



AFRICA TWIN 650/750

**Rear shock service manual
by DM Moto Adventures.**



**Version 0.3
05.02.2021**

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1 Introduction

Hi!

We are Dawid and Marta from DM Moto Adventures :)

Last time we were working on AT rebuild kit as a small side project. It looks like our AT shock absorber is fully rebuilt now and works fine, so we can show you how to rebuild this shock and offer you a rebuild kit.

With this instruction and the rebuild kit, repairing of the shock should be much cheaper than sending it to a professional service. You can also learn how to service shock in your motorcycle - it is always nice too :)

You can use our new reservoir cap like an original one or move the bladder to the opposite side. Thanks to this the oil change in the future will be much easier. Reservoir modification is needed - at least you need to add the gas valve to the cover.

You can also replace the piston rod to make the shock absorber longer. Thanks to this you can rise the bike up to 6cm (2.4in).

In my case oil seal was working for ~25kkm (15k miles), then I sold the bike. 4 years passed since this shock absorber rebuild and it is still working fine! I repaired it without any special tools or knowledge (it was my first shock absorber on the bench).

Just be patient, think twice before every step and it will be fine!

This manual is also available at our YouTube channel: <https://www.youtube.com/c/DawidMartasMotoAdventures>

Part1: Rear shock disassembly: <https://youtu.be/luo3R10weyo>

Part 2: What's inside, new parts, tuning, oil change methods: <https://youtu.be/fmiq-SgIHMk>

Part 3: Rear shock assembly: <https://youtu.be/vu0mbvVnpAk>

2 Changelog

Here you can track all changes from the initial version of this instruction.

Always make sure you use the newest version.

Date	Version	Change
1.05.2020	0.1	Initial version of this manual, only RD07A
19.08.2020	0.2	RD03 update
05.02.2021	0.3	RD04 and RD07 update, major instruction update
?	0.4	Work in progress :)

If you have any question, you found an error or you want to add something

→ send us an email or contact us by FB to make this instruction better.






Check for the newest version at:

<https://dmmotoadventures.com/shock-absorber-service/>

3 New Parts

Here you can see our repair kits and other parts.

To chose which rebuild kit you need use the table below.

		AT model you own	
		RD03/04/07	RD07A
I want an inverted bladder 	-	KIT#3	KIT#3
I want a normal bladder 	I want a new, ready to install cap 	KIT#3	KIT#3
	I already have a gas valve 	KIT#1	KIT#1 (you need to drill a vent hole in the seal head)
	I don't have a gas valve 	KIT#2	KIT#2 (you need to drill a vent hole in the seal head)

3.1 Rebuild KIT#1

Basic repair kit (oil seal, slide bushing, dust seal with adapter, seal head o-ring, reservoir cap o-ring, piston nut, compression adjuster o-rings). Used during shock absorber rebuild with already mounted gas valve.

To every kit we also add sag helper, see chapter 3.5

<https://dmmotoadventures.com/shop/rear-shock-rebuild-kit-1-for-africa-twin-rd03rd07rd07a/>



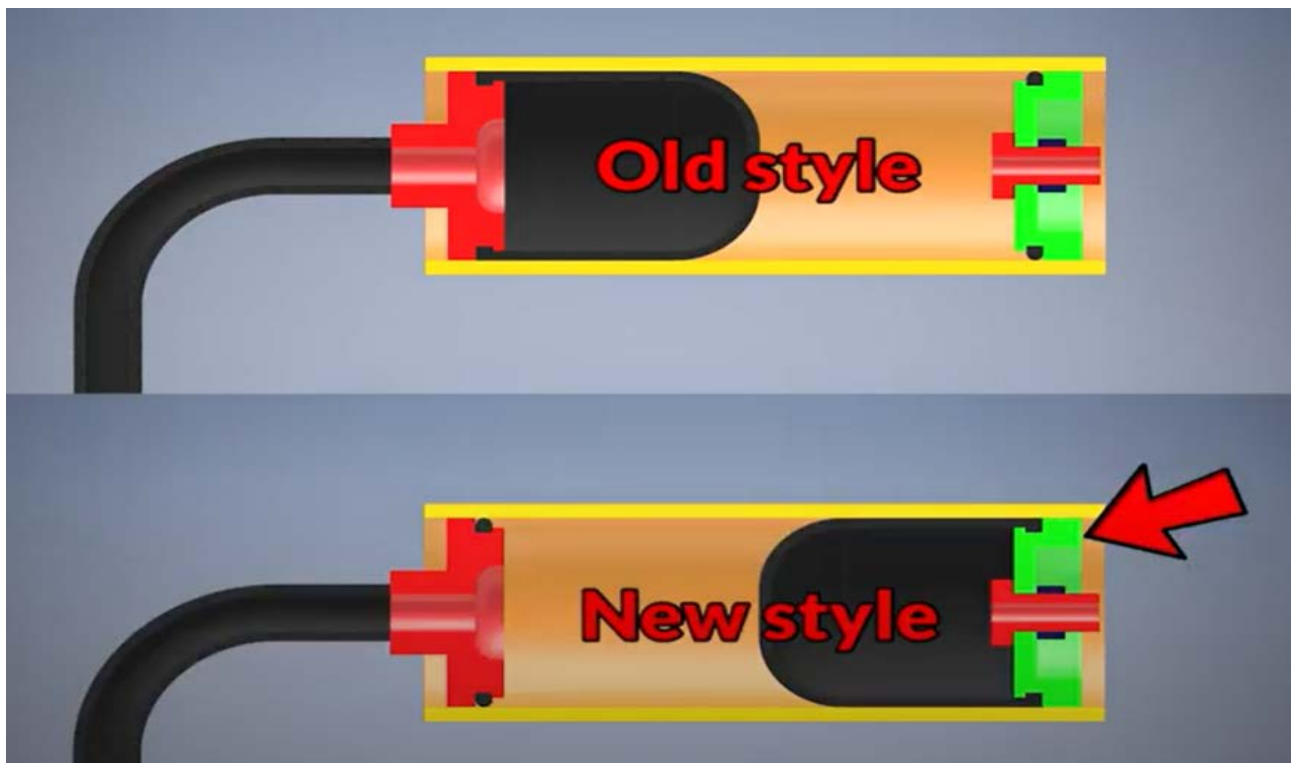
3.2 Rebuild KIT#2

Basic repair kit + gas valve + o-ring for original reservoir cap.
Used during first shock absorber rebuild without mounted gas valve.

<https://dmmotoadventures.com/shop/shock-rebuild-kit-2-for-africa-twin-rd03rd07rd07a/>



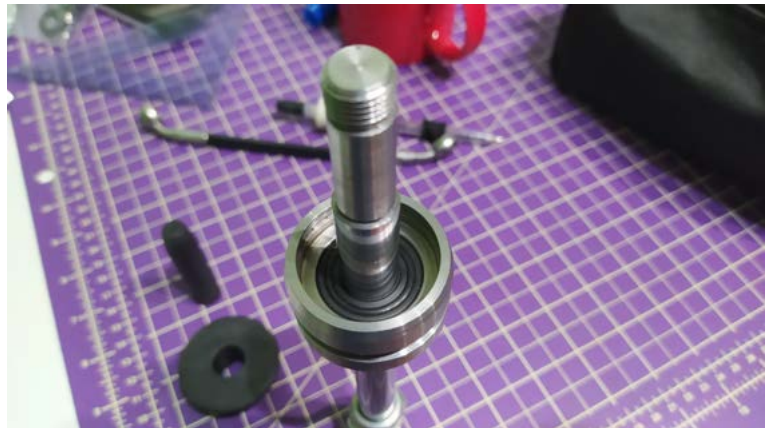




Bladder position: old style and new style. You can use our reservoir cap in two ways.

3.4 “Help tools”

During assembly there is a risk of damaging oil seal or slide bushing on the piston rod thread. Oil seal may also fall out during mounting seal head on the rod. Those tools were created to make the shock absorber service easier and **we add those tools to every order for free.**



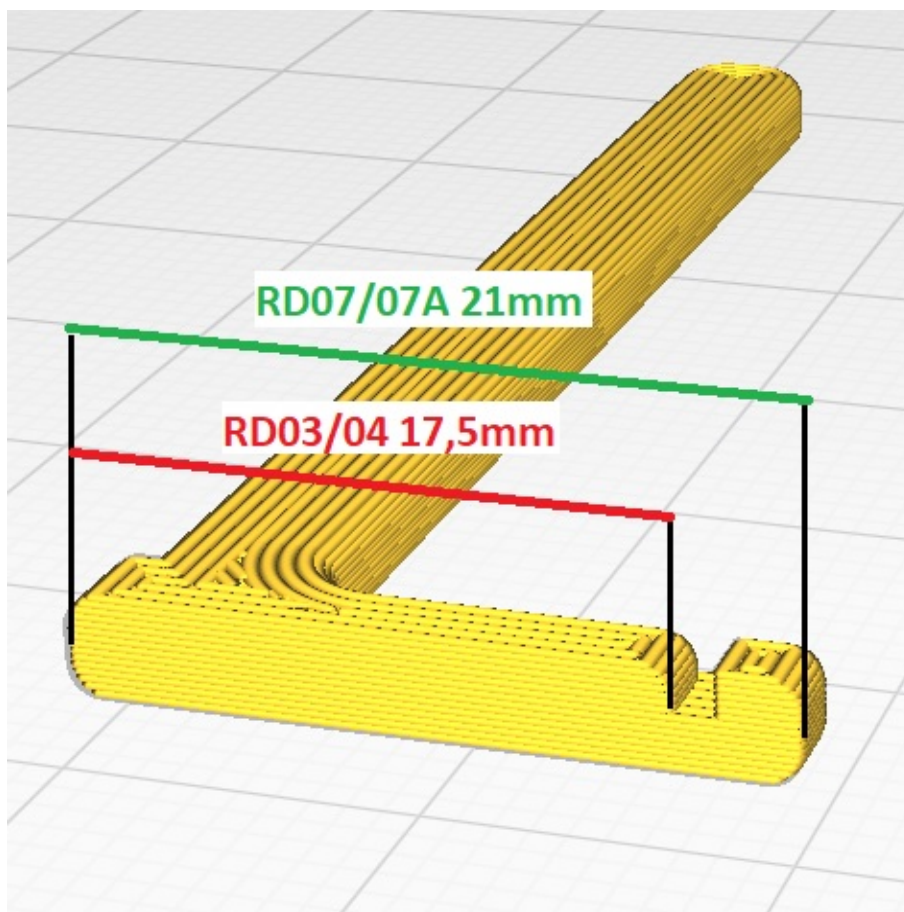
3.5 SAG helper:

After shock rebuild we should set the spring preload to a specific value :)

When we sit on the motorcycle, the shock absorber should be compressed by 30% of its travel. The shock travel depends on the AT model, you can see it in following table (I measured it without a bump stop):

Model	Shock travel
RD07/07A	70mm
RD03/04	58mm

In RD03/04 it should be 17,5mm. In RD07/07A is 21mm. I designed this little helper stick:



When you are RD03 or RD04 owner you need to cut off end of this tool using scissors. When you want to set sag in RD07 or RD07A you use this stick without any modifications.

During this procedure your bike needs to be equipped with a centre stand or you need to have access to a motorcycle lift.



There is one o-ring to put on the piston rod when you don't use plastic mudguard under the spring.



Or you can use original mudguard under the spring with a second, bigger o-ring. This one is mounted on the shock absorber tube.

To measure the sag you push the o-ring up (o-ring on the rod, no mudguard) or you push it down (o-ring on tube, with mudguard).

