



Levo Retailer Technical Guide

MY2017

Introduction

This guide provides important technical information and recommendations about Specialized Levo bicycles. It is for use by USA Authorized Specialized Retailers only. If you have any questions please contact Retail Care at 1-800-722-4423.

Please consult the **Service Site** at service.specialized.com or linked from **B2B** for any updates to this and any other technical documents before starting work. The **Service Site** is always has the latest technical information.

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Available Resources

This guide is intended to be used in conjunction with other Specialized resources:

- **Levo Owner's Manual** - The Levo Owner's Manual has information useful to retailers as well as riders.
- **Rider/Retail Care Rep** - The Rider/Retail Care teams have hands-on experience in riding, customizing, and servicing Levos. They often can provide assistance or advice that comes from personal experience.
- **SBCU and SBCU.com** - Check with SBCU for Turbo and Levo content currently offered. Visit SBCU.com often for product specific videos, tutorials, and quizzes.
- **Service Site** - The Service Site is the central location for all technical documents, Technical Bulletins, service procedures, manuals, product service item information, and software resources. Information on the Service Site is frequently updated. Please check frequently to ensure you are using the latest information available.
- The Service Site can be accessed directly at service.specialized.com or linked through the B2B site.

Requirements & Recommendations

This section outlines the various tools and service parts inventory retailers will need to invest in to be able to provide professional level support to Levo riders. Levo support at retail means retailers will be able to perform the following activities with confidence and expertise:

- Execute all firmware and hardware updates
- Quickly and accurately diagnose and resolve issues
- Demonstrate working knowledge of Levo bikes and show how their expertise contributes to the Turbo Ride Experience
- Communicate ride and maintenance details to Levo riders in a knowledgeable manner

Tools & Service Parts Inventory at a Glance

REQUIRED TOOLS

- Turbo PC Connect and Diagnostic Tool (version 4.2 or later) : 989E-5610
- 98916-5646 : Levo Diagnosis Tool adapter
- 3" 2-jaw pulley and gear puller
- Brose cap puller tool : S175300006
- Smartphone or tablet : Android or iOS
- Octalink/Isis bottom bracket tool : Shimano® TL-UN98, Park BBT-18, or equivalent

RECOMMENDED TOOLS

- Counterweighted or powered repair stand
- Handlebar/stem mounted phone holder

RECOMMENDED SERVICE PARTS INVENTORY

- Magnet holder including magnet plate, anodized black : S166800012, *recommended inventory 2-3*
- Motor-to-battery harness : S176800002, *recommended inventory 1*
- Speed Sensor : S16680018, *recommended inventory 1-2*
- Chainring Steel, 104 BCD: S161400009, *recommended inventory 1*
- Amazinger 2.0 derailleur hanger : S162600002
- Battery mounting thru axle : S166800004, *recommended inventory 2*
- Battery : 98916-5617, *recommended inventory 1-2*
- Battery pin w/o hardware : S166800005, *recommended inventory 3*
- Battery rock guard w/o hardware: S169900019, *recommended inventory 3*
- Bolt kit for battery : S170500004, *recommended inventory 1*

OPTIONAL SERVICE PARTS INVENTORY

- Bearing kit, Levo FSR : S160600004
- Bolt kit for Levo FSR : S160500007
- Crank, custom alloy arm for MTB, 165 mm : S161600013
- Crank, custom alloy arm for MTB, 170 mm : S161600015
- Spider, Levo Fat, 104 BCD : S161600017
- Spider, 104 BCD : S161600018
- Chain guide Fat : S161200002
- Chain guide 29 and 6Fattie : S161200001
- Chain stay protector mastic tape Levo Fat : S166900002
- Chain stay protector mastic tape Levo Hardtail : S166900004
- Chain stay protector FSR : S166900003

Requirements & Recommendations

Required Tools

Turbo PC Connect and Diagnostic Tool, version 4.2 or later : 989E-5610

This is an updated version of the existing Turbo PC Connector (aka Turbo Diagnostic Tool). This tool is used exclusively to update the Levo system firmware of the motor and battery. All system diagnosis can be performed electronically with the Mission Control App or manually with the diagnosis techniques outlined in the *Troubleshooting Guide* section of this guide.

To update the motor firmware, the Levo Diagnosis Tool Adapter must be used in conjunction with Turbo PC Connect and Diagnostic Tool.

Note: previous versions of the Turbo PC Connect and Diagnostic Tool will only update the battery firmware. The previous versions will *not* update the motor firmware.



Levo Diagnosis Tool Adapter : 98916-5646

The adapter must be used with the Turbo PC Connect and Diagnosis Tool to update the motor firmware. In addition, the battery must be connected to the motor while the Turbo PC Connect performs the update.



3" 2-jaw pulley and gear puller

These tools are typically available at auto parts and/or hardware stores.

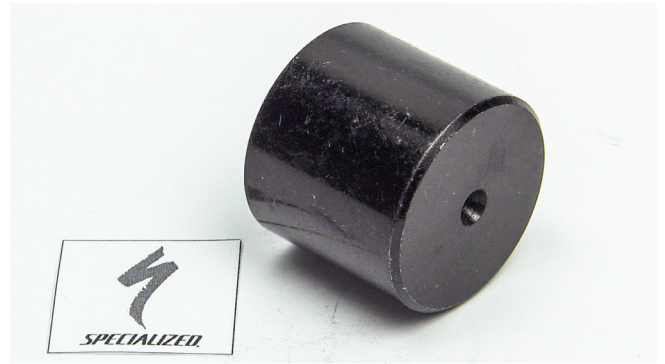
The ends of the jaws must be thin enough to fit between the chainring spider and motor cover. The force required to pull the spider is low. Therefore, if the ends of the jaws need to be modified or ground down to fit between the spider and motor, that is acceptable.



Requirements & Recommendations

Brose spindle cover : S175300006

This tool holds the threaded plunger of the gear puller stable. It applies force to the driver when the spider is pressed on which helps to prevent damage to the torque sensor.



Smartphone or tablet : Android or iOS

System requirements: Android 4.3 (Jellybean) or later, iOS 8.1 or later.

All Levo system diagnosis and user customization is performed through the Mission Control App. Unlike the Turbo, system diagnosis and user customization is *not* possible through the Turbo PC Connect and Diagnostic Tool.

Octalink/Isis bottom bracket tool

Use Shimano® TL-UN98, Park BBT-18, or an equivalent bottom bracket tool.

This tool is used to tighten or loosen the spider lockring.



Requirements & Recommendations

Recommended Tools

Counterweighted or powered repair stand

EVT E-Z Lift and Park PRS-33 Powered Lift Stand are two options for counterweighted or powered repair stands.

While these stands are expensive, they are a worth the investment.

E-bikes are considerably heavier than standard bicycles. A counterweighted or powered stand minimizes the physical effort required to position the bike and reduces the potential for injury to retailer staff when they lift the bike. The bikes can be easily maneuvered in the stand which reduces the potential for damage to the bike while showcasing to Levo riders a level of professionalism that inspires confidence in the retailer.

