TVT22 FORK CARTRIDGE
Installation Instructions

NITRON®
SUSPENSION

INSTRUCTION MANUAL B

WARNING

Warnings will be highlighted in boxes like these with a warning triangle icon. These 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 these with a lightbulb icon. These 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 identify your TVT Fork Cartridge Kit.

Thank you for purchasing a set of Nitron TVT Fork Cartridges.

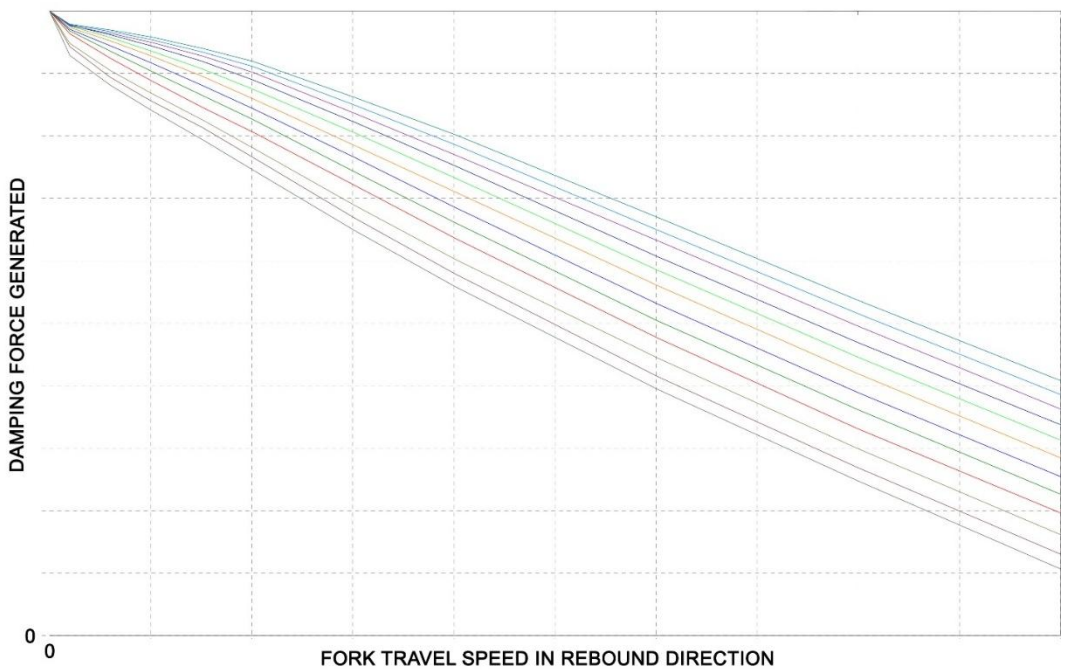
Nitron have invested heavily in developing the technology, materials and performance of our suspension components and we are pleased to be able to pass on this experience to our customers. All of our designs are based on many hours of both real world testing and racing experience. TVT technology has 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 range. The system features a large bore 22mm shimmed piston which provides significant improvements in performance over the OEM set up.

FUNCTION

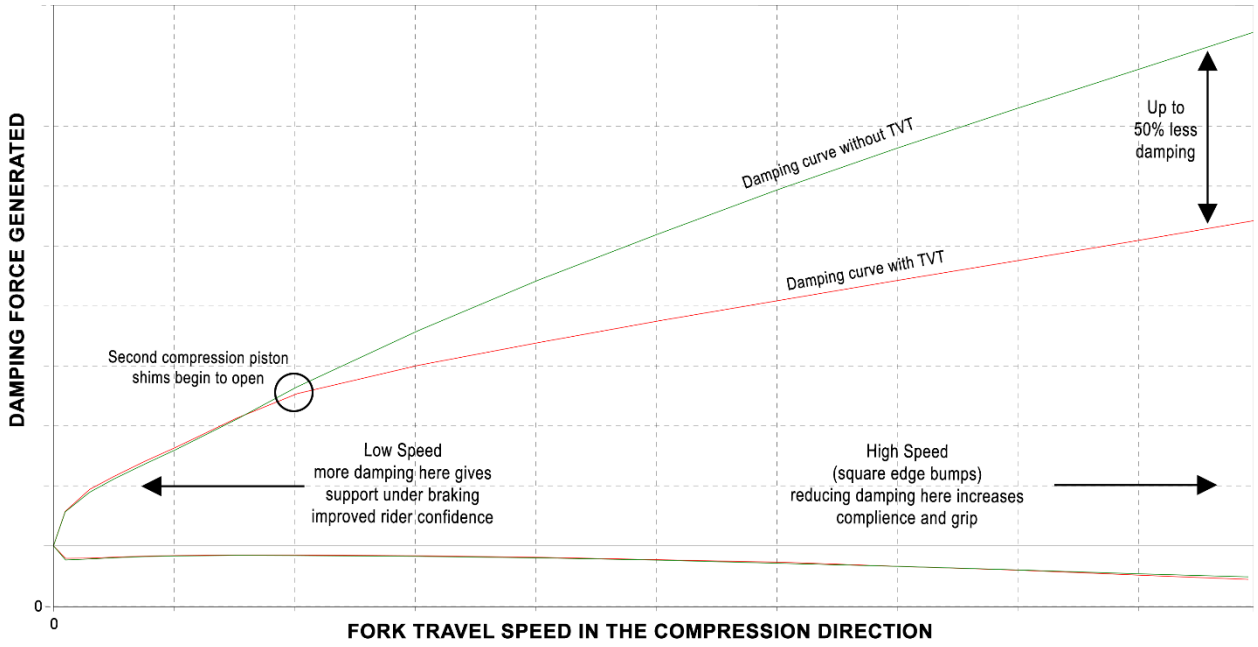
The damping system is divided between each fork leg with the right-hand side cartridge controlling the rebound phase and the left-hand side compression. This system allows completely independent damping adjustment, making setup both simpler and quicker.

