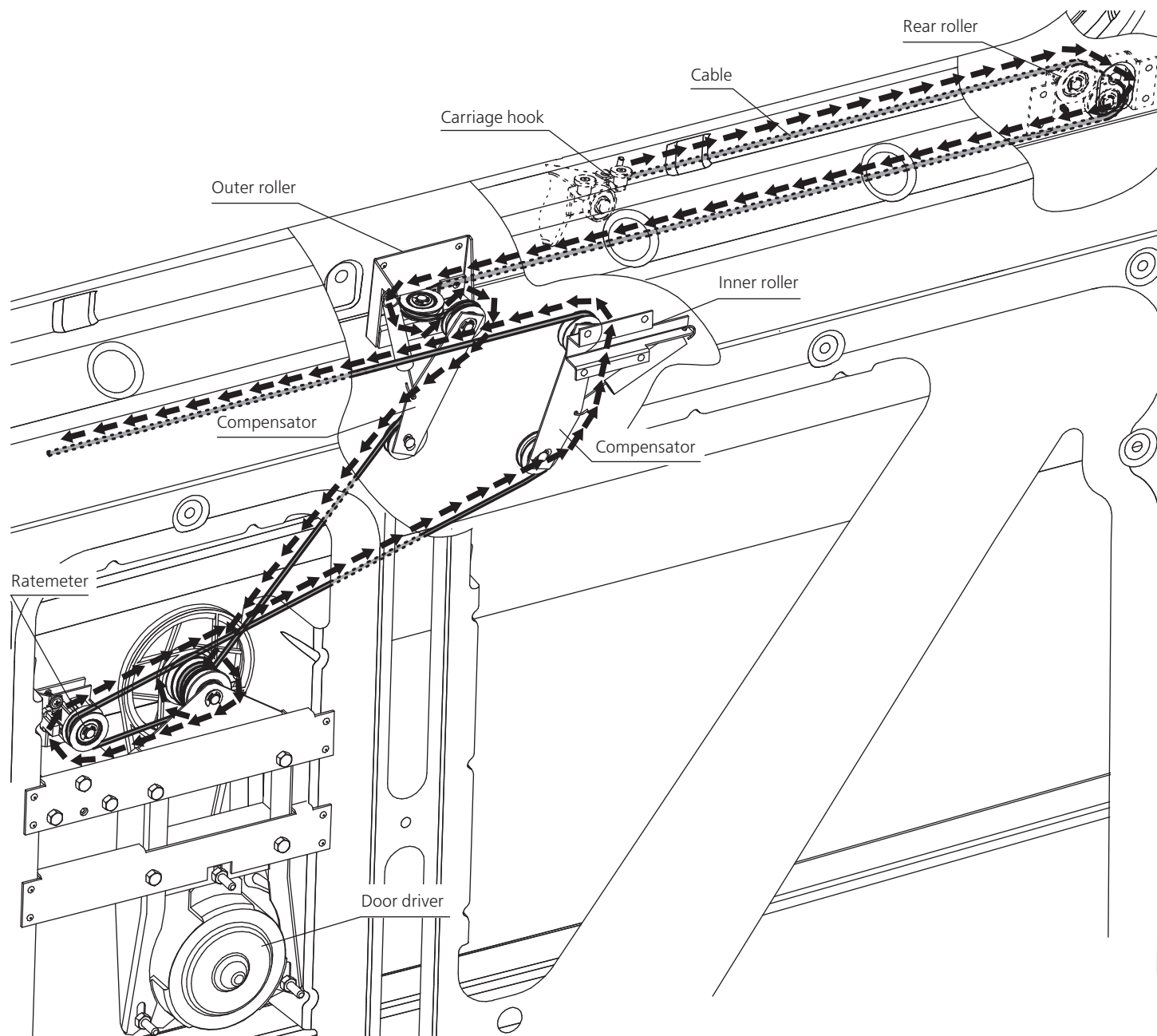
3.6.8 The cable is passed through the outer roller under door guide as shown in the picture.

