



Cressi-sub

Regulators repair and maintenance

Ellipse 2nd stage





Regulators repair and maintenance

Cressi-sub

Ellipse 2nd stage

WARNING !

- This document is intended for experienced technical personnel who have already attended a Cressi-sub training course on equipment repair and maintenance.
- We decline any responsibility for any maintenance and/or repair operation carried out by unauthorized personnel.
- Avoid carrying out maintenance and repair operations on the equipment without the correct training required.
- Should the information reported in this manual be unclear or not fully understandable, please contact Cressi-sub before carrying out any disassembling or maintenance operation.
- Before carrying out any operation, Cressi-sub recommend to read this manual carefully in order to get to know thoroughly all necessary tools and techniques to carry out a correct maintenance and repair of the equipment.



Regulators repair and maintenance

Cressi-sub

Ellipse 2nd stage

WARNING !

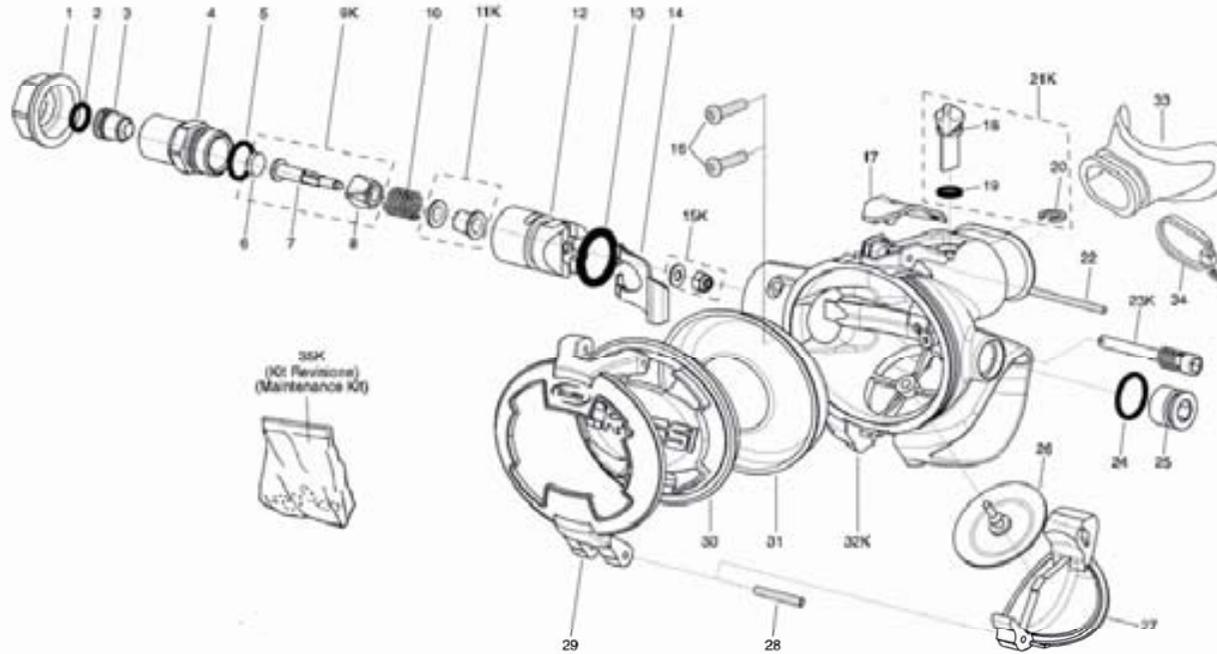
- Before any operation, Cressi-sub recommend to read carefully the present document in order to get to know thoroughly all necessary tools and techniques to carry out a correct maintenance and repair of the equipment.
- Use this document during every phase of the equipment maintenance and repair, in order not to leave out any sequence. On the contrary, bad working or even accidents might occur.
- Pay particular attention to the advices written on the sides of the pictures representing the different phases of maintenance and repair, in order to avoid any possible problem that might cause accidents.
- All operations described in this manual are relating and destined *only* to disassembling, maintenance and assembly of equipments to be used with air (21% oxygen, 79% nitrogen).



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Regulators repair and maintenance

Ellipse 2nd stage



POS.	CODICE / CODE
1	HZ 810096
2	HZ 810095
3	HZ 810094
4	HZ 810093
5	HZ 810092
6	HZ 742013
7	HZ 810091
8	HZ 810090
9K	HZ 810089
10	HZ 730207
11K	HZ 810088
12	HZ 810087
13	HZ 810086
14	HZ 810085
15K	HZ 746094
16	HZ 810084
17	HZ 810083
18	HZ 810082
19	HZ 810081
20	HZ 810080
21K	HZ 810079
22	HZ 810078
23K	HZ 810077
24	HZ 810076
25	HZ 810075
26	HZ 810074
27	HZ 810073
28	HZ 810072
29	HZ 810071
30	HZ 810070
31	HZ 810069
32K	HZ 810068
33	HZ 790094
34	HZ 730202
35K	HZ 810067

(kit Revisione/Maintenance Kit)

2° Stadio Ellipse CE / 2nd Stage Ellipse CE

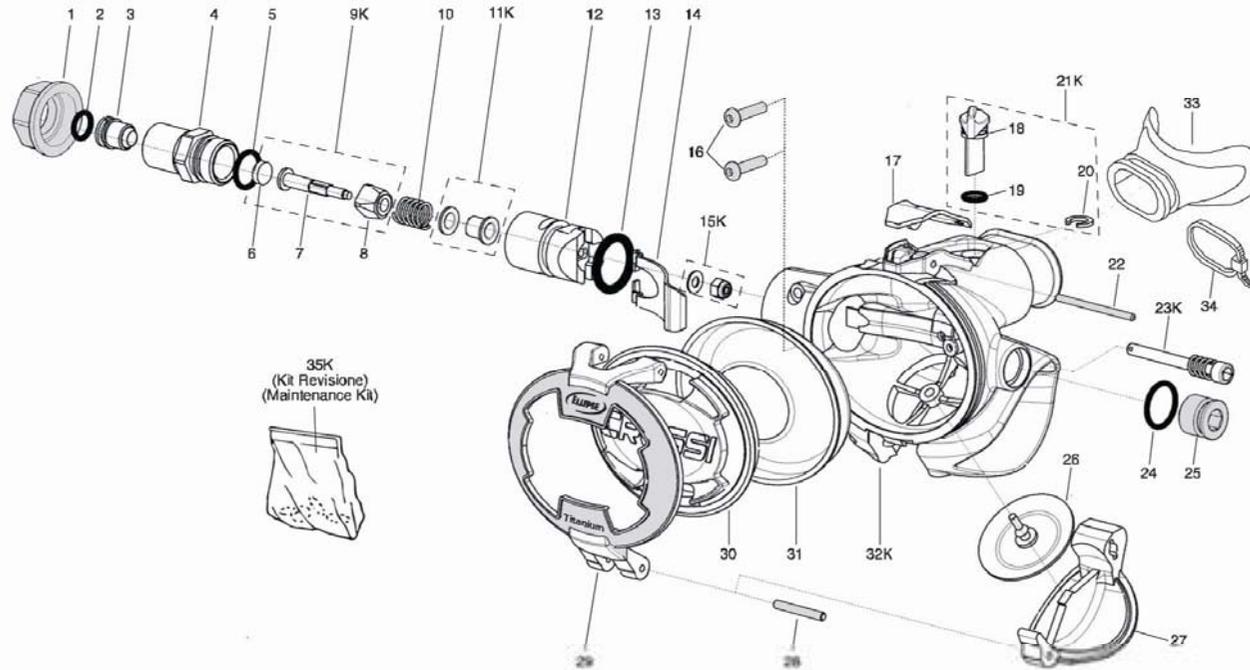
Ed./Issue	ELL/2
B/07	N° Tav./Rev.



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Regulators repair and maintenance

Ellipse 2nd stage Titanium



POS.	CODICE / CODE
1	HZ 810060
2	HZ 810095
3	HZ 810094
4	HZ 810093
5	HZ 810092
6	HZ 742013
7	HZ 810091
8	HZ 810090
9K	HZ 810089
10	HZ 730207
11K	HZ 810088
12	HZ 810087
13	HZ 810086
14	HZ 810085
15K	HZ 746094
16	HZ 810084
17	HZ 810083
18	HZ 810082
19	HZ 810081
20	HZ 810080
21K	HZ 810079
22	HZ 810078
23K	HZ 810077
24	HZ 810076
25	HZ 810061
26	HZ 810074
27	HZ 810073
28	HZ 810072
29	HZ 810062
30	HZ 810070
31	HZ 810069
32K	HZ 810068
33	HZ 790094
34	HZ 730202
35K	HZ 810067

(Kit Revisione/Maintenance Kit)

2° Stadio Ellipse titanium CE / 2nd Stage Ellipse titanium CE

Ed./Issue	ELLT/2
B/07	N° Tav./Rev.



- Ellipse 2nd stage maintenance kit



HZ 810067

- **Use only Cressi-sub original replacement units**

• Note: we recommend to carry out a complete maintenance of your regulator once a year or more in case of a particularly intensive use.



Regulators repair and maintenance

Cressi-sub

Ellipse 2nd stage

- **Yearly maintenance**

- Cressi-sub recommend a complete maintenance of the regulator at least once a year, and more frequently in case of a particular intensive use. Please replace all the parts contained in the yearly maintenance kit (code HZ 810067).
- The required tools to carry out the maintenance are described in a section of this manual.
- Wash the metal parts in warm water and soap, then rinse them in fresh water. Remove any concretion by means of ultra-sound cleaning or diluted acid solutions and rinse them carefully in fresh water.



