# REPAIRMANUAL2005-2008

## WP FORK 4860 ROMA

REPARATURANLEITUNG

MANUALE DI RIPARAZIONE

MANUEL DE RÉPARATION

MANUAL DE REPARACIÓN

ART.NR.: 3.211.214

suspension WP

# EXPLANATION - UPDATING

## 3.211.0124-E Repair Manual WP FORK 4860 ROMA

**990 SUPERDUKE, 950 SUPERMOTO**

**Basicversion Modelyear 2005**

**9/2005**

Edition: 9/2005

## INTRODUCTION

This repair manual offers extensiv repair-instructions and is an up-to-date version that describes the latest models of the series. However, the right to modifications in the interest of technical improvement is reserved without updating the current issue of this manual.

A description of general working modes common in work shops has not been included. Safety rules common in the work shop have also not been listed. We take it for granted that the repairs are made by qualified profesionally trained mechanics.

Read through the repair manual before beginning with the repair work.

**⚠ WARNING ⚠**

**STRICT COMPLIANCE WITH THESE INSTRUCTIONS IS ESSENTIAL TO AVOID DANGER TO LIFE AND LIMB.**

**! CAUTION !**

**NON-COMPLIANCE WITH THESE INSTRUCTIONS CAN LEAD TO DAMAGE OF MOTORCYCLE COMPONENTS OR RENDER MOTORCYCLES UNFIT FOR TRAFFIC !**

**„NOTE" POINTS OUT USEFUL TIPS.**

Use only **ORIGINAL KTM/WP SPARE PARTS** when replacing parts.

The KTM high performance fork is only able to meet user expectations if the maintenance work is performed regularly and professionally.

TÜV MANAGEMENT SERVICE ISO 9001
REG.NO. 12 100 6061

In accordance with the international quality management ISO 9001 standard, KTM uses quality assurance processes that lead to the highest possible product quality.

KTM Sportmotorcycle AG reserves the right to modify any equipment, technical specifications, colors, materials, services offered and rendered, and the like so as to adapt them to local conditions without previous announcement and without giving reasons, or to cancel any of the above items without substituting them with others. It shall be acceptable to stop manufacturing a certain model without previous announcement. In the event of such modifications, please ask your local KTM dealer for information.

KTM Sportmotorcycle AG
5230 Mattighofen, Austria

# REPLY FAX FOR REPAIR MANUALS

We have made every effort to make our repair manuals as accurate as possible but it is always possible for a mistake or two to creep in.

To keep improving the quality of our repair manuals, we request mechanics and shop foremen to assist us as follows:

If you find any errors or inaccuracies in one of our repair manual – whether these are technical errors, incorrect or unclear repair procedures, tool problems, missing technical data or torques, inaccurate or incorrect translations or wording, etc. – please enter the error(s) in the table below and fax the completed form to us at 0043/7742/6000/5349.

NOTE to table:
- Enter the complete item no. for the repair manual in column 1 (**e.g.: 3.211.124-E**).
  You will find the number on the cover page or in the left margin on each right page of the manual.
- Enter the corresponding page number in the repair manual (**e.g.: 2-3**) in column 2.
- Enter the current text (inaccurate or incomplete) in column 3 by quoting or describing the respective passage of the text. If your text deviates from the text contained in the repair manual, please write your text in German or English if possible.
- Enter the correct text in column 4.

Your corrections will be reviewed and incorporated in the next issue of our repair manual.

| Item no. of repair manual | Page | Current text | Correct text |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Additional suggestions, requests or comments on our Repair Manuals (in German or English):