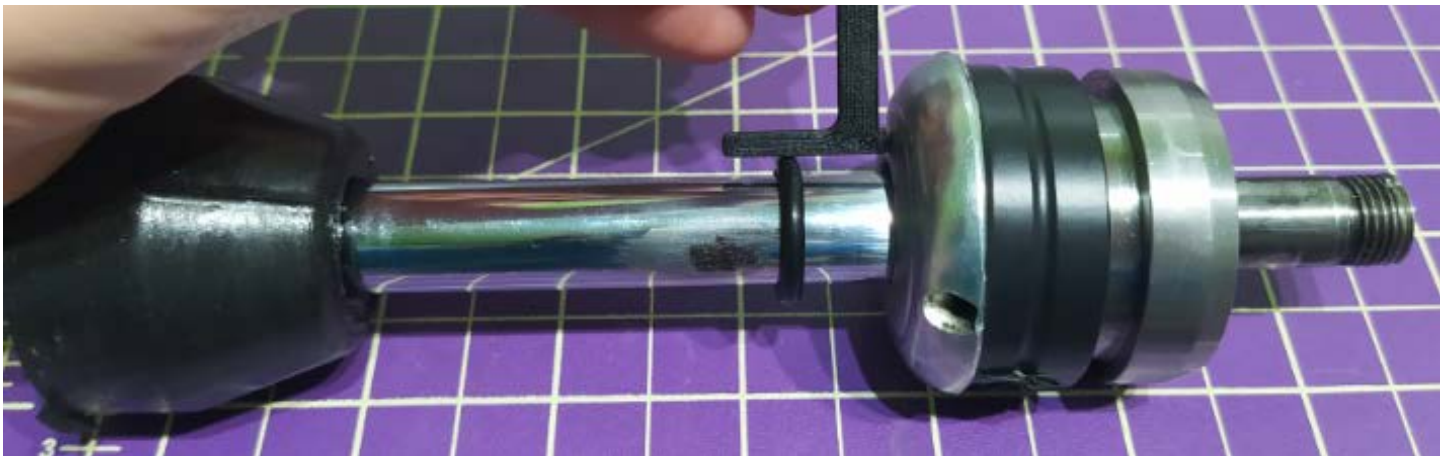
Next you sit on the bike. During shock absorber compression o-ring will be pushed and it will stay in this position. Next we get off the bike and we put it on the centre stand or we lift it using a motorcycle lift.

Now we check the sag, and if correction is needed we adjust spring tension and re-check new sag.

Perfect sag should look like this:



In following picture sag is too small, you need to unscrew the spring adjuster or change the spring to a softer one.



In following picture sag is too big, you need to screw in the spring adjuster or change the spring to a stiffer one.



This procedure is the same when we use a mudguard under the spring and the o-ring on the shock absorber tube.

3.6 Other parts:

New piston rod with rubber bumper holder. There are two types:

RD03/04: (available soon)

RD07/07A: (available soon)



Braided hose connecting shock absorber with reservoir. There are 3 types:

RD07A: <https://dmmotoadventures.com/shop/stainless-steel-braided-hose-for-the-reservoir-for-africa-twin-750-rd07a/>

RD07: (available soon)

RD03 and RD04: (available soon)



There is a difference in the inner diameter between original hose and the braided hose, you can see it in next photos. Unfortunately, I've never tested it on the dyno to see, if there is a noticeable difference in the damping force between these two. Though, during maximal stroke there is less than 10ml of oil flowing to the reservoir.



Braided hose vs. OEM hose inner hole diameter



Braided hose RD07A fitting vs RD03/04 fitting inner hole diameter.

All parts from this service manual are available at our Facebook page or Internet shop (or just write email to us).

Internet shop: <https://dmmotoadventures.com/shop>

Facebook shop: <https://www.facebook.com/pg/DMMotoADVentures/shop>

E-mail: contact@dmmotoadventures.com

4 Cheat sheet

Some useful data for Africa Twin shock absorbers.

4.1 Parts o-rings and seals dimensions

In next table you can see dimension of all important seals

Model	Part name	Parameters (dimension in millimeters)
RD07/RD07A	Oil seal	14x26x5 (original), 14x26x6,5 (our)
	Dust seal	14x22x4 + adapter ID:22
	Seal head o-ring	32,92x5,53
	Slide bushing	14x12
	Reservoir cap o-ring (original)	35x2,5
	Reservoir cap o-ring (our 2 in 1 solution)	28x5
	Spring	Free length 245mm, rate 70kg/cm, ID:57, OD:81
	Gas pressure	14-15bar (203-217 psi)

RD03/RD04	Oil seal	14x26x5 (original), 14x26x6,5 (our)
	Dust seal	14x22x4 + adapter ID:22
	Seal head o-ring	32,92x5,53
	Slide bushing	14x12
	Reservoir cap o-ring (original)	35x2,5
	Reservoir cap o-ring (our 2 in 1 solution)	28x5
	Compression adjuster o-ring (inner)	4x1,5
	Compression adjuster o-ring (outer)	12x2
	Reservoir hose o-ring seal	9,5x2
	Spring	Free length 240mm, rate 100kg/cm, ID:57, OD:85
	Gas pressure	14-15bar (203-217 psi)

4.2 Compression and rebound shim stack table.

In next table you can see how the compression and rebound shim stack are built. Data is in following format:

Outer Diameter [mm] x Thickness [mm] number of washers [pcs]

Stack\Model	RD07A	RD07	RD04	RD03
Rebound stack base	?	?	Washer 25,7mm x 3,15mm	Washer 25,7mm x 3,15mm
Spacer	?	?	-	-
Rebound stack layer 2	?	?	-	-
Spacer	?	?	16,3mm x 0,4mm 1pcs	16,3mm x 0,4mm 1pcs 15mm x 0,2mm 2pcs
Rebound stack layer 1	?	?	25mm x 0,3mm 6pcs 26mm x 0,3mm 9pcs	26mm x 0,3mm 9pcs
PISTON	PISTON	PISTON	PISTON	PISTON
Compression stack layer 1	?	?	34mm x 0,3mm 3pcs	34mm x 0,3mm 2pcs
Spacer	?	?	20mm x 0,1mm 1pcs	16mm x 0,15mm 1pcs
Compression stack layer 2	?	?	34mm x 0,5mm 8pcs	34mm x 0,5mm 7pcs
Spacer	?	?	22mm x 0,1mm 2pcs	17mm x 0,15mm 2pcs 34mm x 0,5mm 3pcs
Compression stack base	?	?	Washer 37mm x 4mm	Washer 37mm x 4mm 16,3mm x 0,4mm 1pcs

If you don't need our rebuild kit, but this manual was helpful for you and you were able to save money on service you can support us by sending a tip for a beer or a gas for our bikes for the next trips :)



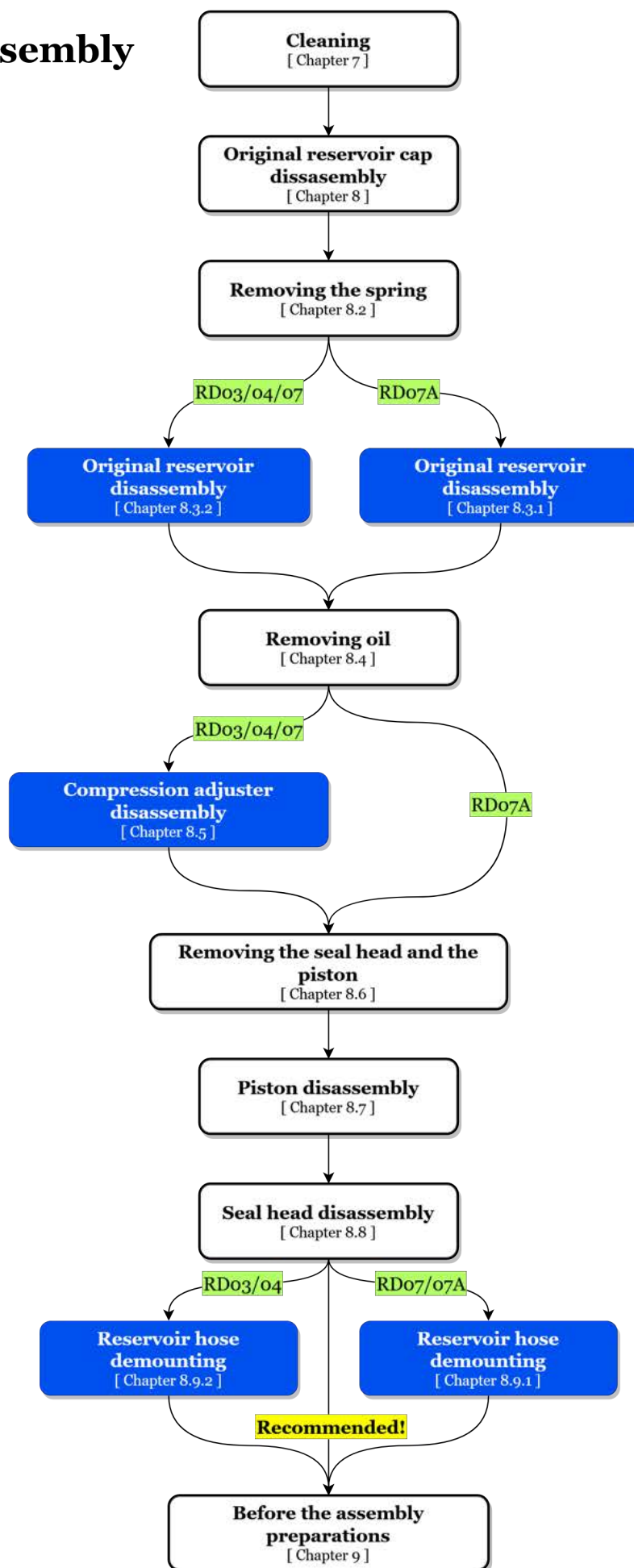
PayPal: <https://www.paypal.me/DMMotoAdventures>



4.3 Disassembly guide

To have better overview on how to disassembly the shock absorber see the following diagram.

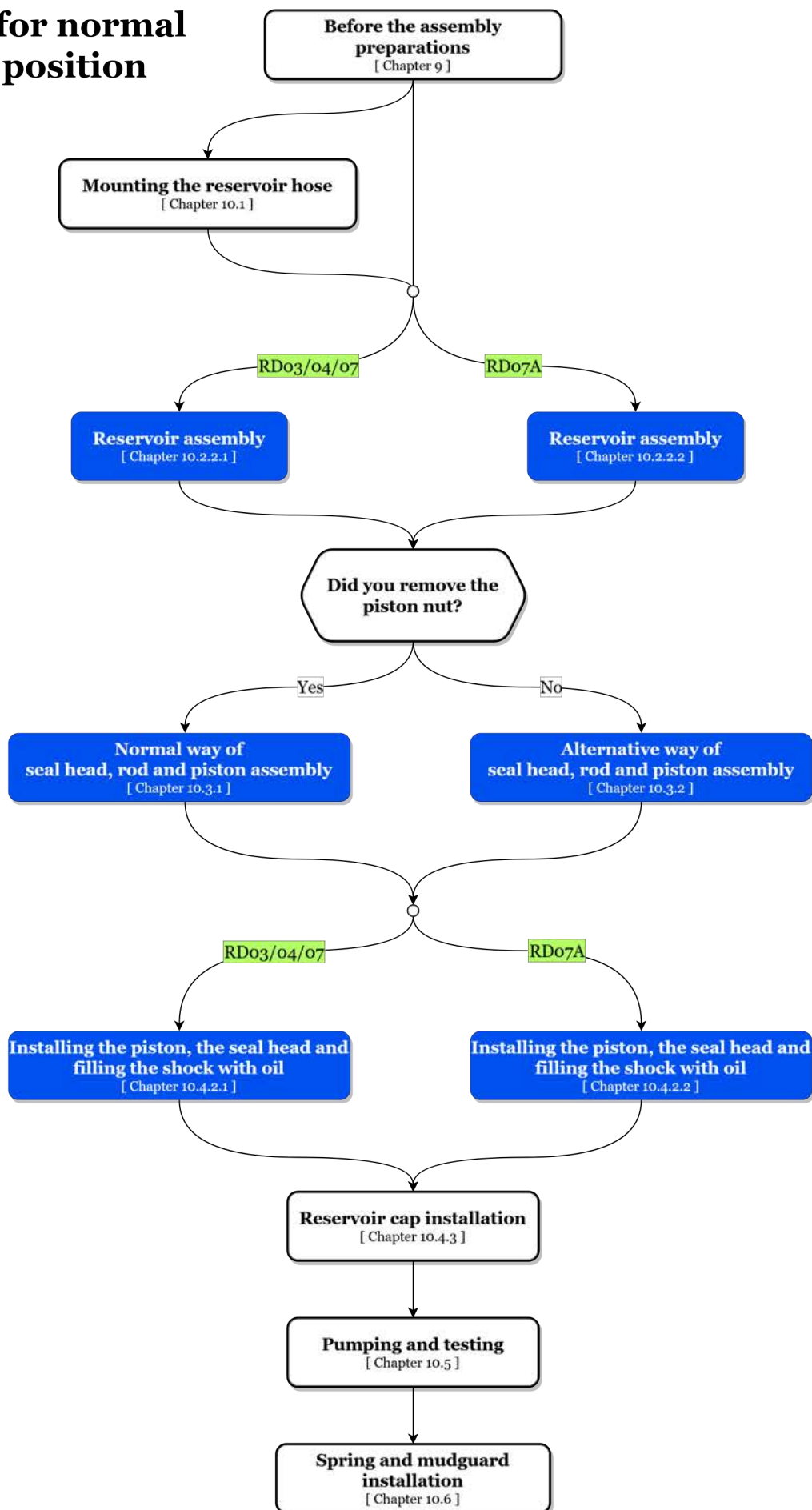
Disassembly



4.4 Assembly guide, normal bladder position

To have better overview on how to assembly the shock absorber with a normal (like OEM) bladder position, see the following diagram.

