NITRON™

TVT FORK CARTRIDGE KIT Installation Instructions

WARNING

Warnings will be highlighted in boxes like this. This will indicate that your safety is involved and careful attention should be made to observe these instructions. Severe injury or fatality may occur if these instructions are not observed.

WARNING

This cartridge kit requires special tools and should be installed by an authorised dealer to ensure optimal function. The front fork is a critical part of the motorcycle and improper installation could cause serious injury or death.

WARNING

Nitron will not be held responsible for any damage or injury caused through incorrect fitment, modification or incorrect application of any TVT Fork Cartridge Kits or related products.

WARNING

If you notice any abnormality in performance or operation, you should stop using the product immediately and contact Nitron for technical advice.

WARNING

Failure to comply with the installation and maintenance procedures may result in avoidable damage caused to the shock or motorcycle.

NOTE

Notes and Tips will be highlighted in boxes like this. This will offer important information regarding procedures or recommendations for ease of installation.

IMPORTANT

Nitron warrant all of its products and accessories against design and material defect for a period of 1 year from date of purchase. The warranty does not cover any such failure due to incorrect fitment or use and does not extend to any other part of the motorcycle.

IMPORTANT

Images used in this Instruction Manual are for illustration purposes only, any specific fittings may differ from your TVT Fork Cartridge Kit.

IMPORTANT

Please keep the individual specification sheet with the Vehicle Service Manual as this is the best way to indentify your TVT Fork Cartridge Kit

Introduction

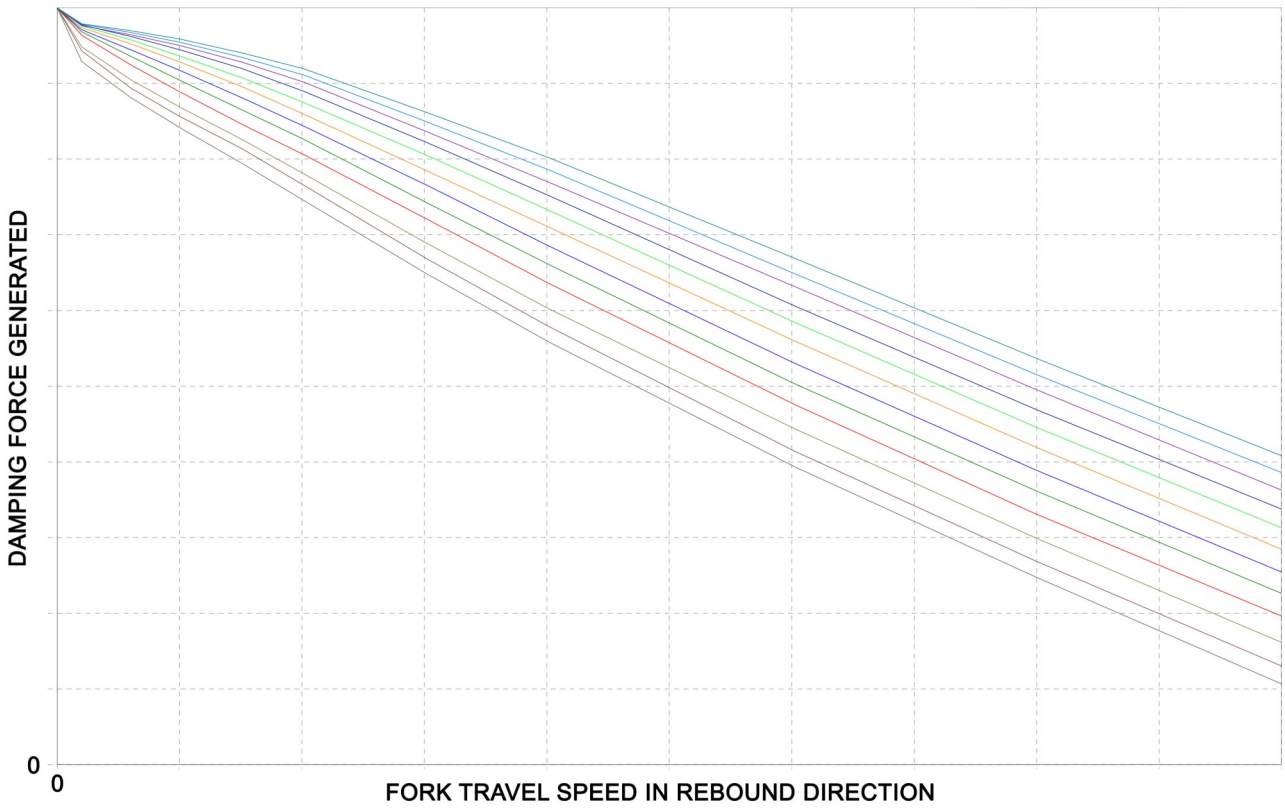
Thank you for purchasing a set of Nitron TVT Fork Cartridges. Nitron have invested heavily in developing the technology, materials and performance of our suspension components and we are pleased to be able to pass on this experience to our customers. All of our designs are based on many hours of both real world testing and racing experience. TVT technology has proven to be extremely versatile and whether you are riding a Superbike on track or adventuring off-road with a Dual Sport machine you can be sure that your fork cartridge kit has been developed specifically for your needs.

Nitron TVT Adjustable Fork Cartridge Kits offer the same level of improvements in rider control, performance and comfort that have become the trademark of the Nitron product. The system features a large bore 25mm shimmed piston which provides significant improvements in performance over the OEM set up.

