

Owners Manual

Öhlins car shock absorbers for Honda S2000



Including:
How the shocks work
Setting up the car
Making adjustments
Trouble shooting
Maintenance, inspections

Traction, handling,
comfort and safety



ADVANCED SUSPENSION TECHNOLOGY

Öhlins car shock absorbers for street use



Contents

Safety signals	2
Introduction	3
Design	3
When you are driving	4
External adjusters	4
Recommended settings	5
Setting up your car	5
Making adjustments	6
Maintenance, inspection.	6
Trouble shooting	6

© Öhlins Racing AB.
All rights reserved.
Any reprinting or unauthorized use
without the written permission of
Öhlins Racing AB is prohibited.
Printed in Sweden.

Safety signals

Important information concerning safety is distinguished in this manual by the following notations.

*The Safety alert symbol means:
Caution! Your safety is involved.*

⚠ WARNING!

*Failure to follow warning instructions could result in **severe or fatal injury** to anyone working with, inspecting or using the suspension, or to bystanders.*

CAUTION!

Caution indicates that special precautions must be taken to avoid damage to the suspension.

NOTE!

This indicates information that is of importance with regard to procedures.

Before installation

⚠ WARNING!

Installing a shock absorber, that is not approved by the vehicle manufacturer, may affect the stability of your vehicle. Öhlins Racing AB cannot be held responsible for any personal injury or damage whatsoever that may occur after fitting the shock absorber. Contact an Öhlins dealer or other qualified person for advice.

Öhlins Racing AB can not be held responsible for any damage whatsoever to shock absorber or vehicle, or injury to persons, if the instructions for fitting and maintenance are not followed exactly. Similarly, the warranty will become null and void if the instructions are not adhered to.

⚠ WARNING!

Please study and make certain that you fully understand all the mounting instructions and the owner's manuals before handling this shock absorber kit. If you have any questions regarding proper installation procedures, contact an Öhlins dealer or other qualified person.

⚠ WARNING!

The vehicle service manual must be referred to when installing the Öhlins shock absorber.

NOTE!

Öhlins products are subject to continual improvement and development. Consequently, although these instructions include the most up-to-date information available at the time of printing, there may be minor differences between your suspension and this manual. Please consult your Öhlins dealer if you have any questions with regard to the contents of the manual.

Introduction

Öhlins Racing congratulates you on your choice of shock absorbers for your vehicle.

Your new Öhlins high performance shock absorbers are developed from experience gained during years of successful co-operation with the World Championship winning teams.

Total shock absorber length, spring travel and damping forces are developed just for your car.

The design and the settings are consequently the results of extensive testing and no guesswork! All Öhlins shock absorbers are designed with just one aim; to win races.

To design a winner you need a concept starting with a unique know-how. You add engineering skill, precision and the best materials available. The result is quality, endurance and winning performance.

Our shock absorbers are used by the winning teams in World Rallying, Touring Cars, CART and by several top teams in Formula Atlantic, Formula 3, Formula Ford, NASCAR, Late Model and in Truck Racing, etc.

Öhlins suspensions have dominated the motorcycle and the car racing scene for several years and have captured over 80 World Championship titles!

A network of authorised Öhlins service centres around the world, with specially trained mechanics, can help you with personally tuned settings, service, repairs and spare parts.

Design

Öhlins car shock absorbers are based on Öhlins successful application of the "de Carbon" concept. In short, that means that the damping oil is put under gas pressure, and separated from the gas by a floating piston.

The de Carbon concept has many advantages. It prevents the risk of cavitation, that can wear out internal components and cause inconsistent damping. It eliminates aeration of the damping oil, which also causes inconsistent damping.

It improves the cooling, because the oil is in direct contact with the outer tubing. It gives more consistent damping, regardless of the shock absorber's working temperature, and it makes the shock absorber last longer.

The shock absorber reservoir, connected directly to the shock absorber body is in fact an "extension" of the main body which contributes to the improved cooling. The reservoir contains the floating piston and the gas that pressurises the damping oil. The oil is forced through a base plate reinforcing the damping.

At low shaft speeds the damping oil is forced through an adjustable bleed valve in the main piston. The valve affects mainly rebound damping and has only a small effect on compression damping.

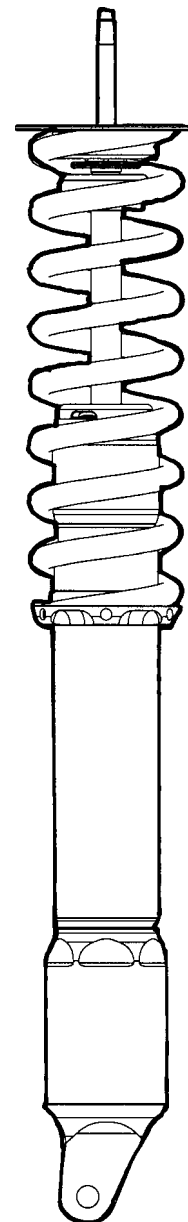
The adjuster is connected to the valve via an aluminium shaft, that runs inside the piston shaft. When the temperature in the shock increases the aluminium shaft extends, thereby closing the bleed valve gradually.

