

CHAPTER TEN

FRONT SUSPENSION AND STEERING

FRONT WHEEL
(3-SPOKE TYPE)

Removal

1. On models so equipped, remove the engine spoiler as described in the Chapter Thirteen section of this supplement.
2. Place the bike on the centerstand or place wooden blocks under the engine oil pan to support it securely with the front wheel off the ground.

NOTE

On ABS equipped models, the ABS electronic trigger sensor is attached to the left-hand fork slider. Do not damage the sensor during caliper removal.

3. Remove the front fender as described under *Front Fender (1-Piece Type) Removal/Installation* in Chapter Thirteen in the main body of this book.
4. Remove the brake caliper assembly mounting bolts (**Figure 84**) from the front fork on each side. Both caliper assemblies must be removed on these models.
5. Slide both caliper assemblies off of the brake discs.
6. Tie the caliper assemblies and brake line up with a Bungee cord to take the strain off the hydraulic brake line.
7. Insert a piece of vinyl tubing or wood in the calipers in place of the brake disc. That way, if the brake lever is inadvertently squeezed, the pistons will not be forced out of the cylinders. If this does happen, the calipers may have to be disassembled to reseat the pistons and the system will have to be bled.
8. Loosen the front axle clamping bolts (**Figure 85**) on the left-hand fork leg.
9. Remove the bolt and special washer (**Figure 86**) from the left-hand side of the front axle.
10. Loosen the front axle clamping bolts (**Figure 87**) on the right-hand fork leg.

NOTE

*Prior to removing the front wheel, note the direction of the tire rotation arrow **Figure 88**. If the tire is not marked, mark a rotation arrow either on the tire or wheel. The wheel must be reinstalled the same way so the arrow will be pointing in the correct direction.*

11. Insert a drift or Allen wrench into the hole (**Figure 89**) in the right-hand side of the front axle.

12. Rotate the axle back and forth and withdraw the front axle from both fork legs.

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13. Let the wheel come down and forward to remove it. Don't lose the spacer on each side of the front hub. Don't intermix them as they must be reinstalled on the correct side of the wheel during installation.

CAUTION

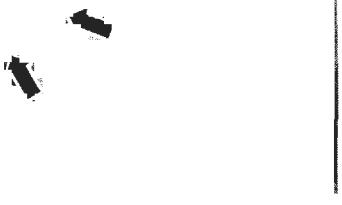
Do not set the wheel down on the disc surface as it may get scratched or warped. Set the tire sidewalls on 2 wooden blocks.

14. Inspect the front wheel as described in this chapter of the supplement.

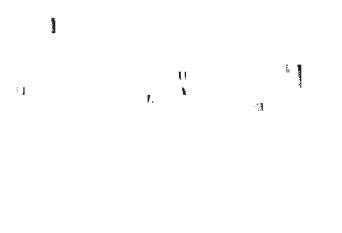
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Installation

1. Make sure the axle bearing surfaces of both fork sliders and the axle are free from burrs and nicks.
2. Apply a small amount of cold grease to the inner surface of the spacers; this will help hold them in place.
3. Position the spacers onto the correct side of the wheel hub. The narrow spacer goes on the right-hand side.
4. Make sure the front wheel tire rotation arrow (**Figure 88**) is pointing in the correct direction.
5. Apply a light coat of multipurpose grease to the front axle prior to installation.
6. Roll the wheel into position. Lift the wheel up and install the front axle in from the right-hand side (**Figure 89**). Push the axle all the way in until it bottoms out on the left-hand fork leg. Make sure the axle spacers are still in place.
7. Install the special washer and the Allen bolt (**Figure 86**) into the front axle.
8. Install a drift or Allen bolt wrench into the hole in the right-hand end of the front axle. This is to prevent the axle from turning while tightening the Allen bolt on the opposite end.
9. Tighten the Allen bolt to the torque specification listed in **Table 8**.
10. Remove the vinyl tubing or pieces of wood from both brake calipers.

NOTE

On ABS models, the ABS electronic trigger sensor is attached to the left-hand fork slider. Do not damage the sensor during caliper installation.

11. Carefully install the caliper assemblies onto the disc. Be careful not to damage the leading edge of the pads during installation.
12. Install the brake caliper assembly mounting bolts (**Figure 84**).
13. Tighten the caliper mounting bolts to the torque specifications listed in **Table 8**.
14. Install the front fender as described under *Front Fender (1-Piece Type) Removal/Installation* in Chapter Thirteen in the main body of this book.
15. Remove the wooden block(s) from under the engine oil pan and take the bike off the centerstand.
16. Apply the front brakes and pump the front forks up and down several times to seat and center the front axle within the fork tubes.
17. Tighten the front axle clamp bolts on each fork leg to the torque specification listed in **Table 8**. Refer to **Figure 87** and **Figure 85**.

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18. After the wheel is completely installed, rotate it several times and apply the brakes a couple of times to make sure the wheel rotates freely and that the brake pads are against the discs correctly.

19. On models so equipped, install the engine spoiler.

Inspection

Inspect the front wheel as described in Chapter Ten in the main body of this book.

FRONT HUB

Inspection/Disassembly/Assembly

The inspection, disassembly and assembly of the front hub is the same as on previous models with the exception of the appearance of the wheel and hub center as shown in **Figure 90**. Refer to Chapter Ten in the main body of this book for the inspection, disassembly and assembly of the front hub assembly.

TIRE BALANCING (3-SPOKE TYPE)

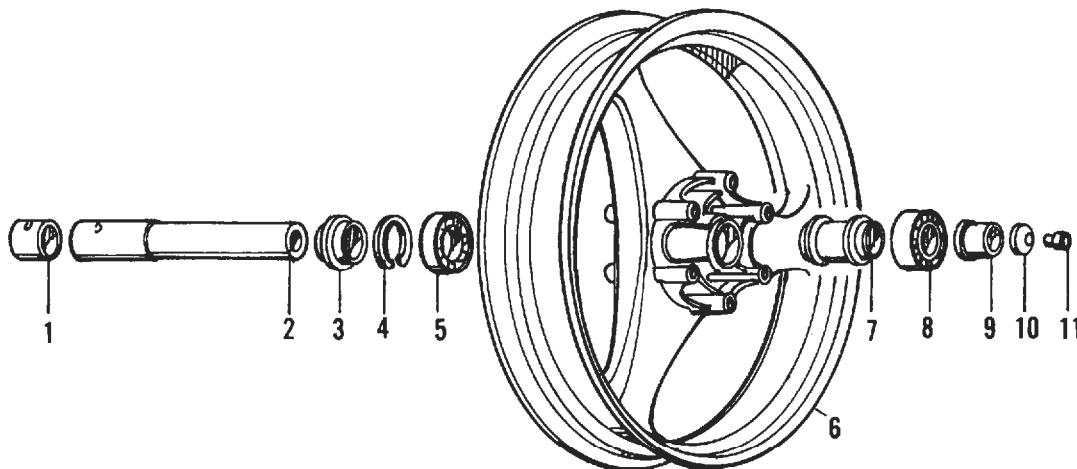
The balancing procedure is the same as on prior wheels with the exception of the special tools required to hold the rear wheel in the fixture.

Refer to **Figure 91** for this procedure.

- 1A. On the front wheel, perform the following:
 - a. Install the balance axle through the center of the front hub.
 - b. Lightly secure the balance axle with the knurled nut.
- 1B. On the rear wheel, perform the following:
 - a. Install the mounting fixture into the centering collar side of the rear hub and secure it with the wheel mounting bolts.
 - b. Install the balance axle through the center of the rear hub.
 - c. Lightly secure the balance axle with the knurled nut.
2. Place the wheel on the balancing device as shown in **Figure 92**.
3. Follow the *Wheel Balance* procedure in Chapter Ten in the main body of this book.

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FRONT WHEEL—3 SPOKE



1. Cap
2. Front axle
3. Right-hand spacer
4. Circlip
5. Wheel bearing
6. Front wheel

7. Distance collar
8. Wheel bearing
9. Left-hand spacer
10. Cover
11. Allen bolt

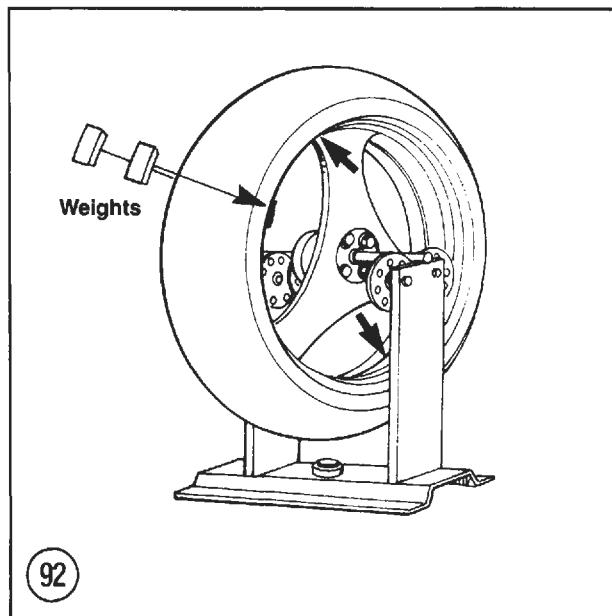
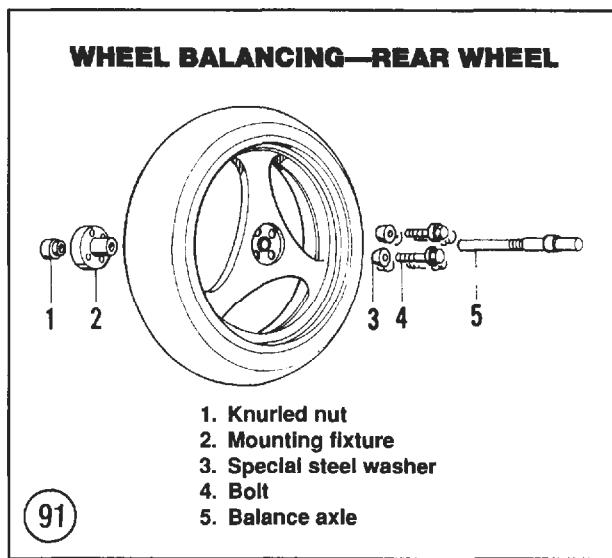
HANDLEBAR**Removal/Installation**

Refer to the following illustrations for this procedure.

- K1, K100RS models: **Figure 93.**
- K1100LT models: **Figure 94.**

NOTE

The handlebar on the K1100RS is the same as on previous models.



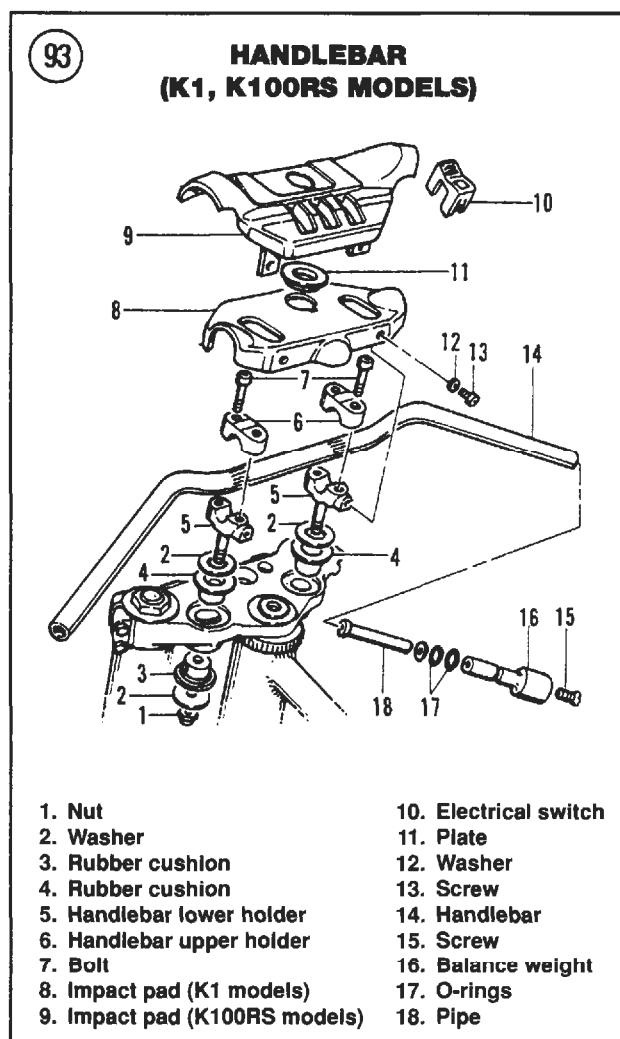
The removal and installation procedures are the same as on previous models with the exception of the shape of some of the handlebar components. Refer to the *Handlebar* procedure in Chapter Ten in the main body of this book and the to these illustrations during the removal and installation procedures.