Function

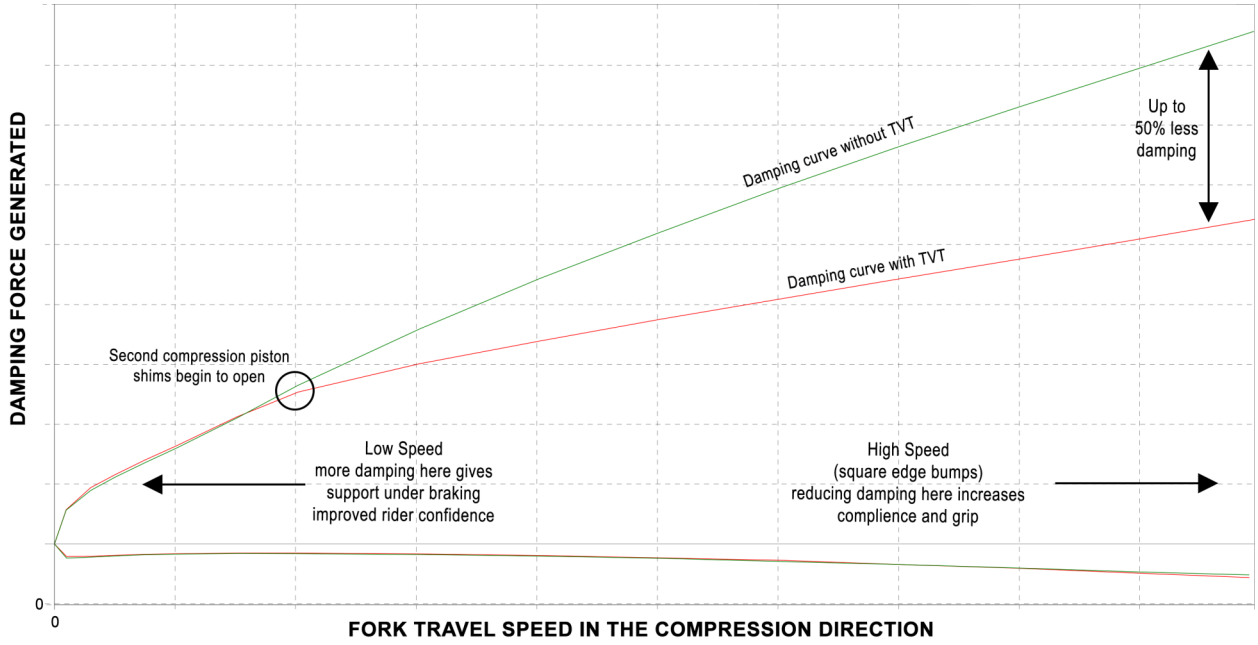
The damping system is divided between each fork leg with the right hand side cartridge controlling the rebound phase and the left hand side compression. This system allows completely independent damping adjustment making setup both simpler and quicker. Re-valving is also much quicker particularly when a change is only required to one side of the damping curve.

For ease of use all adjustments are made from the top of the fork, preload is adjusted via a 17mm hex with each complete turn of the adjuster resulting in 1mm of additional spring preload from a total of 18 turns. Damping adjustment is adjusted using the supplied tool by turning the 3mm hex in the centre of the fork cap, there should be at least 25 clicks of adjustment. Careful attention to the design of the adjustment system results in not only a broad range of adjustment but the click by click adjustment across the range is very linear making a setup easier.



Introduction

In addition to the main piston in the compression leg TVT cartridges also employ a third piston which gives a great deal of flexibility when designing the damping curve for a specific application. This piston also utilizes shims in much the same way as the main compression piston but with this design the shim stack is preloaded. During slow to medium speed movements of the fork in compression such as braking or through undulations in the road the damping is created by the main piston. As the pressure in the compression cartridge reaches a certain point the preload on the second piston will be overcome and oil can now flow through the TVT ports reducing overall damping for the higher fork speeds.
The main piston in a TVT fork cartridge can be valved to create firmer damping in the low

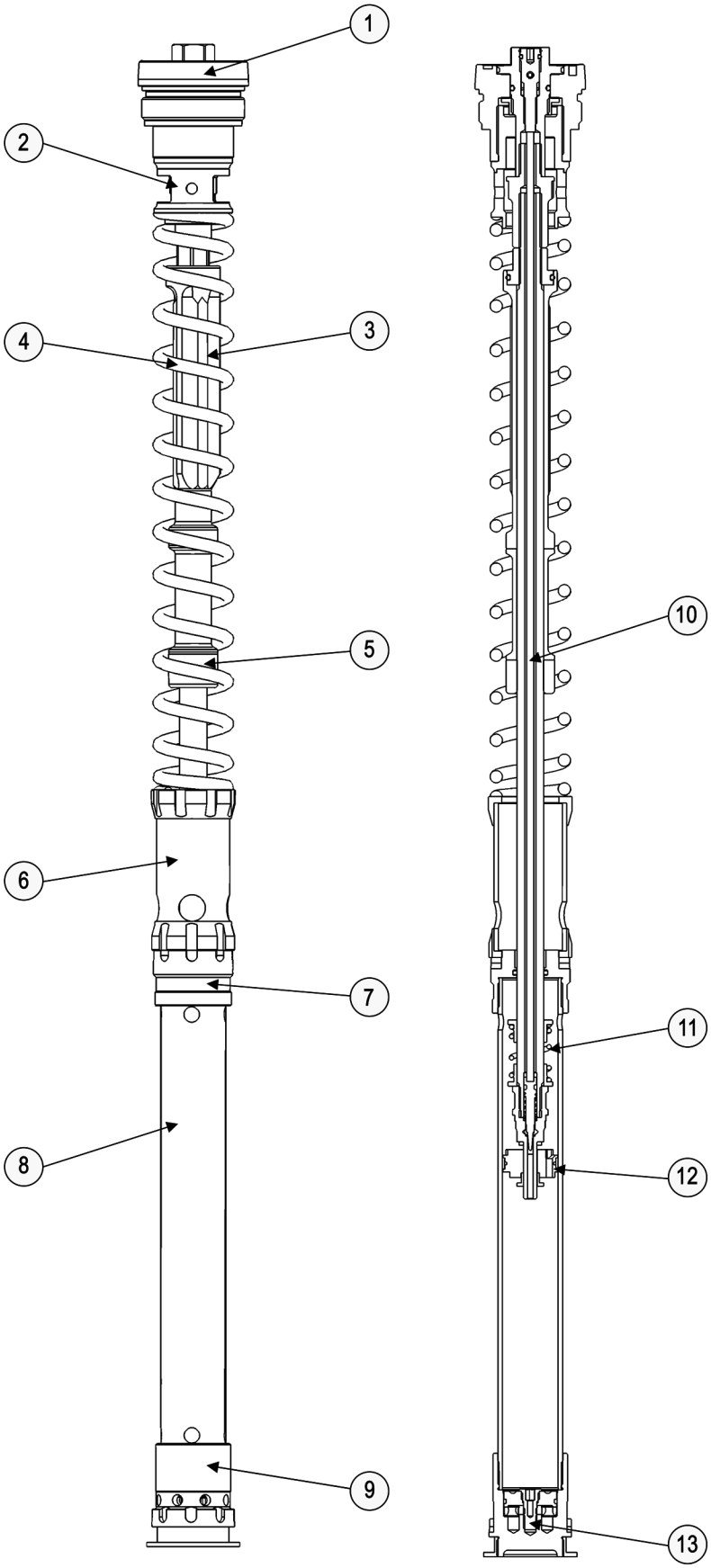


to mid speed range of compression velocities giving improved brake support and control of weight transfer leading to improved rider confidence. With a single compression piston design this would normally result in unwanted high speed damping forces being generated at higher compression velocities such as square edged bumps and surface irregularities.

