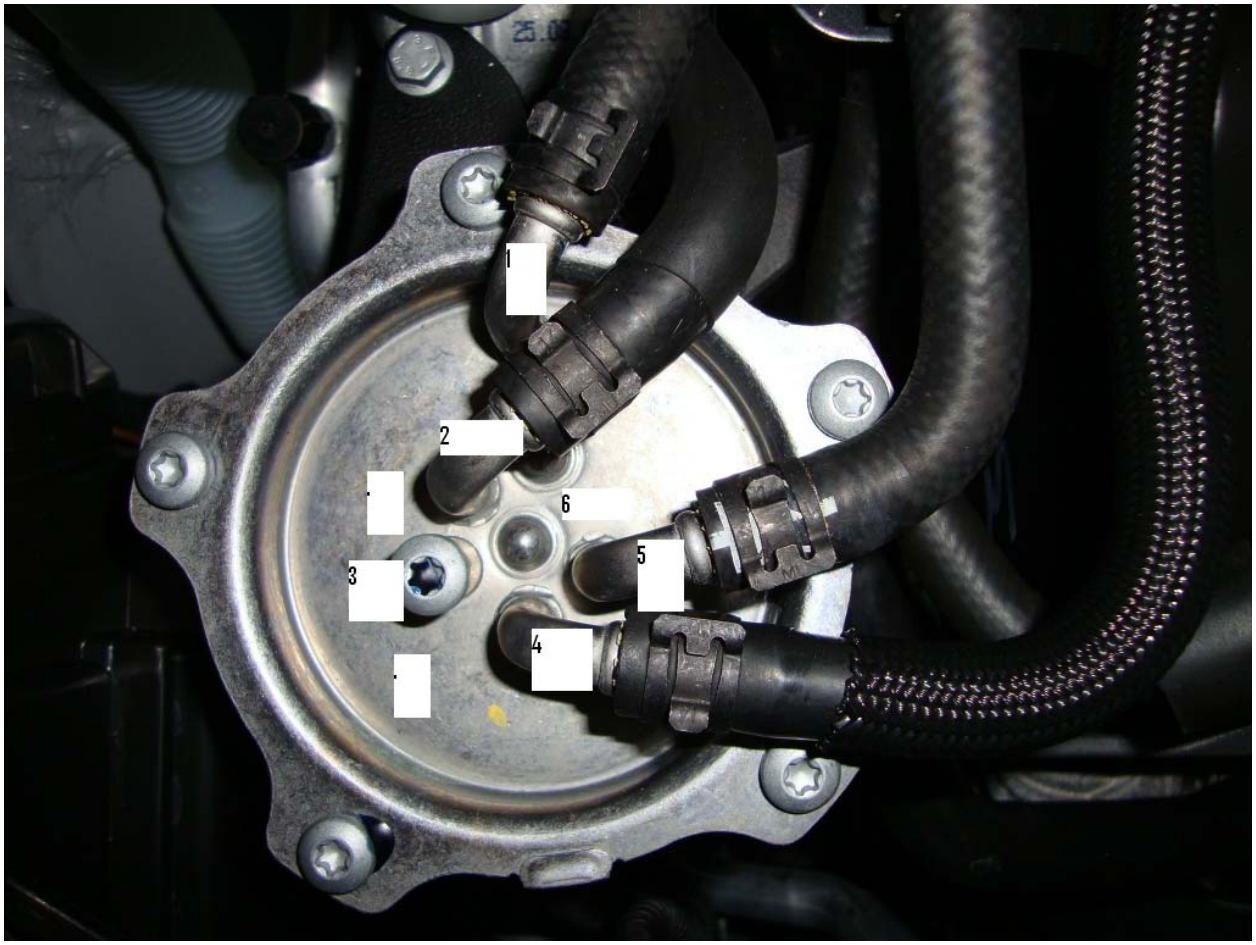
**Fuel Filter housing construction and flow paths, CJAA, CBEA, Early BRM.**

This is the one with the water removal screw on top.

