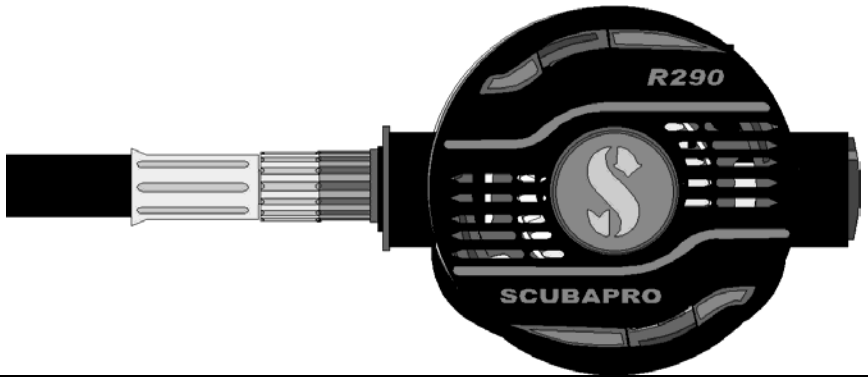
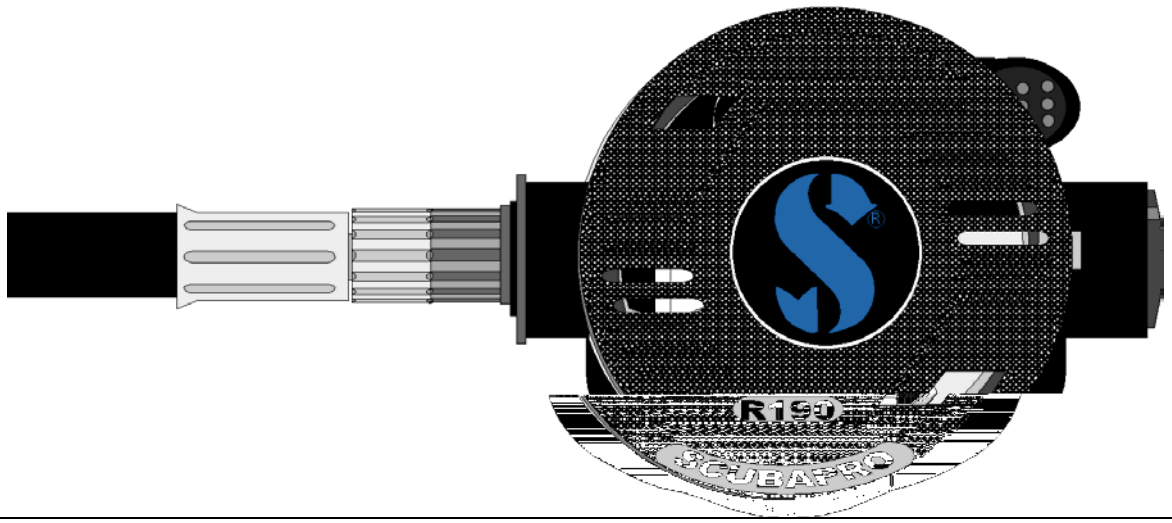
SCUBAPRO
Repair Guide
R290 - R190
Second Stages

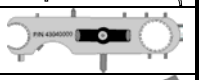
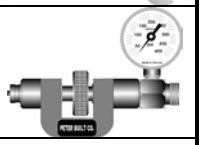


USE THIS GUIDE AS A REFERENCE WHEN SERVICING THE R290 AND R190 SECOND STAGES

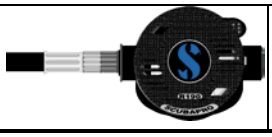


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TOOLS NEEDED FOR REPAIR OF R290-R190

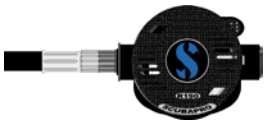
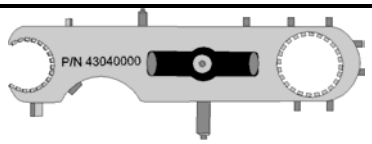
Quantity	Part Number	Description	
1 set	10.102.100 (Peter Built)	Brass o'ring picks	
1 tube	41.047.000	Christo-Lube	
1	47.010.000	Counter Mat	
1	41.496.101	Lubricant syringe	
1	43.040.000	Universal Tool	
1	11.153.500 (Peter Built)	Ball-end Allen Wrench	
1	43.300.225	VIVA Flow Vane Removal Tool	
1		13mm low torque wrench	
1	20.500.200 (Peter Built)	Pneumatic Adjusting tool	
1	18.300.500	Blow Gun/Air Nozzle	
1		¼" Nut Driver	