**STEERING DAMPER
(K1, K100RS)****Removal/Installation**

Refer to the following illustrations for this procedure.

- K1 models: **Figure 95.**
- K100RS models: **Figure 96.**
- K1 models: **Figure 97.**

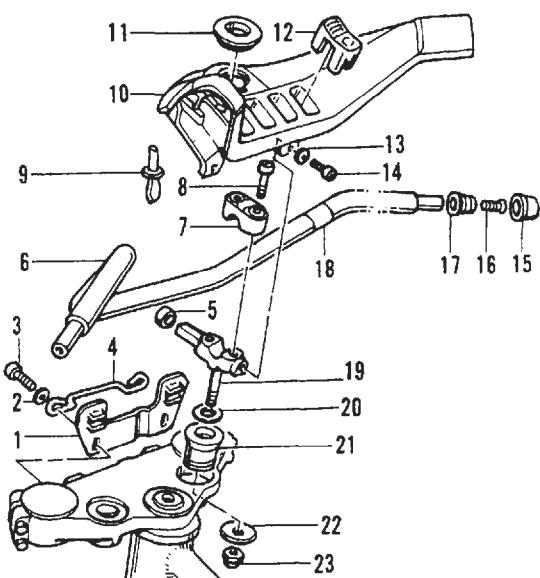
1. Remove the seat cover and the dual seat as described in the Chapter Thirteen section of this supplement.



2. Remove the front fairing left-hand knee pad and the left-hand inner cover as described in the Chapter Thirteen section of this supplement.
3. Disconnect the electrical connector from the instrument panel.
4. On K1 models, carefully pry back the plastic cover on the front fairing mounting bracket to expose the mounting bolt.
5. Remove the Allen bolt securing the damper unit (**Figure 98**) to the front fairing mounting bracket.
- 6A. On K1 models, remove the washer and shim from the front fairing mounting bracket receptacle.
- 6B. On K100RS models, remove the 2 shims from the front fairing mounting bracket receptacle.
7. Hold onto the damper unit and remove the Allen bolt securing the damper unit to the lower fork bridge (A, **Figure 99**), remove the damper unit (B, **Figure 99**) from the frame.

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HANDLEBAR (K1100LT MODELS)



1. Mounting plate

2. Washer

3. Bolt

4. Wire loop

5. Hose

6. Handlebar

7. Handlebar
upper holder

8. Bolt

9. Rivet

10. Impact pad

11. Plate

12. Electrical switch

13. Washer

14. Bolt

15. Cover

16. Screw

17. Vibration damper

18. Foil

19. Handlebar
lower holder

20. Washer

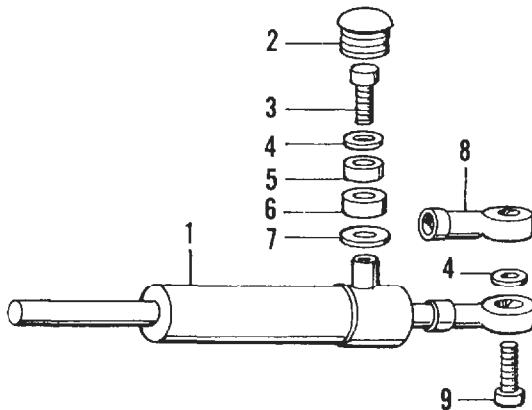
21. Rubber cushion

22. Washer

23. Nut

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STEERING DAMPER (K1 MODELS)



1. Damper unit

2. Plastic cover

3. Bolt

4. Washer

5. Shim

6. Pivot bearing

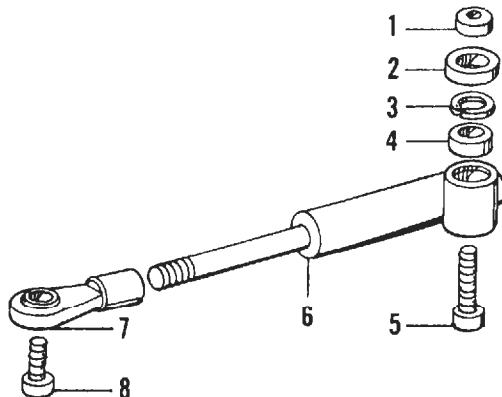
7. Circlip

8. Connector

9. Bolt

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STEERING DAMPER (K100RS MODELS)



1. Shim

2. Shim

3. Snap ring

4. Pivot bearing

5. Bolt

6. Damper unit

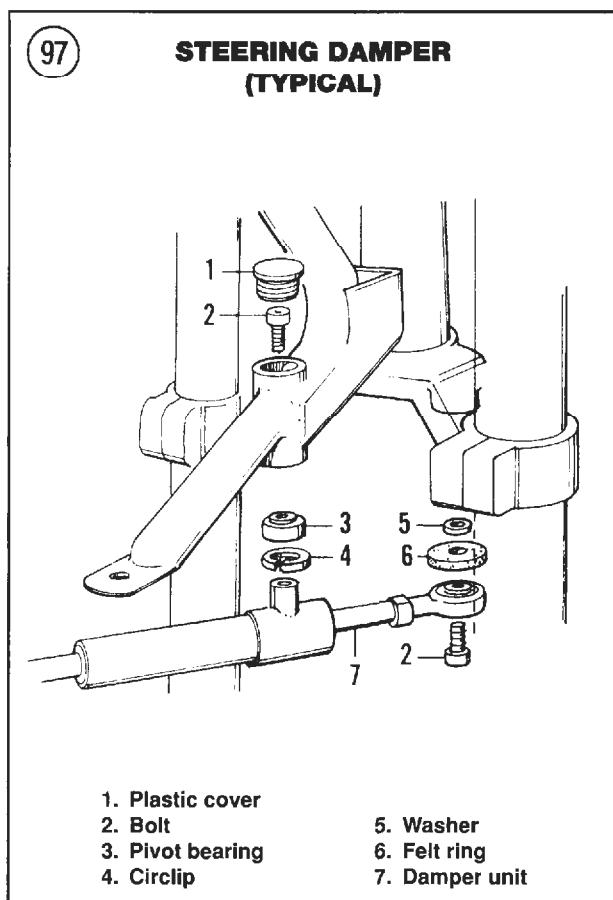
7. Connector

8. Bolt

8. Remove the felt ring and washer from the lower fork bridge.

CAUTION

Do not remove the pivot bearing for inspection purposes as it will be damaged during the removal process. Remove the pivot bearing only if replacement is necessary.



9A. On K1 models, to remove the pivot bearing from the front fairing mounting bracket, perform the following:

- Remove the circlip.
- Using a suitable size socket, carefully tap the pivot bearing out of the receptacle in the bracket.

9B. On K100RS models, to remove the pivot bearing from the steering damper, perform the following:

- Remove the circlip.
- Using a suitable size socket, carefully tap the pivot bearing out of the receptacle in the steering damper.

10. Install by reversing these removal steps, noting the following.

11. Install the Allen bolts and tighten to the torque specification listed in **Table 8**.

**STEERING HEAD
AND STEM
(K75, K75RT, K75S)**

Disassembly/Assembly

Refer to **Figure 100** for this procedure.

The disassembly and assembly procedures are the same as on previous models with the exception of the number of the clamping bolts and their locations on the lower fork bridge. Refer to the *Steering Head and Stem* procedure in Chapter Ten in the main body of this book and to **Figure 100** during the disassembly and assembly procedures.

**FRONT FORK
(K75, K75RT, K75S 1992-ON)**

Removal/Installation

The removal and installation procedures are the same as on previous models with the exception of the number of the upper and lower fork bridge clamping bolts and their locations (**Figure 101**). Refer to the *Front Forks Removal*

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and Installation procedure in Chapter Ten in the main body of this book.

Disassembly

To simplify fork service and to prevent the mixing of parts, the legs should be disassembled and assembled individually. Some models have different internal components in the right-hand fork assembly than those installed in the left-hand fork assembly.

Refer to Figure 102 for this procedure.

1. Clamp the slider in a vise with soft jaws.

NOTE

This Allen bolt is secured with a locking compound and is often very difficult to remove because the damper rod will turn inside the slider. It sometimes can be removed with an air impact driver. If you are unable to remove it, take the fork tubes to a dealer and have the bolts removed.

2. Loosen the Allen bolt on the bottom of the slider, then remove the Allen bolt and gasket.
3. Remove the fork slider from the vise.
4. If not already removed, remove the plastic trim cap (Figure 103) from the fork tube.
5. Hold the fork top cap with an open end wrench and remove the oil fill plug and O-ring.
6. Pour the fork oil out and discard it. Pump the fork several times by hand to expel most of the remaining oil.
7. Remove the dust seal from the fork slider.
8. Hold the upper fork tube in a vise with soft jaws.
9. Compress the fork top cap with a drift or socket extension.

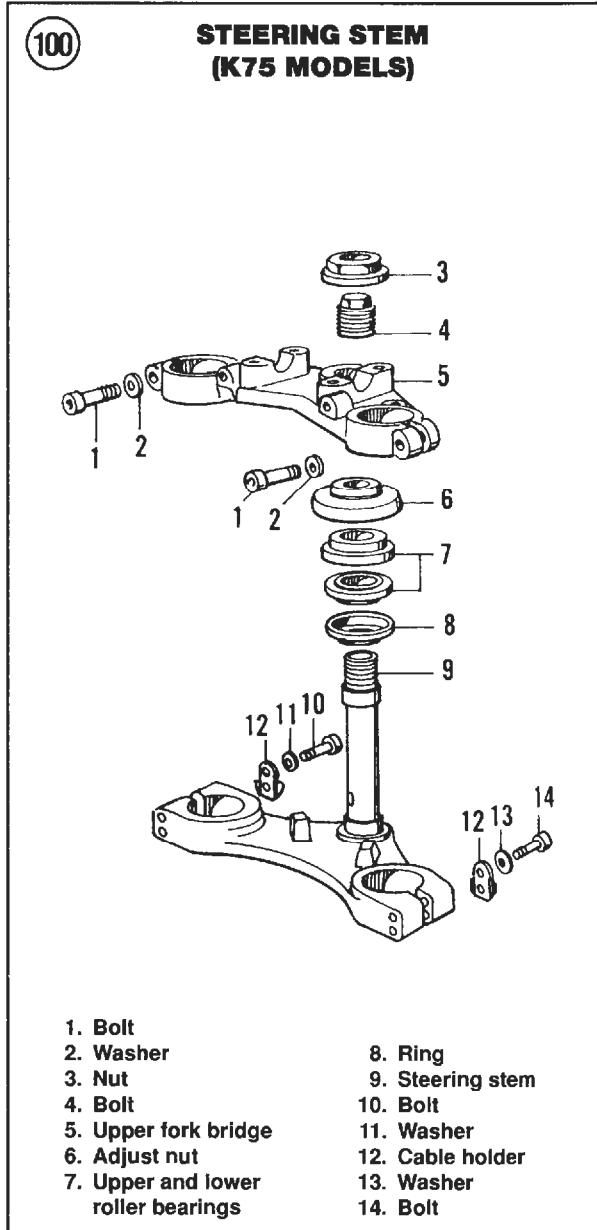
WARNING

Be careful when removing the fork top cap as the spring is under pressure. Protect your eyes accordingly.

