



Document # 142-00033-01

Revision 02

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RS26 Lower LIDAR Protection Cage Replacement (BC Only)

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<i>See Electronic PLM system for approvals and signatures.</i>			

Revision History

Revision	Date	Brief Description	ECO No.	Initials
01	03/19/2019	Initial release	ECO-000454	GP/ AH
02	05/02/2019	Added visual inspection	ECO-000531	GP/ AW

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1. Scope

This document gives step by step instructions on how to replace the lower LIDAR protection cage on the BE-MK2-RS26 machines. This procedure requires access to the Service Menu and therefore can only be performed by Brain Corp trained personnel.

2. Tools List

- Gloves
- Ratchet
- Socket head: 13mm & 14mm
- Allen Wrench: 2.5mm, 5mm & 8mm
- Blue Low Tack Film
- Torque Wrench

3. Swap-out Procedure

3.1. Removal of the Old Cage

Note: All removed hardware is reusable unless visibly defective.



Before doing any work, the lower LIDAR is sensitive, calibrated and cannot be touched. Protect the black cover with blue low tack film.



Step 1: Remove the front cover.

1a. Using a 2.5mm Allen wrench (or equivalent), remove the 6 black button-head socket cap screws (3 on each side of the cover).



1b. Using a 5mm Allen wrench (or equivalent), remove the 6 button-head socket cap screws. 2 Are located in the front and 2 on each side of the cover.



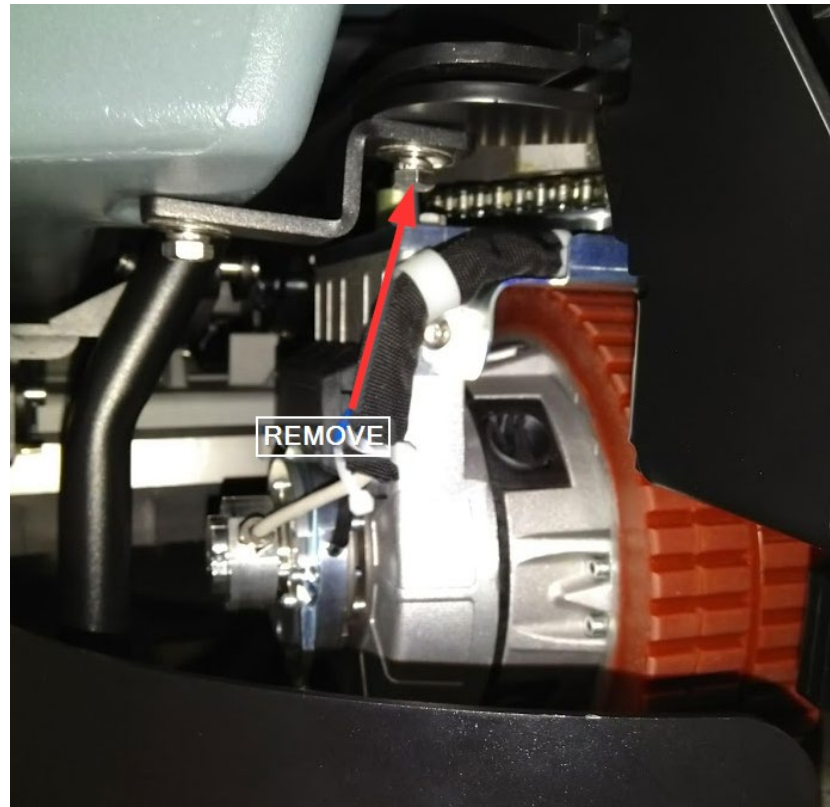
1c. Slide the cover off.

Step 2: Disconnect the front brush from the cage.

