

**SHOWA**

**BFRC<sup>lite</sup> Kit**  
BALANCE FREE REAR CUSHION  
For 2016 KAWASAKI ZX10R




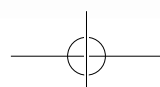
**Owner's Manual**

**SHOWA**

The best technology and the highest quality to meet every user's needs.

No. T574200-OME1

 Read this manual carefully before operating this BFRC® lite Kit.





## Introduction

Thank you for purchasing the SHOWA Balance Free Rear Cushion lite Kit (referred to as "the BFRC® lite Kit").

The BFRC® lite Kit is a suspension kit that provides the best performance and durability for public road riding for a "rider seeking a difference". It is designed with knowledge gained from the world's highest motor sports, Moto GP, World Superbike Championship, Dakar, etc.

In 2015's World Superbike Championship, the winner of the world champion was riding the motorcycle equipped with the BFRC® lite Kit and the Balance Free Front Fork (BFF).

Installation of the BFRC® lite Kit, handling, and tuning are described in this Owner's Manual.

Please read this manual carefully, and follow the described instructions.

Please note that installation, handling, and tuning should be conducted in a dealership or controlled environment where there are technicians with special knowledge and skills. Make sure to change the spring at a dealership or store specializing in installation. If conducted by the customer, it is not covered by the warranty.

The warranty is appended at the end of this manual.

Please make sure to receive a warranty from a dealership where you purchased the product.

### Handling this product properly


In this manual, items that need you to comply to prevent injuries on the user and other people and property damage, in addition to the correct installation are shown with the following "Symbols". Please understand what each "Symbol" means, and read this manual.


	<b>It is the safety warning symbol. This symbol is used to call your attention when there is a danger for personal injury. Comply with the safety items specified after this symbol to prevent injury and accident that may cause death.</b>
	<b>The symbol represents a content that if mishandled, "it may cause death or serious injury".</b>
	<b>The symbol represents a content that if mishandled, "it may cause injury or property damage".</b>
<b>Note</b>	<b>It describes points to pay attention, and focus when conducting service.</b>




## Safety Caution


### Caution When Installing

 <b>WARNING</b>	<p>Special knowledge is required to replace the rear cushion unit. If someone without special knowledge performed installation, and the installation was improper, it may cause damage on the motorcycle and accident. Please make sure that replacement is conducted in a dealership or controlled environment where there are technicians with special knowledge and skills.</p>
	<p>If the product is installed on a modified motorcycle, it may cause function and performance deterioration. Install this product only on a motorcycle with genuine parts of its manufacturer.</p>

 <b>CAUTION</b>	<p>This product is a precision machine part. Deformation and dent from a drop, hammer, and shock may cause function and performance deterioration. When handling and installing the product, do not drop, hammer, and apply shock.</p>
	<p>If only one person handles the product, there may be a case that a motorcycle and parts cannot be held by himself/herself. Make sure 2 or more people work when removing and installing the product.</p>
	<p>When installing to a motorcycle, comply with the items described in the Service Manual provided by the motorcycle's manufacturer.</p>

### Caution when Using

 <b>WARNING</b>	<p>High-pressure nitrogen gas is filled in this product. When disassembling and refilling nitrogen gas, the product may burst causing serious injury. If exposed to flames and puncture a hole, this product may burst causing serious injury. Replacement and discarding must be done by a specified dealership.</p>
--	---

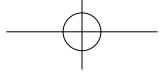
 <b>CAUTION</b>	<p>There are recommended inspection items for this product to maintain its performance. If not inspected and defects are ignored, it may cause function and performance deterioration. When using, make sure to perform the recommended inspection items described in this manual.</p>
	<p>Always use the oils specified by SHOWA. When unspecified oils are used, it may cause function and performance deterioration.</p>



