Precision Machinery

Repairing the CIS Jetronic Alloy adjustable Bosch Fuel distributor

When do you have to repair your CIS Bosch fuel distributor?

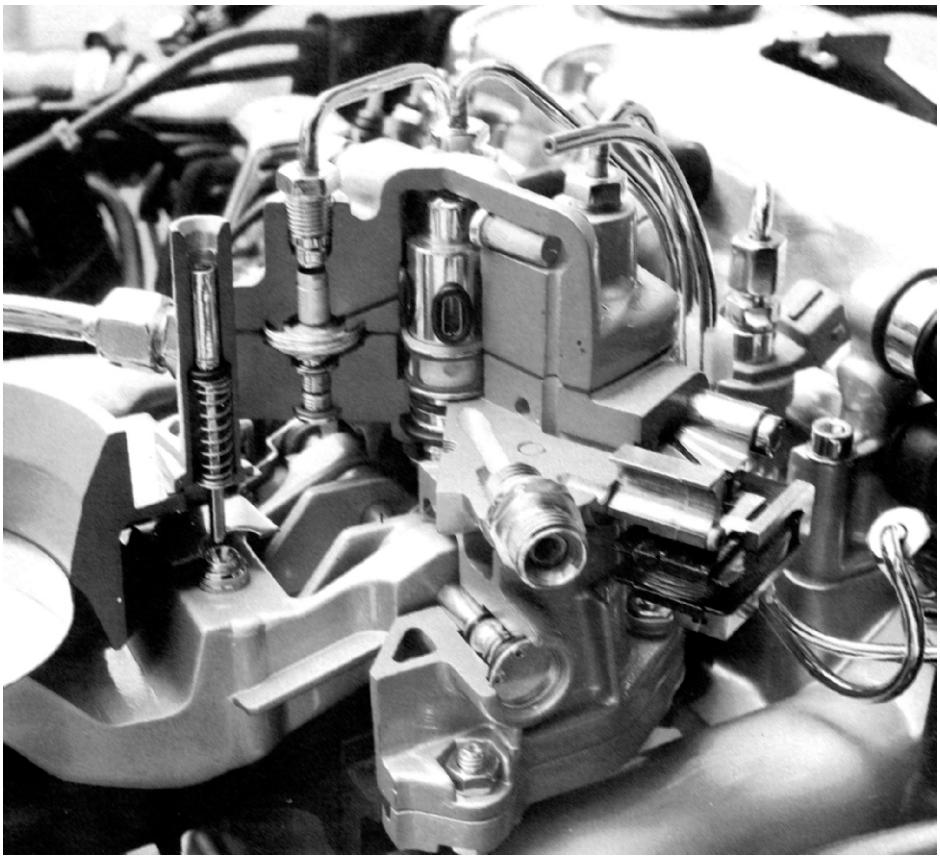
- If your car has rough idle, low power, high MPG, inflexible acceleration, or too long of a cranking time with a hot engine.
- If the fuel distributor has an unequal flow from each port and can't be adjusted.
- If you have turned the CO 3mm Allen screw on the mixture control unit to its maximum position (anti clockwise) and you still have flow to each port.
- If the Control plunger is stuck.
- If the fuel distributor has an internal leak.
- If you have a damaged fuel distributor diaphragm.

In General:

Mercedes-Benz and Bosch doesn't support the repair of fuel distributors.
If you decide to repair your fuel distributor you do so at your own risk.
Repairing a fuel distributor is a precise job that requires basic metric tools, fuel pressure gauges, and some shop made tools. All tools and equipment are listed on the last page of these instructions.

These instructions are made for repairing the adjustable 6-cylinder alloy fuel distributor.
If you have a 4, 5 or 8 cylinder alloy fuel distributor you can use this manual as a guide and make some corrections for your model of Bosch fuel distributor.

This manual is based on the technical specifications of Bosch for Mercedes-Benz cars and adapted for mechanical shops or customers who own a garage without special industrial equipment and tools.

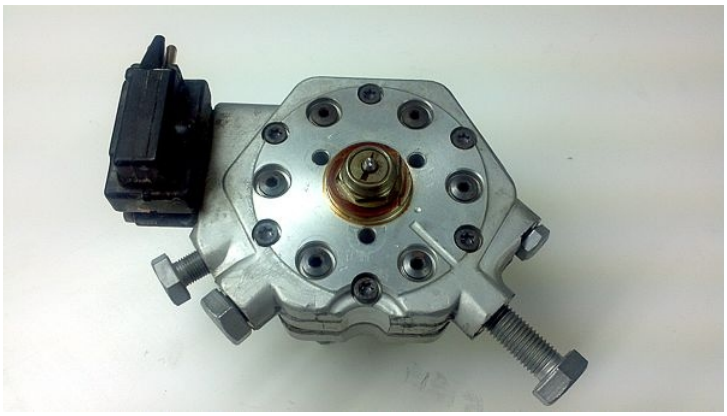


Preparation.