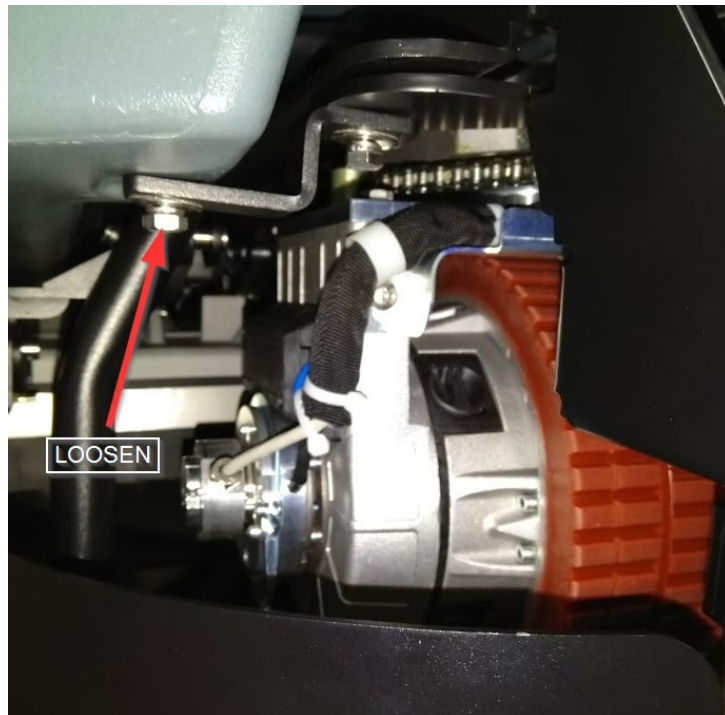
2a. Using an 8mm Allen wrench, remove the shoulder bolt. This bolt passes through a spring which is in compression due to the brush. Once removed, rest the bumper on the ground and collect all hardware (1X Shoulder bolt, 2X Washer, 1X Spring)



2b. Remove both 13mm Hex Head screws located on each side of the cage.



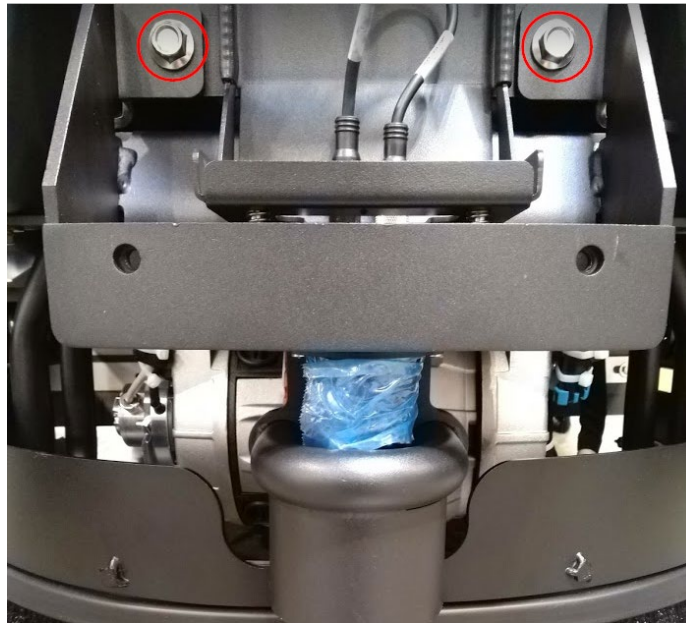
2c. Loosen (DO NOT remove) both 13mm Hex Head screws that hold the Z-shaped bracket.



2d. Swing both Z-shaped brackets away from the cage



2e. While holding the cage, remove both front 14mm Hex Head screws.



Step 3: Remove the old cage.

Note: Once the cage is loosened, be very careful not to hit the lidar. The smallest scratch can render it defective.

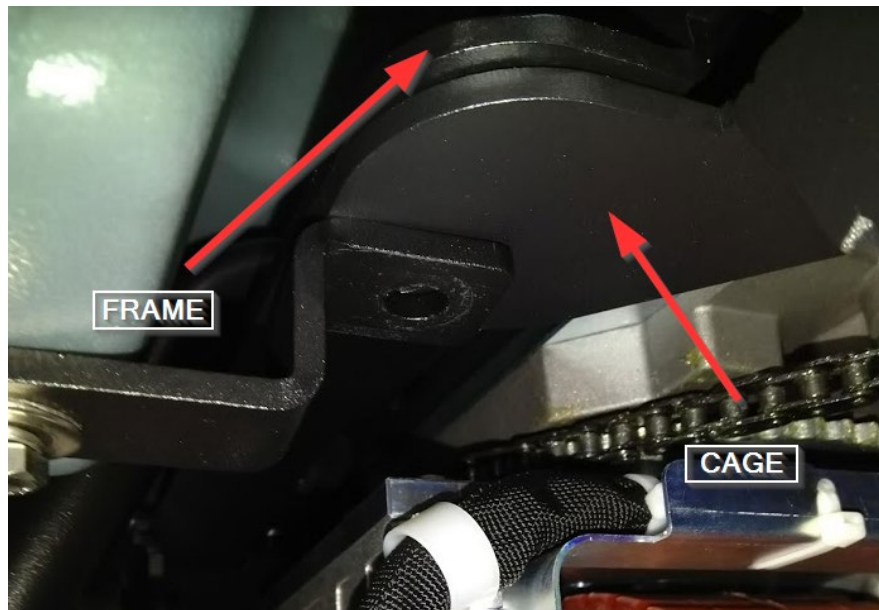
Slide the cage past the Lidar then tilt it out. DO NOT let the cage touch the LIDAR. Push down on the brush towards the floor for extra clearance.