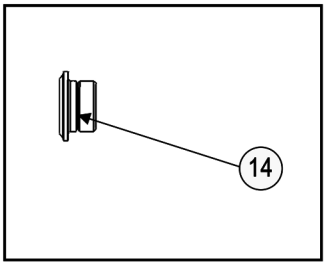
On track, professional riders have praised the system describing new found levels of confidence particularly during high speed , hard edge bumps which combined with hard braking and cornering forces would normally unsettle a well damped set up. Likewise on the road this system has allowed new levels of compliance on bumpy poorly surfaced roads.

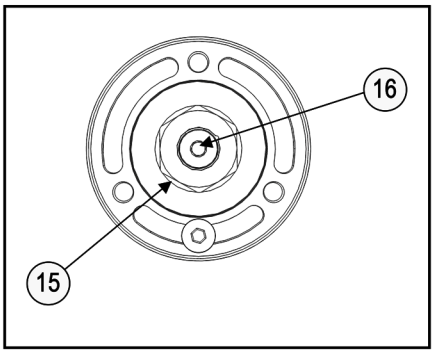
The TVT valve has also been designed to allow quick and easy re-valving at the track and can be extracted from the fork without having to remove the forks from the bike. Instructions and tools are shown at the end of this manual.

Fork Cartridge Diagram



1. Top Cap
2. Spring Seat
3. Spring Guide
4. Spring
5. Bump Rubber
6. Spacer Tube
7. Gland
8. Cartridge Tube
9. Adapter
10. Piston Rod
11. Top Out Spring
12. Piston
13. Base Valve (Compression)
14. Blanking Plug (Where Applicable)
15. Preload Adjuster (17mm Hex)
16. Damping Adjuster (3mm Hex)





Installation Preparation

Before commencing with the installation you will need to support the motorcycle with suitable front and rear stands, ensuring it is on flat, level ground. The front stand should allow the front wheel to be raised off the floor so it can be removed.

NOTE

Before removing the fork legs from the yokes loosen the top cap half a turn, this will make disassembly of the cartridge easier.

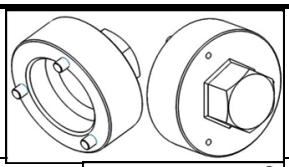
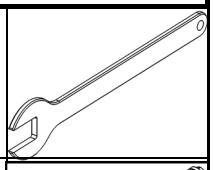
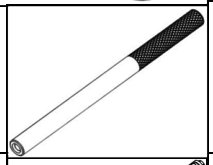
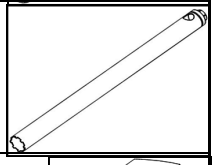
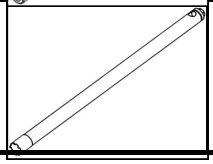
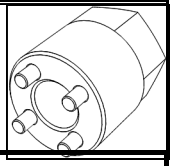
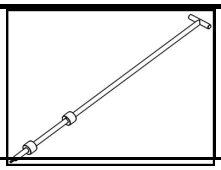
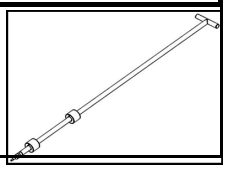
Both fork legs will need to be removed from the motorcycle to perform the installation. It is a good idea to thoroughly clean the fork legs before proceeding to avoid any contamination later on. Install the fork legs in a soft jaw vice and remove the standard cartridge system; please refer to your manufacturer's manual for the correct procedure and for any specific tools that are required.

Depending on the amount of use that the fork has had it is recommended to replace the seals and to check the condition of the bushes. For optimal performance of your fork it is crucial that these are in good condition and to tolerance. You should also check for any damage to the lower fork tube coating and if necessary repair or replace before proceeding any further. Clean the inside of the fork tubes to ensure there is no debris left inside.

WARNING

Do not be tempted to use cheaper and inferior quality seals or bushings as this can dramatically increase friction in the fork and can even lead to premature wear of the lower fork tube surface coatings.

Tools Required

Nitron Specialist Tools Required			
Top Cap Tool NTT050264/5		Rod End Fitting Spanner NTT050270	
Piston Rod Holder NTT050268		Gland Tool NTT050291	
Adaptor Tool NTT050272		Blanking Plug Tool (This is only applicable where a blanking plug is supplied) NTT050025	
Optional Specialist Tools These base valve removal tools offer the ability to adjust the base valve without removing the fork leg please see the base valve section for more information.			
Base Valve Removal Tool 1 NTT050394		Base Valve Removal Tool 2 NTT050298	

Other Tools Required	
Oil Level Tool	Soft Jawed Vice
Torque Wrench	21mm Socket
17mm Socket Or Spanner	22mm Socket
Type A Installation Specific Tools	**Type C Installation Specific Tools**
Long Hex Driver Bit (Please refer to your manufacturers manual for correct size)	Heat Gun
	Suitable Fork Tube Removal Tool

NOTE

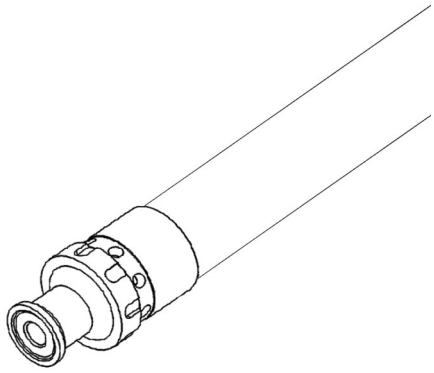
Type B installation does not require any installation specific tools.

