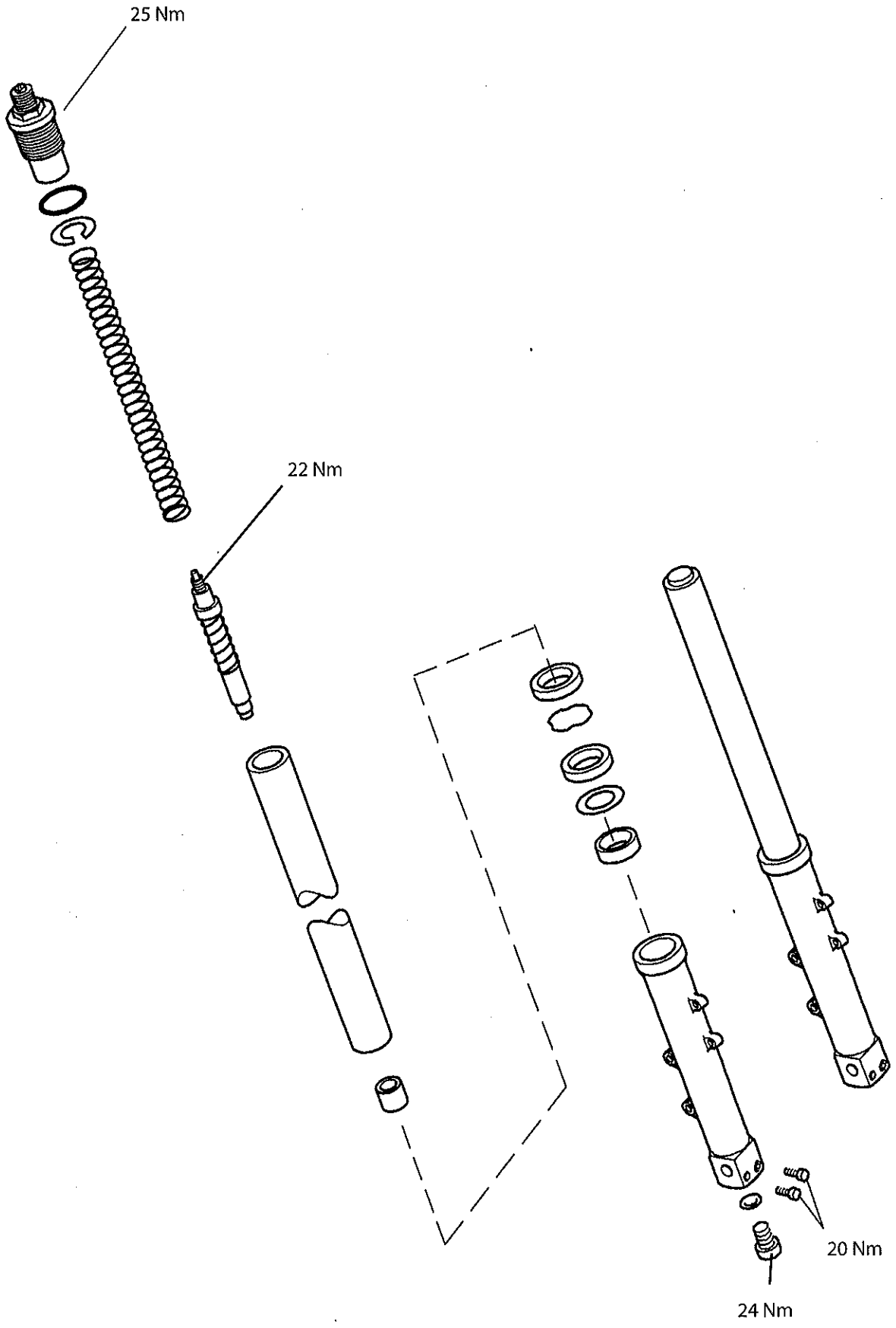
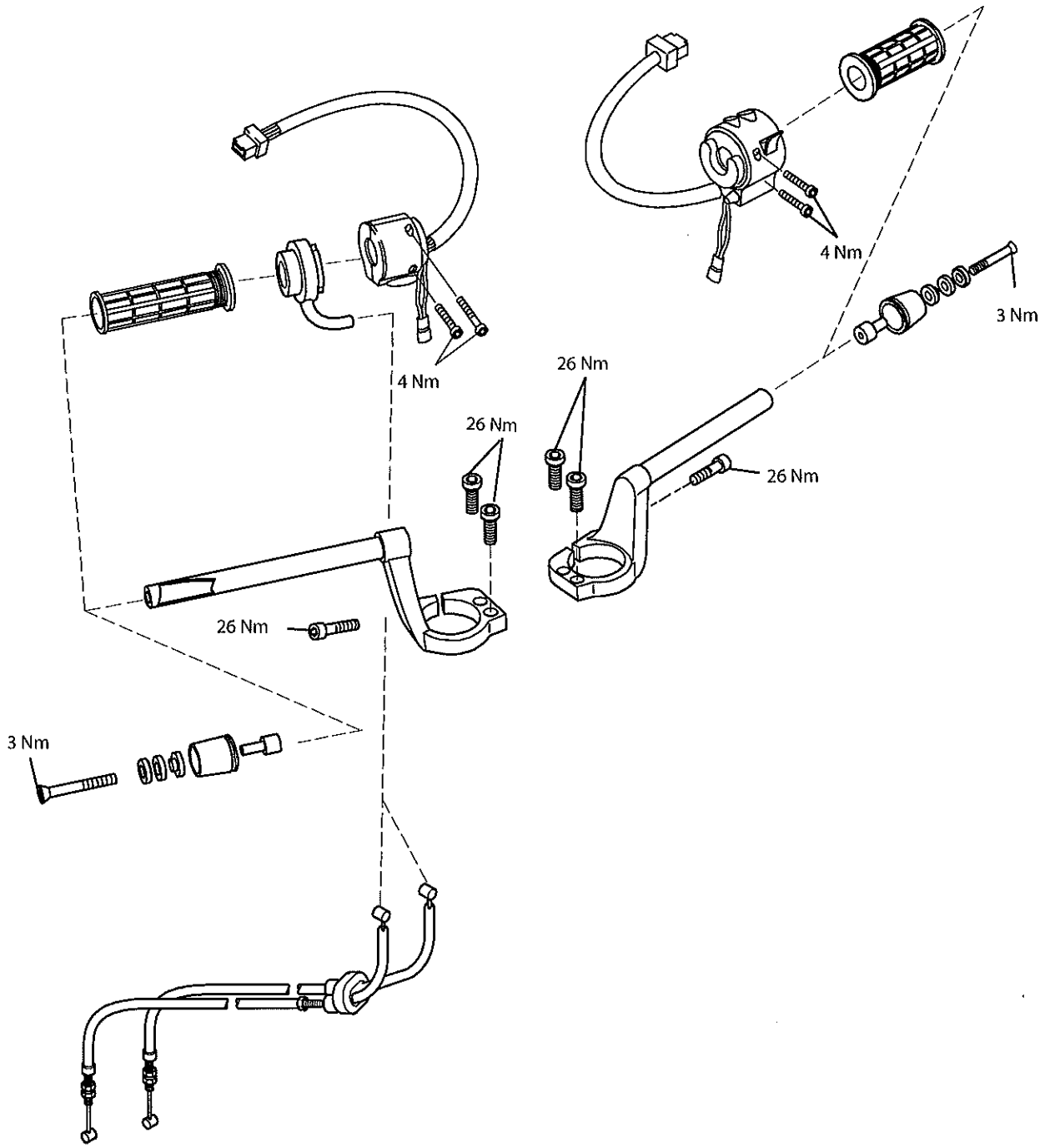
13 Front Suspension

