Öhlins Shock absorber for Automotive

TTX FLOW

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 for almost 40 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 product. More than two hundred 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 almost 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 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 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 Öhlins.

⚠ 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_2). Do not open, service or modify this product without proper education (Öhlins dealer) and proper tools.

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.

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.

CONTENTS

Congratulations on choosing the Öhlins TTX shock absorber - the most unique and powerful racing shock absorber available today. The TTX shock absorber design is the culmination of five decades of Öhlins successful participation in World Championship events.

This shock absorber draws on all the expertise developed by Öhlins while winning more than 350 World championship titles.

The Öhlins TTX features a patented concept with a unique concentric twin tube design, that allows for the gas pressure to always back-up the low pressure side of the main piston. This design creates positive pressure build up on both compression and rebound stroke. As a result the TTX has a more direct damping response, less risk for cavitation and works with lower gas pressure. With the new Flow-technology we redesigned the 'check-valve' system to balance wide valve openings and quick open/close actions to handle a large volume of oil flow. This gives the car improved traction, comfort and predictability which enhance the stability of the car.

Compared to a regular piggy back single tube shock absorber, that has positive pressure build up only on rebound stroke and relies on compression valve resistance together with gas pressure to avoid cavitation on compression stroke, the TTX design is superior.

The TTX Flow shock absorbers are designed to handle the demanding damping characteristics needed for all types of surfaces. For best performance, the shock absorber must be adjusted to different driving conditions; for the smooth and fast gravel roads in Finland or the rougher roads in Greece or in the Middle East. Temperature stability is maintained by a flow restriction design in the bleed valves that creates a turbulent flow at very low piston velocities. Also, materials with different thermal expansion rates are used to compensate for the viscosity change of the fluid caused by changes in temperature.

In addition the Öhlins shim system offers infinite combinations of shim stacks, with a wide spectrum of different character using the same piston. The whole system is pressurized by nitrogen gas behind a floating piston to ensure separation of the gas and fluid.

The Öhlins TTX Flow shock absorber are racer friendly shock absorbers, easy to set up, dial in and rebuild. Remember that you can always get support from the Öhlins dealers worldwide.

ADJUSTMENT AND SETTING UP

Set up the vehicle

Installing new shock absorbers may change the ride height and wheel angles on your vehicle. Therefore, we recommend to do a complete set-up check of the vehicle after you have installed the Öhlins shock absorber. To help with the set up we have attached a setup sheet at the end of the manual, the sheet is also available for download from www.ohlins.com.

1. Check ride height, front and rear. Note ride height. Adjust if necessary.
2. If scales are available, check corner weight, front and rear. Note measures. Adjust if necessary.

Note!

Always consult an Öhlins dealer if you have any questions regarding shock absorber/strut set-up.

Note!

Always start with the settings recommended by Öhlins.

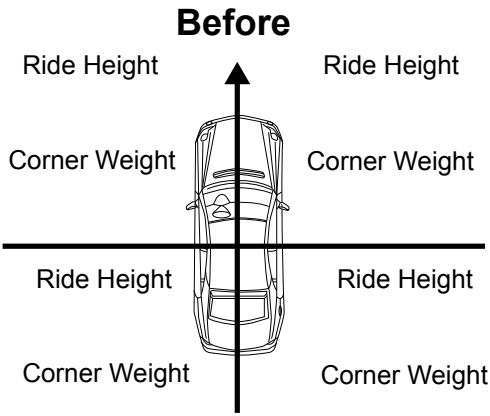
Note!

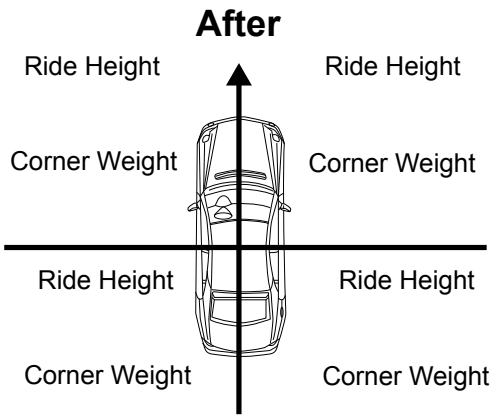
Higher click numbers give less damping force.

Make adjustments

Suspension settings depend on the vehicle weight, the driving style and the road conditions. If you are not happy with our recommended settings, follow these few guidelines and ground rules on how to make adjustments.

- Make adjustments in small steps (2-3 clicks at a time) and not outside the usable click range, take notes. See the Mounting instructions or contact an Öhlins dealer.
- When you think you have made an improvement, go back to the adjustment settings you started with, and double check to be sure.
- Pay attention to changes in conditions like tires or temperatures, etc. In general, compression damping changes should be used to influence the vehicle stability and response, while rebound damping changes should be used to influence comfort and traction.
- When you need more damping force, you should mainly try to increase compression damping and use as little rebound damping as possible. This usually means that you gain comfort and handling performance.