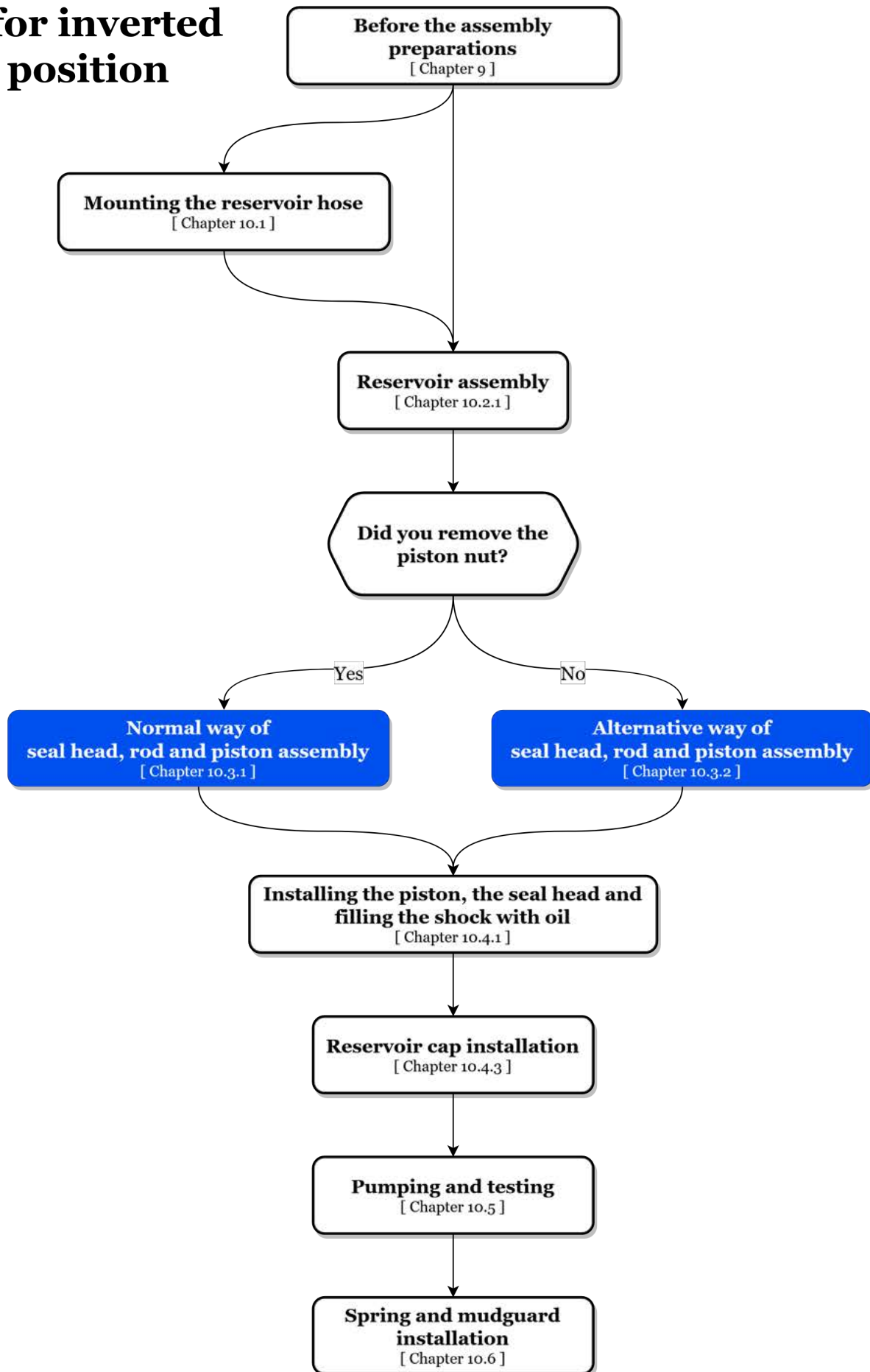
Assembly for normal bladder position



4.5 Assembly guide, inverted bladder position

To have better overview on how to assembly the shock absorber with inverted bladder position, see the following diagram.

Assembly for inverted bladder position



5 FAQ – frequently asked questions

Here may be your question... feel free to ask.

6 Useful tools:

Before you start it may be nice to collect these items.

Item/Tool	Needed for
Drill and drill bits: 1,5mm, 3mm, 5mm, 7,8mm	1,5mm: only RD07A seal head vent hole 3mm: piston nut, reservoir cap 5mm: reservoir cap 7,8mm: reservoir cap
Thread locking fluid medium and strong	Medium: piston nut, bottom stem Strong: Schrader valve
Silicone	Schrader valve additional seal
Tap M6	Pulling out reservoir cap
Die M12x1,25	Piston rod
Schrader valve removal tool	
Rear shock absorber oil	I use IPONE Monoshock. 3W oil. You can use any similar oil dedicated to rear shock absorbers.
Mountain bike shock pump or nitrogen charging station	
Spring compressor	Only needed while using aftermarket, longer spring. You don't need this to work with OEM shock.
Oil bleed tool: rubber hose (OD:8mm) connected to small container	It works only with RD03/RD04/RD07. You can bleed the shock through compression adjuster. In RD07A there is no compression adjuster so you need to drill a hole in seal head or use our 2in1 reservoir cap.

7 Before we start - Clean it!

Cleaning the shock absorber with pressure washer or parts cleaner will help during disassembly.



I use small parts cleaner. You should concentrate on cleaning securing ring grooves to make them easier to remove.



Next I use air blow gun to clean grooves even better and to dry the shock absorber.

8 Disassembling

Now we will disassembly the shock absorber :)



8.1 Original reservoir cap

We start with depressurizing the shock's reservoir and removing the cap. This step is common for all AT models.



That's how an original shock looks like. You may notice there is no air valve in the reservoir cap. Disassembly of this is a little complicated.



If you want to reuse the old reservoir cap, use a center punch tool before drilling in it. It is important to drill at the center in this case.



During drilling use a short drill bit. There is very big possibility of destroying the bladder.

Start with 3mm drill bit, 1cm. (0,5in.) drill bit length bit is enough!

Use eye protection! Gas under pressure may blow metal shavings into your eye!



You can limit the drill length using aluminum tube.

Reservoir cap may collapse after depressurizing and you may reach bladder even with a short drill bit.



Enlarge the hole with 5mm drill bit.



Thread the hole using M6 tap.



To move down the air can cap hit reservoir cover gently with a hammer through a piece of wood. You can also use a rubber hammer instead.



Now we remove the air can cap securing ring. After that we clean this area using a brake cleaner.



Now we screw in a hook bolt or a bolt with a big washer. It will be easier to pull the reservoir cap harder.



In this case I used a weight plate as a big washer.



After one pull, the cover is separated from the reservoir.

8.2 The spring

Next step is spring removal. There is only a small difference in **RD07**.



Use a special hook wrench, a punch tool or a big flat screwdriver to loosen the spring adjuster locking nut.



Next we loosen the spring adjuster. You can grab and rotate the spring – the spring adjuster should rotate with the spring. Later you can turn spring adjuster by hand.



Only RD07 locking washer is divided to 2 parts. After loosening the spring you can remove both parts of the washer and remove the spring.



Now we slide the spring up. Just above the stem is a nut (rubber bumper holder) and you should be able to hold it using a flat wrench 22mm.



Use a piece of wood, metal pipe or a big wrench to unscrew the stem.



Next we demount the big flat washer holding the spring.



Now we remove the metal collar, spring and plastic mudguard.



Removed parts.

8.2.1 Additional tools needed

You don't need any special tools to remove the spring in original shock absorber from RD03/04/07/07A.



In some cases (longer aftermarket spring, additional spacer) you need to use spring compression tool.

You can use a car spring compressor. Motorcycle spring is smaller in diameter and you will be able to fit only one hook from two (you can see it in the photo), but it works.

Be careful while working with springs. There is a lot of energy stored in compressed spring and it may be dangerous when one hook slip from the spring. Compress it as minimum as possible and keep fingers away!

8.3 Reservoir

Reservoir disassembly in RD07A is described in chapter: 8.3.1

Reservoir disassembly in RD03/04/07 is described in chapter: 8.3.2



If there was an oil leakage, the bladder may be collapsed. But if there are no cracks it should work again.

8.3.1 Reservoir (RD07A)

Now we will disassembly reservoir in RD07A.



We push in the second air can cover (you can also hit it gently using a hammer)



Again we remove the securing ring



We pull the cover. Removing it out from the reservoir can should be much easier than the first cap.

8.3.2 Reservoir (RD03/04/07)

RD03/04/07 is a little different, because there is compression adjuster build in the bottom reservoir cap.



This securing ring is difficult to remove, because of lack of space.

First try to clean this area as good as possible. To remove the ring you need to press in the cap and use small screwdriver and piece of metal sheet (or old feeler gauge). **It is difficult, but possible.**



To fully remove the securing ring, rotate the reservoir body while you take out one end of the securing ring.



In photo above you can see reservoir cap with bladder, without reservoir body.

It may be nice to inspect and clean everything, but you can also omit this step and leave the bladder inside the reservoir. In this case you will remove old oil through the compression adjuster valve.

8.4 Removing the oil

If you are lucky there is oil after 30 years :D



Remove bladder from the reservoir bottom cap.



Then pump the shock absorber to remove the oil.

Yes, this oil looks like ...

8.5 Compression adjuster (RD03/04/07)

Only RD03/04/07 shock absorbers are equipped with the compression adjuster.



To remove compression adjuster valve you need only a flat wrench.



Under compression adjuster valve are **thin metal washer** and its **seat**.

In most cases the seat will stay in the reservoir cap, but don't leave it there. Take it out and put it into safe place.



To disassembly the valve we screw in the adjuster screw.

Adjuster screw may be damaged. File any sharp edges to avoid scratching inner surface of the adjuster.



The valve end will fall off during screwing and the valve screw will be free.

8.6 Removing seal head and piston

Now we will remove the piston from the shock absorber body. This step is common for RD03/04/07/07A.



Use some old knife to push out metal cover a little.

Hold it steady and don't hit too hard. Knife may slip and hit piston rod.



When there will be a bigger groove you can switch knife to a heavy duty punch tool. But don't hit it too hard with a hammer to avoid damaging the cover.