Safety first.
You must reset the system pressure in the fuel system.
Pull the fuel pump relay out for your car. The relay is located behind the battery.
Use the starter for about 5-10 sec. Disconnect the negative cable from the battery.
Pull the fuel filler cap. Now, the fuel pressure in the fuel system is zero.
Remove the fuel distributor from your car.
Be careful, there will be some fuel pressure at the openings.
Use a cloth to catch the fuel that comes out. Make a photo or drawing to be sure where all the fuel lines are attached.
Remove all banjo bolts or struts on the top and sides of the fuel distributor.
Remove the three screws on top and remove the fuel distributor from the mixture control unit.

First you need to do a complete cleaning of the external surfaces of the fuel distributor.
Here you have several options.
You can use an engine decrease and a soft brush, soda blasting or glass blasting.

But first you must protect the interior of the distributor.
Here, we use the appropriate sized bolts
(four - M8x1.0, seven - M10x1.0, two - M12x1.5).

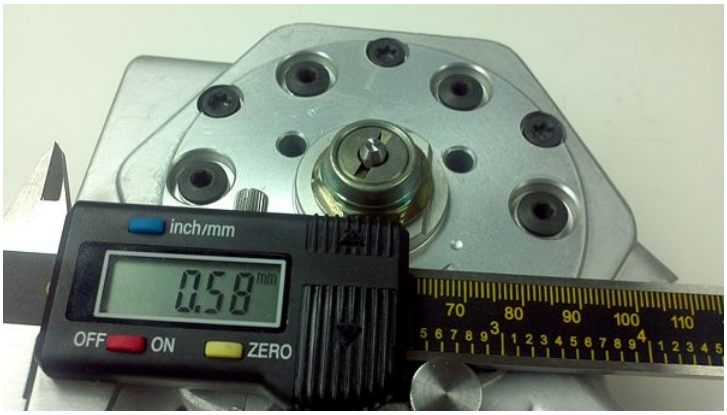


Preparation.

After cleaning, we get our distributor suitable for further operations.

Disassembly.

Measure the depth of the initial nut Control plunger position.
If your car does not have any problems with hot or cold start, measure the distance to the nearest hundredth of a millimeter and record the values.
When assembling, use these values.

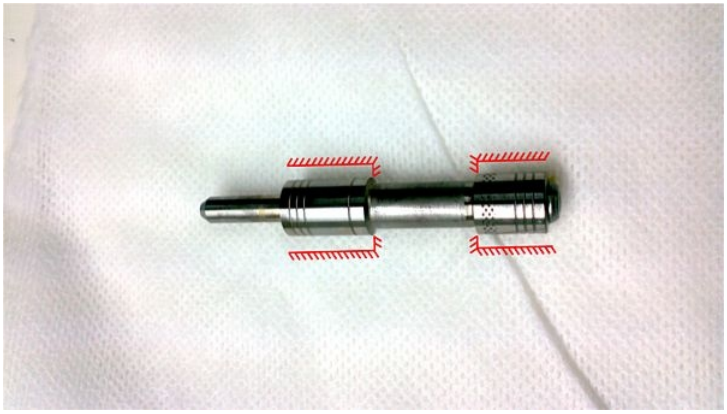


If you have had problems with hot or cold engine start-up, we recommend using the basic facilities of the company Bosch. The base recess is 0.6 millimeters.

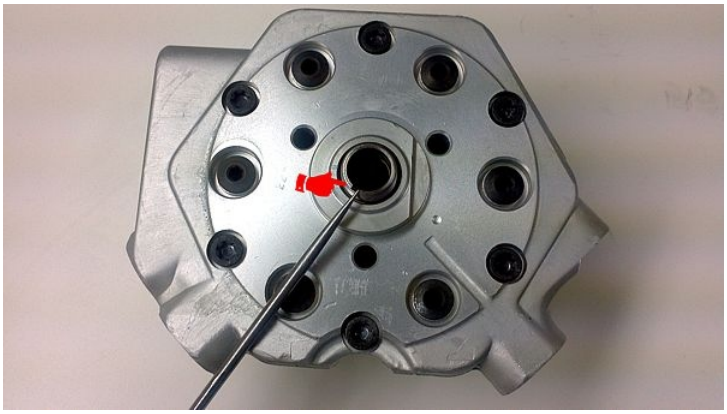
Remove the sleeve, nut and retainer shim.

Disassembly.

Now you can pull the Control plunger out.

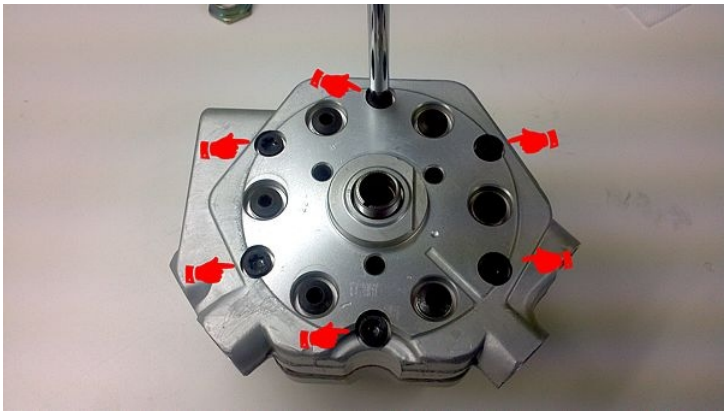


Be very careful with this piece.
Do not drop, knock, or touch any objects to the working surfaces.
Do not polish it, even with the finest sandpaper or polishing paste.



