

Shock Absorber for Adventure

AR-X 40

Owner's Manual

ÖHLINS®
ADVANCED SUSPENSION TECHNOLOGY



Öhlins Headquarters Upplands Väsby, Sweden

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.

Being a careful observer, Kenth's attention was continously 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 since 1976, the search for perfection and new functions is still the main focus of the company.

Congratulations! You are now the owner of an Öhlins product. More than hundreds of World Championships and other major world titles are definitive proof that Öhlins products 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 40 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 product on your vehicle you have made a clear statement… you are a serious rider or driver with a focus on getting the maximal handling ability and outstanding feedback from your vehicle. Along comes the fact that your Öhlins product 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 note followed exactly.

⚠ Warning!

After installing the Öhlins product, take a test ride at low speed to ensure your vehicle has maintaned 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 immediatly and return the product to an Öhlins dealer.

⚠ 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 an Öhlins dealer.

Note!

When working with the Öhlins product, always read the vehicle service manual.

Note!

This manual shall be considered as a part of the product and shall 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.

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The AR-X 40 shock absorber is developed from the latest TTX technology and adapted to the Adventure bikes.

The product offers great performance for on and offroad use. The shock has an integrated spring preload adjustment with easy access adjuster, and the advantage of rebound and compression adjustment easily accessible on the cylinder head.

The TTX technology has brought bikes and riders to the podium and to the winner's circle many times and now we bring it to the Adventure segment. The result is a shock absorber with the long term technology developments from Öhlins, all learned from the experiences from Enduro/ Motocross, MotoGP and WSBK.

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Inside the AR-X 40

When the shock absorber moves

When the shock absorber moves, the fluid inside is forced to flow through the compression valve or the rebound valve, depending on the direction of the movement, followed by going through either the rebound check valve or compression check valve and to the other side of the main piston (figure 2 and 3, page 6). The piston rod volume displaces the fluid into or out of the reservoir.

Blow of valve in main piston In parallel to the compression valve, the main piston is also a valve, which allows a flow of oil through the piston when moving in the compression direction, acting as a blow of in parallel to the compression valve. The function of a blow of in this case is to act as a filter for all unwanted peaks in pressure, improving both comfort and safety.

The reservoir

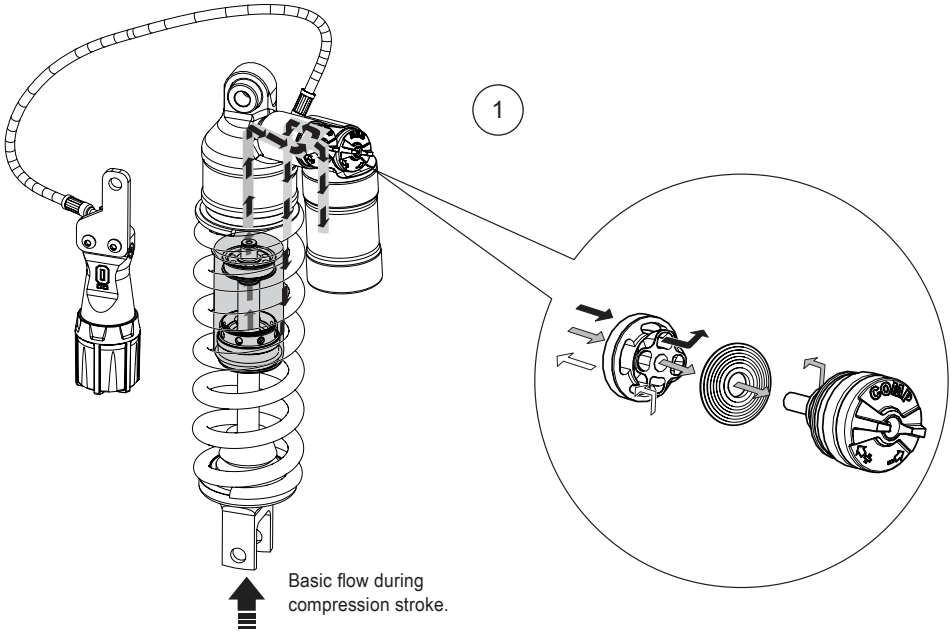
The reservoir is connected to the damping system in a way that regardless of the direction of the movement the reservoir will be connected to the low pressure side of the main piston.

The compression and rebound valves

The compression and rebound valves have three flow paths for the fluid, the bleed valve, shim valve and the check valve.