**Name mechanic/shop foreman** **Company/work shop**

# SPECIAL TOOLS 1

INDEX



Art.No.: 3.211.124-E

**T 103**
Adjusting wrench

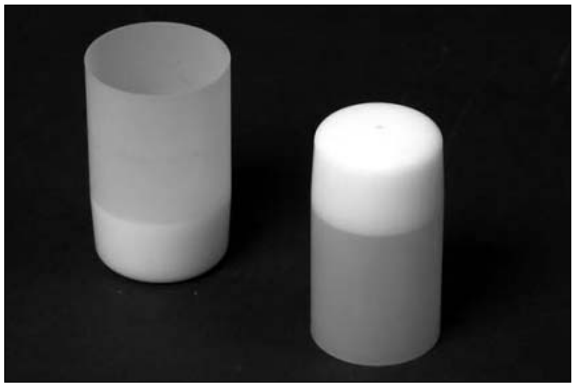
**T 137S**
Suction bottle


**T 158**
O-ring grease

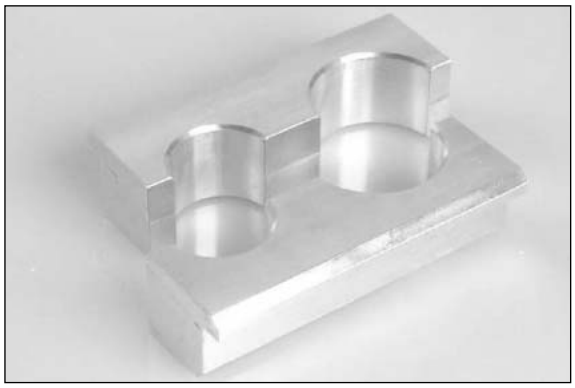

**T 159**
Waterresistant grease

**T 502S**
Seal ring /guide bush mounting tool


**T 511**
O-ring grease



**T 1401**
Seal ring mounting tool



**T 1403S**
Clamping tool 48/60

**T 14026S**
Retaining tool

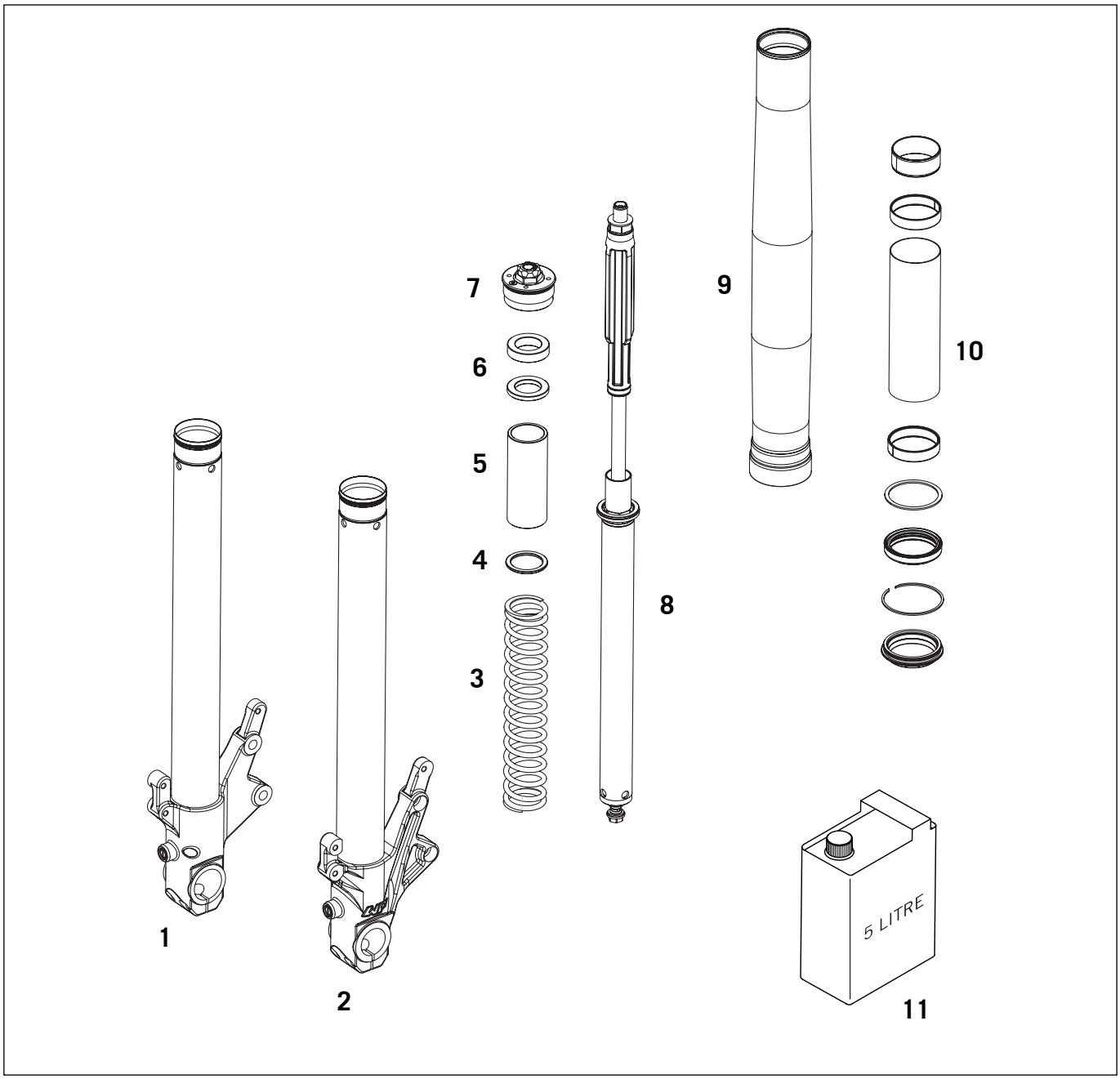
# GENERAL INFORMATION 2

INDEX



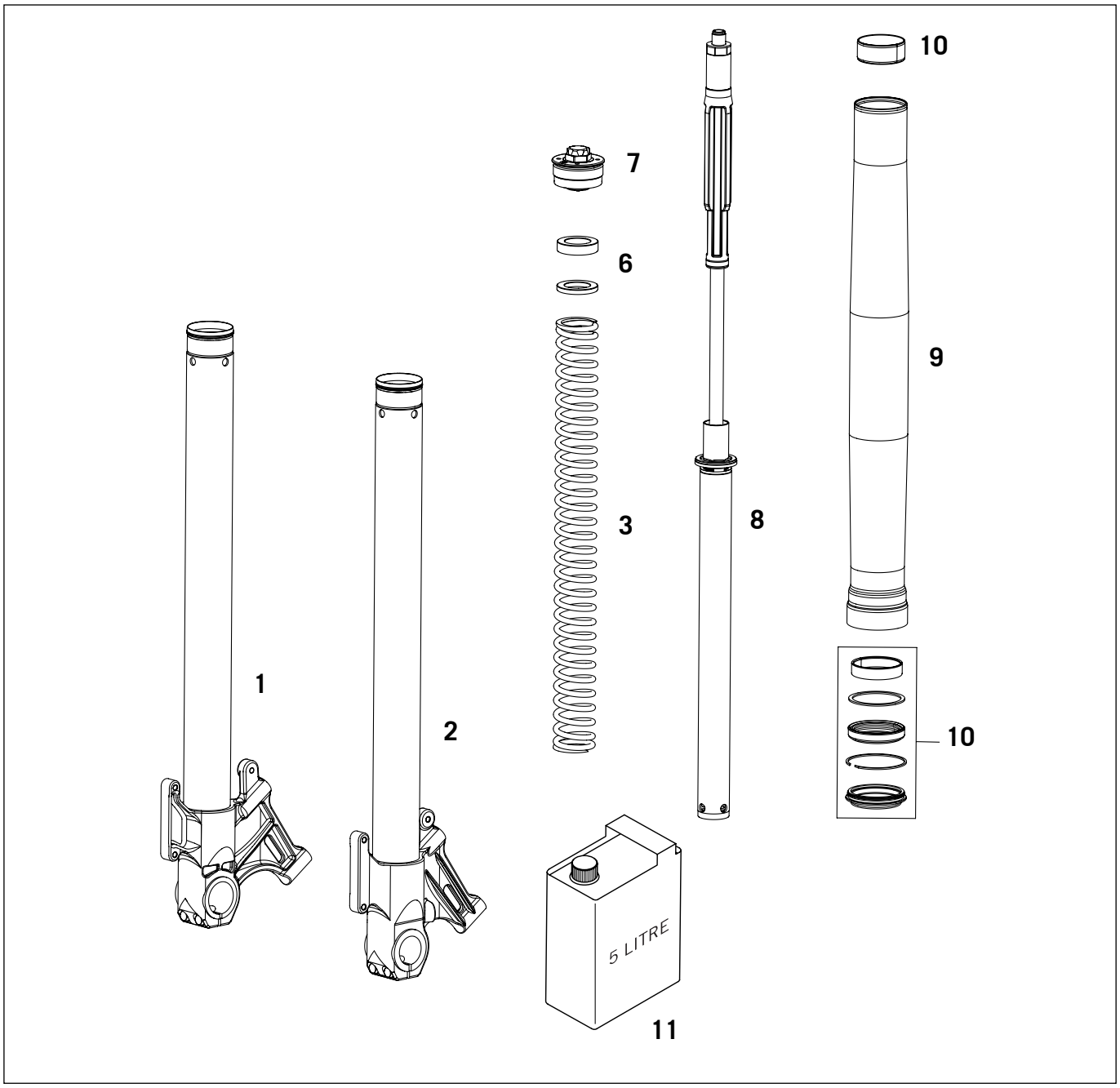
Art.No.: 3.211.124-E

## Exploded view - 990 Super Duke

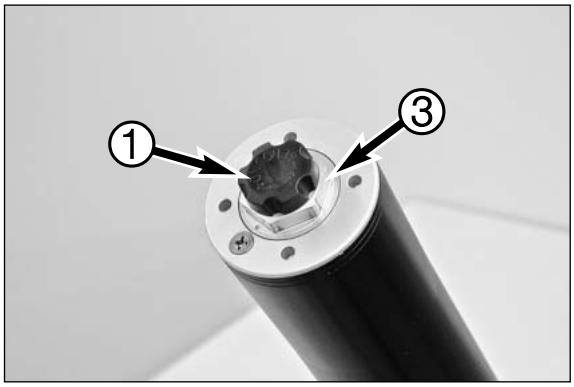



| FIG | Description | Quantity |
|---|---|---|
| 1 | Right fork leg axle passage | 1 |
| 2 | Left fork leg axle passage | 1 |
| 3 | Spring (C=9 L=250 D=5.1) | 1 |
| 3 | Spring(C=8,5 L=250 D=5.1) | X |
| 3 | Spring (C=9,5 L=250 D=5.25) | X |
| 4 | Washer 32x42x2.5 | 2 |
| 5 | Spacer D40x100 | 2 |
| 6 | Preload spacer 42x26,5x1.5 | 2 |
| 6 | Preload spacer 42x26,5x2.5 | 2 |
| 6 | Preload spacer 42x26,5x5 | 2 |
| 7 | Spring preload M51x1.5 | 2 |
| 8 | Cartridge | 2 |
| 9 | Outer pipe (L=500MM D=54/60) | 2 |
| 10 | Repair kit | 1 |
| 11 | Fork oil SAE 5 | 1 |

## Exploded view - 950 Supermoto



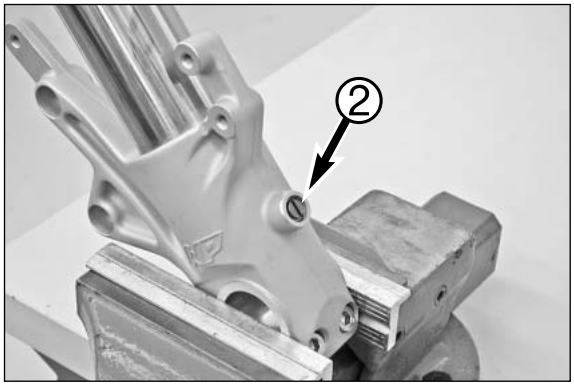

| FIG | Description | Quantity |
|---|---|---|
| 1 | Right fork leg axle passage | 1 |
| 2 | Left fork leg axle passage | 1 |
| 3 | Spring (C=5.6 L=450 D=5.5) | 1 |
| 6 | Preload spacer (42x26,5x2.5) | 2 |
| 6 | Preload spacer (42x26,5x5) | 2 |
| 6 | Preload spacer (42x26,5x1.5) | 2 |
| 7 | Spring preload (M51x1.5) | 2 |
| 8 | Cartridge | 2 |
| 9 | Outer pipe (L=500MM D=54/60) | 2 |
| 10 | Repair kit | 1 |
| 11 | Fork oil SAE 5 | 1 |




## Adjusting the position of the compression and rebound damping

Rebound damping:

– Turn in the adjusting screw ❶ in a clockwise direction all the way to the stop.
– Turn back the respective number of clicks in a counterclockwise direction.