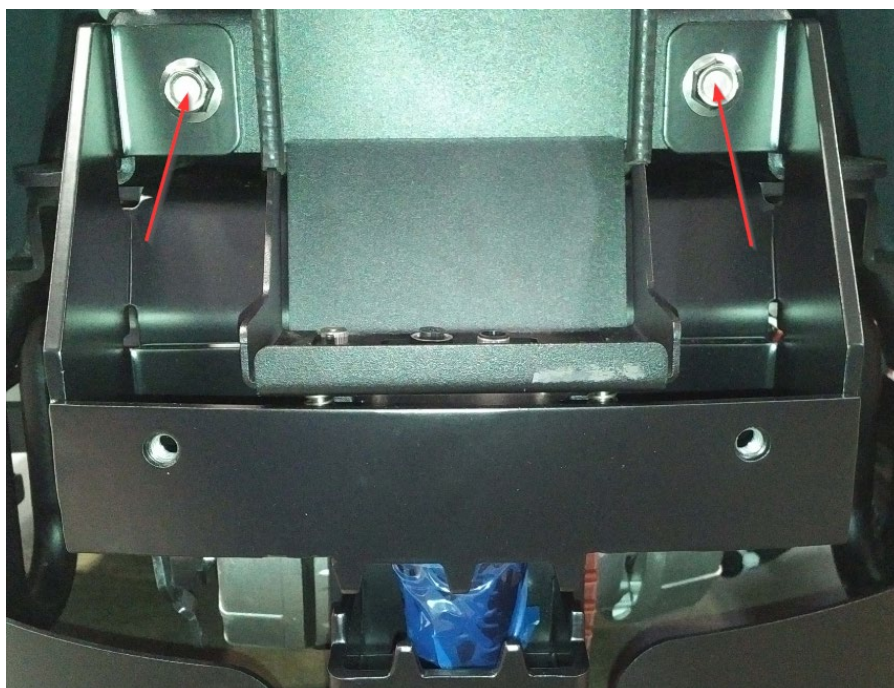
3.2. Installation of the New Cage.

Step 1: Attach the front of the cage.

- 1a.** Slide the new cage in the same way the old one came out.
- 1b.** Return the Z-shaped brackets to their original position and make sure the cage goes between the frame and the brackets.
- 1c.** Hand tight the two vertical 13mm Hex Head screws (they will be torqued later).