# Contents

---

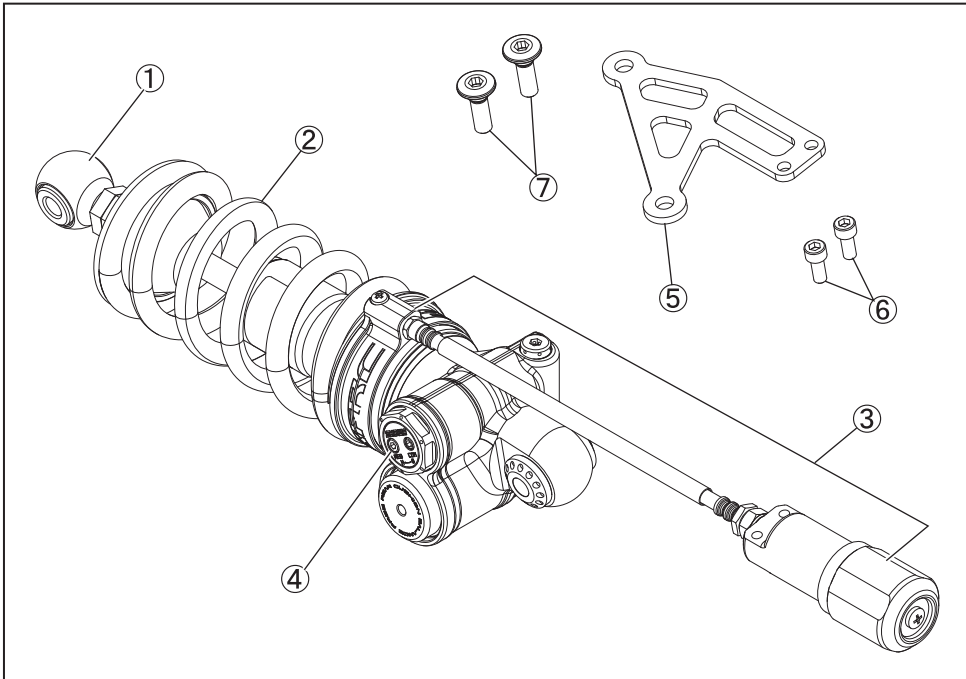
<b>Overview .....</b>	<b>1</b>
Product Features .....	1
List of Specification .....	2
Recommended Inspection Items .....	2
Explanation of Icons Used in this Manual .....	2
<b>Installation Method of the Product (Replacement from Standard Specification) .....</b>	<b>3</b>
Measuring Vehicle Height Before Replacing .....	3
Installation .....	3
Measuring Vehicle Height After Replacing .....	4
<b>Tuning Method .....</b>	<b>5</b>
Spring Preload Tuning and Damping Force .....	5
• Spring Preload Tuning .....	5
• Damping Force Tuning .....	5
Available Option Parts .....	6
<b>Replacement Method of the Spring .....</b>	<b>7</b>
Removing .....	7
Installation .....	9
<b>Vehicle height adjusting with the lower metal .....</b>	<b>10</b>
<b>Troubleshooting .....</b>	<b>12</b>



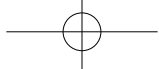
## Overview

### Product Features

The BFRC® lite Kit is a rear cushion product that enabled to reduce the fluctuations of pressure balance to the utmost limit by making the piston, damping valve, and sub tank independent, and the damping valve on the compression side and rebound side to the compact unit called the Plug Bolt COMP ④ which is placed on the damper case.



No.	Part Name	Reference Page
①	Lower metal	Page 3, 4, 9
②	Spring	Page 4, 6, 8
③	Spring Adjuster COMP	Page 5
④	Plug Bolt COMP	Page 1, 5
⑤	Stay	Page 3
⑥	Bolt M6 x 1.0 (2)	Page 3
⑦	Bolt M8 x 1.25 (2)	Page 3



## Overview

### List of Specification

		Kit	STD
Assembly	Max. length/Min. length (mm)	309 (312)/254 (253)	309/254
	Stroke (mm)	55	55
	Spring tuning (mm)	±5	—
	Spring length (mm)	160	175
	Length tuning	-1 to +3	—
	Filled gas pressure (Mpa)	1.0	1.0
Spring	Rate (N/mm)	91	91
Rebound spring	Rate (N/mm) -ST (mm)	100-10	100-8
Oil	Type of oil	SS25	SS25
Tuning reference position	Rebound side/Compression side	Max -12 clicks/ Max -22 clicks	Max -2.25 rotations/ Max -1 rotation
	Hydro spring tuning	Min +22 clicks (Total: 40 clicks)	—

### Recommended Inspection Items

	Before riding	Semi-annually	Annually
Operation check of the rear suspension operation	✓	✓	✓
Oil leakage of the rear suspension	✓	✓	✓

### Explanation of Icons Used in this Manual

In this manual, the following icon is displayed in illustrations for inspection and disassembling service to proceed smoothly.