Record the position of the kerf mark of aligning on the Control plunger barrel, as indicated by the marker. In our case, it is aimed at channel 5.

Disassembly.



Unscrew the locking screws with an appropriate tool (Torx wrench - T27).

Now we need to separate the two halves of the fuel distributor.
The upper and lower half will often stick together.
Never drive in a screwdriver between both halves to open the fuel distributor,
as this will harm the housing.

Some mechanics recommend using a hammer. ie:
Turn in (a few turns to avoid damage to the threads) four M5x0.8 screws with the top of the screw 2mm above the housing.
With a nylon hammer, tap the top of the screws to open it.
When the fuel distributor has a small gap, you can open it by pulling both halves by hand.
Don't use a screwdriver to wiggle it. If it is open you can open it further by removing the four screws and pull and hammer at the plunger house.

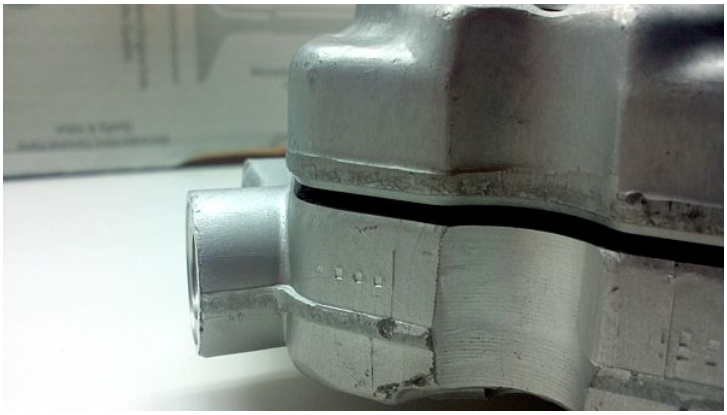
We strongly oppose this method because the distributor is made of aluminum, and even light blows through steel bolts lead to the destruction of the thread in the body of fuel distributor.

We use the difference between the coefficients of expansion.

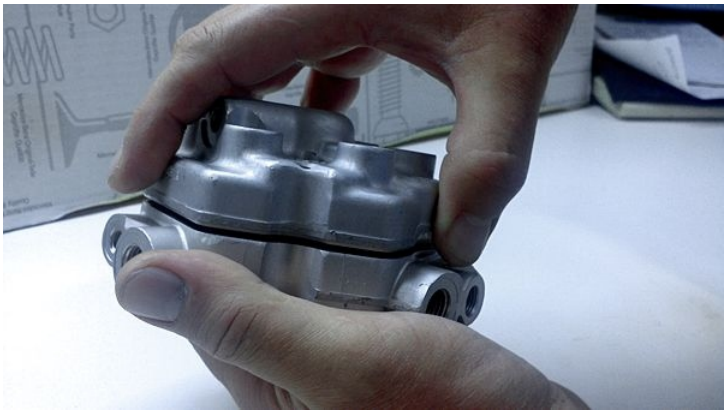
Preheat your distributor to a temperature not exceeding 80 degrees Celsius.
Use a heat gun or even a hair dryer.

Allow the distributor to cool naturally and you will see how the two halves of the distributor will separate from each other by a couple of millimeters.

Disassembly.



Now you need to separate the two halves of the fuel distributor.
Use only your hands. Simultaneously pull the two halves apart.



You can wiggle the two halves a bit in opposite directions, but do not move them apart more than 5-7 mm. Otherwise, there is a deformation of internal springs.
At the time of separation of the halves of distributor, be careful not to lose the small internal parts.

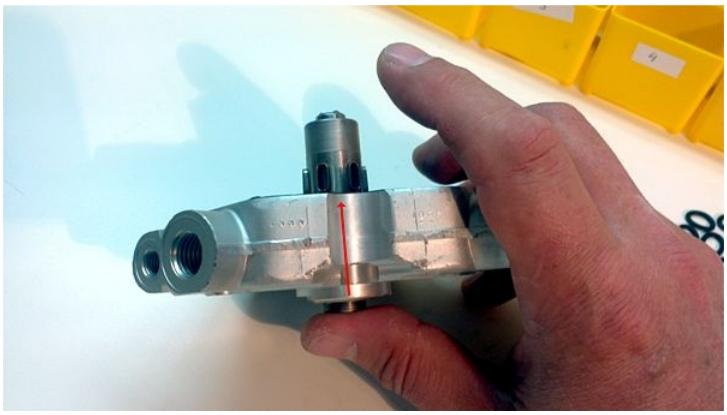
You can see the short video on YouTube.

Disassembly.

It is a good idea to have a box or plastic bags for sorting the small internal parts of the fuel distributor. Add up all the parts of a fuel channel in the corresponding box.
Do not interfere with the parts corresponding to each other.
This will also facilitate the setting fuel flow on the channels.

Remove the top spring and the plastic valve.
If any spring is connected to the valve, gently separate them.

Here we can see the deformation of the diaphragm.



Using only your hands, squeeze the barrel of the Control plunger, as indicated by the arrow in the photo.