Table of Contents

Exploded View - Front Fork



Exploded View - Handlebars

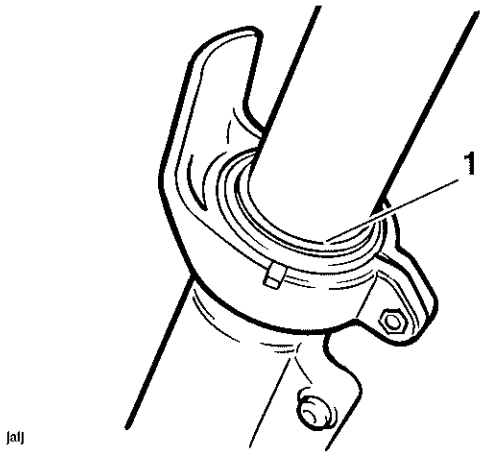


Front Suspension

The motorcycle is equipped with hydraulic, telescopic front forks which are adjustable for spring pre-load. Periodic inspection for damage and fluid leaks is essential for safe riding. Always follow the inspection instructions at the intervals stated in the scheduled maintenance chart.

Fork Inspection

1. Visually inspect the fork inner tube assembly for rust and damage. Repair or replace as necessary.
2. Visually inspect the dust/oil seal areas for signs of damage and fluid leaks. If oil leaks are found, the fork must be stripped and overhauled or replaced completely.



1. Fork Seal Area

3. Check for smooth operation of the forks as follows:
   - Place the motorcycle on level ground.
   - While holding the handlebars and applying the front brake, pump the forks up and down several times.

Warning

If roughness or excessive stiffness is detected, investigate the cause and take the necessary remedial action before riding the motorcycle.

Riding the motorcycle with defective or damaged suspension can damage the motorcycle, cause loss of control, or an accident.

Never ride with damaged or defective suspension.

Warning

All suspension units contain pressurised oil. Always wear eye, face and skin protection during fork disassembly.

Fork Oil

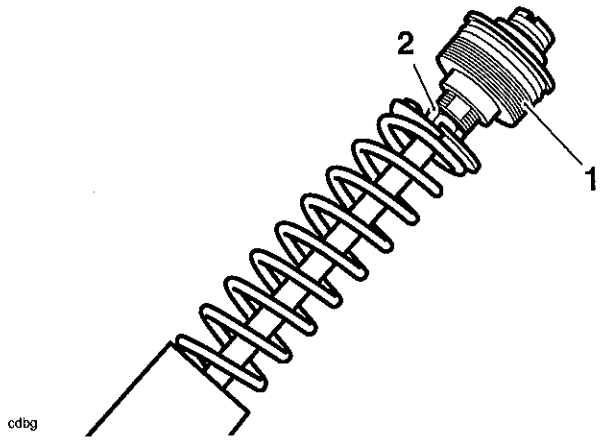
Oil change

1. Remove the fork assembly (see page *13-9*).

Note:

- **To aid removal, slacken but do not remove the top cap before releasing the fork from the yoke.**

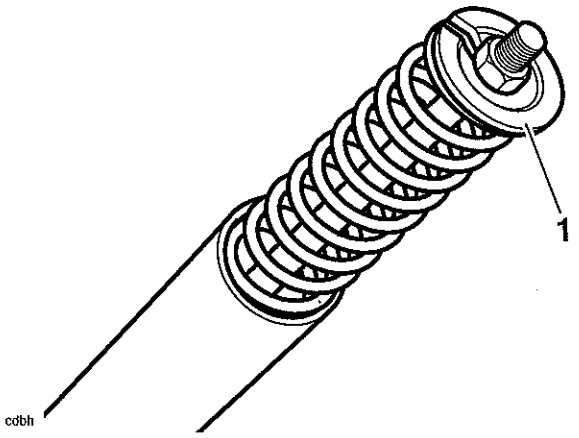
2. Unscrew the fork cap from the inner tube. Release the locknut on the damper rod to allow the top cap to be removed completely. Discard the cap 'O' ring.



1. Fork cap
2. Locknut

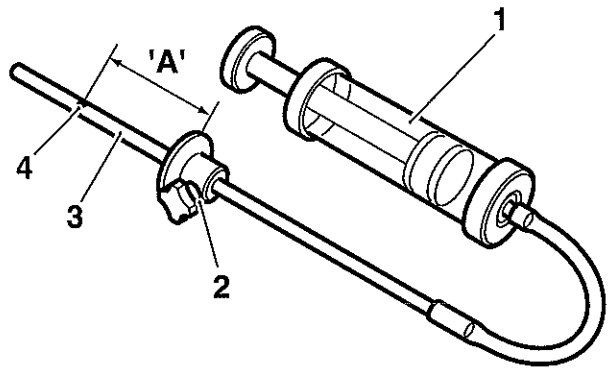
3. Raise the damper rod slightly and remove the dished, slotted washer from the upper end of the spring,

4. Remove the spring.



1. Dished, slotted washer

5. Invert the fork assembly and allow all the oil to drain into a suitable container. Turn the fork back to an upright position.
6. Fill the fork with the grade of oil specified in the fork oil table, to a level slightly above that which will finally be required.
7. Set the scale on tool 3880160-T0301 to the level specified for the model being worked on (see the fork oil table for the correct level setting or the illustration following paragraph 8).