Regulators repair and maintenance

Cressi-sub

Ellipse 2nd stage

- **Yearly maintenance**

- Grease all new OR with a thin silicone film: this will reduce to the minimum the risk of damage during the assembly phases.
- You may grease the first two turns of the metal threads.
- All operations described in this manual are relating and destined *only* to disassembling, maintenance and assembly of equipments to be used with air (21% oxygen, 79% nitrogen).

- **Use only original Cressi-sub spare parts**



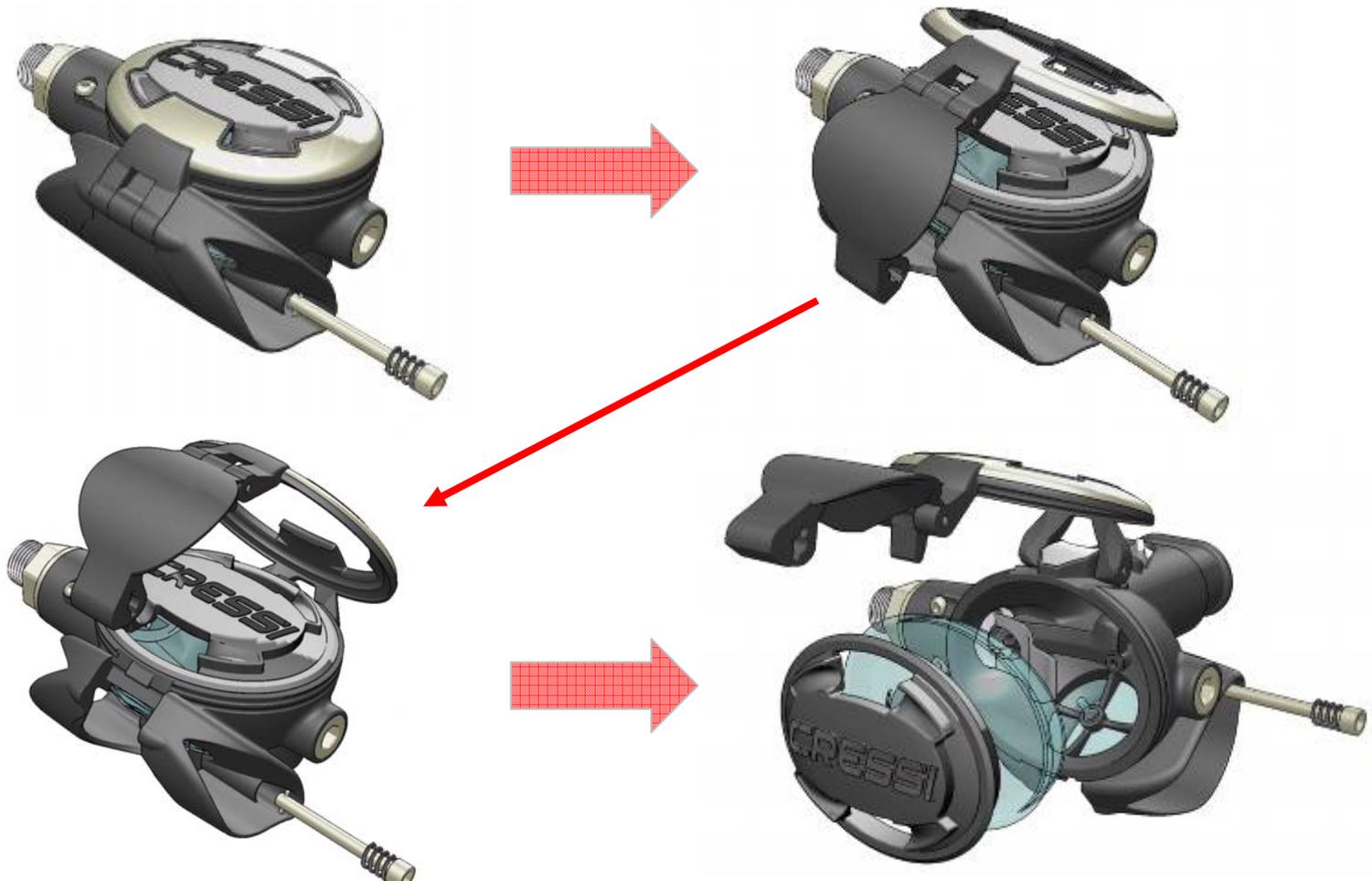
• Removal of the low pressure whip

- Remove the low pressure whip by holding the set nut with a 0,74" (19 mm) spanner and unscrewing the whip with a 0,66" (17 mm) spanner.
- The OR inside the whip must be replaced annually.





- Cam-Lock – Regulator disassembling stages





- **Cam-lock – Disassembling the regulator**

Insert a 0,15" (4 mm) allen key in the cam-lock housing, slightly press and make an anticlockwise 90° rotation. The inner spring will push the small key out, so that it may be easily removed.





- **Tongue door opening – 1-**

- After removing the cam-lock small key, insert two fingers in the tongue and press to the outside: the central door will be opened, as in the picture.





- **Tongue door opening – 2-**

- Open the cap, by holding the regulator's body with your hand.





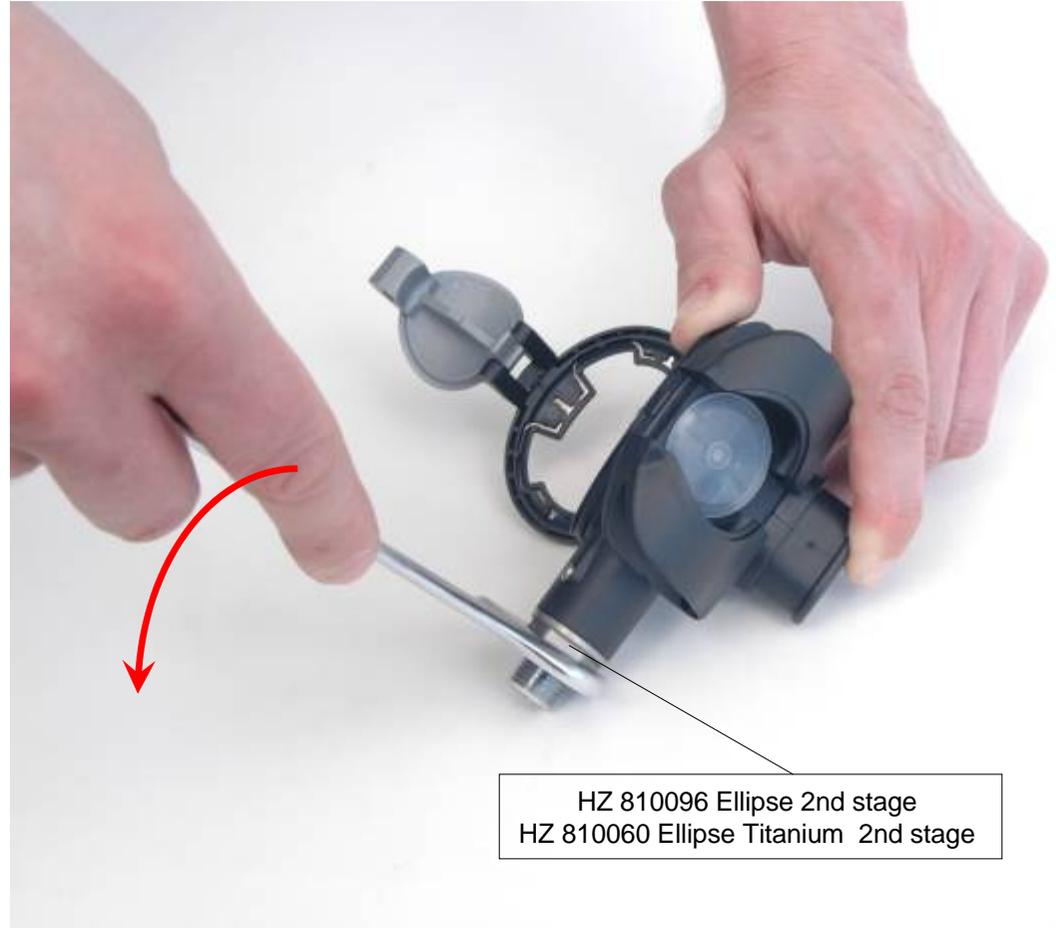
- **Removal of cap and seal**
- After opening the cap, remove the regulator's semi-rigid cap and seal.





• Removal of the blocking set nut

- Use a 0,74" (19 mm) spanner to remove the regulator's blocking set nut.
- Please note that the set nut is so shaped in order to reduce the obstructions in the housing of the adjustable nozzle.