For ease of use, all adjustments are made from the top of the fork. Preload is adjusted via a 14mm hex with each complete turn of the adjuster resulting in 1mm of additional spring preload from a total of 15 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.



TRI-VALVE TECHNOLOGY (TVT)

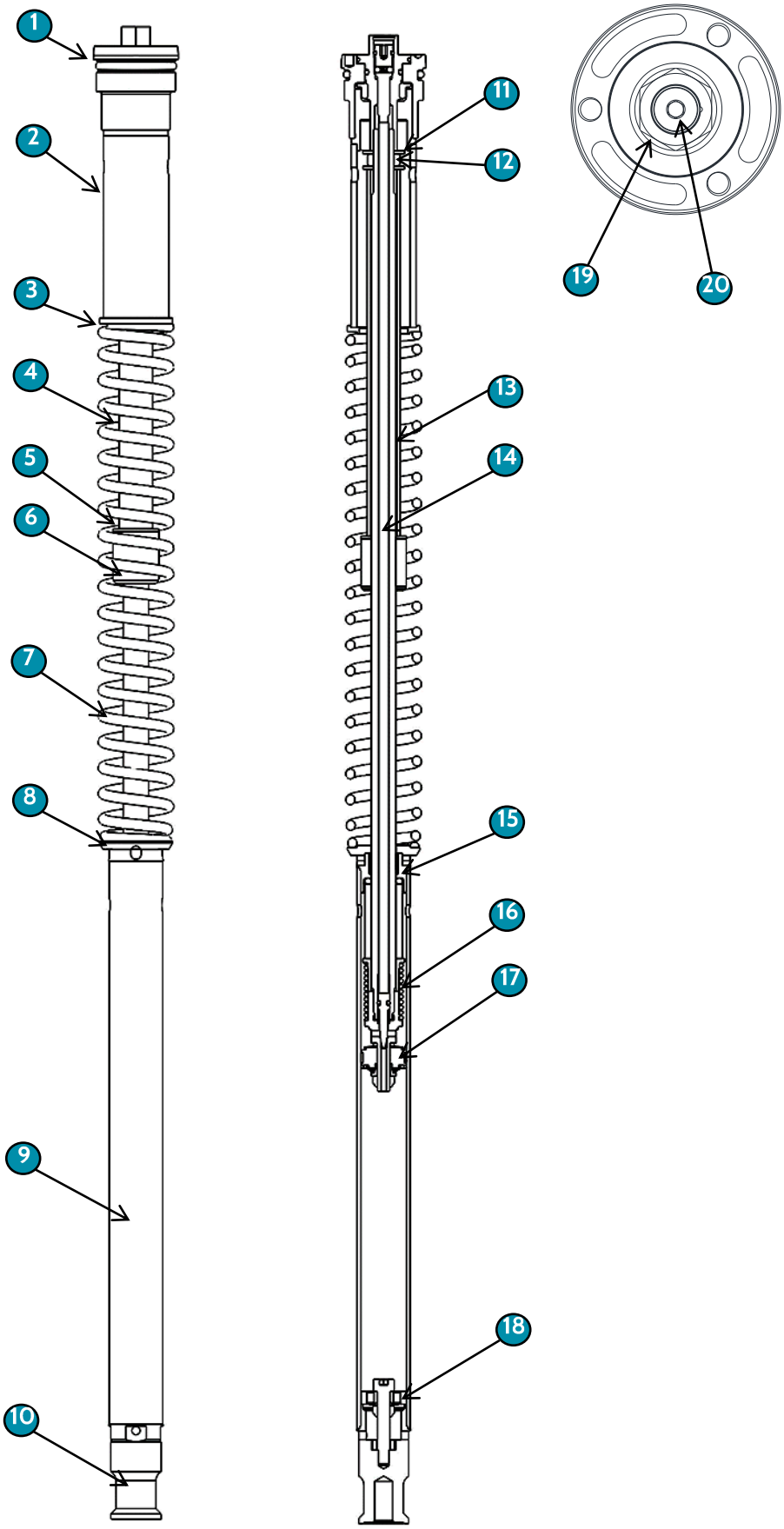
In addition to the main piston in the compression leg, TVT cartridges also employ a third piston which gives a great deal of flexibility when designing the damping curve for a specific application. This piston also utilises shims in much the same way as the main compression piston, but with this design, 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.