1. Tool 3880160-T0301
2. Adjustment Plate
3. Scale Area
4. Hole (zero position)

Note:

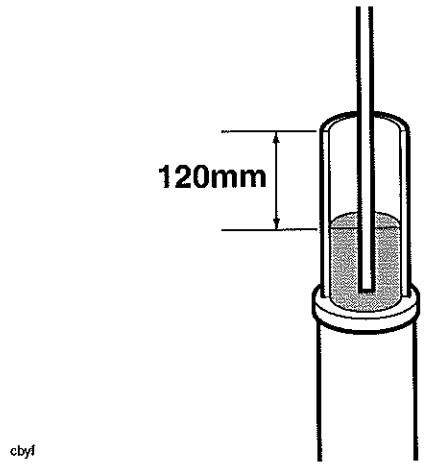
- **Zero level on the tool is set at the small exit hole in the side of the scale tube, NOT AT THE END TIP. Do not attempt to block this side hole as this will cause the final fluid level to be incorrect.**

8. Operate the fork several times to expel any trapped air from the valves, then fully compress the fork.

Warning

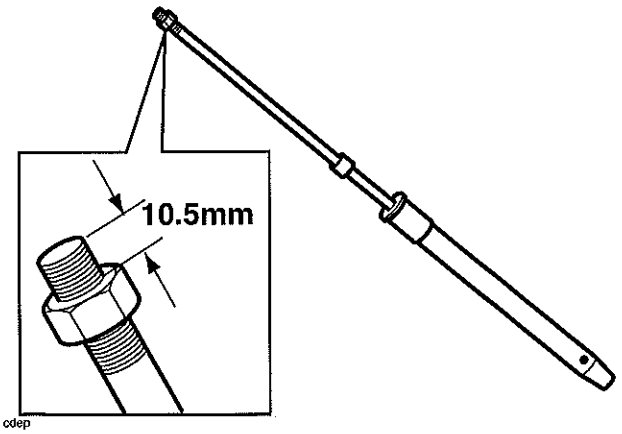
Incorrect tool adjustment and/or failure to keep the tool level with the fork slider will affect the final fluid level setting.

Incorrect fork oil levels could result in an unsafe riding condition leading to loss of control and an accident.



1. Fork Oil Level Setting (fork fully compressed)

9. Insert the scale end of the tool into the fork inner tube.
10. Hold the tool adjuster plate level with the upper surface of the fork inner tube and draw fluid into the syringe until fluid flow ceases (empty the syringe if the body becomes full before fluid flow stops).
11. The fluid level in the fork is now set to the height set on the tool scale. Check the tool scale setting and repeat the process if incorrectly set.
12. Check that the locknut remains in the position shown in the diagram below. Adjust as necessary.



13. Refit the spring, closed coils down.

14. Fit a new 'O' ring to the fork cap, and fit the cap to the damper rod.
15. Prevent the cap from turning by holding the inner flats then tighten the locknut to **22 Nm**.
16. Screw the fork cap into the inner tube, tightening down by hand as far as possible.
17. Refit the fork as described in 'front fork Installation'.
18. Tighten the fork cap to **25 Nm**. Check that the preload height adjustment remains at the mark noted prior to dismantling.

Fork Oil Level Chart

Oil Level*	Oil Volume	Oil Grade	Fork Pull Through
120 mm	469 cc	SAE 10W	Top of the inner tube flush with upper face of the handlebar

Warning

Any variation in fork oil level from the figures quoted above could result in an unsafe riding condition leading to loss of control and an accident.

Front Fork

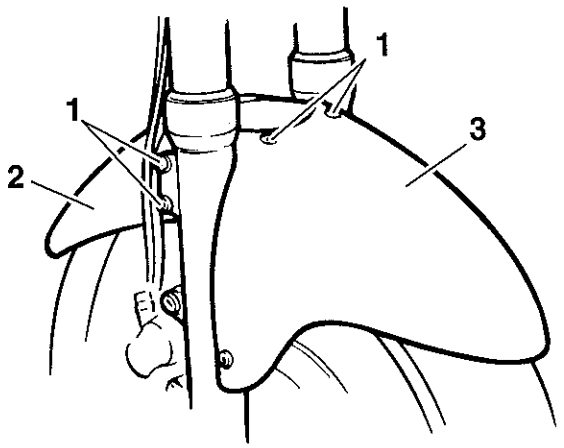
Removal

1. Raise and support the front of the motorcycle.

Warning

Ensure the motorcycle is stabilised and adequately supported, to prevent it falling and causing damage or injury.

2. Remove the front wheel (see page *15-6*).
3. Models with ABS brakes: Remove the front wheel speed sensor (see page *14-29*).
4. Remove both sections of the front mudguard.



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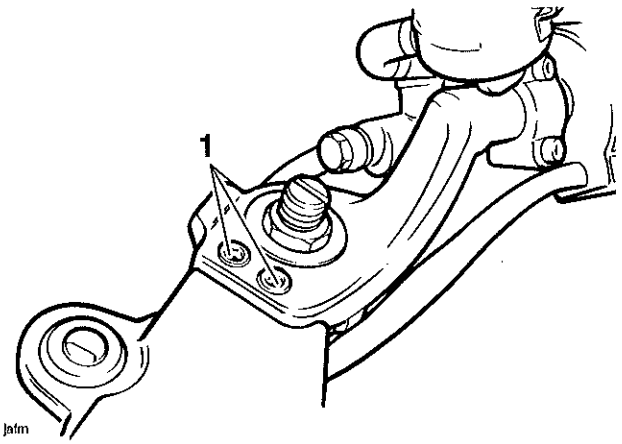
1. Mudguard fixings
2. Rear Section
3. Front Section

5. Release the handlebar fixings but do not remove the handlebars.



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1. Handlebar Fixings

Note:

- **If the fork is to be dismantled, slacken the fork cap (at the top of the fork) and the damping cylinder securing bolt (at the bottom) before releasing the yoke clamps.**

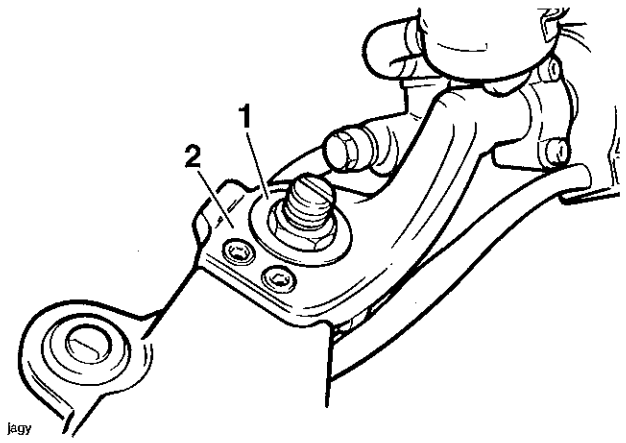
Caution

After slackening the damping cylinder securing bolt, lightly secure it again to prevent oil escaping.

6. Slacken but do not remove the pinch bolts on the top and bottom yokes and, using a downward twisting motion, slide the fork out from the yokes.

Installation

1. Fit the forks into the yokes and adjust the fork height such that the top of the fork inner tube is flush with the top face of the handlebars.