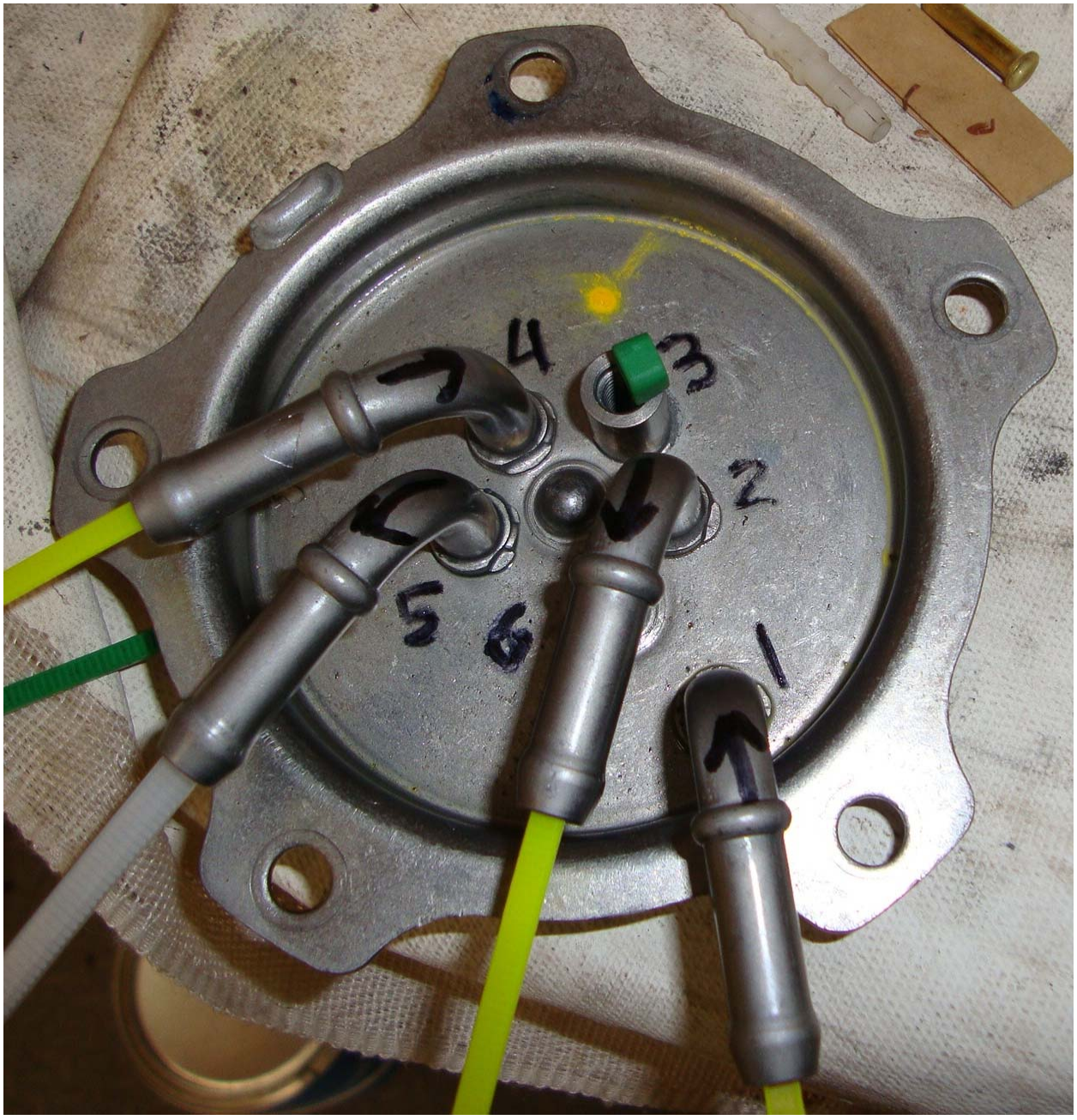



I have always wondered how the fuel flowed through this housing, and recently had a chance to find out.