SPRING PRELOAD & SET-UP

When adjusting the spring preload you move the spring seat which will lower or raise the vehicle ride height. The ride height is an important criteria for the vehicle stability and behaviour.

Note!

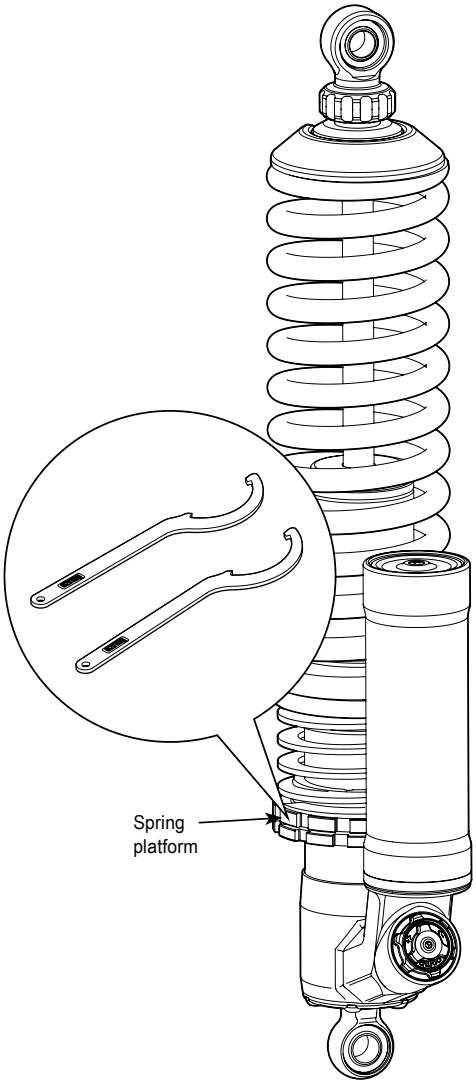
For correct tools, contact an Öhlins dealer.

Note!

For recommended spring preload, see Mounting instructions or contact an Öhlins dealer.

Set the spring preload

1. Use two C-spanners to unlock the lock nut.
2. Turn the spring platform to the desired position.
3. After adjusting, make sure to lock the lock nut.



There are a number of springs available for both gravel and tarmac to suit different driving conditions. For rougher gravel conditions we recommend to use one step stiffer springs but also increase ride height 10-20 mm depending on the conditions. It usually gives a better result than to use an even stiffer spring and less ride height change.

For very rough conditions like Middle East rallies even stiffer springs is recommended. For specific spring recommendations for your vehicle please see the Mounting Instructions or contact an Öhlins dealer.

COMPRESSION AND REBOUND

The Automotive TTX Flow is modular based damper. The base model is equipped with a general damping adjuster on the shaft and a low-speed compression adjuster on the cylinder head, making it easy to adjust to find the perfect setting for the stage and driving style.
There is an option available to separate the damper adjuster to a pure rebound adjuster with a fixed compression bleed. Ask your service center about this option or information of any new options released.

Compression and rebound damping

Compression damping controls the energy absorption when the shock absorber is compressed, thus controls how easy the shock absorber compresses when you hit a bump. Rebound damping controls the energy absorption when the shock absorber is extended and controls how fast the shock absorber returns to its normal position after being compressed.

General damping adjuster

This adjuster affects the bleed flow for both the compression and rebound damping. Use this adjuster to control chassis movements. More damping gives less movement and better stability but too much will cause a loss of traction. It is therefore a powerful balance tool together with the low speed compression adjuster. For slippery conditions when grip levels are low, a softer set up is a way to gain more traction.

Compression damping adjuster

Low speed compression is mainly used to control chassis movements and response but it also affects the traction. It affects how the car behaves during braking, turn in and acceleration. Less low speed compression gives more chassis movement but in many cases it can improve traction and grip. Therefore it is possible to balance the car by adjusting the low speed compression.

Recommended set up

For recommended set up, see the Mounting instructions or contact an Öhlins dealer. Driver preferences and driving conditions will affect how the shock absorbers should be set up but the recommended setup is a good starting point. For latest updates contact an Öhlins dealer.