1. Fork Inner Tube
2. Handlebar Upper Face

2. Tighten the top and bottom yoke pinch bolts to **20 Nm.**
3. Tighten the handlebar clamp bolts to **26 Nm.**
4. Fit the mudguard and tighten the mudguard fixings to **5 Nm.**
5. Models with ABS brakes: Refit the front wheel speed sensor (see page *14-29*).
6. Fit the front wheel (see page *15-7*).

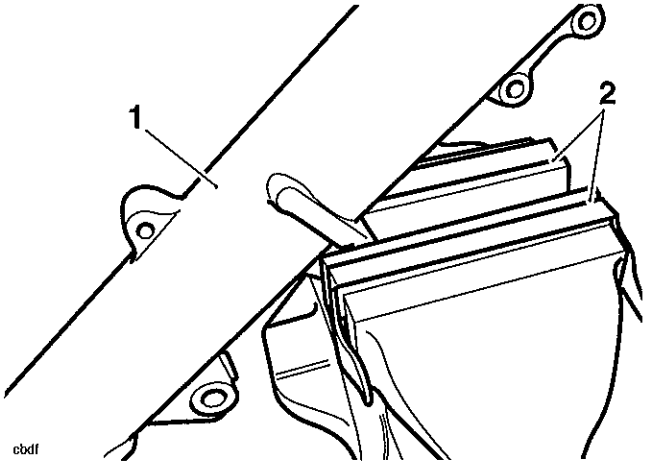
Fork Dismantling/Assembly

Dismantling

Caution

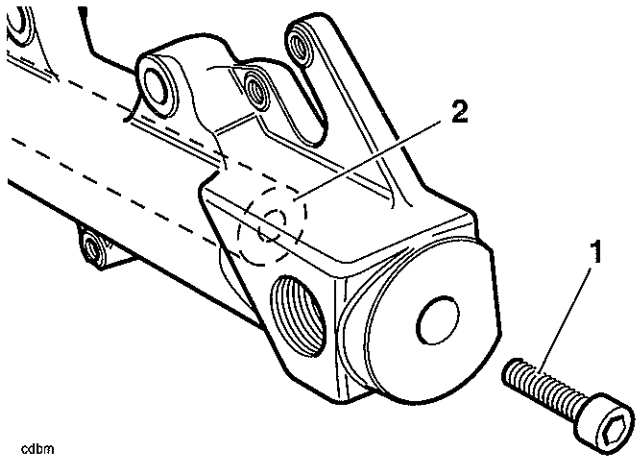
If securing the fork in a vice use the caliper mounting points. Never clamp directly onto the tube as this will cause irreparable damage.

1. Secure the fork by its calliper mountings in a soft jawed vice, taking care not to mark or damage the mountings.



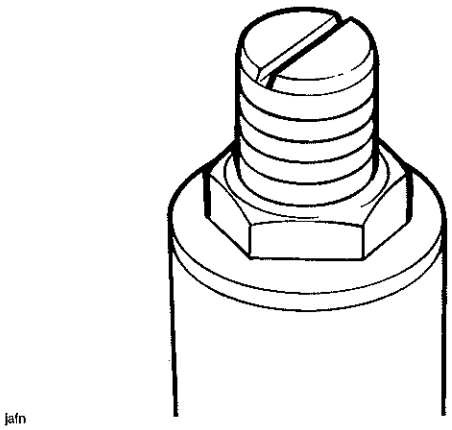
1. Fork
2. Soft jaws

2. If not already done, release the torque on the damping cylinder bolt, then lightly re-tighten it to prevent oil loss.



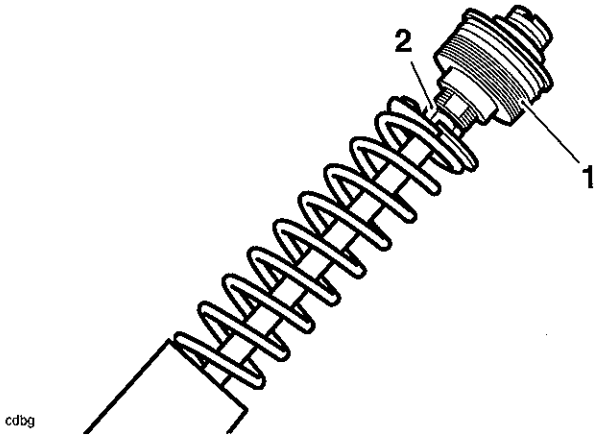
1. Bolt
2. Damping Cylinder

3. Note the position of the preload adjuster relative to the fork cap to ensure the setting is retained on re-assembly.



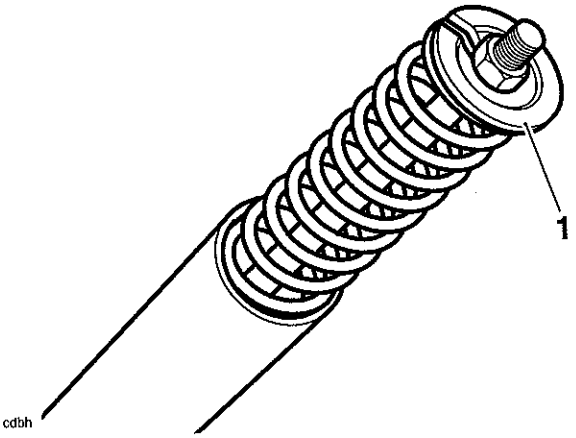
Preload adjuster marks

4. Unscrew the fork cap from the inner tube. Release the locknut on the damper rod to allow the top cap to be removed completely. Discard the cap 'O' ring.



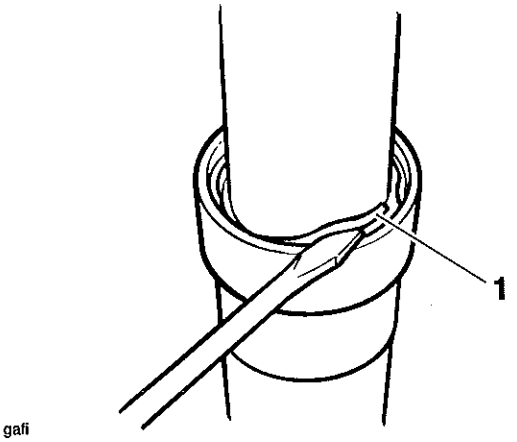
1. Fork cap
2. Locknut

5. Raise the damper rod slightly and remove the dished, slotted washer from the upper end of the spring,



1. Dished, slotted washer

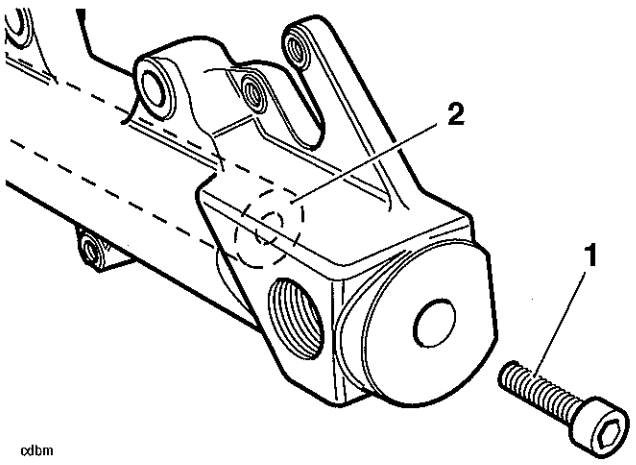
6. Remove the spring.
7. Drain the oil from the fork by removing it from the vice and inverting over a suitable container.
8. Return the fork to the vice.
9. Prise out the dust seal from the outer tube and remove the circlip from beneath the seal.