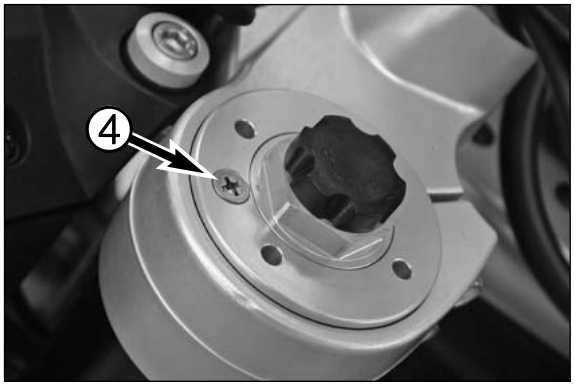



Compression damping:

– Turn in the adjusting screw ❷ in a clockwise direction all the way to the stop.
– Turn back the respective number of clicks in a counterclockwise direction.

## Adjusting the spring preload

– Turn the adjusting screw ❸ in a counterclockwise direction all the way to the stop.
– Turn back the respective number of turns in a clockwise direction.




## Bleeder screw

– Jack up the motorcycle.

NOTE: the front wheel must be off the ground.

– Loosen the bleeder screw ❹ on the screw cap on the upper end of the fork and tighten again after approx. 10 seconds.

# DISMOUNTING/MOUNTING THE FORK 3

INDEX



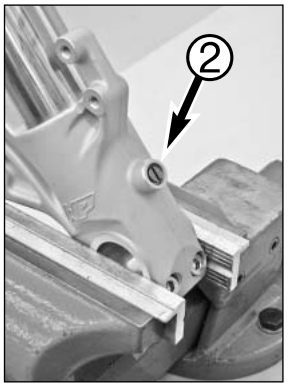
Art.No.: 3.211.124-E

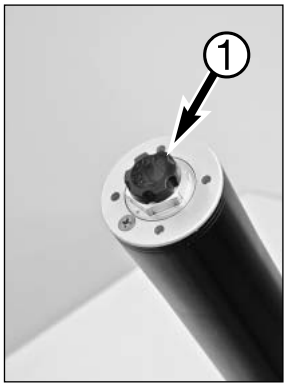
# DISASSEMBLING/ASSEMBLING THE FORK 4

INDEX



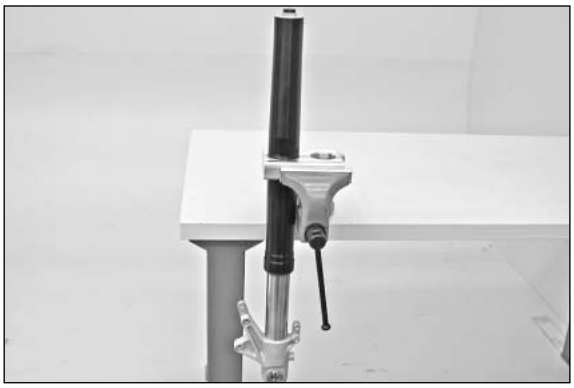
Art.No.: 3.211.124-E



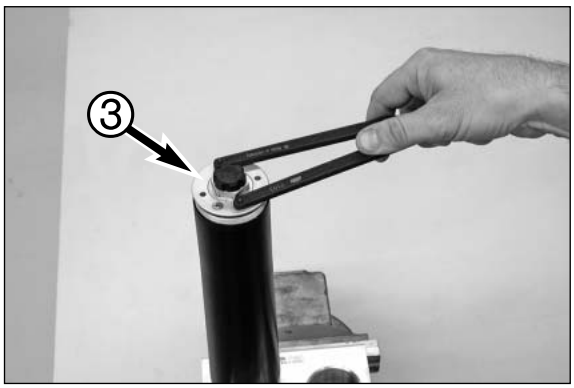

## Disassembling the fork

– Write down the rebound ❶ and compression damping settings ❷, counting the clicks while turning in a clockwise direction.



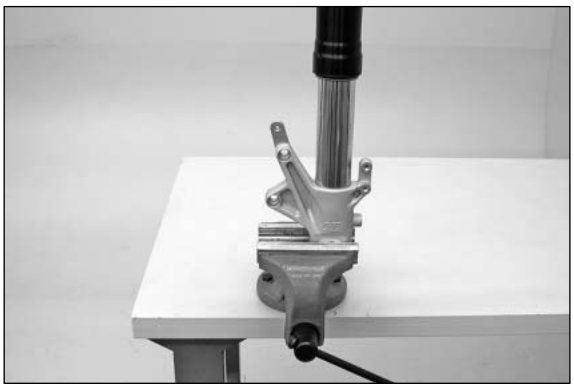
– Clamp the fork in a vise at the lower triple clamp using special tool T1403S.

– Turn the spring preload all the way back to the stop (in a counterclockwise direction), 5 turns, A/F 24 to minimize the spring preload.

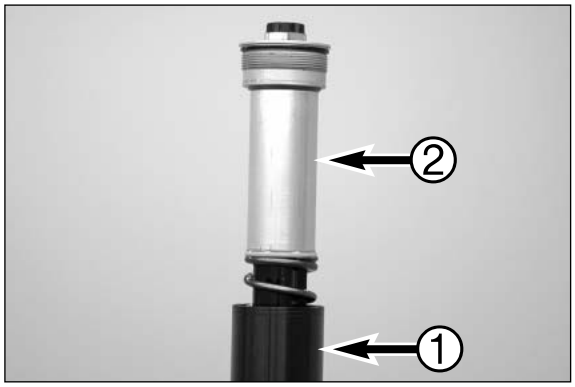



– Loosen the spring preload with special tool T103 and screw out.

NOTE: the spring preload ❸ cannot be removed yet.

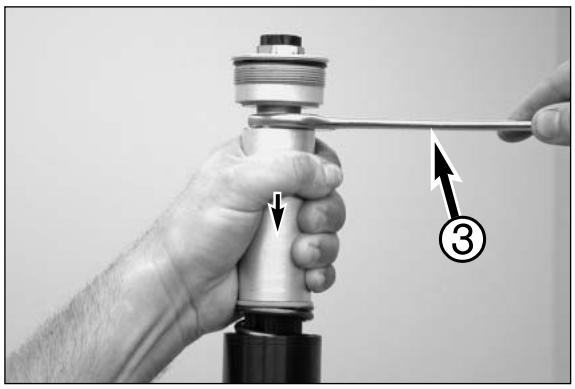


– Unclamp the fork and clamp with the fork leg axle passage (use protective jaws).




– Push the outer pipe ❶ all the way down.

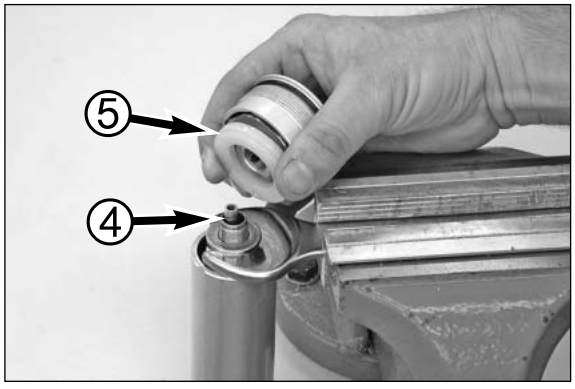
990 Super Duke:
– Remove the oil from the spacer ❷ and push the spring down.