Fluids/Grease	
Nitron 02 Fully Synthetic Fork fluid (Please see specification sheet for required amount)	Molykote 33 Medium Grease
Type A Installation Specific	**Type C Installation Specific**
Medium Strength Threadlock - Loctite or Similar	Loctite 2701

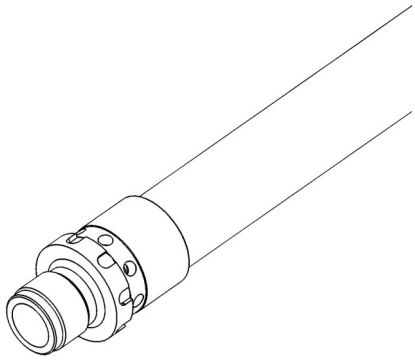
Fork Types

Please be aware that there are 3 different types of fork (Type A, B & C) all of which require different initial installation preparation. Before beginning your installation please check as to which type you have.

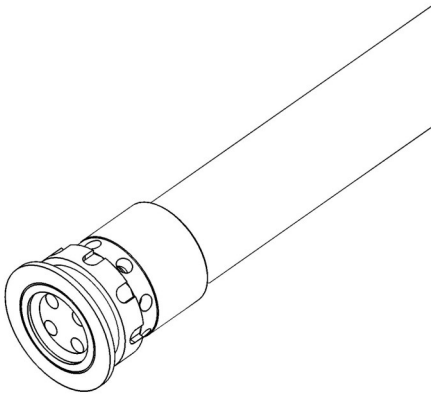
Type A -
With this design the fork cartridge is secured to the fork bottom via a bolt. The bolt is fastened to the cartridge adaptor externally using a torque wrench.



Type B -
With this design the fork cartridge threads directly into the fork bottom



Type C -
With this design the lower fork tube must be removed from the fork bottom. A lock ring is then installed in the fork bottom which is then trapped in place by the lower fork tube. The fork cartridge is then screwed into this lock ring.



Your Cartridge Kit is supplied fully assembled; you will need to partially disassemble it before installation.

Step 1A Removal of Spring Hardware
Unscrew the top cap and then remove and set aside the spring seat, spring and spacer tube.
(See **Fig. 1A**).

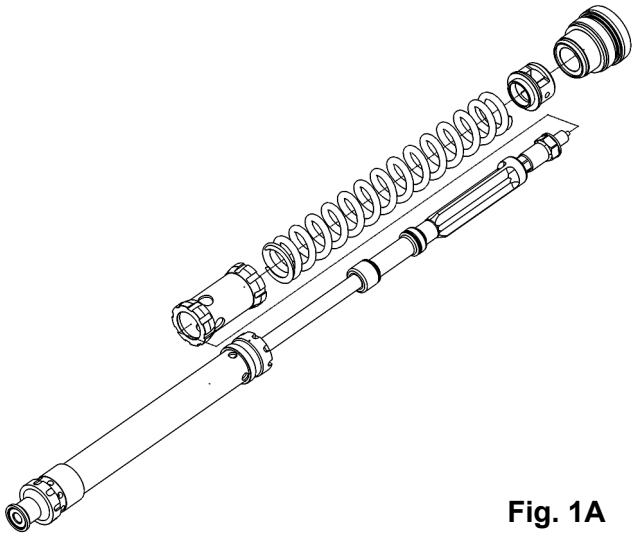


Fig. 1A

Step 2A Piston Rod Assembly Removal
Unscrew the piston rod assembly and carefully remove it from the body tube.
(See **Fig. 2A**).

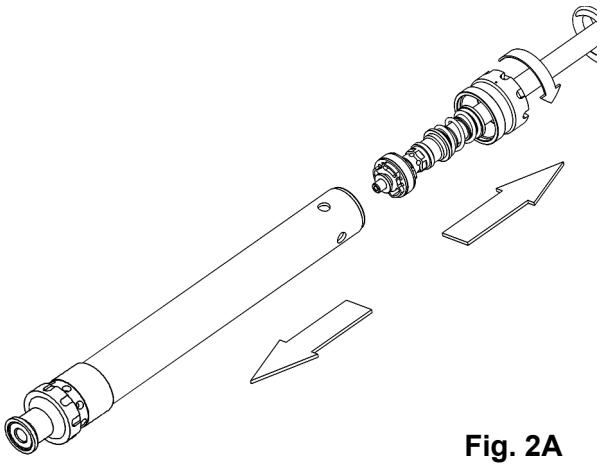


Fig. 2A

Step 3A Cartridge Tube Installation
Carefully insert the cartridge tube into the fork tube. Apply medium strength threadlock to the threads of the lower cartridge bolt and screw it into the cartridge adaptor. Use adaptor tool NTT050272 to hold the
cartridge tube whilst you torque the bolt, refer to your manufacturers recommended torque setting.
(See **Fig. 3A**).

⚠ WARNING

Ensure that you keep the compression and rebound cartridge leg components separate to avoid confusion later. The rebound cartridge (silver adjuster) should be installed in the right hand leg and the compression cartridge (black adjuster) in the left hand leg.

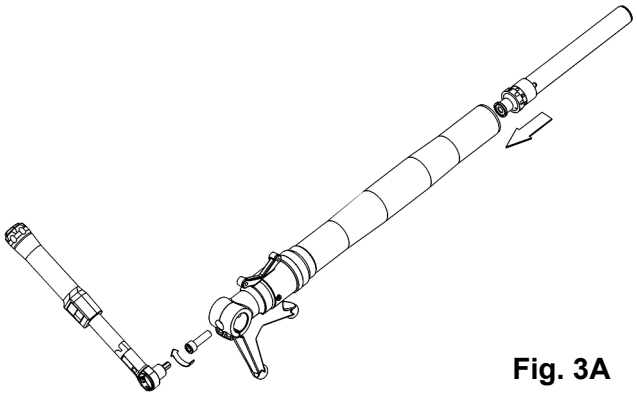


Fig. 3A

Please turn to the **Final Installation Section** on Page 14 to continue your installation.

Your Cartridge Kit is supplied fully assembled; you will need to partially disassemble it before installation.