General damping adjuster

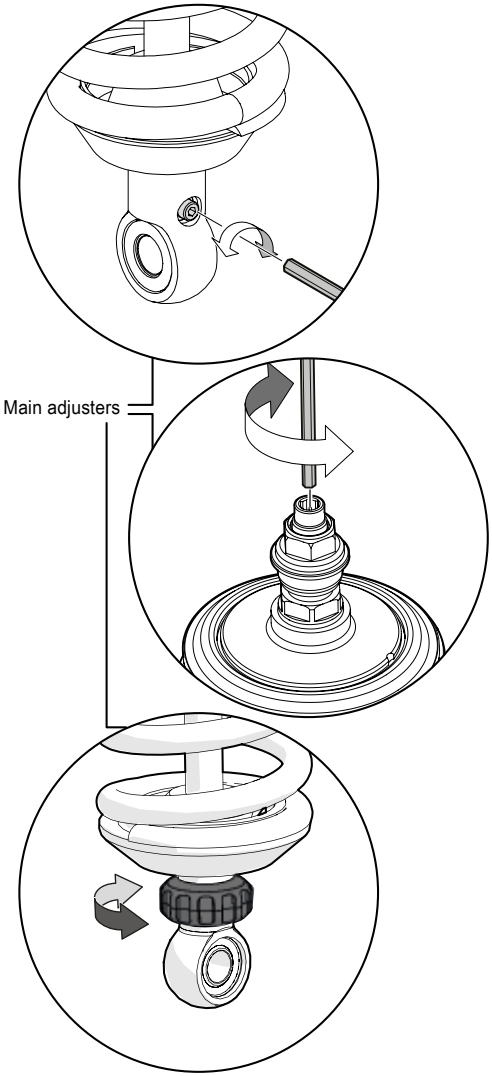
Caution!

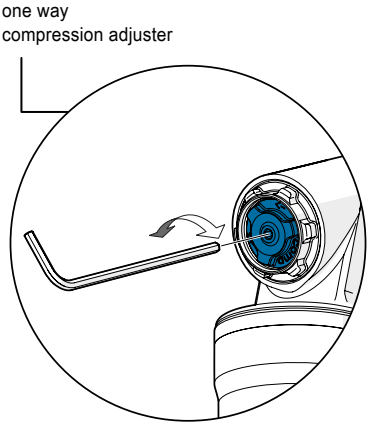
Turn gently not to damage delicate sealing surfaces. Hand tighten only.

To adjust general damping

1. Use a 3 mm allen key or adjustment tool (01822-02) or simply your fingers depending on design of the adjuster.
2. Turn the adjuster clockwise to fully closed position (position zero [0]).
3. Turn counter clockwise to set the adjuster to recommended number of clicks (see recommended set up in the Mounting Instructions or contact an Öhlins dealer).
4. If you want to change setting, adjust in steps of 2-3 clicks at a time.

Useful adjustment range
The number of clicks may change between the different adjuster designs, but the useful adjustment range is between 10% and 90% of the total amount of clicks.





Compression damping adjuster

To adjust compression damping

Use a 3 mm allen key.
Adjustment range 10 clicks.

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 Öhlins dealer.

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.

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.

✋ Caution!

Never spray water directly into the adjuster knobs and/or the ball joints.

TTX Inspection points

→ Every 300-400km

1. Check ball joints/ brackets for possible excessive play or stiction.
2. Check the piston shaft for damage that can cause leakage.
3. Check the shock absorber body for external damage.
4. Check the external reservoir for damage that can restrict the floating piston from moving freely.
5. Make sure that the reservoir is protected against stone chip.
6. Check the attachment of the shock absorber to the vehicle.

Maintenance

Service your damper(s) according to the recommendations in the table below:

⚠ Warning!

Never alter the gas pressure. Special purpose charging equipment and access to nitrogen is required. The gas pressure should normally never be altered.

Driving condition	Service after
Smooth gravel	
Max working temp 90°	800km
Medium gravel	
Max working temp <110°	700km
Rough gravel	
ax working temp >110°	350km
Tarmac	1000km

ADVANCED SUSPENSION TECHNOLOGY

ÖHLINS SET UP SHEET

DATE		TEAM		CAR	
EVENT		DRIVER		FUEL (litres)	
TRACK		ENGINEER		SPARE	
WEATHER		SURFACE		TEMP	

	FRONT		REAR	
	LHS	RHS	LHS	RHS
PLATFORM HEIGHT				
WLC TO WHEEL ARC				
CAMBER				
TOTAL TOE				
ANTI-ROLL BAR				
SPRING				
HELPER				
DAMPER SPEC.				
COMP LOW SPEED				
COMP HIGH SPEED				
REBOUND LOW SPEED				
REBOUND HIGH SPEED/FINE				
TIRE MAKE/COMPOUND				
COLD TIRE PRESSURE				
WARM TIRE PRESSURE				
WEIGHT CORNER				
WEIGHT AXLE				
WEIGHT TOTAL				

NOTES

ÖHLINS RACING AB • Instrumentvägen 8-10 S-194 51 Upplands Väsby Sweden • +46 8 590 025 00 • info@ohlins.se • www.ohlins.com

Owner's Manual | Part No. 07440-10_0 | Issued 2019-02-06 | © Öhlins Racing AB

Your Öhlins retailer:

Öhlins Racing AB
Box 722
SE-194 27, Upplands Väsby
Sweden

Phone: +46 (0)8 590 025 00
Fax: +46 (0)8 590 025 80
www.ohlins.com

ÖHLINS®
ADVANCED SUSPENSION TECHNOLOGY