FORK CARTRIDGE DIAGRAM



NO.	DESCRIPTION
1	Top Cap
2	Spring Spacer Tube
3	Upper Spring Seat
4	Bump Stop Spacer Tube
5	Plastic Spacer
6	Bump Stop
7	Spring
8	Lower Spring Seat
9	Cartridge Tube
10	Adaptor
11	M10 Washer
12	M10 Lock Nut
13	Piston Rod
14	Adjuster Rod
15	Gland
16	Top Out Spring
17	Piston
18	Base Valve
19	Preload Adjuster
20	Damping Adjuster

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 later contamination.

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 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 to fork stanchion surface coatings.

NITRON SPECIALIST TOOLS

PART NO.	DESCRIPTION
NTT050392/ NTT050264/ NTT050265	Fork cartridge top cap tool -33,38 or 41mm PCD
NTT050268	Piston rod holder
NTT050404	22mm cartridge gland tool (type B & C installations only)

NOTE

Refer to the Nitron Fork Tooling Application List for full details.

STANDARD TOOLS REQUIRED

DESCRIPTION
Piston rod holding plate
Oil level tool
Soft jawed vice
Torque wrench
14mm socket
17mm spanner
Fork tube removal tool (type 'C' installations only – see next page)

FLUIDS/GREASE

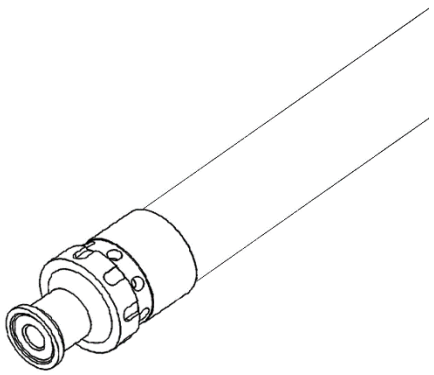
PART NO.	DESCRIPTION
090217	Nitron 02 fully synthetic fork fluid (please see specification sheet for quantity required)
NTT050473	Molykote 33 White Grease
NTT050476	Loctite 243 Medium Strength Loctite
NTT050477	Loctite 270 High Strength Loctite (type 'C' installations only – see next page)

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 the specification sheet to identify which type you have.

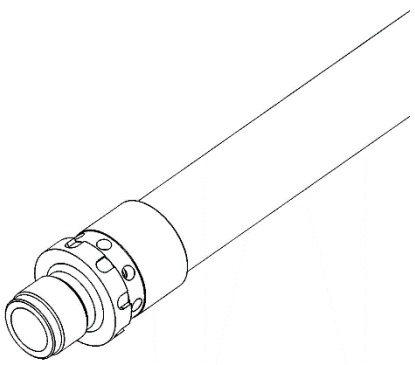
TYPE A

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.



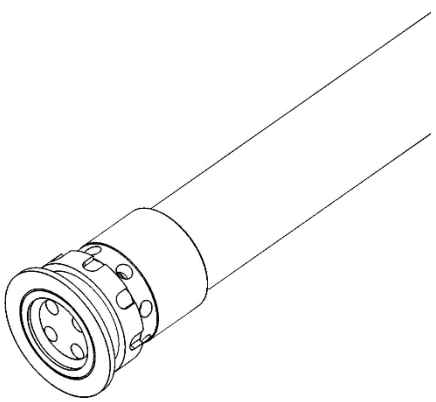
TYPE B

With this design, the fork cartridge threads directly into the fork bottom.



TYPE C

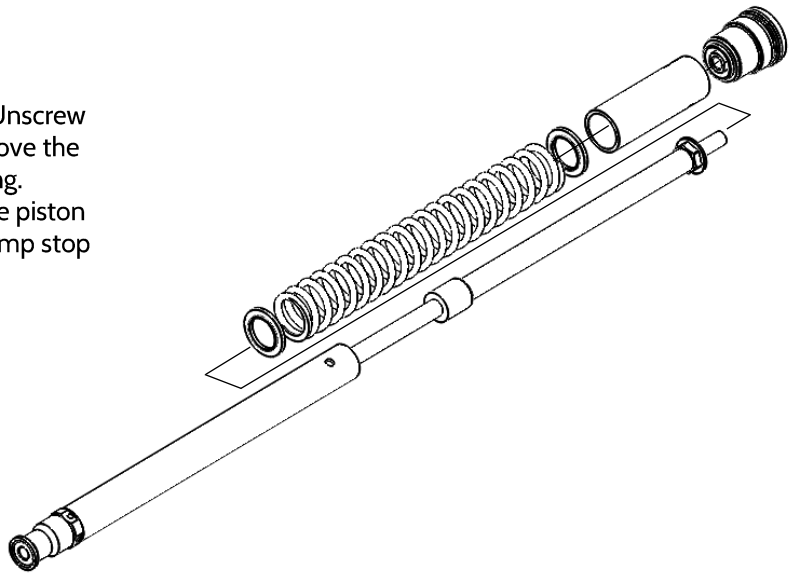
With this design, the lower fork tube must be removed from the fork bottom. A lock ring is then installed in the fork bottom which is then trapped in place by the lower fork tube. The fork cartridge is then screwed into this lock ring.



