



*Shock Absorber*

# *Road & Track Automotive*

Manual

# INTRODUCTION



## Öhlins Racing AB - The Story

*It was the 1970's, a young man named Kenth Öhlin spent most of his spare time pursuing his favourite sport: motocross.*

A careful observer, Kenth's attention was continually drawn to one specific detail – motocross bikes had more engine power than their suspension could handle. It was not long before Kenth realised that better performance could be achieved by improved wheel suspension.

Öhlins Racing was established in 1976, and just two years later the company won its first World Championship title. Despite being in the business for 30 years, the search for perfection and new functions is still the main focus of the company.

Congratulations! You are now the owner of an Öhlins Shock Absorber. More than two hundred World Championships and other major world titles are definitive proof that Öhlins shock absorbers offer outstanding performance and reliability.

Every product has gone through rigorous testing and engineers have spent thousands of hours, doing their very best to use every possible experience from our 30 years within the racing sport.

The product that you now have in your possession is pure racing breed that is built to withstand.

By installing this shock absorber on your vehicle you have made a clear statement... you are a serious rider with a focus on getting the maximal handling ability and outstanding feedback from your vehicle. Along comes the fact that your shock absorber will be a long lasting friend, delivering the very best of comfort and performance every time you go for a ride. Go explore!

# SAFETY PRECAUTIONS

## General Warnings

### **Note!**

*The shock absorber/front fork/steering damper is an important part of the vehicle and will affect the stability.*

### **Note!**

*Read and ensure you understand the information in this manual and other technical documents provided by Öhlins, before using the product.*

### **Note!**

*Öhlins Racing AB can not be held responsible for any damage to the shock absorber/front fork/steering damper, vehicle, other property or injury to persons, if the instructions for mounting, usage and maintenance are not followed exactly.*

### **Warning!**

*After installing the Öhlins product, take a test ride at low speed to ensure your vehicle has maintained stability.*

### **Warning!**

*If the suspension makes an abnormal noise, or the function is irregular, or if you notice any leakage from the product, stop the vehicle immediately and return the product to an Öhlins Service Centre.*

### **Warning!**

*The product warranty shall only apply if the product has been operated and maintained in accordance with recommendations in this manual. If you have any questions regarding usage, service, inspection and/or maintenance please contact Öhlins.*

### **Note!**

*When working with the Öhlins product, always read the Vehicle Service Manual.*

### **Note!**

*This Manual shall be considered a part of the product and shall therefore accompany the product throughout its life cycle.*

## SAFETY SYMBOLS

In this manual, mounting instructions and other technical documents, important information concerning safety is distinguished by the following symbols:



*The Safety Alert Symbol means: Warning! Your safety is involved.*

### **Warning!**

*The Warning Symbol means: Failure to follow warning instructions can result in severe or fatal injury to anyone working with, inspecting or using the shock absorber, or to bystanders.*



### **Caution!**

*The Caution Symbol means: Special precautions must be taken to avoid damage to the shock absorber.*

### **Note!**

*The Note Symbol indicates information that is important regarding procedures.*

## Product Specific Warnings

### **Warning!**

*This product was developed and designed exclusively for a specific vehicle model and shall only be installed on the intended vehicle model in its original condition as delivered from the vehicle manufacturer.*

### **Warning!**

*This product contains pressurized nitrogen gas (N<sub>2</sub>). Do not open, service or modify this product without proper education (authorized Öhlins dealer/distributor) and proper tools.*

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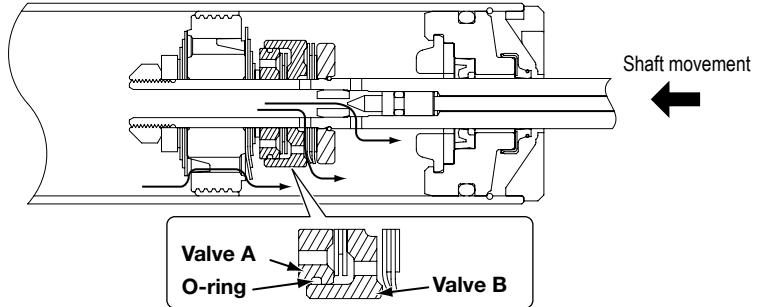
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## DFV Dual Flow Valve