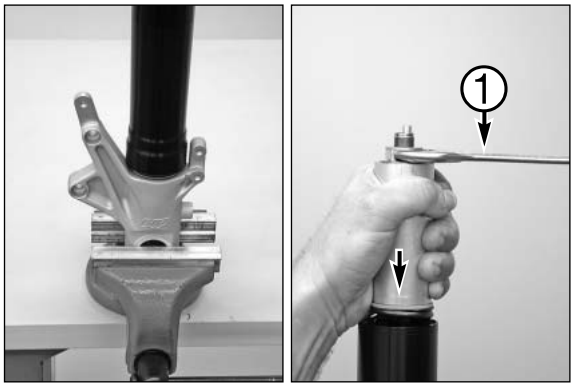

– Position the fork wrench ❸ A/F22 on the hexagon of the hydrostop and let go of the spacer.

950 Supermoto:
– No spacer is used, the spring must be pushed down directly.

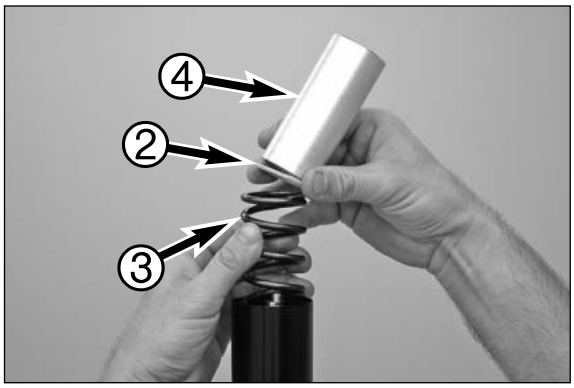
– Unclamp the fork and clamp with the fork wrench. Loosen the spring preload (A/F 24) and unscrew.




NOTE:
– The adjusting pipe ❹ for the rebound damping should stay in the cartridge.
– Also remove the preload spacer(s) ❺.

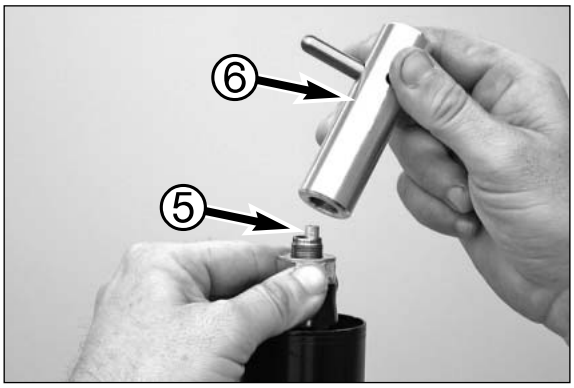



– Rechuck the fork, press the spacer or spring down, remove the fork wrench ❶ and relieve the spring.




– Remove the washer ❷ and spring ❸ (for the 990 Super Duke also the spacer ❹).

NOTE: the fork on the 950 Supermoto does not have a spacer.




– Make sure the adjusting pipe ❺ for the rebound damping is correctly seated.

NOTE: the adjusting pipe should protrude approx. 5 mm if correctly seated, approx. 12 mm if incorrectly seated.

– Screw the special tool T14026 ❻ on the cartridge.

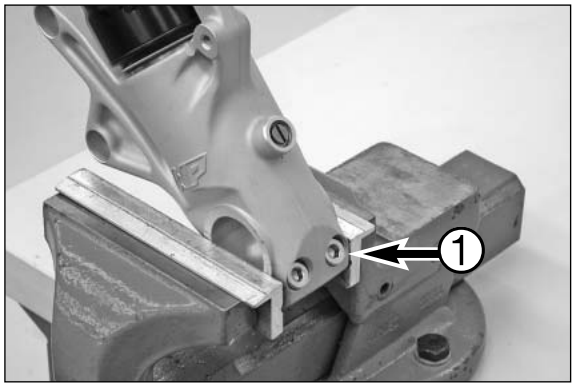
NOTE: the cartridge can be retained more easily with the T14026 and it prevents the adjusting pipe for the rebound damping from being lifted and oil from running inside the cartridge (which would cause oil to leak out in operation).

– Unclamp the fork and drain the oil in a suitable vessel.

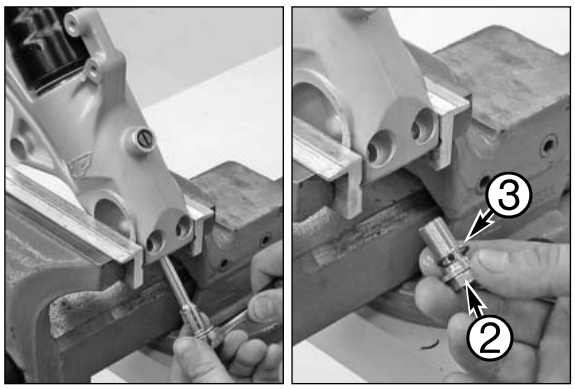
– Hold the fork in a vertical position and pull the piston rod all the way out of the cartridge and push it back in 4 to 5 times using T14026.

NOTE: the pumping action will drain the cartridge.

– Drain the fork again.

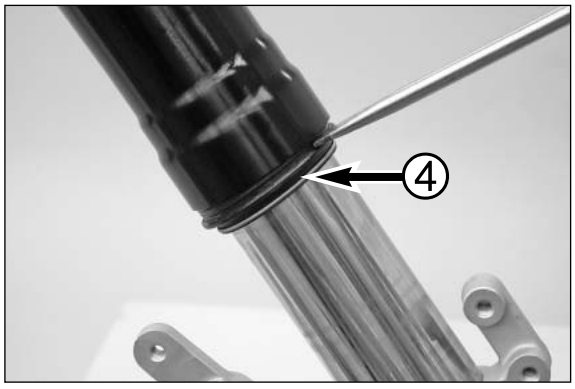



– Clamp the fork and the fork leg axle passage in the vise again, making sure the clamping screws ❶ on the fork leg axle passage face up. Remove both screws.

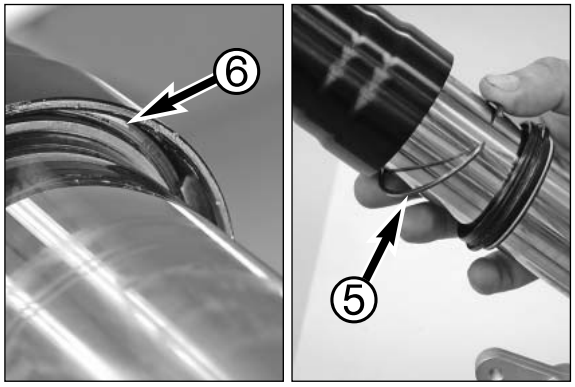



– Loosen the fixing screw ❷ on the cartridge (A/F 13) from below and remove, discard the copper seal ring ❸.

– Lift out the cartridge.



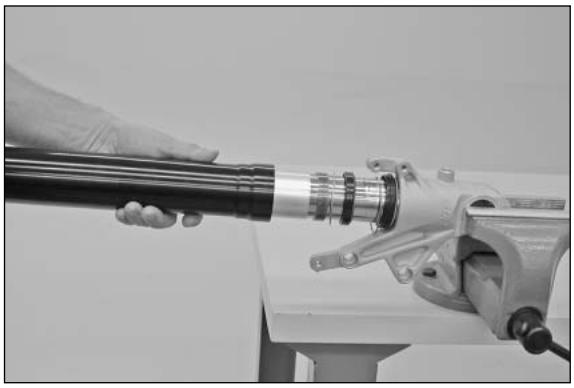

– Pry out the dust boot ❹ with a suitable screwdriver or (preferably) with a plastic wedge.




– Pry the lock ring ❺ out of the outer pipe.

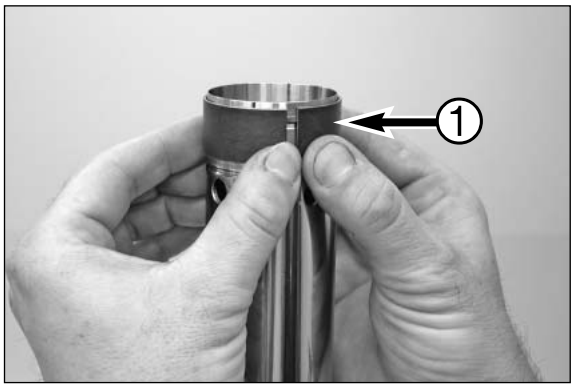
NOTE: the lock ring has a scuffed area ❻ where you can insert the screwdriver.