ICON LEGEND

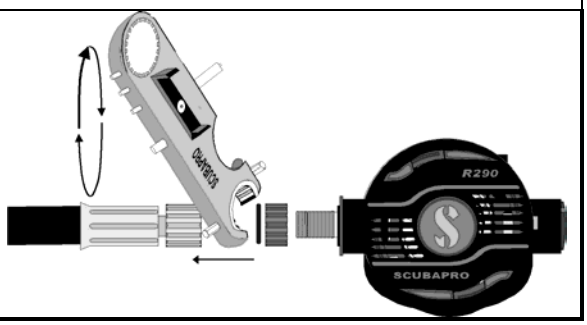
	Inspect carefully, replace if needed
	Lubricate properly
	Replace annually
	Dynamic o'ring, replace annually and lubricate properly
	No tools needed for this step
	 Indicates the regulators affected by this step

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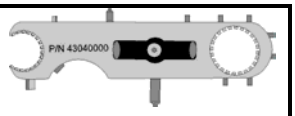
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Remove hose and jam nut from the second stage.

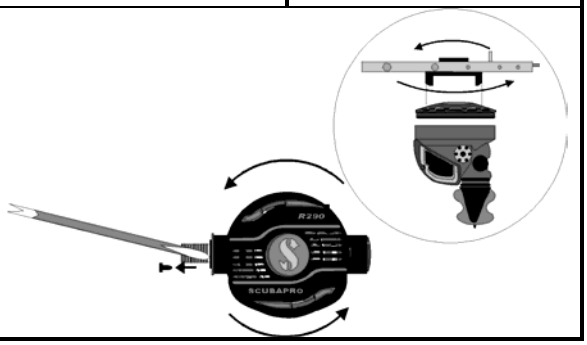


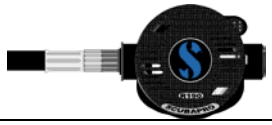
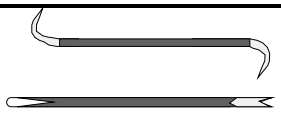
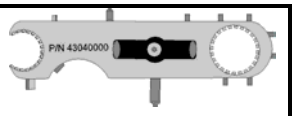




Remove the housing pin using the brass pick or similar tool.

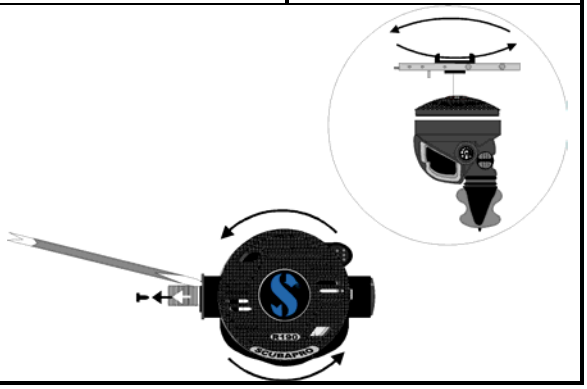
Use the universal tool as shown to loosen the two-piece cover of the R290.



Remove the housing pin using the brass pick or similar tool.

Use the universal tool as shown to loosen the cover of the R190.



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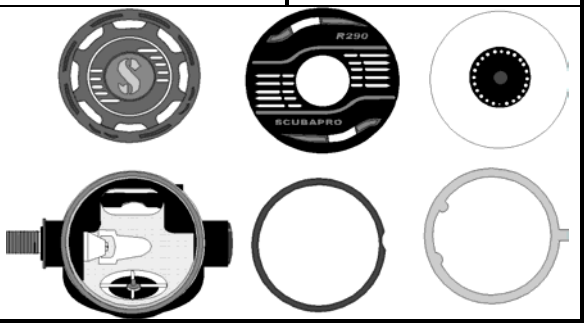
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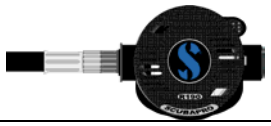




No tools needed this step

Remove the two-piece cover, friction washers and diaphragm from the second stage housing.