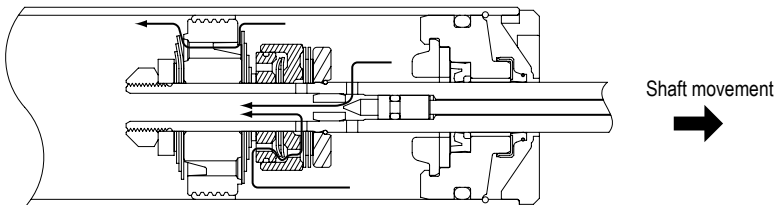
The DFV (Dual Flow Valve) is a sub-piston system, consisting of a compression valve (Valve A) and a rebound valve (Valve B), see figure below. The settings for valve A and B can be changed individually.

### Compression Stroke



During a compression stroke, oil flows through 3 different passages as shown in the figure. At low shaft speeds the DFV is closed, and the damping from the bleed valve and the piston shim stack is tailored to give good steering response. When hitting a bump, the DFV opens instantly to absorb the impact.

### Rebound Stroke



During a rebound stroke, oil flows through 3 different passages as shown in the figure. At low shaft speed the DFV is closed, and the damping from the bleed valve and the piston shim stack is tailored to give good steering response. When passing a pot-hole or sudden depression in the road, the DFV opens instantly to keep the tyre in contact with the road.

With the extra third valve created by incorporating the DFV, the damping force characteristics can be tailored to improve both handling and comfort at the same time, something that is not possible without the DFV.

## Camber

To adjust front camber, the top mount can be moved in relation to the mounting plate. The adjustment screws can be mounted in different holes depending on which camber you want.

To adjust camber, loosen the adjustment screws (see figure) and slide the top mount in the slots in the mounting plate until you have the camber you want. If the screws bottom out in the slots, mount the adjustment screws in another set of holes.

Tighten the adjustment screws to 12-14Nm. The top/nylon nut may come off depending on the suspension type. Apply appropriate screw lock agent if necessary. Tighten the nut carefully.

### Caution!

The scales marked on the top mount shall only be used as a reference. The camber shall be measured with appropriate equipment.

### Caution!

If the nut is tightened to a higher torque than recommended the shaft may be damaged.

## Tightening Torque

Thread	Lock Nut	Regular Nut
M10x1.25	18-24 Nm	25-30 Nm
M12x1.25	30-35 Nm	35-40 Nm
M14x1.5	-----	60-70 Nm

### Caution!

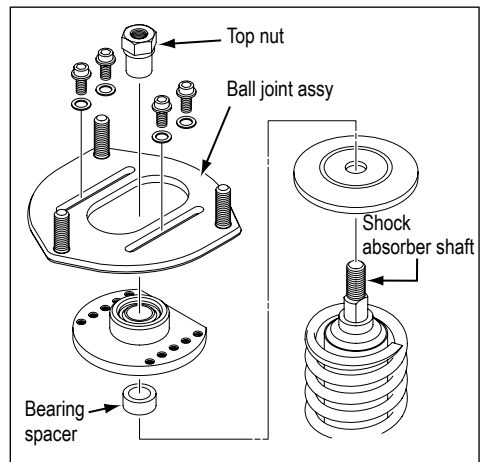
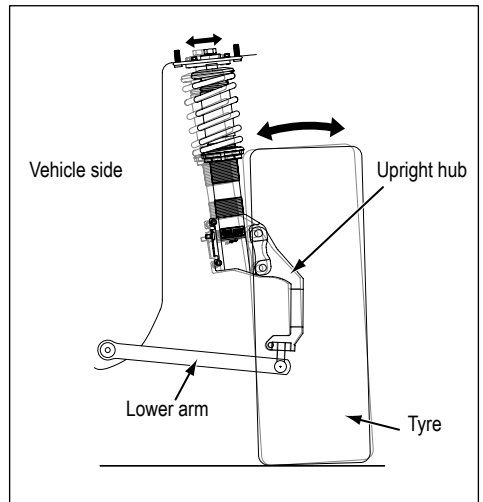
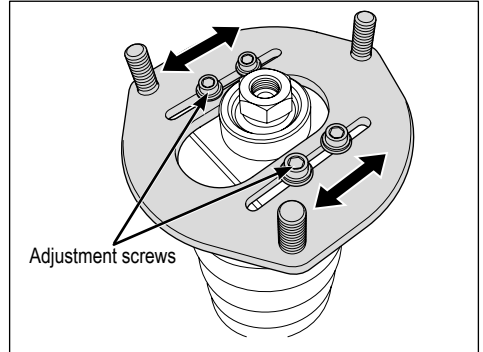
Use the correct bearing spacer. If you do not use the correct bearing spacer the shaft may be damaged.