1. Circlip

10. Remove the damping cylinder securing bolt from the lower end of the assembly. Discard the copper washer.

11. Remove the damping cylinder.



1. Damping cylinder bolt
2. Damping cylinder

12. Pull sharply upwards on the inner tube to release it from the outer tube and remove the seal, washer and bush.

Note:

- **The oil lock at the base of the outer tube may be removed, if necessary, by pushing the oil lock upwards through the damping cylinder bolt-hole. Always renew the oil lock `O' ring if the lock is removed.**

Inspection

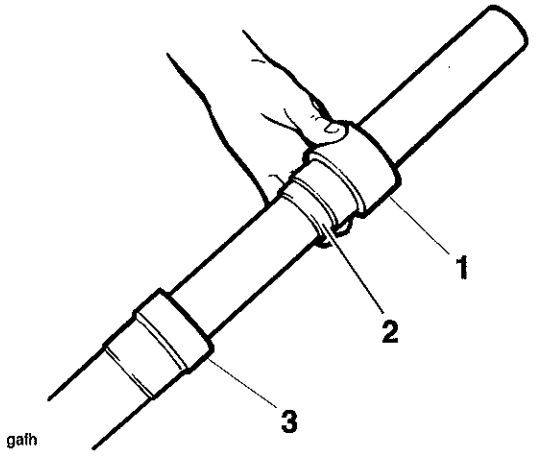
1. Thoroughly clean and examine all components for damage, wear, scoring, corrosion etc. Renew as necessary.
2. Always renew the oil and dust seals.

Assembly

Warning

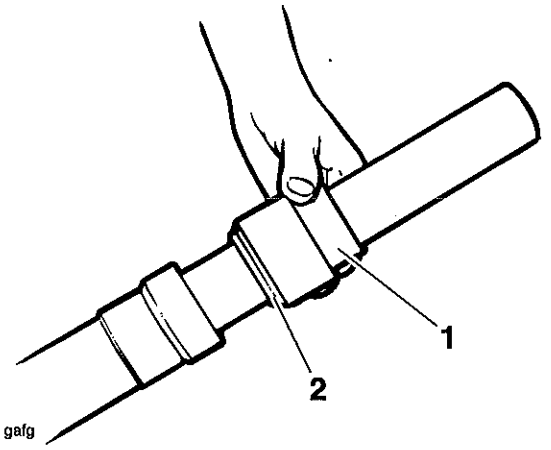
The front forks comprise many precision-machined parts. Total cleanliness must be observed at all times and assembly must take place in a dirt/dust-free environment. Dirt ingress may cause damage to the fork parts, leading to incorrect operation, instability, loss of control or an accident.

1. Fit the inner tube into the outer tube.
2. Fit the bearing over the inner tube.
3. Slide the bearing down the tube and tap it into its location in the outer tube using the smaller diameter end of tool 3880080-T0301.



1. Tool 3880080-T0301
2. Bearing
3. Outer tube

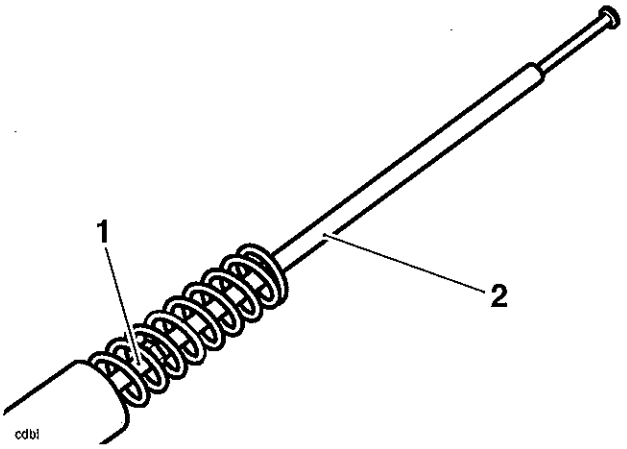
4. Fit the washer.
5. Lubricate a new oil seal and fit it into the outer tube (text face upwards). Tap it into position again using the smaller diameter end of tool 3880080-T0301.
6. Secure the assembly with the circlip
7. Fit a new dust seal (spring band upwards) over the inner tube, tapping it into position in the outer tube using the larger diameter end of tool 3880080-T0301.



1. Tool 3880080-T0301
2. Dust seal

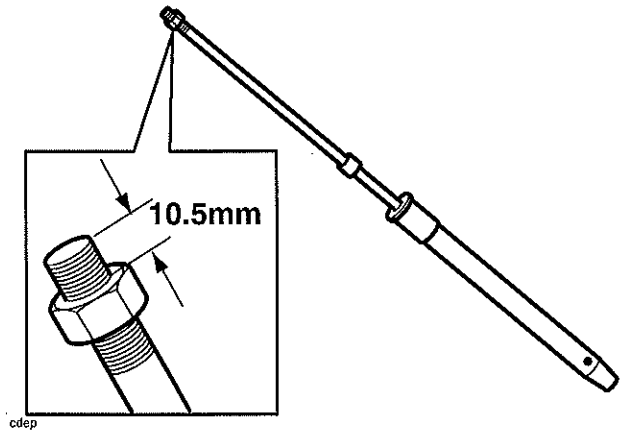
8. Fit a new copper washer to the damper bolt.
9. Locate the damping cylinder in the fork inner tube and secure with the bolt in the base of the outer tube. Fit a new washer to the bolt.
10. Fill the fork with the specified grade of oil, as described in the section `Fork Oil Change'.
11. Fit the spring, close coils downward.