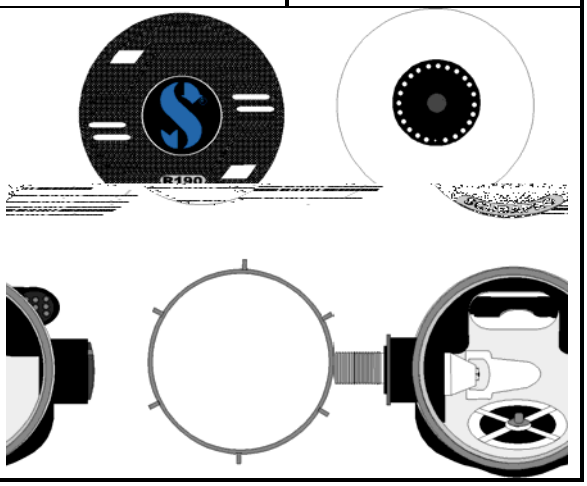




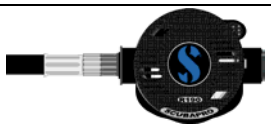


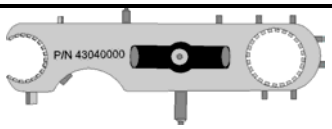
No tools needed this step

Remove the cover, friction washer and diaphragm from the second stage housing.



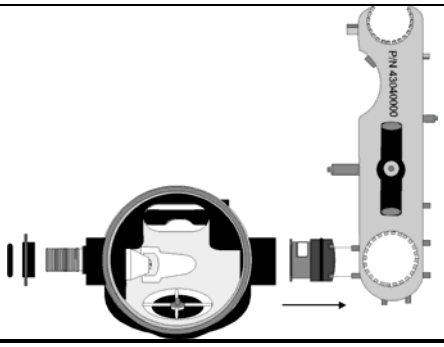






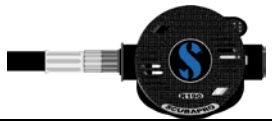
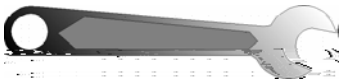
Remove the washer from the air inlet.

Using the universal tool remove the housing plug by turning and then pushing from the inside of the housing.



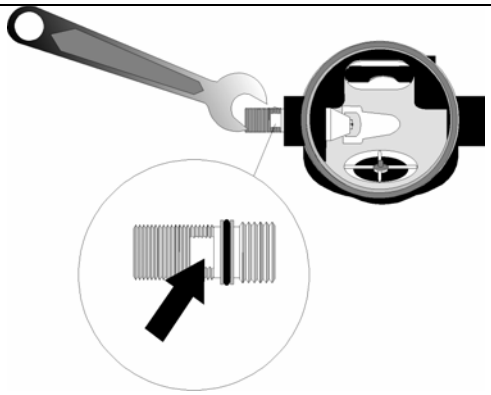
©2003 SCUBAPRO

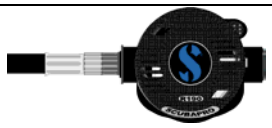
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Use a 13mm or ½" low torque (thin) wrench to loosen and remove the valve body. The wrench should rest on the "flat" sides of the valve body, which are designed to permit gripping by a wrench.

Caution: Do not score the threads on the valve body when applying the wrench. Scoring the threads will result in damage and require replacement of the valve body.

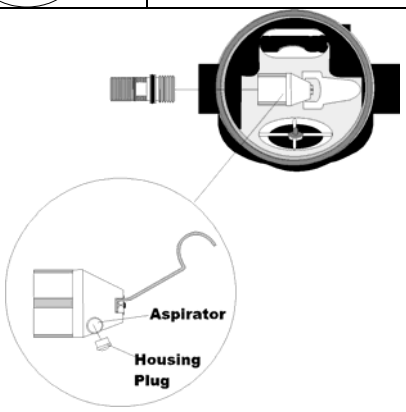



No tools needed this step

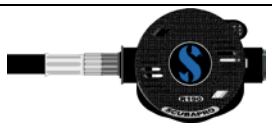
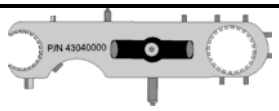
Push the valve housing to the inside of the case to remove. Take care not to lose the housing plug.