NOTE

The spring pressure should push the fork top cap out of the fork slider after the circlip is removed. If it does not come out after the circlip is removed, install a bolt (Figure 104) into the oil fill plug threaded hole in the fork top cap. Pull the fork top cap out with a pair of pliers. Unscrew the bolt from the cap.

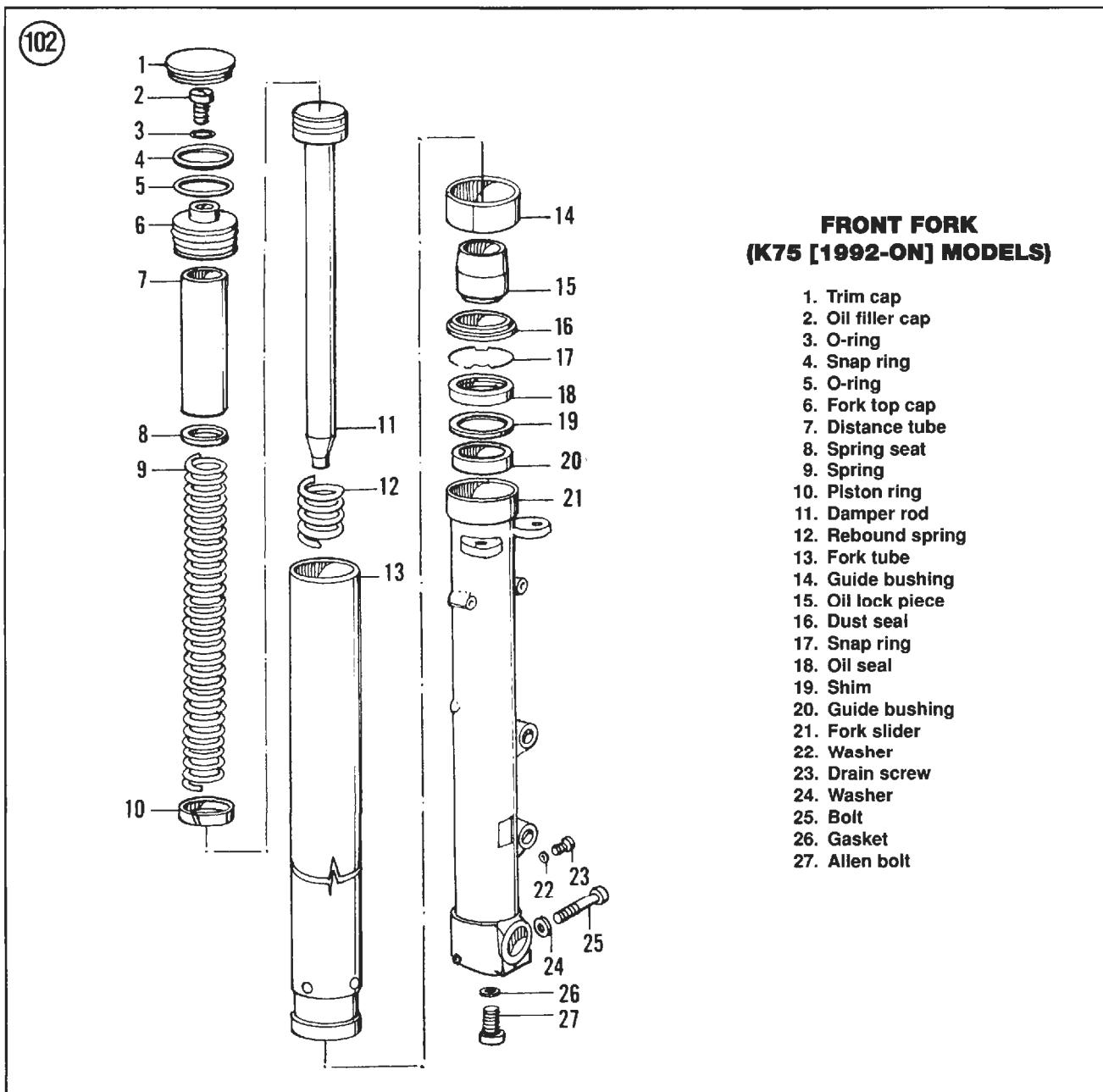
10. Using a small flat-bladed screwdriver, pry out and remove the snap ring (Figure 105) securing the fork top cap into the slider.
11. Remove the fork top cap and O-ring.



12. Slide out the distance tube, spring seat and the fork spring from the top of the fork tube.
13. Remove the fork from the vise, pour the fork oil out and discard it. Pump the fork several times by hand to expel most of the remaining oil.
14. Remove the dust seal from the slider.
15. Using circlip pliers, remove the internal circlip from the slider.
16. Install the fork slider in a vise with soft jaws.

NOTE
On this type of fork, force is needed to remove the fork tube from the slider.

17. There is an interference fit between the fork slider guide bushing and the fork tube guide bushing. To remove the fork tube from the slider, pull hard on the fork tube using quick in and out strokes (Figure 106). Doing this will withdraw the guide bushing, shim and oil seal from the slider.



18. Withdraw the fork tube from the slider.

NOTE

Do not remove the fork tube guide bushing unless it is going to be replaced. Inspect it as described in this section of the supplement.

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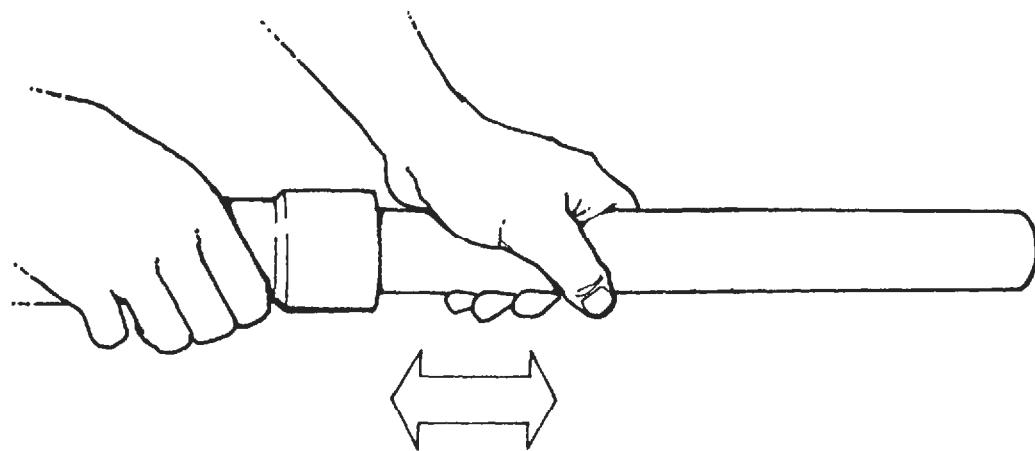
19. Turn the fork tube upside down and slide off the oil seal, shim and guide bushing from the fork tube.
20. Remove the oil lock piece, the damper rod and rebound spring from the slider.
21. Inspect all parts as described in this chapter.

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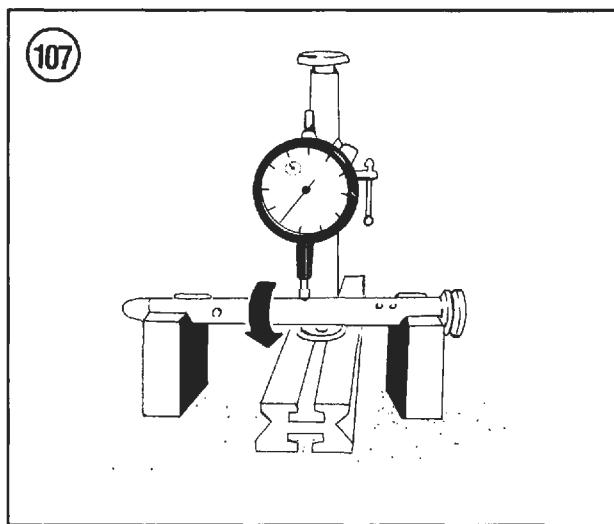
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Inspection

1. Thoroughly clean all parts in solvent and dry them. Check the fork tube for wear or scratches.
2. Check the damper rod for straightness (**Figure 107**). BMW does not provide service limit specifications for runout.

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3. Carefully check the damper rod and piston ring (**Figure 108**) for wear or damage. Replace if necessary.
4. Inspect the fork oil seal for wear or deterioration. Replace if necessary.
5. Check the fork tube for straightness. If bent or severely scratched, it should be replaced.
6. Check the lower portion of the slider for dents or exterior damage that may cause the fork tube to hang up during riding. Replace if necessary.
7. Check the slider in the area where the fork seal is installed for wear or damage. Replace the slider if necessary.
8. Inspect the snap ring groove (**Figure 109**) in the fork tube for wear, corrosion or damage. Clean out the groove if necessary so that the snap ring can seat correctly during assembly.
9. Check the axle bearing surfaces of the slider (**Figure 110**) for wear or gouges. Clean up the surfaces or replace the slider if necessary.
10. Inspect the axle clamping lugs (**Figure 111**) on the slider for cracks or fractures from over tightening the clamping bolts. If any cracks are found, replace the fork slider.
11. Inspect the fork tube and slider guide bushings (**Figure 112**). If either is scratched or scored, they must be

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replaced. If the Teflon coating is worn off so the copper base material is showing on approximately 3/4 of the total surface, the bushing must be replaced.

12. Inspect the distance tube for wear or damage. Replace if necessary.
13. Any worn or damaged parts should be replaced. Simply cleaning and reinstalling unserviceable components will not improve performance of the front suspension.

Assembly

Refer to **Figure 102** for this procedure.

1. Apply fork oil to all parts prior to installation.
2. If removed, install the new fork tube guide bushing (**Figure 113**).
3. Install the rebound spring onto the damper rod and insert the assembly into the fork tube (**Figure 114**).
4. Install the fork spring (**Figure 115**), spring seat and spacer (**Figure 116**) into the fork tube.
5. Hold the upper fork tube in a vise with soft jaws.
6. Inspect the O-ring seal (**Figure 117**) on the fork top cap; replace if necessary.
7. Install the fork top cap and O-ring (**Figure 118**).

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8. Press down on the fork top cap with a drift or socket extension. While holding the fork top cap down, install the snap ring (**Figure 119**). Make sure the snap ring is correctly seated in the fork tube groove.

9. Install the oil lock piece on the end of the damper rod (**Figure 120**).

10. Install the upper fork assembly into the fork slider (**Figure 121**).

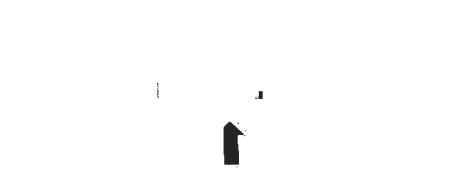
11. Slide the new slider guide bushing down the fork tube and rest it on the slider.

12. Slide the fork slider shim down the fork tube and rest it on top of the guide bushing.

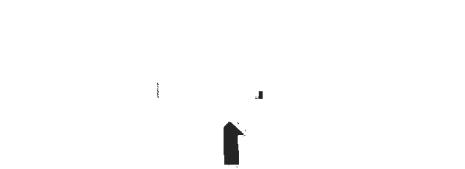
13. Carefully tap the slider guide bushing and shim down into the fork slider.