HZ 810096 Ellipse 2nd stage
HZ 810060 Ellipse Titanium 2nd stage



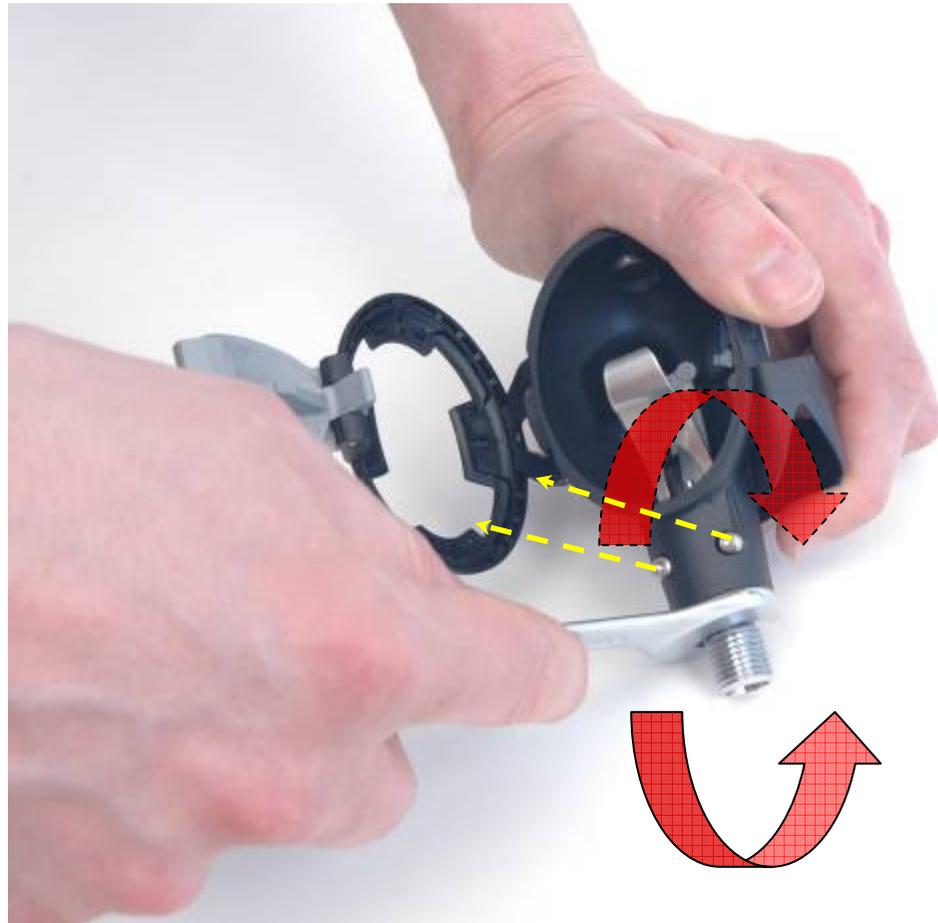
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Regulators repair and maintenance

Ellipse 2nd stage:
disassembling phases

- **Removal of the blocking tapered pins –1-**

- In order to easily remove the regulator's blocking tapered pins, use a 0,58" (15 mm) spanner to make a slight rotation - in both directions - of the adjustable nozzle's hexagonal housing.





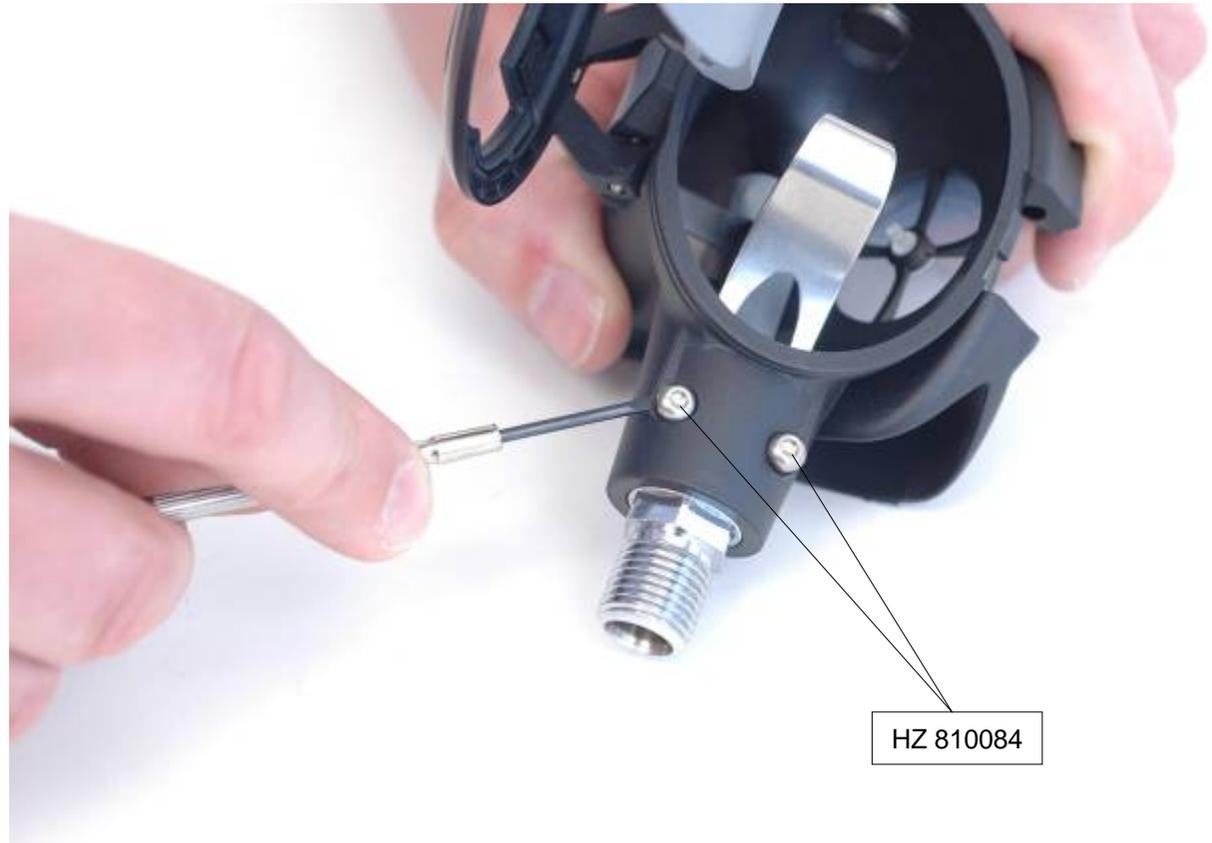
Regulators repair and maintenance

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Ellipse 2nd stage:
disassembling phases

• Removal of the blocking tapered pins –2-

- Remove both tapered pins, by care fully inserting a pointed tool in their side blunting (pointed tool).





- **Removal of the 2nd stage mechanism**

- After removing the blocking tapered pins, it is possible to draw out the 2nd stage mechanism from the regulator's body, without having to remove any component and without therefore altering the regulator's setting: this is a unique patented specification, and is a huge advantage during servicing.





- **Disassembling the flux switch**

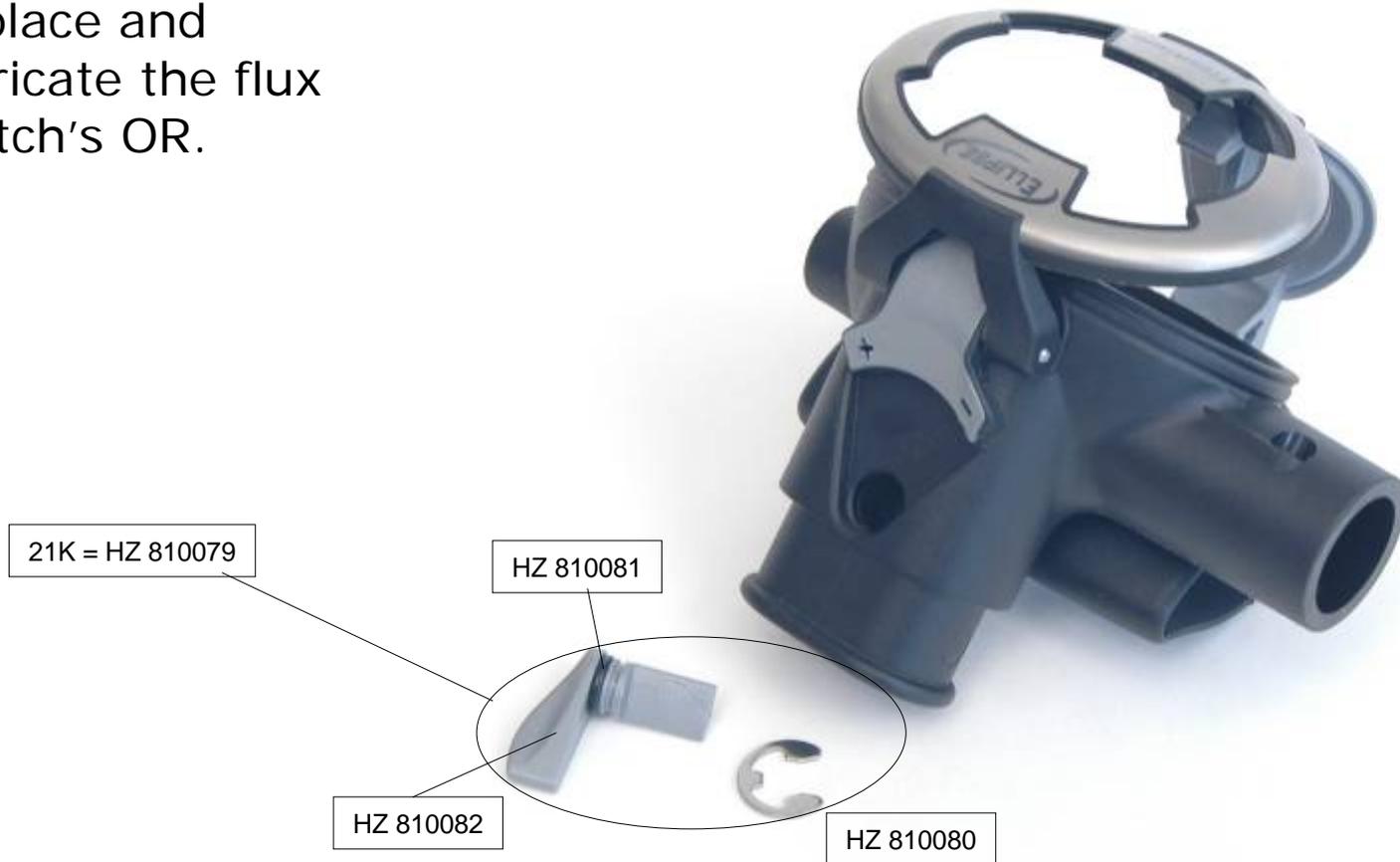
Use a flat point to push the flux switch's Seger seal ring to the outside and remove it.