12. Raise the damper rod, using tool 3880085-T0301 if necessary, and fit the slotted washer.



1. Damper rod
2. Tool 3880085-T0301

13. Check that the locknut remains in the position shown in the diagram below. Adjust as necessary.



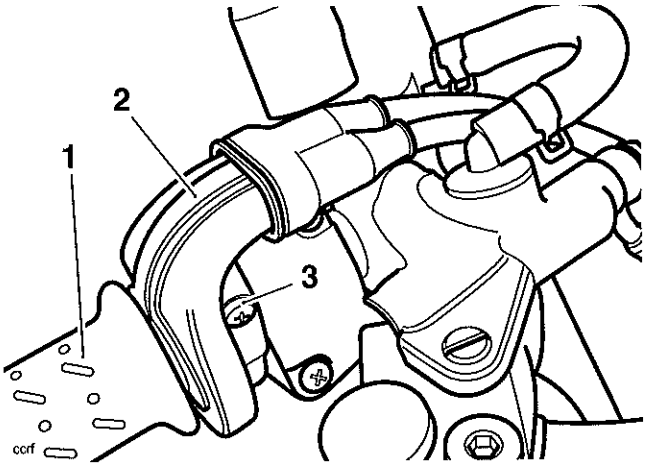
14. Fit a new 'O' ring to the fork cap, and fit the cap to the damper rod.
15. Prevent the cap from turning by holding the inner flats then tighten the locknut to **22 Nm**.
16. Screw the fork cap into the inner tube, tightening down by hand as far as possible.
17. Tighten the damping cylinder securing bolt to **24 Nm**.
18. Refit the fork as described in `front fork Installation'.
19. Tighten the fork cap to **25 Nm**. Check that the preload height adjustment remains at the mark noted prior to dismantling.

Handlebars

Right Hand

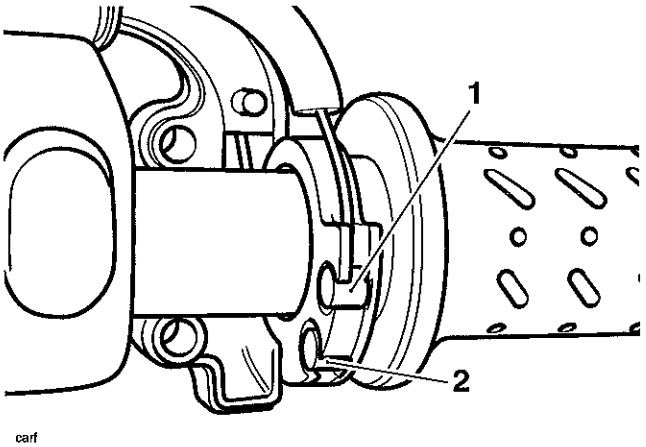
Removal

1. Remove the right hand handle bar end.
2. Slide the rubber boot off the twist grip guide.
3. Release the screws securing the two halves of the twist grip guide to each other.



1. Twist grip
2. Twist grip guide
3. Screws

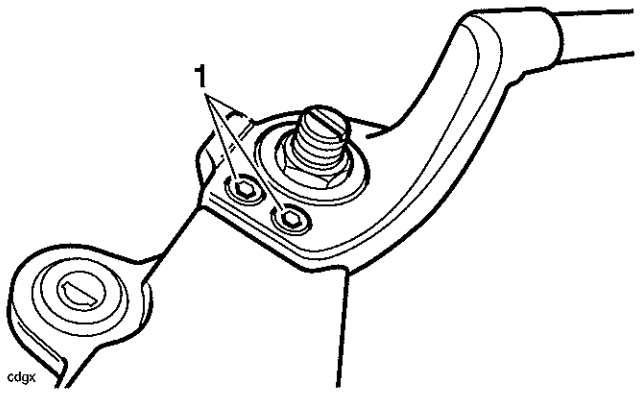
4. Separate the two halves of the twist grip guide then release the inner cables from the twist grip.



1. Opening cable
2. Closing cable

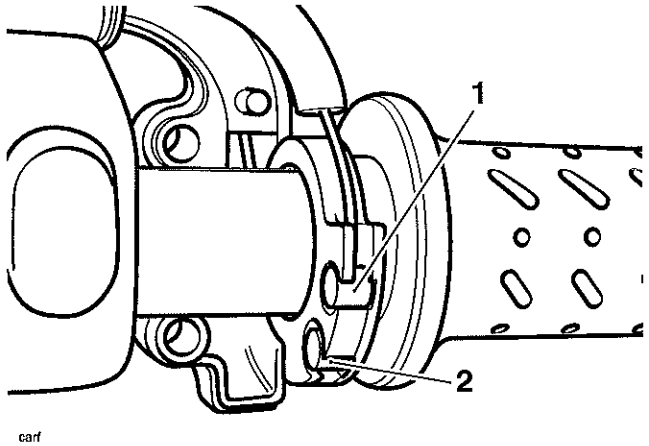
5. Remove the twist grip from the handlebar.
6. Release the screws from right hand switch assembly and position aside.
7. Release the clamp screws from the brake master cylinder assembly and position aside.

8. Release the right hand handlebar fixings and remove the handlebar.



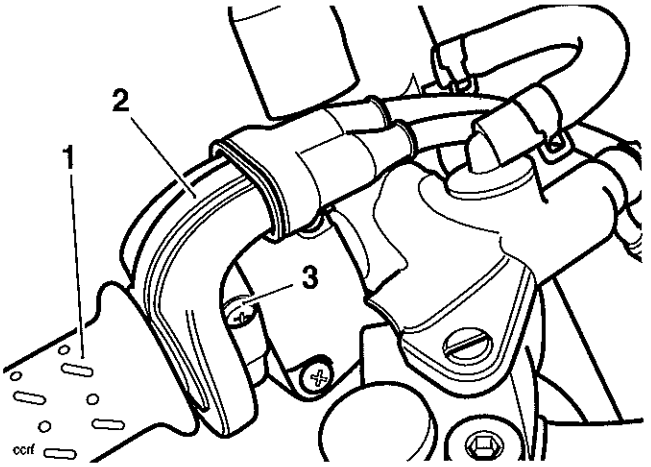
Installation

1. Fit the handlebar to the top yoke. Tighten the handlebar fixings to **26 Nm**.
2. Locate the master cylinder to the handlebars and position the clamp with the 'UP' arrow pointing upwards. Align the master cylinder/clamp split line with the dot mark on the handlebar. Tighten the fixings to **15 Nm**.
3. Fit the right hand switch assembly. Tighten the fixings to **4 Nm**.
4. Fit the twist grip to the handlebar.
5. Engage the inner cable nipples to the twist grip.



1. Opening cable
2. Closing cable

6. Assemble the two halves of the twist grip guide ensuring that the outer cables are correctly located in the guide and the guide is positioned on the handlebars as prior to removal.



