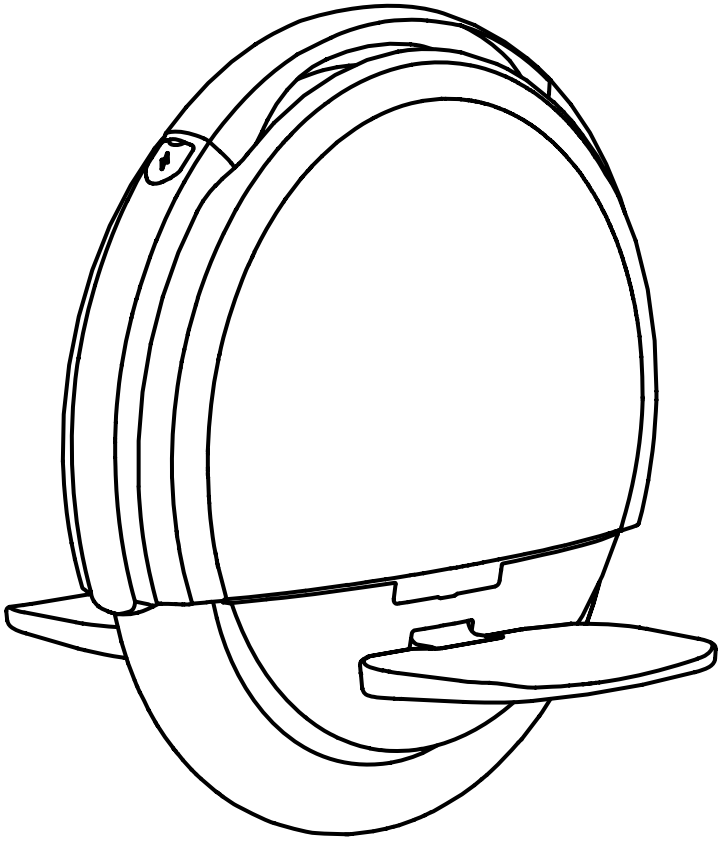
Service Manual

ninebot one S1



by SEGWAY

Trademark, Patent, and Contact Information

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For patent information go to www.segway.com.

Ninebot (Tianjin) Technology Co. Ltd. manufactures and sells the One S1 under a license from DEKA Products Limited Partnership.

Contact Information

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Technical Support: 1-866-473-4929, prompt #2

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Safety Conventions

The following safety messaging conventions are used throughout this document:

⚠ **WARNING!**	Warns you about actions that could result in death or serious injury.
⚠ **CAUTION!**	Warns you about actions that could result in minor or moderate injury.
NOTE	Indicates information considered important, but not related to personal injury. Examples include messages regarding possible damage to the One S1 or other property, or usage tips.

Important Safety Notices

Read and follow all safety notices.

⚠ **WARNING!**

- To replace parts on the One S1, you must read and follow all instructions and warnings in this manual.
- If servicing a One S1 on a raised surface such as a table, be sure to secure the One S1 so it cannot fall.
- Always power off the One S1 before performing any maintenance or installing any part or accessory. Always unplug the power cord before performing any maintenance or installing any part or accessory.
- Do not use the battery if the case is broken or if the battery emits an unusual odor, smoke, or excessive heat, or leaks any substance. Avoid contact with any substance seeping from the battery. Batteries contain toxic and corrosive materials that could cause serious injury. If you experience any of the above, call Segway Technical Support immediately at 1-866-473-4929, prompt #2.
- Observe and follow all safety information on the warning label found on the battery and all other labels.
- Use only charging devices approved by Ninebot or Segway and never attempt to bypass or override their charging protection circuits.
- Do not wash the One S1 with a power washer or high pressure hose. Avoid exposure to heavy downpours or extended periods of heavy rain (including during riding, storage, or while being transported). Clean with soap and water and a soft cloth. Make sure that the charge port is dry before you plug in the power cord.
- Do not submerge the One S1 or battery in water. If you suspect the battery has been submerged or experienced water intrusion, call Segway Technical Support immediately at 1-866-473-4929, prompt #2. Until you receive further instructions, store the One S1 outdoors and away from flammable objects.
- As with all rechargeable batteries, do not charge near flammable materials. When charging, the batteries heat up and could ignite a fire.
- Always wear gloves when handling chemicals (such as lubricants, corrosion inhibitors, greases, or oils) to reduce the potential for skin damage or irritation.
- When a procedure requires the use of safety glasses (such as those in which a mallet or solvent is used), failure to wear eye protection could result in serious injury.
- Failure to adhere to these warnings could lead to serious injury, death, fire, or damage to property.

⚠ **CAUTION!**

- When a repair involves removing, disconnecting, or handling electronic components, use best-practice electrostatic discharge (ESD) control procedures to avoid damaging sensitive electronic components.

Introduction

Purpose

The purpose of this manual is to provide instructions for servicing the Ninebot One S1 by Segway.

Audience

This manual is written for authorized service technicians.

General Service Procedures

Before performing any service on the One S1, you must first determine which components may be damaged or malfunctioning. In some cases this requires a simple visual inspection – as in the case of a cracked or damaged housing. In other cases diagnostic equipment must be used to troubleshoot the problem – as in the case of a vehicle limiting the maximum speed to lower than expected.

No matter what the problem is, the service procedure is the same:

1. **Identify** – identify the symptoms.
2. **Diagnose** – determine which components may be malfunctioning.
3. **Replace** – replace the malfunctioning component(s).
4. **Verify** – operate the vehicle to verify the problem has been solved.

It may be the case that there are multiple problems affecting a One S1. Try to isolate the problems and solve them one at a time.

Related User Materials

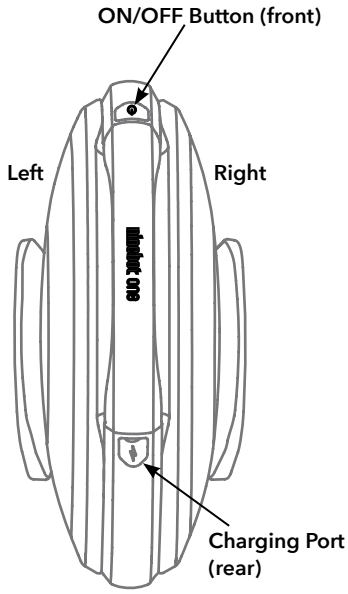
This document is a service manual intended for use by trained technicians to service and repair the One S1. It does not contain general operating information. The following additional user materials may be needed for reference during service:

- *Ninebot One S1 by Segway User Manual*

Please check www.segway.com for the latest user manual, and/or contact Segway to confirm you have on hand the most recent service publications.

Unit Orientation

When servicing the One S1, unit orientation is referenced as shown in the illustration to the right



Control Board Connectors

Some One S1 connectors have a locking tab holding it in place. To unplug/disconnect these connectors you must depress the locking tab while pulling on the connector.

NOTE
When pulling on a connector it is possible to pull the socket as well. Be careful not to pull the socket off the board.

Fasteners

Always tighten fasteners in a cross pattern to ensure that components sit flat against each other. Tighten fasteners to the torque specification listed (if provided). If no torque specification is provided, tighten fasteners securely, but do not overtighten.

NOTE
If a fastener falls into the housing/interior of the unit during service, you MUST remove the fastener before turning ON or operating the unit. A loose fastener could possibly cause a short or some other type of mechanical failure.

ESD Protection

When a repair involves removing, disconnecting, or handling electronic components, use best-practice electrostatic discharge (ESD) control procedures to avoid damaging sensitive electronic components.

At a minimum, ESD protection should include an antistatic mat and an antistatic wrist strap. Both these items must be properly grounded.

Power Tools

Do not use power tools when servicing the One S1. Tighten fasteners to the torque specification listed (if provided). If no torque specification is provided, tighten fasteners securely, but do not overtighten.

Hardware

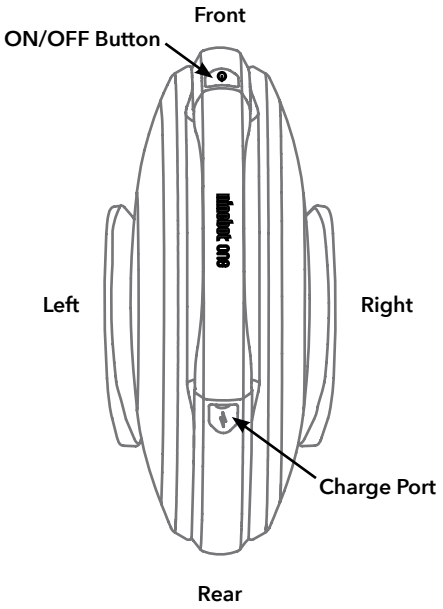
Installation and Removal Procedures

Batteries

Overview

There are two batteries, one on each side of the unit. Each battery is accessed by opening the battery cover. A gasket underneath the battery cover protects the batteries from the elements.

This component is not serviceable; if there is a problem with the battery it must be replaced.



When to Replace

Replace when troubleshooting determines that the battery is malfunctioning.

Safety

⚠ WARNING!
Always remove the batteries before servicing the One S1. Failure to remove the battery could result in serious injury or death due to electric shock.

⚠ WARNING!
After removing the batteries, press the ON/OFF button to discharge any residual energy in the One S1. Failure to do so could result in serious bodily injury from electric shock.

⚠ WARNING!
Do not allow any metallic object to touch the pins of the battery connector. Shorting these pins could result in a hazardous release of stored energy.

⚠ WARNING!
Do not use the battery if the case is broken or if the battery emits an unusual odor, smoke, or excessive heat, or leaks any substance. Avoid contact with any substance seeping from the battery. Batteries contain toxic and corrosive materials that could cause serious injury. If you experience any of the above, call Segway Technical Support immediately at 1-866-473-4929, prompt #2.

Battery Cover

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove the silicone plug (**Figure 1**).
2. Use a Phillips screwdriver to remove the two screws (**Figure 2**).
3. Use your hand to grab the battery cover between the now-empty screw holes. Pull the battery cover off the One S1.

NOTE
It may take a great deal of force to remove the battery cover.

Installation

1. Verify that the gasket is securely installed in the groove (**Figure 3**).
2. Position the battery cover on the One S1. Line up the tabs on the cover with the slots on the housing (**Figure 4**).
3. Press the battery cover onto the housing. Press until it snaps in place.
4. Use a Phillips screwdriver to install the two screws removed earlier (**Figure 2**).
5. Reinstall the silicone plug (**Figure 1**).

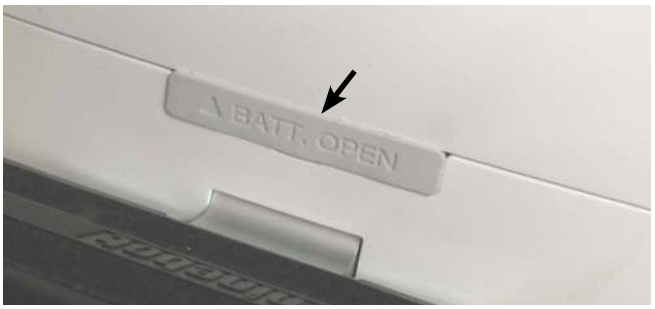


Figure 1: Remove the silicone plug


Figure 2: Remove the two Phillips-head screws

Figure 3: Verify gasket is installed


Figure 4: Line up cover tabs with slots in the housing

Battery

⚠ WARNING!
Remove BOTH batteries before performing any internal service. Otherwise you risk serious injury or death due to electric shock.

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove the battery cover (**page 14**)
2. Use a Phillips screwdriver to remove the four battery screws (**Figure 5**).
3. Unplug the black connector first, then unplug the yellow connector (**Figure 6**).

⚠ CAUTION!
Pull on the connectors, not on the wires. You don't want to pull the wires out of the connectors.

4. Follow the steps above to remove the battery from the other side of the One S1.

⚠ WARNING!
Do not touch any internal electrical components until after you have removed BOTH batteries and pressed the ON/OFF button to discharge the residual power. Failure to do so could result in serious bodily injury from electric shock.