Disassembling the flux switch

- Replace and lubricate the flux switch's OR.





- **Disassembling the 2nd stage mechanism**



HZ 810085

- After drawing out the 2nd stage mechanism, remove the small lever, by inserting the special spring-pushing tool in the valve and pressing it, in order to pull down the lever and easily draw it out.



Regulators repair and maintenance

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Ellipse 2nd stage:
disassembling phases

• Disassembling the 2nd stage mechanism

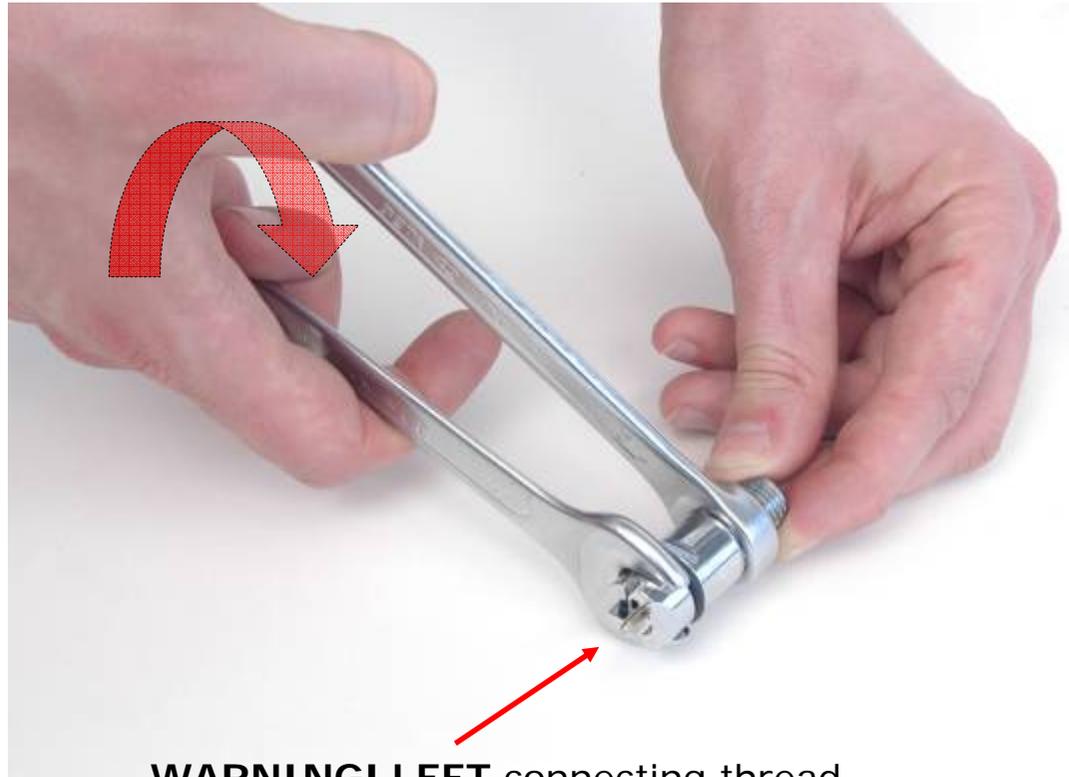
- Use a 0,21" (5,5 mm) screwdriver to remove the setting nut and its metallic washer.





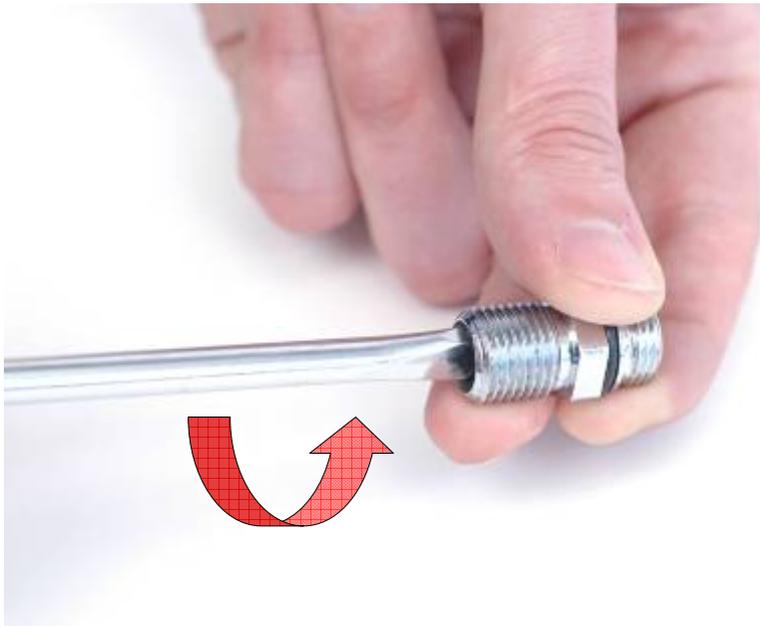
• Disassembling the 2nd stage mechanism

- In order to disassemble the 2nd stage mechanism, insert a 0,58" (15 mm) spanner in the valve body's external housing and another 0,58" (15 mm) spanner in the nozzle body's hexagon. Unscrew clockwise since the connecting thread between nozzle's housing and valve body is **LEFT HAND THRED.**





- **Disassembling the 2nd stage mechanism**



- After disconnecting valve and nozzle, use an edged screwdriver to unscrew the adjustable nozzle from its housing.
- Use the special plastic spring-pushing tool to remove the nozzle, in order not to damage the valve edge.



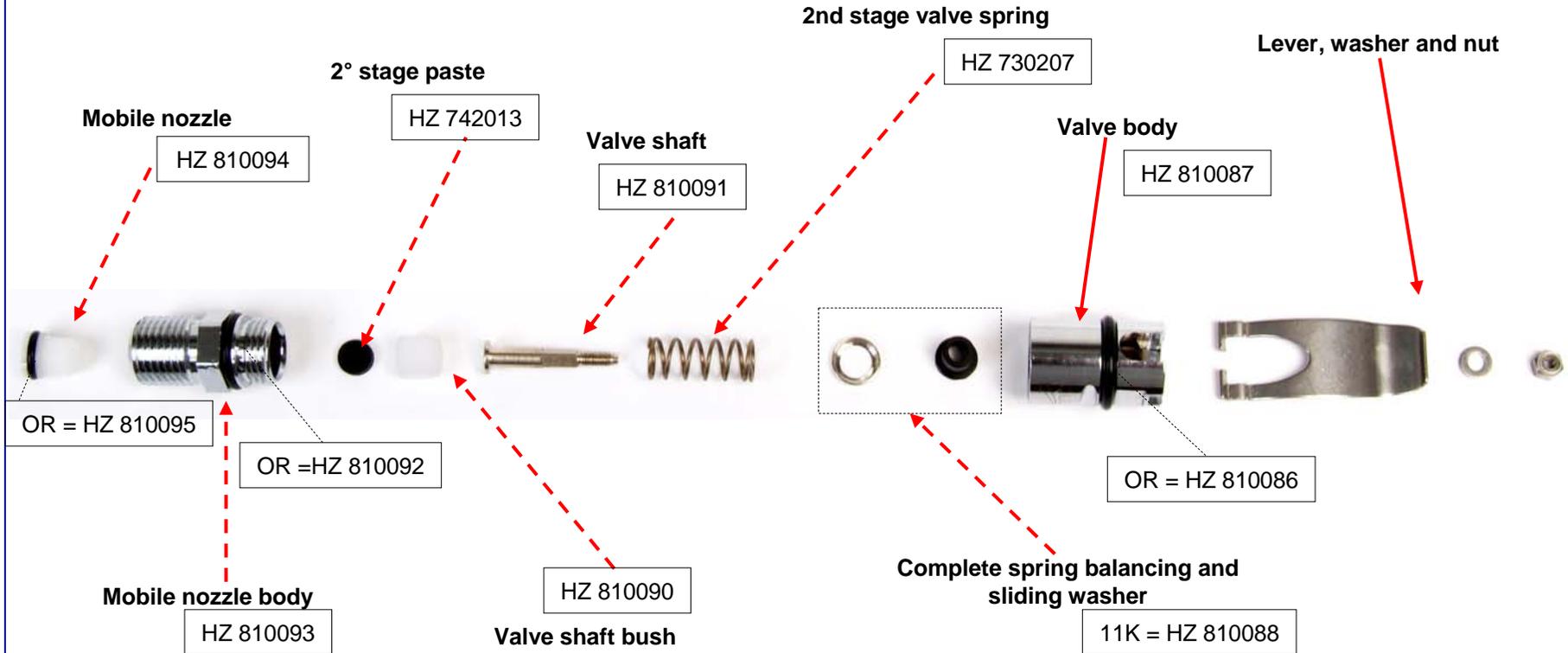
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Regulators repair and maintenance

Ellipse 2nd stage

- **Disassembling the 2nd stage mechanism**

- At this point, lay out in order, all components of Ellipse 2nd stage mechanism.