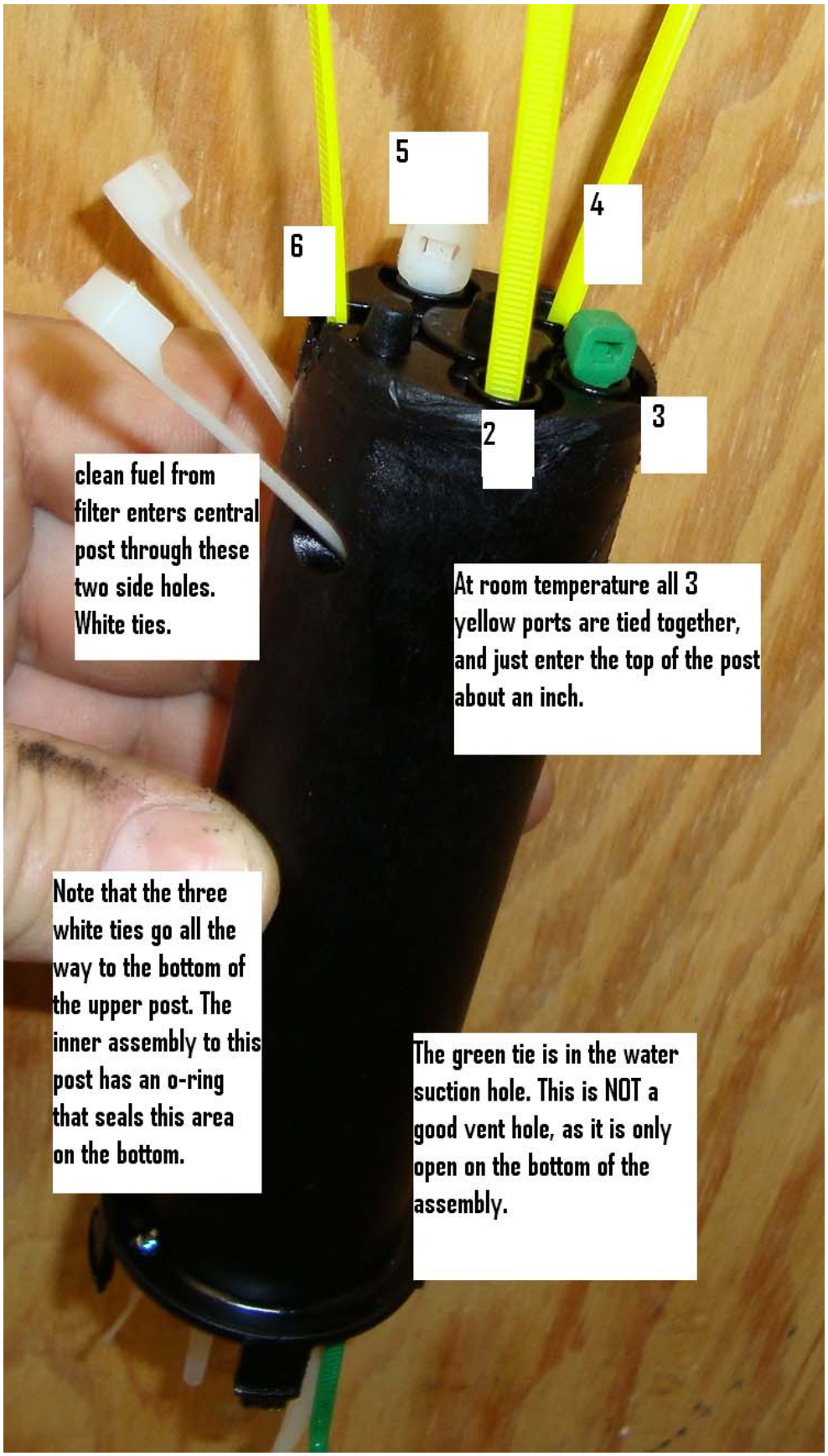
1. I have labeled the passages in this text with numbers and used colored cable ties to help make the passages clear.
2. This particular housing came off of a 2010 CJAA Jetta.
3. As with many apparently simple automotive components there are quite a few important design features incorporated. I will point some out, but there are likely some that I missed as well.
4. Note the tamper seal wax on the vent screw and one of the filter top screws.