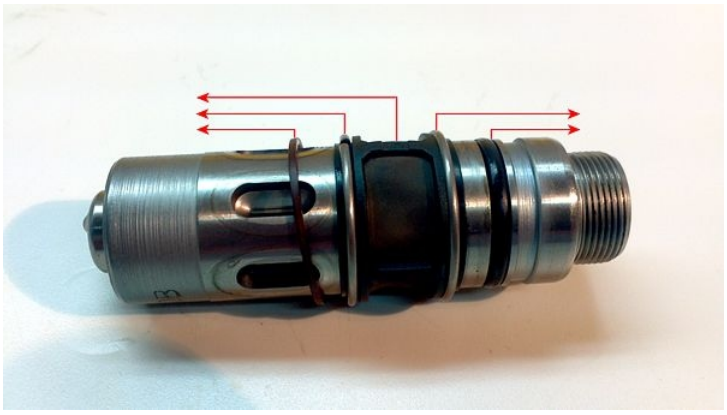
Remove the rubber o-ring from springs on slits.

A word of advice:
never dispose of used parts
to complete the repair.

Disassembly.

Here's another problem with this distributor.

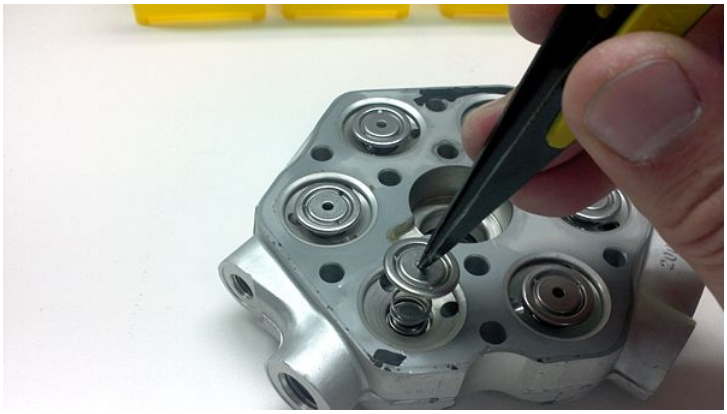
Record the installation direction of the springs.
Use tweezers to compress the spring and remove them from the Barrel.



Complete disassembly of the barrel.
Remove the circlips, rubber and ceramic ring in the direction indicated on the photo.
To facilitate this operation, use a lubricant. WD40 is well suited.

Disassembly.

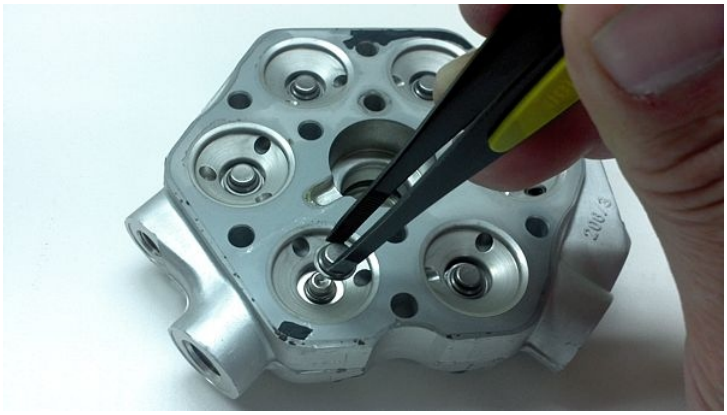
Carefully remove the diaphragm from the lower half of the fuel distributor.



Using tweezers remove the spring plates.

Now remove the lower spring.

Disassembly.



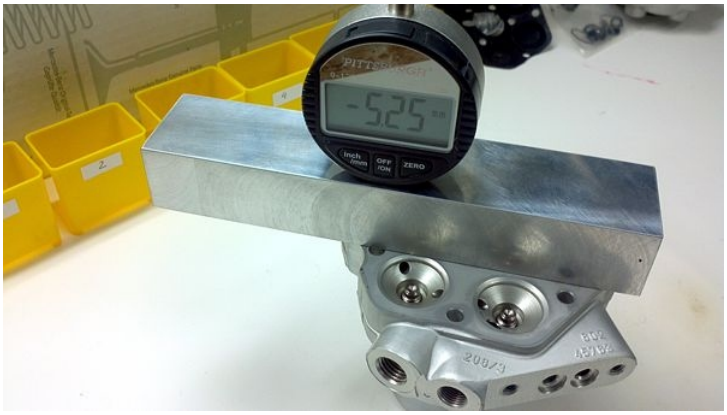
Finally, remove the metal caps.

The next step will be to measure the grooved screws indicated by the arrows on this picture. These adjusters are responsible for the amount of fuel in each channel. These screws are very sensitive to adjustment. They turn freely even to the slightest touch.
That is why the previous file operation had to be carried out using tweezers.

The value of the recesses can be measured from the inside of the fuel distributor, and from the outside. We prefer to take measurements from the inside.

Disassembly.

Measurement accuracy - hundredths of a millimeter. These numbers should be recorded and used in the assembly.