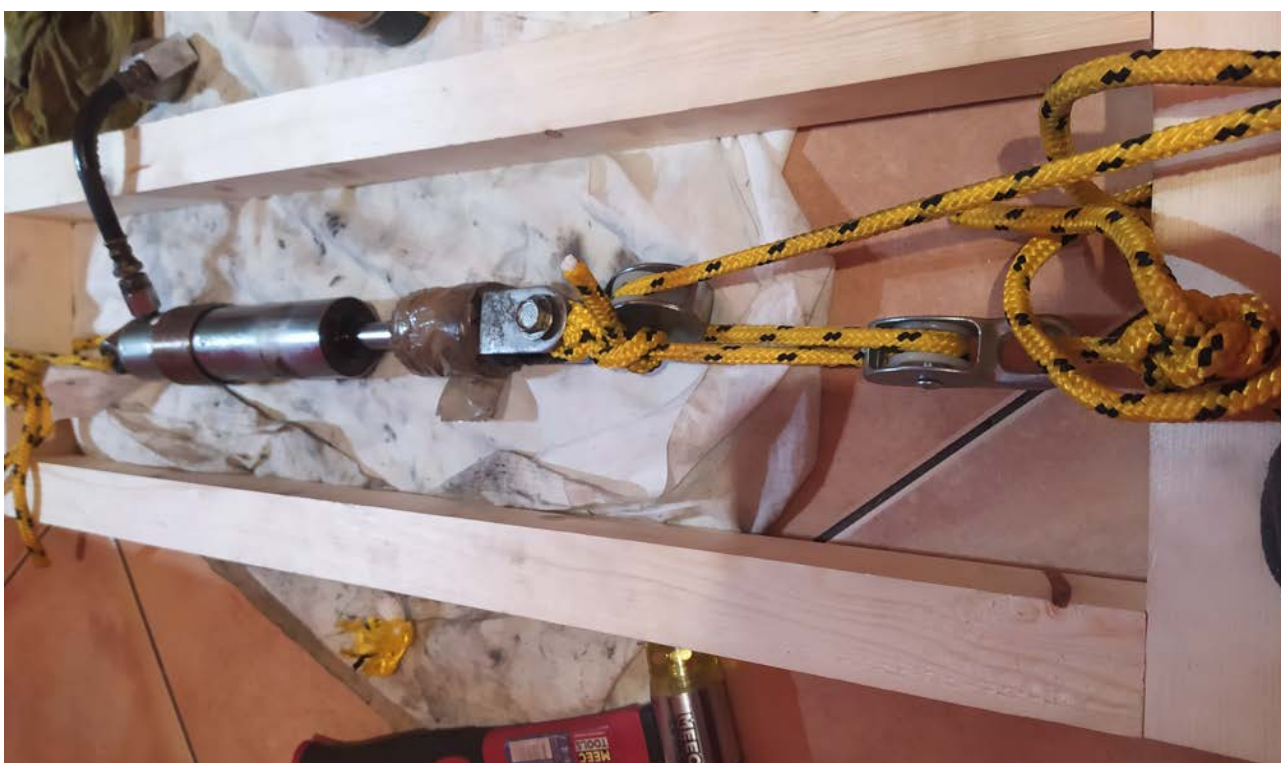
Remove dust seal using a flat screwdriver.



Push in the seal head and remove the securing ring.



Now screw in the stem you removed, when you were removing the spring.
Put a piece of metal through the stem and pull the shock absorber body up.



You can also make a simple tool to pull out the piston and the seal head.
Sometimes it is hard to remove, especially in RD03/04.

8.7 Piston

Now we demount piston from the rod.

Before next step screw back bottom stem and torque it.

The stem must act like a lock nut for rubber bumper holder nut.



Original nut is locked by punch tool in 2 places and it is hard to remove.



To unscrew the piston nut you can use an impact wrench, but after using it the thread is damaged. I don't recommend this method anymore, because I've found better solution.



You need to drill two small holes in places, where the nut was punch locked. I use 3mm drill bit for it.

Try to drill mostly in the nut, only touch rod thread a little.

Anyway it causes smaller damage to the thread than using brutal force.

Next you should file the rod around, above the nut, using a rotary tool, like in the photo below.





Piston is ready for disassembly now.



Slide out the shim stack from the piston rod to a screwdriver or a bolt and secure it with zip tie.



Remove the seal head, the metal cover and the rubber bumper.



Now to repair the rod thread use die M12x1,25mm



Use a rotary tool to grind sharp edges on the top of the piston rod.

Use eyes protection!

8.7.1 Ooops ... problem

When we were unscrewing the piston nut, we unscrewed the rubber bumper holder with the stem and there is no chance to unscrew the piston nut.



The piston rod may be punch locked too much. Luckily, we can service the shock from the second side :)



Leave the piston nut and go on.

8.8 Seal head

Now we disassemble seal head. It is same in RD03/04/07/07A



First remove the rebound rubber bumper



Next remove the big washer securing the oil seal



Push out the old oil seal using a screwdriver



Remove the last small washer securing the slide bushing



To remove the slide bushing we need to grind it a little using a rotary tool.

Grind near place, where 2 parts meet together.



When the slide bushing is very thin we can use a small screwdriver to bend one edge. Push screwdriver in place where 2 edges met together and hit it gently with a hammer.



You can grab the edge with pliers, turn it and pull it out.
Our seal head is completely disassembled now!

8.9 Reservoir hose

Reservoir hose disassembly in RD07/07A is described in chapter: 8.9.1

Reservoir hose disassembly in RD03/04/ is described in chapter: 8.9.2

It is not recommended to unscrew rubber hose connecting reservoir with the shock absorber.

Replace the hose only when original hose is damaged or it is leaking.

Making this connection sealed is hard to achieve.

Make a photo or measure angles before unscrewing the hose, to mount it in same way during the assembly.

8.9.1 Reservoir hose (RD07/07A)

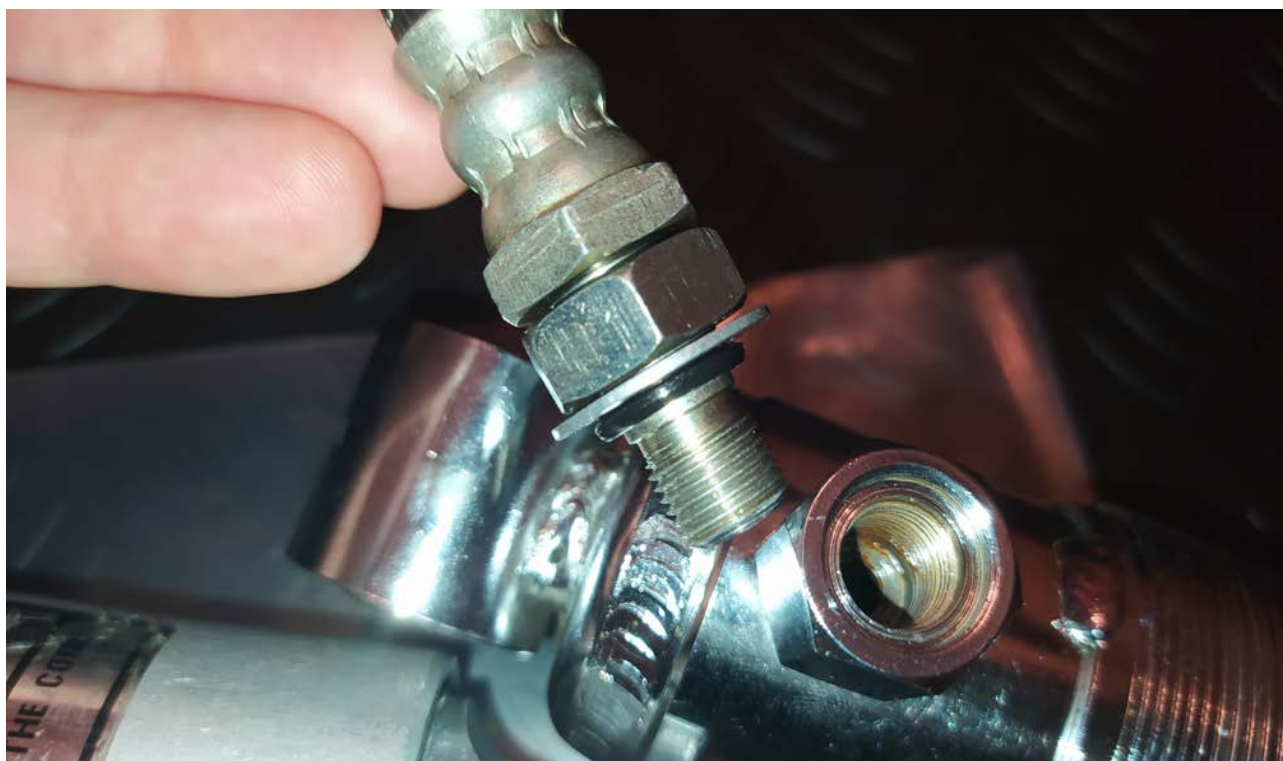
In **RD07/07A** There are 2 banjo bolts (M10x1) holding the hose connecting the shock absorber body to the reservoir cap. The hose in RD07 and RD07A is sealed by copper crush washers.



8.9.2 Reservoir hose (RD03/04)

In RD03/04 rubber hose is sealed by 2 o-rings.

In the shock absorber body and in the reservoir cap you can see o-ring grooves.



9 Before assembling back the shock

Before we assembly shock back we need to clean it and prepare the reservoir cap.

9.1 Cleaning

We need to clean all the parts. Make sure there is no dirt in o-ring grooves or any corrosion. I like to use a rotary tool with a brass rotary wheel to clean the o-ring grooves.

Actually cleaning process takes much longer than shock absorber assembly or disassembly.



At the end I rinse parts with water and dry them with air blow gun.

9.2 Preparing inner surfaces

You can use a fine/super fine sand paper to clean the shock absorber inner tube and the reservoir inner tube and to remove any scratches or corrosion. I've made special tool for this, but you can also use a regular sand paper.



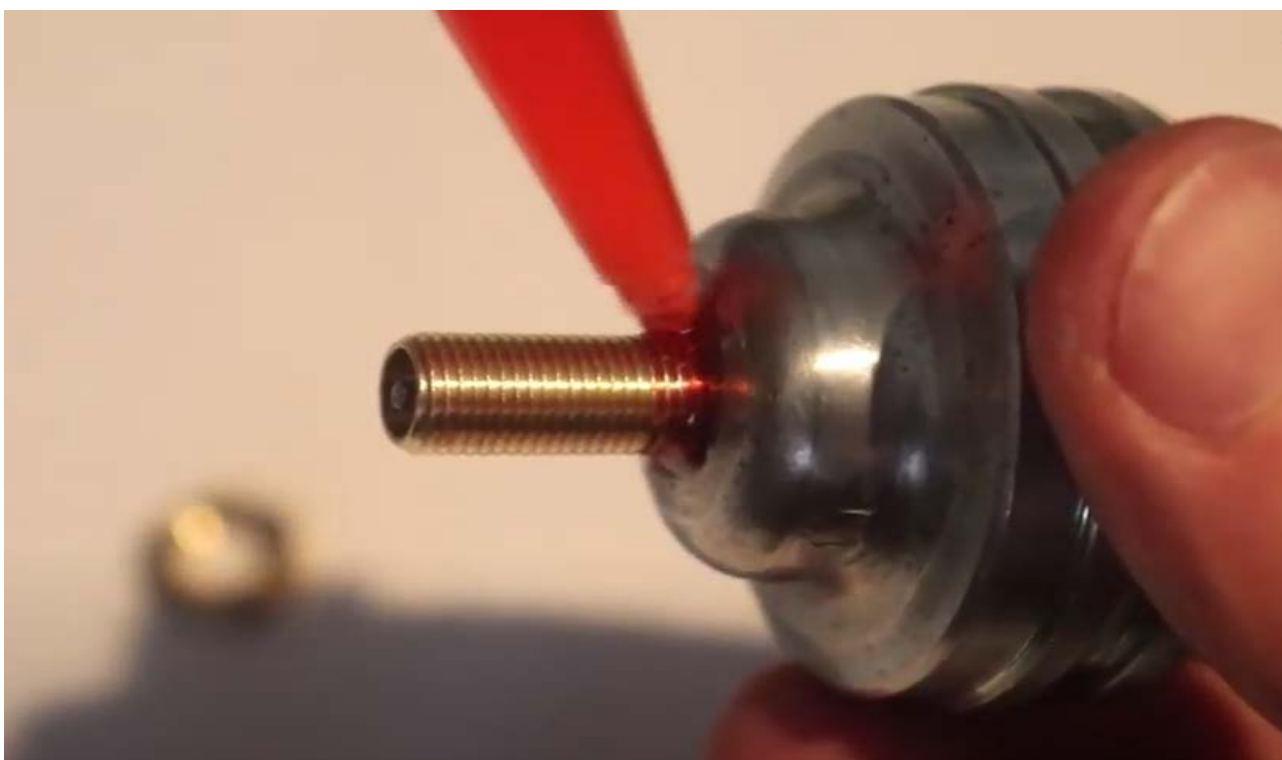
Inner surface must be without any scratches. Otherwise oil or gas may escape.