1. Twist grip
2. Twist grip guide
3. Screws

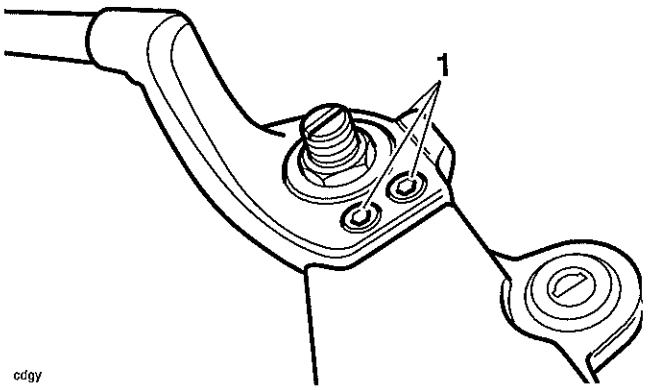
7. Refit the boot.
8. Install the right hand handlebar end. Tighten the fixing to **3 Nm.**

Left Hand

Removal

1. Remove the left hand handle bar end.
2. Remove the left hand grip.
3. Release the screws from left hand switch assembly and position aside.
4. Release the clamp screws from the clutch lever assembly and position aside.

5. Release the left hand handlebar fixings and remove the handlebar.



Installation

1. Fit the handlebar to the top yoke. Tighten the handlebar fixings to **26 Nm.**
2. Locate the clutch lever assembly to the handlebar and position the clamp with the 'UP' arrow pointing upwards. Align the clutch lever assembly clamp split line with the dot mark on the handlebar. Tighten the fixings to **15 Nm**
3. Fit the left hand switch assembly. Tighten the fixings to **4 Nm.**
4. Install the left hand grip.
5. Install the left hand handlebar end. Tighten the fixing to **3 Nm.**

Headstock Bearing Check/ Adjustment

Adjustment

1. Raise and support the front of the motorcycle.

⚠ Warning

Ensure the motorcycle is stabilised and adequately supported, to prevent it falling and causing damage or injury.

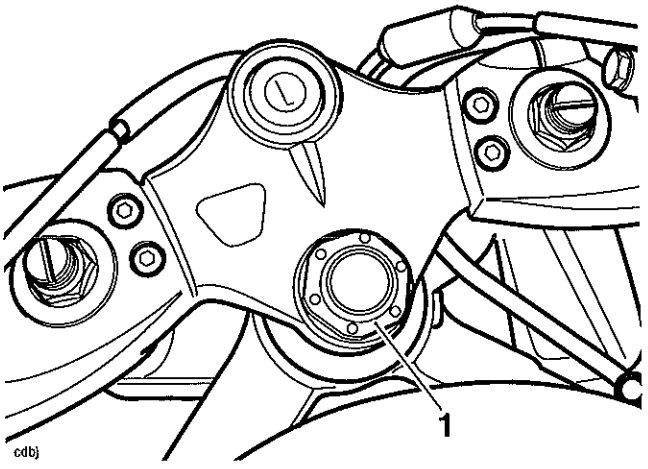
2. Remove the seat and disconnect the battery, negative (black) lead first.
3. Slacken the handlebar clamp bolts.
4. Slacken the pinch bolts on the top yoke.

⚠ Warning

If the lower yoke fixings are also slackened, the forks will no longer support the weight of the motorcycle.

Do not slacken the lower yoke fixings as, in this condition, the motorcycle could topple over causing damage and injury.

5. Remove the headstock top nut.



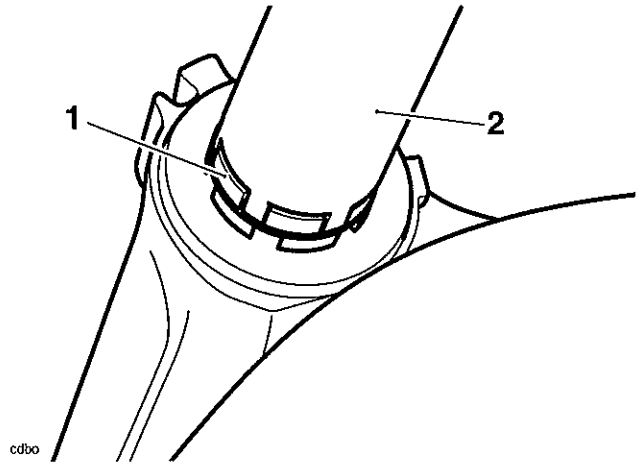
Headstock top nut

6. As an assembly, raise the top yoke and handlebars until clear of the steering stem. Rest the assembly forward of the steering stem such that access to the adjustment nuts is unrestricted.
7. Adjust the bearing free-play as follows:

Note:

- **Throughout, tool T3880023 is used in setting the adjuster and locknut torques.**

a) Remove the locknut and tab washer.



1. Locknut
2. T3880023

b) Slacken then tighten the adjuster nut to **40 Nm.**

c) Release the adjuster nut and re-torque to **15 Nm.**

d) Fit the tab washer and locknut.

e) Prevent the adjuster nut from turning then tighten the locknut to **40 Nm.**

8. Locate the upper yoke to the steering stem and forks.
9. Tighten the top nut to **65 Nm.**
10. Tighten the top yoke pinch bolts to **20 Nm.**
11. Tighten the handlebar clamp bolts to **26 Nm.**
12. Recheck the bearing adjustment and repeat the adjustment procedure if necessary.
13. Reconnect the battery, positive (red) lead first.
14. Refit the seat.

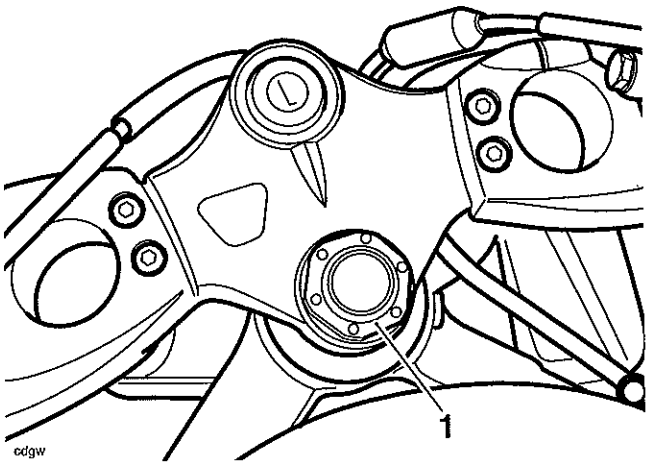
Headstock Bearings

Removal

Warning

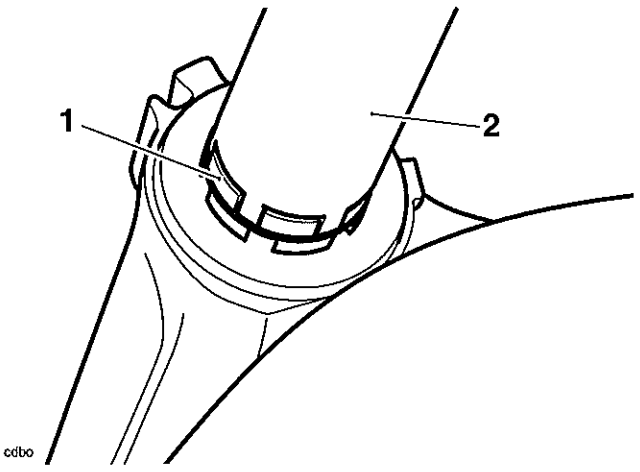
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help to prevent it falling and causing injury to the operator or damage to the motorcycle.