– Heat the outer pipe to approx. 50° C at the lower guide.



– Pull the fork apart horizontally.

NOTE: clamp the fork as shown in the illustration and separate both parts by abruptly pulling the outer pipes apart. Hold over a suitable vessel to catch any oil that may run out.



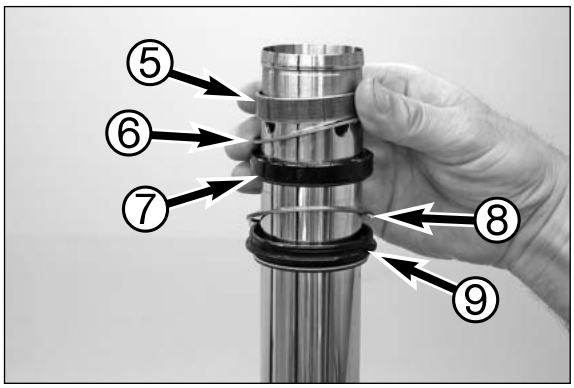

– Clamp the inner pipe in a vertical position.

– Remove the guide bush ❶ from the recess in the inner pipe.

NOTE: it should be possible to gently pull the guide bush on the inner pipe apart at the joint and to remove it by hand without using a tool.


– 990 Super Duke only: remove the guide bush ❷ on the outer pipe and distance bushing ❸ from the inner pipe ❹.

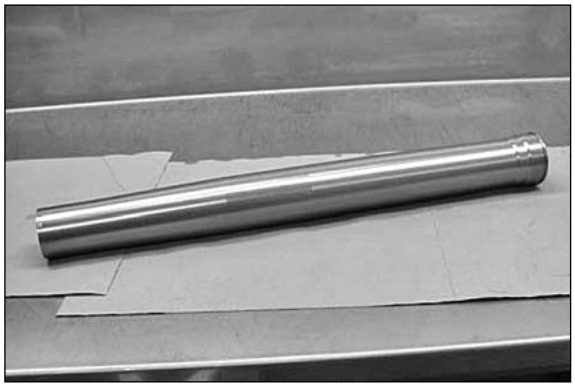
NOTE: the fork on the 950 Supermoto does not have these two components.




– Remove the guide bush ❺ on the outer pipe.

– Remove the supporting ring ❻ and seal ring ❼.

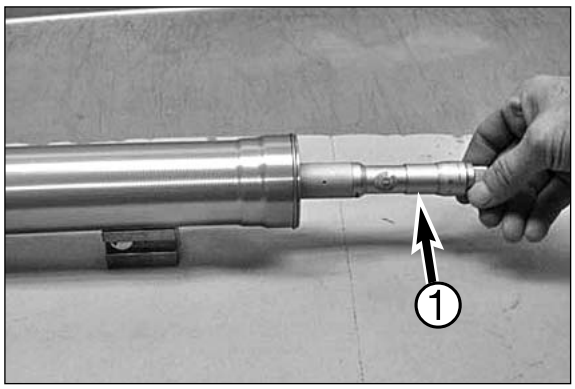
– Remove the lock ring ❽ and the dust boot ❾.



## Checking the outer pipe

– Check the outer surface of the outer pipe for damage (e.g. from gravel impact).

– Check the inner bearing surface of the outer pipe for scratches.
– Also check the anodized coating of the bearing surface.

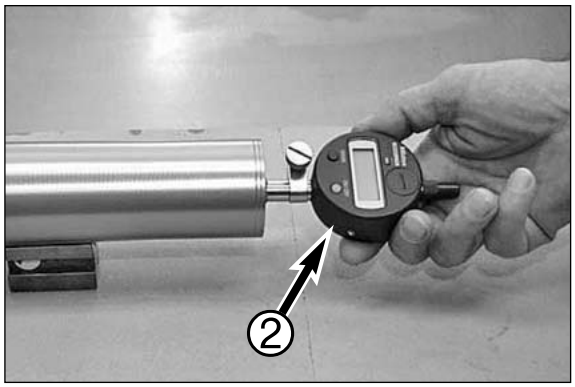



– Use a micrometer ❶ to measure the diameter of the guide bush seat.

Maximum diameter: 52.15 mm

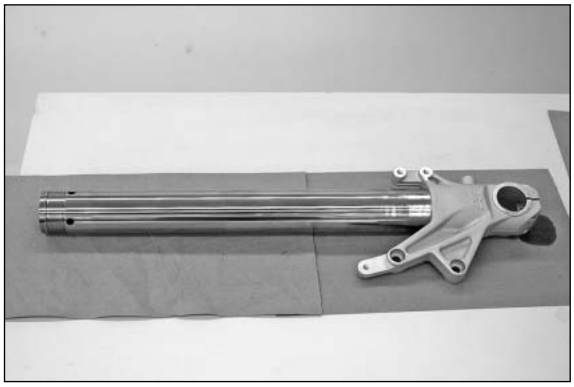
– Use a micrometer ❶ to measure the diameter of the oil gasket seat.

Maximum diameter: 57.50 mm.




– Use a micrometer ❷ to measure the diameter of the bearing surface from the side of the screw cap approx. 300 mm into the outer pipe; repeat the measurement rotating by 90°.

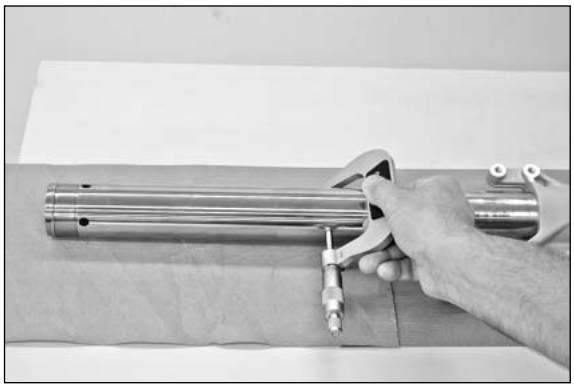
Maximum diameter: 49.20 mm



## Checking the inner pipe

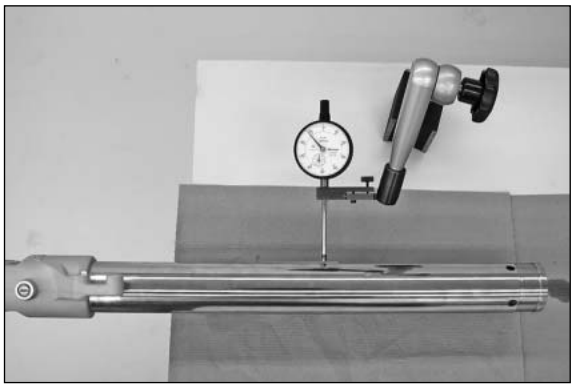
– Check the outer bearing surface of the inner pipe for scratches, wear and cracks.

NOTE: polish with a "Scotch Brite" pad if the scratches are sharp but not too deep.



– Measure the outer diameter of the inner pipe, turn the inner pipe by 90° and repeat the measurement. Measure at difference sections of the inner pipe.

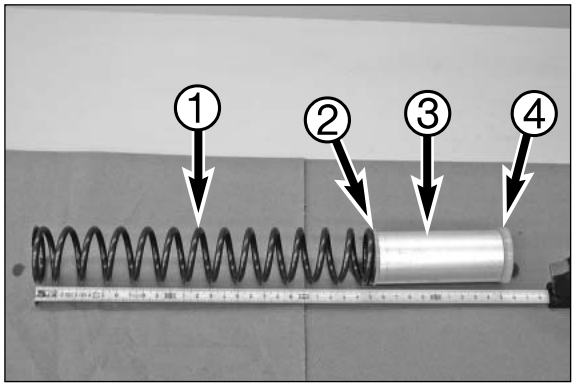
Maximum diameter: 48.005 mm.
Minimum diameter: 47.950 mm



– Measure the inner pipe runout.