9.3 Adding a gas valve to the reservoir cap

You need to add a gas valve to every shock absorber to pressurize the oil after assembly. You can use the gas valve from our KIT#2, you can screw in the valve from an inner tube ... anyway you need a valve.



Enlarge the hole in the reservoir cap to 7,8mm.



Use red (strong) thread locking fluid on the valve thread.



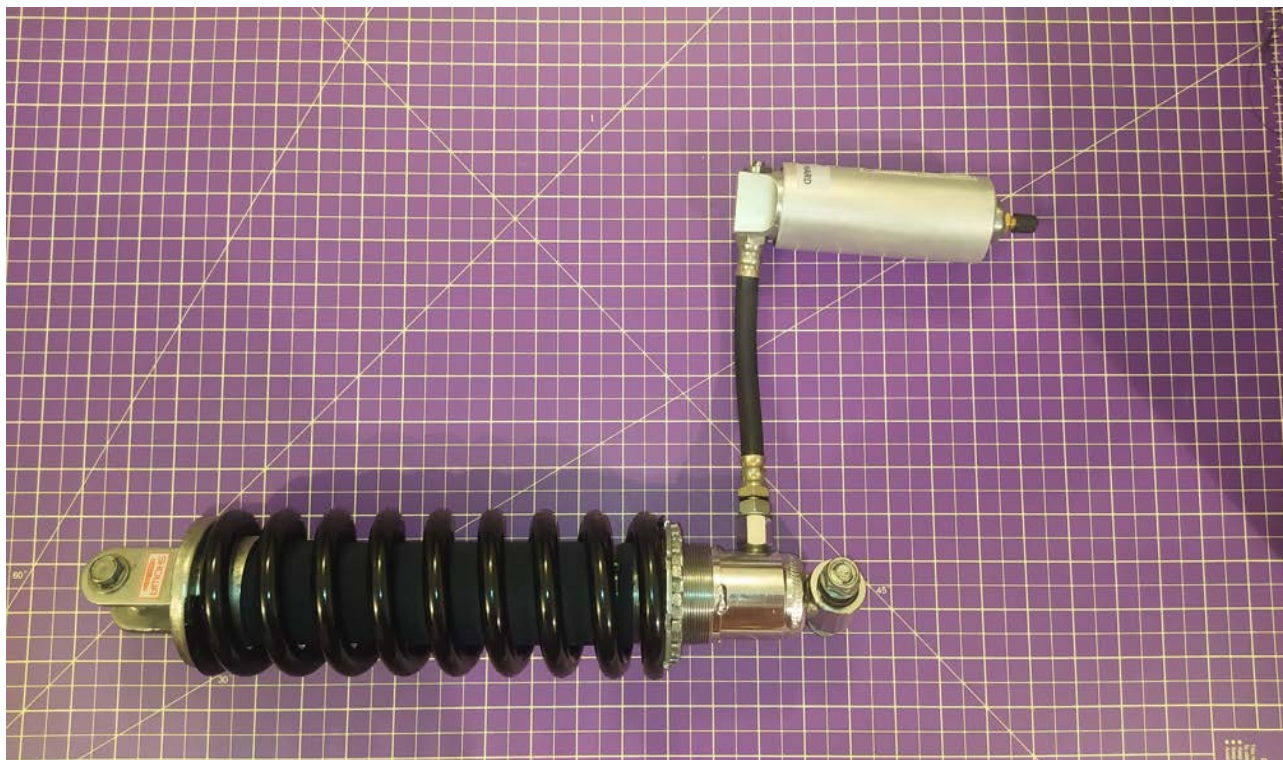
Screw in the blocking nut.



At the end use an automotive silicone to double seal the valve.

10 Assembly

Finally it's time to assembly back the shock absorber :)



10.1 Reservoir hose

We start with connecting the shock absorber body with the reservoir.

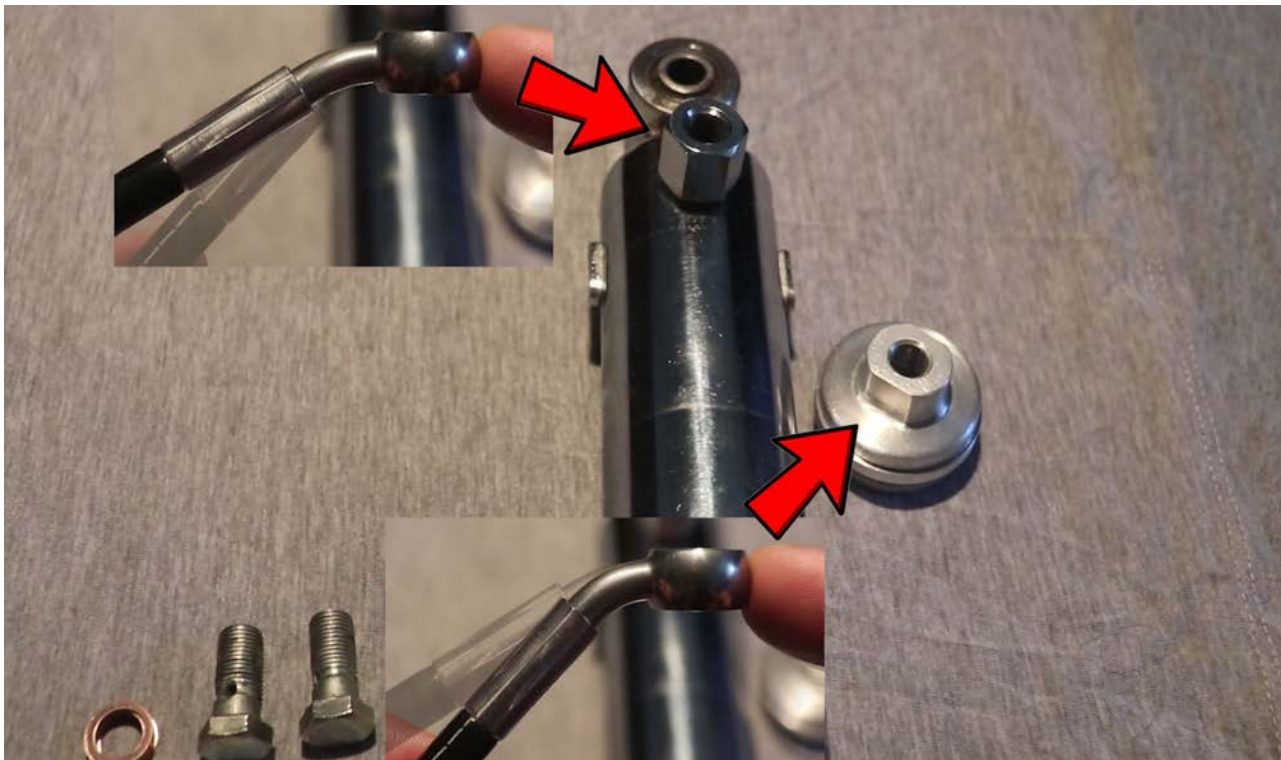
Reservoir hose assembly in model RD07A is described in chapter 10.1.1

Reservoir hose assembly in model RD07 is described in chapter 10.1.2

Reservoir hose assembly in model RD03/04 is described in chapter 10.1.3

10.1.1 Reservoir hose (RD07A)

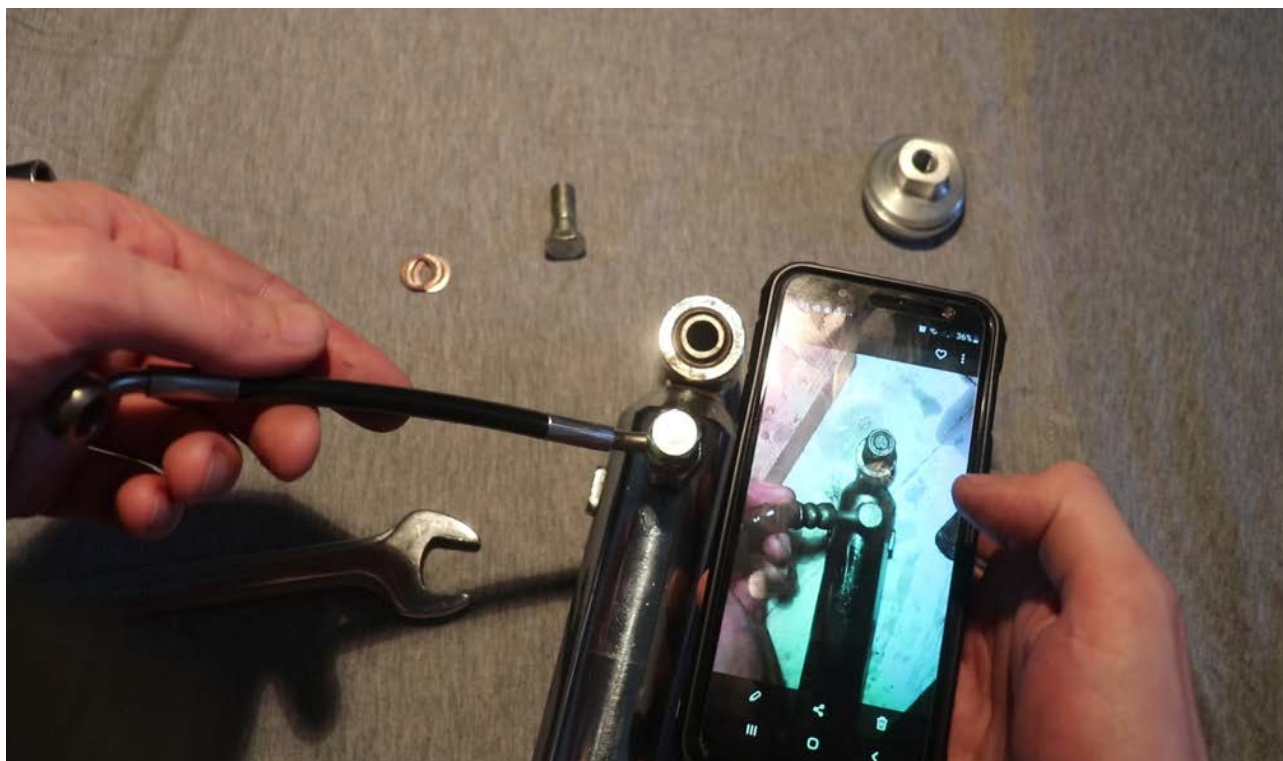
Now we will assembly back the reservoir hose.



Pay attention to the banjo fittings. They have two different bending angles, so look carefully and connect them correctly!



Use some thread locking fluid on the bolt before screwing



Mount the new hose at similar angle as the original one.



Torque the shock absorber banjo bolt to 23 Nm (16,5 lb-ft).



Torque the reservoir cap to 20 Nm (14,75 lb-ft)

10.1.2 Reservoir hose (RD07)

The hose connecting reservoir with the shock absorber in RD07 is almost the same as in RD07A. There is only difference in one banjo fitting bending angle.

Sorry, I don't have any photos :(

10.1.3 Reservoir hose (RD03/04)

Now we will assembly back the reservoir hose.



First we mount the reservoir cap hose fitting. There is no adjustment.

You torque it at least to 20 Nm.



Screw back the fitting adjuster nut and push back the washer and the o-ring.

Now screw in the fitting, set it to correct position and tighten it using a nut. Thanks to this you can achieve correct orientation of the reservoir and the connection is sealed.

10.2 Reservoir assembly

Depending of the chosen bladder position we continue work as described in next chapters

Inverted bladder assembly is described in chapter 10.2.1

Normal bladder assembly is described in chapter 10.2.2

10.2.1 Inverted bladder (2in1 cap)

Next steps are common for every shock absorber model, in which you want to invert the bladder position.

Of course, there is difference between RD03/04/07 and RD07A (compression adjuster), but we don't touch it at this moment.



First lube the o-ring and mount it on the reservoir cap instead of the rubber bladder.



Insert the reservoir cap into the reservoir body.



Press in the reservoir cap until the locking ring's groove will be visible



Insert the locking ring.



Push out the reservoir cap using something soft. Reservoir cap should be blocked by the securing ring in place.

10.2.2 Normal bladder

Leaving bladder in unchanged position leads us to two ways of working further, depending on the AT model.