Handlebar/stem mounted phone holder

Hondo Garage Perfect Squeeze, Ram Mounts, and Rokform Mounts are three options for handlebar/stem mounted phone holders.

Remember, all Levo system based diagnosis and user customization is performed through the Mission Control App. The best diagnostic method is to use the app's real time data display while riding the bike. Using a handlebar or stem mounted phone holder allows the mechanic to ride safely, with both hands on the handlebar, and view the app at the same time to compare the motor performance with respect to speed and rider input.

Requirements & Recommendations

Recommended Service Parts Inventory

This section outlines a small inventory of critical replacement parts that a retailer should keep in stock to help diagnose issues effectively and efficiently. Diagnosis of a Levo drive system issue typically requires the replacement of various components of the system with known functional parts to determine which components are functional or non-functional through a process of elimination. It is much like finding a creak in a bike. A small inventory of parts will save considerable time and money on ordering and shipping replacement parts individually for diagnosis purposes. In addition, some components are wear items that a Levo retailer will want to have in stock to perform service for their customers.

Magnet holder including magnet plate, anodized black : S166800012

The drive system must recognize the bike is in motion before it can activate the motor. Motion is detected when the magnet mounted on the rear brake rotor passes a reed switch in the speed sensor. The speed sensor then sends a signal to activate the motor. The motor will not provide power if the magnet is not attached to the rotor. Riders with multiple wheel sets will need a magnet on each wheel that is used with the Levo or the rider will need to transfer the magnet to the other rear wheel rotor.

Recommended inventory: 2-3



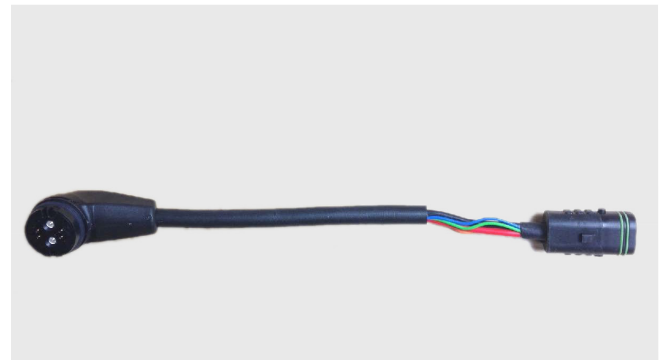
Motor-to-battery harness : S176800002

Specification change - S176800002 replaces S166800008 and is backward compatible. S176800002 is a longer harness length of 180 mm versus the original 165 mm length.

Riders who frequently unplug the battery from the system will wear out the connector which will require replacement.

Remember, to diagnose system issues, various parts, including wire harnesses, must be replaced with a known functional part to eliminate it as a source of the issue.

Recommended inventory: 1



Speed Sensor : S166800018

The speed sensor, much like a traditional cycle computer, is a wire with a reed switch at the end. While a reed switch rarely fails, if it does, or if a rider damages the speed sensor, the motor will not receive a signal to activate and will not operate.

Recommended inventory: 1-2



Requirements & Recommendations

Chainring steel, 104 BCD : S161400009

This is a 104 mm BCD chainring made specifically for Levo by Praxis Works. There are two features that make the chainring ideal for Levo:

- It is made of steel for durability.
- It has internal threads for the chainring bolts which eliminates the need for backing nuts. If the chainring had backing nuts, the spider would have to be removed to install the chainring.

While standard 104 mm BCD chainrings are compatible with the Levo spider, performance could be compromised because:

- Most standard chainrings are made of aluminum and will wear more quickly than a steel chainring.
- Most standard chainrings do not have internal threads for the chainring bolts so the spider must be removed to install the chainring.
- Use of a chainring larger than the stock 32T may inhibit climbing and make larger gears less useful because the larger gears will be difficult to engage until the speed is above the speed limiter (i.e. the speed is above the limit where the motor is required to turn off).

Refer to the *First Ride Tips* later in this guide for climbing tips.

Max chainring: 36T with chain guide; 38T without chain guide

Recommended inventory: 1



Amazinger 2.0 Derailleur Hanger : S162600002

A straight, aligned derailleur hanger is more critical to shift performance on a Levo bicycle versus a traditional bicycle because the motor applies more torque through the rear of the bike. Any misalignment of the derailleur hanger can cause shifting issues.

Retailers should encourage Levo riders to purchase a spare hanger and keep it on hand in case the hanger is bent during a ride.

Battery mounting thru axle : S166800004

Levo riders who frequently remove the battery from the bike to charge the system will most likely need to replace the thru axle because of increased wear, damage, and/or loss of the axle.

Recommended inventory: 2



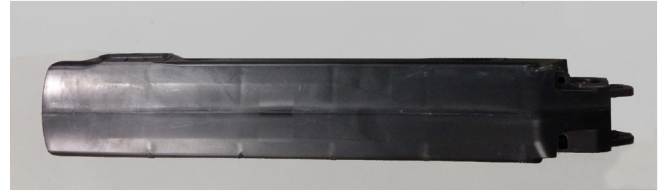
Requirements & Recommendations

Battery : 98916-5616

The MY16 Aftermarket Levo battery is only offered in a 504 Wh capacity.

The battery requires the additional service item SKUs that follow for installation and use.

Recommended inventory: 1-2



Battery pin w/o hardware : S166800005

Recommended inventory: 3



Battery rock guard w/o hardware : S169900019

Recommended inventory: 3 (in locations with loose rocky trails)



Bolt kit for battery : S170500004

Recommended inventory: 1

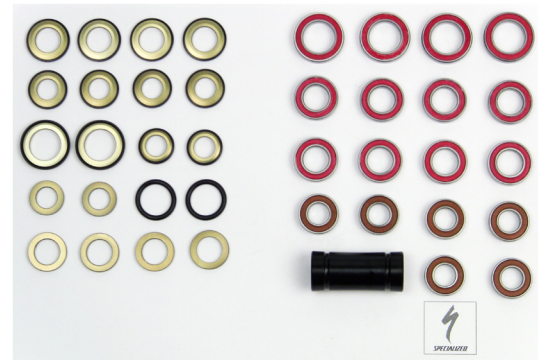


Requirements & Recommendations

Optional Service Parts Inventory

This section outlines optional replacement parts that a retailer might choose to keep in stock.