Step 1B Removal of Spring Hardware
Unscrew the top cap and then remove and set aside the spring seat, spring and spacer tube.
(See **Fig. 1B**).

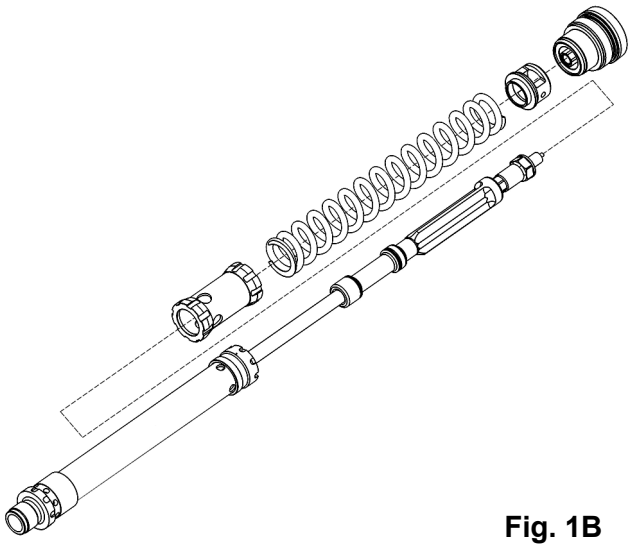


Fig. 1B

Step 2B Piston Rod Assembly Removal
Unscrew the piston rod assembly and carefully remove it from the body tube.
(See **Fig. 2B**).

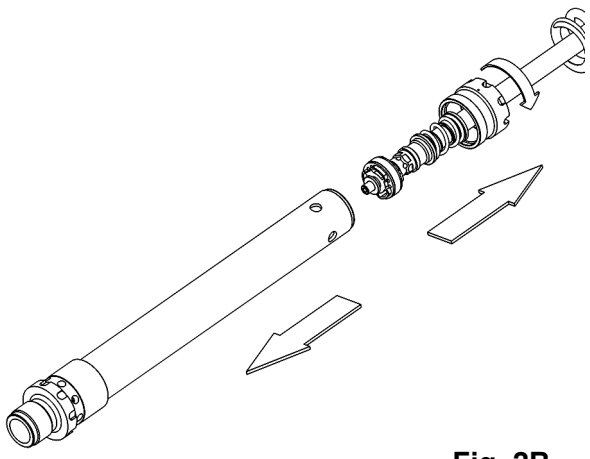


Fig. 2B

Step 3B Cartridge Tube Installation
Carefully insert the cartridge tube into the fork tube. Apply medium strength threadlock to the threads on the end of the cartridge adaptor and then screw the cartridge tube into the fork bottom using tool NTT050272. Torque to 50N/mm.
(See **Fig. 3B**).

⚠ WARNING

Ensure that you keep the compression and rebound cartridge leg components separate to avoid confusion later. The rebound cartridge (silver adjuster) should be installed in the right hand leg and the compression cartridge (black adjuster) in the left hand leg.

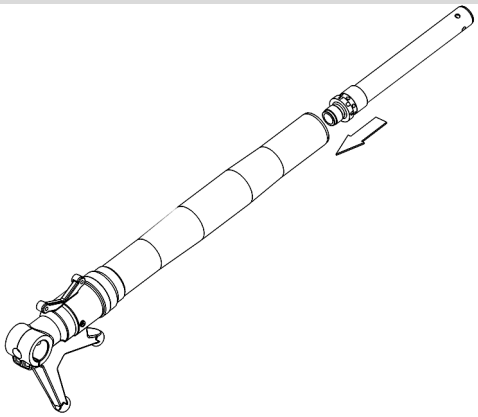


Fig. 3B

Please turn to the **Final Installation Section** on Page 14 to continue your installation.

Step 1C Installation of Fork Tube Tool
If the seals and/or bushings are not being replaced the outer fork tube does not need to be removed. Slide the tube up as far as possible and install a suitable fork tube removal tool.

Step 2C Grubscrew Removal
Heat the fork bottom to break down the threadlock surrounding the grub screw. Ensuring the fork is held securely, unscrew and remove the grubscrew. (See **Fig. 1C**).

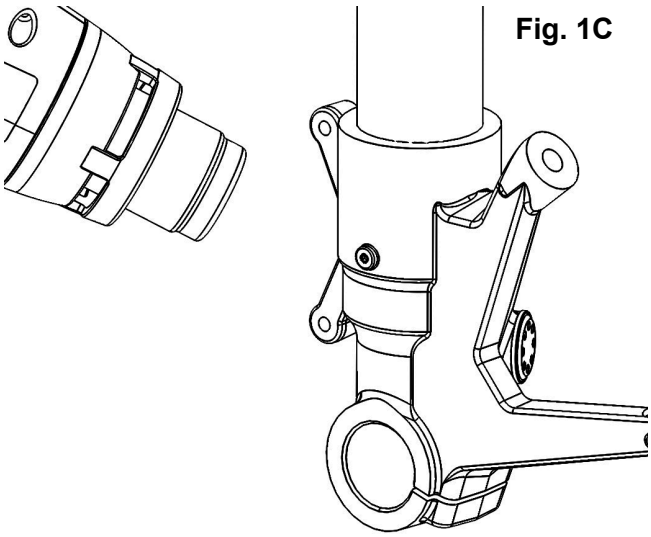


Fig. 1C

Step 3C Fork Tube

⚠ WARNING

It is imperative that the grub screw in the fork bottom is removed – failure to do so will result in serious damage to the lower fork tube!

Removal
Heat the fork bottom to break down the threadlock between it and the lower fork tube. Ensure that the fork leg is securely fastened in the vice and unscrew the tube from the fork bottom.
(See **Fig. 2C**).