RD03/04/07 assembly is described in chapter 10.2.2.1

RD07A assembly is described in chapter 10.2.2.2

10.2.2.1 Reservoir assembly (RD03/04/07)

In RD03/04/07 we install the bladder and the reservoir body.



We lube the bladder with the shock absorber oil and put on the reservoir bottom cap.



Next we lube the reservoir one more time and insert into tube.



We insert the securing ring and and pull back the cap to make sure it is locked in place

10.2.2.2 Reservoir assembly (RD07A)

In RD07A model we only install bladder on the bottom reservoir cap.



Of course, in RD07A there is no compression adjuster, this photo shows only mounted bladder.

10.3 Sealing head, rod and piston assembly

Now we will assembly sealing head back and mount it on the rod.

Depending on the success or failure in your shock piston nut removal, we will continue assembly in two ways:

Normal way is described in chapter 10.3.1 and you follow it, when you were able to remove piston nut

Alternative way is described in chapter 10.3.2 and you follow it, when you were **not** able to remove piston nut

10.3.1 Normal way

You continue assembly from here, when you were able to unscrew the piston nut.

10.3.1.1 Sealing head assembly

First we need to decide, if we need to drill a vent hole in sealing head or not.

This step is needed in **RD07** with **normal bladder position**.

This step is needed in **RD03/04/07** with **normal bladder position**, when we **don't use bleed tool**, to bleed the shock through the compression adjuster

To remove the air from shock absorber we need to drill a small hole in the sealing head. (In some sealing heads vent hole like this is made in factory).

Without the vent hole we would trap some air inside the shock absorber, when closing the shock absorber with the seal head.

When you use 2in1 cap or you bleed the shock through compression adjuster – you don't need to drill any vent hole.



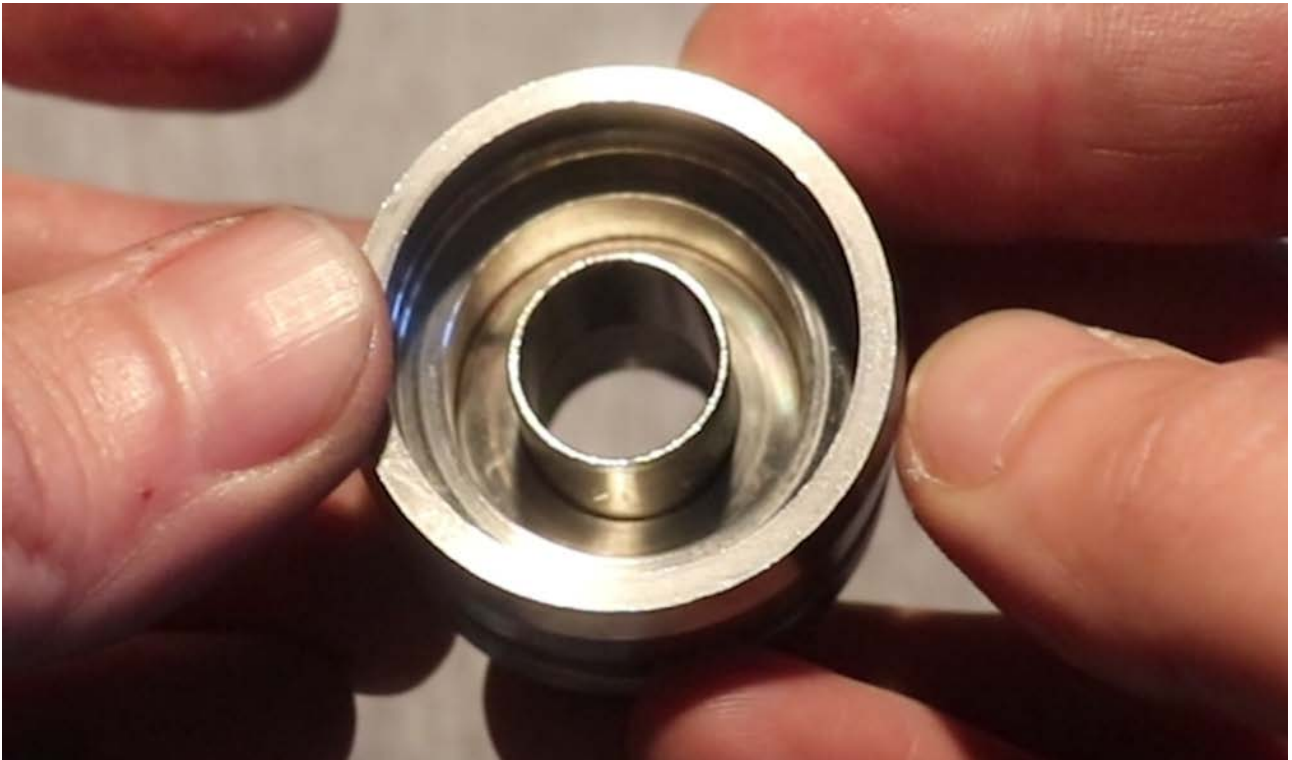
As far as I remember I used a 1,5mm or 2mm drill bit. You need to drill a small hole under the seal head o-ring.



In red circle you can notice the vent hole. I don't have any better photo of this vent hole.



You can also see how it looks in XR400



Now we will press in the new slide bushing.

Lube it with oil before inserting it into the seal head and insert it with a hand into its place.



Now we secure the piston rod with “help tool” or with tape.

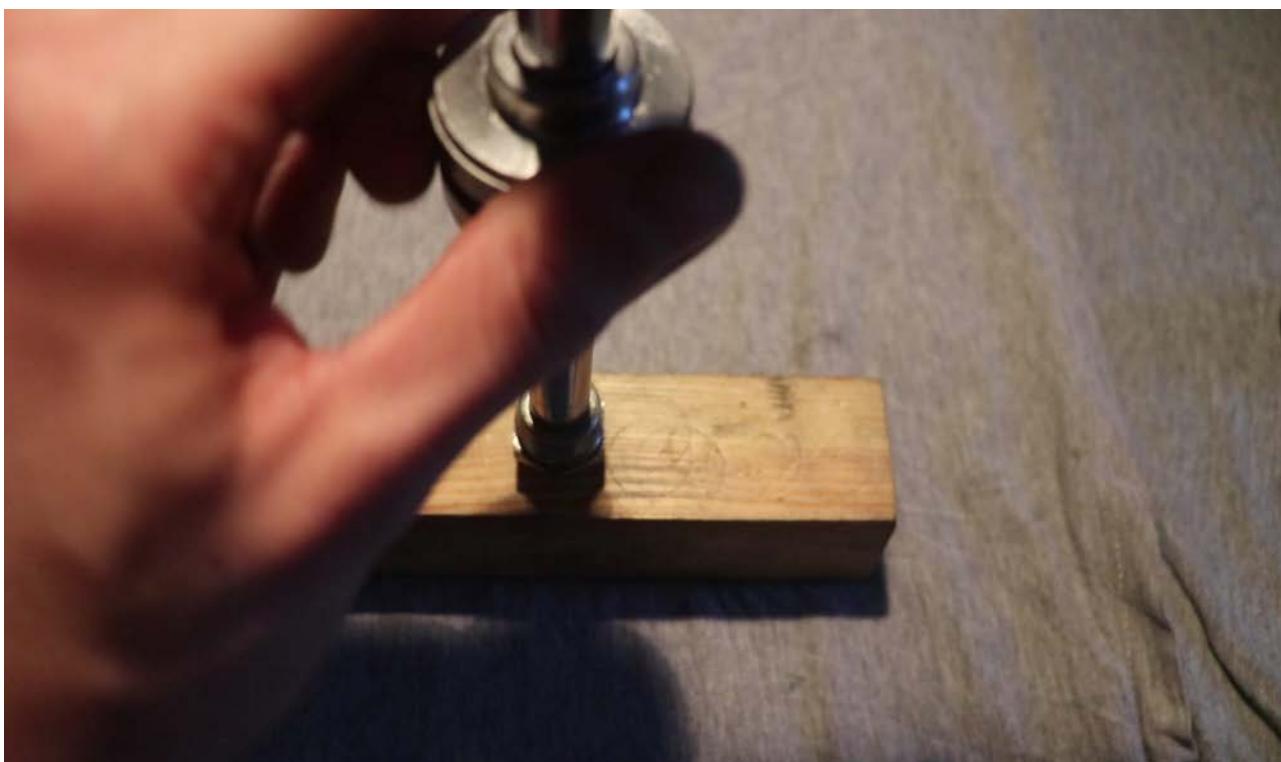
Always secure sharp edges to avoid damaging the seals or the slide bushing!



Insert the piston rod into the seal head upside down.

Lube the rod and place it on a piece of wood.

Thanks to this you can use the rod, rod's rubber bumper holder and the sealing head as a slide hammer to press in the slide bushing.



Slide the seal head up and down to press in the slide bushing. When it will be ready, you will notice the hit sound changed.



Install the new dust seal with adapter.



After installation it should look like this.

Don't press it too far. The inner lip should stay free, it should not touch the seal head.

During every step lube all the parts with oil before assembly.



Now we assemble the seal head.



Insert the thin flat washer.



Insert the main oil seal support plate.



Insert the main oil seal body (you can use help press tool to press in the oil seal)



Insert the main oil seal o-ring



It also may be good idea to insert this o-ring before putting the main oil seal body inside the seal head :)

10.3.1.2 Sealing head installation on the rod



Install the **rubber bumper** and the shock absorber **metal cover** on the piston rod.

Don't forget any part! Once I've noticed this metal cover on the bench almost at the end of the work...

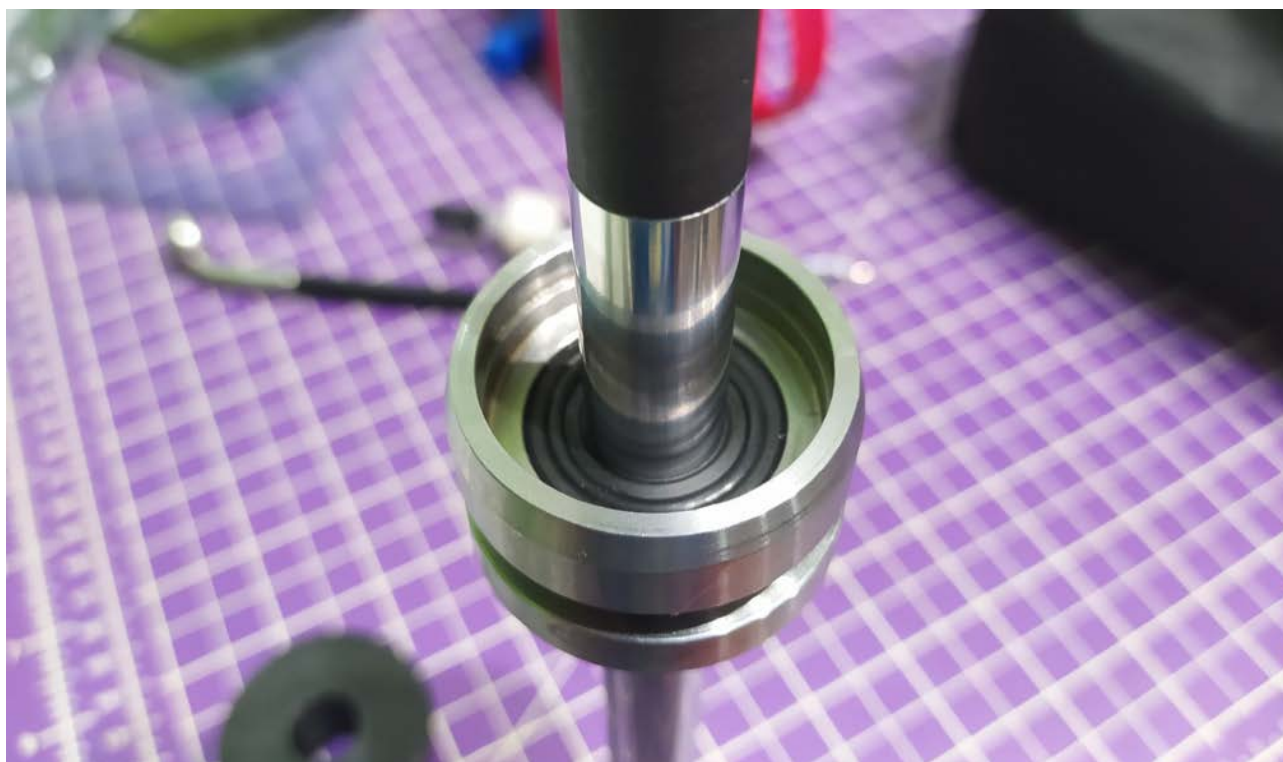


Lube tool, oil seal, bushing and dust seal with the oil. “Helper tools” makes this process much easier.