Bearing kit, Levo FSR : S160600004



Bolt kit for Levo FSR : S160500007



Crank, custom alloy arm for MTB, 165 mm : S161600013

Crank, custom alloy arm for MTB, 170 mm : S161600015

Crank, custom alloy arm for Levo Fat, 170 mm : S161600016



Requirements & Recommendations

Spider, Levo Fat, 104 BCD : S161600017

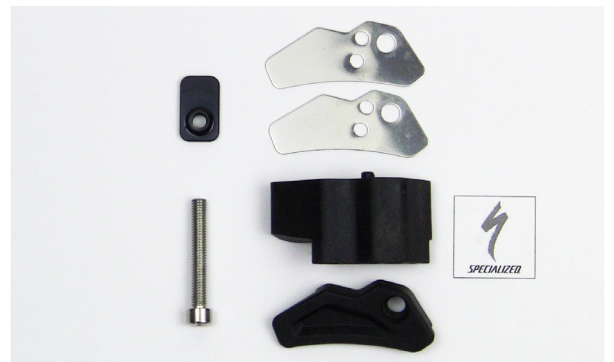


Spider, 104 BCD : S161600018



Chain guide Fat : S161200002

Chain guide 29 and 6Fattie : S161200001



Requirements & Recommendations

Chain stay protector mastic tape Levo Fat : S166900002



Chain stay protector mastic tape Levo Hardtail : S166900004



Chain stay protector FSR : S166900003



Build, Setup, & Maintenance

This section outlines the specific Levo components that have unique build, setup, and maintenance requirements. When a new Levo bike is built or prepared for a test ride, demo, or sale, please pay attention to the following items to ensure rider safety and optimal performance of the bike.

New Bike Build Checklist

☐ Confirm that the rear derailleur hanger is straight

A straight and aligned derailleur hanger is more critical to shift performance on a Levo bicycle versus a traditional bicycle.

☐ Remove the right crankarm and confirm that the spider locking is tight

Hold the chainring with a chain whip or apply the rear brake with the chain in the small cog, then tighten the locking until it bottoms out. The locking is a standard right hand thread.



☐ Confirm that the crankarms are tight

The crankarms are visually identical but can be identified by the "R" and "L" on the back. Confirm the crankarms are on the correct side of the bike and tight.



☐ Confirm that the chain guide is properly adjusted

All Levo bikes: remove the stainless steel shim between the guide and the motor cover unless there is contact between the outer guide face and chain.

FSR Levo bikes: compress the suspension to make sure the chain just rubs the guide when the chain is in the lowest gear.

Hardtail Levo bikes: adjust the guide so that the chain nearly rubs the guide when the chain is in the lowest gear.

☐ Confirm that the motor operates properly

Test ride the bike to verify the drive system is functional.

Build, Setup, & Maintenance

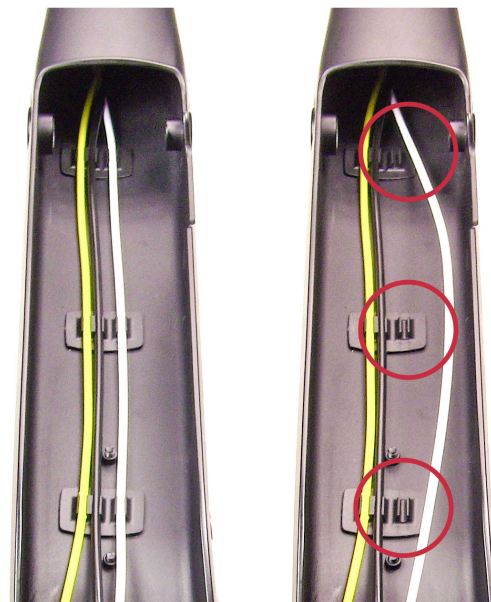
Setup Checklist for Test Rides, Demos, and Sales

☐ Adjust the saddle height

Levo bikes do not have room inside the frame to accommodate cable slack. As a result, the Command Post cable must be pulled from or pushed into the front of the bike when the saddle height is adjusted. To adjust the saddle height complete these steps:

1. Remove the battery.
2. Unclip the Command Post cable from the downtube cable guides.
3. Adjust the Command Post cable as the saddle height is adjusted.
4. Have the rider check the saddle height by test riding the bike with the battery removed and the system off.

Note: there is no additional pedal resistance in the drive system when the motor is not activated.



☐ Adjust the suspension

Suspension setup on a Levo bike is nearly the same as a traditional bike. The primary difference is that it is necessary to account for the additional weight of the drive system - which is located on the frame and is considered a sprung mass above the suspension. The increase in weight requires an increase in spring rate for both the front and rear suspension. In addition, the rebound damping settings should change to reflect the increase in spring rates.

When a bike is set up using the standard Static Suspension Process, the need to increase the suspension spring rate is not obvious; however, it is necessary. For example, when a rider switches from a traditional bike like an Enduro with a RockShox Pike set at 80 psi and 5 clicks from full slow (FFS) to a similarly equipped Levo, the rider will likely set the Pike at 85-90 psi and 3-4 clicks FFS to achieve the same ride response and feel.

☐ Adjust the tire pressure (6Fattie)

Many riders who ride 2-2.5" width tires gauge tire pressure by squeezing the tire by hand. For Levo bikes this method typically results in under inflated tires. The extra weight of the Levo bike requires higher pressure and the wider 3" tires have enough volume that a pressure change as little as 1 psi results in a noticeable change of performance. To help riders consistently set their tires properly, start riders with 16-18 psi in the front tire and 18-20 psi in the rear tire (depending on rider weight). Be sure to stock, sell, and consistently use a quality tire pressure gauge.

Build, Setup, & Maintenance

First Ride Tips

Whether a first time Levo rider is on a test ride, demo, or post-purchase ride, the following tips will help a new Levo rider quickly learn the capabilities of the system and get more out of the first ride experience. Remember, Levo motor support is available in three different drive settings: Turbo Mode, which provides 100% support while pedaling; Trail Mode, which provides 50% support while pedaling; and Eco Mode, which provides 20% support while pedaling. The factory default mode for the Levo motor is Trail Mode.

Be sure to inform the rider which mode the motor is set in so know what to expect while pedaling and give them the additional tips below:

- ☐ **Shift before you need to**
- ☐ **Pedal at a higher cadence than you are used to**
- ☐ **Continue to pedal on climbs to allow the motor to do most of the work**

The motor will automatically shut off if it does not receive a signal, generated when the magnet passes the speed sensor, after 0.2 seconds. This is roughly equivalent to 6 ft (2 m) of trail and can easily occur on slow cadence climbs or from a 'mashing' style of pedaling. Encourage riders to pedal at a higher cadence. Remember, in order for the motor to activate and provide power, the system must recognize the bike is moving which is accomplished when the magnet passes the speed sensor.

In addition, the higher bottom bracket height and shorter crankarms on the Levo allow the rider to pedal over more obstacles.

- ☐ **Use lower power settings on loose and/or technical terrain**

Higher power can result in wheel spin, loss of traction, and trail damage.

- ☐ **Use a lower saddle position on technical climbs**

An efficient climbing position (i.e. saddle height) is not necessary when the motor is activated on a climb. A lower saddle position allows the rider to maximize control of the bike.

Build, Setup, & Maintenance

Maintenance Details - Bicycle

Maintenance for the Levo system is similar to a traditional bike. Much like a traditional bike, there are some components that are sealed that do not require routine maintenance. However, the Levo system does have some components that require more frequent maintenance due to the increase in distance traveled that causes faster wear. In addition, because of the higher cost of some components, it is important to perform maintenance routinely to extend the life of the parts.