Note: There are two aspirator holes in the housing. The housing plug should be in the aspirator hole AWAY from the mouthpiece if the regulator is set up as a right hand second stage.



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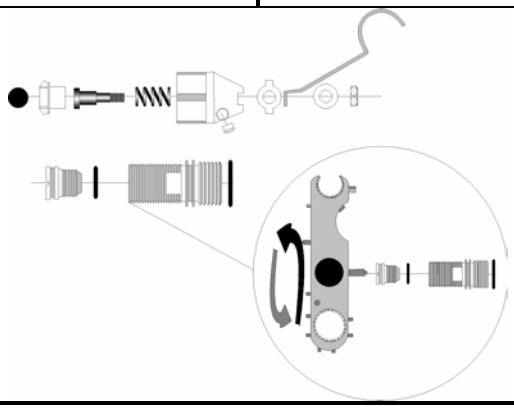




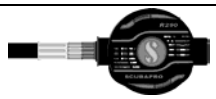
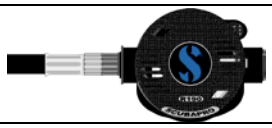


Remove the nyloc nut from the poppet assembly using the ¼" Nut Driver.

Remove the poppet assembly from the housing.

Use the universal tool to remove the adjustable orifice from the valve body.



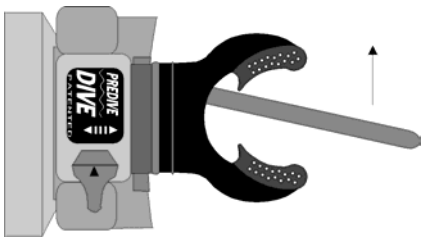




This Step Is Only Performed As Needed

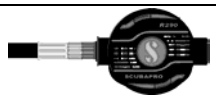
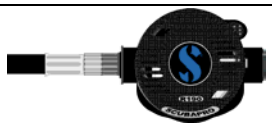
When it is necessary to remove the VIVA flow vane, use the flow vane removal tool (p/n 43.300.225).

Note: This step is seldom needed, unless the VIVA flow vane o'ring is worn or damaged.

Note: The R290 has no external VIVA control. Adjustments to the R290 VIVA must be made by the technician during service.



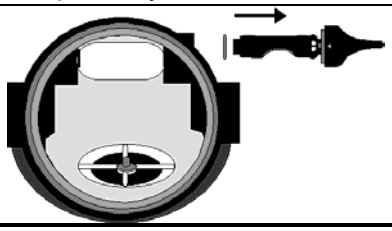
Top View


No tools needed this step

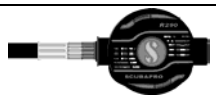
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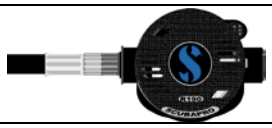
If the VIVA flow vane is removed, it may be necessary to replace the entire VIVA assembly, including the o'ring.



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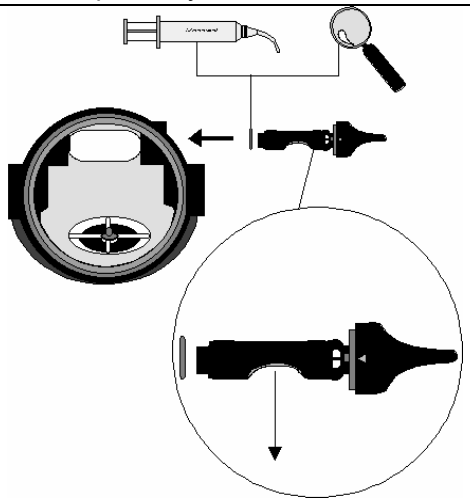
Christo-Lube

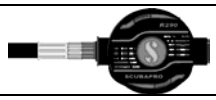
Carefully inspect and lubricate the o'ring. The venturi vane is reversible.

Maximum VIVA:
Place the new knob and vane assembly back into the housing with the crescent-shaped notch facing forward toward the back of the diaphragm for maximum VIVA.
Minimal VIVA:
Place the new knob and vane assembly back into the housing with the crescent-shaped notch facing forward toward the mouthpiece opening for minimal VIVA (ie: for rental equipment).