The bleed valve (figure 1 center grey arrows) is a small orifice giving a flow restriction by its small size. In the shim valve (figure 1 black arrows) the fluid pressure must deflect the thin steel washers to open up the valve to allow fluid to flow through. The check valve (figure 1 outer white arrows) contains a spring preloaded shim that opens easily for return flow of fluid when the movement direction changes.

The bleed valve and the shim valve build up the damping force. At slow stroke speeds the amount of fluid going through the bleed valve is higher. At a fast stroke the shim valve takes care of most of the fluid flow. The check valve, together with the bleed valve (since it can flow both directions), handle return flow.



Control the damping force

When you turn the compression or rebound adjuster you change the size of the bleed valve. Depending on which direction you turn the adjuster you either increase or decrease the damping force. The characteristics of the damping action can be changed by changing the shim stack set up, like for example shim thickness, diameter and shape as well as number of shims. Please note that only approved Öhlins personnel must change the shim stack set up.

Compression damping

When the motorcycle movement compresses the shock absorber, the fluid above the main piston is pressurized (more than the gas pressure set in the shock absorber). The pressurized fluid then goes through both the main piston and:

- the compression adjuster bleed valve
- the compression adjuster shim valve
- the channel connected to the reservoir
- the rebound adjuster check valve and between the inner and the outer tube to the other side of the main piston.

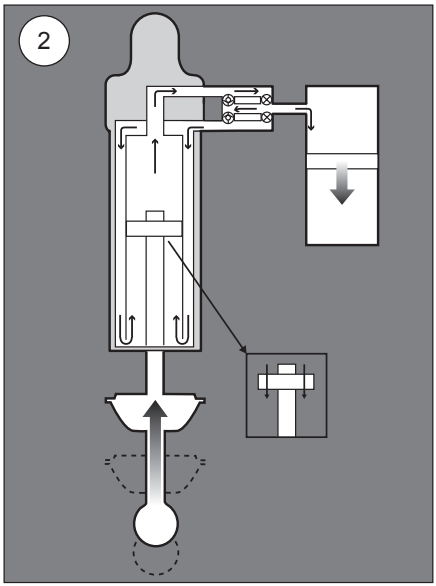
During compression stroke the piston rod goes into the shock absorber body and the displaced volume of damper fluid flows into the reservoir. The fluid moves the separating piston inside the reservoir.

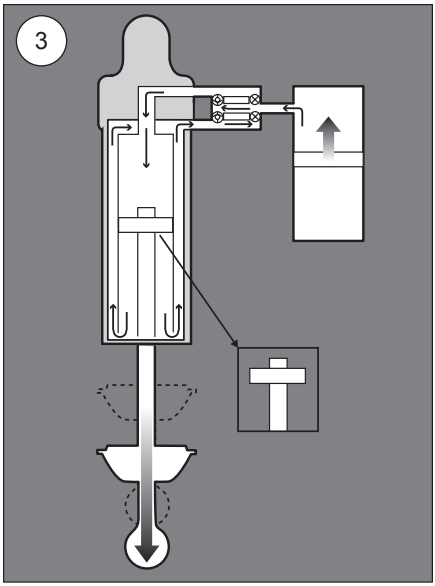
Rebound damping

When the spring forces the shock absorber to extend, the fluid below the piston is pressurized (more than the gas pressure set in the shock absorber) and must move. As the flow cannot go though the main piston in rebound direction (as it can in compression), the piston pushes the oil through:

- the rebound adjuster bleed valve
- the rebound adjuster shim valve
- the channel connected to the reservoir
- the compression adjuster check valve into the inner tube and to the upper side of the main piston.

The fluid that was displaced into the reservoir during compression stroke is now pushed back into the shock absorber main body by the gas pressure. The separating piston will move inside the reservoir as the fluid is pushed out.





2 COMPRESSION, REBOUND AND LENGTH

⚠ Warning!

Before riding, always ensure that the basic settings made by Öhlins are intact. Make only one adjustment at a time, adjust in small steps and take notes.

👁 Note!

For recommended setup see the Mounting Instructions or contact an Öhlins dealer.

Spring Preload

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

The spring preload is fundamental for the suspension function. If the preload is incorrectly set, any other adjustments will not help to get the intended performance from the suspension.

Turn the Hydraulic Adjuster knob to set the spring preload. Turn clockwise to increase the preload (+) and turn counter clockwise to decrease (-). What each turn corresponds to in preload can be read in the mounting instruction.