5. Press and hold the ON/OFF button until all lights are off in order to discharge any power remaining in the One S1.

Figure 5: Remove the four screws

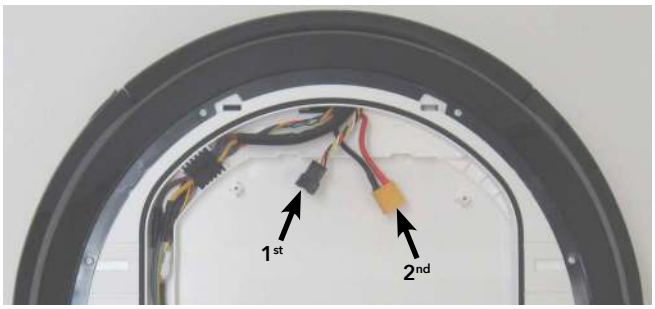


Figure 6: Unplug the connectors

Installation

1. Install in the reverse order of removal, being careful not to pinch the battery wires.

NOTE
Do not overtighten the battery fasteners or you may strip the plastic mounting posts.

Battery Test

Tools Required

- Multimeter

Removal

1. Remove both battery covers (**page 14**).
2. Remove both batteries (**page 15**).

⚠ **WARNING!**
Do not touch any internal electrical components until after you have removed BOTH batteries and pressed the ON/OFF button to discharge the residual power. Failure to do so could result in serious bodily injury from electric shock.

3. Press the ON/OFF button until all lights are off to discharge any power remaining in the One S1.
4. Set the multimeter to measure DC voltage.
5. Measure the battery voltage. Probe the battery's yellow connector, as shown in **Figure 7**.
6. The voltage should be 50–62 VDC. If it is higher or lower there is a problem with the battery. Contact Segway (**page 3**) for a replacement battery.

Figure 7: Measure the DC voltage

⚠ **CAUTION!**
When measuring battery voltage with a multimeter, be careful not to short the test probes or the two pins in the battery connector. Doing so could result in a hazardous release of stored energy.

Installation

1. Install the battery (**page 15**).

Pedals

Overview

There are two pedals, one on each side of the unit.

When to Replace

Replace a pedal when it is cracked, bent, or otherwise broken.

Pedals

Tools Required

- 2.5 mm hex wrench
- 5 mm hex wrench
- Punch

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Loosen the set screw in the bottom of the bracket (**Figure 8**).
2. Remove the end fasteners from both ends of the pedal (**Figure 8**).

   NOTE
   You may need to use significant force to break the tension when removing these fasteners.

3. Using a punch or similar tool, tap out the rod.
4. Retain the bushings and spacers for installation.

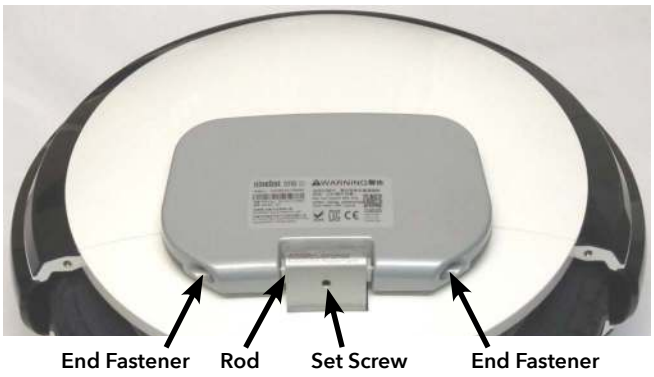


Figure 8: Remove the pedal fasteners

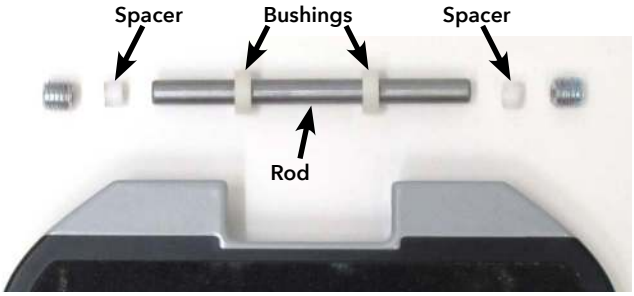


Figure 9: Retain the bushings and spacers

Installation

1. Install in the reverse order of removal.

   NOTE
   Be sure to install the bushings and spacers as shown in **Figure 9**.

Pedal Components

Each pedals is composed of:

- Base
- Cover
- Grip tape, small
- Grip tape, large

Holding the cover onto the base are:

- Threaded inserts (6 per pedal)
- M4x10 flathead screws (6 per pedal)

Tools Required

- 2.5 mm hex wrench

Disassembly

⚠ Make sure the One S1 is powered off and the charger is not connected.

NOTE
You can perform these steps with the pedal still attached to the unit, however it is easier if you remove the pedal first (**page 18**).

1. Peel both pieces of grip tape off the pedal and discard (**Figure 10**).
2. Using a 2.5 mm hex wrench, remove the six fasteners.
3. Separate the pedal cover from the pedal base (**Figure 11**).
4. To remove threaded inserts (**Figure 12**): insert a screw into the threaded insert, then tighten the screw to press the threaded insert out.

Assembly

1. To install threaded inserts (**Figure 13**): orient the threaded insert with the knurled edge up and press it firmly into the hole.
2. Install in the reverse order of removal.

⚠ **WARNING!**
Always install new grip tape. Old/reused grip tape could come loose while riding.

Figure 10: Grip tape removed

Figure 11: Pedal cover (left) and base (right)

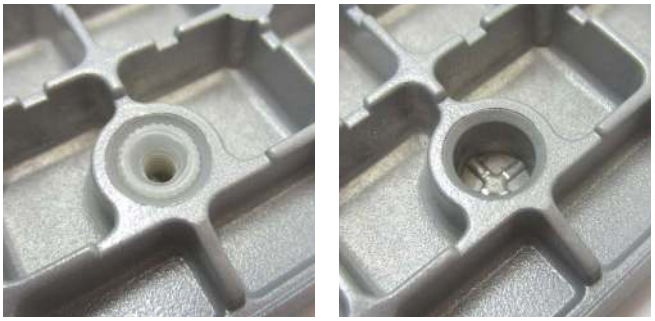


Figure 12: Threaded insert, present (left) and absent (right)

Figure 13: Threaded insert

LED Strips

Overview

There are two LED covers, one on each side of the unit.

There are four LED strips, two on each side of the unit.

When to Replace

Replace an LED cover when it is cracked, bent, or otherwise broken.

Replace an LED strip when troubleshooting determines that it is malfunctioning.

LED Covers

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove the following components:
   a. Both battery covers (**page 14**).
   b. Both batteries (**page 15**).
2. Use a Phillips screwdriver to remove the six screws (**Figure 14**).
3. Remove the LED cover.

Figure 14: Remove the six screws

Installation

1. Install in the reverse order of removal.

   NOTE
   Be careful not to pinch any wires when installing the LED cover.

LED Strips

Tools Required

- Flathead screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove the following components:
   a. Both battery covers (**page 14**).
   b. Both batteries (**page 15**).
   c. LED cover(s) (**page 22**).
2. Gently pull the LED strip connector out from behind the housing, and unplug the connector (**Figure 15**).
3. The LED strip is held in place with double-sided tape. Gently peel the LED strip off.
4. Use a flathead screwdriver or similar tool to scrape off any double-sided tape residue (**Figure 16**).

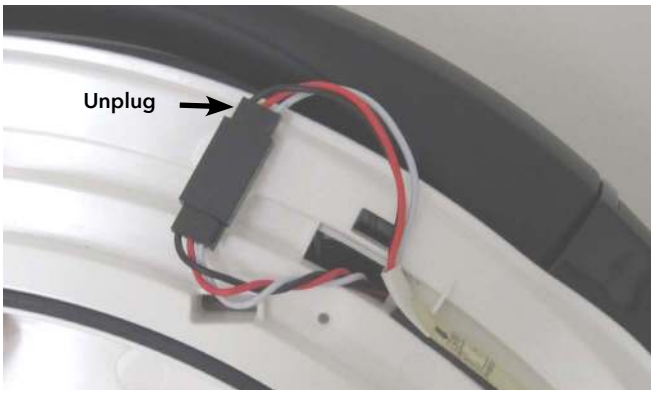


Figure 15: Unplug the LED strip

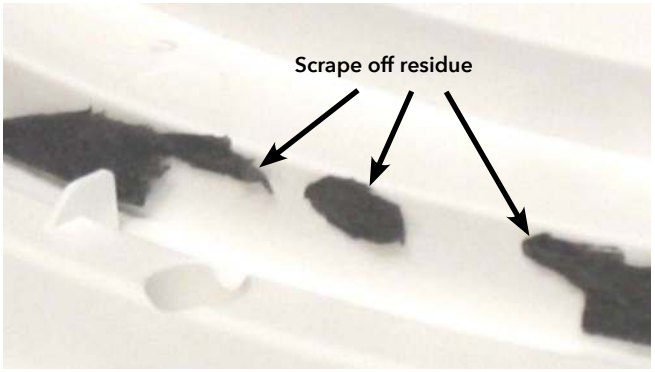


Figure 16: Scrape off any residue

Installation

1. Install in the reverse order of removal.

NOTE

The following sections in this service manual are intended for authorized service technicians only. Segway does not recommend that non-authorized individuals replace any of the components described in the following sections. The warranty will be void if components in any of the following sections are replaced by an individual other than an authorized service technician.

Body

Overview

This procedure breaks down the One S1 into these components:

- Side panels
- LED Covers
- Battery covers
- Frame
- Wheel
- Pedals
- Batteries

Safety

⚠ WARNING!
After removing both batteries, press and hold the ON/OFF button until all lights are off in order to discharge any power remaining in the One S1. Failure to discharge residual power could result in injury or death due to electric shock.

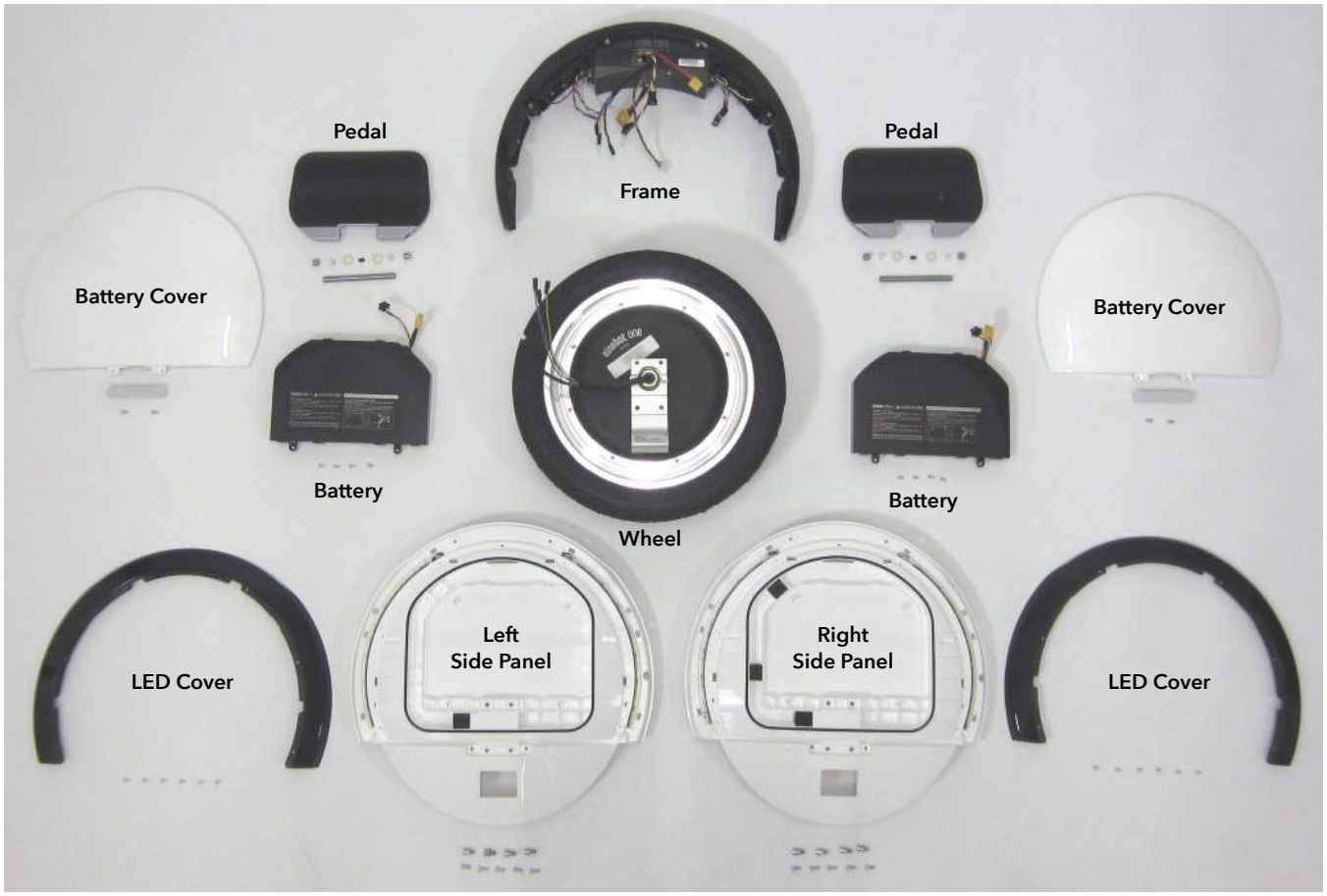


Figure 17: Components after body disassembly

Body Disassembly

Tools Required

- 3 mm hex wrench
- Phillips screwdriver

Setup

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove the following components:
   a. Both battery covers (**page 14**)
   b. Both batteries (**page 15**)
   c. Both Pedals (**page 18**)
   d. Both LED covers (**page 22**)
2. Press and hold the ON/OFF button until all lights are off in order to discharge any power remaining in the One S1.