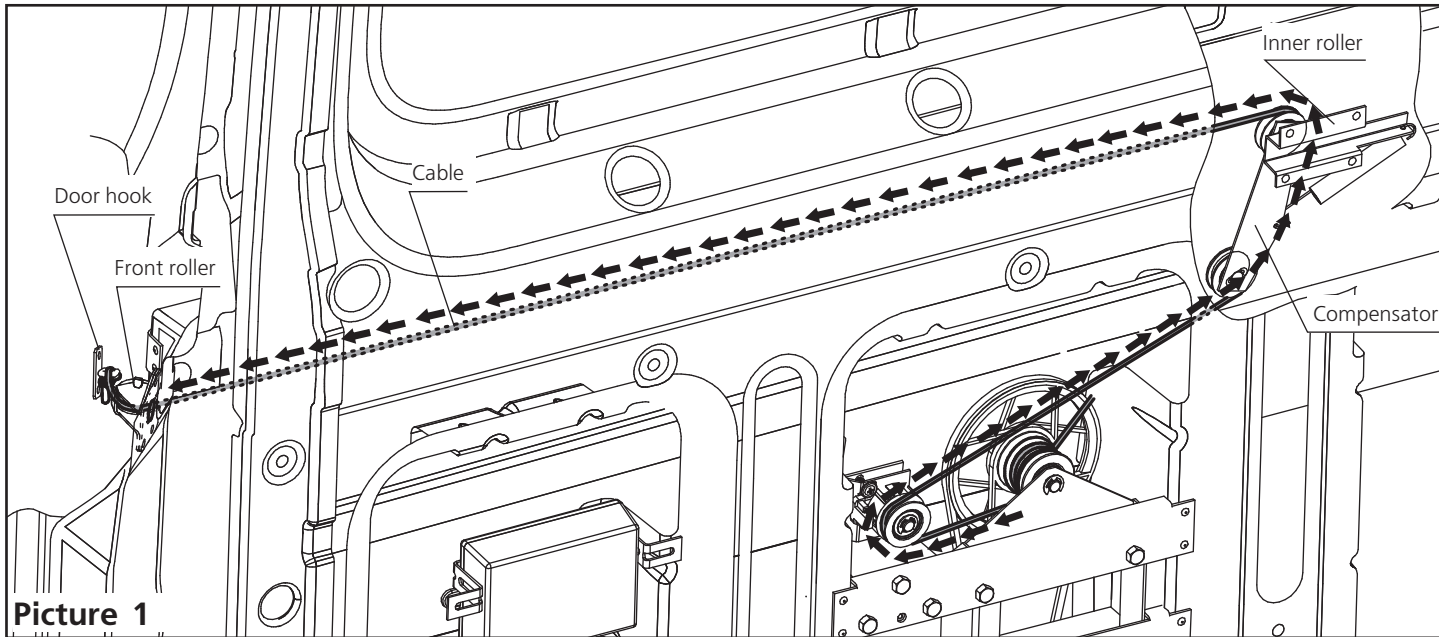
3.6.9 The cable is passed through the outer roller compensator as shown in the picture.

