

Service and Repair Operative Manual

MC9 1st STAGE

January 2009 - Rev. MC9 /B - Ed. C/13



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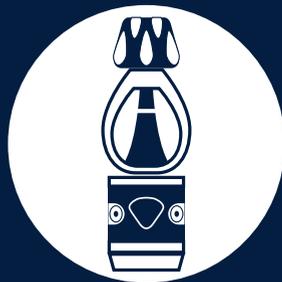
WARNING!

- This manual is intended for use by expert technicians who should attend or have already received training in equipment repairs and maintenance from Cressi-sub.
- This manual is intended for use by expert technicians who have already received training in equipment repairs and maintenance from Cressi-sub.
- Avoid performing maintenance and/or repair operations on the equipment without the proper training required to conduct these operations.
- Users must never perform maintenance themselves; all maintenance must be performed EXCLUSIVELY by an authorized Cressi-Sub center.
- If the information provided in this document is unclear or not fully intelligible, please contact Cressi-sub before proceeding with any disassembly or maintenance procedures.
- Before proceeding, Cressi-sub recommends that you read the following document carefully to familiarize yourself with all the tools and techniques needed to perform proper equipment maintenance and/or repair.
- Use this document as a guide during the various steps of maintaining and/or repairing the equipment.



WARNING!

- All operations must be done strictly in the order provided in this document. Failure to do so could cause the equipment to function poorly, or worse, result in an accident.
- To prevent any assembly errors when performing maintenance and/or repairs, we recommend using **all** the replacement parts provided by Cressi-Sub in every operation.
- Pay special attention to the recommendations provided in the margin of the figures that show the various sequences of equipment maintenance and/or repair in order to avoid any problems that could result in an accident.
- The document below in no way replaces the equipment's instruction manual.
- The procedures described in this document are pertinent to and intended only for the disassembly, maintenance, and assembly of equipment meant for use with air (21% oxygen, 79% nitrogen).
- The instructions provided in this document are based on information referring to the most update equipment available. Cressi Sub reserves the right to make changes at any time.