- Always turn the battery off and disconnect the charger prior to cleaning the bicycle. Leave the battery attached to the bicycle when cleaning the bicycle; the battery prevents water from contacting electrical interfaces.
- Do not use a pressure washer to clean the bicycle. The use of a pressure washer on the bearings or near the area of the chainring/spider area will cause premature wear of the bearings and will void the warranty.
- To clean the battery, remove the battery from the bicycle.
- Do not allow water to contact electrical components.
- Routinely check that the rear derailleur hanger is straight and aligned.
- Encourage Levo riders to frequently replace the chain. A worn chain will increase wear on the drivetrain, particularly the cassette.
- The following wear items will wear more quickly on a Levo bike because the rider will travel a further distance in a shorter amount of time: drivetrain components, including the chain, cassette, and chainring; brake pads; tires; and suspension components.
- Suspension service should be sold pro-actively, particularly for Levo bikes because they typically have increased mileage over traditional bikes.

Maintenance Details - Motor

- **Do not use a pressure washer to clean the bicycle. The use of a pressure washer on the bearings or near the area of the chainring/spider area will cause premature wear of the bearings and will void the warranty.**
- The Levo motor bearings are high quality and have been tested to several thousand miles. When maintained properly they should last for several years.
- The Levo motor is a non-servicable component. Damage to the Levo motor bearings requires replacement of the entire motor unit. The most frequent cause of damage to the motor bearings is the use of a high pressure washer to clean the motor. This damage is not covered by warranty. Replacement cost of the Levo motor unit is in excess of \$1000 USD.

Unlocking or De-restricting the Motor

Unlocking or de-restricting the Levo motor, by any means including software or hardware modification, is not permitted and will void the warranty.

Glossary

This section provides the definition of some common technical terms used in e-bike systems.

Battery Management System (BMS)

The computer software that monitors the function of the Levo Drive System. The BMS, in conjunction with a fusible link, prevents damage to the Drive System when any system anomaly is detected.

How it works

The BMS will *restrict electric power* to the Drive System when the motor and/or battery experience these temperature conditions:

- motor - warm
- battery - warm (while riding)
- battery - warm (while charging)
- battery - cold (while charging)

The BMS will *shut-off electric power* to the Drive System when the motor and/or battery experience these temperature conditions:

- motor - hot
- battery - hot (while riding)
- battery - drawing too much current (while riding or charging)
- battery - voltage imbalance (while riding or charging)

Capacity (Wh)

The total amount of energy a battery can store. A Watt-hour is the measure of electrical energy capacity that relates power and time. For example: a battery listed as 460 Wh capacity means that when it is drained from 100% SoC to 0% in one hour, it will supply 460 W of power. Similarly, a 504 Wh battery will supply 504 W in one hour.

A battery with a larger capacity will provide:

- Longer range per charge, just like a larger gas tank in a car would provide longer range.
- Longer overall battery life; the larger capacity means fewer charge cycles over the lifetime of the battery.
- Longer charge times, just like a larger gas tank in a car would take longer to fill.
- Higher cost; larger capacity batteries cost more.

The 460 W battery is the OE specification for all Levo models except the Expert and S-Works.

The 504 W battery is the OE specification for the Expert and S-Works Levo models. It is also available in AM applications and for warranty.

Charge Cycle

When the battery level is used from 100% charge (full charge) to 0% charge (depletion) then charged from 0% to 100%. If the battery level is used from 100% to 50% and is then charged back up to 100% this is only a half charge cycle. Note: a charge cycle is **not** counted as every time the bike is plugged into the charger.

Drive System

The components of a Turbo bike that make it an electric pedal-assist bicycle. For Levo, the Drive System is comprised of five components: the motor; battery; motor to battery wiring harness; speed sensor; and speed sensor magnet.

How it works

For the drive system to operate, all five components must be connected and function properly. If any of the components is not connected or malfunctions the system will not operate.

Glossary

Lithium-Ion (Li-ion)

Modern battery technology that is used in all Specialized Turbo bikes. These are the same type of batteries that are used in modern computers, phones, electric cars, and many other electric powered consumer products. For marketing purposes, some companies may use terms such as: Li-po; Lithium Polymer; or Lithium Cobalt to make the batteries sound more technologically advanced. They are, in fact, all types of Lithium-ion cells.

Some of the key advantages of Li-ion batteries include:

- They do not suffer from 'memory effect'. Li-ion batteries can be charged from any level of charge present; they do not have to be depleted before charging. Older battery technologies such as Nickel cadmium (NiCad) and Nickel Metal Hydride (NiMH) had to be depleted before charging or they would 'remember' the smaller capacity if only partially discharged before charging.
- They offer a large capacity (range) at a low weight.
- There are many reputable manufacturers to choose from.

Maximum Power

The maximum amount of power a motor is capable (or allowed) to put out. The maximum power can be significantly more than the nominal power. However, the motor and/or motor system will not be able to sustain the maximum power for long without overheating.

Unit of Power: Watts (W); 748 W = 1 hp

Nominal Power

The amount of power the motor provides under normal operating conditions without generating excess heat. Typically, the nominal power is used by government agencies as a way to categorize e-bikes.

Unit of Power: Watts (W); 748 W = 1 hp

State of Charge (SoC)

The percentage of total energy stored in the battery that is available to the rider.

Note: the charge amount the rider can access is between 0-100%. Theoretically, Li-ion batteries can be charged more and run down further than the BMS allows, but at the risk of a significantly shortened battery life.

State of Health (SoH)

The percentage of total energy the battery can store compared to its capacity when new. Li-ion batteries gradually lose a small amount of energy capacity with every charge cycle, which decreases the battery's range over time.

Note: while the SoH gradually decreases over time, the SoC refers to the percentage of available energy, which will always show as 0-100%. The output performance of the battery remains the same, but its capacity and therefore range, decreases over time. The BMS in the Turbo family of bikes is designed to maintain a very high SoC for a long time.

User Interface (UI)

The means of communications between the rider and bike. While technically this would include the sensor in the motor we usually use this term for the motor assist and power controls, as well as any display.

Troubleshooting & Diagnosis Guide - Fundamentals

This section outlines the basic process for troubleshooting and diagnosing drive system issues for all Specialized Levo bikes. The Levo system is simple compared to other ebikes. It has six easily replaceable components: the motor, battery, wiring harness, speed sensor, magnet, and charger.

The basic troubleshooting process entails that you:

- Get a description of the issue from the rider
- Determine if the issue is function or performance related
- Diagnose the issue
- Call Retail Care for additional support

The following provides a more detailed look at each step in the process.

Get a Description

Get a full description of the symptoms, riding conditions, and typical maintenance and care practices from the rider. Ask probing questions about what the rider experienced, such as: what was the situation when the issue occurred, what were the riding conditions, how was the bike maintained, and were any changes made to bike including changing components not related to the drive system.