3.6.10 The cable is wound on the friction pulley forming 4 turns as shown in picture 2 page 28.

3.6.11 Attach the cable to the ratemeter as shown in the picture.

3.6.12 Attach the cable to the inner roller via inner roller compensator as shown in the picture.





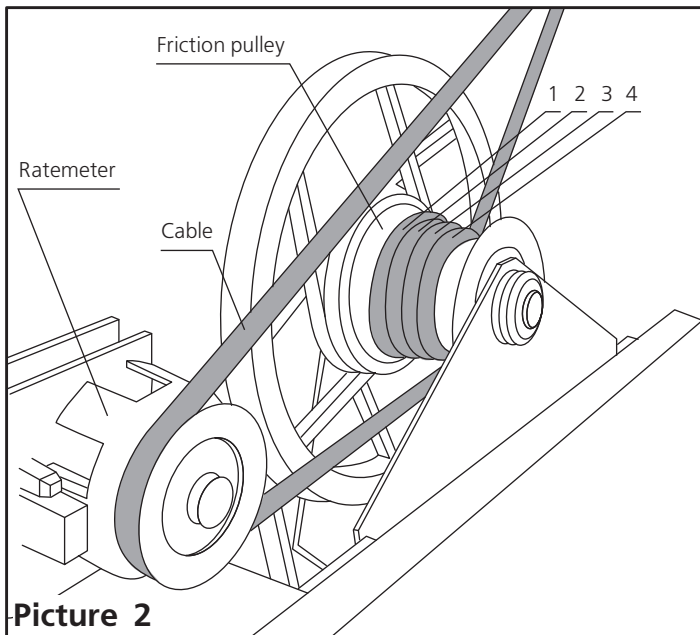
Picture 1

3.6.13 Insert the cable into the pillar and the front roller using a wire (pic.1).

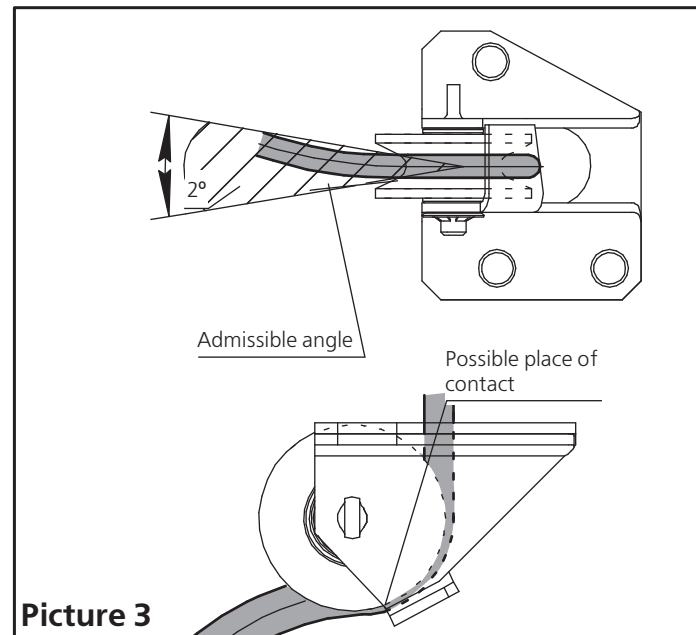
3.6.14 Attach the free part of the cable to the door hook with a knot. The door is not shown in the picture for visual clarity. Pay attention that the cable does not scrape against body parts, drive units or sharp edges of the holes while operating.

3.6.15 There are some possible places where the cable may scrape against something.

- It may scrape against the edges of holes (pic.1).
- It may scrape against the pulley edges if position of the door hook is wrong. The angle of the cable coming out of the pulley is too large (pic.3).
- It may scrape against the parts of the front roller due to wrong door adjustment pic. 3).
- It may scrape against the pulley or drive frame due to wrong drive installation. The friction pulley must have 4 complete turns clockwise (pic. 2).



Picture 2



Picture 3

Get acquainted with door operating rules. Insert a fuse into its connector. Then one long beep sounds, the lighting of main control and V-max buttons is on.

Verify that the cable has been installed correctly. It does not scrapes against body parts and there is no quick wear of the cable. Follow the installation steps on page 26 – 28. Using the picture check up the cable tension. A new cable stretches and sags. That is why, if the items written on page 26 have not been observed, follow the steps outlined below.