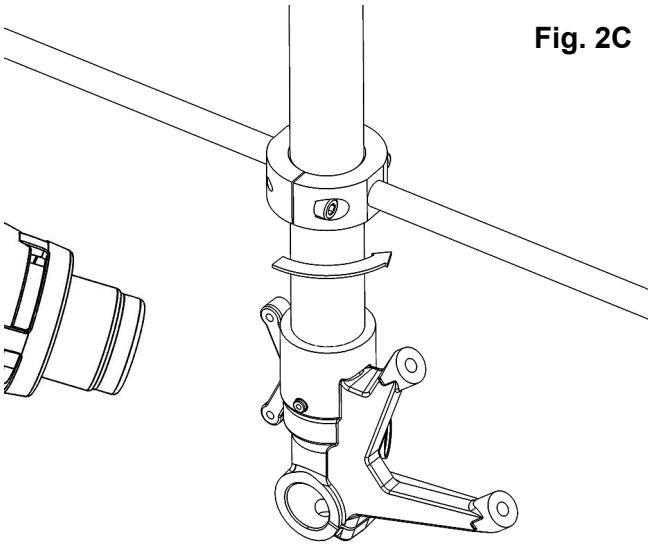


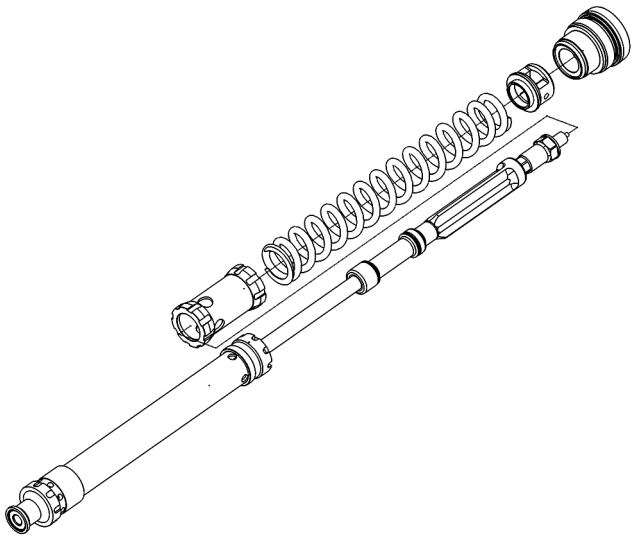
Fig. 2C

Step 4C Fork Bottom Preparation
Remove the o-ring and steel washer (if present) from the fork bottom and thoroughly clean the threads ensuring that no threadlock remains.

⚠ WARNING

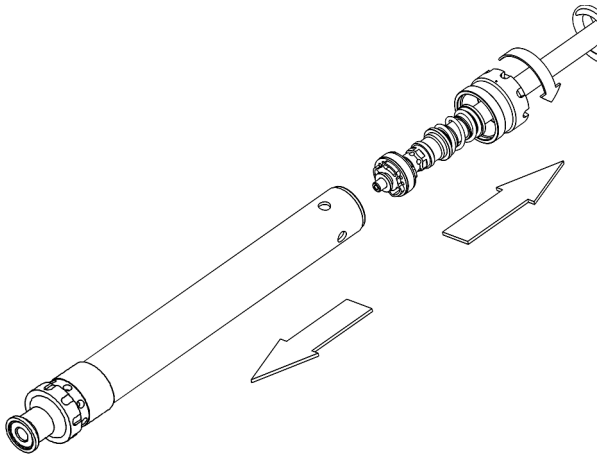
It is good practice to replace the O-ring in case it has been damaged during disassembly; the washer (if present) is not required for the installation of this cartridge.

Step 5C OE Preload Adjuster Removal
If you have a BPF type fork you will need to remove the original spring preload adjuster parts in the fork bottom referring to your manufacturer's manual for the correct tool and procedure.



Step 6C Removal of Spring Hardware
Unscrew the top cap and then remove and set aside the spring seat, spring and spacer tube.
(see **Fig. 3C)**.

Step 7C Piston Rod Assembly Removal
Unscrew the piston rod assembly and carefully remove it from the body tube.
(see **Fig. 4C)**.



⚠ WARNING

Ensure that you keep the compression and rebound cartridge leg components separate to avoid confusion later. The rebound cartridge (silver adjuster) should be installed in the right hand leg and the compression cartridge (black adjuster) in the left hand leg.

Step 8C Lock Ring Orientation
Unscrew the lock ring from the bottom of the cartridge body tube making note of its orientation and install it into the fork bottom. Please refer to your specific model settings sheet if you are unsure which way up the lock ring should face.

See **Fig. 5C** & **6C** for Lock ring facing down.
See **Fig. 7C** & **8C** for Lock ring facing up.

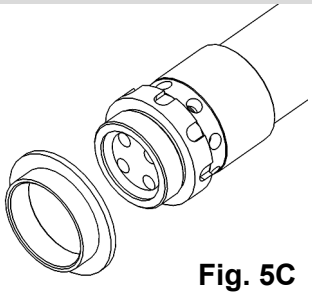


Fig. 5C

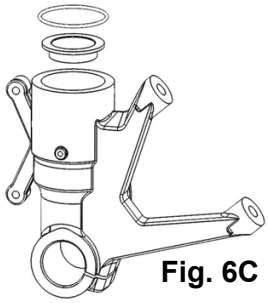


Fig. 6C

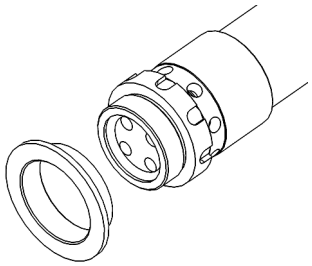


Fig. 7C

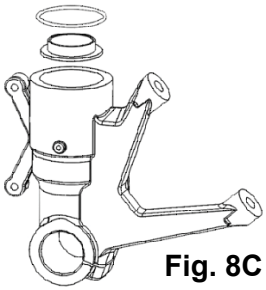


Fig. 8C

Step 9C Fork Bottom O-Ring Installation

Apply Molykote 33 medium grease to the o-ring and install in the fork bottom.

Step 10C Fork Tube Installation

Apply Loctite 2701 high strength threadlock to the lower fork tube threads and re-install to the fork bottom using a fork tube clamp tool, tighten to 120Nm.

Step 11C Grubscrew Installation

Remove the fork tube tool and slide the outer tube fully down. Re-install the grubscrew using high strength threadlock.

Step 12C Cartridge Tube Installation

Apply Loctite 2701 high strength threadlock to the threads at the base of the cartridge tube adaptor and carefully insert into the fork tube. Tighten the body tube into the lock ring using adaptor tool NTT050272 to 60Nm. (See **Fig. 9C**).