Compression Damping

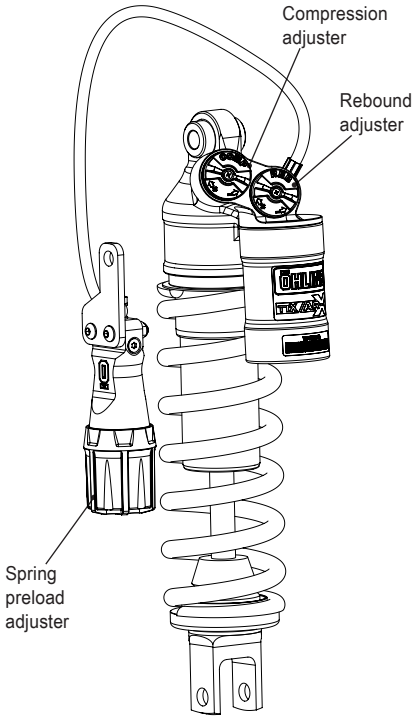
Compression damping controls the energy absorption when the shock absorber is being compressed, thus controls how easy the shock absorber compresses when the rear wheel is being loaded or hits a bump.

Adjust by turning the knob on top of the reservoir. Turn clockwise to increase damping (+), turn counter clockwise to decrease (-).

Rebound Damping

Rebound damping controls the energy absorption when the shock absorber is being extended and controls how fast the shock absorber returns to its normal position after being compressed.

Adjust by turning the knob on top of the reservoir. Turn clockwise to increase damping (+), turn counter clockwise to decrease (-).



Reset the adjusters

Turn the compression or rebound adjuster clockwise to fully closed position (zero [0]). Then, turn counter clockwise to open, and count the clicks until you reach the recommended number of clicks.

For the preload adjuster it's the opposite procedure. Turn the adjuster counter clockwise to fully open. Then turn clockwise to close, and count the clicks or turns until you reach the recommended amount of clicks.

See recommended settings the section Setup Data in this manual.

✋ Caution!

When adjusting, turn carefully not to damage delicate sealing surfaces.

3 ADJUSTMENT AND SET UP

Measure Sag

Spring Preload - Free Sag - Ride Height

Spring preload is a crucial part of setting your motorcycle since it affects the height of the motorcycle and the fork angle. Before setting the preload, measure the sag:

Note!

The following procedure should be performed on a flat surface.

1. Put the motorcycle on a work stand so that at least the rear wheel is off the ground and the suspension is unloaded.
2. Mark, for example with a piece of tape, a point immediately above the rear wheel axle.
3. Measure the distance from the marked point to a fixed point, for example the wheel axle (R1).
4. Put the motorcycle on the ground so that the rear suspension is slightly compressed. Repeat the measuring procedures (R2).
5. Sit on the motorcycle in normal riding position, properly outfitted in your riding gear. Repeat the measuring procedure (R3).

Recommended Measures

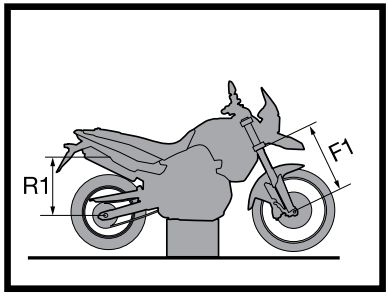
See recommended measures in section Setup Data in Mounting Instructions.

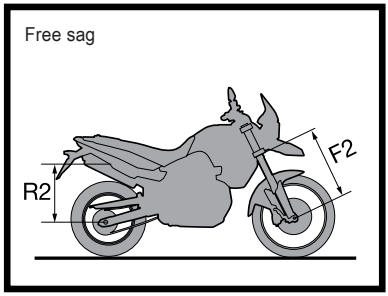
Adjust spring preload

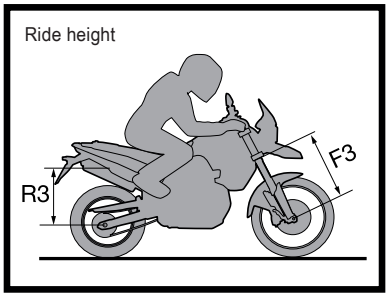
1. If your measures differ significantly from the recommendations, adjust the spring preload. (See chapter 2. Compression, rebound and length in this manual).
2. If the ride height still differs from the recommendations and the preload adjuster is in any of the end positions, you may need to change to softer/harder spring. Contact an Öhlins dealer for advice.

Warning!

Incorrect spring rate may result in a front geometry that is either too steep or too flat. This can result in a tendency of under or over steering, that could seriously affect the handling characteristics of the motorcycle.