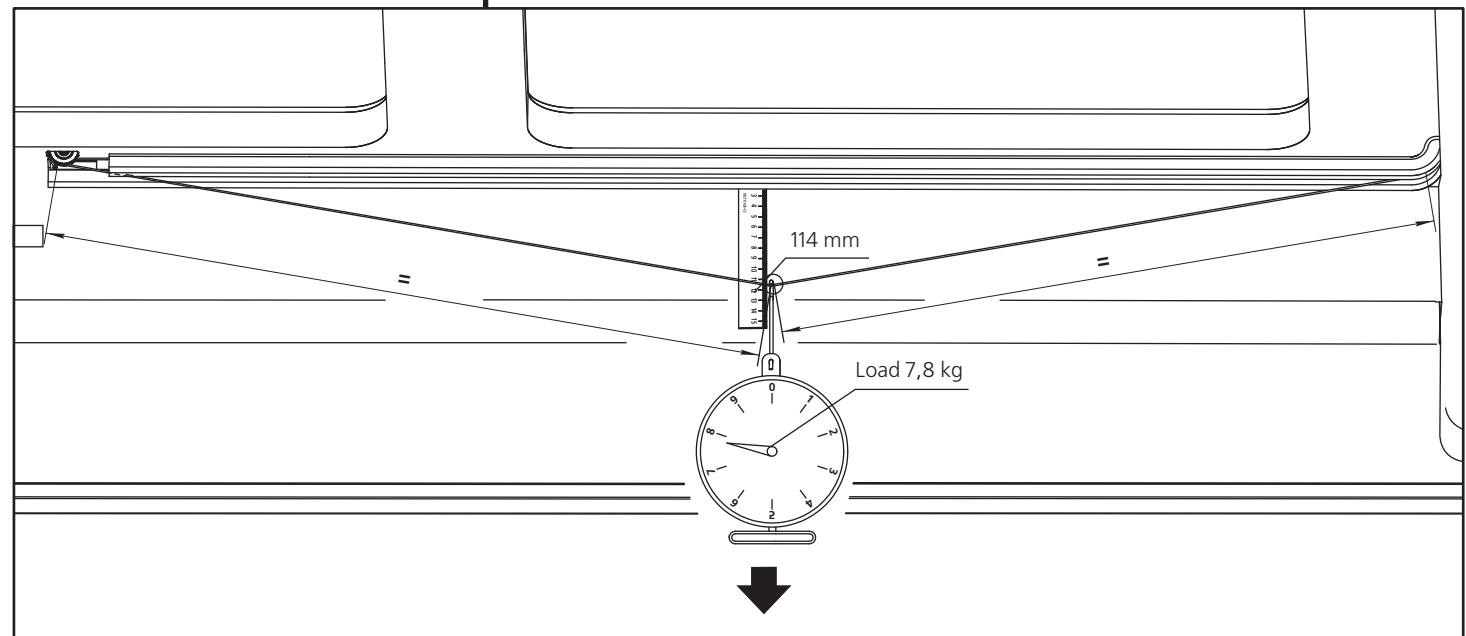
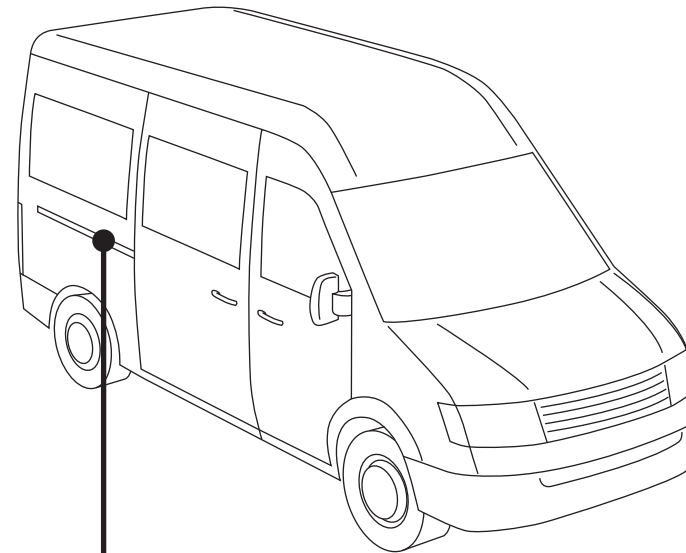
4.1.1 Make 10-15 opening/closing cycles in order to stretch the cable. (The pause between cycles must be not less than 5 seconds in order to avoid overheating of the motor and controller).