NOTE:
- Position the fixtures as far to the side as possible.
- Apply the gauge in the center of the inner pipe.
- Turn the inner pipe by 360°.

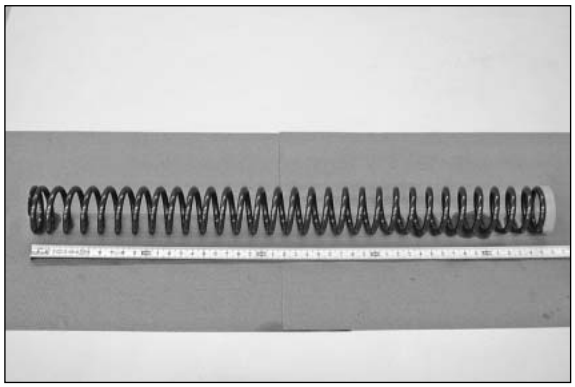
The maximum runout is: 0.06 mm.




## Length of the spring

– 990 Super Duke: measure the length of the spring ❶ with the washer ❷, distance bushing ❸ and the preload washers ❹.

353 mm (spring alone 250 mm +/-3 mm)



– 950 Supermoto: measure the length of the spring with the washer and the preload spacers.

457 mm (spring alone 450 +/-3 mm)

NOTE: if the measured length deviates from the prescribed length, correct the length by using other preload spacers.

– Thoroughly clean all parts and check for damage or wear.


## Assembling the fork

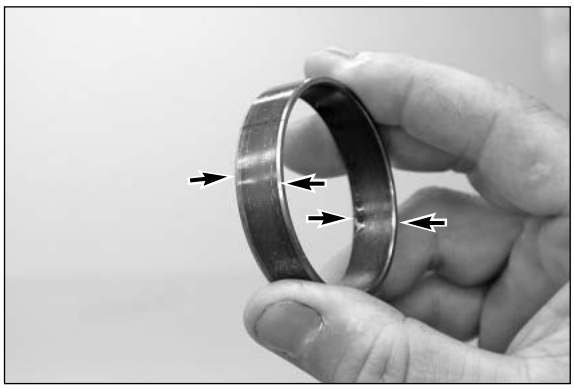
– Lubricate the inner pipe with fresh fork oil.

– Slide on the special tool T1401 ❶ and grease with fork oil.

– Grease the inside of a new dust boot ❷ with special T511 grease and slide on the inner pipe (sealing lip with spiral-type expander facing down).

– Slide on the lock ring ❸.

– Grease the inside of a new seal ring ❹ with special T511 grease and slide on the inner pipe (sealing lip with spiral-type expander facing down).



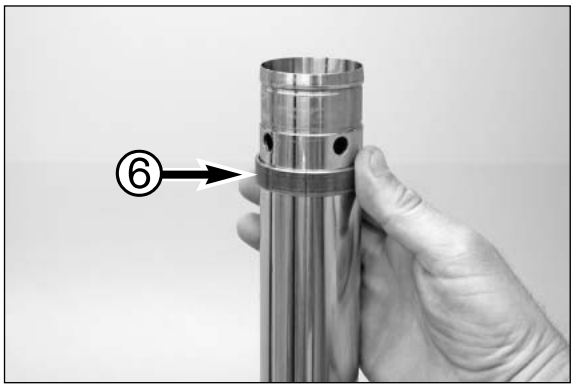
– Slide on a new supporting ring ❺.

NOTE:
– Always replace the supporting ring and the seal rings.
– The supporting ring is symmetrical and can be mounted in any position.

– Remove the special tool T1401.

– Sand the edges of the guide bushes with 600 grit sandpaper, clean thoroughly and lubricate with fresh fork oil.

NOTE: new guide bushes must also be treated with sandpaper.




– Slide the guide bush ❻ for the outer pipe over the inner pipe.


– 990 Super Duke only: slide the distance bushing ❼ and the 2nd guide bush ❽ for the outer pipe over the inner pipe.

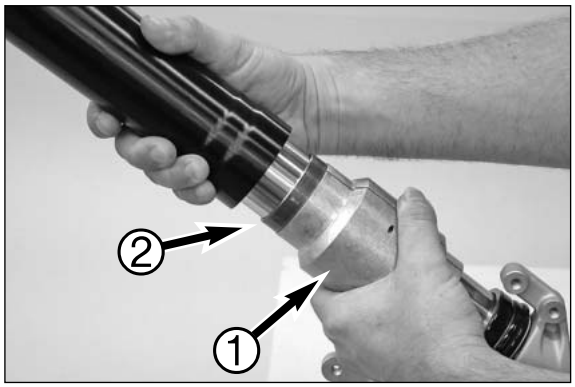

– Mount the guide bush ❾ for the inner pipe in the upper recess.

NOTE: make sure the guide bush for the inner pipe is correctly seated.

– Lubricate the outside of the guide bushes and the seal rings with fork oil.

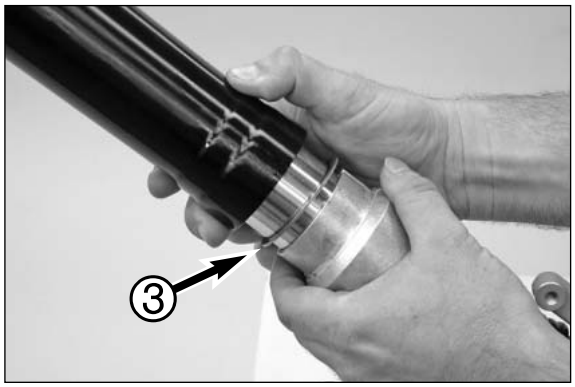
– Clamp the inner pipe diagonally (see illustration).

– Slide on the outer pipe and heat at the guide bush (approx. 50 °C).

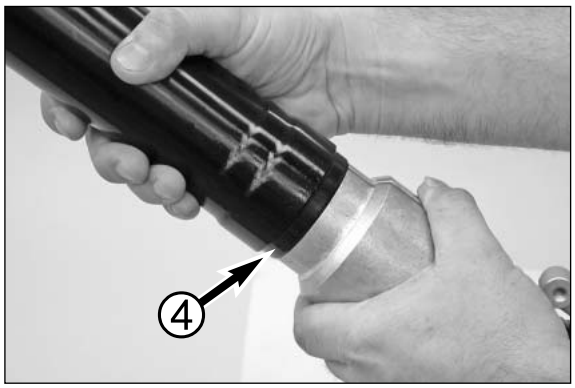



– Use the longer end of special tool T502S ❶ to mount the guide bush ❷ all the way in to the stop.

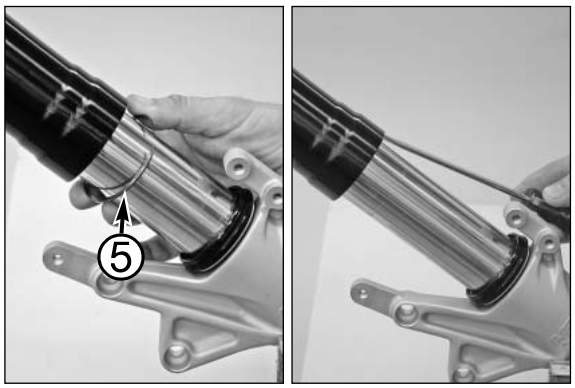
NOTE:
– Oil T502S thoroughly.
– Hold T502S firmly while driving the guide bush in with the outer pipe.




– Insert the supporting ring ❸, press in with T502S if necessary.




– Turn T502S around and use the short side to press the seal ring ❹ in far enough to mount the lock ring. Remove T502S.

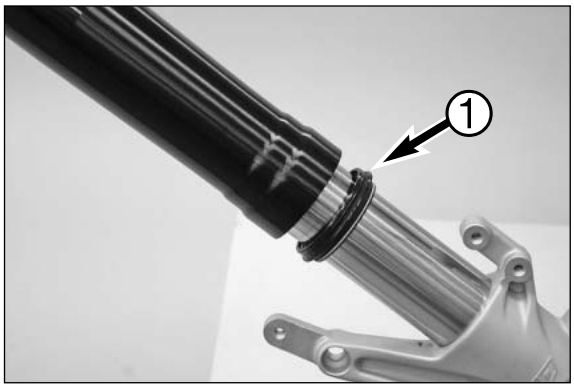



– Mount the lock ring ❺.