⚠ **WARNING!**
Failure to discharge residual power could result in injury or death due to electric shock.

Figure 18: Body

Remove the Left Side Panel

1. Using a 3 mm hex wrench, remove the four hex bolts (**Figure 19**). These connect the side panel to the wheel.
2. Using a Phillips screwdriver, remove the five screws around the exterior edge of the side panel (**Figure 19**).
3. Flip the unit over and remove the bottom-right fastener (**Figure 20**). Then flip the unit back over.

   NOTE
   One or more of these screws may be underneath a Warranty Void sticker. Simply press the screwdriver through the sticker to break the seal and access the screw.

4. Carefully lift the side panel from the bottom. See **Figure 21**.

⚠ **CAUTION!**
Do not strain the wires. If you dislodge a wire from an internal component, you may have to replace that component.

5. Unplug both LED strips (**Figure 22**) and carefully guide the battery wires through the hole.

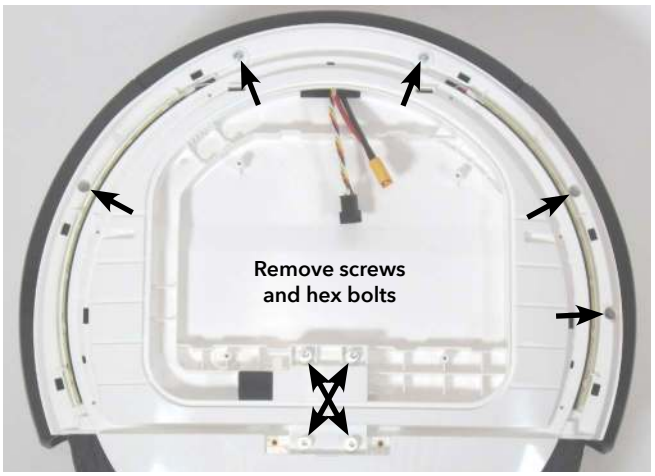


Figure 19: Remove the fasteners

Figure 20: Install the last fastener on the right side panel

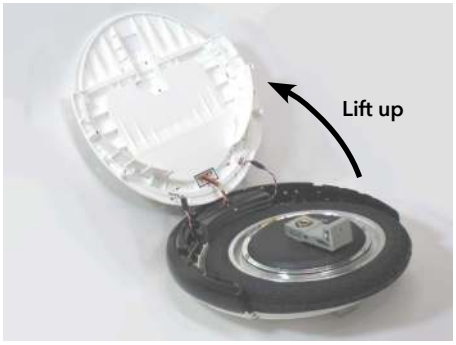


Figure 21: Lift the side panel from the bottom

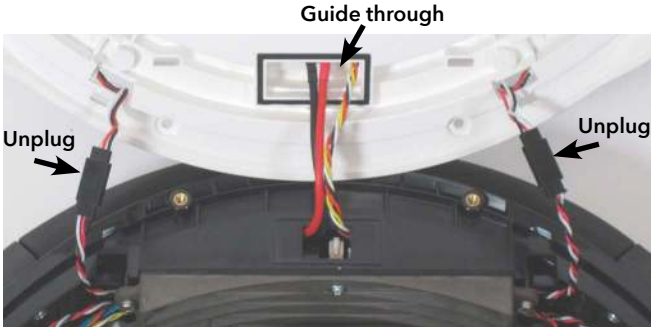


Figure 22: Unplug LED strips

Disconnect the Motor Wires

1. Remove the two upper wire guides (**Figure 23**).
2. Unplug the white connector and three barrel connectors (**Figure 24**).
3. Gently but firmly pull up on the wiring harness to dislodge the third wire guide and the silicone sealant around it (**Figure 25**).
4. Pull the wire guide off the harness and gently scrape any sealant residue off the harness.

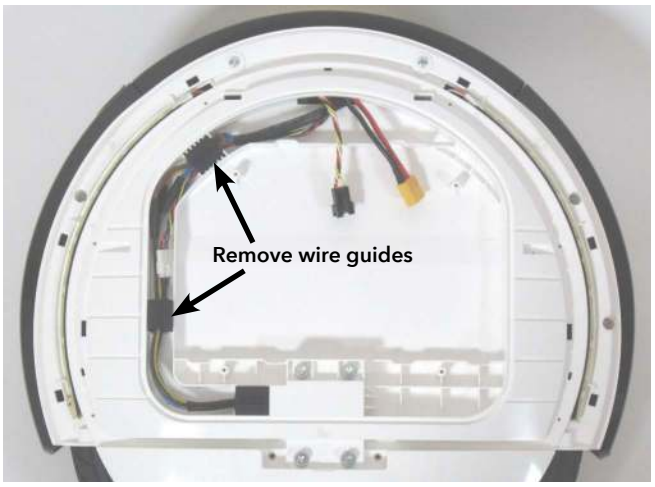


Figure 23: Remove the two wire guides

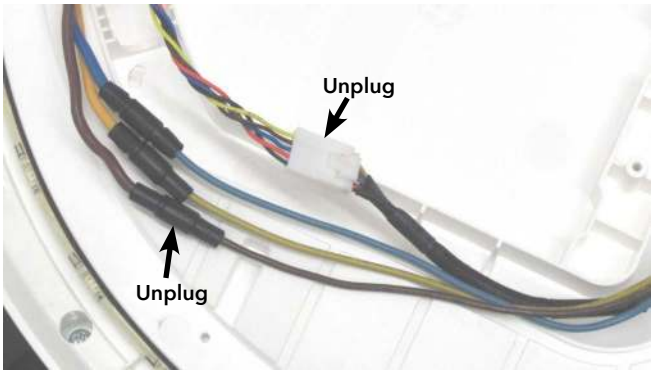


Figure 24: Unplug the motor wires

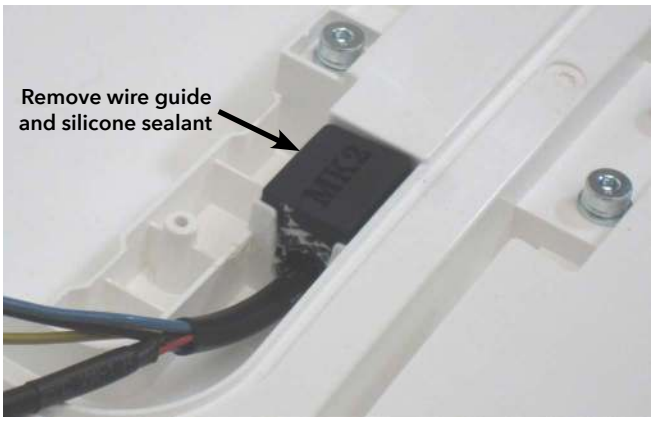


Figure 25: Remove wire guide and silicone sealant

Remove the Frame

1. Using a Phillips screwdriver, remove the four screws around the exterior edge of the side panel (**Figure 26**).

   NOTE
   One or more of these screws may be underneath a Warranty Void sticker. Simply press the screwdriver through the sticker break the seal and access the screw.

2. Carefully separate the frame from the side panel.

⚠ **CAUTION!**
Do not strain the wires. If you dislodge a wire from an internal component, you may have to replace that component.

3. Unplug both LED strips (**Figure 27**) and carefully guide the battery wires through the hole.

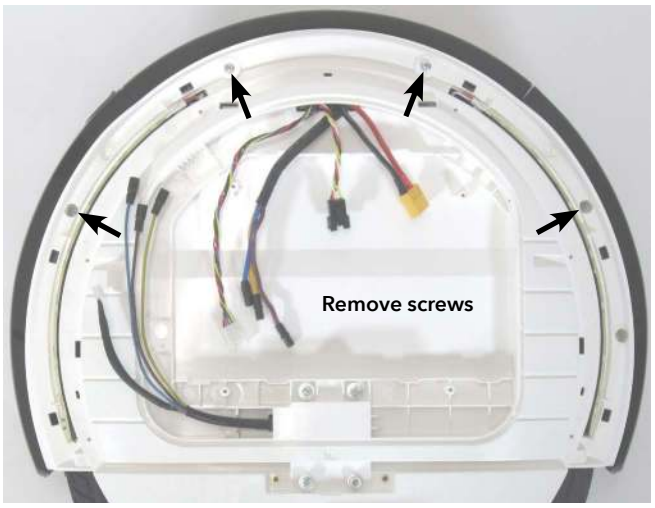


Figure 26: Remove the four screws

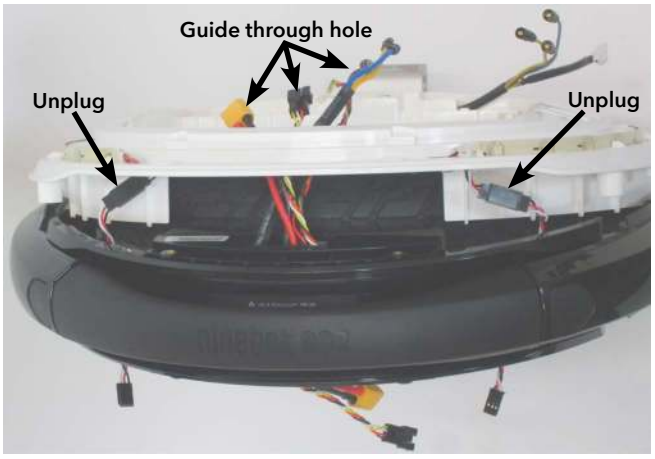


Figure 27: Unplug the LED strips

Separate the Wheel and Side Panel

1. Using a 3 mm hex wrench, remove the four hex bolts (**Figure 28**). These connect the side panel to the wheel.
2. Carefully separate the side panel from the wheel.

⚠ **CAUTION!**
Do not strain the wires. If you damage the motor harness, you may have to replace the wheel.

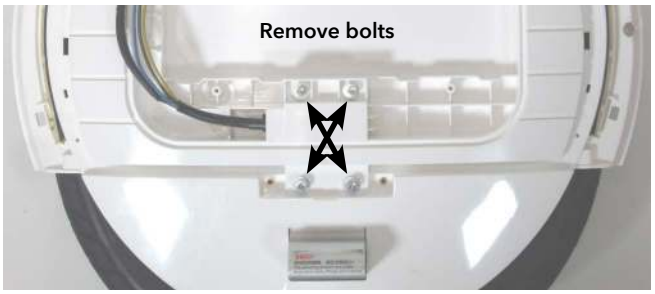


Figure 28: Remove hex bolts

Body Assembly

Follow these steps to assemble together a frame, wheel, and two side panels. Combined, these components make up the body of a One S1.

Tools Required

- 3 mm hex wrench
- Phillips screwdriver
- 705 RTV Sealant

Mount Wheel onto Right Side Panel

1. Take note of which side of the wheel has the wires extending from the hub (**Figure 29**). This is the right side of the wheel.

   NOTE
   Side panels are interchangeable, however it is best to keep them oriented as they were before disassembly. The right side panel has the motor harnesses running through it and has three wire guides. The left side panel has only one wire guide.

2. Mount the wheel onto the right side panel. See **Figure 30**.
   a. Thread the motor harness through the hole in the side panel.
   b. Using a 3 mm hex wrench, install the four fasteners securing the side panel to the wheel.
3. Install the large wire guide (MK2) over the motor harness wires where they enter the side panel. See **Figure 31**.
4. Use 705 RTV Sealant to secure the harness where it exits the wire guide. Apply sealant all the way around the wire.