4.1.2 Check up the tension as shown in the picture.

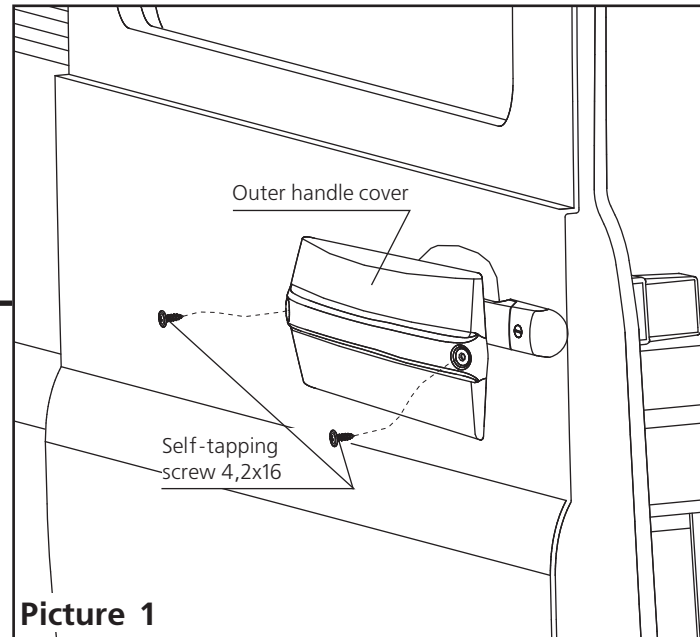
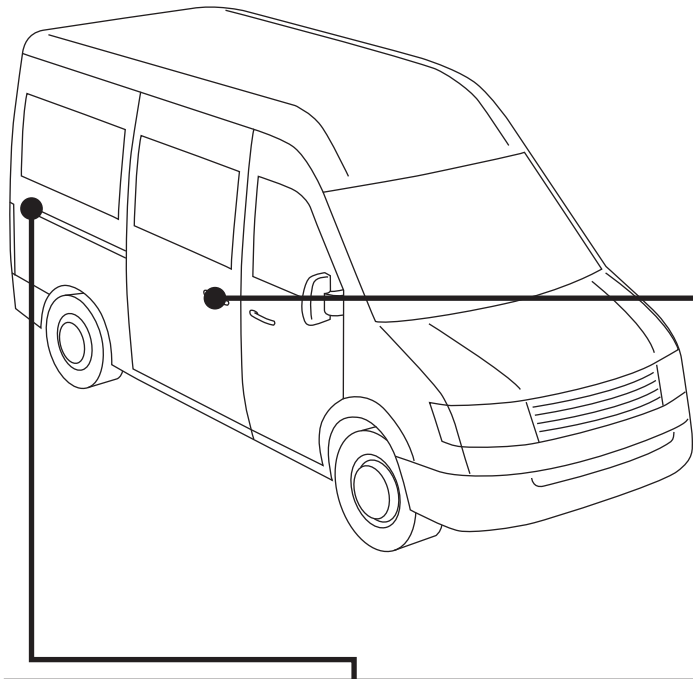
4.1.3 If tension force is less than 4-5 kg, follow the steps:

- Open the door a little bit, the gap is 10 cm.
- Take off the cable from the door hook.
- Untie the knot and make it further from the end of the cable
- Put the cable on the hook and make 2-3 opening/closing cycles.
- Check up the cable tension.

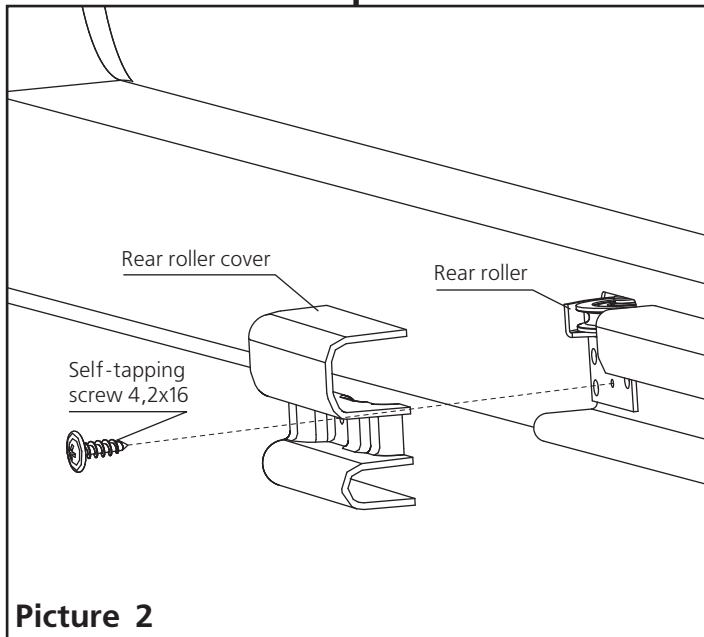
After that the cable has its optimum length, further stretching is not required till the end of the service life.