119**NOTE**

*A piece of pipe can be used as a tool to tap the guide bushing into place. Wrap one end of the pipe with duct tape (**Figure 122**) to prevent the threads from damaging the interior of the slider.*

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14. Apply fork oil to the oil seal and slide it down the fork tube (**Figure 123**). Carefully drive the oil seal into the fork slider using the same tool used in Step 13. Drive the oil

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seal in until the groove in the slider can be seen above the top surface of the oil seal.

15. Install the snap ring, making sure it is completely seated in the groove in the fork slider (**Figure 124**).
16. Make sure the gasket is in place on the Allen bolt (**Figure 125**).
17. Install the Allen bolt into the slider and into the damper rod in the fork tube. Tighten the Allen bolt securely.
18. Remove the oil filler plug from the fork top cap.
19. Fill the fork with the correct quantity of fork oil as listed in **Table 9**.
20. Slide the dust seal down the fork tube and into place in the fork slider.
21. Install the fork assemblies as described in this section of the supplement.

FRONT FORK (K1, K100RS, K100LT)

Removal

1. Remove the engine spoiler as described in the Chapter Thirteen section of this supplement.
2. Place the bike on the centerstand or place wooden blocks under the engine oil pan to support it securely with the front wheel off the ground.

NOTE

The ABS electronic trigger sensor is attached to the left-hand fork slider. Do not damage the sensor during caliper removal.

3. Remove the front fender (A, **Figure 126**) as described in Chapter Thirteen in the main body of this book for K100RS models or for K1 models, refer to the Chapter Thirteen section of this supplement.
4. Remove the brake caliper assembly mounting bolts (B, **Figure 126**) from the front fork on each side. Both caliper assemblies must be removed.
5. Slide both caliper assemblies off of the brake discs.
6. Insert a piece of vinyl tubing or wood in the calipers in place of the brake disc. That way if the brake lever is inadvertently squeezed, the pistons will not be forced out of the cylinders. If this does happen, the calipers may have to be disassembled to reseat the pistons and the system will have to be bled.
7. Remove the front wheel as described in this section of the supplement.
8. Remove the front fairing knee pads and inner covers as described Chapter Thirteen in the main body of this book for K100RS and K100LT models or the Chapter Thirteen section of this supplement for K1 models.

9. Separate the ABS sensor plug connector (C, **Figure 126**).

10. Remove the cable straps (D, **Figure 126**) securing the ABS sensor line and brake line to the left-hand slider.
11. Pull the ABS sensor line out and downward out of the slot in the front fork stabilizer.
12. Remove the bolts and washers securing the front stabilizer cover and remove the cover.
13. Remove the front stabilizer rubber overlay from the fork tubes.
14. Remove the nuts and washers securing the front stabilizer to both fork sliders.
15. Move the front stabilizer and the front brake lines back away from the fork assemblies and secure this assembly to the frame.
16. If the fork assembly is going to be disassembled for service, perform the following:

- a. Loosen the upper fork bridge bolts--do not loosen the lower fork bridge bolts at this time.
- b. Loosen, but do not remove, the fork top cap. It is a lot easier to loosen the fork top cap with the fork tube secure on the lower fork bridge.

17. Loosen the upper and lower fork bridge bolts (**Figure 127**).

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- Lower the fork assembly down and out of the upper and lower fork bridge. It may be necessary to slightly rotate the fork tube while pulling it out. Remove both fork assemblies.

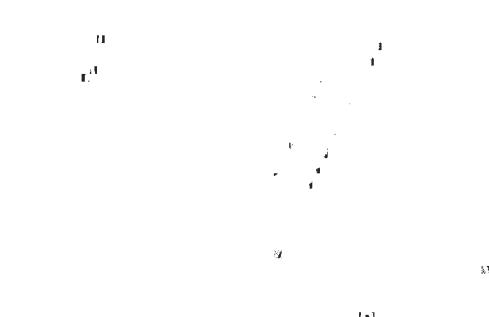
Installation

- Clean off any corrosion or dirt on the upper and lower fork bridge fork receptacles.

NOTE

The fork assemblies must be reinstalled on the correct side of the bike so the brake calipers, the front fork stabilizer and the front fender can be installed. If the fork assemblies are installed on the wrong side these components cannot be installed onto the fork sliders.

- Install the fork assemblies on the correct side. Install the fork tubes up through the lower and upper fork bridges.
- Push the fork tube up until the top surface is 6 mm (0.24 in.) above the top surface of the upper fork bridge.



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- Tighten the upper and lower fork bridge clamping bolts to the torque specification listed in **Table 8**.
- Move the front brake lines and front stabilizer into position on the forks.
- Install the nuts and washers securing the front stabilizer to both fork sliders. Tighten the nuts to the torque specification listed in **Table 8**.
- Install the rubber overlay onto the front stabilizer, then install the front stabilizer cover.
- Install the bolts and washers securing the cover and tighten securely.
- Move the ABS sensor line back into position in the slot in the front fork stabilizer.
- Install the cable straps securing the ABS sensor line and brake line to the slider.
- Connect the ABS sensor connector.
- Install the front fairing knee pads and inner covers.
- Remove the pieces of vinyl tubing or wood from the calipers.
- Install the front wheel as described in this chapter.

NOTE

The ABS electronic trigger sensor is attached to the left-hand forks slider. Do not damage the sensor during caliper installation.

- Install both brake caliper assemblies and tighten the mounting bolts to the torque specification listed in **Table 8**.
- Install the front wheel and the front fender.
- Remove the wooden blocks from under the oil pan.
- Install the engine spoiler.

Disassembly

To simplify fork service and to prevent the mixing of parts, the legs should be disassembled and assembled individually.

Refer to the following illustrations for this procedure:

- Figure 128:** 1990-1991 models.
- Figure 129:** 1992-1993 models.

- Drain the fork oil as follows:
 - Remove the plug and O-ring from the fork top cap.
 - Position the fork assembly in an upright position and remove the drain screw and washer from the slider.
 - Allow the fork oil to drain out into the drain pan. Compress the fork assembly by hand several times to expel the residual fork oil. Discard the fork oil properly.
 - Reinstall the plug and the drain screw and washer to avoid misplacing them.

2. Using the front brake caliper mounting bosses, clamp the slider in a vise with soft jaws.

NOTE

The base valve bolt is often very difficult to remove because the damper rod will turn inside the slider. It sometimes can be removed with an air impact driver. If you are unable to remove it, take the fork tubes to a dealer and have the bolts removed.

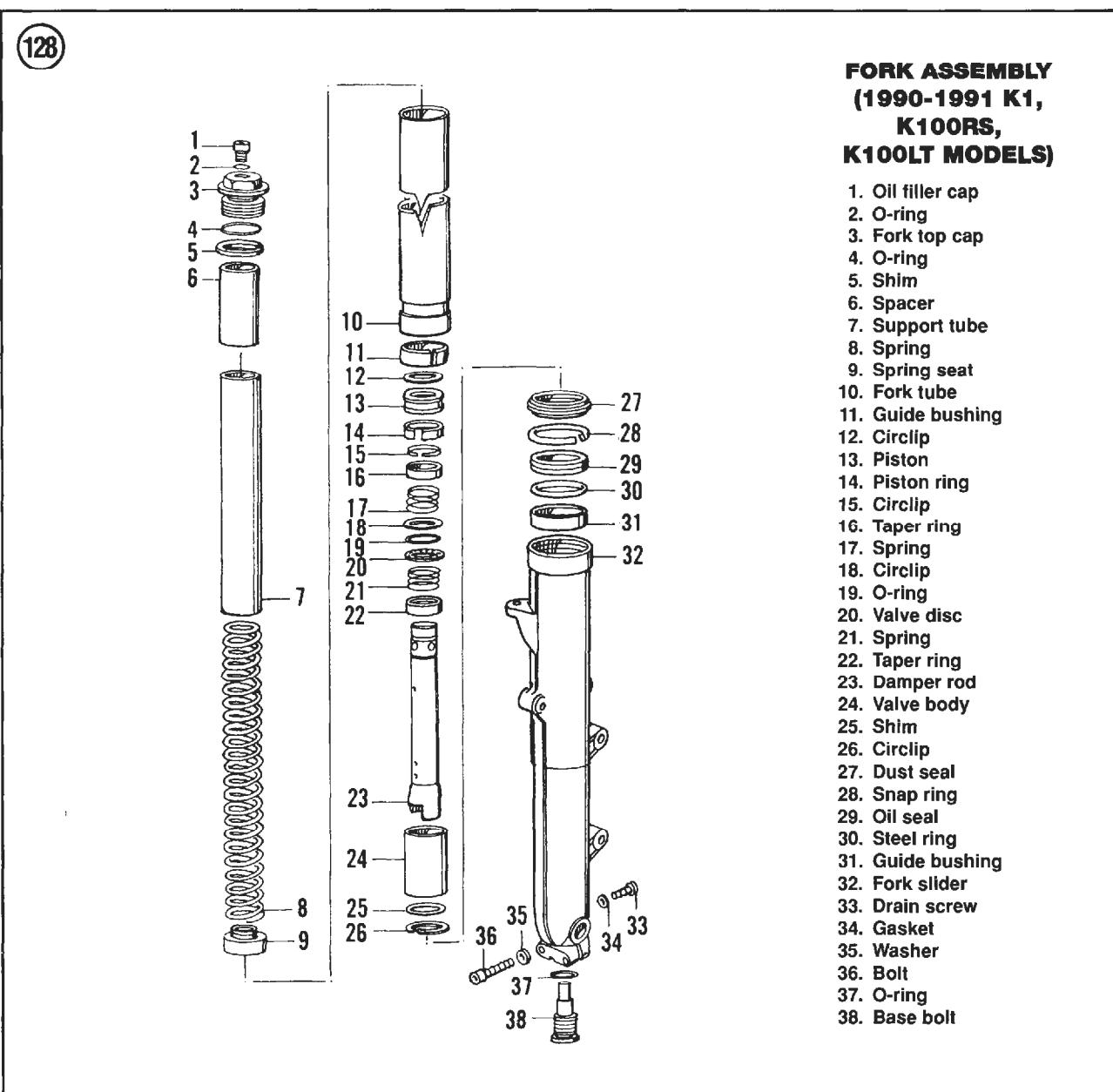
3. Loosen the base valve bolt on the bottom of the slider.

4. Remove the fork slider from the vise.
5. Install the fork tube in a vise with soft jaws.

WARNING

On 1990-1991 models, be careful when removing the fork top cap as the spring is under pressure. Protect your eyes accordingly.

6. Remove the fork top cap with an open end wrench.
7. Remove the fork tube from the vise.



8. Place your finger over the end of the fork tube, then turn the fork assembly over and pour out any residual fork oil and discard it.

9A. On 1990-1991 models, remove the shim, spacer, support tube spring and spring seat from the fork tube.

9B. On 1992-1993 models, perform the following:

- Remove the shim.
- Compress the damper cartridge into the fork tube and remove the clamp ring from the end of the damper cartridge
- Remove the shim from the top of the fork tube.

d. Remove the snap ring and spacer from the fork tube.
e. Remove the support tube, spring and spring seat from the fork tube.