Push the vane inward until it is locked in place.

This Step Is Only Performed As Needed





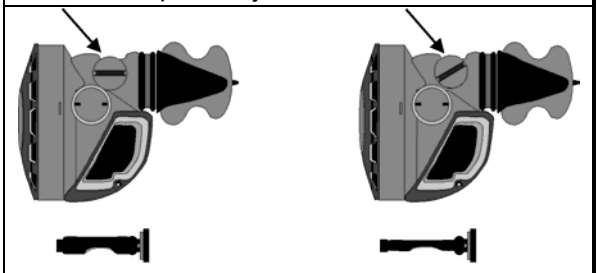
Christo-Lube

VIVA is set during service using the configurations as shown.

Generally, the VIVA is set on minimal if the regulator is used in rental.

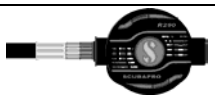
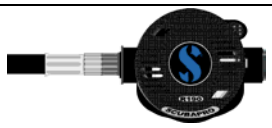
During service the technician can set VIVA according to the customer's needs.

This Step Is Only Performed As Needed



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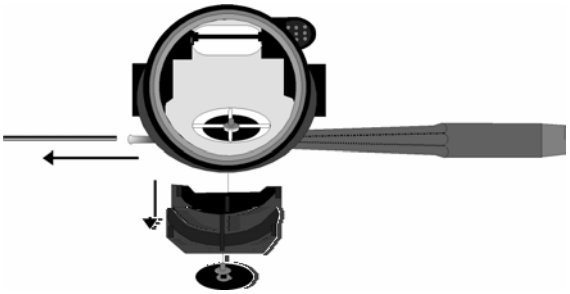



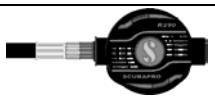
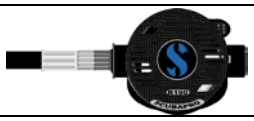

If removal of the exhaust valve is necessary, use the ball-end allen wrench to push out the exhaust tee pin. Remove the center section of the exhaust tee.

To remove the exhaust valve, grasp with fingers and pull firmly out.

The exhaust valve will seldom need to be replaced. Careful inspection is usually all that is necessary. If the valve is removed during service, it may be damaged during the process, requiring replacement.

This Step Is Only Performed As Needed

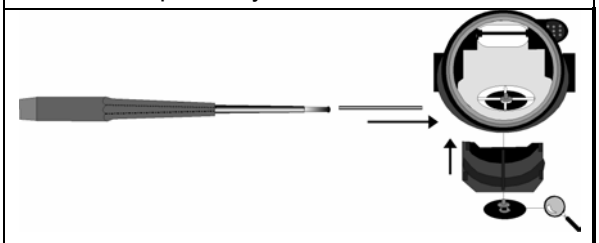


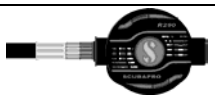
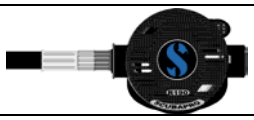




If the exhaust valve is removed, carefully inspect and replace if necessary.

Replace the exhaust tee center section and use the ball-end allen wrench to replace the exhaust tee pin.

This Step Is Only Performed As Needed



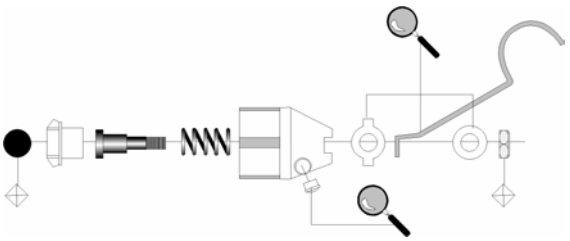




Inspect all washers and the lever.

Replace the poppet seat and nyloc nut.

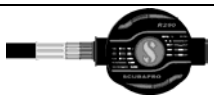
Reassemble the valve housing. The nyloc nut should be adjusted as follows:

a. Maximum of one poppet carrier thread showing through if used for a primary regulator.
b. Maximum of two poppet carrier threads showing through if used for an octopus regulator
c. Maximum of three poppet carrier threads showing through under all circumstances.