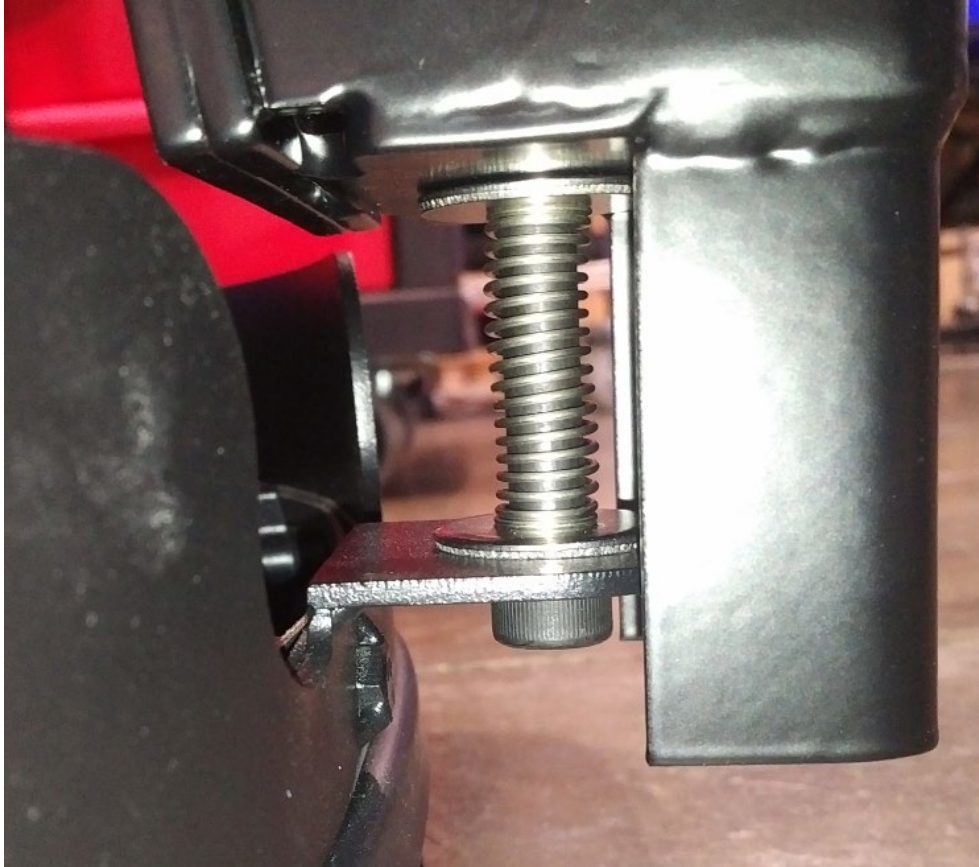


- 1d.** Hand tight the two front 14mm Hex Head screws (they will be torqued later).



Step 2: Connect the front brush to the cage

Connect the front brush back to the cage using the shoulder bolt, the washers and the spring that were removed in section 3.1 step 2. To help with alignment, make sure the brush is in contact with the ground. It can also slightly move side to side.



Step 3: Torque all fasteners.

- 3a.** Torque the four vertical hex head side screws connecting the Z brackets to 21 N-m.
- 3b.** Torque the two front hex head screws to 42 N-m.
- 3c.** Torque the shoulder bolt to 21 N-m.

Step 4: Connect the front cover.

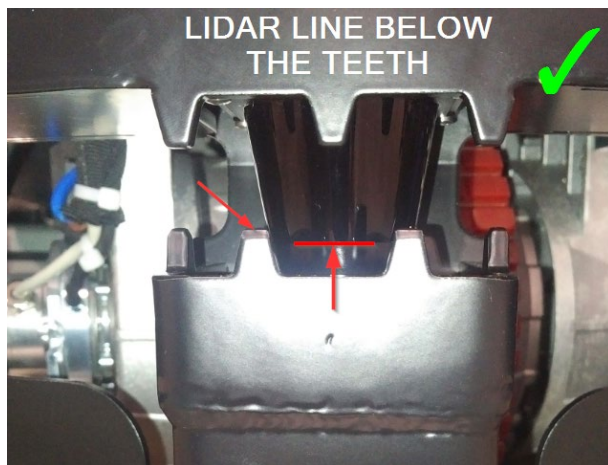
Using the 12 button-head socket screws, re-attach the front cover.

4. Test Procedure

4.1. Visual Inspection

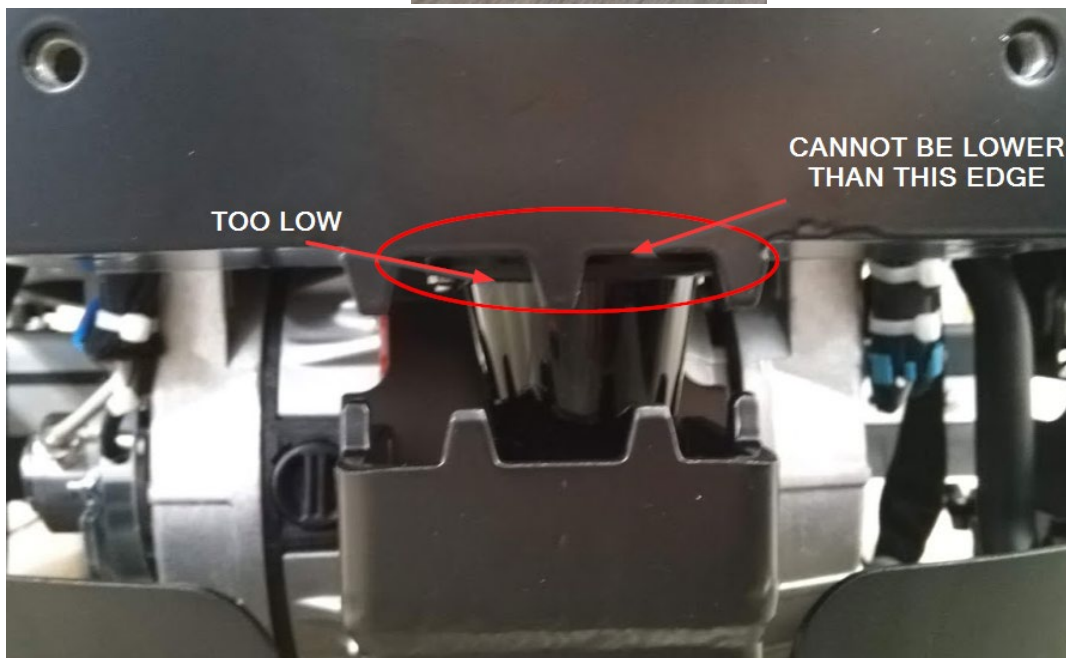
Step 1: Lower Limit.