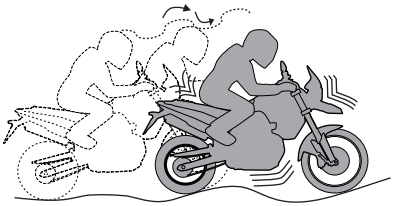


3 ADJUSTMENT AND SET UP

Start with the rebound adjuster

If the bike feels loose and is transferring a lot of movement during acceleration and braking and/ or if the bike feels nervous over bumpy sections close the rebound adjuster two [2] clicks. (If you are close to perfect setup click one click at the time.

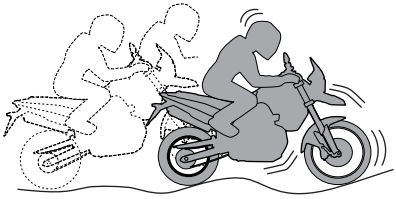
If the bike feels hard, harsh (no comfort) and is difficult to enter corners with or does not stay in line over bumpy sections, open the rebound adjuster two clicks.



If the vehicle feels

- unstable
- loose
- bouncy

Increase rebound damping (+)



If the vehicle feels

- hard
- bumpy

Decrease rebound damping

If you have got a good feeling for the bike with spring, preload and the ride height feels OK but the bike runs low and packs down under acceleration bumps, with lost line and/or lost comfort and traction, open the rebound adjuster two [2] clicks.

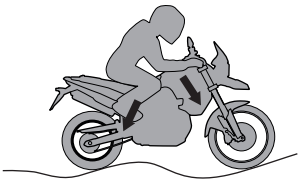
If the bike is nervous and moving a lot or has a high feeling entering corners, close the rebound adjuster two [2] clicks. Fine tune one [1] click at the time. Test ride and make the necessary adjustments. For original rebound setting see the Mounting Instructions for your shock absorber.

The compression adjuster

The compression adjuster is used to control the chassi movement towards the ground.

If you feel that the shock absorber feels soft, spongy or the bike feels unstable for example when going in to a corner, close two clicks (clockwise).

If you feel that the bike feels hard and have poor traction, open two clicks (counter-clockwise).



If the vihicle feels:

- high
- has bad grip at throttle opening

Decreese compresssion damping (-)

If the vehicle

- feels soft
- feels low
- is bottoming

Increase compression damping (+)

4 INSPECTION AND MAINTENANCE

Preventive maintenance and periodic inspection procedures help to keep the shock absorber in proper condition. For additional service, please contact an approved Öhlins dealer.

Cleaning

Clean the external parts of the shock absorber with a soft detergent. Use compressed air. Make sure 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.

Caution!

Do not use strong detergent such as contact cleaner or equivalent. Do not spray water directly into the adjuster knobs and/or the ball joints.

Inspection

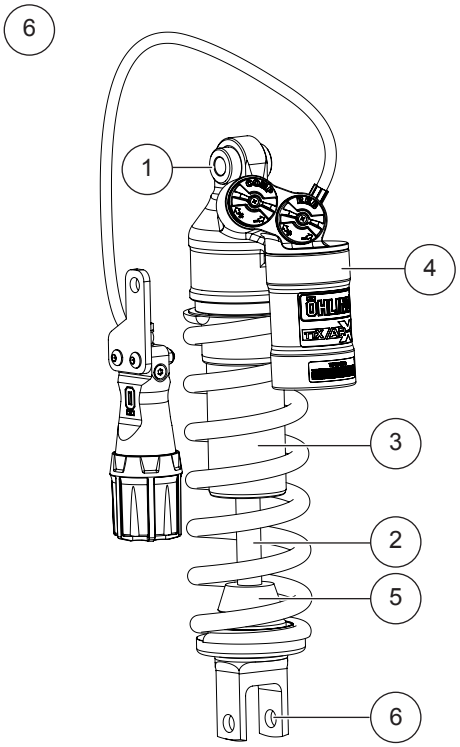
1. Check ball joints for possible excessive play or stiction.
2. Check the piston shaft for leakage and damage.
3. Check the shock absorber body for damage.
4. Check the reservoir for external damage that can prevent the floating piston from moving freely.
5. Check the rubber components for wear.
6.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

Recommended Service Intervals

Regular street use: Every 30 000 km

Offroad use: Every 15 000 km.

If uncertain of what condition is applicable, please contact an Authorized Öhlins Service center.



Disposal

Hand over your discarded Öhlins products to an Öhlins dealer for proper disposal.

Note!

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

Warning!

Do not change the gas pressure. Special purpose charging equipment and access to nitrogen is required.

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