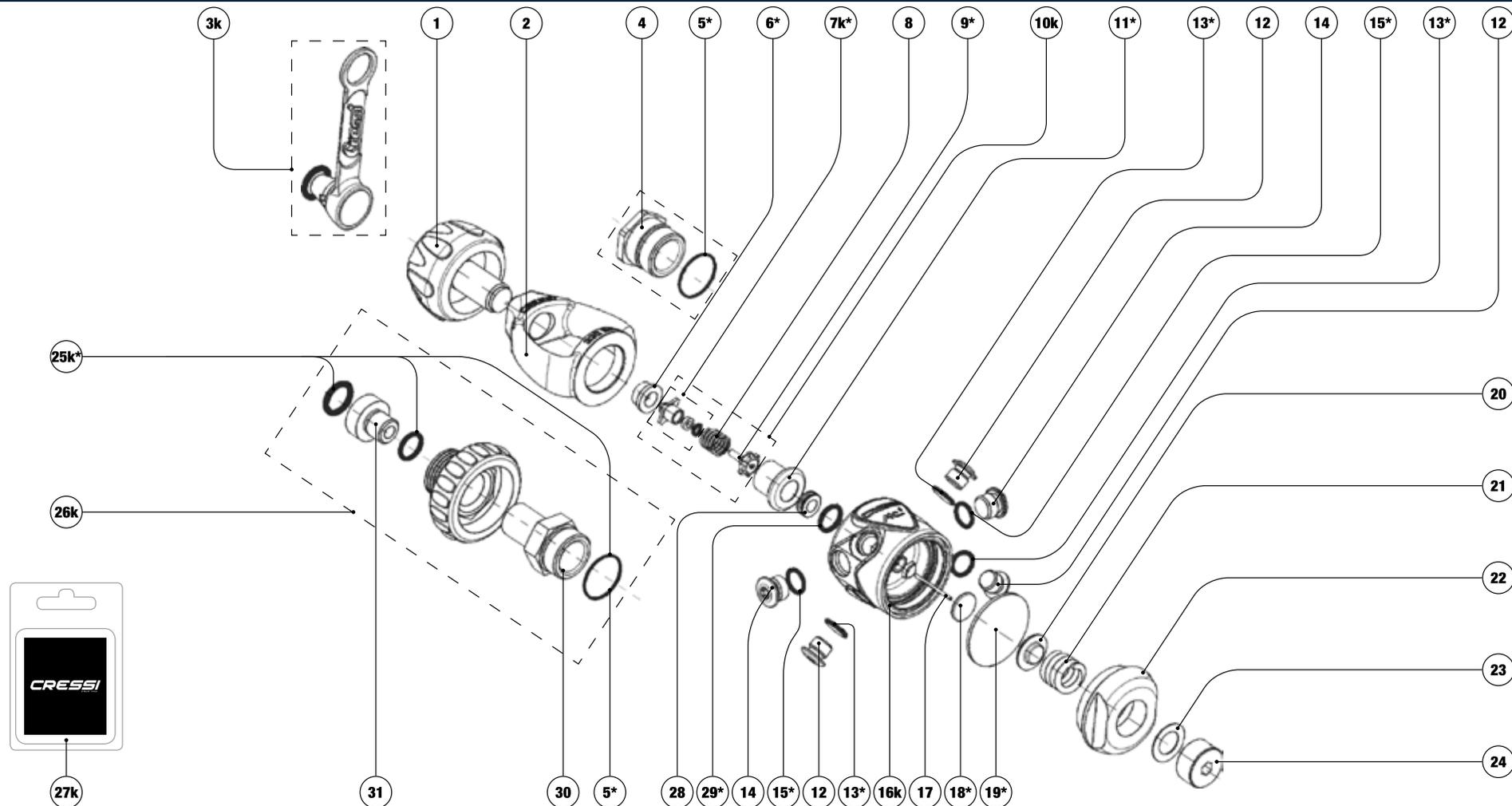


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Spare parts

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Pos	Cod	Pos	Cod
1	HZ730027	17	HZ800041
2	HZ770080	18	HZ800062*
3k	HZ800090	19	HZ800082*
4	HZ800054	20	HZ800081
5	HZ800055*	21	HZ800080
6	HZ800056*	22	HZ800063
7k	HZ800057*	23	HZ800064
8	HZ800086	24	HZ800065
9	HZ800085*	25k	HZ800066*
10k	HZ800058	26k	HZ800067
11	HZ800059*	27k	HZ800047*
12	HZ730106	28	HZ800042
13	HZ730108*	29	HZ800043*
14	HZ730127	30	HZ800049
15	HZ730132*	31	HZ800046
16k	HZ800040		

MC9
MC9 SC
MC5
1st Stages
(HZ 800047)
Annual
Maintenance

*HZXXXXXX** Contenuto nel kit revisione e non disponibile singolarmente. / Only available in maintenance kit; not available individually. / *HZXXXXXX* non disponibile not available.

Ed/Issue	01/09
N°Tav./Rev.	MC9/B



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MC9 / MC9 S.C. / MC5 - Code N° HZ 800047 Annual Replacement Kit Chart

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Use only original Cressi-sub spare parts

Go back to

Note: Cressi-sub recommend a full maintenance of the regulator at least once a year or more in case of intensive use.