Figure 29: Wheel orientation

Figure 30: Right side panel and wheel

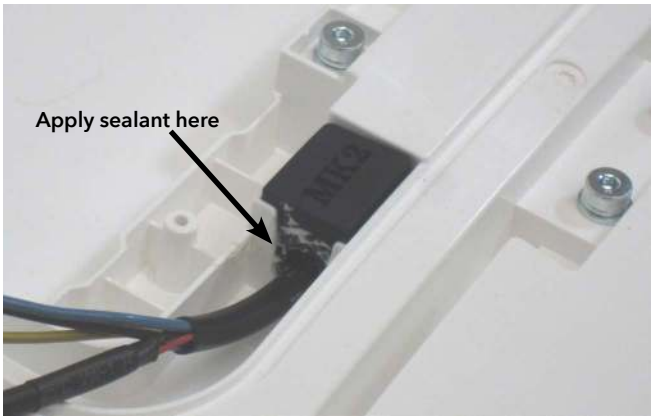


Figure 31: Wire guide

Install the Frame

1. Orient the frame so the motor harnesses are on the right side (same side as right side panel).
2. Thread the motor harnesses and battery harnesses through the hole in the side panel. See **Figure 32**.
3. Connect both LED strips.
4. Gently lay the frame against the side panel, making sure not to pinch any wires between the components.
5. Using a Phillips screwdriver, install four screws securing the frame to the side panel (**Figure 33**).

   NOTE
   There is a hole for one additional screw. You will install this screw after installing the other side panel.

6. Connect the motor communication harness (white connector) and connect the three motor wires (**Figure 34**).
7. Route the motor harnesses through the two small wire guides (MK2a) and press the wire guides into place.

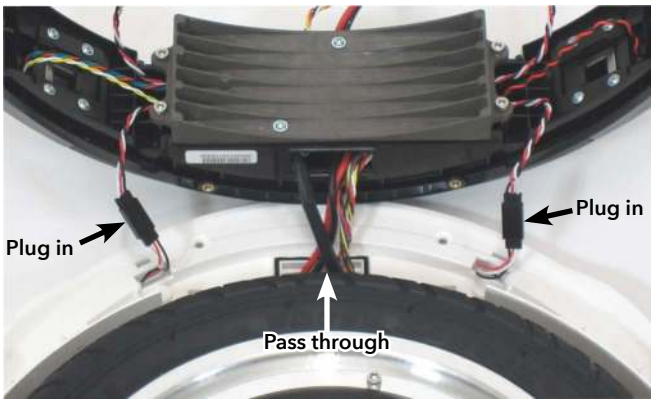


Figure 32: Plug in both LED strips

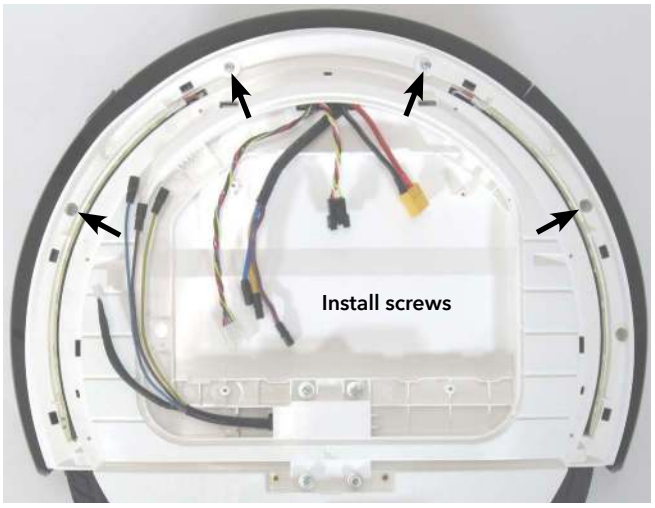


Figure 33: Install four screws

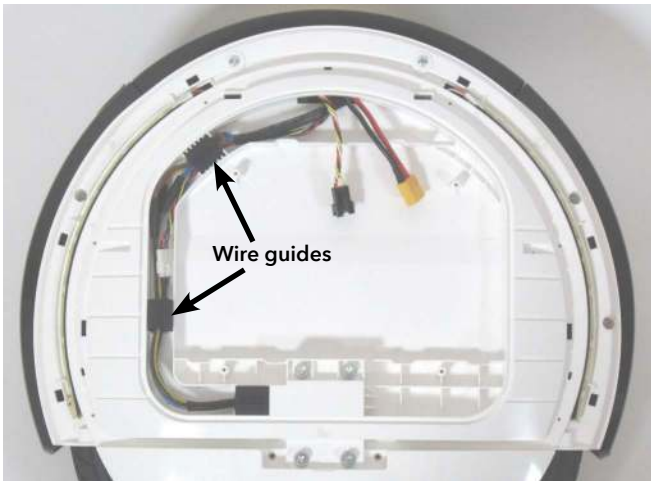


Figure 34: Connect motor harnesses and install wire guides

Install Left Side Panel

1. Verify that that wire guide (MK2b) is installed. See **Figure 35**.
2. Guide the battery harnesses through the hole in the side panel (**Figure 36**).
3. Connect both LED strips.
4. Gently lay the side panel against the frame, making sure not to pinch any wires between the components.
5. Using a 3 mm hex wrench, install four fasteners securing the side panel to the wheel (**Figure 37**).
6. Using a Phillips screwdriver, install five fasteners securing the side panel to the frame (**Figure 37**).
7. Flip the unit over and install the last Phillips-head fastener on that side (**Figure 38**).
8. Install a new Warranty Void sticker over the bottom-right fastener on each side.

Figure 35: Mount the left side panel

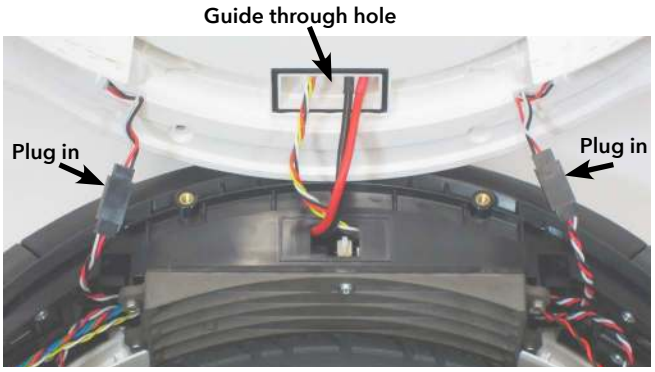


Figure 36: Connect the left side panel to the frame

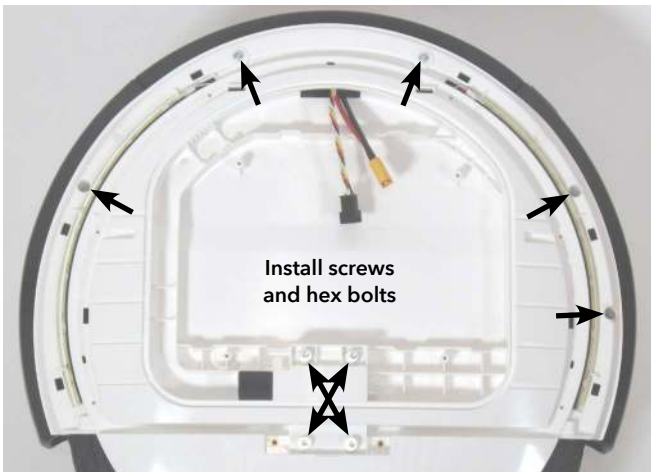


Figure 37: Connect the left side panel to the frame

Figure 38: Install the last fastener on the right side panel

Verify Functionality

Follow these steps to verify that all the harness connections have been made correctly.

1. Install a single battery on either side of the unit.
2. Turn the unit ON.
3. Verify functionality:
   - Does the unit power ON?
   - Do all four LED strips light up?

   If YES to both:
   Remove the battery, press the ON/OFF button (step 4 below), and continue installing components.

   If NO to either:
   Remove the battery. press the ON/OFF button (step 4 below), and diagnose the cause before proceeding with component installation.

⚠ **WARNING!**
Do not touch any internal electrical components until after you have removed BOTH batteries and pressed the ON/OFF button to discharge the residual power. Failure to do so could result in serious bodily injury from electric shock.

4. Press and hold the ON/OFF button until all lights are off in order to discharge any power remaining in the One S1.

Frame

Overview

The frame is the central assembly located between the side panels and around the upper portion of the wheel.

The frame is composed of:

- Upper frame
- Front frame
- Rear frame

Mounted on the frame are:

- Control board
- ON/OFF button
- Charge port
- Buzzer
- Handle

When to Replace

Replace the frame (upper, front, or rear) when it is cracked, bent, or otherwise broken.

Replace the control board, ON/OFF button, charge port, buzzer, or handle when troubleshooting determines that the component is malfunctioning or damaged.

Safety

⚠ **CAUTION!**
ESD best practices and take care with sensitive electronic components. Don’t pull on or stress the wires.

Control Board Assembly

Tools Required

- 3 mm hex wrench

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Using a 3 mm hex wrench, remove the four control board fasteners (**Figure 39**).

Figure 39: Remove the four fasteners

⚠ **CAUTION!**
Do not strain the wires. If you dislodge a wire from an internal component, you may have to replace that component.

3. Gently pull the control board and attached heat sink off of the upper frame. Guide the battery wires and motor wires through the holes in the frame.
4. Remove the U-grommets (**Figure 40**).
5. Unplug the charge port, buzzer, handle sensor, and ON/OFF board harnesses (**Figure 41**).

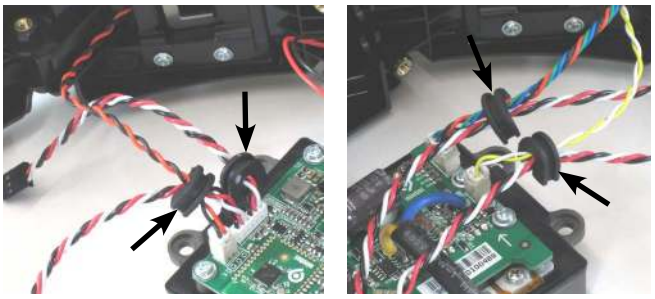


Figure 40: Remove the U-grommets

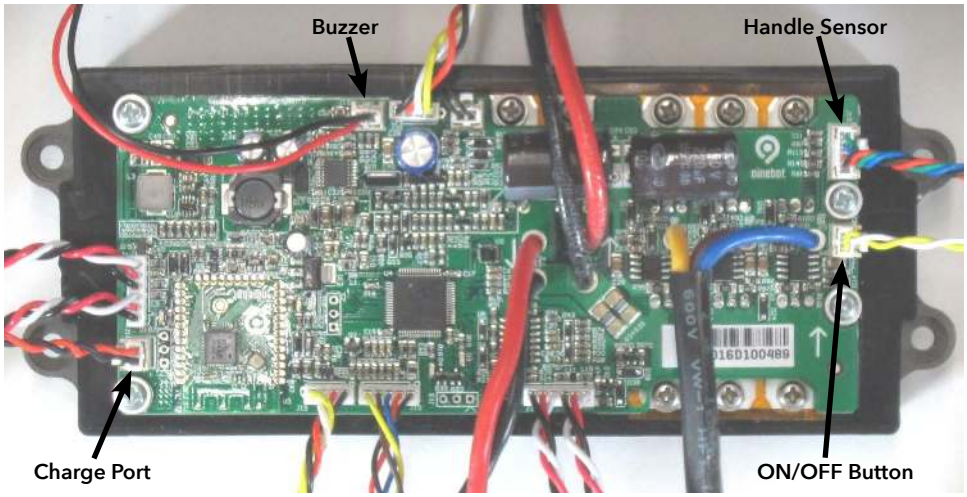


Figure 41: Unplug wires

Installation

1. Plug in the charge port, buzzer, handle sensor, and ON/OFF button (**Figure 41** and **Figure 42**).
2. Install the U-grommets as shown in **Figure 40**.
3. Install the control board assembly:
   a. Insert the motor wires through the holes in the sides of the upper frame.
   b. Press the U-grommets into the grooves in the upper frame (**Figure 43**).
   c. Use a 3 mm hex wrench to install the four fasteners (**Figure 39**).
4. Continue to install in the reverse order of removal.