10. Remove the base valve bolt and O-ring seal from the bottom of the slider.

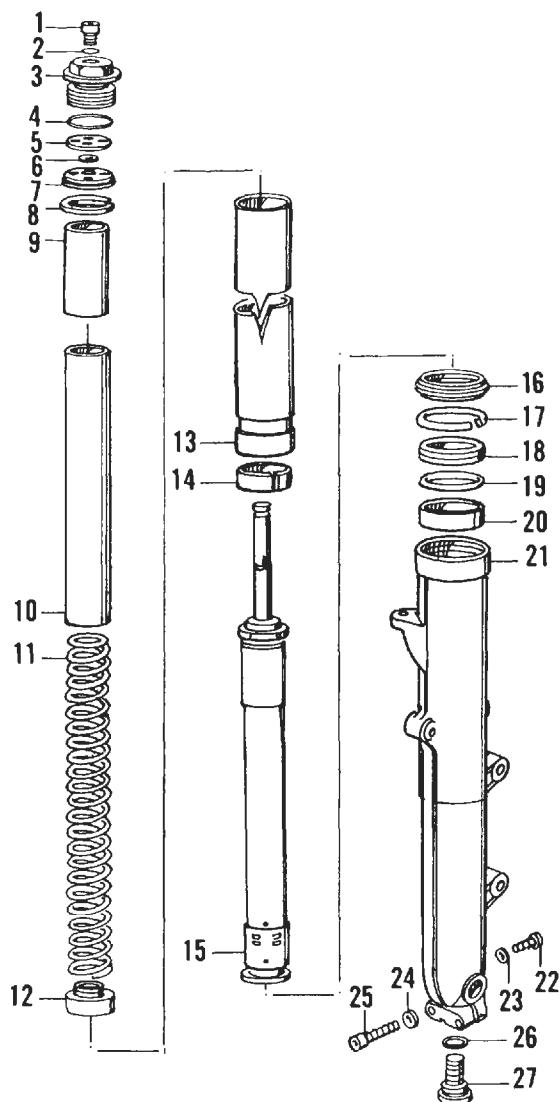
11. Install the fork slider in a vise with soft jaws.

12. Withdraw the fork tube from the slider.

13A. On 1990-1991 models, perform the following:

- Remove the circlip, shim and the valve body from the base of the slider.

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FORK ASSEMBLY (1992-1993 K1, K100RS MODELS)

- Oil filler cap
- O-ring
- Fork top cap
- O-ring
- Shim
- Clamp ring
- Shim
- Snap ring
- Spacer
- Support tube
- Spring
- Spring seat
- Fork tube
- Guide bushing
- Damper rod
- Dust seal
- Snap ring
- Oil seal
- Steel ring
- Guide bushing
- Fork slider
- Drain screw
- Gasket
- Washer
- Bolt
- O-ring
- Base bolt valve

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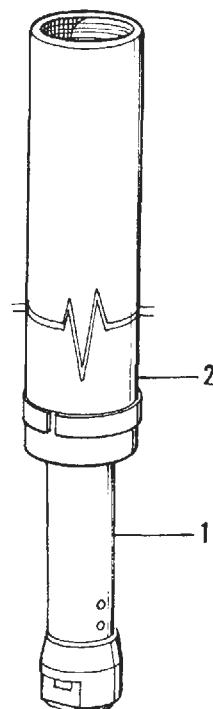
b. Withdraw the damper rod assembly from the fork tube (**Figure 130**).

13B. On 1992-1993 models, withdraw the damper cartridge from the fork tube.

14. On 1990-1991 models, examine the damper rod assembly as described in this chapter. Do not disassemble the damper rod assembly for inspection purposes, if one of the components is faulty, refer to **Figure 131** and disassemble as follows:

- Thoroughly clean the assembly in solvent and dry with compressed air.
- Remove the circlip from the top of the damper rod.
- Slide off the piston and piston ring assembly.
- Remove the circlip.
- Note the direction of the upper taper ring, then slide off the ring and the spring below it.
- Remove the circlip, then slide off the O-ring, valve disc and spring.
- Note the direction of the lower taper ring, then slide off the ring.

(130)



1. Damper assembly
2. Fork tube

15. Remove the dust seal from the fork slider (**Figure 132**).

16. Carefully remove the snap ring, located above the oil seal, from the top of the fork slider.

17. Protect the edge of the fork slider with a piece of wood or plastic ring (A, **Figure 133**) to keep the screwdriver from making contact with the slider while prying out the oil seal.

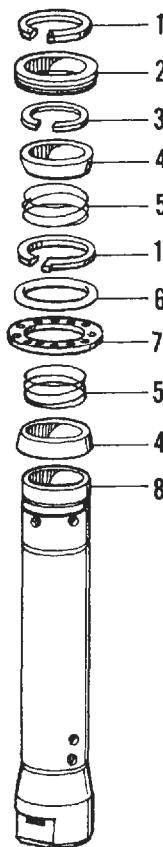
18. Using a broad-tipped screwdriver (B, **Figure 133**), carefully pry the oil seal (C, **Figure 133**) out of the fork slider.

19. Remove the steel ring, then using both index fingers, remove the guide bushing from the top of the fork slider.

20. Inspect all parts as described in this chapter.

(131)

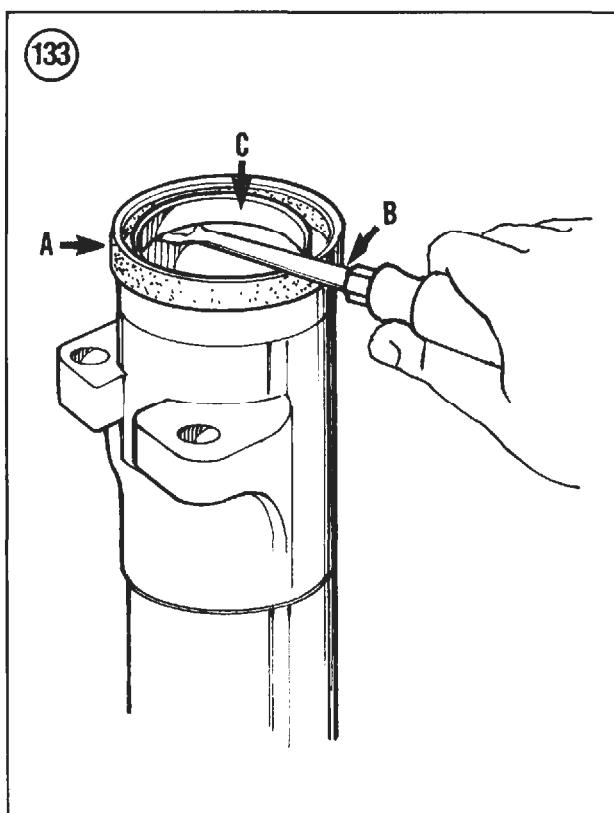
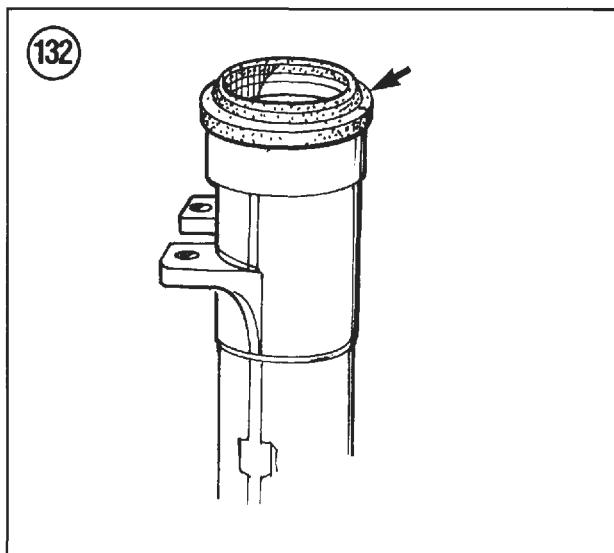
DAMPER ROD ASSEMBLY (1990-1992)



1. Circlip
2. Piston/piston ring
3. Circlip
4. Taper ring
5. Spring
6. O-ring
7. Valve disc
8. Damper rod

Inspection

1. Thoroughly clean all parts in solvent and dry them. Check the fork tube for excessive wear or scratches.
2. Check the damper rod, or damper cartridge, for straightness.



3. On 1990-1991 models, if the damper rod assembly was disassembled, roll it on a piece of plate glass and check for any runout. BMW does not provide service limit specifications for runout.

4. On 1990-1991 models, carefully check the taper rings, the O-ring seal, the valve disc and the piston and piston ring for wear or damage. Replace if necessary.

5. On 1990-1991 models, make sure the oil passage holes in the damper rod are clean. If clogged or congested, clean out with solvent and dry with compressed air.

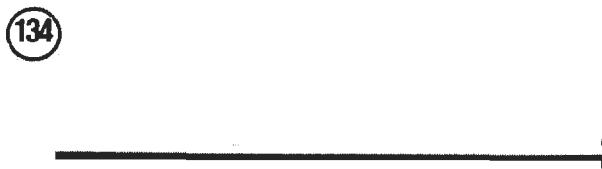
6. Inspect the fork oil seal for wear or deterioration. Replace if necessary.

7. Check the fork tube for straightness (Figure 134). If bent or severely scratched, it should be replaced.

8. Check the slider (Figure 135) for dents or exterior damage that may cause the fork tube to hang up during riding. Replace if necessary.

9. Check the slider in the area where the fork seal is installed for wear or damage. Replace if necessary.

10. On 1992-1993 models, inspect the snap ring groove (Figure 136) in the fork tube for wear, corrosion or damage. Clean out the groove if necessary so the snap ring can seat correctly during assembly.



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11. Check the axle bearing surfaces of the slider (**Figure 137**) for wear or gouges. Clean up the surfaces or replace the slider if necessary.

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12. Inspect the axle clamping lugs (**Figure 138**) on the slider for cracks or fractures from over tightening the clamping bolts. If any cracks are found, replace the fork slider.

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13. Inspect the spacer (**Figure 139**) for wear or damage. Replace if necessary.

14. Any worn or damaged parts should be replaced. Simply cleaning and reinstalling unserviceable components will not improve performance of the front suspension.

Assembly

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Refer to the following illustrations for this procedure:

- a. **Figure 128:** 1990-1991 models.
- b. **Figure 129:** 1992-1993 models.
- c. **Figure 140:** all models.

1. Apply fork oil to all parts prior to installation.
2. Install a new guide bushing into the fork slider. Make sure it is correctly seated in the slider.
3. Install the steel ring on top of the guide bushing.
4. Apply a light coat of grease to the oil seal.
5. Position the new oil seal with the spring on the shaft sealing ring facing up.
6. Using a hammer and a socket that matches the outer diameter of the fork oil seal, carefully tap the oil seal squarely into the fork slider. Tap it in until the groove for the snap ring is visible above it.
7. Install the snap ring to secure the oil seal in the slider. Make sure the snap ring is correctly seated in the slider groove.
8. Apply a light coat of grease to the dust seal, then press the dust seal into the fork slider. Press it down until it is completely seated in the slider.
9. On 1990-1991 models, if the damper rod assembly was disassembled, refer to **Figure 131** and assemble it as follows:

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- a. Position the damper rod on the workbench with the correct end up.
- b. Position the lower taper ring with the larger diameter side going on first and slide it onto the top of the damper rod.
- c. Install the spring, valve disc and O-ring.
- d. Install the circlip and make sure it is correctly seated in the groove.
- e. Install the spring.
- f. Position the upper taper ring with the smaller diameter side going on first and slide it onto the damper rod.
- g. Install the piston and piston ring assembly.

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h. Install the circlip and make sure it is correctly seated in the groove.