MC9 - MC9 S.C. - MC5 1st STAGES (HZ 800047) ANNUAL REPLACEMENT KIT CHART

O-RING Reference Table						
HZ 800055	HZ 800066	HZ 800066	HZ 730132	HZ 800043 HZ 730108	HZ 800057	
SPARE PARTS - Reference Table						
1 External Hydrostatic Diaphragm (MC9 S.C. Only) HZ 800011	1 Diaphragm HZ 800082	1 Back-Up Ring HZ 800057	1 Sintered Filter HZ 800056	1 HP Valve HZ 800085	1 HP Valve Jacket HZ 800059	1 Pin Support HZ 800062



Annual replacement

- Cressi-Sub recommends complete regulator maintenance at least once a year, or more frequently in the case of particularly intense use.
- Maintenance must include replacement of all components provided in the annual equipment maintenance kit.
- **The special tools for maintenance of this equipment are illustrated in a section of this document on page 8.**
- Metal parts must be washed with hot water and neutral detergent and rinsed in fresh water. Any concretions must be removed using ultrasound cleaning or with diluted acid solutions, always followed by long and thorough rinsing under running water. For more information, please refer to the general procedure.
- Do not use acids or solvents on rubber components.
- The new ORs must be greased with a thin layer of silicon grease: this procedure reduces to a minimum the risk of damage during assembly.
- The metal threading can be lubricated with grease on the first two rings of threading.



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Annual replacement

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Annual replacement

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- Users must never perform maintenance themselves; all maintenance must be performed EXCLUSIVELY by an authorized Cressi-Sub center.
- You can find your authorized Cressi-Sub center by asking your dealer, or Cressi Sub S.p.A. itself by sending an e-mail to:

info@cressi-sub.it

Use only original
Cressi-sub spare parts



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Special tools

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HZ 709004
extration
point tool



HZ 709016
tool to remove
the nozzle



HZ 709008
threaded bar
to tighten the
regulator in
the vice



HZ 709012
yoke nut socket
and wrench



HZ 709018
removing
yoke tool



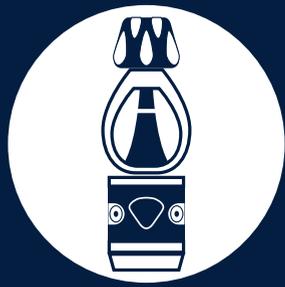
HZ 709006
allen key
6 mm



dynamometric
wrench
(unavailable)



HZ 710010
1st stage setting
pressure gauge

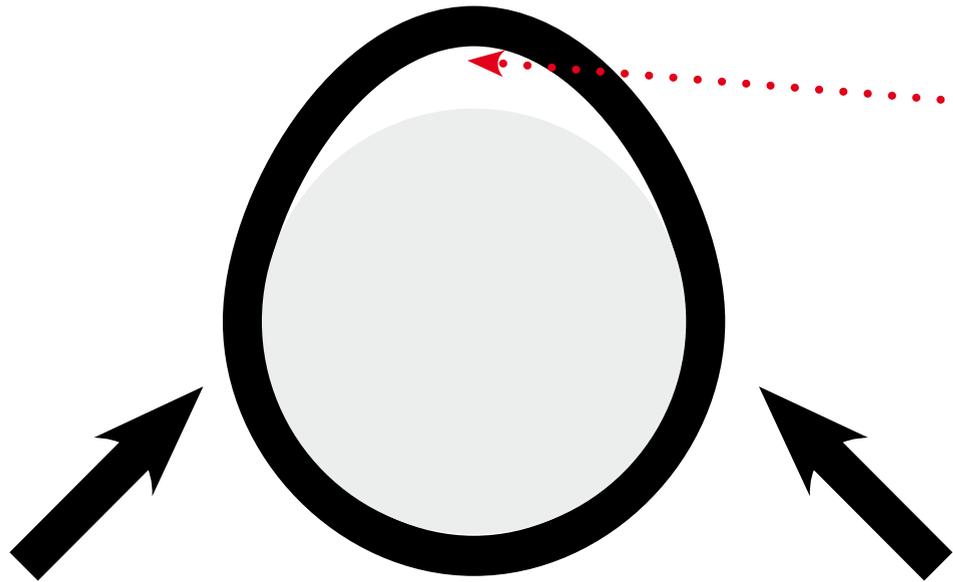


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Disassembling procedures

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- Remove and replace all O-rings;
- Use a plastic tool or a round pointed metal one in order not to damage the O-ring seat;
- To replace the O-ring correctly, press its sides to create a bulge inside which to insert the round pointed tool, as shown in the pictures;
- **Attention: USE ONLY ORIGINAL CRESSI-SUB SPARE PARTS**



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Disassembling procedures

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In case the regulator has been used under water for a long time and shows oxidation traces, it may be useful to tap gently with a plastic hammer all along the perimeter of the area to be removed.