This diminishes the influence of the oil viscosity changes due to temperature, keeping the flow through the valve virtually the same, regardless of temperature.

At higher shaft speeds the damping forces are primarily controlled by the main piston and its compression- and rebound shim stacks. By changing the numbers, diameter, and thickness of the shims in the stack and by using different jets in the valves, your Öhlins shock absorbers are tailor-made for just your car.

Key features

- Lightweight aluminum body
- Large reservoir for better cooling
- Double acting damper adjuster
- Quick response for best handling
- Optimum consistency on long runs
- Easy to dial-in, reshim, rebuild and service
- Professional technical support
- Base valve
- Large diameter floating piston



When you are driving

Base plate

The Öhlins WCJ and MCJ shock absorbers features a base plate, which allows the damper to work smoother and safer (fig.2 and 4).

This base plate eliminates the cavitation risk, without the need of increased gas pressure. It consists of a fixed dividing wall with apertures and with shims on both sides. In the center there is a jet that is available in different sizes.

The stiffer the compression valving on the main piston, the more restrictive the hole in the base plate jet.

The fluid that flows through the base plate is the volume of the shaft displacement, which also moves the floating piston.

The shims on the compression side eliminate the risk of cavitation, and the shims on the rebound side works as a check valve.

On a smooth surface

When you are driving on a smooth surface and the shock absorbers are compressed slowly (low shaft speed), the damping oil is forced only through the adjuster valve in the piston shaft, fig 1, flow 3.

The oil displaced by the piston shaft is forced through the valve in the independent compression damping base plate into the large diameter reservoir, fig 2

The floating piston in the reservoir is forced to move, compressing the gas behind it further.

When the shock absorber extends, the pressure behind the floating piston will force the oil through the valve in the base plate, and back into the shock absorber body, fig 6, flow 1 and 2.

The oil beneath the piston returns through the adjuster valve in the piston shaft, fig 5, flow 3.

Hitting a bump

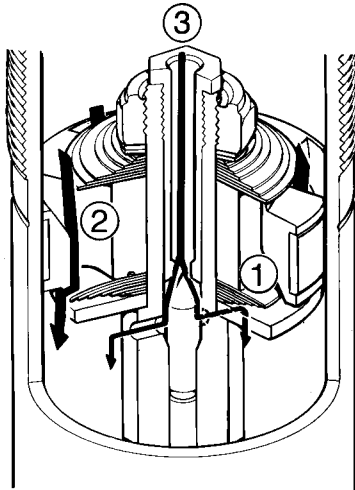
When you are hitting a bump the shock absorbers are compressed fast (high shaft speed). The oil can not be forced "fast enough" through just the valve in the piston shaft. The pressure on the compression side increases and opens the shim stack covering the compression orifices in the piston, fig 1, flow 2.

Also, oil displaced by the piston shaft can not be forced "fast enough" through just the valve in the base plate. The pressure increases and a shim stack, parallel to the valve, opens, fig 2.

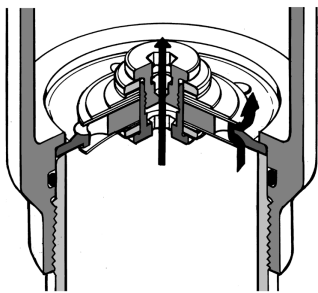
The floating piston is forced to move, compressing the gas.

When the shock absorber extends, the floating piston will force the oil through the base plate back into the shock absorber body, fig 4.

The pressure difference over the piston is still high and the flow can not be forced "fast enough" through just the valve in the piston shaft. The shim stack covering the rebound orifices in the piston opens and the oil returns, fig 1, flow 1.

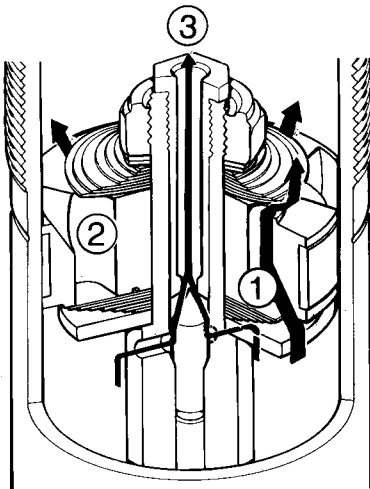


1

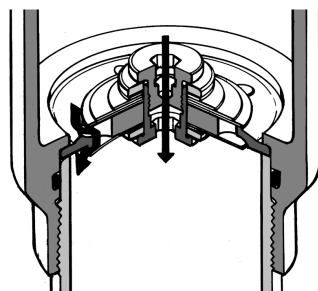


2

Compression phase



3



4

Rebound phase

External adjusters

On the Öhlins shock absorber, the rebound adjustment device is located at the end of the piston shaft. Adjustments are made with a 3 mm Allen key (Fig 5).

The temperature compensation system of the rebound adjuster reduces the number of clicks (due to the elongation of the aluminium shaft, as described earlier) when the shock absorber is hot.