Figure 42: Plug in all wire harnesses

Figure 43: Install U-grommets

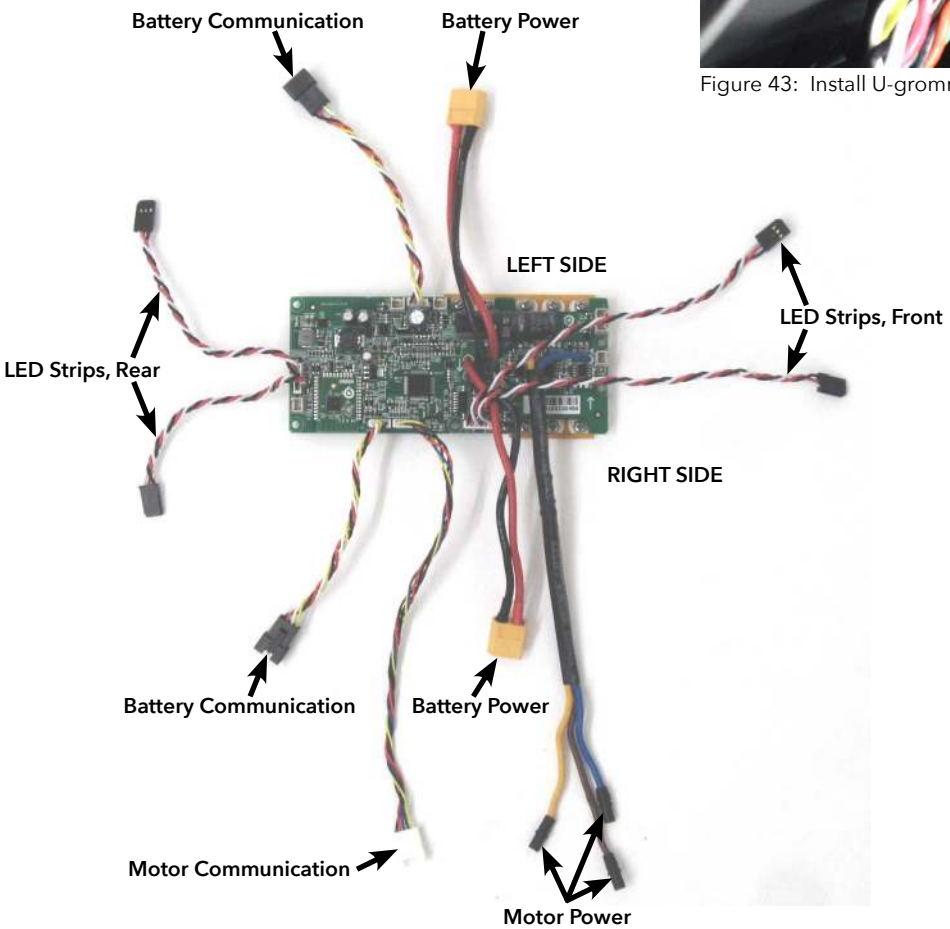


Figure 44: Control board connectors

Control Board Components

Tools Required

- Phillips screwdriver
- Isopropyl alcohol
- Silicone thermal paste

Disassembly

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).
3. Remove the control board gasket (**Figure 51**).
4. Unplug the temperature sensor (**Figure 45**).
5. Using a Phillips screwdriver, remove the nine screws holding the control board to the heat sink
   a. Five screws on top (**Figure 46**).
   b. Four screws on bottom (**Figure 47**).

   NOTE
   DO NOT remove the eight fasteners connecting the FETs to the two aluminum pads (**Figure 48**).
6. Gently pull the control board off the heat sink.

   NOTE
   Thermal paste between the aluminum pads and the heat sink may cause the components to stick together. Apply firm but gentle pressure. Do not force the components apart.
7. Use isopropyl alcohol and a rag to remove the thermal paste from both surfaces.

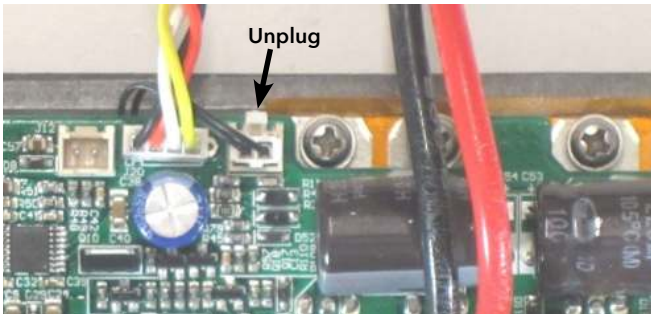


Figure 45: Unplug the temperature sensor

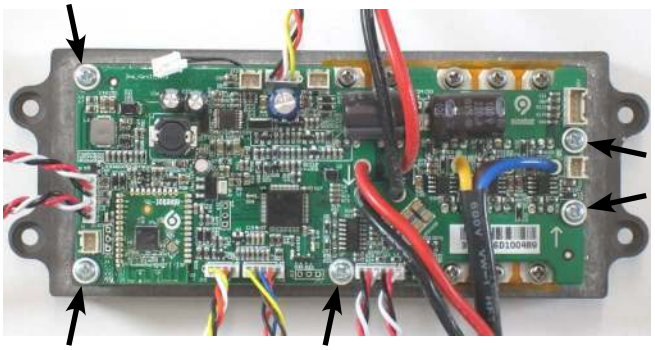


Figure 46: Remove five fasteners on top

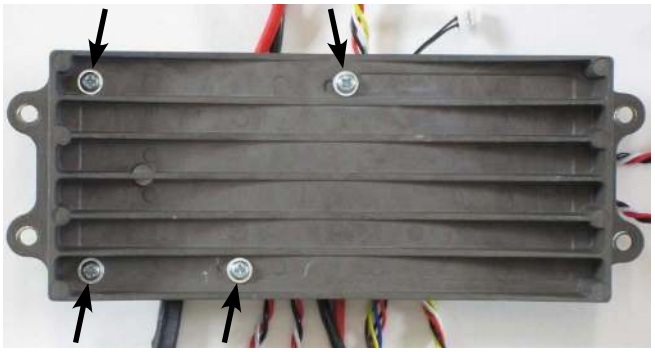


Figure 47: Remove four fasteners on bottom

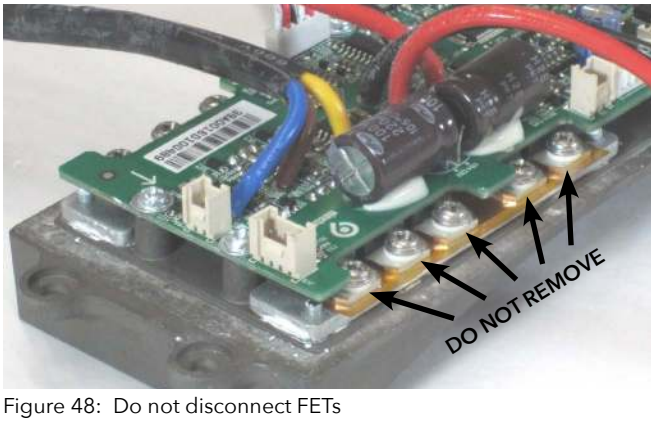


Figure 48: Do not disconnect FETs

Assembly

1. Apply thermal paste on the the two aluminum pads, as shown in **Figure 49**.
2. Place the control board on top of the heat sink and install nine screws:
   a. Five screws on top (**Figure 46**).
   b. Four screwson bottom (**Figure 47**).
3. Plug in the temperature sensor (**Figure 50**).
4. Orient the control board gasket as shown in **Figure 51**, with the lip up and toward the rear. Install the control board gasket.
5. Continue to install in the reverse order of removal.

NOTE
If you installed a new control board, you will need to reset the serial number (**page 64**).

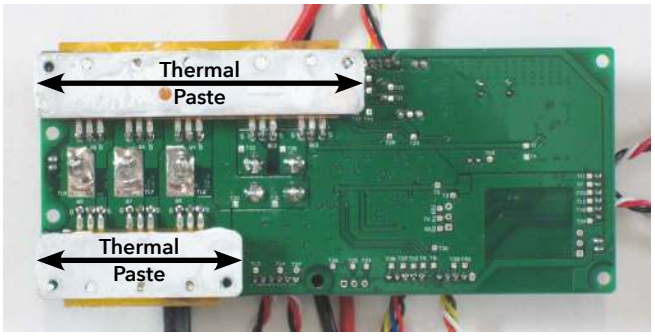


Figure 49: Apply thermal paste

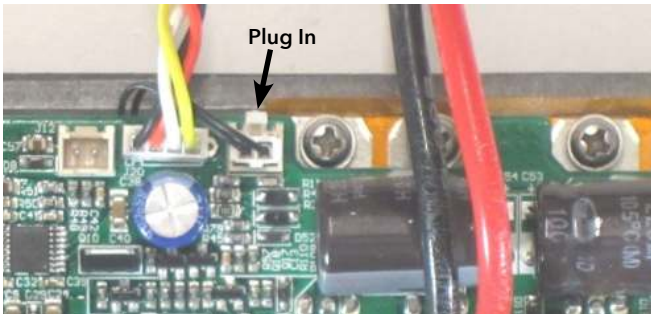


Figure 50: Plug in the temperature sensor

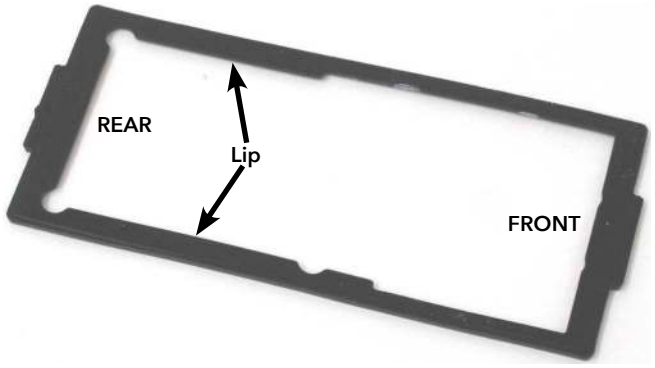


Figure 51: Rubber gasket orientation

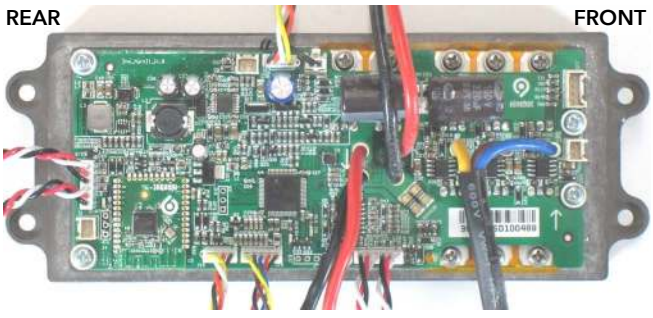


Figure 52: Control board orientation

Front/Rear Frames

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).

Front Frame

1. Using a Phillips screwdriver, remove the four fasteners holding the handle clasp (**Figure 53**).
2. Remove the handle clasp.
3. Lift the front frame off the upper frame.

Rear Frame

1. Using a Phillips screwdriver, remove the four fasteners holding the handle clasp (**Figure 55**).
2. Remove the charge port wire guide (**Figure 56**).

   NOTE
   For better access, you may have to slide the handle back.

3. Gently lift the rear frame off the upper frame while carefully guiding the wires through the hole in the upper frame.

Installation

1. Install in the reverse order of removal.

   NOTE
   Inspect the handle to determine which end has the magnet embedded in it (end closest to the "n" in "ninebot"). Orient this end toward the ON/OFF button.

Figure 53: Front handle clasp present (left) and removed (right)

Figure 54: Front frame

Figure 55: Rear handle clasp present (left) and removed (right)

Figure 56: Wire guide present (left) and removed (right)

Figure 57: Rear frame

Handle

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).
3. Remove the front and rear frames (**page 42**)

⚠ **CAUTION!**
The handle is under spring tension, be careful when removing it.

4. Carefully remove the handle (**Figure 58**).

Installation

1. Inspect the handle to determine which end has the magnet embedded in it (end closest to the "n" in "ninebot"). Orient this end toward the ON/OFF board (**Figure 60**).

⚠ **CAUTION!**
This magnet is used to activate Carry Mode when the unit is lifted by the handle while powered ON. Orienting it the other way could cause Carry Mode not to activate when the user lifts the unit.