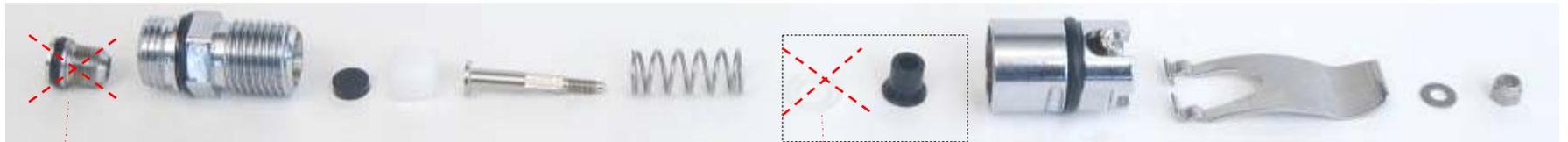
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Regulators repair and maintenance

Ellipse 2nd stage

• Parts and materials development

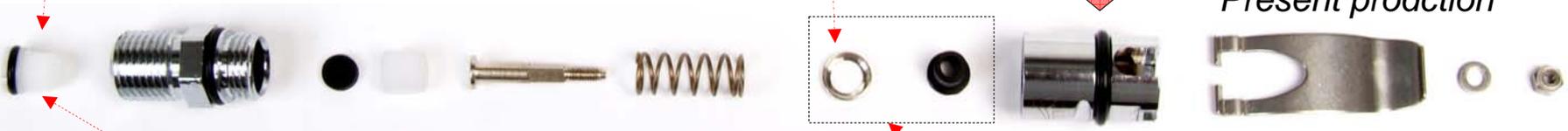
- The following diagram shows the Ellipse regulator's parts and materials development.



Ellipse Rev/1

2006 / 2007

Ellipse Rev/2
Present production



Plastic setting nozzle, present production (since 2006)

3 = HZ 810094

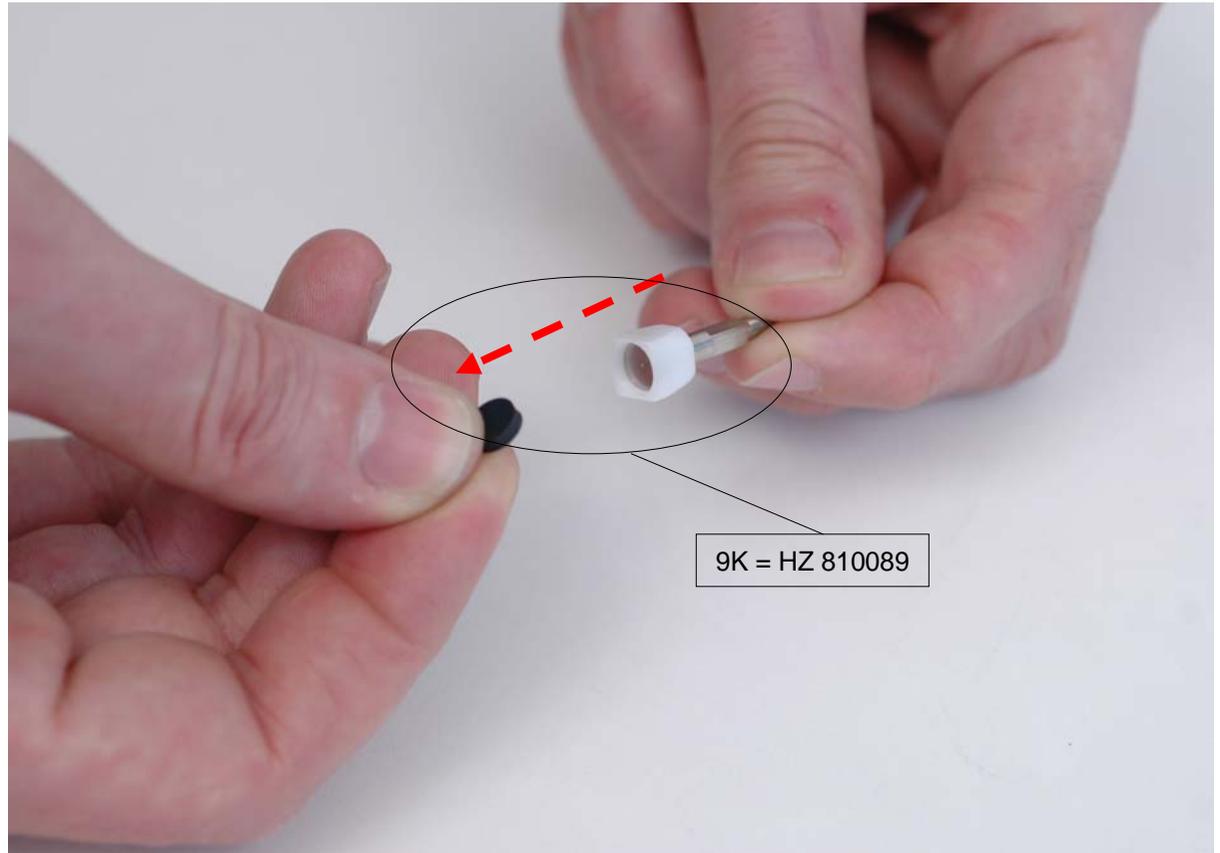
Complete spring balancing and sliding metal washer, present production (since 2007)

11K = HZ 810088



- **Yearly maintenance**

- The replacement of the 2nd stage valve's seat is particularly easy: just let the shaft bush slide, and remove the paste out of its housing.





- **Yearly maintenance**

- Use a plastic – or metallic – round-pointed tool to remove every OR, in order not to damage the packing's housing.

- ***Warning: USE ONLY CRESSI-SUB ORIGINAL PACKING***



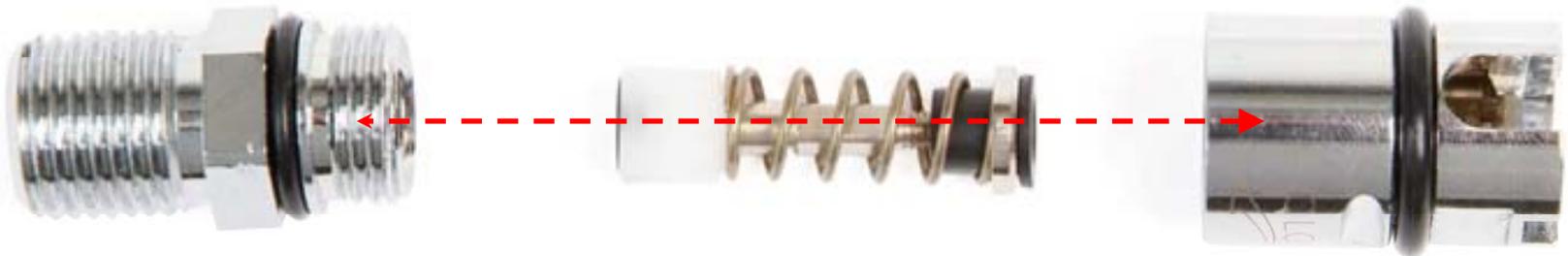


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Regulators repair and maintenance

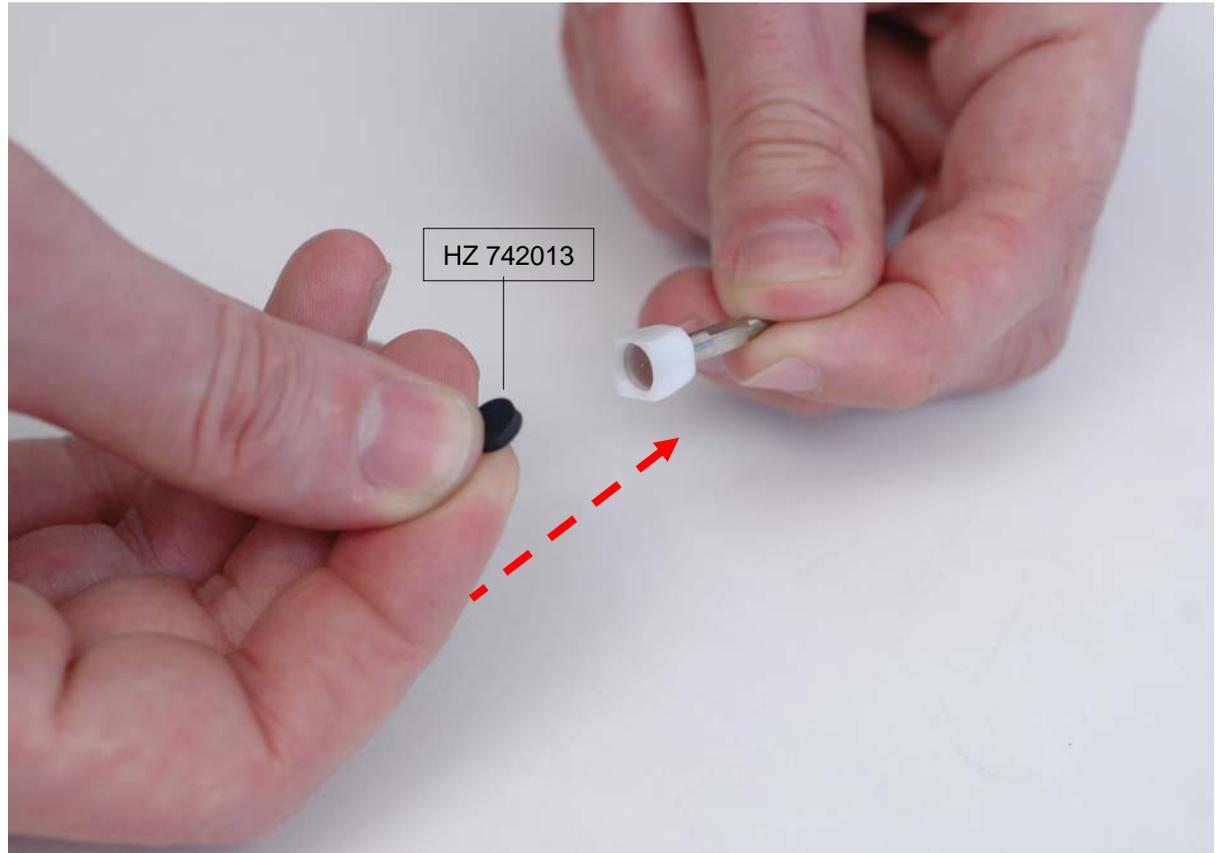
ELLIPSE 2nd stage

- Assembling the 2nd stage mechanism





- **Assembling the 2nd stage mechanism**
- Firstly, assemble the regulator's valve by inserting a new paste in the special bush of the valve shaft.