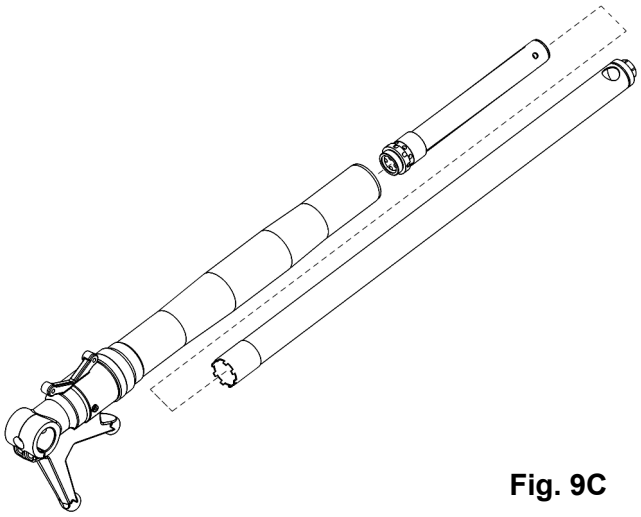


Fig. 9C

NOTE

The next step is not applicable to all installations please check your specification card to see if there is a need to install Blanking Plugs.

Step 13C Blanking Plug Installation

If your kit was supplied with a pair of blanking plugs to replace the OE preload or compression adjuster parts apply Molykote 33 grease to the o-ring and install them into the fork bottom using tool NTT050025. Tighten to 15N/m.(See **Fig. 10C**).

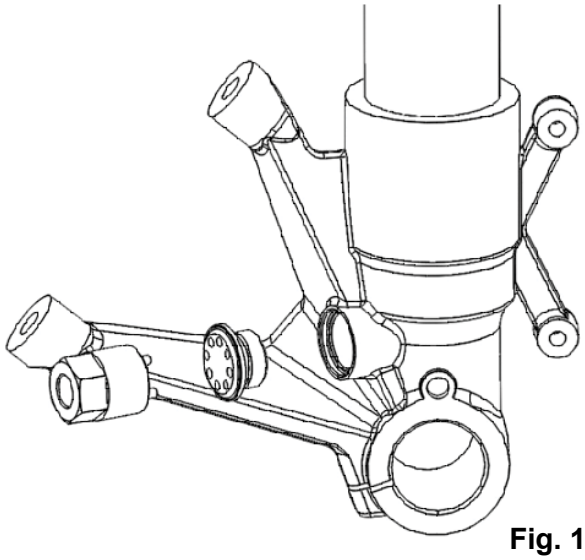


Fig. 10C

Please turn to the **Final Installation Section** on Page 14 to continue your installation.

Final Instructions

Step 1 Filling The Fork With Fluid

Pour approximately half of the bottle of suspension fluid into the fork leg making sure that it easily covers the top of the cartridge body tube. (See **Fig. 1**).

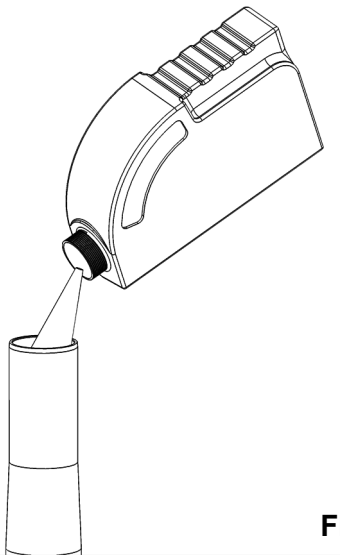


Fig. 1

Step 2 Piston Rod Assembly

⚠ WARNING

For the best damping performance it is essential to use Nitron 02 suspension fluid.

Installation

Apply Molykote 33 to the inner threads of the gland and carefully insert the piston rod assembly into the cartridge body tube ensuring that the piston ring is properly seated and doesn't become dislodged (see **Fig. 2**). Use tool TT050291 to tighten the gland to 20Nm (see **Fig. 3**).

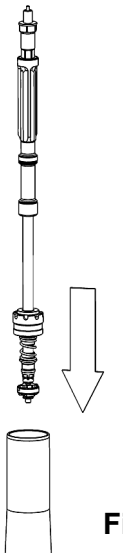


Fig. 2

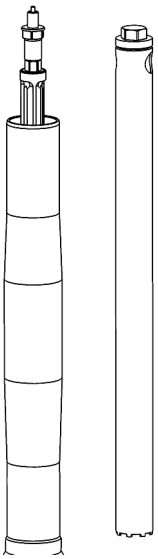


Fig. 3

Step 3 Temporary Installation of The Fork Cap

Unwind the damping adjuster to its full soft position (counter clockwise) on the top cap and then install it on to the end of the piston rod (see **Fig 4.**).

Step 4 Bleeding The System

Pull the outer fork tube up and tighten it to the top cap. The air can now be bled from the system by working the outer fork tube up and down. Repeat this approximately 15 times (see **Fig. 5**).

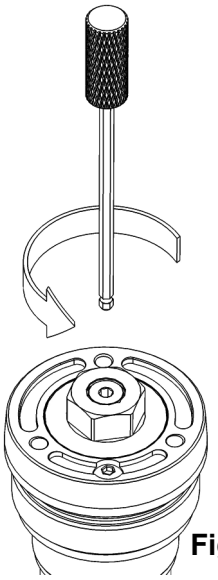


Fig. 4

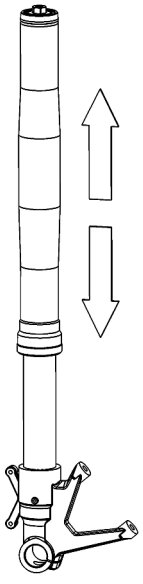


Fig. 5

Step 5 Setting the Oil Level (Air Gap)
Remove the top cap from the piston rod and push the outer tube fully down. Ensure the piston rod assembly is also pushed fully down. Using a suitable oil level tool add or remove oil to obtain the specified oil height. The quoted oil height is the measurement from the upper edge of the outer fork tube to the surface of the oil (see **Fig 6.**).