2. Install in the reverse order of removal.

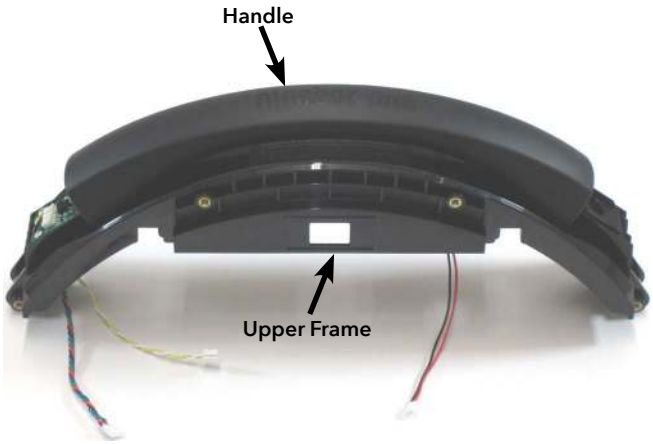


Figure 58: Upper frame and handle assembly

Figure 59: Handle

Figure 60: Handle orientation

ON/OFF Button

Tools Required

- Flathead screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).
3. Remove the front frame (**page 42**).
4. Using a flathead screwdriver, press first one tab and then the other (**Figure 62**) to remove the ON/OFF button from the front frame. Press the tabs in toward the center.
5. Remove the spring (**Figure 63**).

Installation

1. Install in the reverse order of removal.

Figure 61: ON/OFF button installed

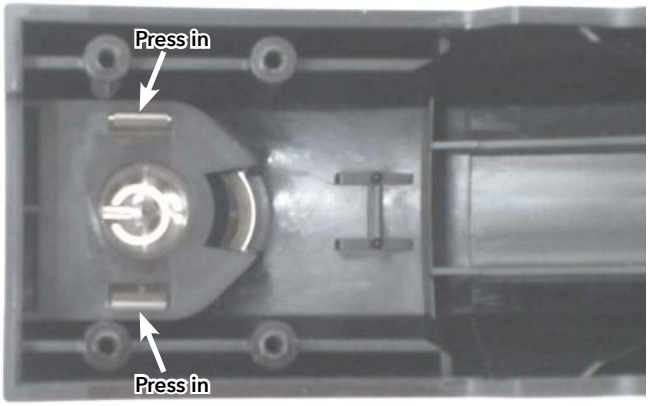


Figure 62: Press the tabs to remove

Figure 63: ON/OFF button and spring

ON/OFF Board

Tools Required

- Phillips screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).
3. Remove the front frame, rear frame, and handle (**page 42**).
4. Using a Phillips screwdriver, remove the three screws holding the ON/OFF board onto the upper frame (**Figure 64**).
5. Gently lift the ON/OFF board off the upper frame while carefully guiding the wires through the hole in the upper frame.

Figure 64: Remove the three screws

Figure 65: ON/OFF board

Installation

1. Install in the reverse order of removal.

Charge Port

Tools Required

- 15 mm socket
- Locking pliers
- Flathead screwdriver
- CA glue

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Access the charge port:
   a. Disassemble the One S1 (**page 28**).
   b. Remove the control board (**page 38**).
   c. Remove the rear frame (**page 42**).
2. Thread a 15 mm socket over the charge port wires. Grip the socket with locking pliers. Remove the nut on the back of the charge port connector.

   NOTE
   If you cannot remove the charge port, replace the rear frame.

3. Open the charge port cover and pull the charge port out of the rear frame. Carefully guide the wires through the hole.

Figure 66: Remove the nut

Figure 67: Charge port

Installation

1. Insert the charge port through the hole in the rear frame.
2. Thread the nut onto the back side of the charge port. Do not tighten fully.
3. Apply a drop of CA glue underneath the nut.
4. Thread a 15 mm socket over the charge port wires. Grip the socket with locking pliers, and tighten firmly.
5. Continue to install in the reverse order of removal.

Charge Port Cover

Tools Required

- Flathead screwdriver
- CA glue

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Access the charge port:
   a. Disassemble the One S1 (**page 28**).
   b. Remove the control board (**page 38**).
   c. Remove the rear frame (**page 42**).
2. Use a flathead screwdriver to pry the end of the charge port cover off the mounting studs. See **Figure 68**.

⚠ **CAUTION!**
Be careful not to damage the mounting studs.

3. Remove the charge port cover.

Installation

1. Insert the long end of the charge port cover through the hole in the rear frame.
2. Press the end of the charge port cover onto the two mounting studs (**Figure 68**).
3. Apply a drop of CA glue over each mounting stud to affix the charge port cover in place.
4. Continue to install in the reverse order of removal.

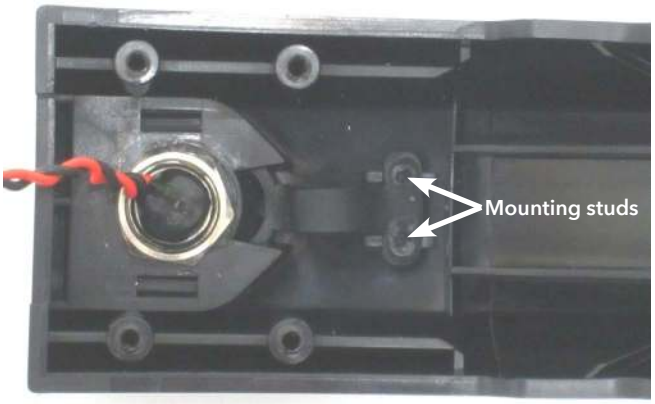


Figure 68: Charge port cover attached to mounting studs

Figure 69: Charge port cover, exterior

Buzzer

Tools Required

- Knife
- Hot melt glue

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove the control board (**page 38**).
3. Use a knife to separate the glue from the frame.
4. Remove the buzzer.

Installation

1. Insert the buzzer into the hole.
2. Apply a generous glob of hot melt glue to hold the buzzer in place.
3. Continue to install in the reverse order of removal.

Figure 70: Buzzer

Figure 71: Glue holds buzzer in place

Temperature Sensor

Tools Required

- Knife
- Thermally conductive epoxy
- Tape

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Remove and disassemble the Control Board (**page 38**).
3. Use a knife to scrape the glue off the heat sink around the temperature sensitive resistor.
4. Gently but firmly pull the resistor out of the hole.
5. Scrape off any remaining residue on the heat sink.

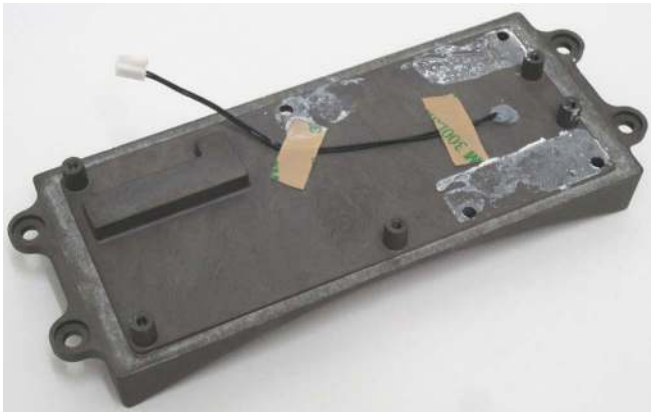


Figure 72: Temperature sensor installed

Installation

1. Insert the temperature sensitive resistor into the hole in the heat sink.
2. Cover the resistor with a glob of thermally conductive epoxy.
3. Route the harness as shown and affix it with tape.
4. Continue to install in the reverse order of removal.

Wheel and Tire

Overview

The wheel contains an internal hub motor. Around the wheel is the tire and inner tube. Attached to the wheel are two foot pedal brackets that are used to mount the wheel onto the side panels and to attach the foot pedals.

Figure 73: Measuring tread depth

When to Replace

Replace the wheel when troubleshooting determines that the hub motor is malfunctioning, or when the wheel is cracked, bent, or otherwise broken.

Replace the foot pedal brackets when they are cracked, bent, or otherwise broken.

Replace the inner tube when it no longer holds air.

Replace the tire when the tread nearly gone. Without the tread, the smooth tire will have less grip.

Safety

⚠ **CAUTION!**
DO NOT attempt to disassemble the wheel and/or hub motor. These components are not serviceable. Disassembling them could cause permanent damage to the internal components.

Hub Brackets

Tools Required

- 13/16-inch socket
- Pass-through socket wrench
- Large flathead screwdriver

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Disassemble the One S1 (**page 28**).
2. Lay the wheel horizontally between two tables, as shown in **Figure 74**.
3. Remove the hub nut, as shown in **Figure 74**. Use a 13/16-inch pass-through socket wrench and a large flathead screwdriver (or metal rod) to turn the hub nut loose.
4. Use a flathead screwdriver to pop loose the axle clamps (**Figure 75**).
5. Lift the bracket and clamps off the wheel shaft
6. Remove the hub bushing (**Figure 76**).

Installation

1. Install in the reverse order of removal.

Figure 74: Removing the hub nut

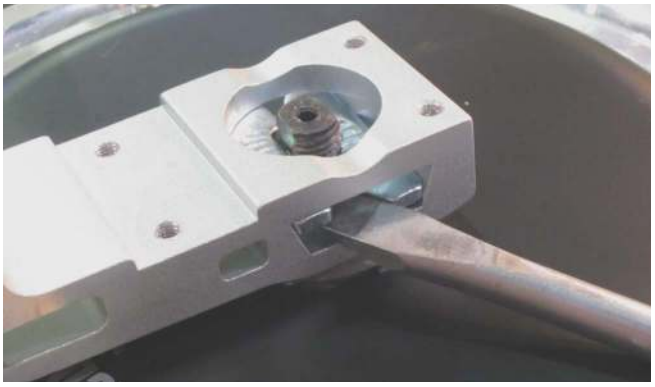


Figure 75: Pop loose the axle clamps

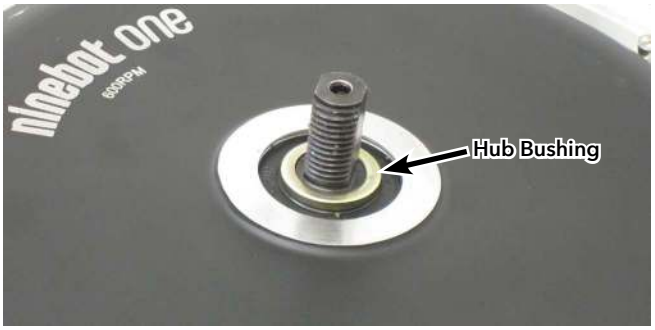


Figure 76: Remove the hub bushing

Tire/Inner Tube

Tools Required

- Two tire irons
- Safety glasses

Removal

⚠ Make sure the One S1 is powered off and the charger is not connected.

1. Remove both battery housings (**page 28**).
2. Remove the valve stem cap and completely deflate the tire by pushing down on the valve needle while squeezing the tire (**Figure 77**).
3. Release the bead on both sides of the tire.
4. Pry one end of a tire iron underneath the lip of the tire bead, pulling the bead up above the rim.
5. Insert a second tire iron under the tire bead about six inches away from the first tire iron and pry that portion of the tire over the rim (**Figure 78**). Repeat until the entire bead of one side of the tire is lifted over the rim.
6. Push the valve stem through the rim and into the tire, then remove the inner tube from the tire (**Figure 79**).
7. If replacing the tire, work the other bead over the wheel to remove the tire completely.

Installation

1. Install in the reverse order of removal.

NOTE
Seat the tire bead on the wheel by hand before installing the inner tube. Inflate the inner tube with just enough air to give it a circular shape, then seat the other tire bead. Be careful not to pinch or trap the inner tube between the tire and wheel rim.

⚠ **CAUTION!**
To avoid pinching, keep hands and fingers away from the bead during inflation.