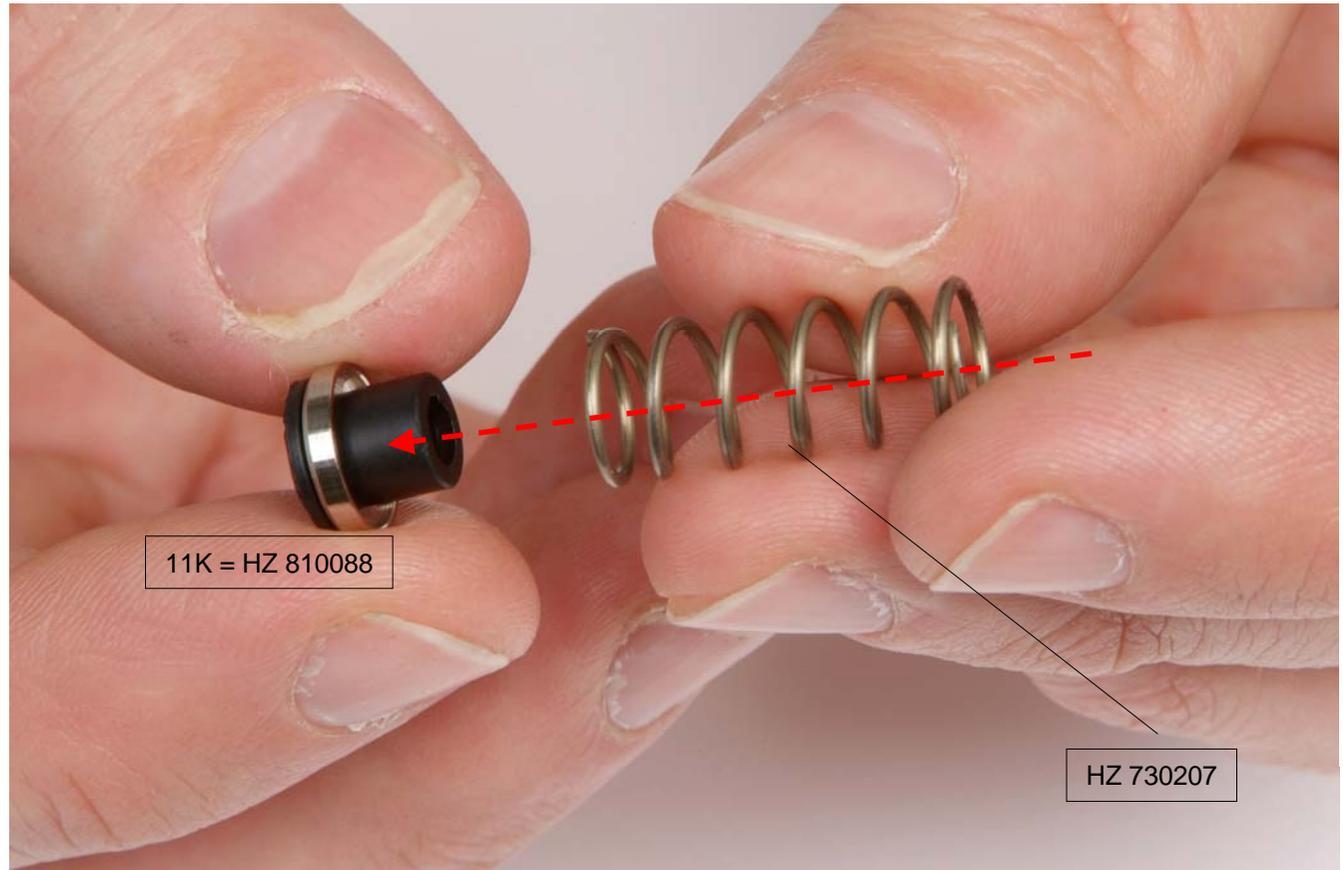
- **Assembling the 2nd stage mechanism**

- Insert the spring balancing washer in the sliding thermoplastic rubber bush, as shown in the picture.





- **Assembling the 2nd stage mechanism**
- Insert the whole sliding washer in the valve's spring.





- **Assembling the 2nd stage mechanism**

- Insert both spring and sliding washer in the valve body, making sure the latter is correctly inserted in its special housing inside the valve body.





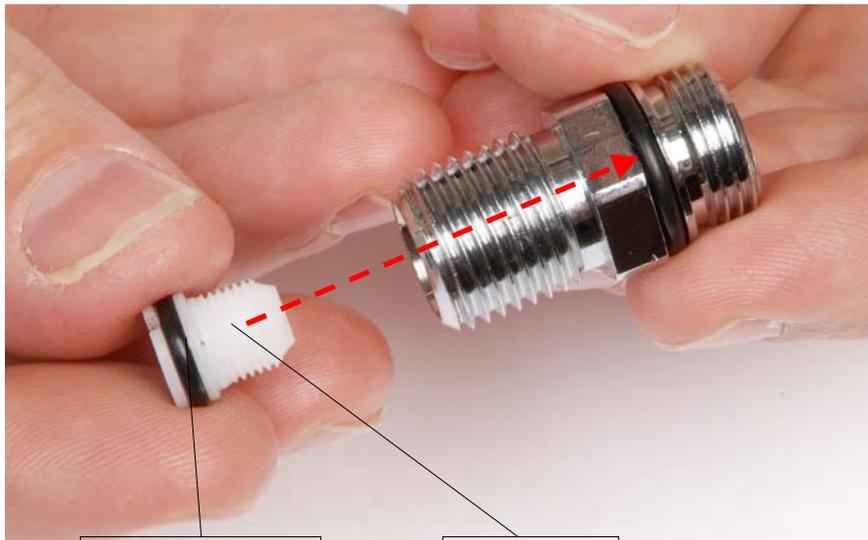
- **Assembling the 2nd stage mechanism**



- Insert the whole shaft in the spring, making sure its square stem locates inside the sliding washer.



- **Assembling the 2nd stage mechanism**
 - After carefully greasing the OR, insert and push the mobile nozzle into its seat up to the upper end of the thread.
 - Screw the nozzle in its seat (not too tight: less than a round angle will be enough, to prevent the nozzle edge from damaging the pad when assembling the regulator); the full assembled regulator will be then correctly set.



OR = HZ 810095

HZ 810094



1' x 360°



- **Assembling the 2nd stage mechanism**



Screw both assembled parts down to the bottom end of the thread, without tightening: ***please remember the coupling thread between both parts is LEFT.***



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Regulators repair and maintenance

**Ellipse 2nd stage:
assembling phases**

- **Assembling the 2nd stage mechanism**

- Insert the lever in the valve body slot, then insert the washer and the nut, and screw the latter using a 0,22" (5.5 mm) screwdriver (not too tight: a couple of threads will be enough to sustain the lever vertically, until the full assembled regulator is correctly set).





- **Assembling the 2nd stage mechanism**

Use two 0,58" (15 mm). spanners to connect both assembled components tightly; be careful to keep the lever pressed in order not to cut the seat with the nozzle's sharp edge.





Regulators repair and maintenance

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Ellipse 2nd stage:
assembling phases

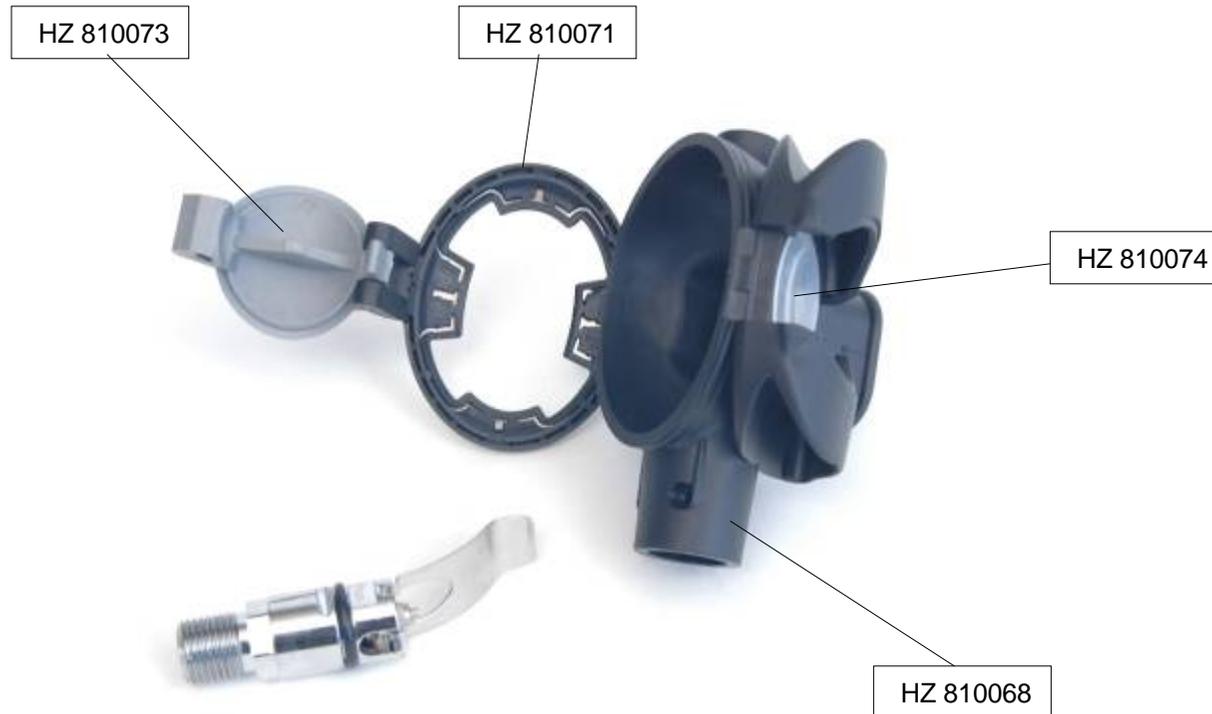
- **Assembling the flux switch**

Use a flat point to push back the flux switch's Seger seal ring into its housing.