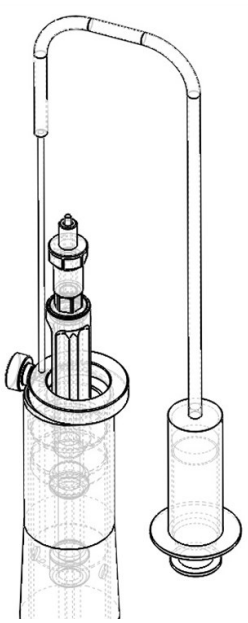


Fig. 6

NOTE

The fork must be upright when carrying out this procedure

Step 6 Installation of the Spring Hardware
You are now ready to close the fork. Screw NTT050268 – piston rod holder onto the end of the piston rod and pull it upwards. Install the spacer tube (with its plastic ends), spring and spring seat and then insert NTT050270 – rod end fitting spanner through the spring seat and over the flats on the rod end fitting. (See **Fig. 7** & **8**).

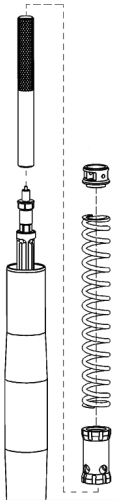


Fig. 7

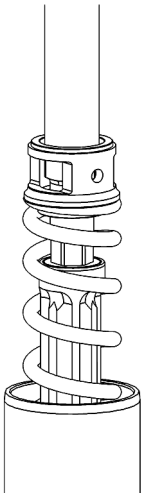


Fig. 8

Step 7 "Pull Up Tool" Removal
The spanner will now hold the rod in position and you can remove the pull up tool (See **Fig. 9**).

Step 8 Top Cap Installation
Ensure that the damping adjuster rod is located properly and then install the top cap onto the rod. Tighten the top cap to the piston rod using a 17mm socket to 20Nmm. Remove the spanner (see **Fig. 10**).

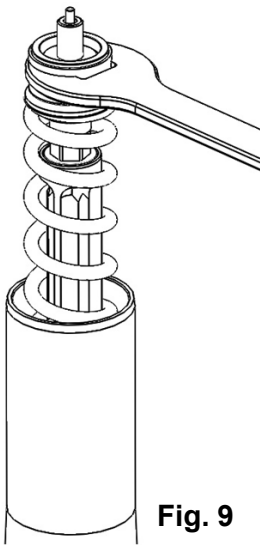


Fig. 9

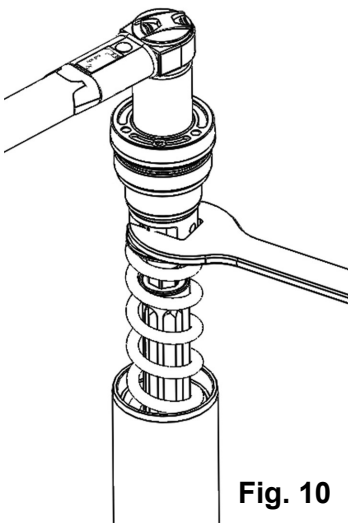


Fig. 10

Step 9 Top Cap Torque Setting
Pull the outer tube up and screw the top cap in to it. Tighten to 10Nm using a 21mm socket with tool NTT050264 (see **Fig. 11**).

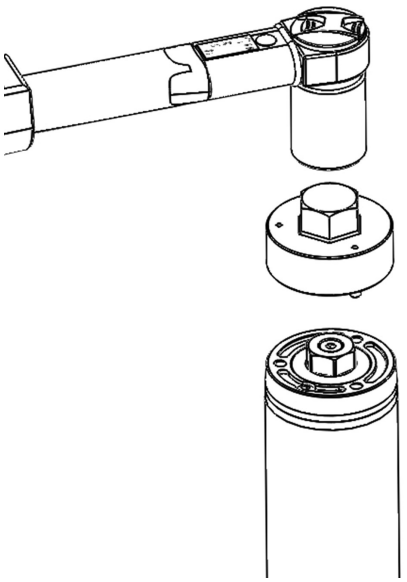


Fig. 11

Setup

Set the compression and rebound damping adjusters as per the specification sheet. Adjustment is made by screwing the adjuster clockwise to its full hard position and then counting the clicks backwards from this point. Do not force the adjuster at either end of its adjustment range as this may damage the internal components. (see **Fig 12.**).

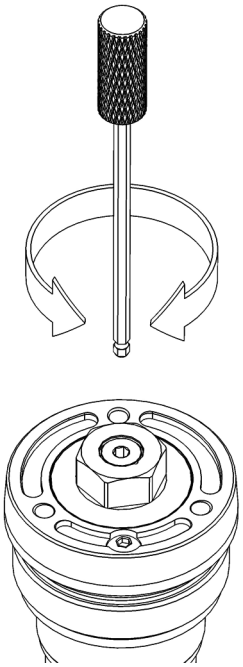


Fig. 12

Spring preload is adjusted by turning the 17mm hex, every complete turn of adjustment equals 1mm of spring preload. (see **Fig 13**). There are 18 turns of adjustment in total and the setting is referenced as the number of turns from the fully anticlockwise position. Adjusting spring preload will change the amount of initial force required to compress the springs a given distance in relation to the rate of the springs. This will effectively raise (more preload) or lower (less preload) the front of the bike thus changing the angle of the fork and the bikes attitude.

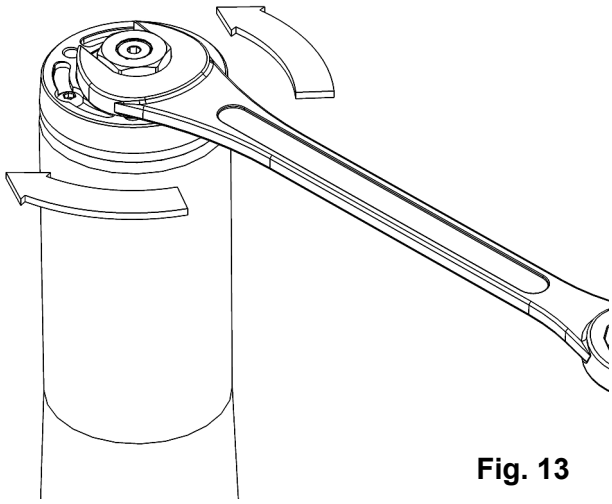


Fig. 13

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