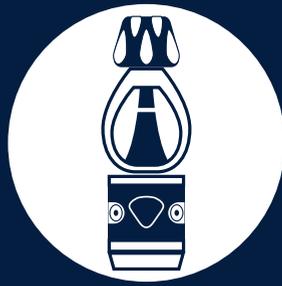
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MC9 1st STAGE INT

Disassembling procedures

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Service and Repair Operative Manual

MC9 1st STAGE INT

Disassembling procedures

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Remove the bracket nut using the special spanner, as shown in the picture.

After inserting the threaded tool in one of the first stage ports, tighten the regulator in a vice.

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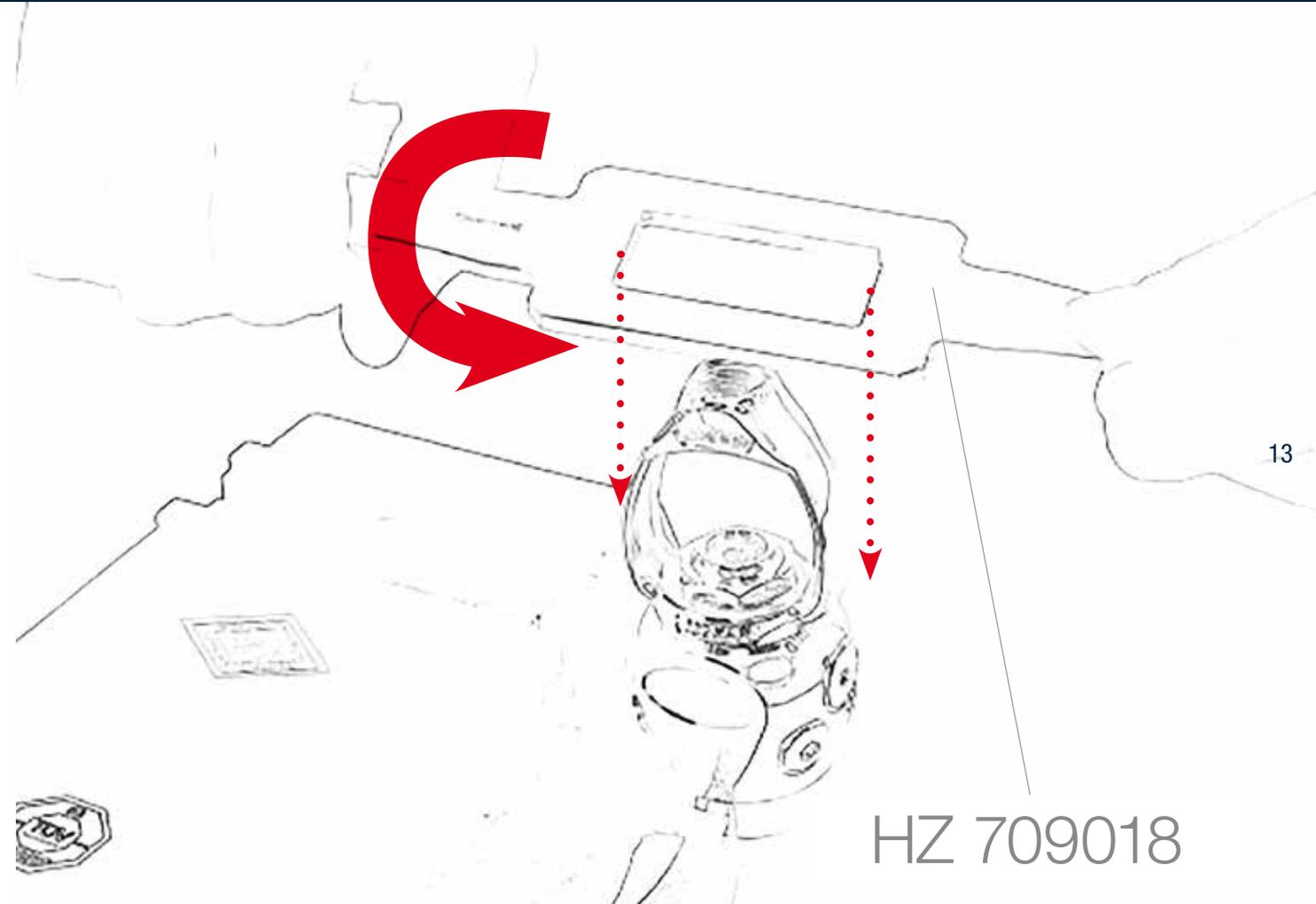