Dust seal will wipe off oil from the guide tool, so put some additional oil on top of the tool to oil the seal and the slide bushing from the inside.



In photo above you can see seal head in place.



At this step you can demount both helper tools.



Install the seal head **o-ring** and the **big metal washer**.



Install the rebound rubber bumper.

10.3.1.3 Installing the piston on the rod



Install the piston on the rod.

Shim stack order is very important, be careful to not spill it out.



Use thread locking fluid on the piston rod nut and torque it to 35-40 Nm (26 - 30 lb-ft).

Try to keep the piston and seal head “in the air”. Just to avoid damaging the seal head o-ring while torquing the piston nut.

10.3.2 Alternative way

Continue from here, when you were unable to unscrew the piston nut.

10.3.2.1 Sealing head assembly

First we need to decide that we need to drill a vent hole in sealing head or not.

This step is needed in **RD07** with **normal bladder position**.

This step is needed in **RD03/04/07** with **normal bladder position** when we **don't use bleed tool**, to bleed the shock through compression adjuster

When you use 2in1 cap or you bleed the shock through compression adjuster – you don't need to drill vent hole.

To remove the air from shock absorber we need to drill a small hole in the sealing head (In some sealing heads the vent hole like this is made in factory).

Without the vent hole we will trap some air inside the shock absorber, when closing the shock absorber with the seal head.



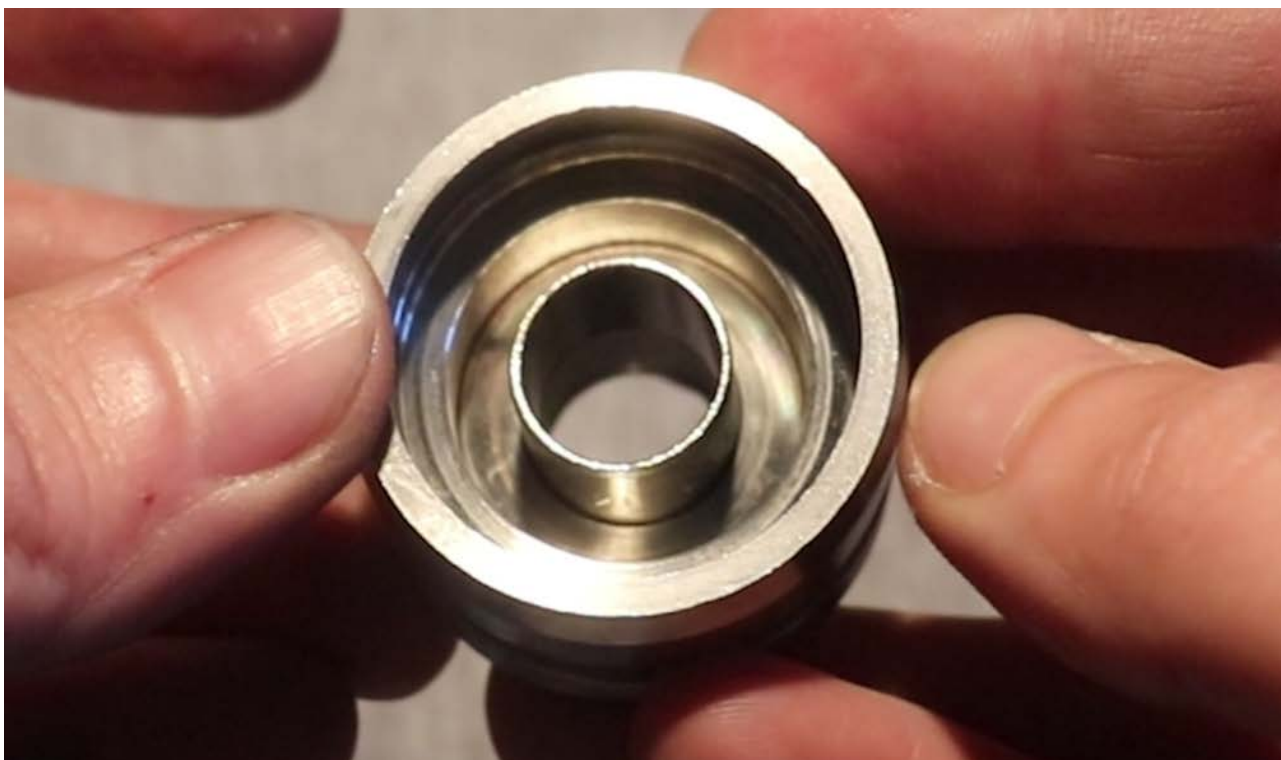
As far as I remember I used 1,5mm or 2mm drill bit. You need to drill a small hole under the seal head o-ring.



In red circle you can notice the vent hole. I don't have any better photo of this vent hole.



You can also see how it looks in XR400



Now we will press in the new slide bushing. Lube it with oil before inserting it into the seal head and insert it with a hand into its place.



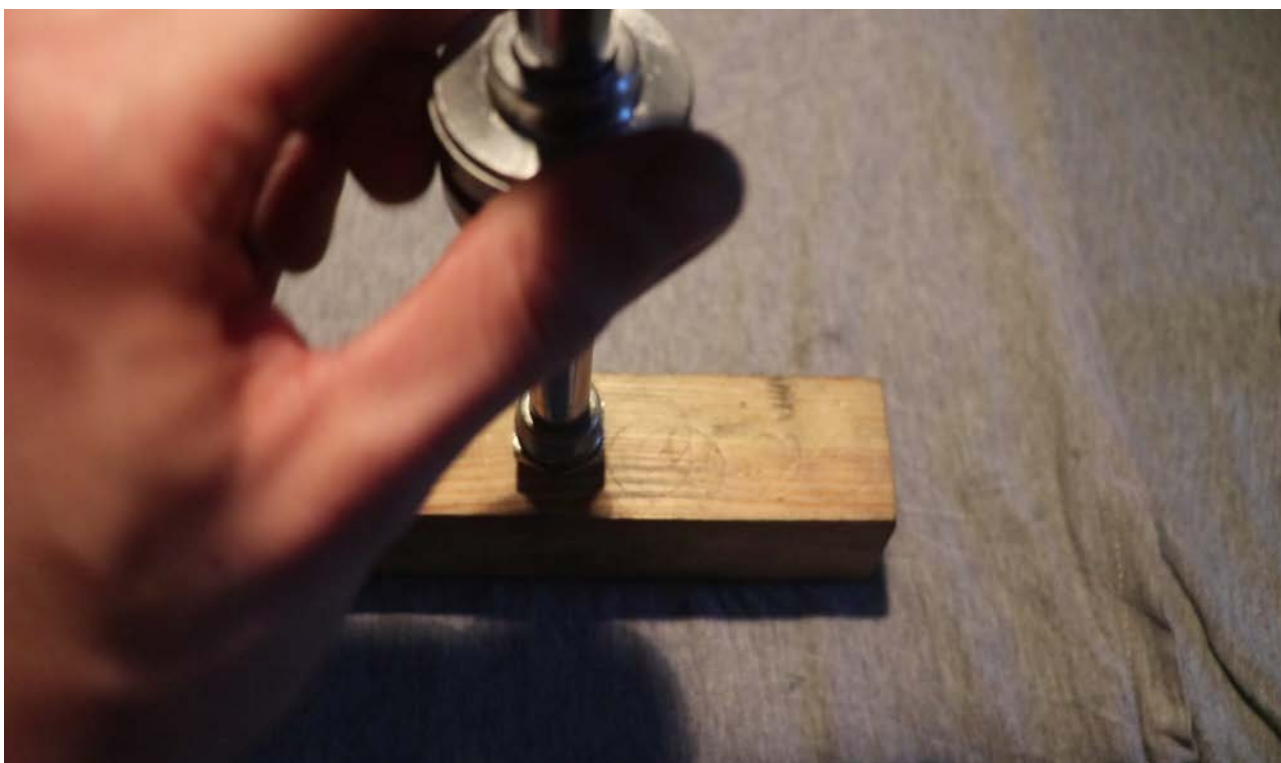
Now we secure the piston rod with tape.

Always secure sharp edges to avoid damaging the seals or the slide bushing!



Insert the piston rod into the seal head upside down and install the rubber bumper holder.

Lube the rod and screw back the rubber bumper holder nut. Place it on a piece of wood. Thanks to this you can use the rod, rod's rubber bumper holder and sealing head as a slide hammer to press in the slide bushing.



Slide the seal head up and down to press in the slide bushing. When it will be ready you will notice the hit sound changed.



When you have the piston on the rod (you could not unscrew the piston nut), then install **only** adapter, **WITHOUT** the seal.



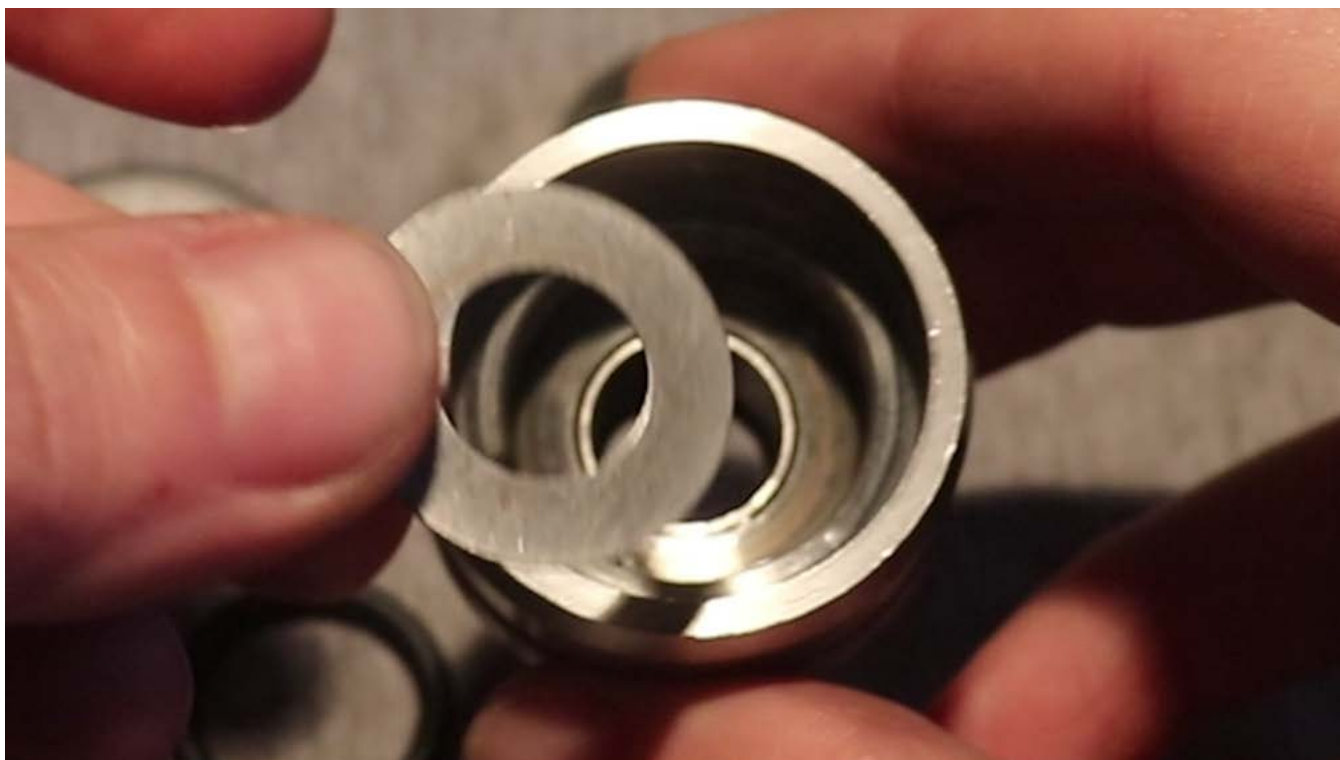
After installation it should look like this. Don't press it too far.