STEP 1A

Cartridge Preparation

Your cartridge will arrive partially assembled. Unscrew the top cap from the piston rod and then remove the spring spacer tube, upper spring seat and spring. Remove the locknut and two washers from the piston rod, bump stop spacer tube, plastic spacer, bump stop and lower spring seat.



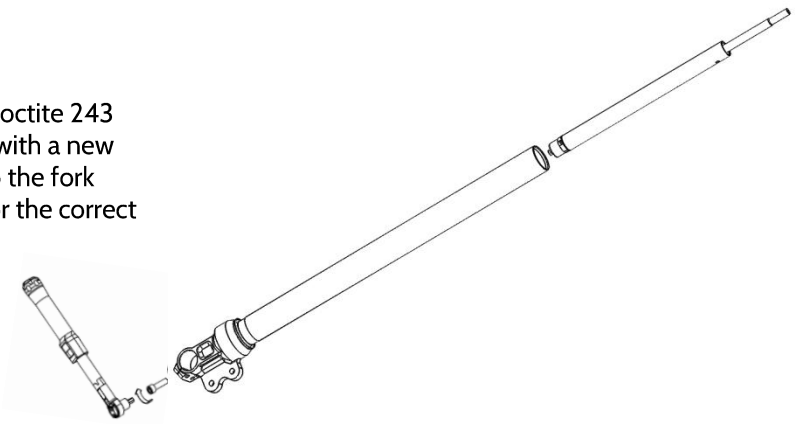
WARNING

Your cartridge kit splits the functions of compression and rebound damping into separate fork legs. The rebound cartridge should be installed in the right-hand fork leg and the compression cartridge in the left-hand leg. Be careful not to mix the two cartridges up. It is advisable to work on one fork at a time.

STEP 2A

Install The Cartridge Into The Fork

Install the cartridge into the fork. Apply Loctite 243 medium strength threadlock to the bolt with a new crush washer and tighten the cartridge to the fork bottom. Refer to your owner's manual for the correct torque setting.



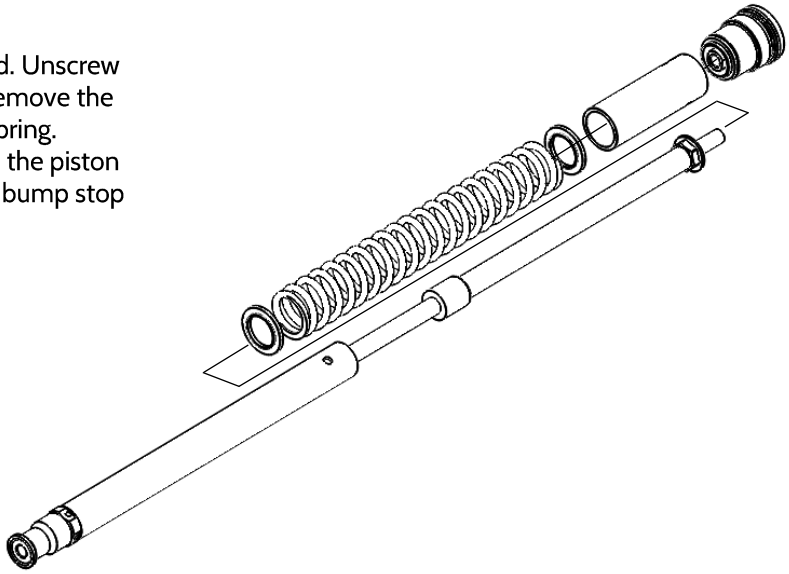
NOTE

*Please turn to the **Final Assembly Instructions** on page 13 to continue your installation.*

STEP 1B

Cartridge Preparation

Your cartridge will arrive partially assembled. Unscrew the top cap from the piston rod and then remove the spring spacer tube, upper spring seat and spring. Remove the locknut and two washers from the piston rod, bump stop spacer tube, plastic spacer, bump stop and lower spring seat.



WARNING

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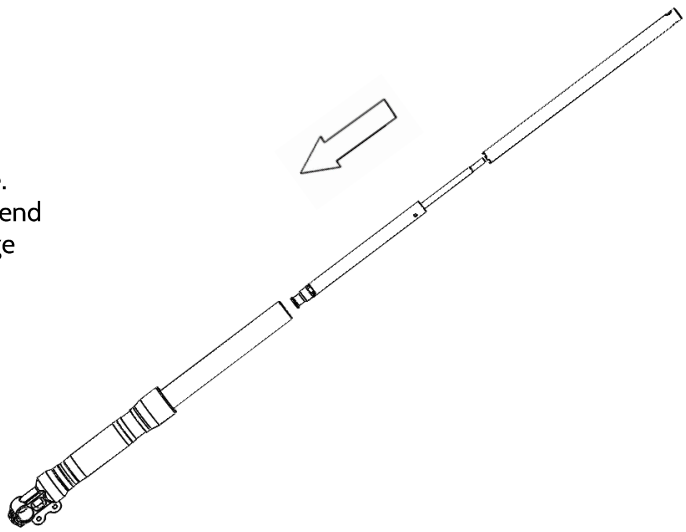
STEP 2B

Install The Cartridge Into The Fork

Carefully insert the cartridge tube into the fork tube. Apply Loctite 243 threadlock to the threads on the end of the cartridge adaptor and then screw the cartridge tube into the fork bottom using tool NTT050404. Torque to 50N/m.