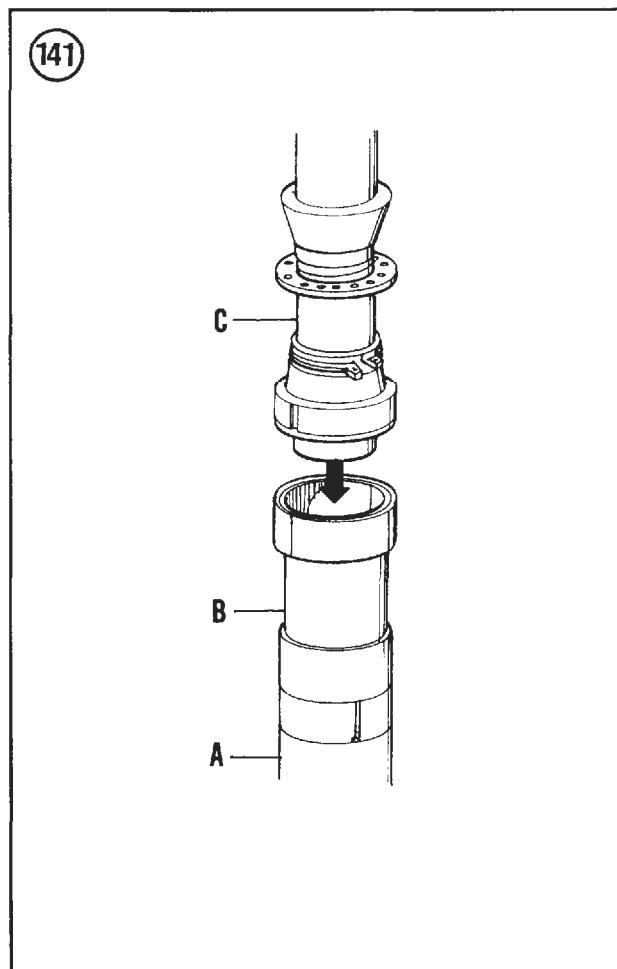
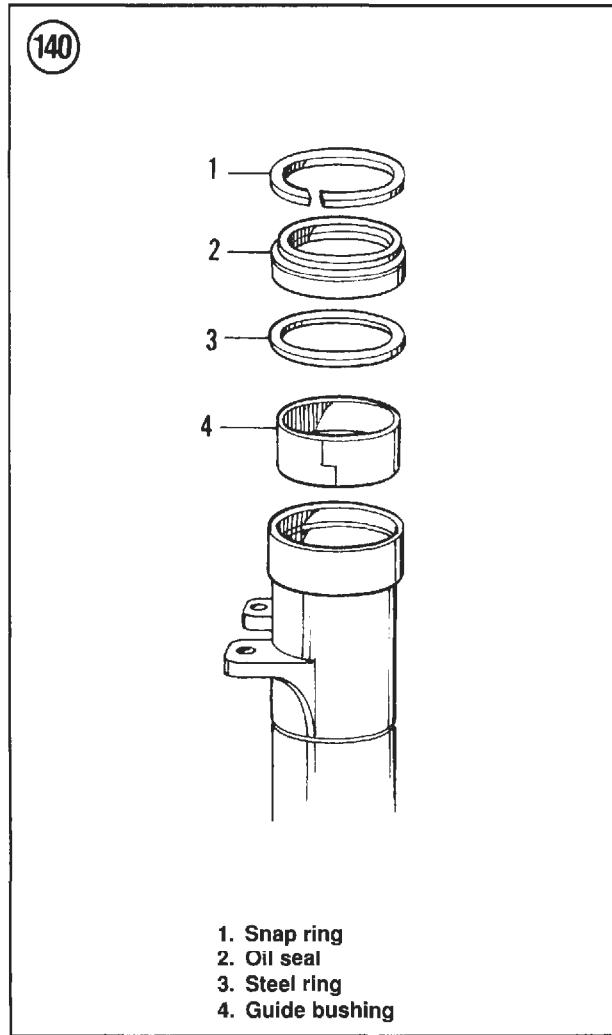
10A. On 1990-1991 models, refer to **Figure 141** and perform the following:

- Install the fork tube (A, **Figure 141**) *upside down* in a vise with soft jaws with the lower end (non-threaded end) facing up.
- Install the BMW Slip Sleeve special tool (part No. 31 4 710) (B, **Figure 141**) into the fork slider.
- Insert the piston end of the damper rod assembly (C, **Figure 141**) into the slip sleeve. After the piston assembly has passed through the slip sleeve, remove the slip sleeve.
- Push the damper rod assembly down into the fork tube until it stops.
- Position the valve body (A, **Figure 142**) with the larger inner diameter end going in first and install it into the fork tube (B, **Figure 142**).
- Install the shim and circlip (C, **Figure 142**) and make sure the circlip is correctly seated in the fork tube groove.

10B. On 1992-1993 models, install the damper cartridge into the fork tube.

- Install the fork tube into slider.
- Using the front brake caliper mounting bosses, install the fork slider in a vise with soft jaws.
- Make sure the O-ring seal is on the base valve bolt and install the base valve bolt and O-ring seal into the bottom of the slider (**Figure 143**) and into the damper rod or damper cartridge. Tighten the bolt to the torque specification listed in **Table 8**.
- On 1990-1991 models, refer to **Figure 144** and perform the following:

- Install the spring and spring seat assembly, support tube, spacer and shim into the fork tube.
- Push down on the fork spring and install the fork top cap. Use an open end wrench and tighten to the torque specification listed in **Table 8**.



- 14B. On 1992-1993 models, perform the following:
 - a. Install spring and spring seat assembly and the support tube into the fork tube.
 - b. Install the spacer and snap ring. Make sure the snap ring is properly seated in the fork tube groove.
 - c. Install the shim.
 - d. Compress the damper cartridge into the fork tube and install the clamp ring onto the end of the damper cartridge. Make sure it is properly seated.
 - e. Install the shim.
 - f. Push down on the fork spring and install the fork top cap. Use an open end wrench and tighten to the torque specification listed in **Table 8**.
15. Make sure the washer is in place and securely tighten the drain screw.
16. Add the recommended type and specified amount of fork oil through the small opening in the fork top cap. Refer to **Table 9** for fork oil capacity.
17. Hold onto the fork top cap with an open end wrench and install the oil fill plug. Tighten the plug securely.
18. Install the fork assembly as described in this chapter.
19. Repeat for the other fork assembly.

FRONT FORK (K1100LT, K1100RS)

Removal

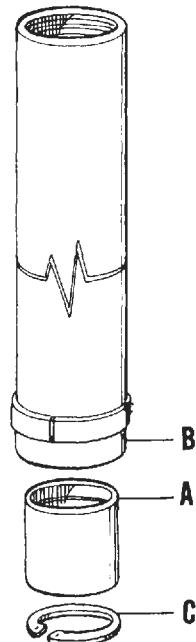
1. Remove the engine spoiler as described in the Chapter Thirteen section of this supplement.
2. Place the bike on the centerstand or place wooden blocks under the engine oil pan to support it securely with the front wheel off the ground.

NOTE

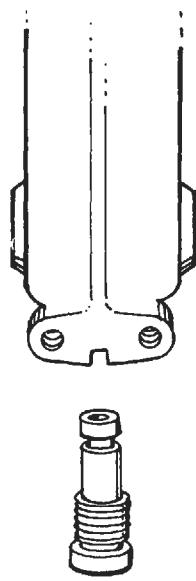
The ABS electronic trigger sensor is attached to the left-hand fork slider. Do not damage the sensor during caliper removal.

3. Remove the front fender (A, **Figure 145**) as described in Chapter Ten in the main body of this book.
4. Remove the brake caliper assembly mounting bolts (B, **Figure 145**) from the front fork on each side. Both caliper assemblies must be removed.
5. Slide both caliper assemblies off of the brake discs.
6. Insert a piece of vinyl tubing or wood in the calipers in place of the brake disc. That way if the brake lever is inadvertently squeezed, the pistons will not be forced out of the cylinders. If this does happen, the calipers may have to be disassembled to reseat the pistons and the system will have to be bled.
7. Remove the front wheel as described in this section of the supplement.

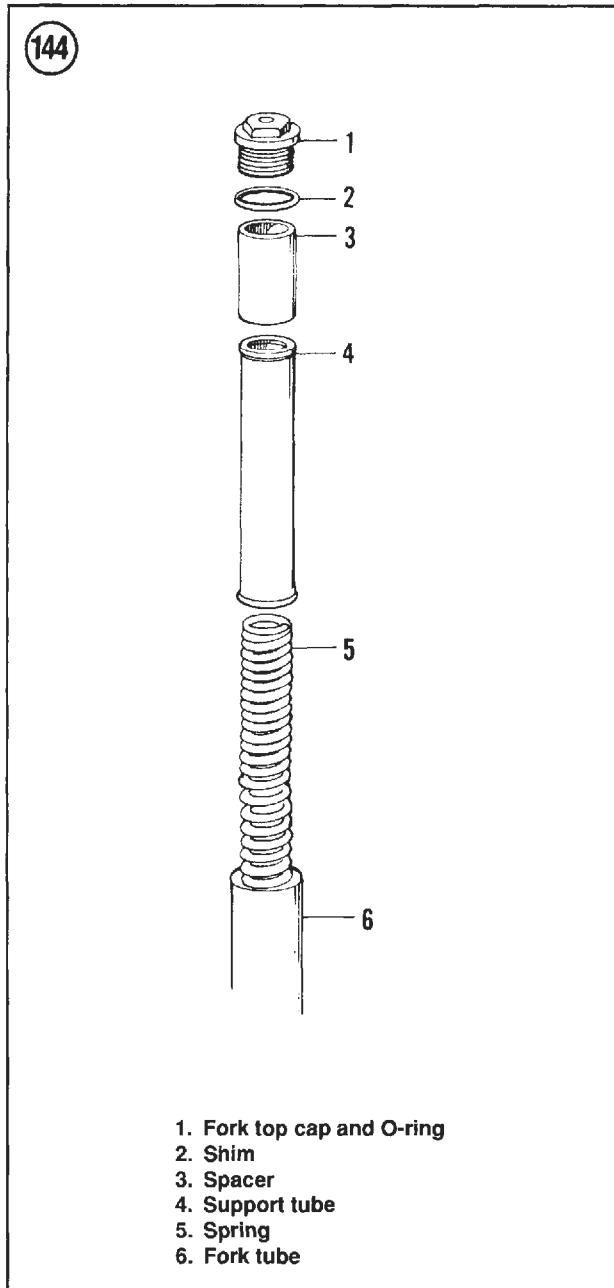
142



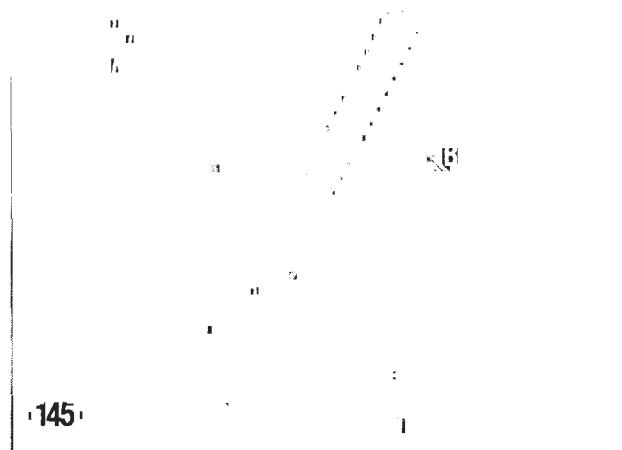
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8. Remove the front fairing knee pads and inner covers as described in the Chapter Thirteen section of this supplement.
9. Separate the ABS sensor plug connector (C, **Figure 145**) and remove the sensor from the fork slider.
10. Remove the cable straps (D, **Figure 145**) securing the ABS sensor line and brake line to the left-hand slider.
11. Pull the ABS sensor line out and downward out of the slot in the front fork stabilizer.



12. Remove the bolt securing the brake joint to the top of the front stabilizer. Move the brake line assembly back and out of the way.
13. Remove the bolts and washers securing the front stabilizer to both fork sliders.
14. Move the front stabilizer and the front brake ABS sensor line back away from the fork assemblies and secure this assembly to the frame.
15. If the fork assembly is going to be disassembled for service, perform the following:
 - a. Loosen the upper fork bridge bolts--do not loosen the lower fork bridge bolts at this time.
 - b. Loosen, but do not remove, the fork top cap. It is a lot easier to loosen the fork top cap with the fork tube secure on the lower fork bridge.
16. Loosen the upper and lower fork bridge bolts (**Figure 146**).
17. Lower the fork assembly down and out of the upper and lower fork bridge. It may be necessary to slightly rotate the fork tube while pulling it out. Remove both fork assemblies.