Some common symptoms, riding conditions, and maintenance habits to ask about and listen for include:

Symptoms

Noise, grinding
Noise, squeaking
Noise, clunking
Looseness
Decrease in power
Changes in performance
Intermittent power
Reduced range
No power
Does not turn on
Beeping from battery
Messages on app
Communication problems with app/other device

Riding Conditions

Ambient temperature and weather
Macro terrain - mountainous, rolling, flat, straight, twisty, etc
Micro terrain - soil type, soil moisture, rocks, roots, dusty, etc
Riding style - stand & hammer vs. sit & spin, accelerate hard or easy, attack climbs and descents
Length of ride
Charge level at start and finish
Rider defined settings
Mode setting
Bike transport method - ridden to trail, roof rack, back of pickup/tailgate pad, kept in car, battery removed or installed etc

Maintenance and Care

Charged to full capacity immediately after every ride
Stored after a long ride
Stored for extended times
Ambient temperature - charging
Ambient temperature - storage
Cleaning methods - garden hose, bucket and brush, pressure washer, not usually washed
Drive system changes or additions - motor, battery, harness, magnet, speed sensor, charger
Any other component changes - drivetrain, tire size/type, wheels, brakes, connected devices, trailers

Determine the Issue

All Levo drive system faults or errors are either *performance* or *function* related issues. To resolve either type requires a different approach.

PERFORMANCE

Performance issues are defined as when the system works but not to the rider's expectations. The information gathered in the **Get a Description** process will help expedite the diagnosis of performance issues especially if a Rider Care consultation is required.

FUNCTION

Function issues are defined as when the system does not work. For example, if the battery turns on but no power is transmitted to the wheel. This type of issue is most often due to one single component that is faulty, damaged, or missing. It can also be the result of a bad connection between components. It is rare for more than one component or connection to be faulty at the same time.

The core elements of functional issue diagnosis are: visual inspection of components, using the Mission Control App, and substituting components.

Troubleshooting & Diagnosis Guide - Fundamentals

Diagnose the Issue

Prior to diagnosing any issue, performance or functional, the system to meet the following Conditions of Operation for the motor to activate:

CONDITIONS OF OPERATION

- The battery must be charged and turned on
- The battery must be connected to the motor
- The motor must be operational
- The speed sensor must be connected
- The magnet must be installed on the rear wheel
- The rider defined settings must allow power via the Mission Control app
- The rider must apply torque to the cranks
- The bike speed must be greater than zero but less than 20 mph (US & Canada), 25 km/h (elsewhere)

PERFORMANCE DIAGNOSIS

The best approach to diagnose a performance issue is to:

- Categorize the issue
- Understand the rider's expectations
- Understand the situation that resulted in the perceived issue
- Attempt to correlate the rider's perception with data based values from the Mission Control App
- Test ride the bike with known good components installed as a comparison.

Again, the insights from the **Get a Description** process will provide valuable information on how the rider's input to the bike impacts the issue.

Detailed information about common performance issues and how address them are found in the next section *Troubleshooting & Diagnosis - Performance Issues*.

FUNCTION DIAGNOSIS

Function issues or faults are typically due to a single component that is damaged, defective, or is not properly connected. Review the rider's responses from the **Get a Description** process and adhere to the Conditions of Operation while you perform:

- Visual inspection - check the connections and components that are visible before removing any of them.
- Check connectivity with the Mission Control App - specific types of data are transmitted to the app if there is a proper connection.
- Substitute components connected to the motor - removal of the left crankarm and motor covers allows access to the entire drive system.

Detailed information about common function issues and how address them are found in the next section *Troubleshooting & Diagnosis - Function Issues*.

Call Retail Care

Your Retail Care representative will be able to help with issues that are unique or not easily solved. You Retail Care rep will be able to provide technical information, consult with other Specialized subject matter experts on your behalf, and get you the solution or parts you need to get the rider back on the trail. Remember that the entire drive system is made up of only six components and that they are all easily replaceable. It is in everyone's best interest to keep a rider on their Levo, or get them back on it as quickly as possible.

Troubleshooting & Diagnosis Guide - Performance Issues

Symptom Category - Noise

Type of Noise	Conditions & Checks	Typical Cause	How to Address
Grinding	Occurs at all speeds Tactile Felt when turning motor by hand with bike in stand	Outer bearing wear and/or damage Abuse Use of pressure washer, especially on the drive side	Replace the motor unit (typically not covered under warranty). Work with Retail Care rep for potential "crash replacement" pricing of motor. Educate the rider on proper bike washing habits. The rider can continue to use the bike until there is excessive bearing play.
Squeaking	Occurs at all speeds	Dry belt, found on early motors	SBC Service center can address in the Summer 2017 (CE and US). Possible warranty resolution, send to Retail Care for evaluation.
	Felt when turning motor by hand with bike in stand	Bearing failure/seize Use of pressure washer, especially on the drive side	Replace motor unit (typically not covered under warranty).
	During extreme effort the motor produces a loud squeak then shuts off	The over torque protection is engaged. This happens when the rear wheel suddenly stops while the rider and motor are providing full effort.	Not typically a fault or defect as the system is designed to perform this way to protect the motor. The motor should return to normal operation after restarting the bike.
Clicking/clunking	Occurs intermittently during specific conditions such as: • Acceleration • Hard efforts • Rapid changes from pedaling to coasting	Loose spider and spider locking	Remove, grease, and tighten to 70 N•m.
		Motor cover bolts over tightened	Remove, clean, prep, then reinstall bolts: • Clean bolts thoroughly • Apply light grease under bolt heads • Apply blue thread lock to bolt threads (i.e. Loctite 242®) • Clean the edges of the motor cover and frame • Install the cover bolts and tighten to 1.5 N•m, do not overtighten
		Motor covers have edge contamination	Remove the motor covers (does not require crank removal) Clean the edges of the motor cover and frame Lightly roughen the motor cover edges with a 100-180 grit emery cloth or equivalent. Prep and install the cover bolts.
		Improper motor mount fastener torque	Loosen, then gradually tighten the bolts in an across-the-motor sequence to 23 N•m. Do not over tighten.
		Loose belt in motor, occasionally found on some early motors	SBC Service center can address in the Summer 2017 (CE and US).
		Axial play in spindle	Contact Retail Care
Variable	Motor sounds change during a single ride	Different demands during a ride will result in different motor sounds	General, as opposed to specific, motor noise is not typically problematic nor covered by warranty. Motors that do create excessive noise can be covered under warranty on a case-by-case basis by contacting Retail Care.
	Motor sounds change over the life of motor	Motors generally get louder as they age	
	Motor sounds change in response to heat	Motors generally get louder as they generate heat internally	