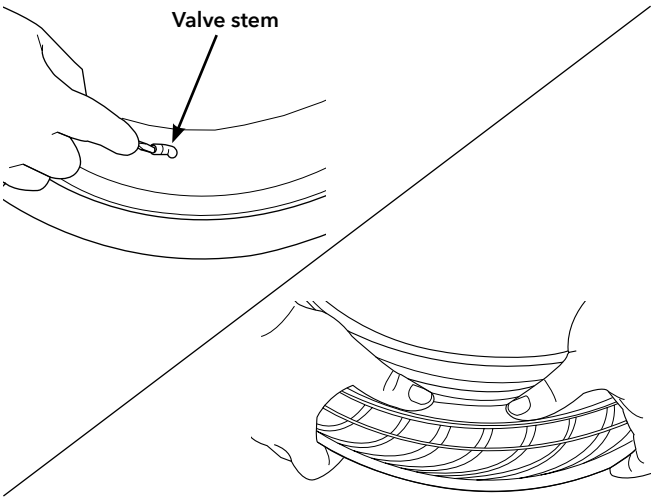


Figure 77: Completely deflate the tire/inner tube

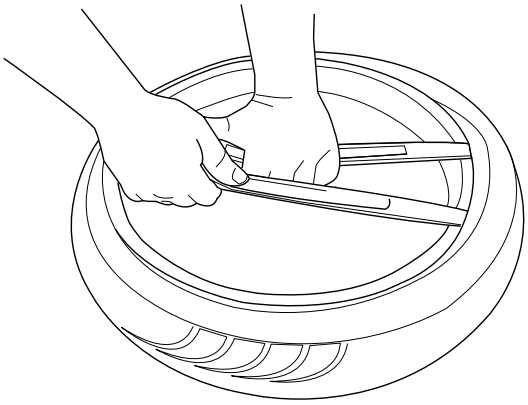


Figure 78: Pry up bead with tire irons six inches apart; repeat

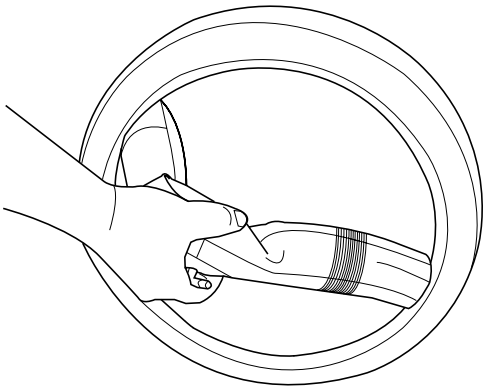


Figure 79: Remove inner tube from tire

Software

Installation, Use, and Diagnostics

Ninebot App

Overview

The Ninebot App can be used to update the firmware on the One S1 and for accessing the Black Box data. A lot of vehicle information can be found within the Ninebot App. Take the time to explore it, because it can be a great tool for troubleshooting.

Ninebot App Installation

Follow these steps to download and install the Ninebot App on your mobile device.

1. Use an iOS or Android mobile device.

   NOTE
   Requires iOS 8 or above, Android 4.3 or above.

2. Scan the appropriate QR code for your device. Alternatively, go to the Apple App Store (iOS devices) or the Google Play Store (Android devices) and search for “Ninebot.”
3. Download and install the App.

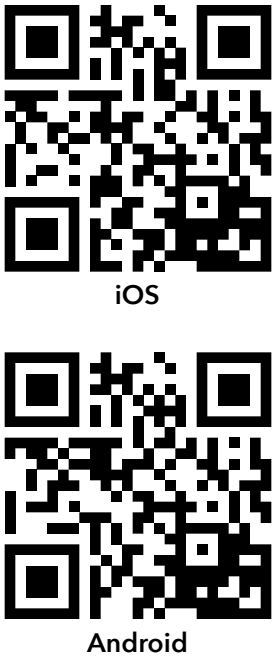


Figure 80: Scan the QR code for your device

Connecting to a One S1

Follow these steps to connect your smartphone or tablet to your One S1.

1. Turn on your One S1.
2. Enable bluetooth on your smartphone or tablet.
3. Open the Ninebot App (**Figure 81**).
4. Wait while the App searches for your One S1.
5. Select your One S1 from the list at the bottom of the screen (**Figure 82**).

Figure 81: Ninebot App icon

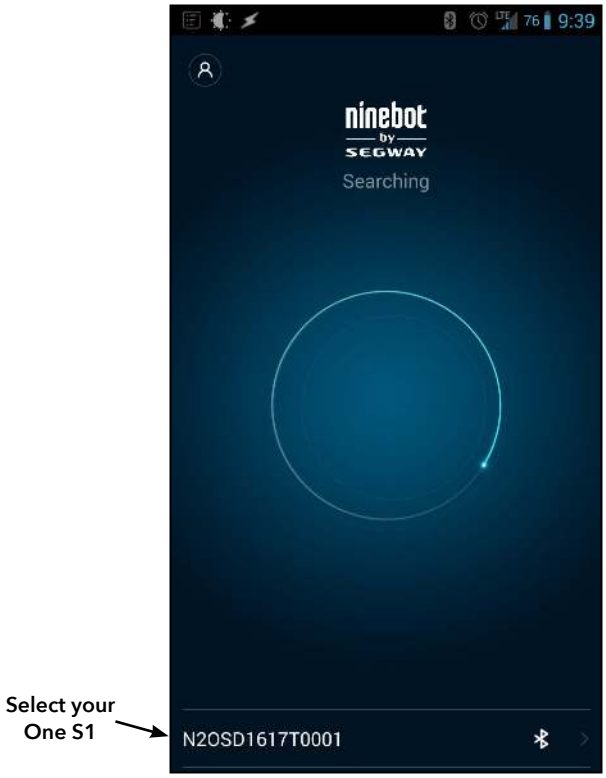
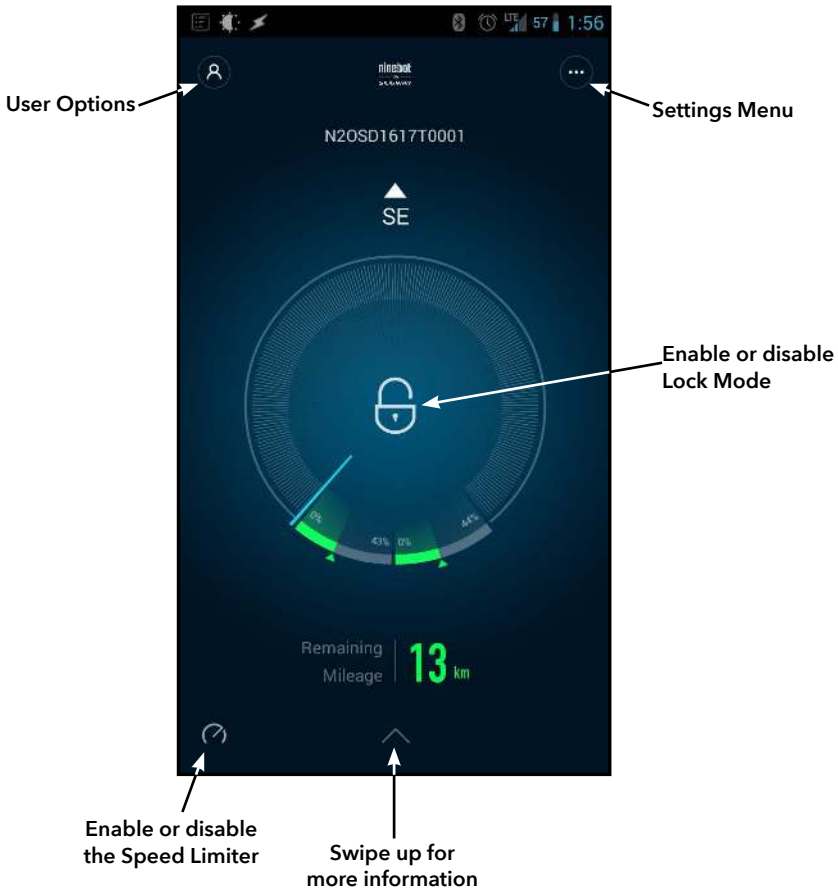


Figure 82: Select your One S1

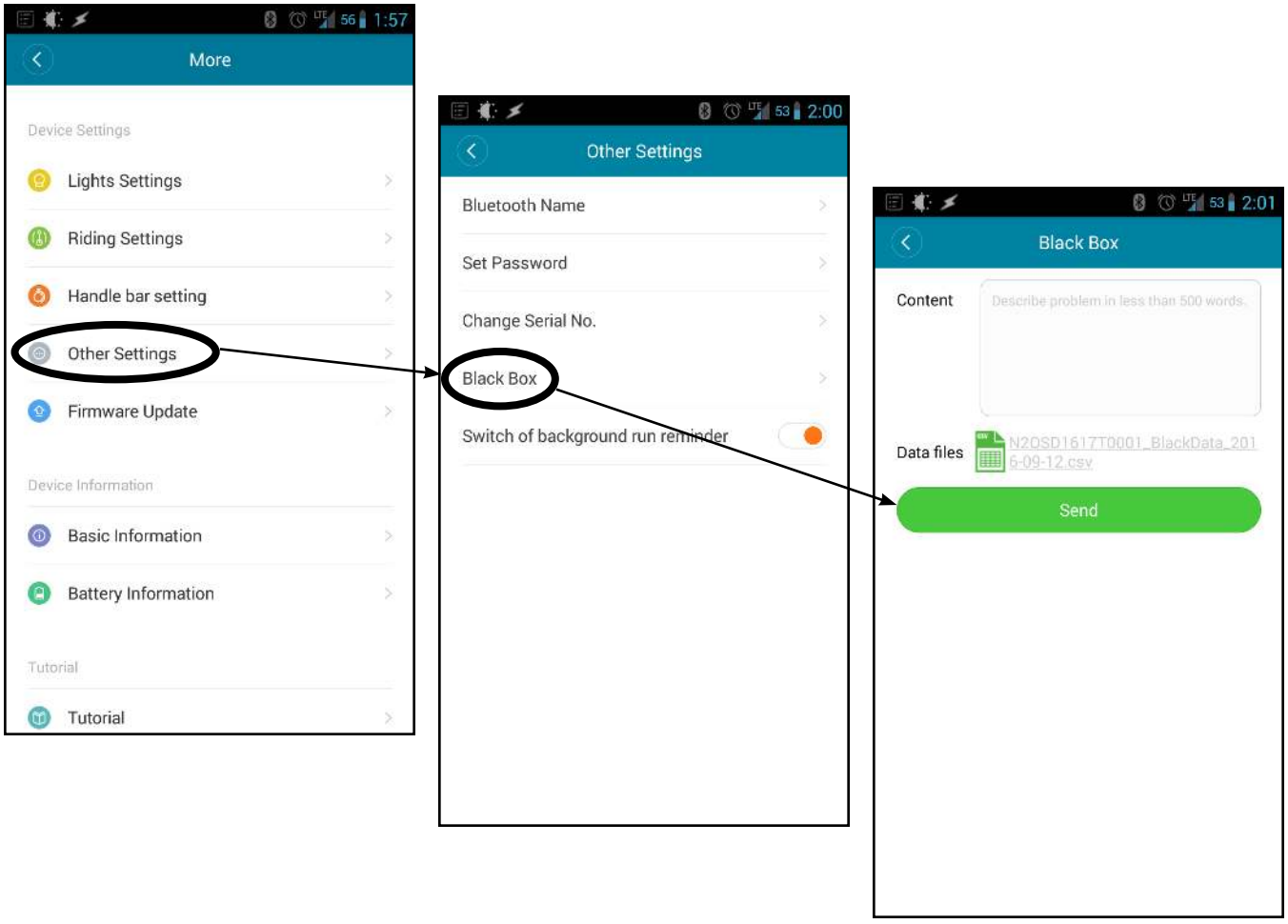
Ninebot App Overview



Black Box

Follow these steps to send the black box data from your One S1. The black box data includes the fault log, battery charge/discharge history, and other information.

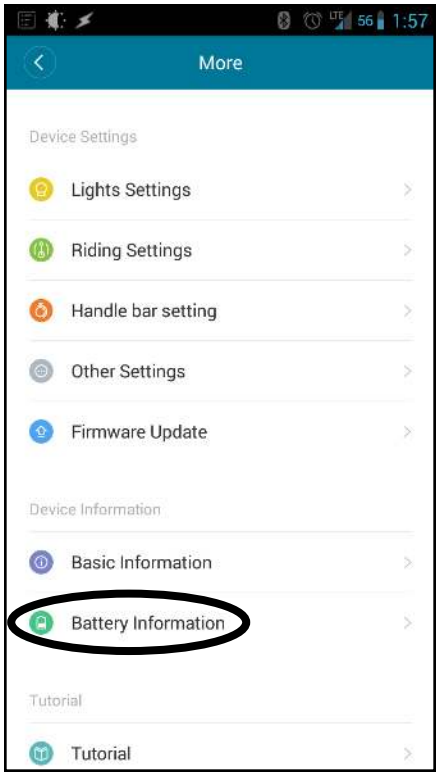
1. Open the Ninebot App and connect to your One S1.
2. Go to the Settings Menu.
3. Select Other Settings.
4. Select Black Box.
5. Type your name and email address in the text box.
6. Click Send.