Flow paths and important features.

1) (RED) Fuel enters from the lift pump and is dumped outside the filter. Fuel is free to flow around the outer edges, and the top and bottom of the filter housing.
2) (Yellow) This is the fuel return line to the tank.
3) (Green) This screw seals the top of a tube that runs to the very bottom of the filter housing. It is only open at this screw and on the very bottom.
4) (Yellow) This is the return flow from the engine (from fuel rail and HPFP excess on the CJAA and CBEA, from the return fuel rail built into the head on the BRM.) This is where wear particles travel.
5) (White) This is clean fuel to the engine (via the booster pump and HPFP on the CJAA and CBEA, and to the tandem pump on the BRM.)
6) (Yellow) This gap in the top is labeled because there is an open passage in the center fuel distribution assembly under this lid.
7) (Not numbered) Two detents for aligning the head and center fuel assembly to each other, located near the center of the lid.
8) (Not numbered) A detent on the edge to align the lid to the body of the filter housing.




Showing flow direction and using colors to show joining flow paths. Path 1 in the lower right is where the fuel enters and should be shown as red. (In actuality it has a red and yellow tie in it; I wish the red was on top…The yellow recirc flow path joins the red dirty fuel flow path through the channel marked 6 here.


5
4
6
3
2
clean fuel from filter enters central post through these two side holes. White ties.
At room temperature all 3 yellow ports are tied together, and just enter the top of the post about an inch.
Note that the three white ties go all the way to the bottom of the upper post. The inner assembly to this post has an o-ring that seals this area on the bottom.
The green tie is in the water suction hole. This is NOT a good vent hole, as it is only open on the bottom of the assembly.