- **Assembling the body mechanism**





- **Assembling the body mechanism**

- Insert the previously assembled and lubricated 2nd stage mechanism into the regulator's case: make sure the air outlet hole under the lever's washer is placed against the injector's top, inside the body.





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Regulators repair and maintenance

Ellipse 2nd stage:
assembling phases

- Assembling the body mechanism
 - Insert the regulator's mechanism: whilst pressing the thermoplastic injector's top with your thumb.



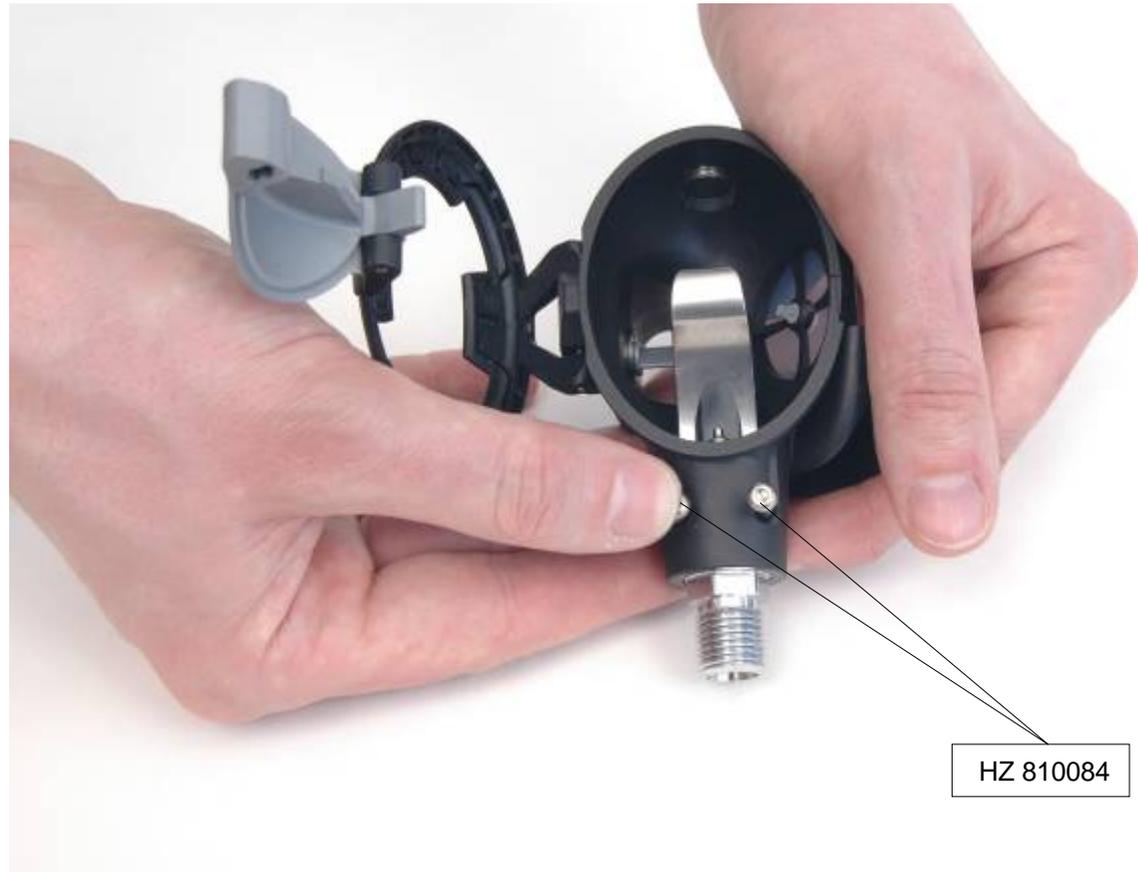


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Regulators repair and maintenance

Ellipse 2nd stage:
assembling phases

- Assembling the body mechanism
- Insert the blocking tapered pins in their special housing.





- **Assembling the body mechanism**
- Use a 0,74" (19 mm) hexagonal spanner to tighten the 2nd stage regulator's set nut.



HZ 810096 Ellipse 2nd stage
HZ 810060 Ellipse Titanium 2nd stage





• **Assembling the body mechanism**

- Place the cap on the seal, making sure its perimeter covers the whole external surface of the seal perfectly.
- Insert the whole assembled part making sure the seal perimeter edges get perfectly into the regulator body.





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Regulators repair and maintenance

Ellipse 2nd stage:
assembling phases

- **Closing the regulator's cap**

- Keep the semi-rigid discharge cap pressed with a finger and turn the weigh-cap towards the discharge valve's housing.





- **Closing the regulator's cap**

- To close, place the tooth shown in the picture in such way that it **LIES** on the 2nd stage special housing. The latter serves as closing fulcrum of the cap itself.





- **Closing the regulator's cap**

- Complete the rotation of the weigh-cap until the regulator is fully closed.





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Regulators repair and maintenance

**Ellipse 2nd stage:
assembling phases**

- **Closing the regulator's cap**

- Press the tongue's central space (grey in the picture) until a slight click is felt. The regulator is now fully closed.





Regulators repair and maintenance

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Ellipse 2nd stage:
assembling phases

- **Cam-Lock closing of the regulator**





- **Cam-Lock closing of the regulator**

Use a 0,15" (4 mm) allen key to insert the cam-lock safety key in its housing and make a clockwise 90° rotation.





Regulators repair and maintenance

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Ellipse 2nd stage:
assembling phases

- **Cam-Lock closing of the regulator**
 - If inserted correctly, the cam-lock key looks as in the picture.



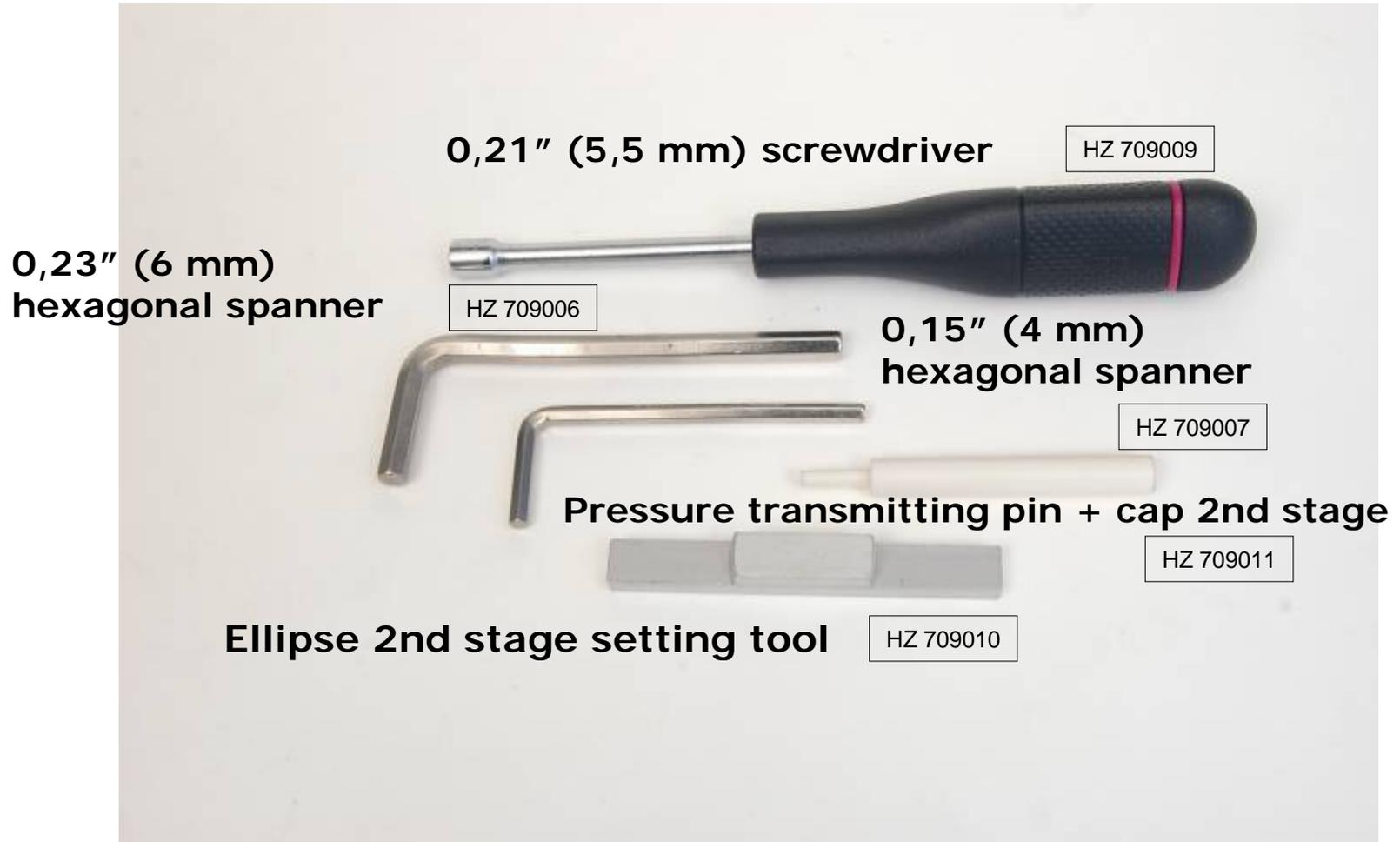


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Regulators repair and maintenance