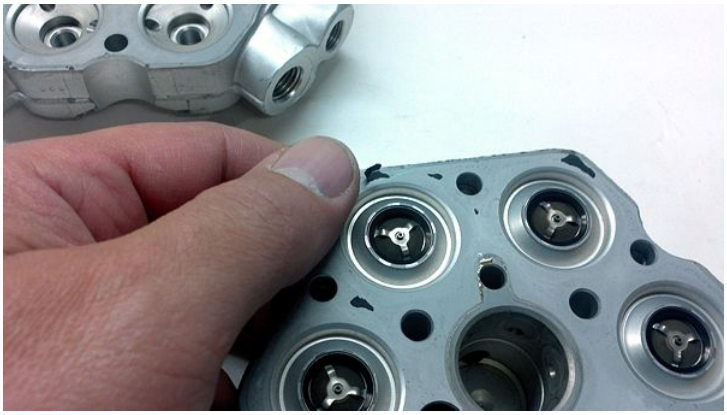


Remove the inner rubber o-ring from the bottom of the lower half of the fuel distributor.

Use an appropriate tool (Hex wrench - 3.5mm) to remove the screws with alloy seal ring at outside of the fuel distributor. Under these screws are other adjuster screws.

Disassembly.

Now you can loosen these adjusters. Hex wrench 3.0mm.
It is best to twist the screws on the inside direction.



Using only your hands, remove residues of the diaphragm from the surface of the distributor.

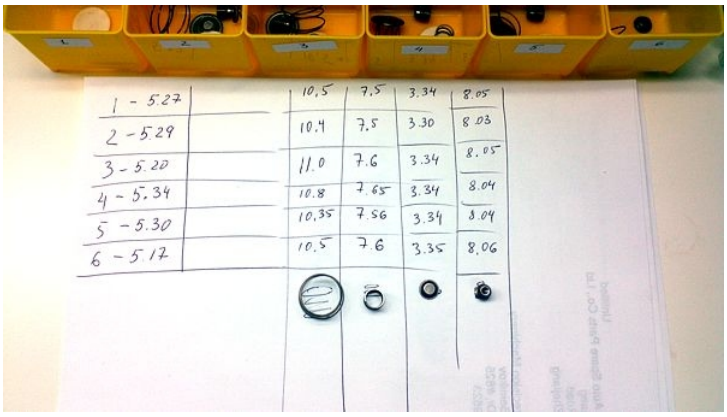
The fuel distributor is now disassembled and we can proceed to the next step - cleaning.

Cleaning.

A lot of chemical solutions can be used to clean the fuel distributor; CarbCleaners, Wynn's, Injector cleaners etc… Read the labels of these chemicals.
Use only products that are safe to use on aluminum parts.

The best option is ultrasonic cleaning with mineral spirits.
In this case, follow the recommendations of the manufacturer of ultrasonic devices.

The quality of cleaning treatment should be at a very high standard.
Just imagine that the parts will be implanted into your body.
Obviously, you want to do a thorough job.



If you use an ultrasonic cleaning machine for small parts, make measurements prior to the procedure and write them down.
Small details are not the same, especially the spring. Your task (after the cleaning) is to install all these details exactly on the same fuel channels where they were before.

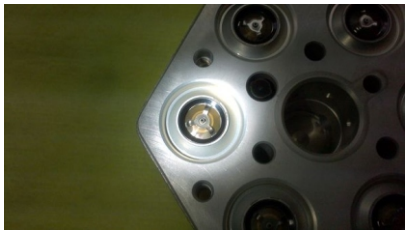
After cleaning, check the cleanliness of all the channels.
Cleanliness of the barrel metering slits is one of the most important things affecting the performance quality of the injection system. Width of the opening in slits is 0.2mm.
Use a powerful flashlight. Slits must be perfectly clean.

Cleaning.

For a very gentle cleaning of these holes do not use sewing needles or a blade.
Try to do it with just chemicals.
In severe cases, use a special blade whose work surface does not exceed 0.15mm thickness.

Check the cleaning quality of internal channels using a powerful flashlight.
In this picture we check the calibration hole.

Check all channels in all directions.
The smallest particle of foreign origin, and you do not achieve perfect idle.



Check the condition and cleanliness of the internal filters.

Cleaning.

This photo shows the small particles on the internal filter that will affect the quality of idle if they are not removed.

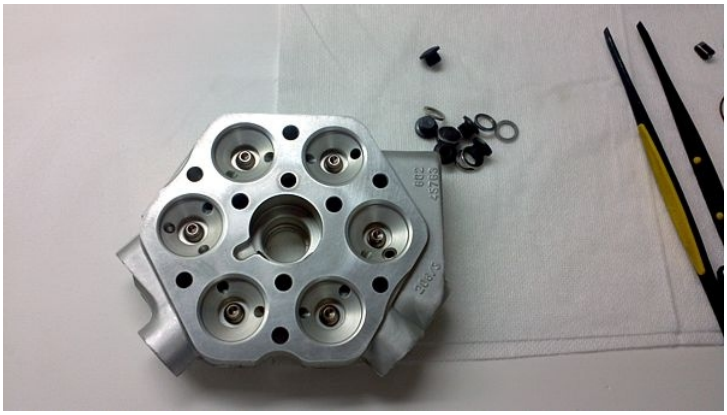
Check both the internal and external filters.

This picture shows the size of the holes in the slit in the idle position.
When the engine is on idle, the fuel enters to the injector through this tiny, 0.2 x 0.3mm hole.