NOTE: you should be able to hear the lock ring engaging. If not, carefully press further with a screwdriver without damaging the inner pipe or seal ring.

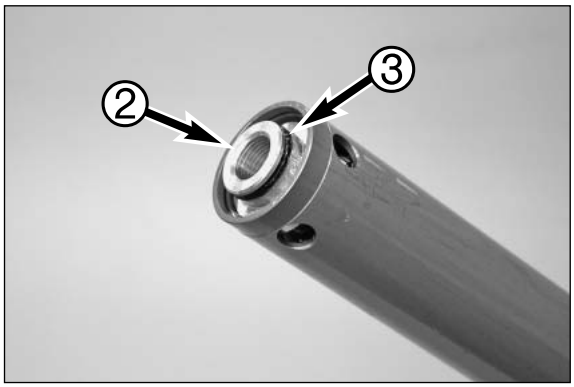
**! CAUTION !**

MAKE SURE THE LOCK RING IS CORRECTLY SEATED.




– Mount dust boot ❶.

NOTE: the dust boot can easily be mounted by hand if the outside of the dust boot is lubricated with fork oil.

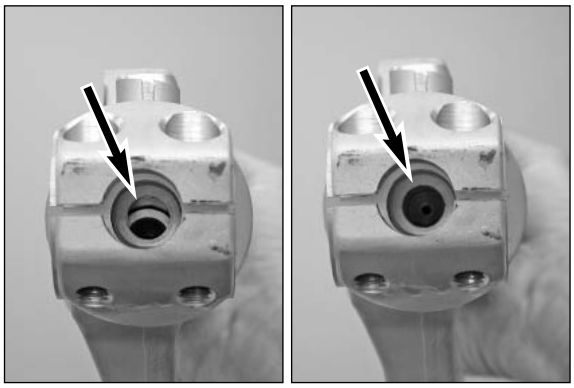



– Pull the inner part of the compression damping ❷ out of the cartridge all the way to the stop.

NOTE:
– You will not be able to screw in the cartridge fixing screw (A/F 13) unless the inner part of the compression damping is pulled all the way out.
– If necessary, screw in the fixing screw and pull out the inner part of the compression damping to the stop; remove the screw again.

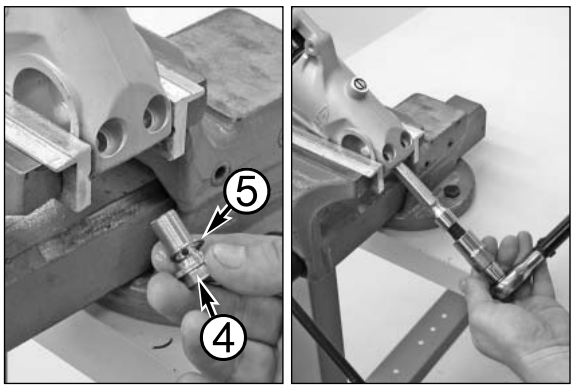
– Check the O-ring ❸ on the inner part of the compression damping for damage and grease with special T158 grease.

NOTE: this O-ring can usually be used again.

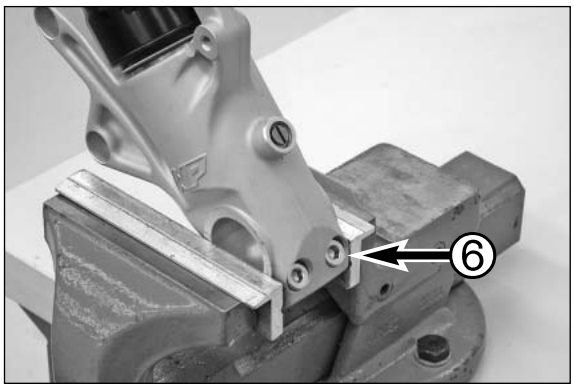


– Carefully slide the cartridge in the inner pipe and center, making sure the collar with the O-ring is inserted and centered in the recess in the inner pipe.

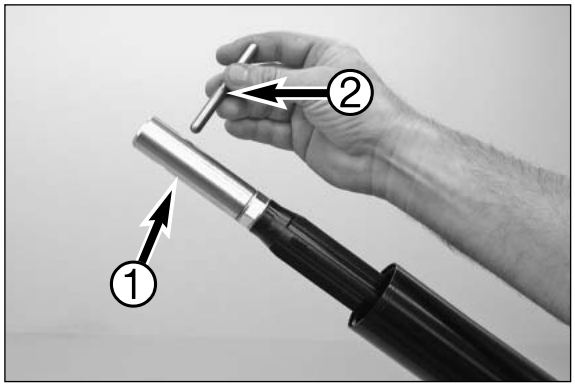
– Visually check from below: if mounted incorrectly the cartridge will be off center (left photo); the correct mounting is shown in the photo on the right.




– Mount the fixing screw ❹ for the Cartridge (A/F 13) with a new copper ring ❺ and tighten to 25 Nm.




– Grease the thread on the fork leg axle passage screws ❻ with special T159 grease and mount.




– If the special tool T 14026 ❶ was removed, remount, otherwise mount handle ❷ on T14026.

NOTE: the cartridge can be retained more easily with the T14026 and it prevents the adjusting pipe for the rebound damping from being lifted and oil from running inside the cartridge (which would cause oil to leak out in operation).

## Bleeding the fork

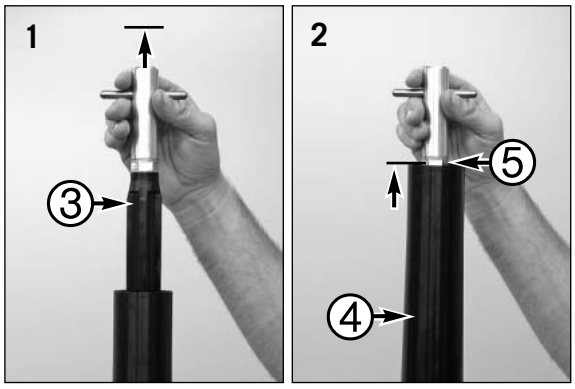
– Unclamp the fork and place in a vertical position.

– Add fresh fork oil until the oil level is over the inner pipe.

NOTE: too little fork oil will prevent the cartridge from being bled properly; too much fork oil is not a problem since it will be sucked off again when adjusting the correct air chamber length.

– Use the special tool to pull the cartridge up and down until you feel a firm pump resistance. The slurping noise will stop simultaneously. Add fork oil if necessary.

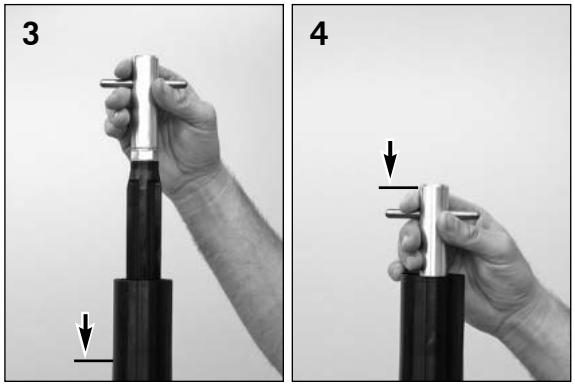
NOTE: do not pump too quickly otherwise the oil will begin to foam, making it more difficult to bleed properly.




**Important for the correct oil level:**

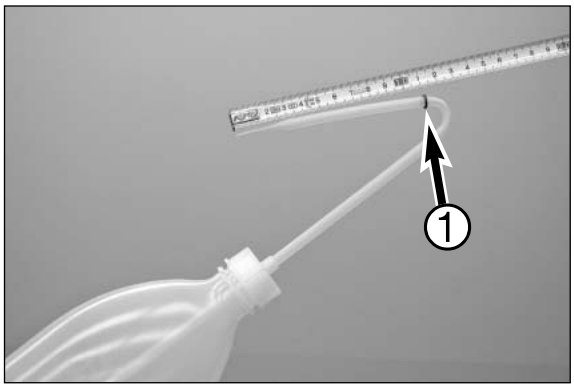
– Pull the cartridge ❸ all the way out and hold (photo 1).