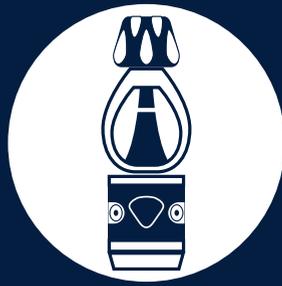
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Disassembling procedures

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In case the special spanner is not available, the bracket nut can be removed using a large adjustable spanner as shown in the picture.





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Disassembling procedures

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Remove the first stage bracket nut and bracket.

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MC9 1st STAGE DIN

Disassembling procedures

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Kit OR DIN
HZ 800066



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MC9 1st STAGE DIN

Disassembling procedures

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Using a threaded bar, tighten the first stage body in a vice.

Unscrew the DIN connector from the relating thread on the DIN filter, using a 6 mm. Allen wrench.



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MC9 1st STAGE DIN

Disassembling procedures

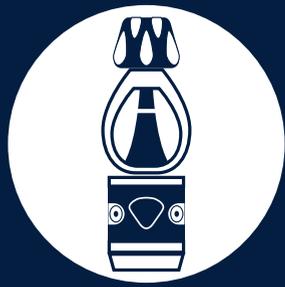
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⚠ Warning: in case the disassembling operations are difficult, do not carry out them using wrench extensions, since this might damage details of the equipment!

In such case, we recommend to contact Cressi-sub at once, before carrying out any disassembling operation.



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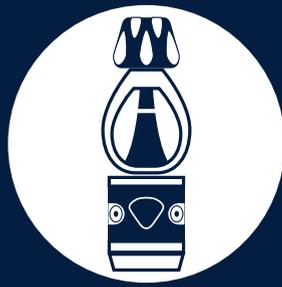
MC9 1st STAGE DIN

Disassembling procedures

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Remove the DIN connector ring from the DIN filter.





MC9 1st STAGE DIN

Disassembling procedures

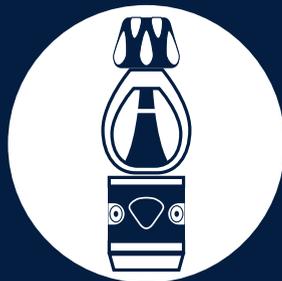
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Unscrew the DIN filter using a 24 mm hexagonal spanner, as shown in the picture.

Pay particular attention: unscrewing the thread causes the inner valve spring to lessen its resistance, which might make the inner valve dart out of its seat.



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Disassembling procedures

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HZ 800056

Remove the sintered filter and take out the first stage valve completely.



HZ 800058



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Disassembling procedures

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Remove the bracket nut O-Ring (same as the DIN filter one) and take the HP jacket-piston bush completely out of its seat.