Icon	Explanation
	Specify the tightening torque.



## Installation Method of the Product (Replacement from Standard Specification)



**WARNING**

Please make sure that installation is conducted in a dealership or controlled environment where there are technicians with special knowledge and skills.

When replacing the rear cushion, conduct tuning of the motorcycle posture with the following ways.

### Measuring Vehicle Height Before Replacing

1. While placing a motorcycle on the ground, measure the distance from the axle shaft of the rear wheel to the top frame, and record the value.
2. Measure above while a rider is on the motorcycle, and record the value.
3. Measure above by jacking up the motorcycle and the rear wheel is dropped completely, and record the value.

### Installation

1. Remove the standard rear cushion on the motorcycle.

[Note]

For the removing method of the rear cushion, refer to the service manual of the motorcycle manufacturer.

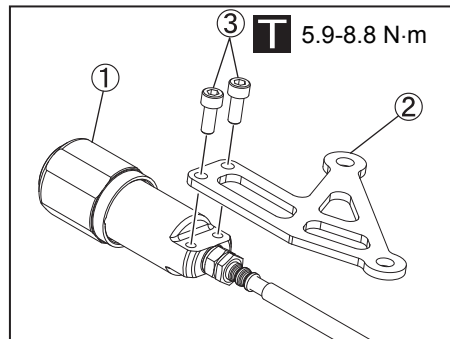
2. Install the BFRC® lite Kit to the motorcycle.

[Note]

- Install the lower metal to face the forward direction of the motorcycle.
- For the tightening torque of each bolt, refer to the service manual of the motorcycle manufacturer.

3. Install the stay ② on the spring adjuster COMP ①.
  - Install with M6 x 1.0 bolt ③.

**Tightening torque: 5.9 to 8.8 N·m**



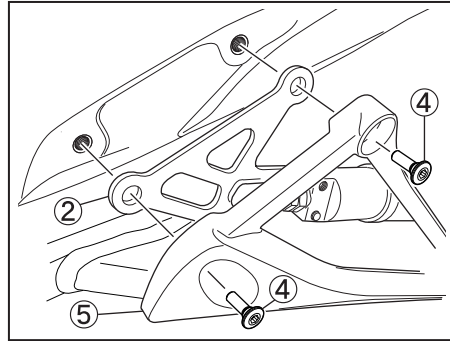


## Installation Method of the Product (Replacement from Standard Specification)

4. Remove the tandem step ⑤ on the left side of the motorcycle, and pinch the stay ② using M8 x 1.25 bolt ④ with the tandem step ⑤ to install.

[Note]

For the tightening torque of the tandem step installation bolt, refer to the service manual of the motorcycle manufacturer.



### Measuring Vehicle Height After Replacing

**⚠ WARNING**

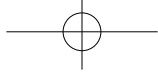
After replacement, the caster angle of the front fork is changed from the pre-replacement state. If ridden in this condition, it is very dangerous because the motorcycle behavior may be unstable and the brake performance may change. Before riding, make sure to tune the motorcycle posture.

Measure similarly before replacement, and adjust the lower metal installation position and the spring preload to be the same value before replacement. (Refer to page 5.)

**⚠ CAUTION**

- When lowering the vehicle height, adjust within the compressed range that each part of the motorcycle does not interfere with the BFRC® lite Kit.
- Conduct vehicle height tuning at installation with the spring preload.
- If tuning is difficult, contact your nearest dealership that sells SHOWA products.





# Tuning Method

## Spring Preload Tuning and Damping Force

Perform spring preload tuning and damping force tuning of the BFRC® lite Kit following the procedure below.



**Always perform tuning in the position that a clicking feeling can be felt. When tuned between clicking positions, it can cause shifted setting during riding.**

### • Spring Preload Tuning

Turn the tuning dial on the spring adjuster COMP with your hand to adjust.