– Pull the outer pipe ❹ up to the hexagon ❺ on the hydrostop, hold briefly (photo 2).

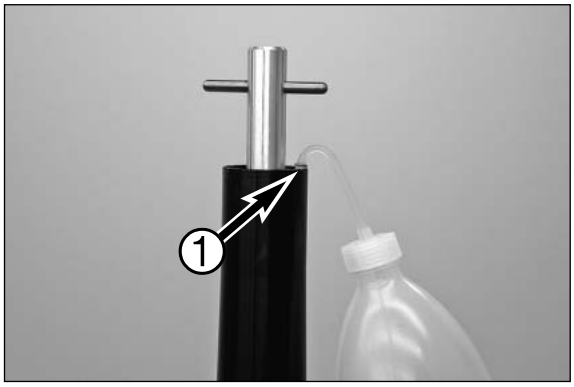



– Push the outer pipe all the way back down again (photo 3).

– Push the cartridge all the way back down again (photo 4).




– Adjust the O-ring ❶ on the suction bottle T137S to precisely 110 mm from the opening in the suction pipe.



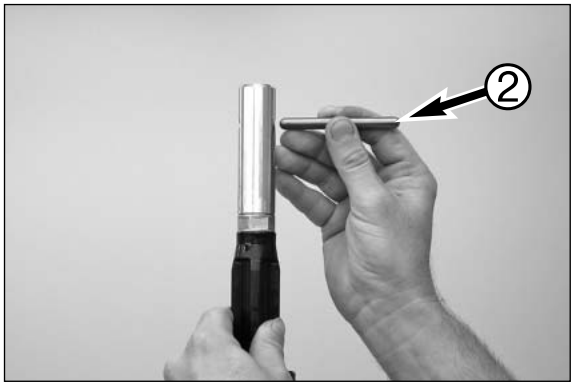

– Hold the suction bottle T137S so that the O-ring ❶ is flush with the upper edge of the outer pipe; compress the suction bottle T137S and extract the oil.

NOTE: the fork spring should not be mounted before adjusting the air chamber length.

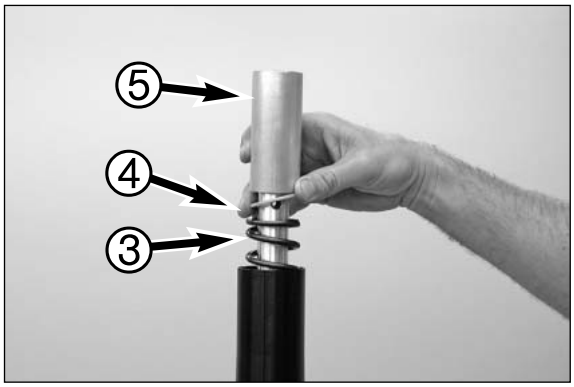
– Repeat the instructions starting with "**Important for the correct oil level**" and adjust the air chamber length again.

**! CAUTION !**

CARRY OUT THE STEPS DESCRIBED ABOVE PRECISELY, OTHERWISE THE AIR CHAMBER LENGTH AND CONSEQUENTLY THE FORK'S DAMPING BEHAVIOR WILL NOT COMPLY WITH THE FACTORY SPECIFICATIONS, WHICH WILL HAVE AN ADVERSE EFFECT ON THE HANDLING CHARACTERISTICS.



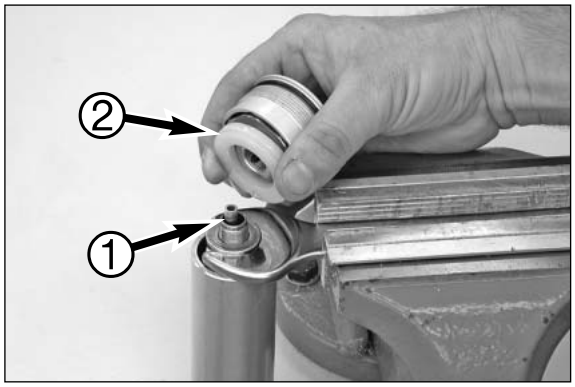

– Clamp the fork and the fork leg axle passage in the vise, pull the cartridge all the way up and remove the handle ❷ from the T14026.




– Mount the spring ❸.

– 990 Super Duke only: slide on the washer ❹ and spacer ❺.

– Press the spring (for 950 Supermoto) or the spacer (for 990 Super Duke) down and position a fork wrench A/F 22 on the hexagon of the cartridge, release the spring/spacer again.



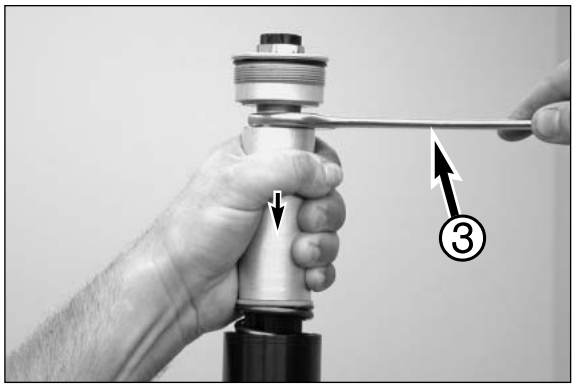

– Clamp the fork and fork wrench in the vise, unscrew the special tool T14026.
– Make sure the adjusting pipe ❶ for the rebound damping is correctly seated.

NOTE: the adjusting pipe should protrude approx. 5 mm if correctly seated, approx. 12 mm if incorrectly seated.

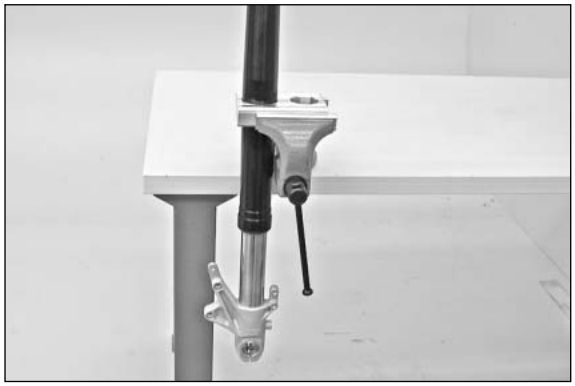
– Mount the spring preload with the pretension spacers ❷ on the cartridge and tighten to 25 Nm.

**! VORSICHT !**

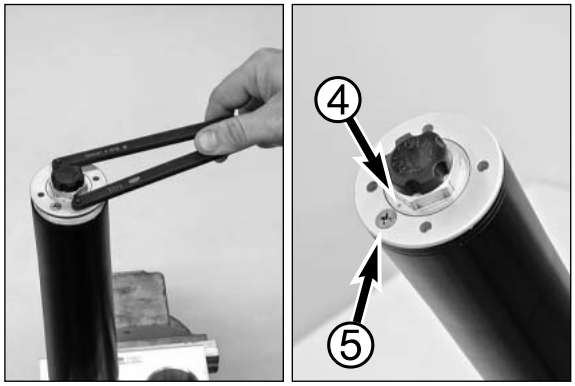
THE SPRING PRELOAD SETTING MUST BE TURNED IN A COUNTERCLOCKWISE DIRECTION ALL THE WAY TO THE STOP (SEE PAGE 4-2), OTHERWISE THE PRELOAD SPACERS WILL PRESS AGAINST THE WRENCH AND WILL BE DAMAGED.




– Clamp the fork with the fork leg axle passage.
– Pull the spring/spacer down, remove the fork wrench ❸, release the spring/spacer again.



– Unclamp the fork and clamp again at the lower triple clamp with special tool T1403S.




– Lubricate the O-ring on the spring preload with fork oil.
– Screw the spring preload in the outer pipe and tighten with special tool T103.

– Screw the spring preload in 5 turns in a clockwise direction, the center point ❹ must be positioned directly opposite from the bleeder screw ❺.

– Adjust the rebound and compression damping as previously written down or according to the specifications (see Chapter 2).