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Remove the push pin



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HZ 800041



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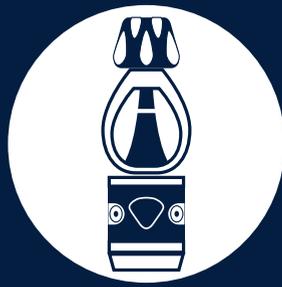
MC9 1st STAGE

Disassembling procedures

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Take out the interchangeable nozzle, inserting the special tool curved end very carefully under its edge, so that you can use it to contrast the O-ring frictional resistance.





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Disassembling procedures

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The especially shaped tool combined with the sturdiness of the stainless steel nozzle allows to take it out safely without any risk of damage.



HZ 800042 HZ 800043



HZ 709016





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Disassembling procedures

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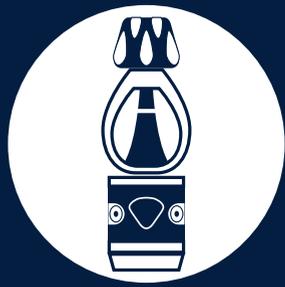
In case the regulator has been used under water for a long time and shows oxidation traces, it may be useful to tap gently with a plastic hammer all along the perimeter of the first stage closing disk.





Keeping the first stage tightened in the vice through the threaded bar, remove the closing disk using a 30 mm. hexagonal spanner. Then remove the 1st stage setting spring and guide plate.





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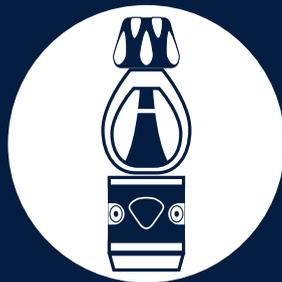
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Disassembling procedures

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Introduce low pressure air through a 3/8" LP port to remove the diaphragm from its seat.