Ellipse 2nd stage: Tools

- **Ellipse 2nd stage maintenance tools**



Torna



Regulators repair and maintenance

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Ellipse 2nd stage: Setting

• Setting the Ellipse 2nd stage: *setting the valve nozzle*

- Connect the second stage to the correctly set first stage.
- Place the full regulator (1st+ 2nd stages) on a 200 bar pressurized tank or on an equally pressurized test-bed: slowly open the air tap while pushing the 2nd stage air discharge button.
- Should the regulator slightly supply air, close the air tap, unscrew the lash and use a sharp-edged tool to screw the valve nozzle, as shown in picture [T1 on page 55](#).
- Repeat the above operation until the air stops flowing: the valve sharp edge should now hardly lie on the closing pad and guarantee its correct working.
- **NOTE:** make sure the valve nozzle is not too tightly screwed, otherwise the closing pad might be too much weighed upon, that might make inspiring difficult, because of the excessive compression of the valve spring.
- **NOTE:** the same setting operation as above may be carried out using the special setting tool, shown in picture [T2 on page 56](#)



- Setting the Ellipse 2nd stage: *setting the valve nozzle*



Pic. T1
[Go back to](#)



- Setting the Ellipse 2nd stage: *setting the valve nozzle*



Pic. T2
[Go back to](#)



Regulators repair and maintenance

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Ellipse 2nd stage: Setting

- Setting the Ellipse 2nd stage: *setting the valve nozzle*

- Setting the Ellipse 2nd stage: *adjusting the lever height*
- After adjusting the valve nozzle position correctly, the final setting may be carried out, by adjusting the height of the valve supplying lever.
- Keeping the regulator under pressure and the tap open, the final setting may be carried out in two ways:
 - 1) Setting by original Cressi-sub dima (optional).
 - 2) Direct setting on the 2nd stage seal.



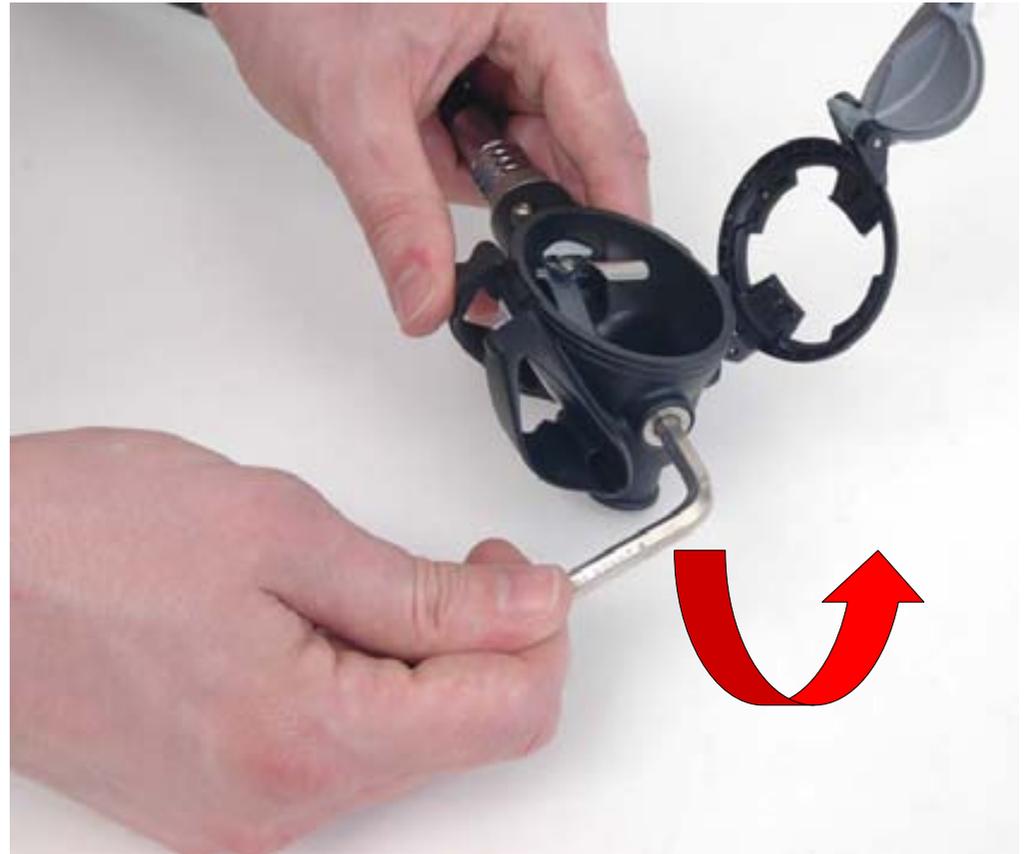
Regulators repair and maintenance

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Ellipse 2nd stage: Setting

- Setting the Ellipse 2nd stage: *setting the valve nozzle*

- Use a 0,24" (6 mm) Allen wrench to unscrew the 2nd stage regulating cap, as shown in the picture.





Regulators repair and maintenance

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Ellipse 2nd stage: Setting

- **Setting the Ellipse 2nd stage by dima**

- Insert a 0,22" (5,5 mm) screwdriver (HZ 709009) in the side slot and screw the valve nut clockwise until the regulator starts supplying slightly.





- **Setting the Ellipse 2nd stage by dima**

- Turn the setting nut anticlockwise, until the regulator stops supplying; turn a little more, in order to allow the lever idling a while.





Regulators repair and maintenance

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Ellipse 2nd stage: Setting

- **Setting the Ellipse 2nd stage by dima**

- The Ellipse 2nd stage is set correctly if, being the regulator under pressure, the lever is allowed idling slightly for about 0,08" (1,5 mm / 2mm) as to the dima.

- [Go back to](#)





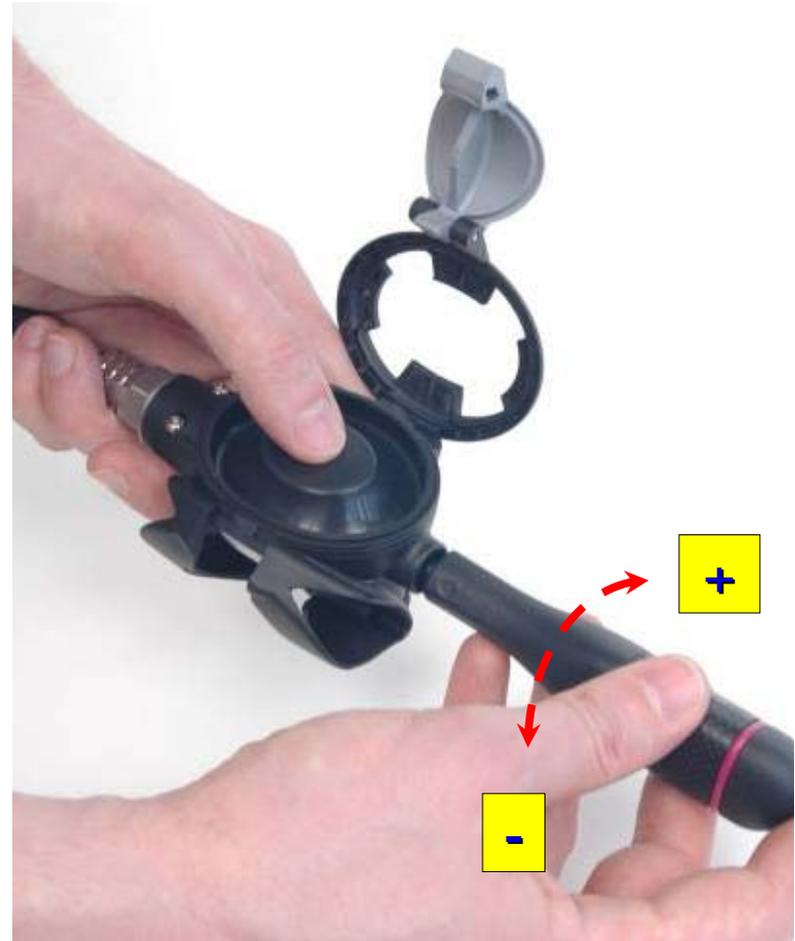
Regulators repair and maintenance

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Ellipse 2nd stage: Setting

• Setting the Ellipse 2nd stage without the dima

- It is possible to carry out the final setting of Ellipse 2nd stage without the dima, by placing the regulating seal in its seat and turning the valve nut clockwise, until the regulator starts supplying slightly. Turn the setting nut anticlockwise until the regulator stops supplying; turn a little more, in order to let the lever idling a while. The Ellipse 2nd stage is set correctly if, being the regulator under pressure, the lever is allowed idling slightly for about 0,08" (1,5 / 2 mm) as to the seal pan.





Regulators repair and maintenance

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Ellipse 2nd stage: Setting

- Ellipse 2nd stage Setting
- After setting the 2nd stage correctly, use a 0,24" (6mm) Allen wrench to turn the side screw, until its top lays even with the body.



HZ 810075 Ellipse 2nd stage
HZ 810061 Ellipse Titanium 2nd stage