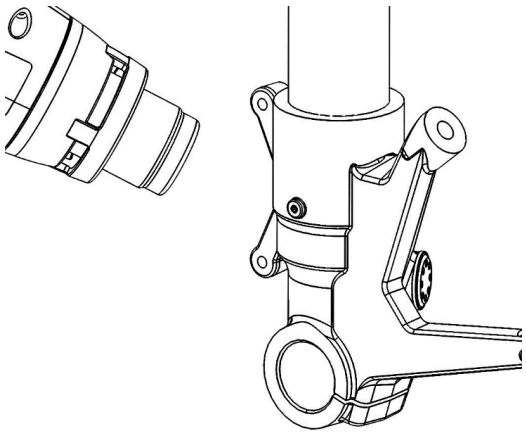


NOTE

*Please turn to the **Final Assembly Instructions** on page 13 to continue your installation.*

STEP 1C
Installation Of Fork Removal Tube

If the seals and/or bushings are not being replaced, the outer fork tube does not need to be removed. Slide the fork tube up as far as possible and install a suitable fork tube removal tool.



STEP 2C
Grubscrew Removal

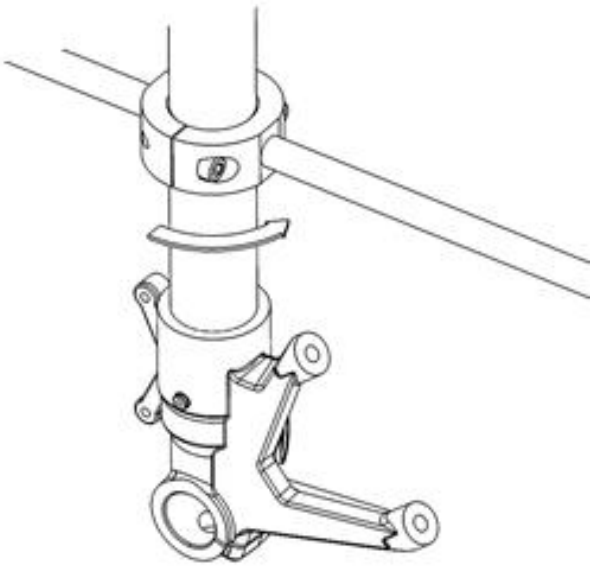
If your fork bottom has a grubscrew, heat the fork bottom to break down the threadlock surrounding the grubscrew. Ensuring the fork is held securely, unscrew and remove the grubscrew.

WARNING

It is imperative that the grubscrew in the fork bottom is removed. Failure to do so will result in serious damage to the lower fork tube!

STEP 3C
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.



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.

NOTE

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 Showa BPF type fork, you will need to remove the original spring preload adjuster parts in your fork bottom. Refer to your manufacturer's manual for the correct tool and procedure.

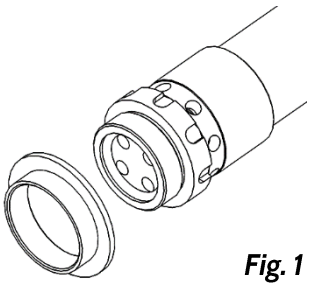


Fig. 1

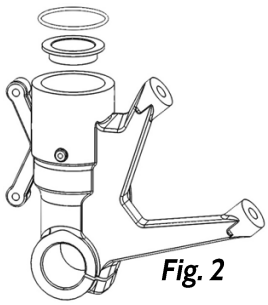


Fig. 2

STEP 6C
Lock Ring Orientation

Unscrew the lock ring from the bottom of the cartridge body tube making a 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. 1*** & ***2*** for Lock ring facing down.
See ***Fig. 3*** & ***4*** for Lock ring facing up.