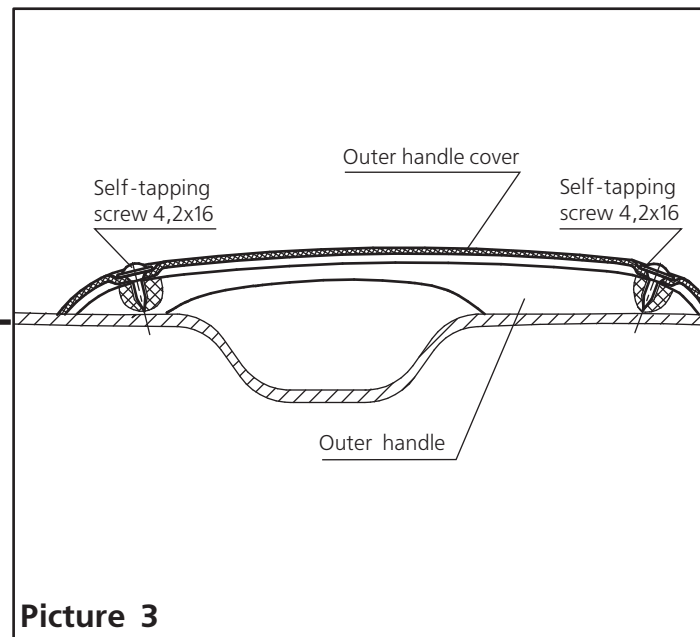
Check up the cable tension each month and each technical inspection.