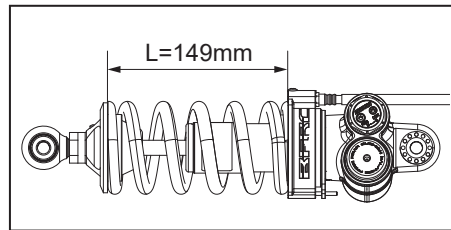
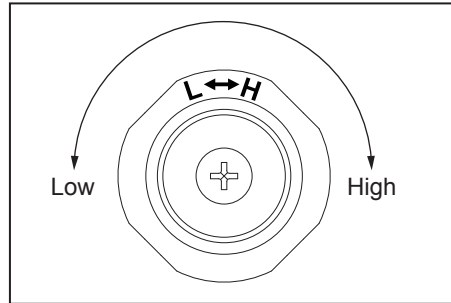
**Do not force to turn from the position that stops lightly for the Low side and High side. It may cause internal damage.**

[Note]

Spring set length L = 149 mm is the standard position.

High: L < 149 mm

Low: L > 149 mm



### • Damping Force Tuning

Adjust the COM and REB on the plug bolt COMP by turning with a hexagonal wrench (3 mm).

COM: Compression side

REB: Rebound side

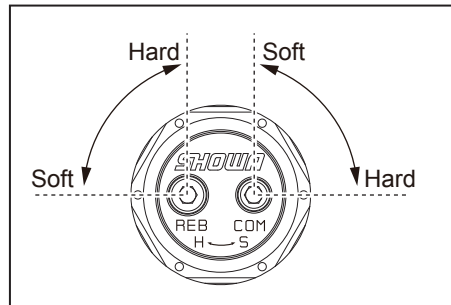


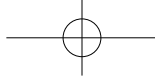
**Do not force to turn from the position that stops lightly for the Soft side and Hard side. It may cause internal damage.**

[Note]

- The standard on the compression side is 22 clicks counterclockwise from the position that is turned all the way on the Hard side.

- The standard on the rebound side is 12 clicks counterclockwise from the position that is turned all the way on the Hard side.





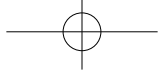
## Tuning Method

---

### Available Option Parts

To widen the vehicle height tuning and setting change, a spring for replacement is available as the optional part. For purchasing, contact the specified dealership.

Rate (N/mm)	Specification
101	Hard
96	Medium hard
91	Medium (Installation part at factory shipping)
86	Medium soft
81	Soft



## Replacement Method of the Spring

To replace the spring follow the bellow procedure.

### ⚠ WARNING

- Make sure the replacement is performed at a dealership or store specializing in installation. If performed by the customer, the warranty will be void.
- When assembling and disassembling the spring using a spring compressor, a large force is applied to the spring. The spring can detach and jump out hitting human bodies causing injury. Use a fixing tool to make sure not to tilt and install it correctly.
- When using a spring compressor, make sure not to contact fingers and hands that can cause injury. Make sure to be cautious sufficiently.
- If a spring compressor is not available or person does not have required skill, please contact the specified dealership.

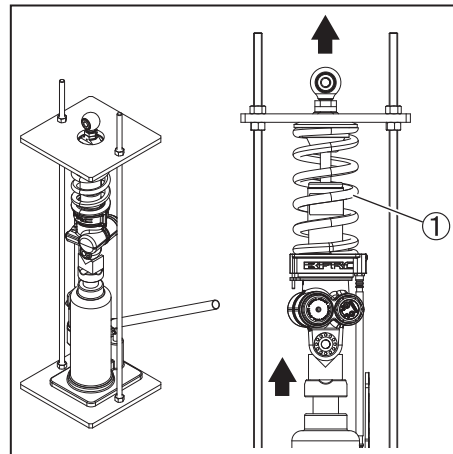
### Removing

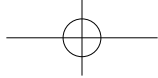
1. Remove the BFRC® lite Kit from the motorcycle.

[Note]

For the removing method of the rear cushion, refer to the service manual of the motorcycle manufacturer.

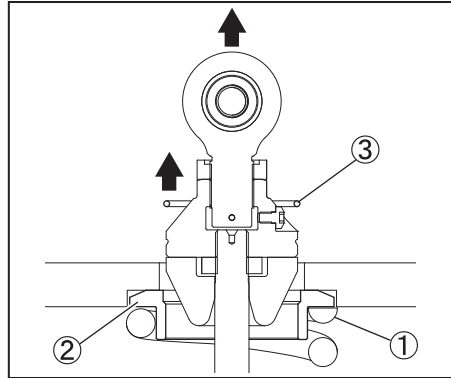
2. Using a spring compressor, compress the spring ①.