Installation

- Clean off any corrosion or dirt from the upper and lower fork bridge fork receptacles.

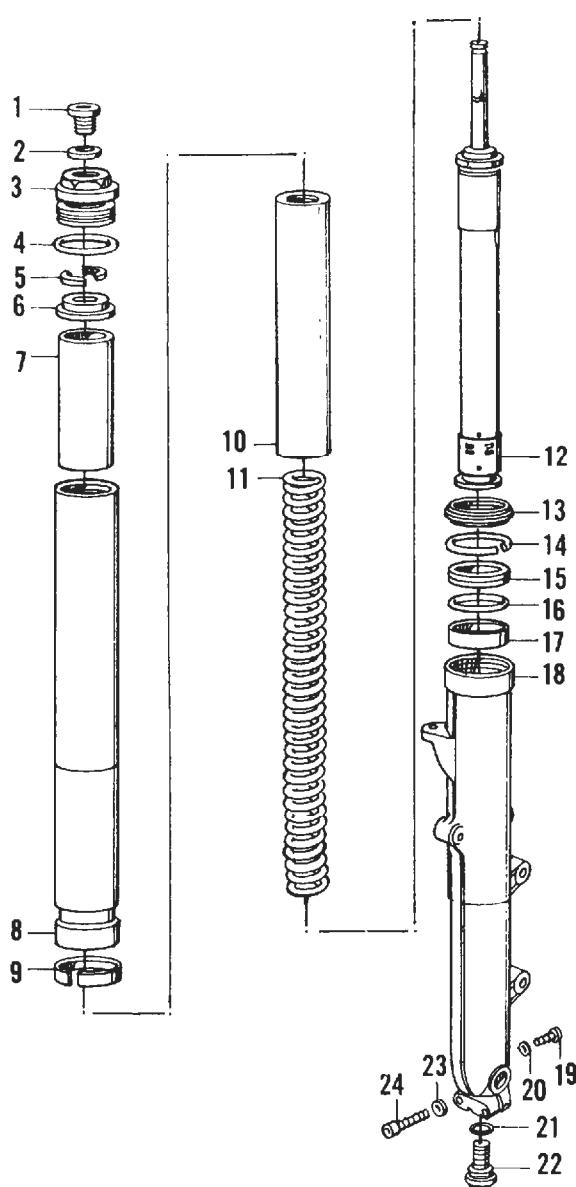
NOTE

The fork assemblies must be reinstalled on the correct side of the bike so the brake calipers, the front fork stabilizer and the front fender

can be installed. If the fork assemblies are installed on the wrong side these components cannot be installed onto the fork sliders.

- Install the fork assemblies on the correct side. Install the fork tubes up through the lower and upper fork bridges.
- Push the fork tube up until the top surface is 210 mm (8.27 in.) above the top surface of the lower fork bridge.

(147)



FRONT FORK (K1100LT, K1100RS MODELS)

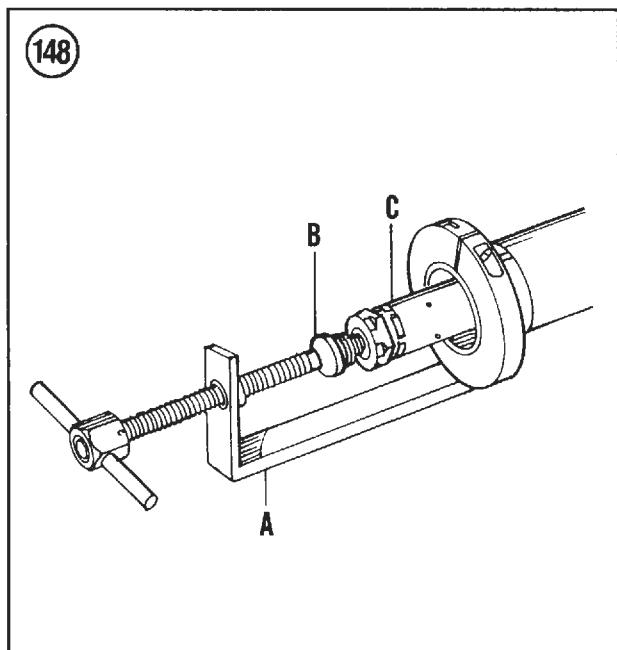
- Oil filler plug
- O-ring
- Fork top cap
- O-ring
- Retainers
- Perforated disc
- Spacer
- Fork tube
- Guide bushing
- Guide sleeve
- Spring
- Damper cartridge
- Dust seal
- Snap ring
- Oil seal
- Shim
- Guide bushing
- Fork slider
- Drain bolt
- Washer
- O-ring
- Bolt
- Washer
- Bolt

4. Tighten the upper and lower fork bridge clamping bolts to the torque specification listed in **Table 8**.
5. Move the front stabilizer and ABS sensor line back into position on the forks.
6. Install the bolts and washers securing the front stabilizer to both fork sliders.
7. Move the brake line assembly back into position and install the bolt. Tighten the bolt securely.
8. Install the cable straps securing the ABS sensor line and brake line to the slider.
9. Install the ABS sensor and connector the plug connector.
10. Install the front fairing knee pads and inner covers.
11. Remove the pieces of vinyl tubing or wood from the calipers.
12. Install the front wheel as described in this chapter.

NOTE

The ABS electronic trigger sensor is attached to the left-hand fork slider. Do not damage the sensor during caliper installation.

13. Install both brake caliper assemblies and tighten the mounting bolts to the torque specification listed in **Table 8**.
14. Install the front wheel and the front fender.
15. Remove the wood blocks from under the oil pan.
16. Install the engine spoiler.



Disassembly

To simplify fork service and to prevent the mixing of parts, the legs should be disassembled and assembled individually.

Refer to **Figure 147** for this procedure.

1. Drain the fork oil as follows:
 - a. Remove the plug and O-ring from the fork top cap.
 - b. Position the fork assembly in an upright position and remove the drain screw and washer from the slider.
 - c. Allow the fork oil to drain out into the drain pan. Compress the fork assembly by hand several times to expel the residual fork oil. Discard the fork oil properly.
 - d. Reinstall the plug and the drain screw and washer to avoid misplacing them.
2. Using the front brake caliper mounting bosses, clamp the slider in a vise with soft jaws.

NOTE

The base valve bolt is often very difficult to remove because the damper rod will turn inside the slider. It sometimes can be removed with an air impact driver. If you are unable to remove it, take the fork tubes to a dealer and have the bolts removed.

3. Loosen the base valve bolt on the bottom of the slider.
4. Remove the fork slider from the vise.
5. Install the fork tube in a vise with soft jaws.
6. Remove the fork top cap with an open end wrench.
7. Remove the fork tube from the vise.
8. Turn the fork assembly over and pour out any residual fork oil and discard it.
9. Withdraw the fork tube from the slider.
10. Install the special BMW tools onto the fork tube as follows:
 - a. Install the clamping fixture part No. 31 5 550 (A, **Figure 148**) onto the fork tube. Tighten the screw securely.
 - b. Install the insert part No. 31 5 553 (B, **Figure 148**) between the clamping fixture and the end of the damper cartridge (C, **Figure 148**).
 - c. Tighten the clamping fixture, compressing the spring and press the damper cartridge up into the fork tube. Press the damper cartridge up and out of the spacer until the perforated disc has moved away from the spacer. This is necessary to remove the retainers and the perforated disc in the next step.
11. Use a screwdriver to push the retainers apart, then remove the retainers (A, **Figure 149**) and the perforated disc (B, **Figure 149**) from the top end of the spacer (C, **Figure 149**).

12. Remove the spacer from the fork tube.
13. Remove the guide sleeve, spring and damper cartridge from the fork tube.
14. Remove the dust seal from the fork slider (**Figure 150**).
15. Carefully remove the snap ring, located above the oil seal, from the top of the fork slider.
16. Protect the edge of the fork slider with a piece of wood or plastic ring (A, **Figure 151**) to keep the screwdriver from making contact with the slider while prying out the oil seal.
17. Using a broad-tipped screwdriver (B, **Figure 151**), carefully pry the oil seal (C, **Figure 151**) out of the fork slider.
18. Remove the steel ring then, using both index fingers, remove the guide bushing from the top of the fork slider.
19. Inspect all parts as described in this chapter.

Inspection

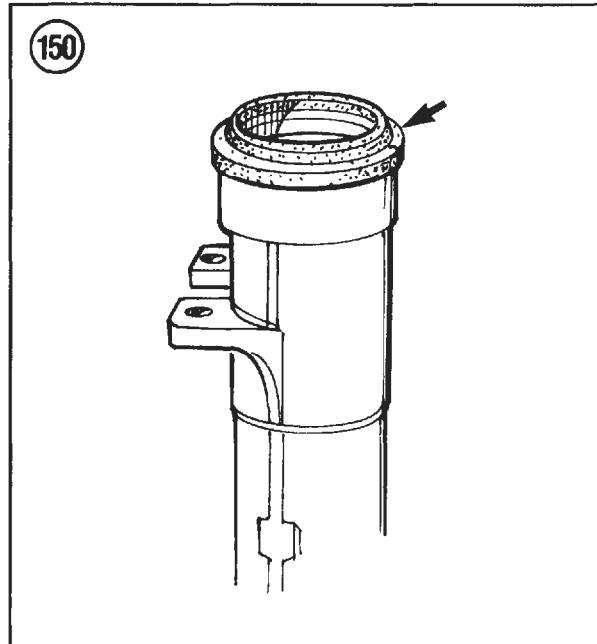
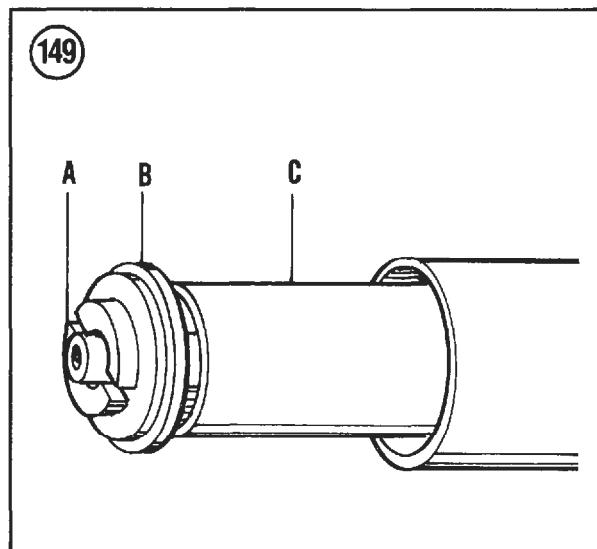
1. Thoroughly clean all parts in solvent and dry them. Check the fork tube for excessive wear or scratches.
2. Check the damper cartridge for straightness or damage. Replace if necessary.
3. Inspect the fork oil seal for wear or deterioration. Replace if necessary.
4. Check the fork tube for straightness (**Figure 134**). If bent or severely scratched, it should be replaced.
5. Check the slider (**Figure 135**) for dents or exterior damage that may cause the fork tube to hang up during riding. Replace if necessary.
6. Check the slider in the area where the fork seal is installed for wear or damage. Replace if necessary.
7. Check the axle bearing surfaces of the slider (**Figure 137**) for wear or gouges. Clean up the surfaces or replace the slider if necessary.
8. Inspect the axle clamping lugs (**Figure 138**) on the slider for cracks or fractures from over tightening the clamping bolts. If any cracks are found, replace the fork slider.
9. Inspect the spacer (**Figure 139**) for wear or damage. Replace if necessary.
10. Any worn or damaged parts should be replaced. Simply cleaning and reinstalling unserviceable components will not improve performance of the front suspension.