### Caution!

If you drive in severe conditions during a long period of time a knocking sound may occur. Replace the spherical bearing after 2 years/20000km.

### Caution!

Do not use any tool to grip the shaft/chrome tube when tightening the top nut. This may cause severe damage.



# SPRING PRELOAD

## Spring Preload

When adjusting spring preload you move the spring seat. This will decrease or increase the initial spring force, which will lower or raise the vehicle.

If your shock absorber is of the length adjustable type, spring preload and ride height can be changed individually. In this case the height adjuster shall be used for ride height adjustment.

The spring preload affects the height of the vehicle and the wheel angles.

### **Caution!**

*By changing the preload, the vehicle stability may be affected.*

### **Warning!**

*Before adjusting; raise the vehicle so that the wheels are off the ground, also, remove the wheels. If setting the spring preload with wheels on and loaded suspension there is risk for damage on the suspension parts as well as personal injury. After adjusting, lock the lock nut.*

## Set the Spring Preload

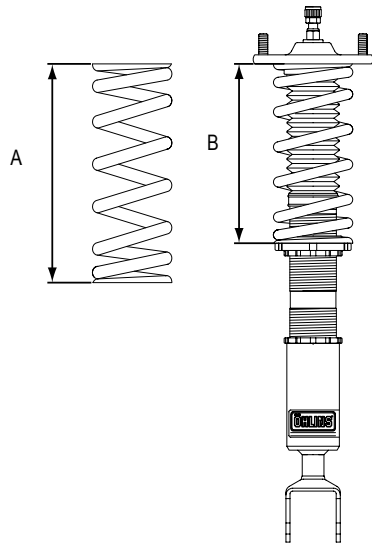
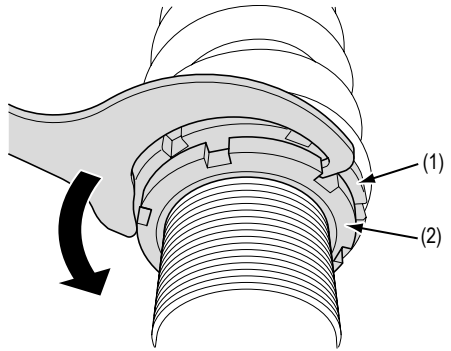
Use a C-spanner. Unlock the lock nut (2). Turn the spring platform nut (1) clockwise to increase the spring preload. Turn counter clockwise to decrease it. Lock the setting with the lock nut (2).

Tightening torque 40-50Nm

### **Caution!**

*Do not adjust the spring platform so that the spring has a play. It shall always be mounted with preload.*

Set the Spring Preload



- A Free spring length
- B Installed spring length, shock absorber fully extended

$A - B = \text{Spring Preload}$

*Spring Preload is the difference between the measures A and B.*

# DAMPING ADJUSTER

## Damping Adjustment

Reference position for damping force adjustment:

1. The adjusters are set at 7 clicks from the factory.
2. The adjuster affects the rebound, and also, the compression damping to a smaller degree.