After removing the blue tack film from the Lidar, notice the vertical cone at the end of the black cover. The edge of this cone should be higher than the highest bottom tooth:



Step 2: Upper Limit.

The top edge of the black cover should not be lower than the base of the upper teeth:



4.2. Software Test

4a. Park the machine 1-2 meters away and facing a wall.

4b. Using the touchscreen go to:

Input code: 1337

Settings

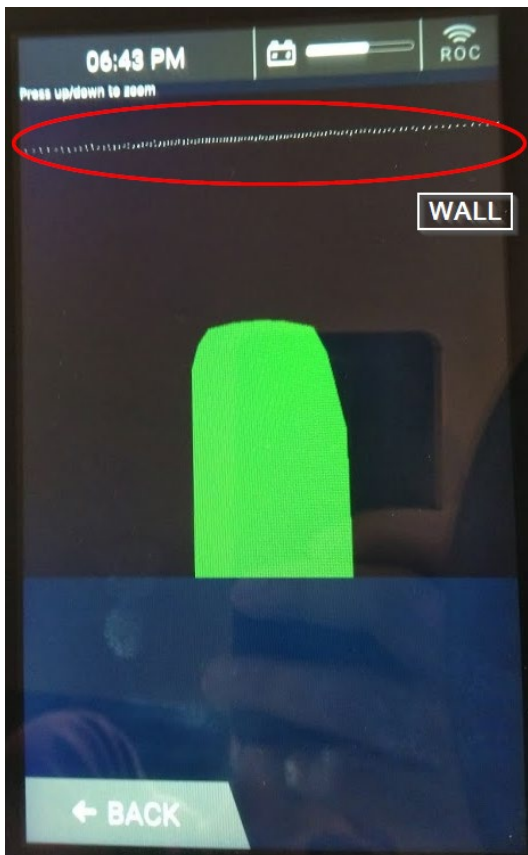
Service

Input code: 1667

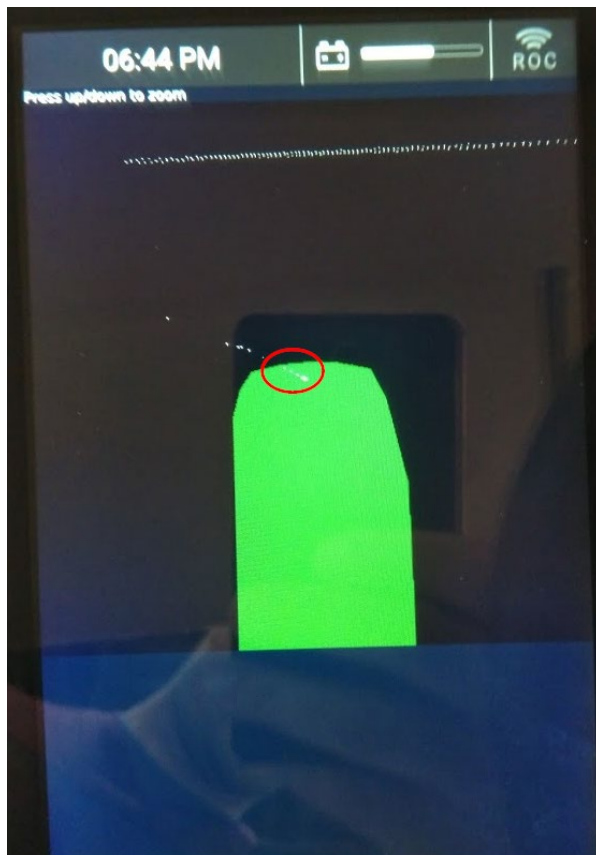
Diagnostics

Raw Planar Lidar

- 4c. Tap the top of the screen to zoom in until the wall appears near the top of the screen
 - 4d. There should be no white dots under the green vehicle footprint or between the vehicle and the white dotted-line that represents the wall.
 - 4e. Turn the vehicle 90 degrees so the wall is about 1-2m on the side of the vehicle.
- Verify no “rogue” dots.
- 4f. Repeat on the other side.



No obstruction detected



Obstruction detected

5. Quality Assurance Checklist

Check off each criterion when evaluated and confirmed

- ☐ Blue tack film removed.
- ☐ Brush re-attached.
- ☐ No scratch on the Lidar.
- ☐ All bolts are torqued to specs.
- ☐ Lidar is visually in the correct position.
- ☐ No obstructions present in the diagnostic window.