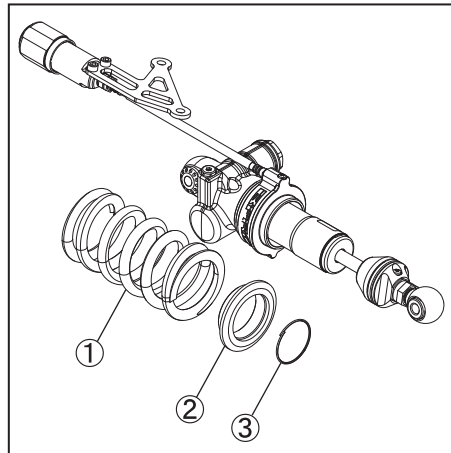


## Replacement Method of the Spring

3. Push down the spring seat stopper ②, and remove the stopper ring ③.



4. Remove the spring seat stopper ② and the spring ①, and replace the spring.

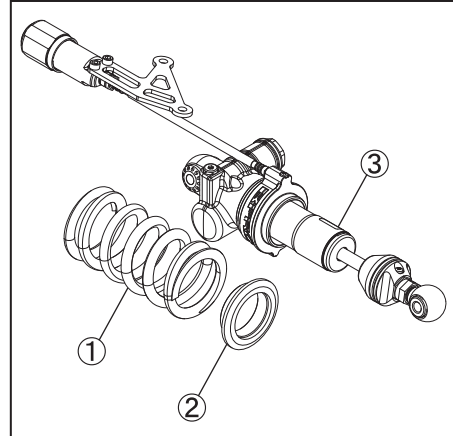




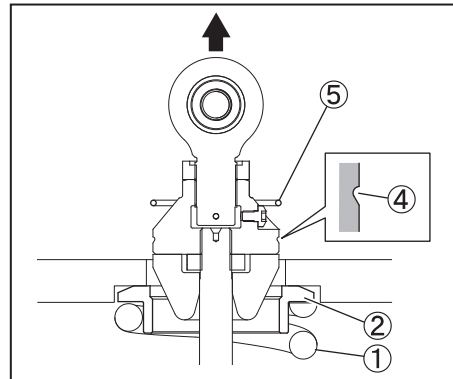
## Replacement Method of the Spring

### Installation


1. Attach the spring ① and spring seat stopper ② to the cushion sub COMP ③.



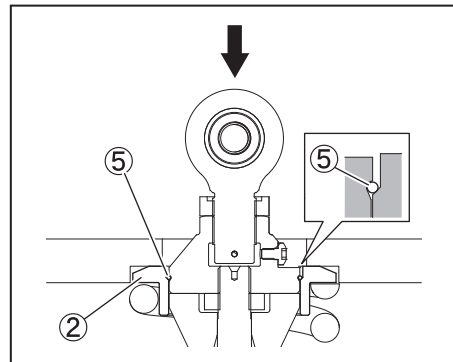
2. Attach to a spring compressor, and push down the spring seat stopper ② until the groove ④ is visible.
3. Attach the stopper ring ⑤ in the groove ④.

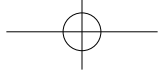


4. Check the spring seat stopper ② is hooked on the stopper ring ⑤, and remove the BFRClite Kit from the spring compressor.

 <b>WARNING</b>	<b>Attach the stopper ring ⑤ to the whole circumference around the groove ④ firmly.</b>
--	---

5. Install the BFRClite Kit to the motorcycle. For installation, refer to Installation Method of the Product (Replacement from Standard Specification) (Page 3).