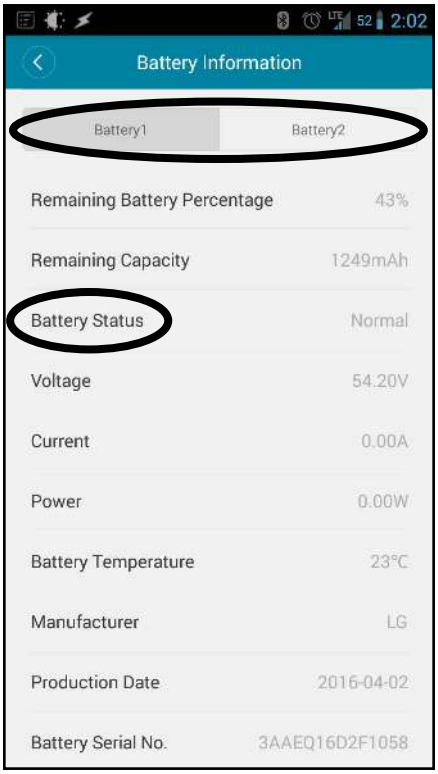


Battery Information

Follow these steps to view detailed information about the Batteries.

1. Open the Ninebot App and connect to your One S1.
2. Go to the Settings Menu.
3. Select Battery Information.

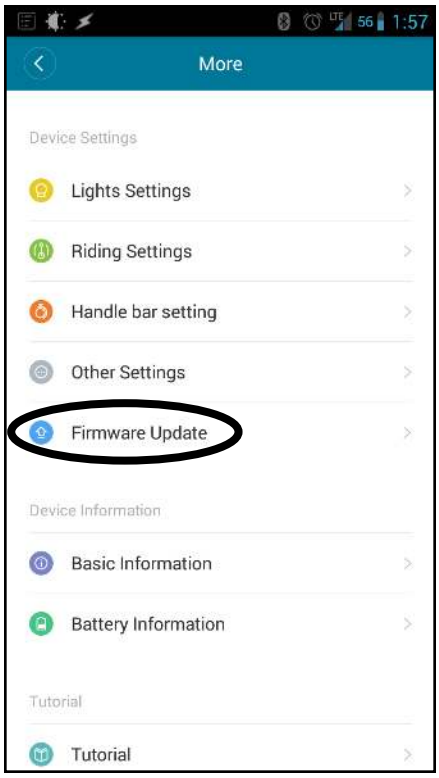




Updating the Firmware

Follow these steps to install the latest firmware on a One S1.

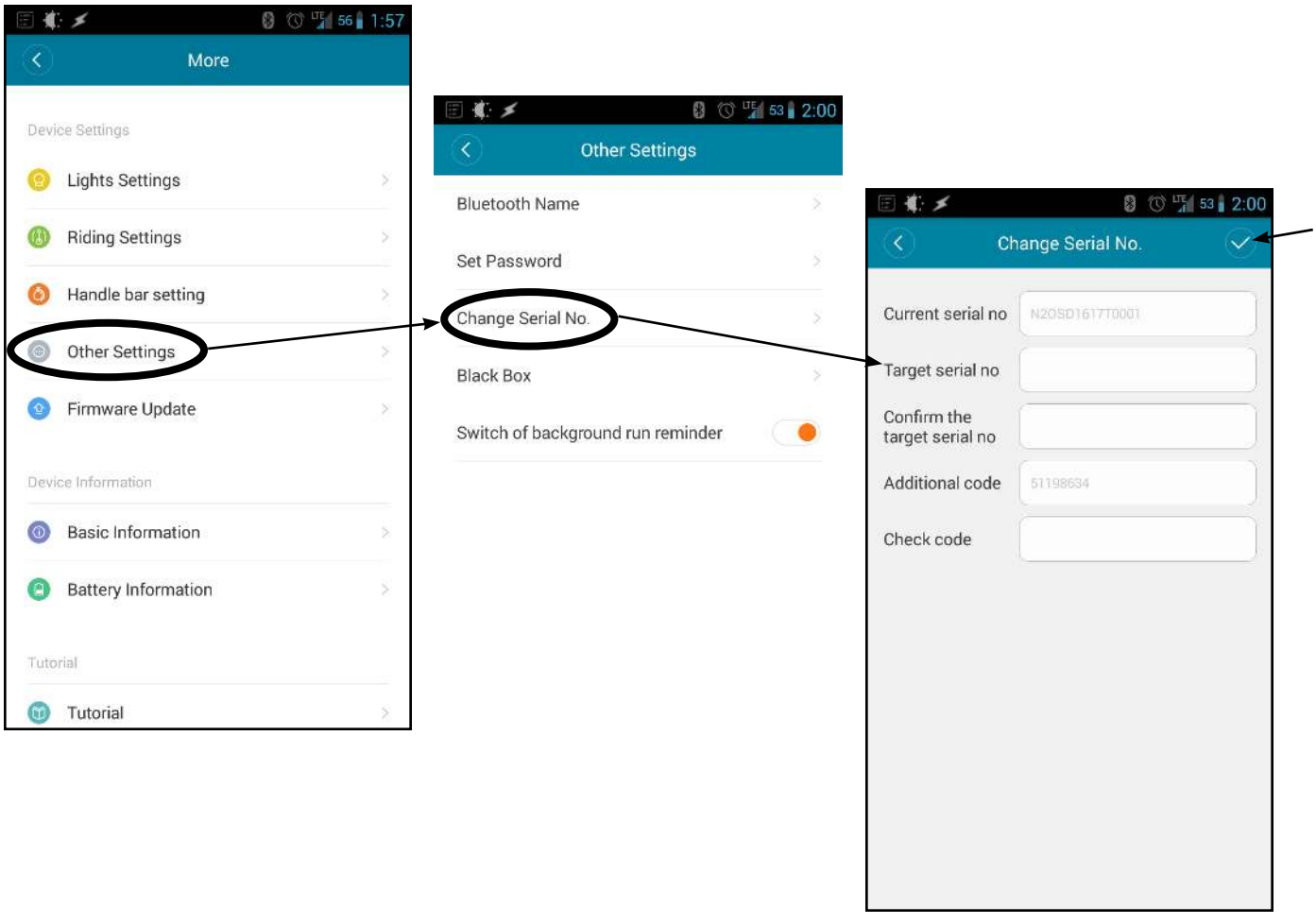
1. Open the Ninebot App and connect to your One S1.
2. You may be prompted to update the firmware.
   Select “Sure” to update it now, otherwise continue to the next step.
3. Go to the Settings Menu.
4. Select Firmware Update. If there is an update, you will be prompted to install it.



Resetting the Serial Number

Follow these steps to reset the Serial Number back to the original serial number. This is necessary when installing a new Control Board (see **"Control Board," page 38**).

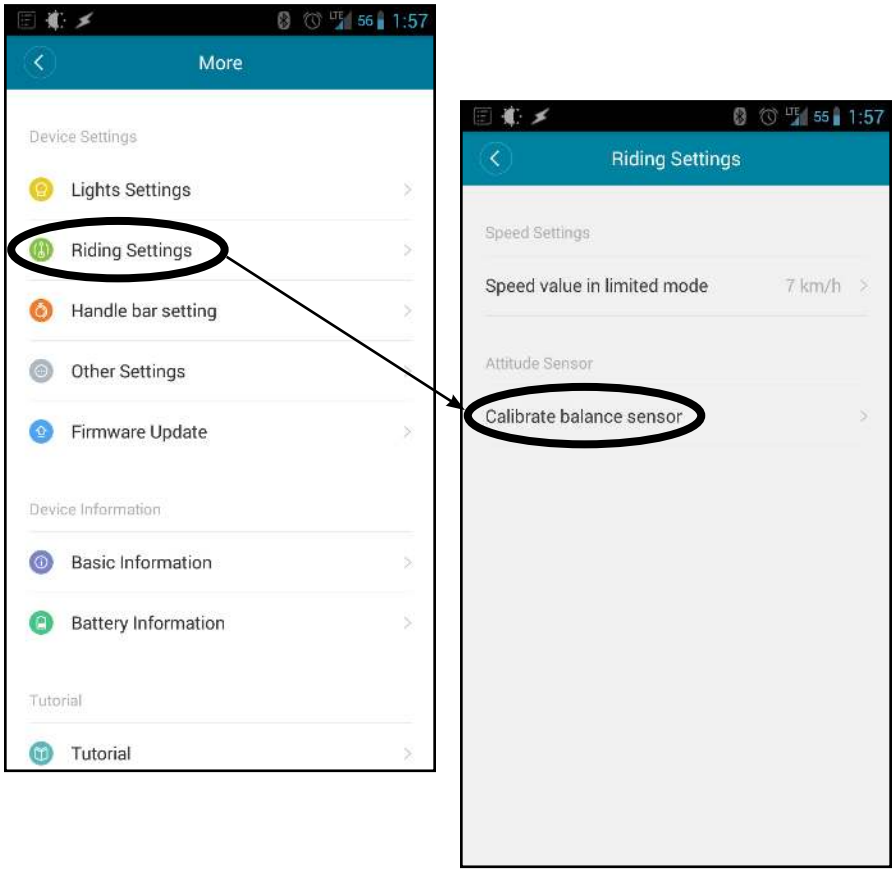
1. Open the Ninebot App and connect to your One S1.
2. Go to the Settings Menu.
3. Select Other Settings.
4. Select Change Serial Number.
5. Read the Serial Number off the label on the underside of the right foot pedal. Enter this number as the Target Serial Number.
6. Enter the Target Serial Number.
7. Take a screenshot showing the Target Serial Number and the Additional Code and email it to technicalsupport@segway.com.
8. Segway Technical Support will reply with the appropriate Check Code / Verification Code.
9. Input the Check Code / Verification Code.
10. Press the check mark to set the Serial Number.



Calibrating the Balance Sensor

The One S1 must be held upright and must remain still (no movement) during calibration. Use the foam packaging the One S1 was shipped in as a convenient stand to hold it upright and stationary.

1. Open the Ninebot App and connect to your One S1.
2. Go to the Settings Menu.
3. Select Riding Settings.
4. Select Calibrate Balance Sensor.
5. Follow the prompts to calibrate.



Resetting the Bluetooth Password

Follow these steps to clear the Bluetooth password for connecting to the One S1 via the Ninebot App.

1. Power ON One S1.
2. Slowly tip unit onto side.
3. Press and hold the ON/OFF button for 5-8 seconds.

Appendices

Post-Service Tests

These are the standard tests to perform after servicing a One S1.

Physical Check

1. Check that the handle is secure.
2. Check the wheel for wear, tightness (make sure there is no side-to-side play), and tire pressure.
3. Check that the foot pedals are secure.
4. Check to make sure no part is damaged or loose.

Startup Test

5. Use the ON/OFF button to power ON the One S1.
6. Verify that the unit turns on and the LED light strips on both sides work.
7. Verify the ON/OFF button is lighted and slowly blinks, indicating proper operation.

Charging Test

1. Turn OFF the One S1.
2. Plug in the charger and connect it to the One S1.
3. Verify that the charger LED is illuminated, indicating proper charging (a Red LED indicates charging, a Green LED indicates the battery is fully charged).

Operational Test

1. Turn ON and power OFF the One S1 twice.
2. Confirm adequate battery level (see the *Ninebot One S1 by Segway User Manual* for information on checking battery charge level).
3. Use the handle to lift the One S1 off the ground while powered on. Verify that the unit beeps and the wheel does not spin.

   NOTE
   If the wheel continues to spin after being lifted, verify that this feature has not been disabled in the app.

4. Turn the One S1 OFF.

Tools and Equipment

This appendix lists the tools and equipment recommended for servicing and diagnosing a One S1.

Table 1: Tools and Equipment

Tool	Description
Adhesive	CA glue – Loctite 403 (P/N 20724-00001) Hot melt glue Thermally conductive epoxy
ESD Equipment	Antistatic mat Antistatic wrist strap
Hex Wrenches	2.5 mm, 3 mm, 5 mm
Knife	Utility knife or other replaceable-blade knife
Mobile Device	Phone or table with iOS (8.0 or above) or Android (4.3 or above)
Multimeter	For measuring battery voltage
Punch	
Safety Glasses	Safety glasses that meet ANSI Z87 for impact resistance
Screwdrivers	Phillips-head #0, #1, and #2 Flat-head
Solvent	Isopropyl alcohol
Spudger	Plastic/nylon spudger or other non-marring prying tool
Tape	Double-sided tape (3/8” wide, 1/16” thick, foam tape [Dubl Kote 473671]) Masking tape (3/8” wide)
Thermal Paste	Silicone thermal paste
Thread Locker	Loctite 262 or Tonsan 1262
Tire Irons	Set of two
Tire Pressure Gauge	
Torque Wrench	Torque wrench with a combined range of 0.4–20 N-m (3.5–175 in-lbf)
Weatherproofing/Sealing	705 RTV Silicone

25399-00001 ab