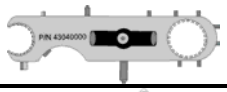


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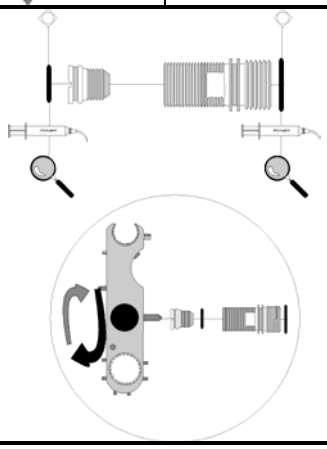




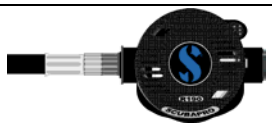


Inspect and lubricate the two static o'rings on the valve body and adjustable orifice.

Insert the adjustable orifice into the valve body and turn the adjustable orifice inward one complete turn using the universal tool.





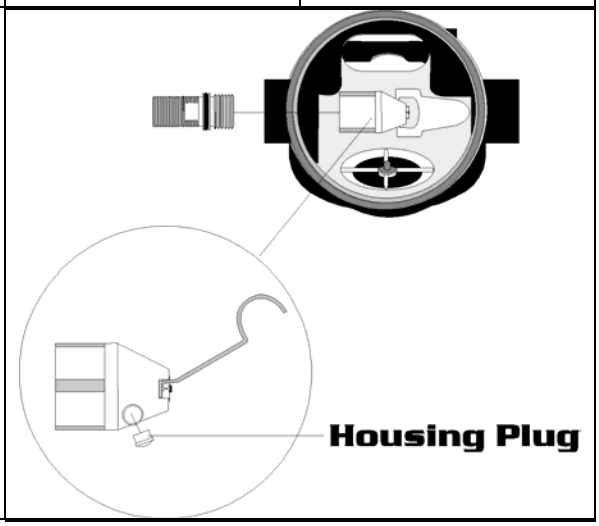




No tools needed this step

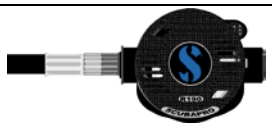
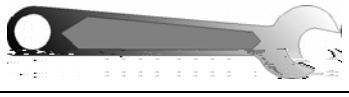
Install the valve housing and valve body into the case.

Hold the lever DOWN while assembling these pieces. This will help prevent engraving of the poppet seat during the threading process.



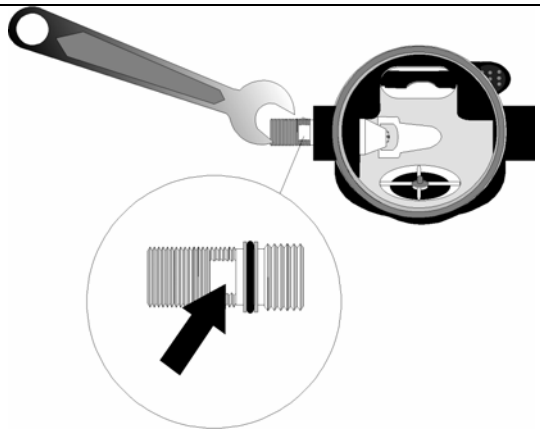
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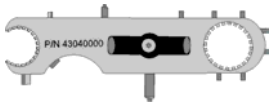




Use a 13mm or ½" low torque (thin) wrench to tighten the valve body. The wrench should rest on the "flat" sides of the valve body, which are designed to permit gripping by a wrench. Hold the lever arm down as you tighten the valve body to prevent engraving of the poppet seat.

Caution: Do not score the threads on the valve body when applying the wrench. Scoring the threads will result in damage and require replacement of the valve body.



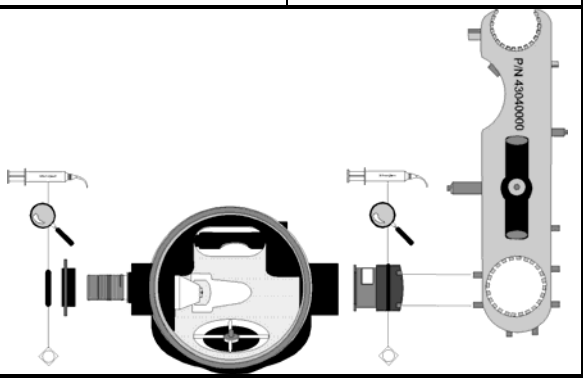






Inspect and lubricate the valve body o'ring. Reinstall the washer and o'ring on the outside of the valve body.