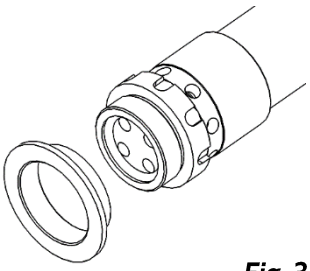


Fig. 3

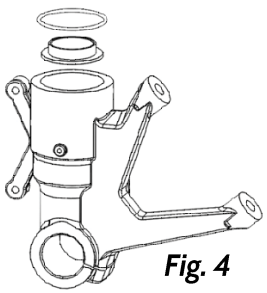


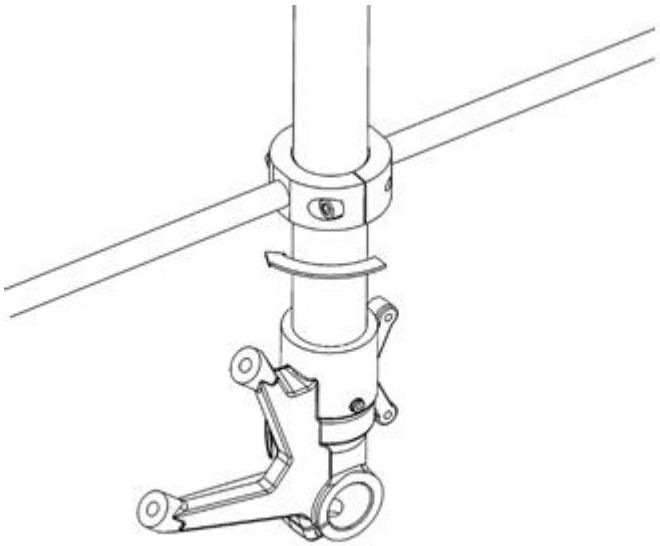
Fig. 4

STEP 7C
Fork Bottom O-ring Installation

Apply grease to the O-ring and install into the fork bottom

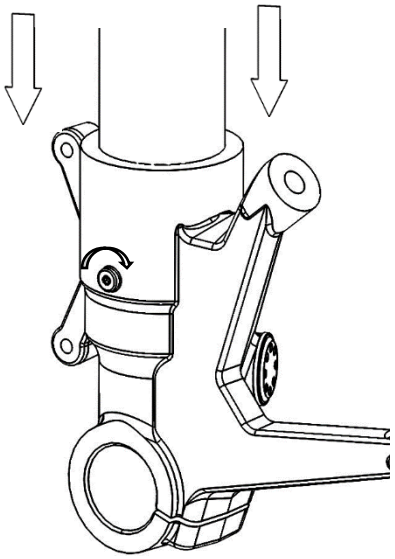
STEP 8C
Fork Tube Installation

Apply Loctite 270 threadlock to the lower fork tube threads and re-install into the fork bottom. Tighten to 120N/m.



STEP 9C
Grubscrew Installation

Remove the fork tube tool and slide the outer fork tube fully down. Re-install the grubscrew using Loctite 270.



STEP 10C
Cartridge Tube Installation

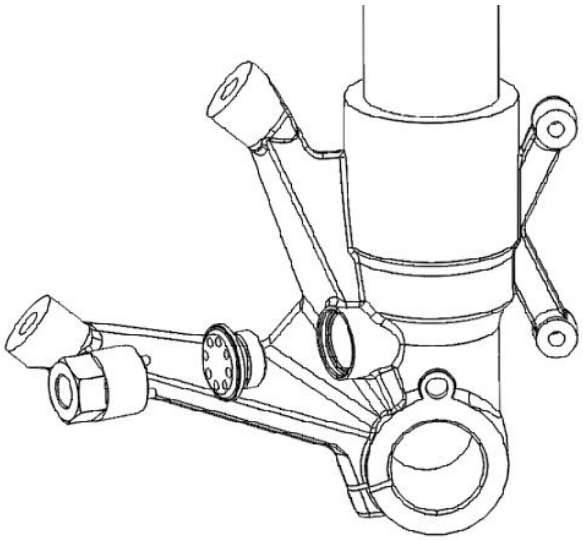
Apply Loctite 243 threadlock to the threads at the base of the cartridge tube adaptor and carefully insert it into the fork tube. Tighten the body tube into the lock ring using tool NTT050404 to 40N/m.

NOTE

The next step is not applicable to all installations. Please check your specification sheet to see if there is a need to install blanking plugs.

STEP 11C
Blanking Plug Installation

If your kit was supplied with blanking plugs to replace the OE preload or compression adjuster parts, apply grease to the O-ring and install them into the fork bottom using tool NTT050025. Tighten to 12N/m.

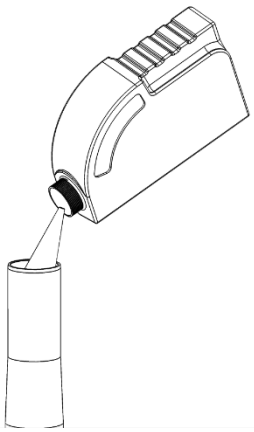


NOTE

*Please turn to the **Final Assembly Instructions** on page 13 to continue your installation.*

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.

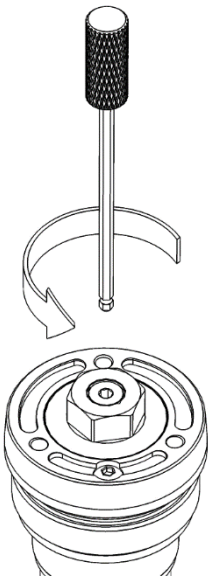


WARNING

For the best damping performance, it is essential to use Nitron O2 suspension fluid.