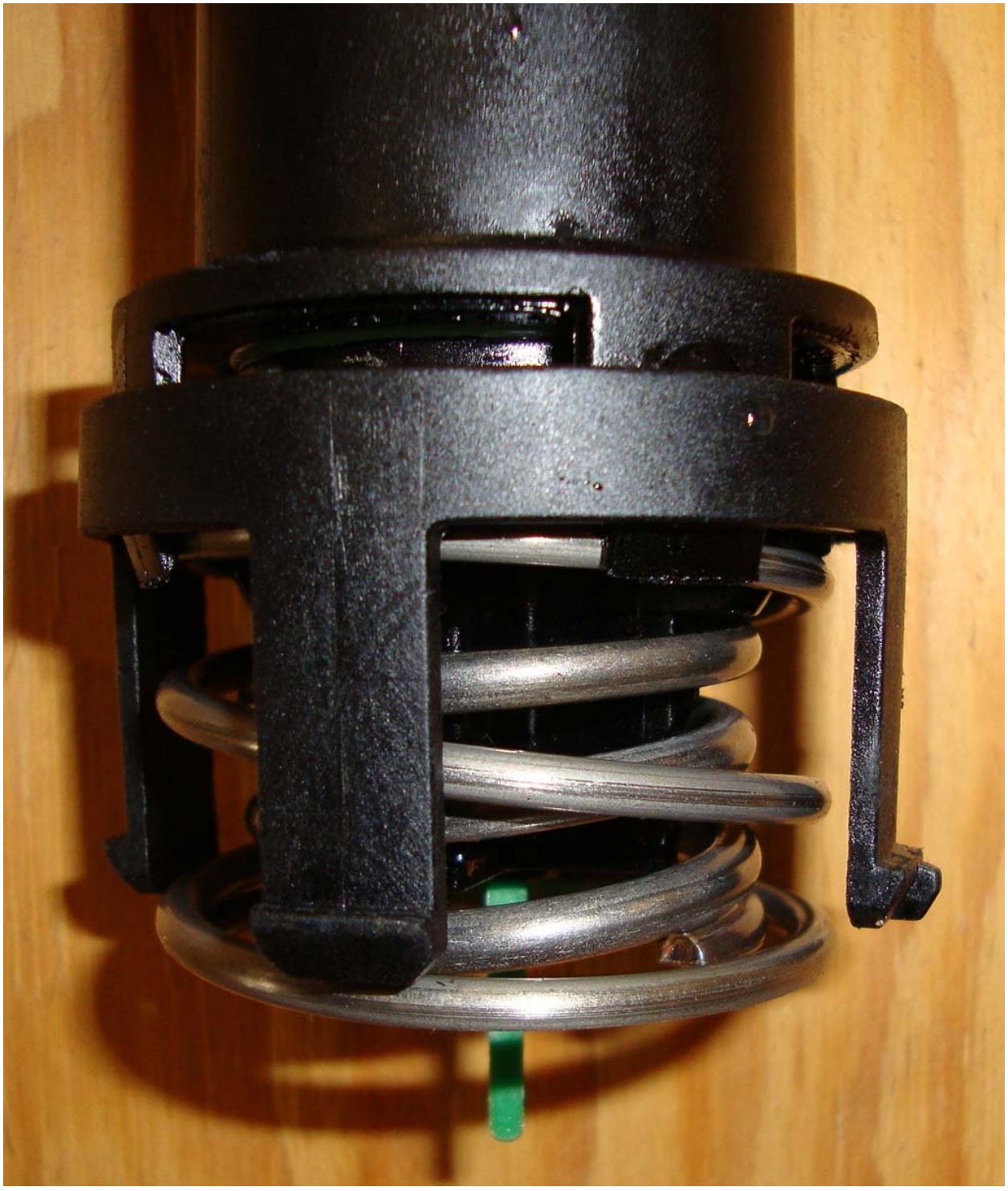
This shows the bottom half of the central post assembly that inserts into the top piece.  Note the tube and o-ring for the water removal passage.  Note the side view of the false floor, which creates the bottom trap or plenum.

This is the bottom of the center post assembly. The high pipe with the o-ring seals to the upper half of the housing, providing a sealed tube all the way through the center housing to the unfiltered fuel area below the filter. Note the slots around the bottom flange for the top's clips to mate into.