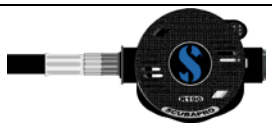
Inspect and lubricate the plug o'ring. Reinstall the plug in the regulator case using the universal tool. Turn the plug ¼ turn until it locks in place.

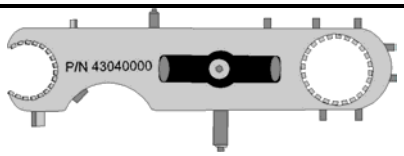


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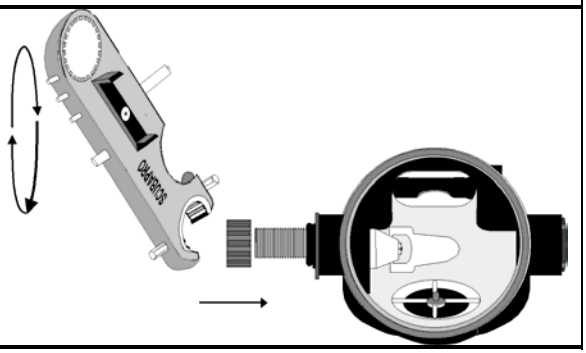
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Install the jam nut on the valve body and tighten using the universal tool.





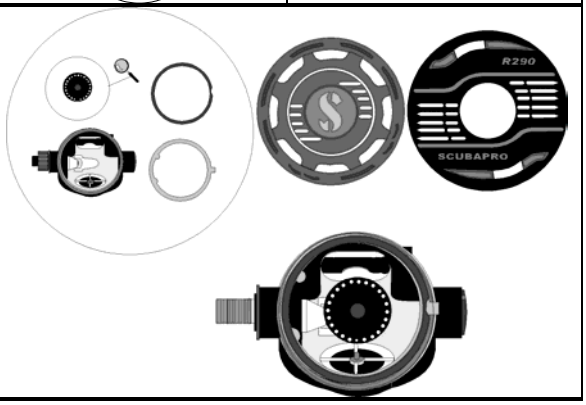


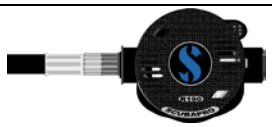
No tools needed this step

Inspect the diaphragm and install.

Install the anti-friction washer on top of the diaphragm being careful to insert the tab in the side of the case.

Install the washer on top of the anti-friction washer.



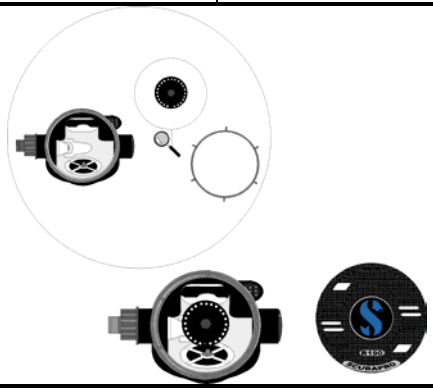




No tools needed this step

Inspect the diaphragm and install.

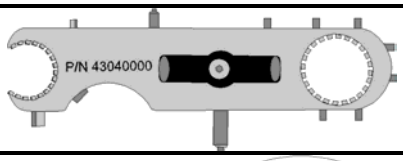
Install the spacer washer on top of the diaphragm being careful to turn the tabs correctly.



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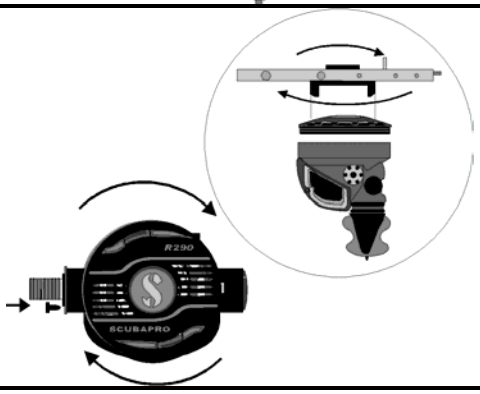
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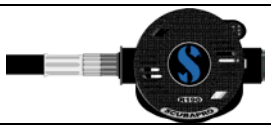


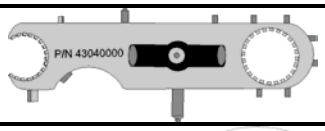


Install the two-piece front cover. Use the universal tool as shown to tighten.