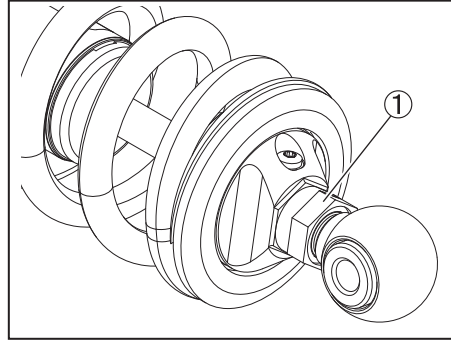




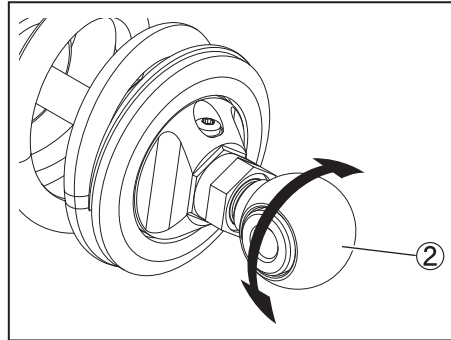
## Vehicle height adjusting with the lower metal

When the vehicle height tuning is necessary, adjust by changing the installation length of the lower metal.

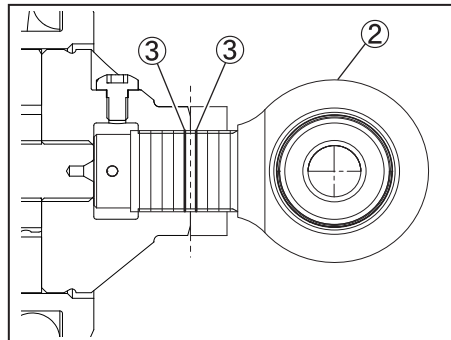
1. Loosen the lock nut ① with a wrench.

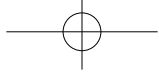


2. Turn the lower metal ② to change the installation length.



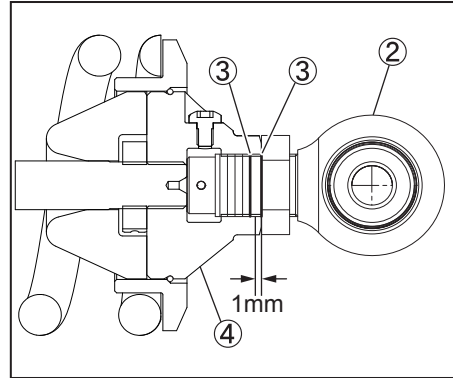
- The line of the screw part ③ of the lower metal ② is the reference line. When set in the center of line ③, the whole length of the BFRC® lite Kit is the reference dimension.



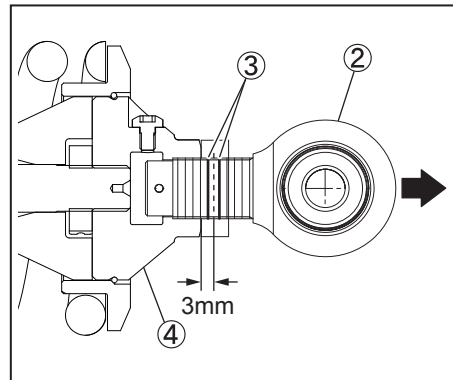


## Vehicle height adjusting with the lower metal

- Turn the lower metal ② clockwise to push the line ③ into the lower joint side ④ for 1 mm, and the length is shortened by 1 mm.



- Turn the lower metal ② counterclockwise to extract the line ③ outward for 3 mm, and the length is extended by 3 mm.
- Turn the lower metal ② half to change the whole length by 0.5 mm.



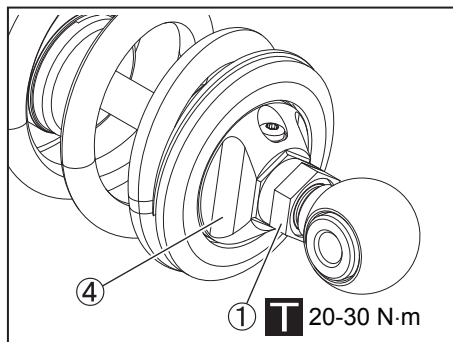
### ⚠ CAUTION

The lower metal ② is designed not to be removed. Do not force to turn or the part breaks. When turning the lower metal ②, use your hand instead of a wrench.

3. Fix the lower joint ④, and tighten the lock nut ① to the specified torque.

**Tightening torque: 20 to 30 N·m**

4. Install the BFRC® lite Kit to the motorcycle. For installation, refer to Installation Method of the Product (Replacement from Standard Specification) (Page 3).