Troubleshooting & Diagnosis Guide - Performance Issues

Symptom Category - Control

Symptom	Conditions	Typical Cause	How to Address
Intermittent power	Motor shuts off even while the bike is moving and the rider is pedaling	Loose or damaged motor or speed sensor connectors	Inspect/replace the harness and/or speed sensor as necessary.
		Bikes that had a motor replaced in 2016 require a firmware update	Update battery firmware to 2.12.1 (504 Wh battery) or 4.12.1 (460 Wh battery)
	Motor shuts off while climbing a steep hill	Typically happens when a rider is pedaling with a slow (mashing) cadence. The slow cadence and wheel speed causes the drive system to shut off power. The motor will stop power if it does not receive a signal after .2 seconds. The motor typically provides power again once the cadence and wheel speed increase.	Educate the rider on how to get the best climbing performance from the Levo: <ul style="list-style-type: none">• Shift earlier than necessary• Pedal at a higher cadence than normal by using lower/easier gears• Continue to pedal on climbs to engage the motor• Use shorter cranks for better pedal clearance• Use a lower saddle position
	No motor assist after a ride delay and the battery turned off	The battery automatically turns off after ten minutes without rider or speed input	Educate riders about this feature, it is common to all Turbo and Levo bikes.
Inability to change mode	Motor feels like it is in Turbo mode even when the mode is changed to Trail or Eco	Faulty data connection between the battery and motor. This will cause the Mission Control App to not display bike data even though the motor works (the motor only requires + and - to function)	Verify that no motor or ride data transmits to the Mission Control App
			Inspect the female data terminals - the five small connectors adjacent to two power terminals - in the harness/motor plug. If the data terminals are spread too wide, use a sharp pick or similar tool to push them back into place.
			Inspect the male data pins on the motor plug end of the harness. If they are bent they can be carefully bent back into place. If any pins are broken or visibly shorter than the other the harness should be replaced.

Troubleshooting & Diagnosis Guide - Performance Issues

Symptom Category - Communications

Symptom	Conditions	Typical Cause	How to Address
App does not connect to bike	Unable to connect the Mission Control App to the bike	Bluetooth is not turned on	Refer to the Mission Control App instructions manual.
		The bike is already actively connected to another device	<p>In the Settings > My Bike menu of the app, delete all other Turbo/Levo bikes. This action only removes the pairing, it does not delete any saved ride data.</p> <p>If other Turbo/Levo bikes are near by, move away from them (i.e. move to another room or go in/outside) to pair the device.</p> <p>Note: the BT/ANT+ module stays on for 2 hours after the battery is shut off.</p>
		The communication module in the battery is defective	Contact Retail Care, the battery is not servicable.
App does not display bike data	App connects to bike but no data is transmitted	<p>Faulty data connection between the battery and the motor.</p> <p>This will cause the Mission Control App to not display bike data even though the motor works (motor only requires + and - to function).</p>	Verify that no motor or ride data transmits to the Mission Control App
			Inspect the female data terminals (the five small connectors adjacent to two power terminals) in the harness/motor plug. If the data terminals are spread too wide, use a sharp pick or similar tool to push them back into place.
			Inspect the male data pins on the motor plug end of the harness. If they are bent they can be carefully bent back into place. If any of the pins are broken or visibly shorter than the other the harness should be replaced.
			Inspect the battery/harness connection for debris or damage

Troubleshooting & Diagnosis Guide - Performance Issues

Symptom Category - Expectations

Symptom	Conditions	Typical Cause	How to Address
Power is less than expected	Bike feels like it does not have adequate power	Rider defined settings were changed; this is very common in test ride and demo scenarios	Connect with the Mission Control App and tap "Restore Defaults" in the Tune menu. In the Let's Ride > Start > Live Data menu of the app, observe the Motor Power field while riding to verify that the motor power reaches at least 530 W.
		The motor has the incorrect firmware parameters (US & Canada)	In the Let's Ride > Start > Live Data menu of the app, observe the Motor Power field while riding to verify that the motor power is provided up to 20 mph (32 km/h).
		The motor is restricting power due to heat. This occurs in conditions such as: <ul style="list-style-type: none">• High ambient temperatures (summer)• Long sustained climbs > 1000 ft (300 m)• Bike is used in Turbo mode and max motor current is at 100%• Motor temperature protection is engaged• High load/demand placed on bike such as a trailer, pack, etc	In the Diagnose > Motor menu of the app, view the motor temperature. Power is reduced around 175° F (80° C). Update the motor firmware to 4.0.1 (early 2017). Contact Retail Care if temperature related power restriction continues after the motor firmware update.
Range is less than expected	Bike does not travel the expected distance	Cold ambient temperatures	Charge/store the battery inside at room temperature. If driving to a trail head, keep the battery inside a heated vehicle. The battery typically generates enough heat during a ride to maintain its temperature.
		Tire selection and pressure	Tires have a huge impact on rolling resistance. A significant decrease in range has been observed due to different tire compounds and casing.
		Rider variation	The difference between rider weight, gear selection, travel mode selection, and cargo load create a significant impact to the range of the battery. Verify by providing the rider with a different, but same capacity, battery to try on their bike.
		Battery charge calibration	Instruct the rider to fully charge the battery after 2-3 cycles then let it rest for at least 2 hours after reaching full charge.
		Battery state of health	In the Diagnose > Battery menu of the app, view the battery State of Health. It is normal for the SoH to decrease a few percent within the first few years. However, a reduction below 75% within 2 years or 300 charge cycles qualifies for a warranty replacement.

Troubleshooting & Diagnosis Guide - Function Issues

Diagnose Hardware Using Visual Inspection

Component to Check	What to Look for	Additional Checks/Information
Battery	Is the battery charged?	Try a different battery and check the charger.
	Does the battery turn on normally?	Try a different battery. Check for beeping/blinking LEDs.
	Is there any debris in the plug receptacle?	Ask about bike washing methods. Educate the rider to keep the harness plugged in when washing.
	Is there any physical or burn damage to the plug receptacle?	Ask about crashes, transport methods, and if the battery has been dropped.
Harness	Is the harness plug fully engaged in the battery?	Check for debris or damage. Ask about bike washing methods.
	Does the plug readily and easily engage the battery?	Check the length and position of the harness, does it feel like it has to be pulled into place?
	Is there any physical damage to the plug?	Ask about crashes and transport methods.
	Is there any evidence of arcing/corrosion in the power terminals?	Ask about charging and unplugging habits, does the rider turn the battery off prior to unplugging it?
Speed Sensor	Is there any visible damage to the wire?	Ask about riding conditions, crashes, look for debris etc.
	Is the reed switch firmly attached to the left rear dropout?	Check the bolt on the speed sensor; the end is fastened to the dropout with a single M5x0.8 mm screw.
Speed Sensor Magnet	Is the magnet assembly attached to the rear hub with two brake rotor bolts?	Ask about any component changes: wheels, brakes, etc. The magnet is required for the motor to operate.

Diagnose System Connection Using the Mission Control App

App Menu to Check	What to Look for	Additional Checks/Information
Diagnose > Motor	Are there any alerts?	Contact Retail Care if there are any error/alert flags.
	Are all of the motor data fields complete?	If the Serial Number, Hardware, or Firmware fields are blank, there is no data connection to the motor. If blank, possible causes include: no data connection (harness or plug damage) or internal motor fault.
Tune	Are any of the rider defined settings set to the lower end of the range?	If Turbo/Trail/Eco mode settings are set to the low end of range, it requires much more rider input power to gain motor assist. It may be difficult to distinguish between the increase in rider effort required - which may not be enough to start the motor -and the motor not working. If the Max Motor Current is set to the lower end of range the motor will not supply maximum power - as low as 100 w.
Let's Ride > Start > Data Field Display	Do any of these fields = 0 when riding and pedaling? •Speed •Cadence •Rider Power •Motor Power	If Speed = 0 but Cadence and Rider Power ≠ 0 then the motor is transmitting data to the battery but is not registering forward motion. Check the speed sensor and/or magnet. If Cadence and Rider Power = 0 possible causes are: no connection to the battery or an internal motor fault. Motor power should = 0 when the bike is not moving or the speed exceeds 20 mph (US & Canada) or 25 km/h (elsewhere).