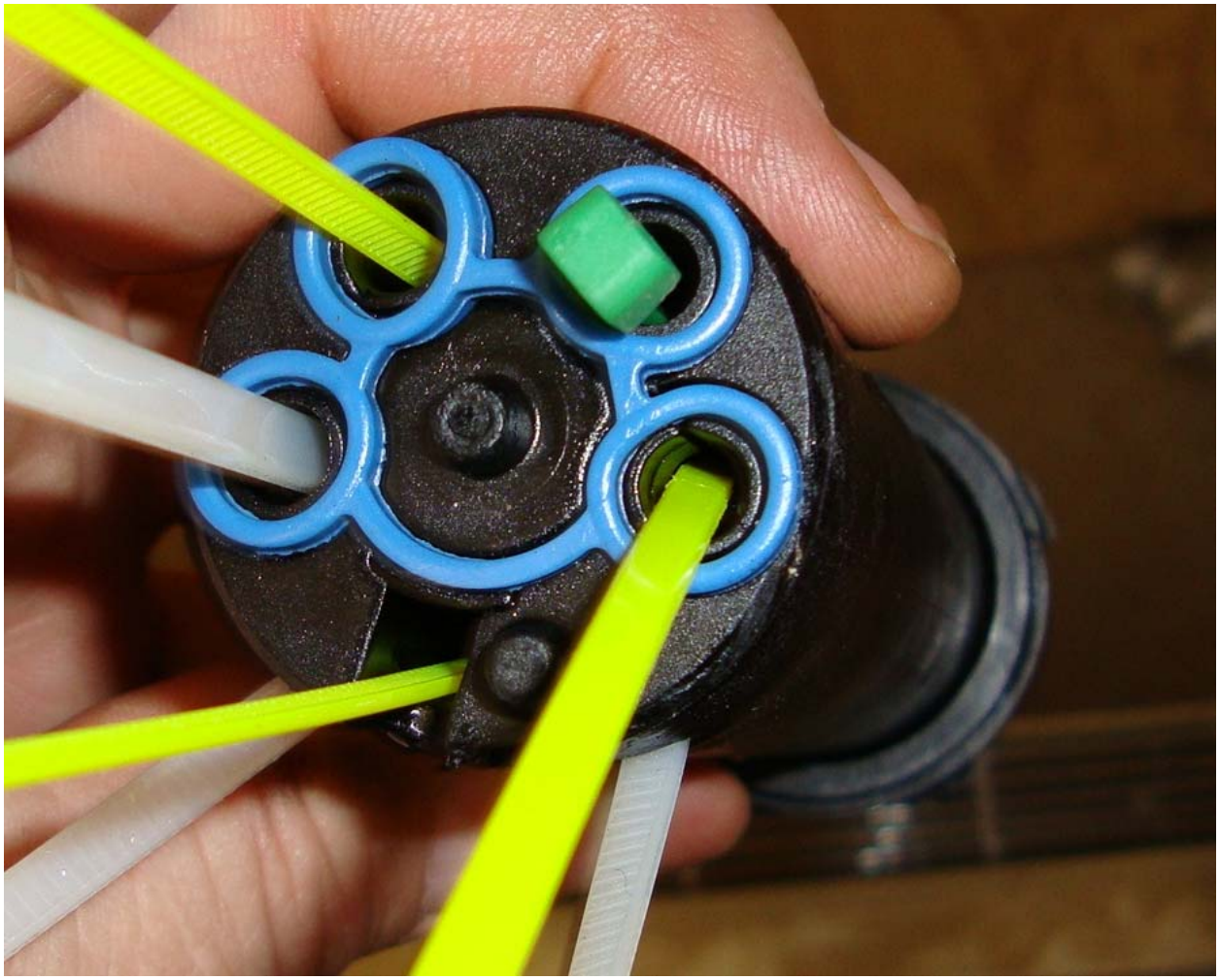
Note the false floor that has an area cut out to allow water and sediment to fall into the closed plenum below the false floor. The only way to get the water out of this area is to turn the assembly upside down after removing the filter.

This shows the top and bottom of the center post set on top of each other, but not clipped.  Note the green tie of the water removal port sticking out the bottom.

This shows the bottom of the assemblies set on each other. The bottom clips mate into slots on the bottom of the canister.  The outer spring is missing in this photo.



This photo shows the top and bottom almost completely mated (note the o-ring is still slightly visible – the top needs to slide down another eighth of an inch.  Both springs are visible in this photo.



A view with the Olympic rings in place.  Note that here you can see that the recirc flowpath (yellow) joins the red in the rectangular notch shown on the lower arc of the top.  Recirc flow is free to mix with the unfiltered fuel around the top, outside, and bottom of the filter.  This is where the metal particles enter the top area of the assembly in those dramatic photos of High Pressure Fuel Pump damage.

The recirc flow through the ports marked in yellow are what VW calls the fuel heater.

A photo of a cut up OEM fuel housing.  Note the flange tack welded on the bottom that the center assembly clips into.  Also note the passages that allow free flow of fuel and water into the central area.