Therefore, always make changes from the previous click position without first closing the adjuster. To count the number of clicks you are using, first let the shock cool down to ambient temperature.

NOTE!

Using too much force when closing the adjuster will destroy important sealing surfaces. Use no tool, simply your fingers.

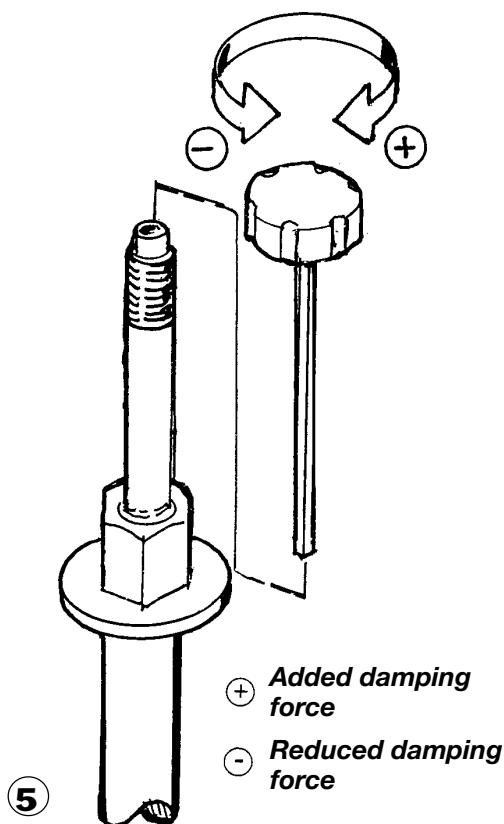
All the adjusters have a normal right-hand thread. Click position zero (0) is when the adjusters are turned clockwise to fully closed.

⚠ WARNING!

There is no stop telling when the adjusters are fully open.

It is possible to unscrew the strut rebound adjuster if more than the recommended usable clicks are used.

Please see "Setting up your car".



Recommended settings

The shock absorbers in your kit are adjusted to the Öhlins recommended setting for your car, see Mounting instructions. We advise you to use this as your start setting.

Setting up your car

Installing new shock absorbers may alter ride height, wheel angles etc. on your car. Therefore, it is wise to do a complete resetting of the car after you have installed the Öhlins shock absorbers.

Perform the following steps before using the shock absorber:

1

Check ride height front and rear. Adjust if necessary.

2

Check corner weight front and rear, if scales are available. Adjust if necessary.

3

Check all wheel angles front and rear. Adjust if necessary.

Making adjustments

Suspension settings are dependent on your car's weight, your driving style, road conditions etc. If you are not happy with our recommended settings, here are a few guidelines and ground rules how to make adjustments.

To make improvements, it is important to understand the function of the shock absorbers and through testing learn how they affect the handling of your car.

Always start with the Öhlins recommended settings, see "External adjusters" and "Recommended settings".

NOTE!

Higher click numbers give less damping force.

When making adjustments; keep notes, make adjustments one at a time and in small steps.

The adjusters should normally not be adjusted in steps of more than 2 clicks at a time and not outside the usable click range.

When you think you have made an improvement, go back to what 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 car's 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

Trouble shooting

The solutions below are what normally works. Again, if the car is not properly set up, the result can be totally different.

Regarding traction, the tires of course have a very large influence.

Also bear in mind that you normally have to make a compromise between the different behaviours of the car to achieve the best overall performance.

A

Bad traction on loose gravel.

Increase rebound damping on all 4 corners.

B

Bad traction on tarmac.

Decrease rebound damping on all 4 corners.

C

Turn in understeer.

Normally not a damper problem, but try increasing rebound damping on the front.

D

Mid/exit understeer.

Try increasing rebound damping on the front.

Take into account that behaviour on corner entry also can influence this phase.

E

Mid/exit oversteer.

Normally depending on wrong spring and anti-roll bar combination, but try reducing both compression and rebound damping on the rear.

Maintenance, inspection

After every competition or hard run:

1

Clean externally and spray with an all-purpose oil after washing with detergent.

2

Check externally for damage.

Every 10 000 km:

1

Clean all parts with a soft detergent.

2

Lubricate the piston rod (except the thread) and the scraper with a layer of Öhlins red grease, part No. 146-01 (100 grams) or 146-02 (400 grams).

After 50 000 km:

Change shock absorber oil. Use Öhlins shock absorber oil only!

Öhlins distributor

JAPAN

Carrozzeria Japan Co., Ltd.
8-23-13 Tsuji, Urawa
SAITAMA-PREF; 336
Tel. +81 48-863 1801
Fax. +81 48-863 1802
E-mail: labocar@peach.ocn.ne.jp

**Traction, handling,
comfort and safety**



ADVANCED SUSPENSION TECHNOLOGY

Öhlins Racing AB, Box 722, S-194 27 Upplands Väsby, Sweden.
Phone +46 8 590 025 00, fax +46 8 590 025 80.
E-mail: info@ohlins.se
Web: www.ohlins.com