Troubleshooting & Diagnosis Guide - Function Issues

Diagnose Motor Harness & Plug Connections Using Substitute Components

To diagnose motor harness and plug connections, you must remove the left crankarm and left side motor cover. You must also have spare components, that are known to be in working order, to determine by process of elimination which connections are malfunctioning. Some connection issues can be repaired by hand, other issues require harness replacement.

Component to Check	What to Look for	Additional Checks/Information
Harness	Is there any external damage to the motor connector?	External damage from previous maintenance/service or when initially assembled can cause internal damage in the connector.
	Are any of the pins in the motor connector bent, uneven, or damaged?	If the internal connectors are slightly bent they can be carefully bent back into place. If they are folded, broken, or shorter than the others the harness should be replaced.
	Is it difficult to reach the battery terminal with the harness?	Check the position of the harness anchor and move it if possible. If the harness anchor cannot be adjusted without placing more stress on the motor connector, measure the length between plugs. If the distance is 165 mm, replace the harness with a 180 mm length version.
	Does a replacement harness address the issue?	
Speed Sensor	Is there any external damage to the speed sensor connector?	If the plastic plug housing is cracked or damaged, replace the entire sensor.
	Are either of the pins in the speed sensor connector bent, uneven, or damaged?	If the pins are slightly bent, they may be carefully bent back into place. Otherwise the speed sensor should be replaced.
	Does a replacement speed sensor address the issue?	
Motor	Is there any external damage to the connector housing on the motor?	Look for external damage to the plastic connector housing. Damage can keep the plugs from full engagement.
	Do any of the internal terminals appear to be damaged or more open than the others?	Female terminals inside the motor connector housing can be carefully compressed with a sharp pick.
	Are any of the blind plugs missing?	Ask about service/warranty history. The blind plugs are included on new bikes but not on replacement motors. Use in wet conditions without the blind plugs can allow water entry.
	Is there evidence of burning/melting on any of the blind plugs?	The HMI blind plug has jumpers and a capacitor and is necessary on the Levo. It is keyed internally to fit in only one direction but can be forced into place the wrong way. This can cause the capacitor to burn out and can also cause internal damage to the motor.

Warranty

For complete warranty provisions, please refer to www.specialized.com.

The warranty for Levo is essentially the same as our full-suspension mountain bikes with the addition of the Turbo drive system terms. Since this type of bike is new to many retailers, this section will provide some clarification and perspective on Turbo Family warranty terms. See the following pages for the complete Specialized Limited Warranty Policy as it is provided.

Turbo Family Warranty - Generally The Same As Other Specialized Bicycles

The warranty for all components that do not make up the drive system is identical to our other bicycles. As stated in the official warranty document:

Lifetime (for original owner):

- Frame and rigid fork

Five years:

- Chainstays and seatstays on full suspension bikes

Two years:

- Suspension components:
 - Suspension related equipment (pivots, bushings, shock units, suspension forks, shock links, fasteners)
 - Suspension attachment points
- Paint/finish
- Components (i.e. saddle, wheels, drivetrain, brakes, seat post, Command Post, crankset, handlebar and stem, baskets, racks)

Turbo Drive System Warranty

The warranty for the drive system is specifically laid out:

Two years:

- Motor
- Cable connectors
- Remote
- User interface

Two years or 300 charge cycles:

- Battery will be at or above 75% State of Health (aka Charge Capacity)

Note that everything that voids the warranty on traditional bikes will void the warranty on a Turbo Family bike. Modification of any of the components (whether through physical modification or modifying the code), abuse, misuse, and transfer of ownership all void the warranty terms.

Please Read And Understand The Warranty

Many of the components on a Turbo Family bike are considerably more expensive than on a traditional bicycle. Clearly explaining the warranty to your riders protects them and your shop from avoidable and expensive mistakes.

Some (but not all) actions that riders and retailers should avoid:

- Using a pressure washer on and around the motor unit and electronics
- Hacking or modifying the system to circumvent the speed limit
- Storing batteries in fully (or nearly fully) discharged state
- Charging batteries in hot or cold temperature extremes
- Unplugging batteries with systems turned on
- Using chargers or other equipment or components from other manufacturers
- Using accessories intended for e-bikes from other manufacturers

Warranty

Understand Some Turbo Family Components Wear Differently

Some riders will experience what they consider to be “accelerated wear” and will attribute this to the additional weight and power of the Turbo Family bike. The reality is that wear is function of distance rather than time, and on a Turbo or Levo riders will typically cover 25-50% more ground per ride.

The best way to address this is to pro-actively promote regular maintenance and service intervals. Since this is a new platform with new technologies the typical rider objections are easier to overcome, especially if communicated as a way to protect the rider’s investment in the equipment and ride experience.

Examples of maintenance services to actively promote:

- | | |
|-----------------------------------|--------------------|
| • Suspension air spring services: | 1-3 per year |
| • Suspension damper services: | 1-2 per year |
| • Chain replacement: | 2-5 per year |
| • Derailleur Hanger Alignment: | monthly |
| • Brake caliper clean and bleed: | annually |
| • Command Post basic service: | 1-3 per year |
| • Wheel tension and true check: | monthly |
| • Motor belt replacement: | 9500 miles/15000km |

These services have value to the rider if they are pro-actively sold as ways to maintain the Turbo or Levo ride experience, not just the bike itself.

Rider Best Practices

Help your riders with the little actions that prolong the life of the bike and provide the best ride experience:

- | | |
|---|---|
| Turn off the battery before unplugging and charging | Shift earlier than on a traditional bike |
| Charge the battery to 50-60% for long term storage | Ease up on pedaling power when shifting |
| Charge the battery at room temperature | Spin lower gears on technical climbs |
| Store the battery at room temperature | Lower the Command Post slightly on technical climbs |
| Transport the battery in a vehicle in sub-freezing temperatures | Use a tire pressure gauge (especially with 6Fattie tires) |
| Do not use high-pressure water or solvents around the motor/crank area | Remove the battery and feed the Command Post cable when adjusting saddle height |
| Wash the bike with the battery installed and with the harness plugged in. Since the connection is waterproof, washing the bike with the harness plugged in minimizes the chance of contamination in the contacts. | |

SPECIALIZED BICYCLE COMPONENTS

LIMITED WARRANTY POLICY FOR BICYCLES



This Limited Warranty is a voluntary manufacturer's warranty. Your rights under this Limited Warranty are in addition to your legal rights as a consumer.