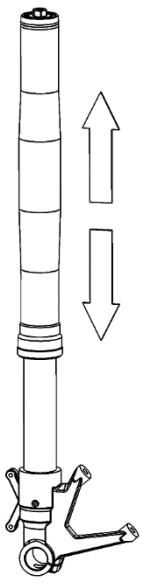
STEP 2
Temporary Installation of The Fork Cap

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.***).



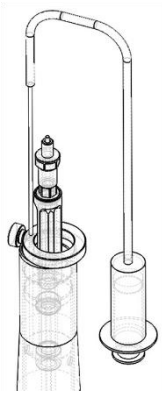
STEP 3
Bleeding The System

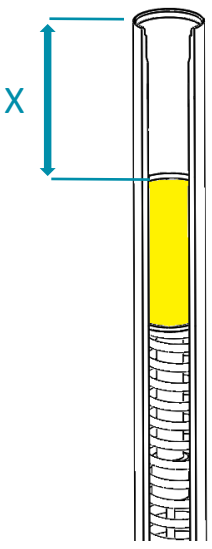
Pull the outer fork tube up and tighten it to the top cap. The air can now be bled from the system by working the outer fork tube up and down. Repeat this approximately 10 times (see ***Fig. 5***).



STEP 4
Setting The Oil Level (Air Gap)

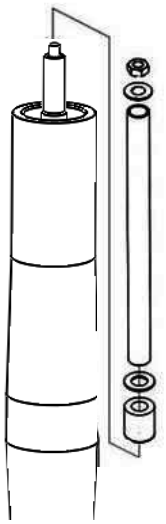
Push the upper fork tube and the piston rod all the way down. Using a suitable oil level tool, add or remove oil to obtain the specified oil height (refer to the specification sheet for your model specific air gap measurement). The quoted oil height is the measurement from the upper edge of the fork tube to the surface of the oil.





STEP 5
Lower Spring Seat Installation

Install the lower spring seat onto the piston rod. Make sure this piece is installed in the correct orientation.

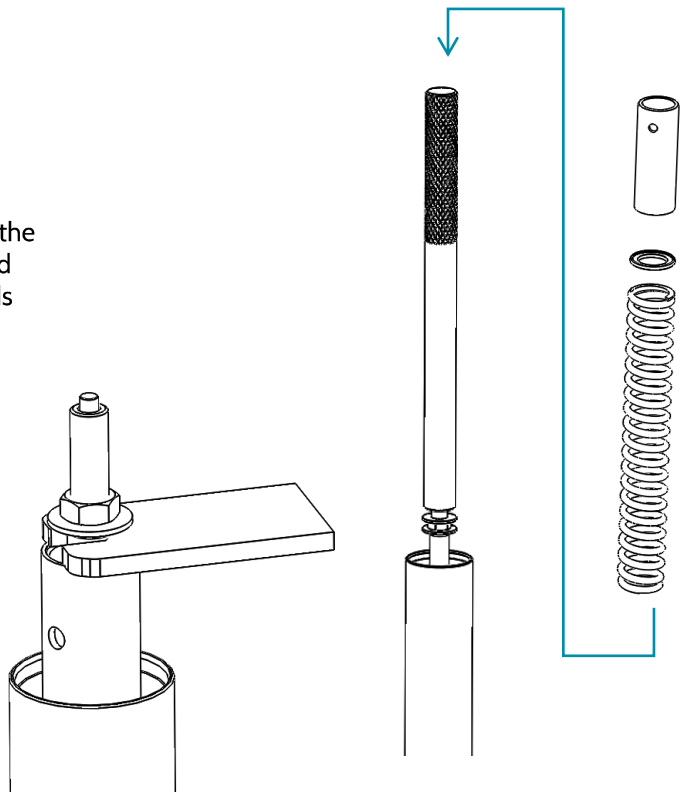


STEP 6
Bump Stop Installation

Install the bump stop, plastic washer, bump stop spacer tube, M10 washer and M10 locknut.

STEP 7
Installation Of The Spring Hardware

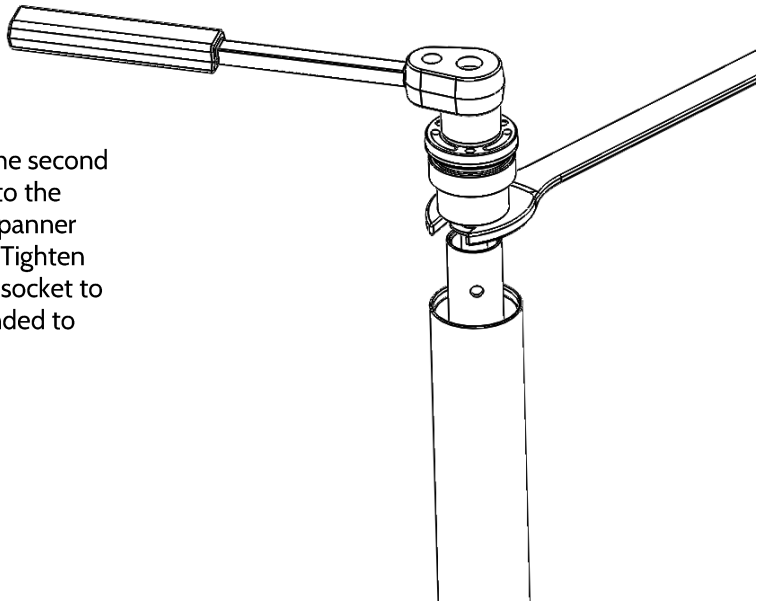
You are now ready to close the fork. Screw NTT050268 – piston rod holder onto the end of the piston rod. Install the spring, upper spring seat and spring spacer tube and pull the piston rod upwards and insert a piston rod holding plate.