Insert the case pin.





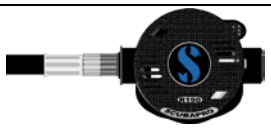


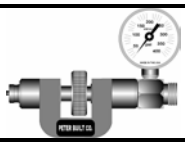
Install the front cover. Use the universal tool as shown to tighten.

Insert the case pin.



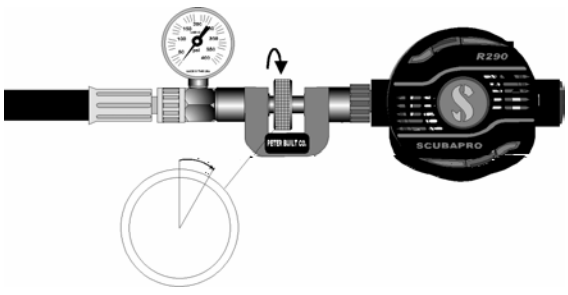






Mount the pneumatic adjusting tool into the second stage body, and thread on the second stage low-pressure hose.

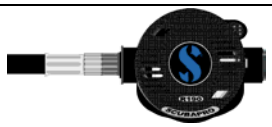
Use the pneumatic adjusting tool to make the initial air-on adjustments to the second stage, and to stop all free flowing. Once free flow stops, de-tune the second stage orifice from the twelve o'clock position to the one o'clock position.

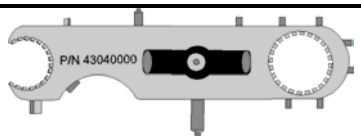


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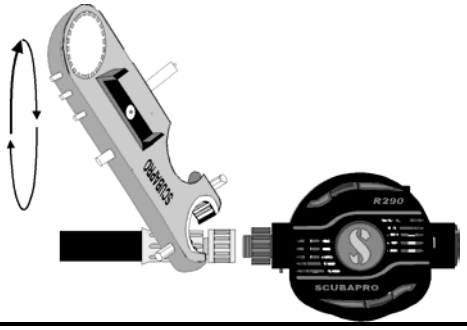
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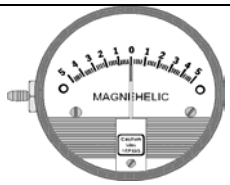


Reinstall the low-pressure hose on the second stage body.





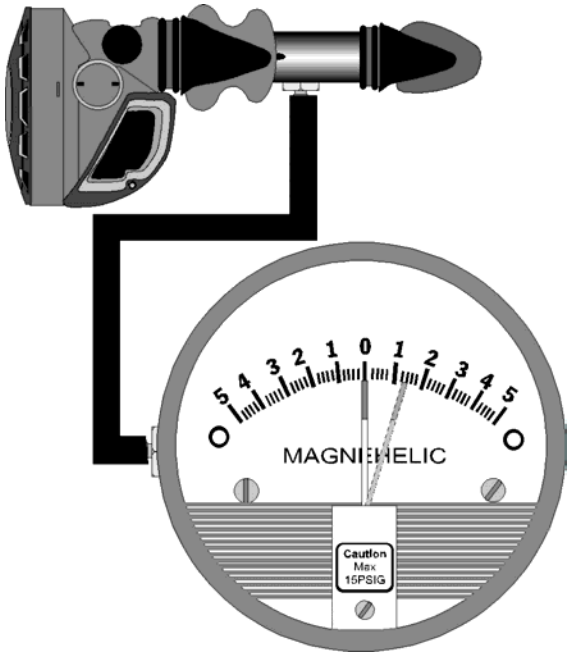




Check the cracking effort of the regulator.

R290 Inhalation effort range:
Primary Regulators: 1.2 to 1.8 inches of water
Octopus/Alternate Air Source: 1.4 to 1.8 inches of water

R190 Inhalation effort range:
Primary Regulators: 1.2 to 1.8 inches of water
Octopus/Alternate Air Source: 1.4 to 1.8 inches of water



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