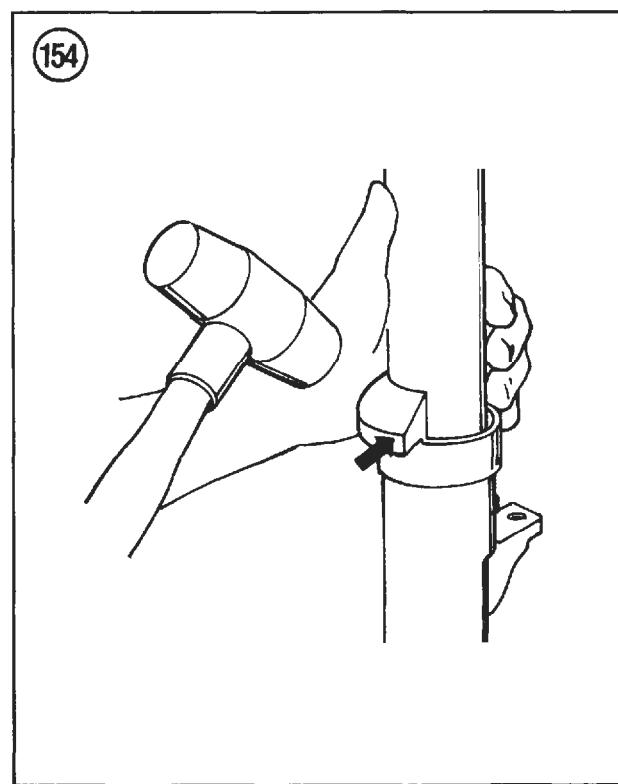
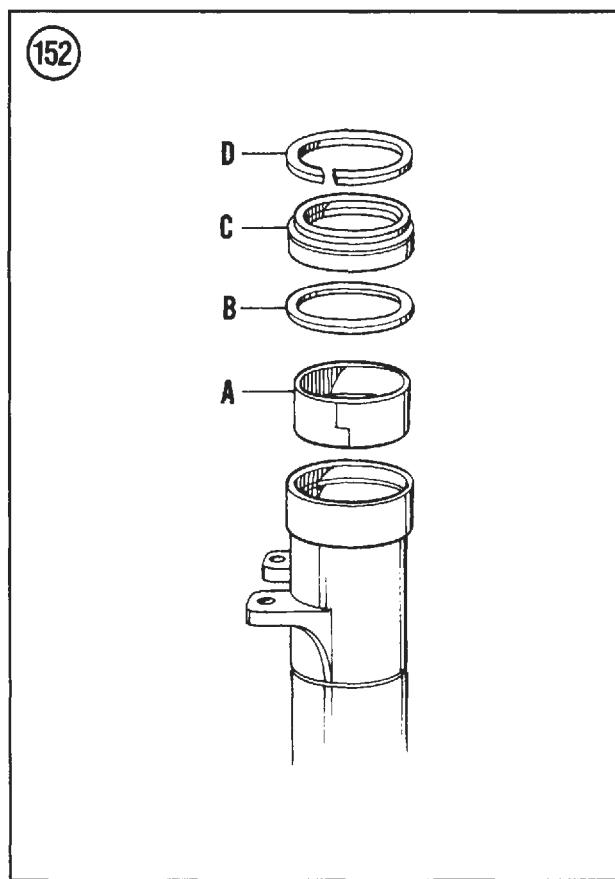
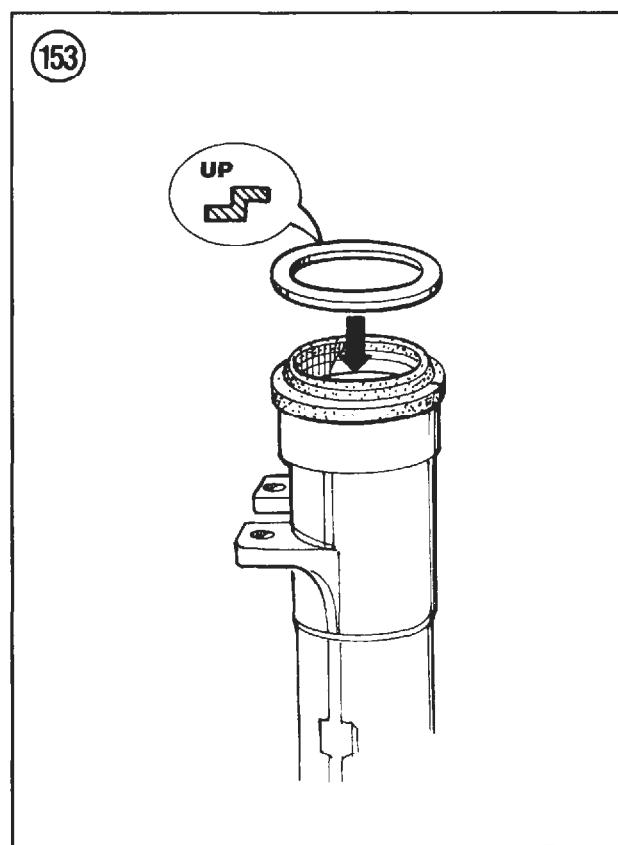
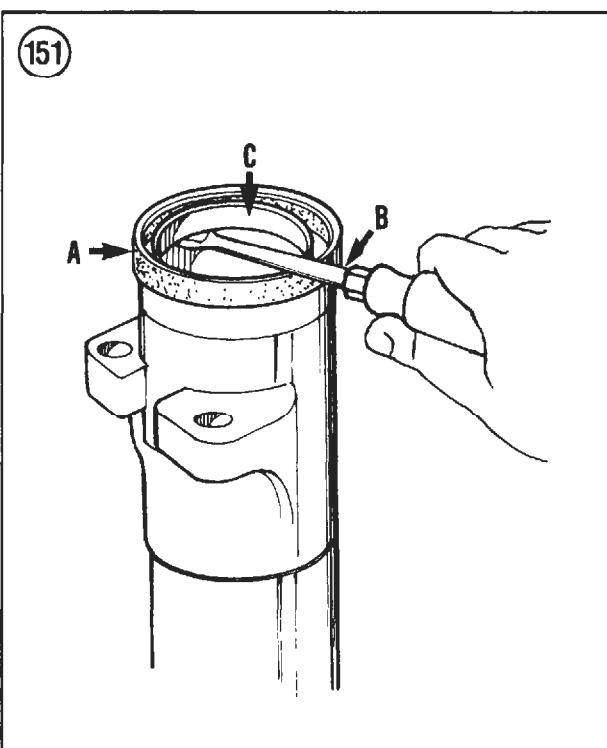
Assembly

Refer to **Figure 147** for this procedure.

1. Apply fork oil to all parts prior to installation.

2. Install a new guide bushing (A, **Figure 152**) into the fork slider. Make sure it is correctly seated in the slider.
3. Position the steel ring as shown in **Figure 153** and install the steel ring (B, **Figure 152**) on top of the guide bushing.
4. Apply a light coat of grease to the oil seal.
5. Position the new oil seal (C, **Figure 152**) with the spring on the shaft sealing ring facing up.
6. Use the BMW special tool (part No. 31 3 620) and a hammer and tap the oil seal into position (**Figure 154**).





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Carefully tap the oil seal squarely into the fork slider. Tap it in until the groove for the snap ring is visible above it.

7. Install the snap ring to secure the oil seal in the slider. Make sure the snap ring is correctly seated in the slider groove.

8. Apply a light coat of grease to the dust seal, then press the dust seal into the fork slider. Press it down until it is completely seated in the slider.

9. Position the spring with the closer wound coils toward the top and install the spring onto the damper cartridge.

10. Install the guide sleeve onto the top of the spring.

11. Install the fork tube in a vise with soft jaws.

12. Install the damper cartridge assembly into the lower end of the fork tube.

13. Install the special BMW tools onto the fork tube as follows:

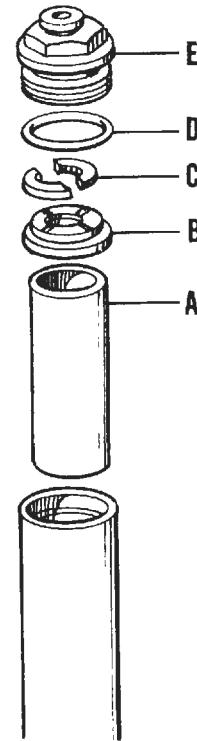
- a. Install the clamping fixture part No. 31 5 550 (A, **Figure 148**) onto the fork tube. Tighten the screw securely.
- b. Install the insert part No. 31 5 553 (B, **Figure 148**) between the clamping fixture and the end of the damper cartridge (C, **Figure 148**).
- c. Tighten the clamping fixture, compressing the spring and press the damper cartridge up into the fork tube. Press the damper cartridge up and out of the top of the fork tube.
- d. Install the spacer (A, **Figure 155**) onto the damper cartridge.
- e. Position the perforated disc (B, **Figure 155**) with the smooth side facing down and install the disc onto the top of the spacer.
- f. Check that the end of the damper cartridge is pressed in far enough to install the retainers into the groove. If necessary, apply more pressure on the clamping fixture and move the end out farther.
- g. Apply small amount of cold grease to the retainers (C, **Figure 155**) to hold them in place, then install the retainers into the perforated disc and into the groove in the end of the damper cartridge. Make sure the retainers are positioned correctly in both parts.
- h. Keep the retainers in place, then slowly release the clamping fixture to allow the damper cartridge to move down into the fork tube.
- i. Completely release the clamping fixture pressure on the damper cartridge. Remove the clamping fixture from the fork tube.

14. Install the fork tube into slider.

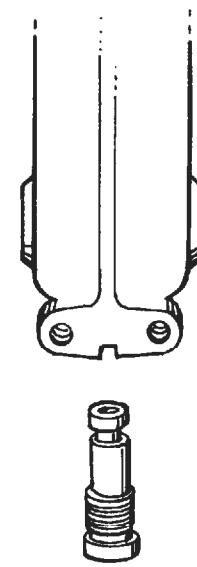
15. Using the front brake caliper mounting bosses, install the fork slider in a vise with soft jaws.

16. Make sure the O-ring (D, **Figure 155**) is in place on the fork top cap then install the fork top cap (E, **Figure**

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155). Tighten the fork top cap to the torque specification listed in **Table 8**.

17. Make sure the O-ring seal is on the base valve bolt and install the base valve bolt and O-ring seal into the bottom of the slider (**Figure 156**) and into the damper rod or damper cartridge. Tighten the bolt to the torque specification listed in **Table 8**.

18. Make sure the washer is in place and securely tighten the drain screw.

19. Add the recommended type and specified amount of fork oil through the small opening in the fork top cap. Refer to **Table 9** for fork oil capacity.

20. Hold onto the fork top cap with an open end wrench and install the oil fill plug. Tighten the plug securely.

21. Install the fork assembly as described in this chapter.

22. Repeat for the other fork assembly.

Table 8 FRONT SUSPENSION TORQUE SPECIFICATIONS

Item	N·m	ft.-lb.
Front axle		
Allen bolt	33	24
Clamp bolts	14	10
Front caliper mounting bolts	32	25
Steering damper tapered bolts	6.9	5
Fork bridge clamping bolts	14.7-15.5	10.8-11
Front fork brace bolts or nuts	19-23	14-17
Fork slider base valve bolts	43.5-50.5	32-37.2
Fork oil drain bolt	16-24	11.7-17.6
Fork top cap bolt	16-24	11.7-17.6
Fork oil fill plug	12.6-15.4	9.3-11.3

Table 9 FRONT FORK OIL TYPE AND QUANTITY

Model	Quantity	Type
K75 models (1992-on)	410 cc (13.8 oz.)	BMW fork oil, ESSO Komfort
K100 models	400 cc (13.5 oz.)	
K1100 models		
Left-hand leg	349-351 cc (11.7-11.8 oz.)	
Right-hand leg	399-401 cc (13.4-13.6 oz.)	