### **Note!**

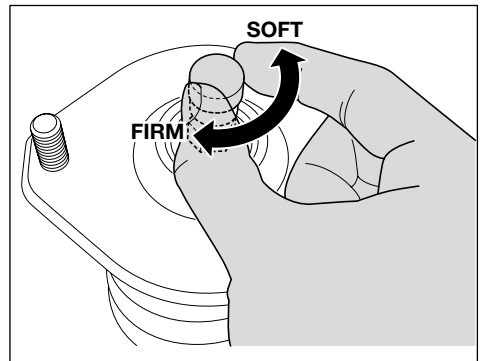
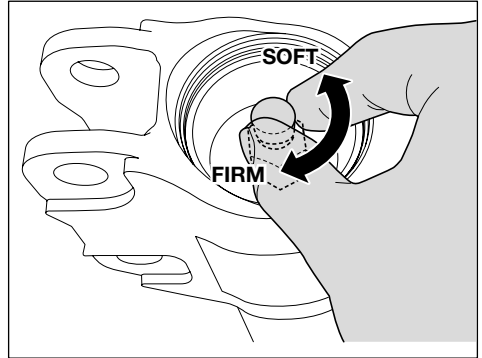
*After mounting the shock absorber, always check the click position of the adjuster.*

## Adjust Damping

Turn the adjuster clockwise to fully closed position (position zero [0]). Then, turn counter clockwise to open, and count the clicks until you reach the recommended number of clicks. See recommended set-up in the Mounting Instructions for the shock absorber.

### **Caution!**

*Do not use force, delicate sealing surfaces may be damaged.*





# HEIGHT ADJUSTER

## Height Adjuster

### ⚠ Warning!

### ⚠ Warning!

Before adjusting; raise the vehicle so that the wheels are off the ground, also, remove the wheels. If setting the spring preload with wheels on and loaded suspension there is risk for damage on the suspension parts as well as personal injury.

### ⚠ Warning!

When adjusting the vehicle height with the height adjuster (in particular, when lowering the vehicle height by shortening the overall strut or shock absorber length), the tyre or suspension arm etc. may easily interfere with the vehicle body or other suspension parts. Therefore, carefully check that there is no interference between parts after adjusting.

## Adjust Strut Length

Adjust strut length with the shock absorber still mounted on the vehicle.

Loosen the two bolts and nuts on the rear side of the upright bracket (B). Use a 5mm and 6mm Allen key.

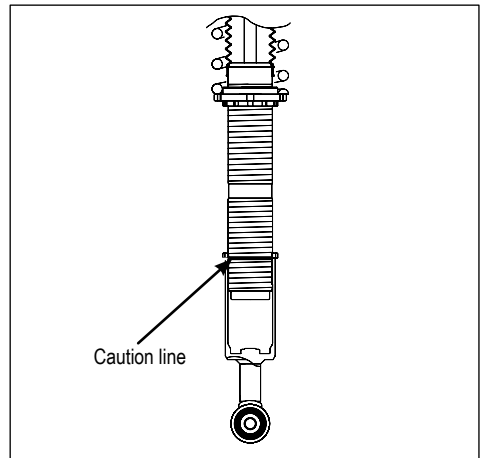
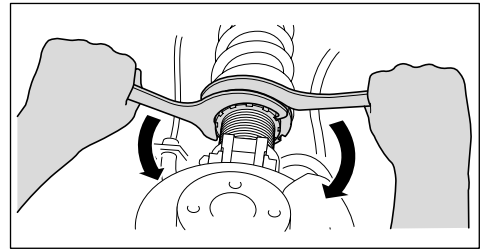
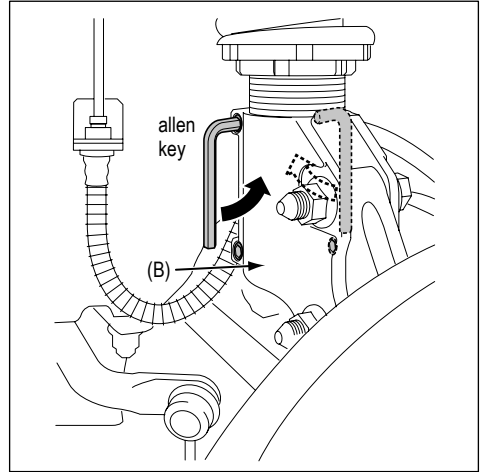
1. Use the supplied C-spanner to and turn the strut main body to adjust vehicle height.

One turn equals 2mm height change. In the standard position the upright bracket edge is 8 mm below the strut casing bottom.

Adjustment range  $\pm 15\text{mm}$  from standard position. Tighten lock nut to 50-60Nm

### ⚠ Warning!

The bracket shall not be adjusted below the caution line as it may come loose or break.