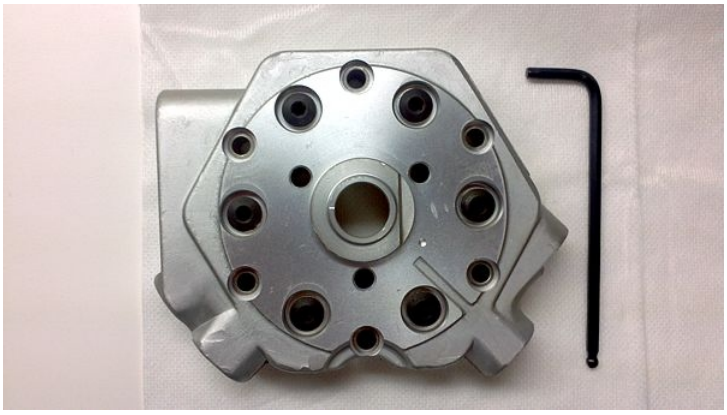
Assembly.

Before starting, make sure all the components are perfectly cleaned and protected from dust or any other contaminants.

Use a silicone lubricant for rubber seals or WD40 assemble barrel of Control plunger.

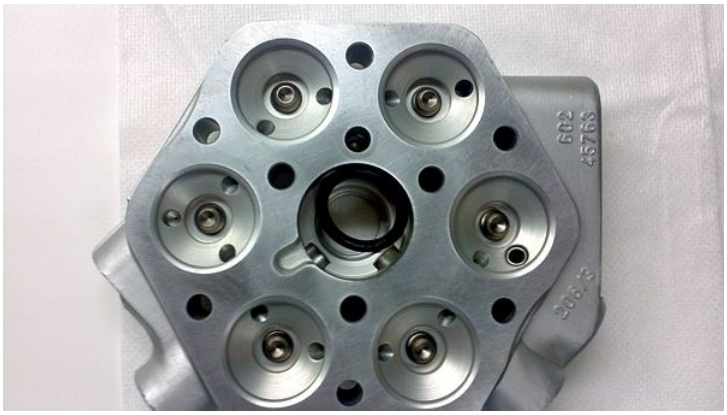


Set the adjusting screw on the fuel channels.
Using a micrometer depth, expose installation in accordance with the previously recorded values.

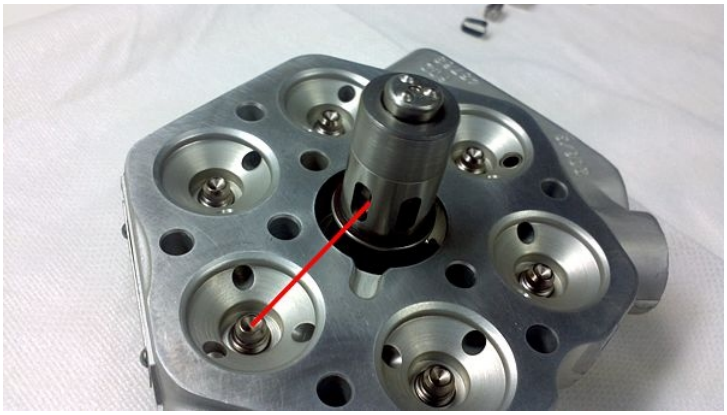


Close the fuel channels on the outside of the screws.
Do not forget about the aluminum washers.

Assembly.

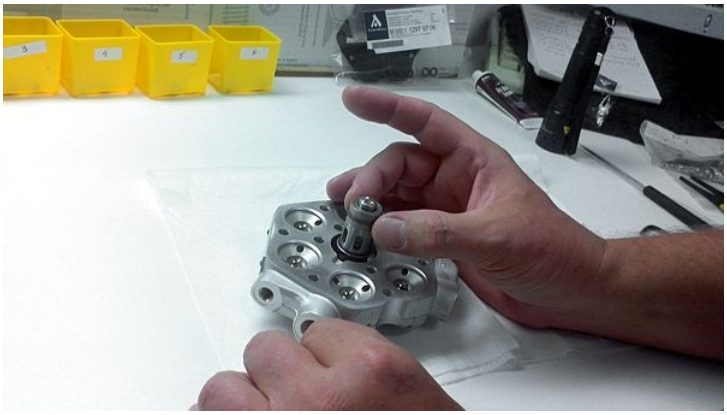


Pre-lubricated with silicone, grease the seal o-ring from the repair kit in the bottom of the lower half of the fuel distributor.
Installation is easier to do with the outside of the distributor.



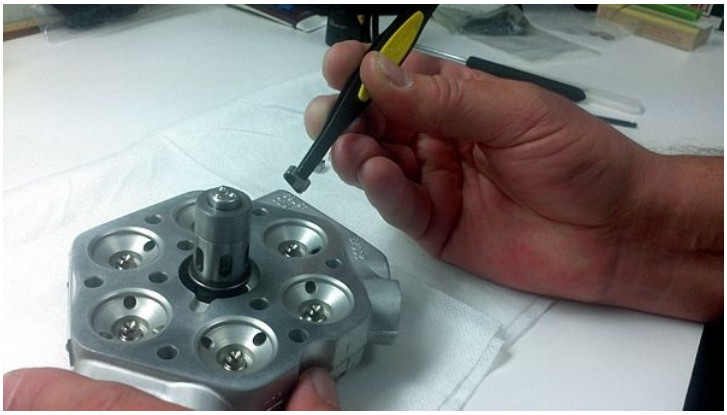
Very carefully, push in the barrel of the Control plunger into the lower half of the fuel distributor.
Do not forget the kerf mark of aligning.
When installing, it should feel like rubber sealing in place.