Picture 1



Picture 2



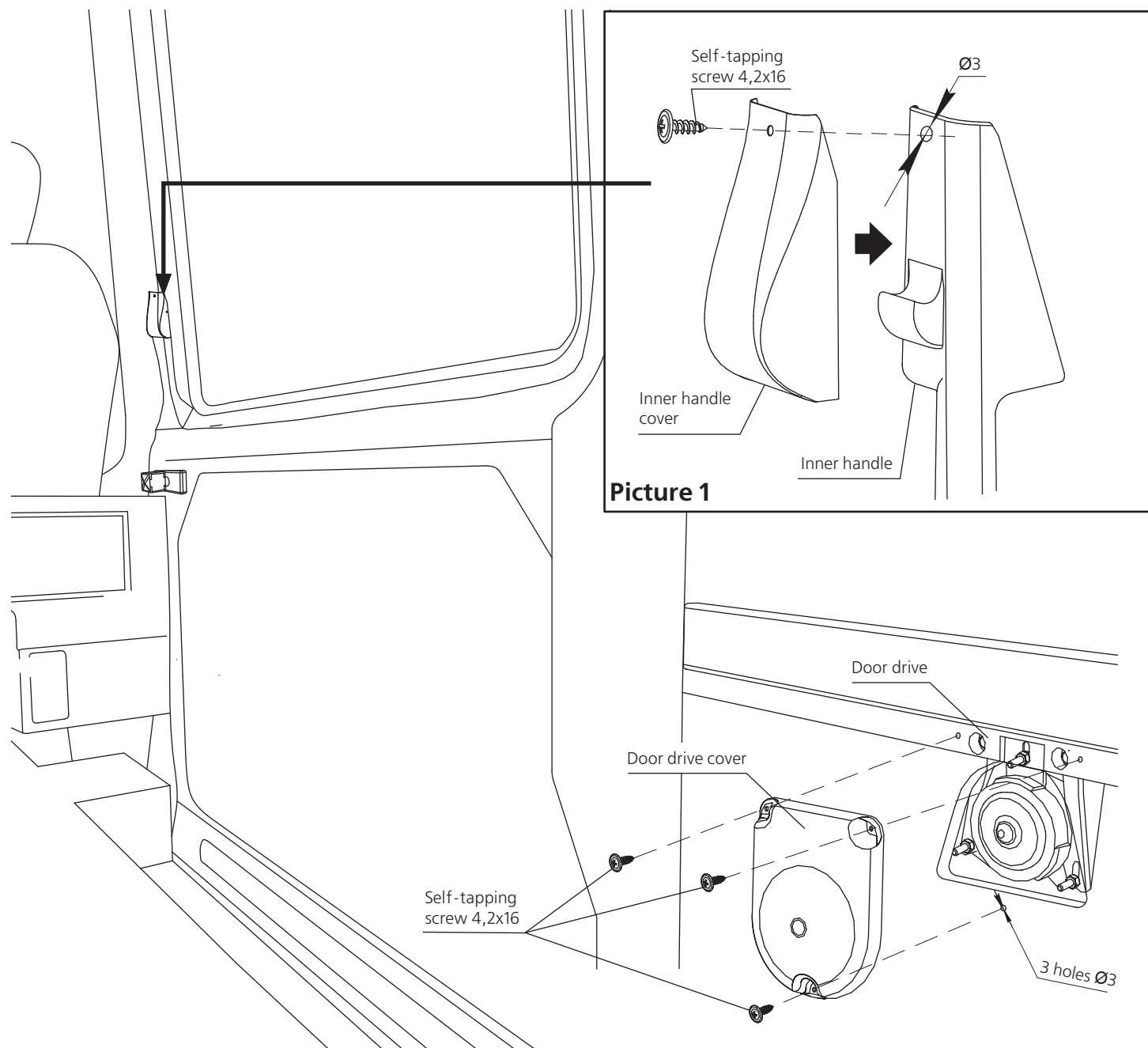
Picture 3

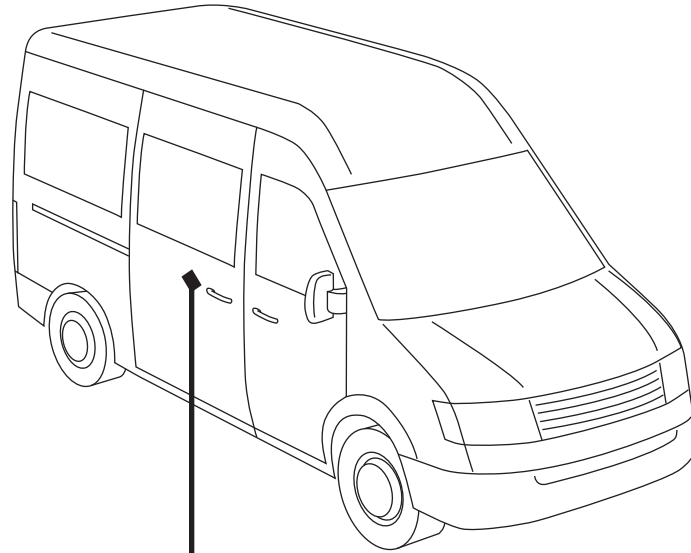
4.2.1 Fix the rear roller cover with self-tapping screws 4,2x16 as shown in picture 2.

4.2.2 Put the outer handle cover on the open/close handle, mark and make 2 holes $\varnothing 3$ mm. Fix it with self-tapping screws 4,2x16 (pic. 1, 3).

4.3.1 Put the protective inner handle cover on the shown place and fix it with self-tapping screw 4,2x16 (hole $\varnothing 3$ mm). Picture 1.

4.3.2 The door drive cover is fixed with three self-tapping screws 4,2x16 via three holes $\varnothing 3$ mm.



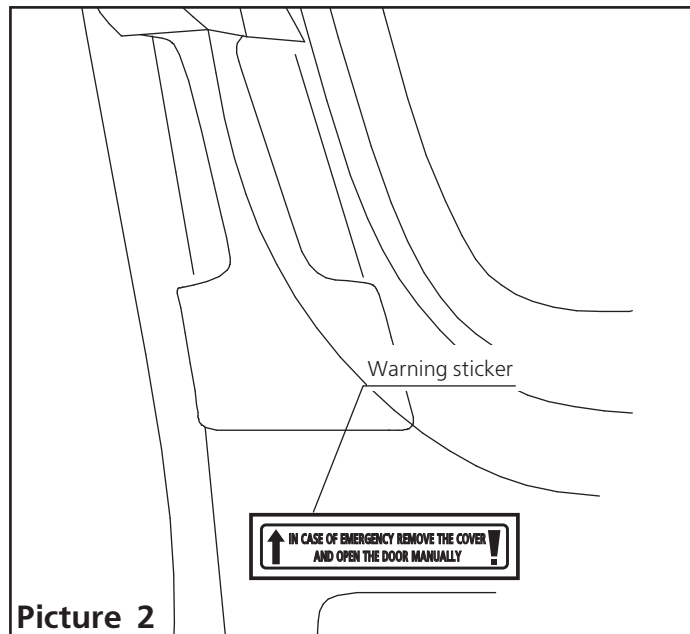


4.4.1 Informational sticker is located outside the sliding door near outer handle. It should be noticeable. Pic. 1

4.4.2 Warning sticker is located on the inner handle cover. Pic.2



Picture 1



Picture 2

DEAR CUSTOMER!

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Email: AdorUSA@gmail.com

Phone number: +1 (216) 214-0828 (USA)

Please, make pictures/video of failed part, issue with installation or operation of device.

Text or email.

Ador Tech support will reply shortly with solution.