# ADJUSTMENT AND SET-UP

With both preload and height adjustments in their standard positions, the vehicle is lowered approximately 25mm when compared to the vehicle equipped with the original suspension.

The actual vehicle height varies depending on the accessories mounted on the vehicle, vehicle weight and/or individual differences of the vehicle. The overall adjustment range for the lower bracket is the reference value shown above  $\pm 15\text{mm}$  on both the front and rear.

## **⚠ Warning!**

*If the lower bracket is set outside the adjustment range it may interfere with suspension or vehicle body parts.*

## **👉 Caution!**

*After adjusting the vehicle height, the overall height must be within a range of  $\pm 40\text{mm}$  from the stock vehicle height.*

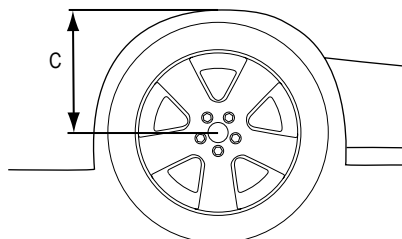
By using the adjustments available on this product, and testing by trial and error, you can learn how the adjustments affect your vehicle.

Always begin by taking your vehicle for a test drive with all adjustments at their basic settings. Choose a short run of varying character with long and sharp bends, hard and soft bumps. Stay to the same round and adjust only one setting at a time.

## **⚠ Warning!**

*Before driving, always ensure that the basic settings by Öhlins have not been changed during delivery. When adjusting, always make notes, adjust in small steps and make only one adjustment at a time. do not adjust more than four [4] clicks at a time.*

Check vehicle height



Measuring points after assembly.  
Wheel centre to wheel arch top (C)

## **Revalving**

The Öhlins R&T shock absorber can be revalved to adjust the damping force to custom specifications. Please contact your Öhlins dealer for advice.

# INSPECTION AND MAINTENANCE

*Preventive maintenance and regular inspection reduces the risk of functional disturbance. If there is any need for additional service, please contact an authorized Öhlins workshop.*

## Cleaning

Clean the shock absorber externally with a soft detergent. Use compressed air. Be careful that all dirt is removed. Lift the bump rubber and clean the area below. Keep the shock absorber clean and spray it with oil (WD40, CRC 5-56 or equivalent) after washing. Wipe off excessive oil with a cloth. Some areas of the shock absorber are treated with special surface treatment such as Teflon coating. Do not use strong chemicals, i.e. strong solvents or wheel cleaning detergents, and/or a hard brush for cleaning as it may discolour and change the appearance of the shocks surface treatments.

## Inspection

1. Check ball joints for possible excessive play or stiction.
2. Check the piston shaft for leakage and damage.
3. Check the shock absorber body for external damage.
4. Check the reservoir for external damage that can restrict the floating piston from moving freely.
5. Check for excessive wear of rubber components.
6. Check the attachment points of the shock absorber to the vehicle.

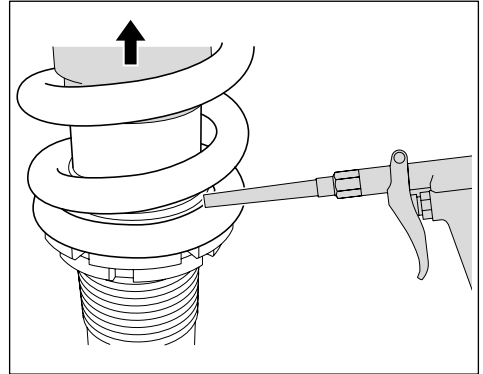
## Recommended Service Intervals

Racing: Every 10 hours of operation.  
Maximum 20 hours of operation  
without service and oil change.

Regular street use: Every 30 000 km

## Disposal

Discarded Öhlins products shall be handed over to an authorized Öhlins workshop or distributor for proper disposal.



### 👁 Note!

*The Öhlins shock absorber shall only be filled with Öhlins High Performance Shock Absorber Fluid. Contact an Öhlins dealer for advice.*

### ⚠ Warning!

*Never change gas pressure. Special purpose charging equipment, access to nitrogen and special knowledge is required.*