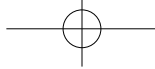




## Troubleshooting

Symptom	Cause	Measures
The rear suspension is soft.	Inadequate damping force tuning.	Tune suspension.
	The gas filling pressure is low.	Check at the dealership.
	Setting of spring.	Replace spring.
The rear suspension is hard.	Bent of the rod.	Check at the dealership.
	Grease shortage of the cushion bearings.	Check at the dealership.
	The gas filling pressure is high.	Check at the dealership.
Noise of the rear suspension.	Damage.	Check at the dealership.
	Abrasion of the cushion bearings.	Check at the dealership.





## Warranty

To Dealership

Please make sure a customer reads and agree with the warranty regulations, and enter information in the box below.

If sold without filling out the information, the warranty shall not be effective.

The warranty shall not be applied to sensible symptoms (sound during adjusting, color tone changes due to lighting, etc.) acknowledged as having no effect on the product functions.

The warranty shall not be applied to a product lacking a manufacturing engraved seal serving as the warranty engraved seal.

Manufacturing engraved seal			
Customer	Name		
	Address		
	Phone		
	E-mail		
Purchased date		Dealership name	
Year:	Month:		
Warranty period (From the purchased date)		Address	
6 months		Phone	
		E-mail	

If information is not filled in the box above, the warranty shall not be applied. Please make sure to fill it all.

If information is not filled in the box above, please contact the dealership a product is purchased promptly.

This warranty shall not be reissued. Please store in a safe place.

This document guarantees warranty application (free repair) on the contents specified in this document.

Manufacturer: SHOWA CORPORATION

1-14-1, Fujiwara-cho, Gyoda, Saitama 361-8506, Japan

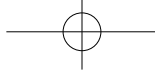
<http://www.showa1.com>

Distributor: K-Tech Suspension Limited

Rawdon Business Park, Marquis Dr, Swadlincote, Derbyshire DE12 6EJ UK.

TEL +44 (0) 1283559000

<http://www.ktechsuspension.com/>



### Warranty regulations

1. If this product fails to operate properly during the specified warranty period as used under normal condition following the cautions in the owner's manual, appended labels on the product, etc., please take the product and this warranty to a dealership you purchased the product, present the warranty, and request for warranty application.
2. The warranty shall not be applied in the following cases even in the specified warranty period.
  - When the customer himself/herself changed the spring.
  - Functional problems generated in the product's normal operation are not present.  
Normal operation noise and some oil permeation on the oil seal itself (if there are no performance issue).
  - Change in riding comfort and feelings generated based on the product's characteristics.
  - When the product is used for racing (includes circuit driving)
  - Failure and damage due to improper usage, and invalid modification and repairs
  - Failure and damage due to accident, fall, and drop.
  - Failure and damage due to fire, salt, natural disaster like earthquake, and external factors.
  - When the warranty is not presented.
  - When the manufacturing engraved seal of this document does not match the product's manufacturing engraved seal.
  - When required information on the warranty is missing or rewritten.
  - Failure and damage due to installation to a model the product is not intended for.
  - Failure and damage due to connected other devices.
  - Failure caused from using parts, oil, etc. not specified by SHOWA.
  - Replacement of consumable parts.
  - Failure and damage due to the customer's usage environment, maintenance and management methods (scratches due to skipped stones, rust, color change, etc., from riding).
3. To have a repair service on this product, please request in the product unit condition.  
Please note any cost to make it the product unit condition (cost for installation, removal, and other labor) is not covered by this warranty.  
Also, on-site repair service shall not be provided on this product even during the specified warranty period.
4. Please understand that warranty regulations are applied on the product unit only, not any other devices to be connected.
5. Please note that all inconvenience and losses (phone call fees, towing fees, replacement products, loaner vehicles, compensation for absence from work, sales loss, etc.) caused from having a warranty repair shall not be covered under any circumstances.
6. Please note that our company is not liable for any loss and damage outside the manufacturer warranty of your vehicle through installation of this product.

Balance Free Rear Cushion lite Kit  
Owner's Manual  
©SHOWA CORPORATION, June,  
2016, All rights reserved.  
Any reprinting or unauthorized use  
without the written permission of  
SHOWA CORPORATION is prohib-  
ited.  
Printed in Japan