STEP 8

Top Cap Installation

Remove the piston rod holder tool. Install the second M10 washer and then screw the top cap onto the piston rod. Hold the lock nut with a 17mm spanner and screw the top cap on to the piston rod. Tighten the top cap to the piston rod using a 14mm socket to 20N/m. A plastic socket insert is recommended to prevent marring the aluminium.



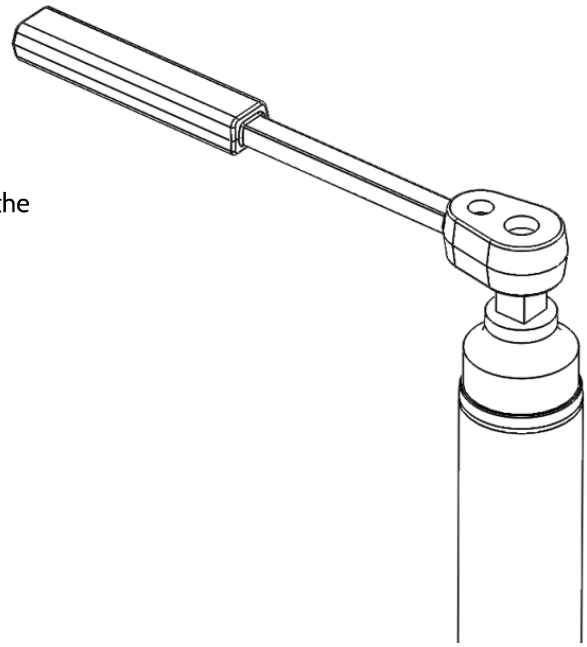
WARNING

Ensure that you have enough exposed thread above the M10 washer to allow the top cap to bottom out on the threads before it meets the washer. Once the top cap has been screwed all the way down, the locknut can then be screwed up the thread to meet the end of the top cap and the two parts tightened. There should be between 25 and 30 clicks of adjustment. If there are more or less than this, the lock nut is in the wrong position.

STEP 9

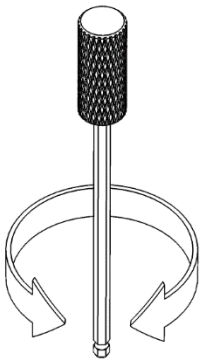
Top Cap Tightening

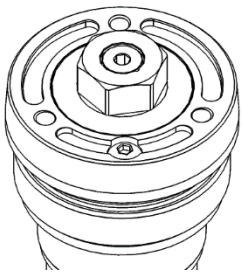
Remove the piston rod holder plate and then pull the inner fork tube up and screw the top cap into it. Tighten to 10N/m.



SETUP

Set the compression and rebound damping adjusters to the baseline settings specified in your model specific specification sheet. Adjustment is made by screwing the adjuster clockwise to its full hard position and then counting the clicks backwards from this point.



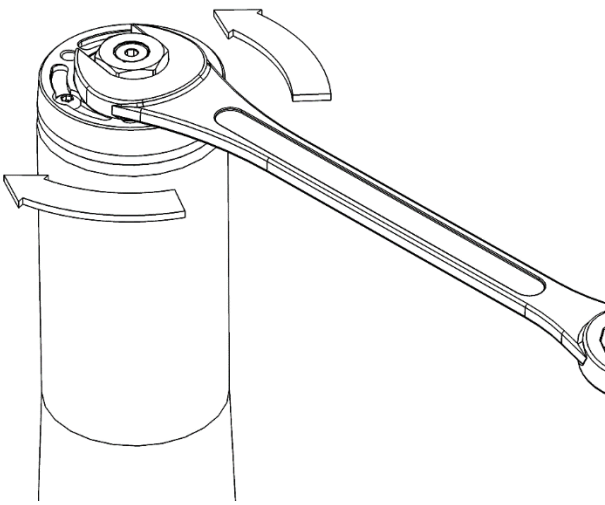


WARNING

Do not force the adjuster at either end of its adjustment range as this may damage the internal components.

Spring preload is adjusted by turning the 14mm hex. Every complete turn of adjustment equals 1mm of spring preload. There are 15 turns of adjustment in total and the setting is referenced as the number of turns from the fully anti-clockwise position.

Adjusting spring preload will change the amount of initial force required to compress the springs a given distance in relation to their rate. 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.



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