Specialized bicycles are sold exclusively through our network of Authorized Specialized Dealers. Specialized Bicycle Components, Inc. provides each original retail purchaser of a new Specialized bicycle or frameset a limited warranty against defect in materials and workmanship as follows:

L I F E T I M E

- Frames and forks on complete bicycles and framesets for the lifetime of the original owner (excluding parts and components to which two year or five year periods apply, as set out below).
- Frames and forks on complete Turbo bicycles for the lifetime of the original owner (excluding parts and components to which two year or five year periods apply, as set out below).

2 Y E A R S

- Suspension attachment points, suspension related equipment (including pivot points, bushings, shock units, front suspension forks, chain stays and seat stays, shock links, fasteners) for two (2) years from the date of the original purchase.
- Chain stays and seat stays on full suspension bicycles sold after 2008 will be covered under this limited warranty for five (5) years from the date of the original purchase.
- Paint/finish, components attached to the bicycle/frameset such as saddle, front suspension forks, wheels, drive train, brakes, seat post, Command Post, crank-set, handlebar and stem, baskets, racks, or any suspension related parts or components for two (2) years from the date of the original purchase.
- Turbo components and lighting (excluding standard wear items as listed below), Turbo motor, battery (or at least 75% capacity after 300 charge cycles), and Turbo electronics (remote, cable connectors, User Interface) for two (2) years from the date of the original purchase.

Some branded equipment and co-branded suspension equipment may have additional warranty coverage offered by the specific manufacturer. Please check in your owner's manual pack for information regarding these warranties or check with your authorized Specialized dealer for details.

T E R M S O F L I M I T E D W A R R A N T Y

This warranty applies to Model Year 2013 and newer Turbos and to all Model Year 2014 and newer model bicycles and covers only Specialized branded products. Any other original component or part will be covered by the stated warranty of the original manufacturer.

The Limited Warranty is conditional upon the bicycle being operated under normal conditions and use, and properly maintained.

Specialized recommends that you register your bicycle with Specialized before a warranty claim may be processed. Even if registration is not required to take advantage of the Specialized Limited Warranty, Specialized encourages you to register your bicycle to allow Specialized to provide you better service in the future.

To exercise the rights under this Limited Warranty, the bicycle or frameset must be presented to an Authorized Specialized Dealer on the same continent (Asia, Africa, North America, South America, Antarctica, Europe, or Australia) on which the bicycle was purchased, together with a written proof of purchase which identifies the bicycle or frameset by serial number.

Only Authorized Specialized Dealers are authorized to perform warranty service under this Limited Warranty. Should the bicycle, frameset, or any part be determined by Specialized to be covered by this Limited Warranty, it will be repaired or replaced, at Specialized's sole option. If your bicycle or frameset is a Specialized Edition (limited edition bicycle or frameset), be aware that an exact warranty replacement may not be possible.

The original owner shall pay all labor charges connected with the repair or replacement of all parts. Under no circumstances does this Limited Warranty include the cost of travel or shipment to and from an Authorized Specialized Dealer. Such costs, if any, shall be borne by the original owner.

Every Specialized bicycle and frameset has a useful product life cycle. Nonstandard use, including without limitation, use in competitive events, jumping, aggressive riding, riding with heavy loads, can dramatically shorten the useful product life cycle of a Specialized bicycle or frameset. In addition, exposure of the product to humid, warm, ocean conditions and/or exposure to salinity (whether from salt water, sweat, salinity in the air) is likely to cause corrosion of the product and will shorten the product life cycle. You are advised to clean your product regularly to avoid such corrosion.

ALL SPECIALIZED BICYCLES AND FRAMESETS SHOULD BE PERIODICALLY CHECKED BY AN AUTHORIZED SPECIALIZED DEALER for indicators of stress, potential problems, inappropriate use, or abuse.

This Limited Warranty applies only to the original owner and is not transferable. This Limited Warranty does not apply to:

- Normal wear and tear. Wear and tear parts (as listed below) are subject to damage as a result of normal use, failure to service according to Specialized's recommendations and/or riding or installation in conditions or applications other than recommended.
- Corrosion.
- Damage or failure due to accident, collision, crash, misuse, abuse, or neglect.
- Improper assembly or installation.
- Improper alteration or installation of components, parts or accessories not originally intended for or compatible with the Specialized bicycle as sold.
- Failure to perform maintenance or service at appropriate intervals per manufacturer manual and instructions and supported by records of such maintenance.
- Non-genuine Specialized products including without limitation counterfeit products.
- Specialized bicycles not purchased new from an authorized Specialized dealer.

WEAR AND TEAR PARTS

Aero bar pads	Disc brake rotors	Saddle cover
Air sealing o-rings	Dust seals	Shifter, brake cables & casings
Bearing races	Foam rings	Shifter grips
Bearings	Free hubs	Spokes
Bottom-out pads	Glide rings	Sprockets
Brake pads	Handlebar grips & grip tape	Stripped threads/bolts
Bushings	Mouth port & hydration accessories	Tires
Cassettes	Pawls	Tools
Chains	Rear shock mounting hardware & main seals	Transmission gears
Coating on stanchion, shock body	Rubber moving parts	Wheel braking surfaces

For Model Year 2013 and older model Specialized bicycles, please consult your owner's manual or contact Specialized or an Authorized Specialized Dealer for the applicable warranty.

THIS IS A FULL AND COMPLETE STATEMENT OF SPECIALIZED'S LIMITED WARRANTY. SPECIALIZED DOES NOT AUTHORIZE OR ALLOW ANYONE, INCLUDING ITS AUTHORIZED DEALERS, TO EXTEND ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, FOR OR ON BEHALF OF SPECIALIZED. NO OTHER REPRESENTATION, AND NO STATEMENT OF ANYONE BUT SPECIALIZED, INCLUDING A DEMONSTRATION OF ANY KIND BY ANYONE, SHALL CREATE ANY WARRANTY REGARDING THIS BICYCLE OR FRAMESET. IT IS AGREED THAT SPECIALIZED'S LIABILITY UNDER THIS LIMITED WARRANTY SHALL TO THE FULLEST EXTENT PERMITTED BY LAW BE NO GREATER THAN THE AMOUNT OF THE ORIGINAL PURCHASE PRICE AND IN NO EVENT SHALL SPECIALIZED BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES THAT WERE NOT FORESEEABLE TO SPECIALIZED AT THE DATE OF THIS LIMITED WARRANTY, LOSSES NOT CAUSED BY BREACH OF THIS LIMITED WARRANTY BY SPECIALIZED, BUSINESS LOSSES OR LOSSES TO NONCONSUMERS. THIS LIMITATION OF LIABILITY DOES NOT EXCLUDE LIABILITY FOR DEATH OR PERSONAL INJURY CAUSED BY SPECIALIZED'S NEGLIGENCE.

This warranty gives you specific legal rights, and you may also have other rights which vary from country to country. If any provision is found unenforceable, only that provision shall be stricken and all others shall apply. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you. Some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

For questions concerning warranty issues, customers can contact Specialized at Specialized Customer Service, 15130 Concord Circle, Morgan Hill, California 95037 or by calling Specialized Customer Service at 877.808.8154.

SPECIALIZED BICYCLE COMPONENTS
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