10.3.2.2 Sealing head installation on the rod

During every step lube all the parts with oil before assembly.



Now we assemble the seal head.



Insert the thin flat washer.



Now we secure the thread with a tape. We can't use the guide tool this time.



Install on the shaft: rebound rubber bumper, big washer, oil seal o-ring, oil seal, oil seal support plate, thin metal washer (it should be already in place), seal head, dust seal.

Put seal head o-ring on the seal head.

Oil seal and dust seal must be installed separately on the rod.

Next install the oil seal o-ring inside the oil seal. After this, push the oil seal with the support plate into the seal head (You can use seal head push tool v3).



Next we can use push tool to install the dust seal. **We need to hold oil seal in place.**

Inserting dust seal will increase air pressure raise between dust seal and oil seal, and it may push oil seal out. Make it slow, hold the oil seal and let the air flow out.



Next we install big washer and the rebound rubber bumper in the seal head. We also install the shock absorber metal cover and the rubber bumper.



Degrease the thread with brake cleaner and use a medium locking fluid to lock the rubber holder nut in place.
You don't need to install it at the end of the shaft and torque it hard.



At the end the stem thread should line up with the end of the piston rod.

10.4 Installing the piston, the seal head and filling shock with oil

Depending on bladder position we have two ways to complete this step.

Bladder in inverted position using 2in1 cap, see chapter 10.4.1

Bladder in original position, see chapter 10.4.2

10.4.1 Shock absorber with inverted bladder (2in1 cap)

10.4.1.1 Installing the seal head and the piston



Now insert piston into the shock absorber body.



Push in the seal head into the shock absorber body. Stop when the locking ring groove will be visible.



Insert the seal head securing ring



Pull the piston rod to lock the seal head in place.



Double check if the seal head is secured correctly.

10.4.1.2 Compression adjuster assembly and installation (RD03/04/07)



In RD03/04/07 we need to assembly back compression adjuster first.



We replace two compression adjuster o-rings.

Use tape to secure sharp edges, before putting the o-rings on.



Screw back the compression adjuster screw, all way in.

Next we mount back the valve black cap. You can gently hit this cap with rubber hammer or piece of wood, while holding valve body in hand. It should be pressed in with just a little force.

Make sure the adjuster end will not collide with the black cap.



In photo above you can see assembled valve.



Install the washer seat and the washer. The seat groove must be faced up.

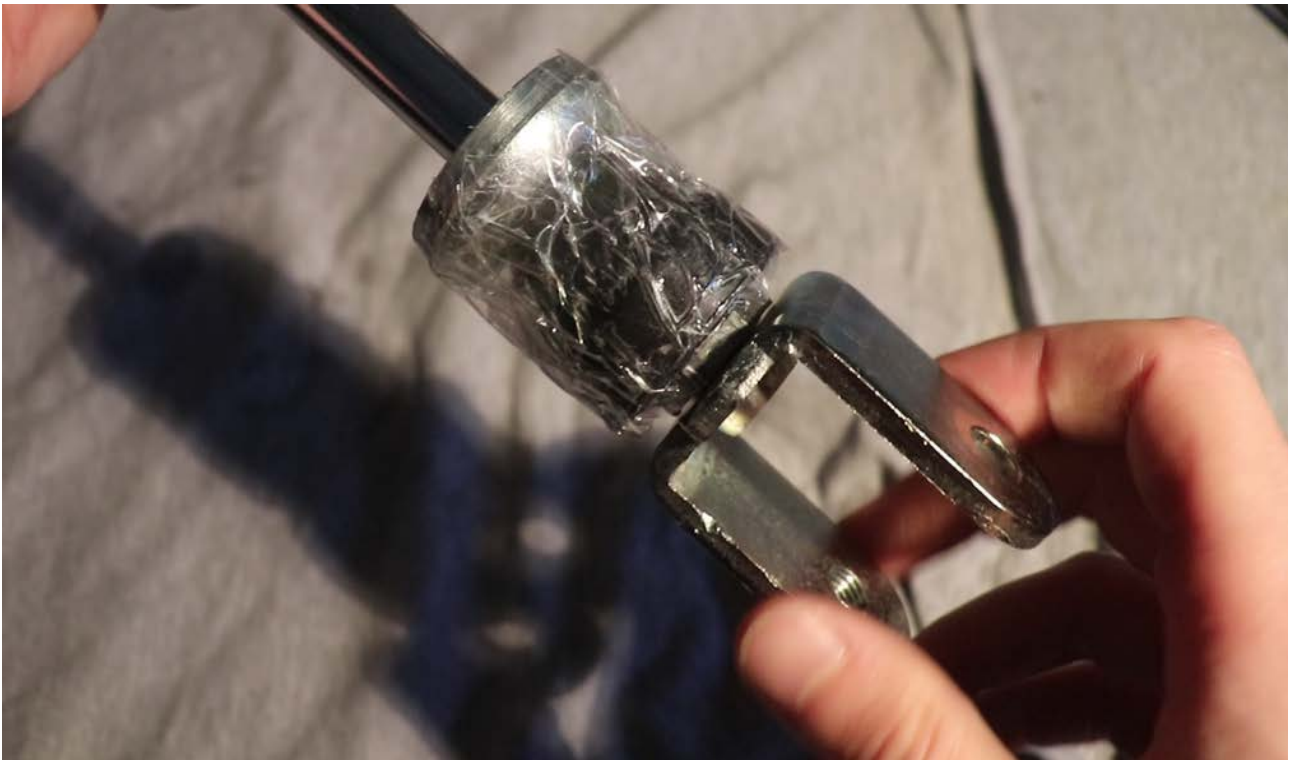


Valve mounted in proper orientation looks like in photo above.



At the end we screw back the compression adjuster valve.

10.4.1.3 Filling the shock absorber with oil



Install the stem on the rod to pump the shock easier.



Pour in the shock absorber oil into the reservoir.



Pump the shock. Press it in, wait couple of seconds and pull it back.
Move the piston slowly, to avoid cavitation.



Try putting the shock in various positions.
All air from the shock absorber need to escape through the hose, so make it the highest point.



After some time of pumping, you should see continuous stream of oil without any air bubbles. Make couple more pumping cycles, try various positions.

After confirming that there is no more air inside, you can go to the next step.

10.4.1.4 Bladder installation



Put the bladder on the new reservoir cap.



As you can see, the bladder is collapsed. We need to pump it a little.



Stop pumping when it will look like this. It was only 2 or 3 pumps with this small shock absorber pump.



Press the shock absorber all the way in.



Pour some more oil. Make sure it will spill out, when you insert the bladder inside.



Insert the bladder. You can notice that oil is spilling out.



At this point the bladder will get stuck and you won't be able to push it further.

Unscrew the air valve core, using a special tool or just press the valve core in to release the pressure.



After that you can press the bladder further in. The locking ring groove should be visible.



Install the locking ring.



Now screw in the air valve core. Don't use too much force.

This valve core has small and short thread, so it's easy to strip it.

10.4.2 Shock absorber with normal bladder

Unfortunately, depending on the shock absorber model we will follow two procedures now.

In case of RD03/04/07 we will follow procedures described in chapter 10.4.2.1

In case of RD07A we will follow procedures describer in chapter 10.4.2.2

10.4.2.1 Normal bladder position (RD03/04/07)

10.4.2.1.1 Seal head and piston installation



Insert the piston into the shock absorber body.



Push in the seal head into the shock absorber body. Stop, when the locking ring groove will be visible.



Insert the seal head securing ring.



Pull the piston rod to lock the seal head in place.



Double check if the seal head is secured correctly.

10.4.2.1.2 Filling shock absorber with oil

In RD03/04/07 you can use the compression adjuster valve to bleed the shock absorber with the oil.



Connect container, rubber hose and compression adjuster body together. Hose must fit tight inside.



Use old o-ring on the compression adjuster body and screw it into the reservoir bottom cap.



In photo above you can see setup to fill the shock with oil



After some time of pumping you should see continuous stream of oil without any air bubbles. Make couple more pumping cycles, try various positions.

After confirming that there is no more air inside, you can go to the next step.

10.4.2.1.3 Compression adjuster assembly and installation



In RD03/04/07 we need to assembly back the compression adjuster first.



We replace two compression adjuster o-rings.

We should use tape to secure sharp edges.



We screw back the compression adjuster screw, all way in.

Next we mount back the valve black cap. You can gently hit this cap with a rubber hammer or a piece of wood, while holding valve body in hand. It should be pressed in with just a little force.

Make sure the adjuster end will not collide with the black cap.



In photo above you can see assembled valve



Install the washer seat and the washer. The seat groove must be faced up



Valve mounted in proper orientation looks like in photo above.



At the end we screw back the compression adjuster valve.

10.4.2.2 Normal bladder position (07A)

In RD07A leaving the bladder in normal position is a little difficult. Previously we drilled a vent hole in the seal head.



We fill the shock absorber tube with the oil.

Next you squeeze the bladder to remove the air from it and fill it with oil. You need to hold the bladder vertically to help the air flow up. **You are operating without the bladder secured by the reservoir body, so it may fall off the bottom reservoir cap!**

When there is no air inside the bladder you can install the piston. **Make it slow, because the bladder may fall off!**

Add more oil and install the seal head.

When you push seal head into the shock absorber tube, you pressurize the oil. When you see that bladder is not collapsed anymore, you need to squeeze it around to remove some oil.

At some point you should see the securing ring groove.

Install the securing ring inside the groove and pull the shaft back to lock it in place.

Next you should push the rod slowly inside the shock absorber (without pushing back the seal head). Bladder should be full of oil. Squeeze it around to remove some oil, without letting air inside.

Basically, the bladder should not look like a balloon, when the shock is compressed. Overfilled bladder may rub reservoir inner tube during work and after some time it may be destroyed.

Last step is the reservoir body installation - you just install the reservoir body and the securing ring.

Sorry for lack of photos, but I did this procedure only once long time ago.

There are also other solutions, like closing the reservoir in an oil bath.

10.4.3 Reservoir cap installation



First we need to grease the bladder to avoid the rubber to metal contact. Use a rubber safe grease.



Push in the reservoir cap with gas valve installed. Push until you will see the securing ring groove.



Insert the securing ring into the groove.

10.5 Pumping and testing

To pump the shock absorber you need at least MTB shock absorber pump. It is nice to have, because you can control pressure inside reservoir and pump it in any case. Running the shock absorber without the pressure may result in a shock failure and poor performance.



Pump the shock 2-3 times and try to pull the reservoir cap out to lock it in place.
If you can't pull it out, pump again 2-3 times.



After locking the cap in place and checking it, you can pump the shock absorber to 15 bar (210 psi).
During this step pay attention and look for any oil or air leakage.



You can also use nitrogen to pump the shock.

Nitrogen is a dry gas and thanks to this it is more stable during temperature changes.

If there are no oil or gas leakage you can continue :)



Use some wood to hammer in the shock absorber metal cover. You can also use rubber hammer.

Don't hit the cover with a regular hammer – you may hit the cover and damage the piston rod.

10.6 Spring and mud guard installation



In some cases there is a separated threaded pipe on the shock, in other case threaded part is welded to the shock absorber body.



Install the spring adjuster nut and the spring adjuster locking nut on the shock absorber body.



Put the spring on the shock absorber



Assembly the mud cover and the spring bottom holder.



Mount the rubber seal (in our case the seal is destroyed).



You can try to fix it using a good quality tape.



Install the mud guard inside the spring.



Install the securing washer (in RD07 it is in 2 parts) and mount back the stem using a thread locking fluid (medium)



Torque the stem.



Set the spring to length measured before disassembly.

You should also set sag, see procedure described in chapter 3.5



Now you need only to lock the spring adjuster securing nut using a hook wrench, a punch tool or a flat screwdriver and a hammer.

Your shock is ready!

11 Extra content

After 30 years the shock may look very bad inside ... be prepared





Oil leakage may be caused by a damaged oil seal or a damaged piston rod.



Damaged bladder, because the oil was overfilled and someone didn't use grease during assembly.