1. Remove both forks as described on page *13-6*
2. Remove the headstock top nut.



1. Headstock top nut

3. As an assembly, raise the top yoke and handle bars until clear of the steering stem. Rest the assembly forward of the steering stem such that access to the adjustment nuts is unrestricted.
4. Using tool T3880023 remove the locknut and tab washer. Discard the tab washer.



1. Locknut
2. T3880023

5. Using the same tool, remove the adjuster nut.

6. Remove the bottom yoke from below the frame headstock.

Warning

Always wear eye, hand and face protection when using a drift as use of a hammer and drift can cause bearings to fragment. Pieces of fragmented bearing could cause eye and hand injuries if suitable protective apparel is not worn.

7. Using a suitable drift, evenly and progressively drive the bearing outer races from the frame headstock.
8. Remove the inner race and dust seal from the bottom yoke using a press or puller.

Inspection

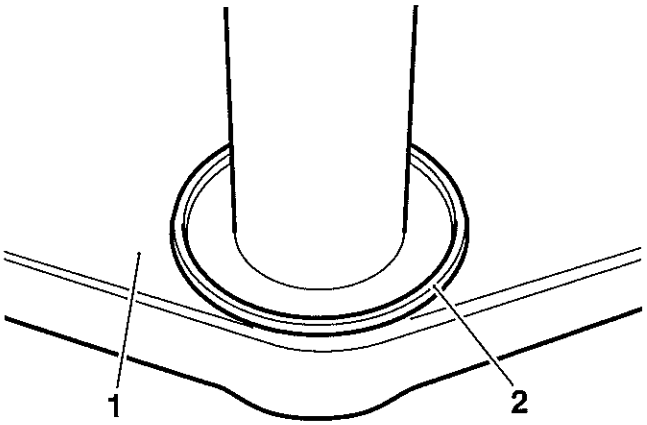
Warning

Only remove raised witness marks from within the frame. Removal of material below any raised areas will reduce the level of interference between the frame and the bearings. Loss of interference could cause the bearing to become loose in the frame leading to loss of motorcycle control and an accident.

1. Examine the frame for any raised witness marks caused by the removal process. Remove any such marks with fine emery paper or a gentle file.

Installation

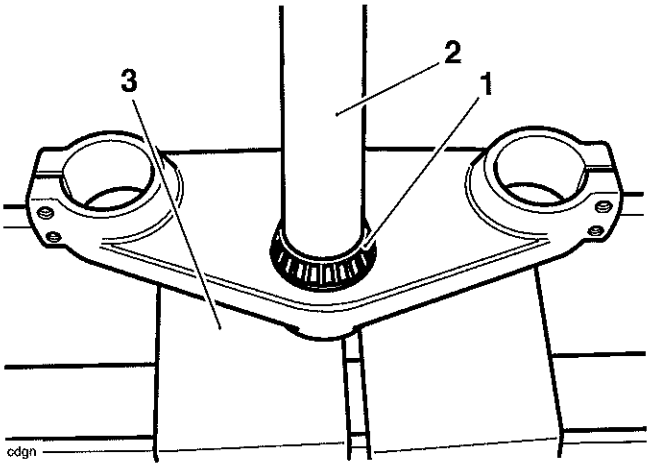
1. Fit a new dust seal to the steering stem on the bottom yoke.



cdgo

1. Steering stem
2. Dust shield

2. Press a new inner race onto the steering stem of the bottom yoke.

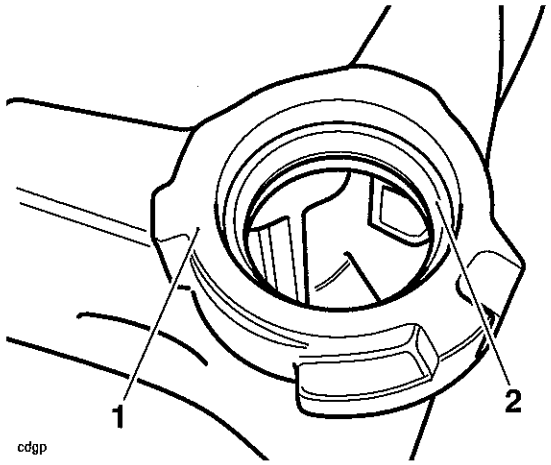


cdgn

1. Bearing
2. Bottom Yoke
3. Press bed

3. Protect the threads of the bottom yoke when using a press or puller as damaged threads may mean replacing the yoke completely.

4. Evenly and progressively drive new bearing outer races into the frame headstock.



1. Frame Headstock
2. Bearing outer race

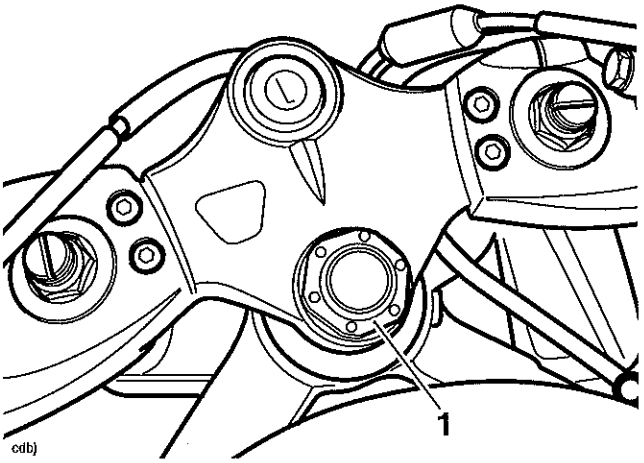
5. Lubricate the headstock bearings using multi-purpose grease.
6. Fit the lower headstock bearing to the bottom yoke.
7. Insert the lower yoke to the frame headstock, fit the upper bearing and race, and retain with the adjuster nut.
8. Adjust the headstock bearings (see page *13-12*).
9. Locate the upper yoke to the steering stem. Install but do not fully tighten the headstock top nut at this stage.

⚠ Warning

Operation of the motorcycle with incorrectly adjusted steering head bearings, either too loose or too tight, may cause a dangerous riding condition leading to loss of motorcycle control and an accident.

10. Fit the forks (see page *13-7*).
11. Check that no free play exists in the headstock bearings and that the steering can be turned freely from lock to lock without any sign of tightness. Re-adjust as necessary (see page *13-12*).

12. Tighten the headstock top nut to **65 Nm.**



1. Headstock top nut

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