Check once again the kerf mark of alignment.
Using a flashlight, check compliance slits of the barrel to the center of each fuel channel.



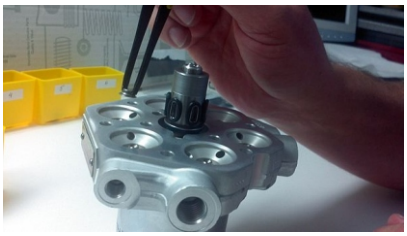
Reinstall plastic ring.

Assembly.

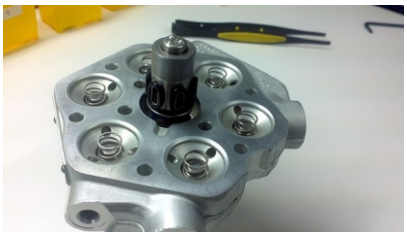


Install the springs of the slits with maximum protrusion of the barrel housing.

Put the seal o-rings on the springs, and then press the springs so that they do not extend beyond the rubber o-rings.

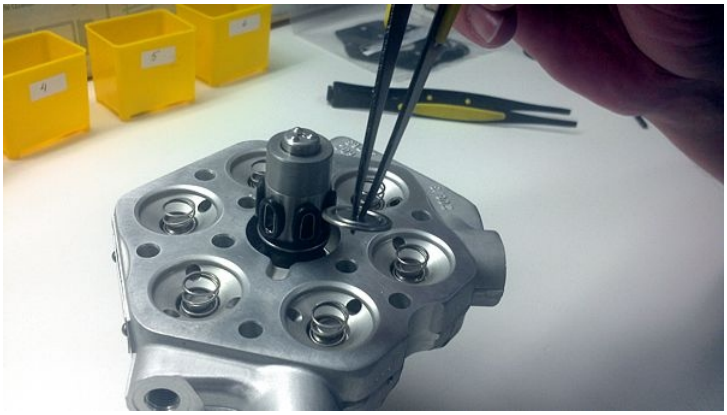


Install the lower metal cups…



...Then the lower spring…

Assembly.



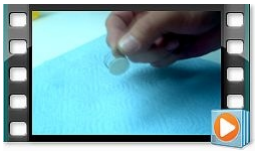
...then the spring plates.

Install a new diaphragm. Ensure full compliance with all the holes in the diaphragm and the lower half of the fuel distributor.

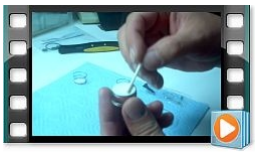
Using this grease or an equivalent, lubricate the Allen screws for protection from chemicals that corrode the steel and aluminum.

Install the Allen screws in place.

Assembly.



Connect the plastic valve and springs.
The narrow part of these springs fit over a valve.
Make sure that the spring is securely hooked to the valve.
Holding it by the spring, shake it a couple of times in the air.
The valve should be securely connected to the spring.



Lubricate the valve with silicone grease to help move them into position.

Exact gentle pressure on the plastic valves to move them to align with the fuel channel.
This is one of the most important operations in the assembly.
Carry it out two or three times.
If there is a difference in the position of the valve in the two halves of the fuel distributor, one of two things will happen:
the diaphragm will rip, or the valve will break.

If done correctly, the springs sit perfectly in the indentations of the top half of the fuel distributor.

Lubricate the barrel hole in the top halve of the fuel distributor.

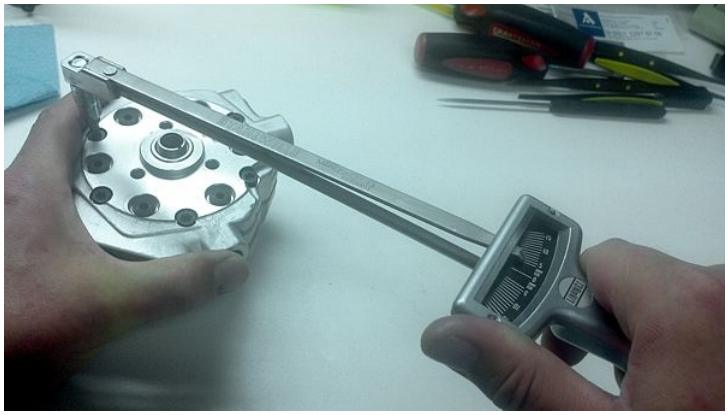
Assembly.

Putting the two halves together:
Very carefully, start to move the upper half of the distributor down.
When you look at it from the side, the diaphragm should be lying on top of the spring plates.
To start assembling the upper and lower halves, you have to press down
while turning the Allen screws. When the rubber seal o-rings on the barrel slits of the Control plunger enter the top half of the distributor, make sure they are straight, without disruptions or distortions. Use a flashlight. Check all o-rings.
Check from the side that the spring plates are still aligned with the chambers.
Press on both halves and check the alignment again, press the Allen screws and make a half turn and check again. If you don't check the alignment you can deform a metal or ceramic part, or damage the diaphragm. Take your time and be cautious.
Keep connecting. Once the connecting bolts touch the top half of the distributor, stop.
Check the position of the top of the springs and the corresponding recesses in the top of the distributor. Make corrections if necessary.
Lower the top of the distributor for another couple of millimeters. Once again,
check the position of the springs and valves.
Fully connect the two halves of the fuel distributor.
(If you feel any resistance, separate the halves of the distributor for 10-15 millimeters and check the status of the valves and springs. Make corrections.)
If there is no gap between the upper and lower halves,
you can start tightening the Allen screws. Make sure the kerf mark on the plunger house is still pointing to one of the ports after assembly.

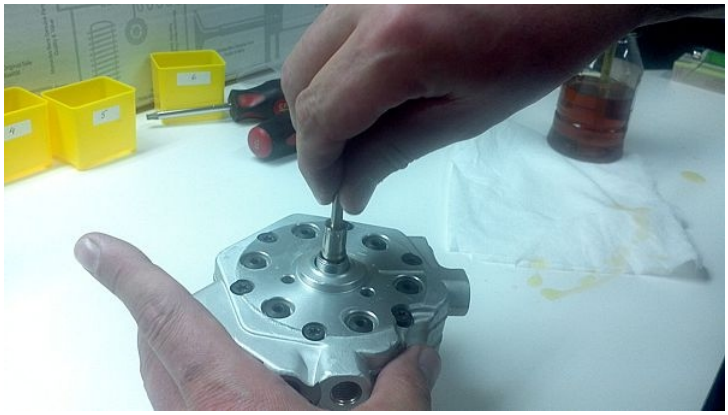
If there is an opportunity to make a mandrel for ease of assembly, you will need six pieces.
Thread is M5x0.8

Screw these mandrel in the upper half of the fuel distributor as shown in the photo.
After connecting the two halves, twist on one mandrel and replace them with Allen screws.

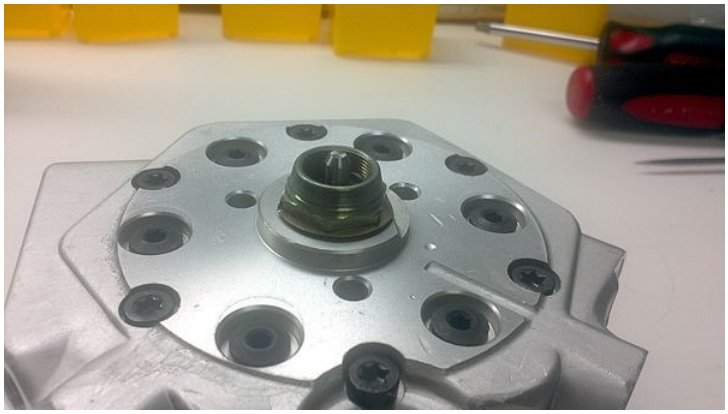
Assembly.



Tighten the Allen screws in a cross pattern. Tightening force - 7-10Nm.
If you feel any resistance, separate the halves of the distributor for 10-15 millimeters and check the status of the valves and springs.

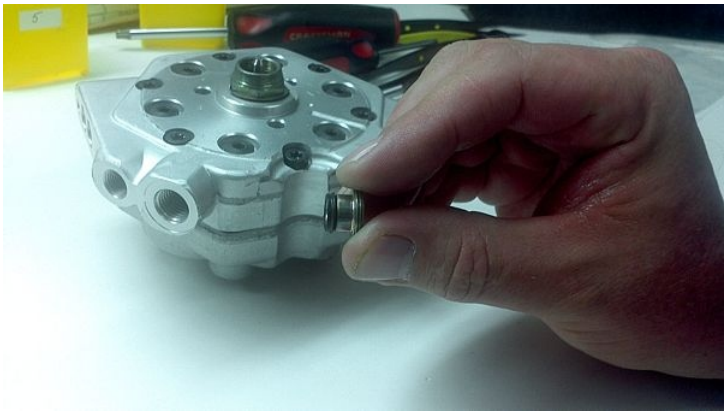


Lubricate the Control plunger with clean engine oil and put it in the Barrel.



Set the retainer shim and nut. Torque settings are minimal, about 3-5Nm. Just by hand.
Check once again the kerf mark of alignment.
Fold edges retainer shim - up and down.

Assembly.



Place the new shaped o-ring on the screw plug.
Pay attention to which side is set - the wide part is directed towards the thread.
Grease the o-ring with oil and screw into place.

Set the size of the indentation on the shot before disassembling.
Basic settings are 0.6mm. If before disassembly you have no problems with hot and cold engine start, set the prerecorded values.

You can always disassemble the fuel distributor in case something went wrong.

Tools.

Open-end wrench - 12mm, 17mm, 19mm.
Flare Nut Wrench - 12mm, 17mm.
Pickup tools - straight and hook
Torx wrench - T25, T27
Hex wrench - 3.5mm, 3.0mm
Torque wrench - 0-10Nm (Torque in Newton Meters)
Heat Gun
Micrometer
Digital Caliper
Tweezers
Flashlight
Carburetor cleaner, compressed air