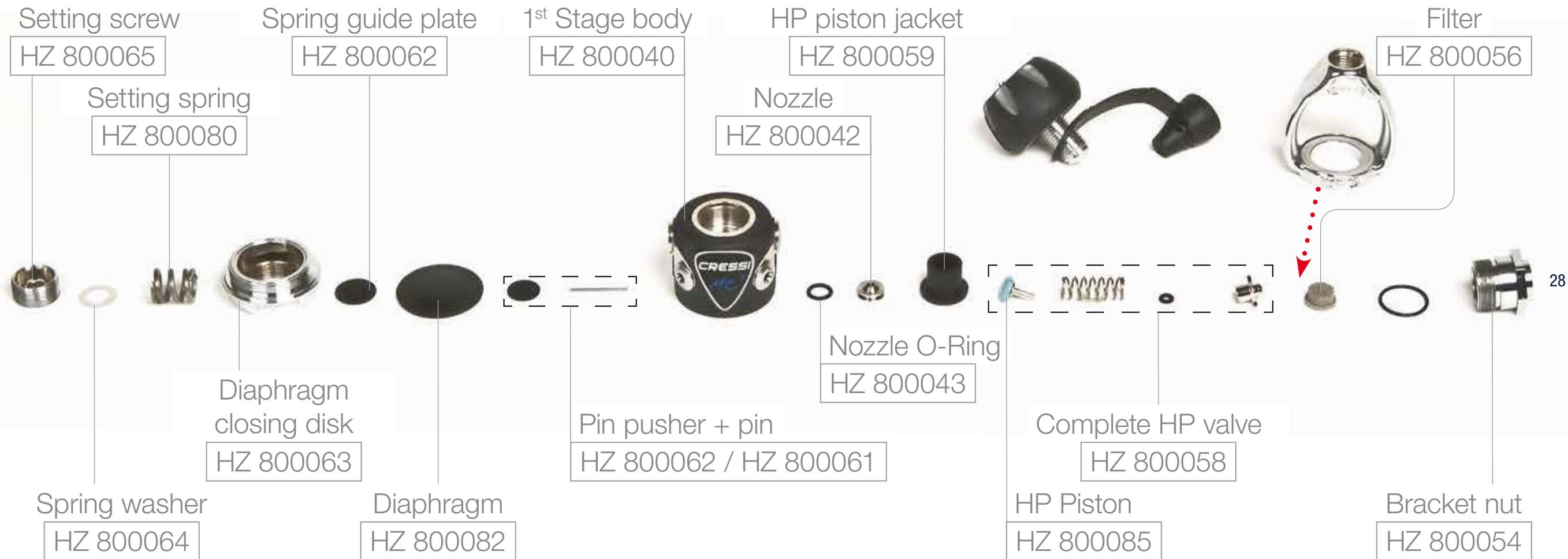




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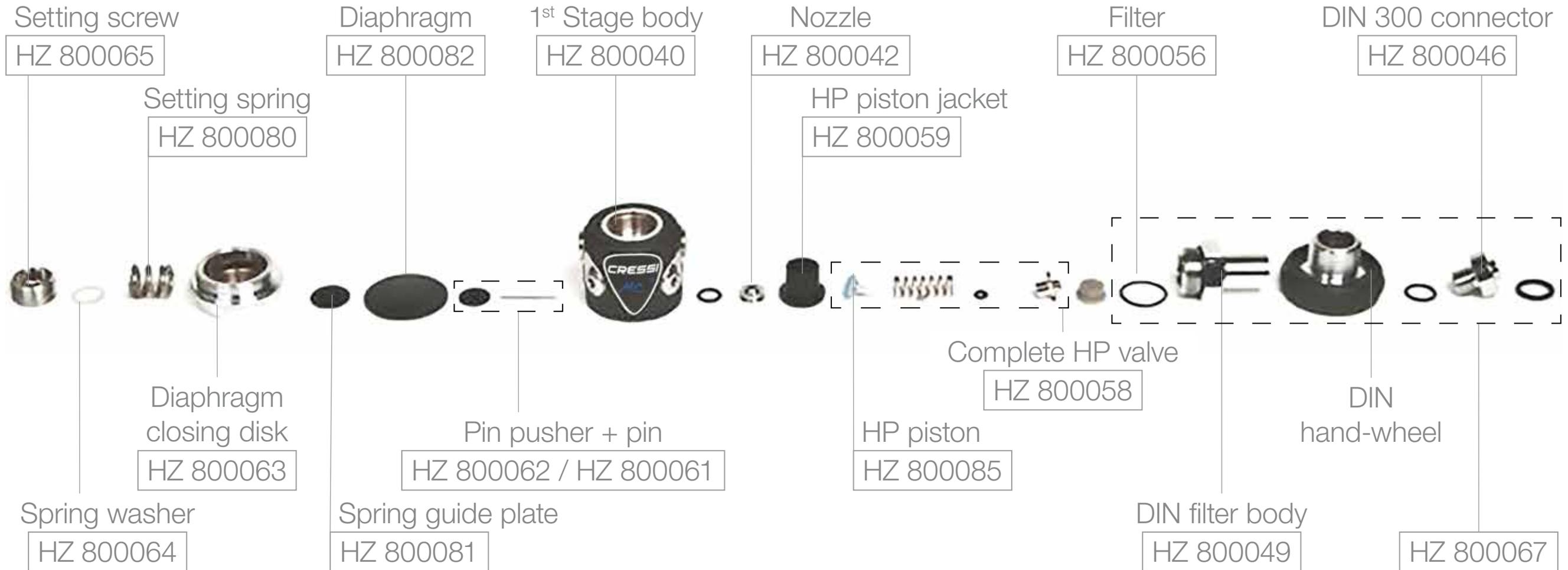




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Assembling procedures

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OR HZ 800043



HZ 800042



After lubricating it carefully, insert the O-Ring into the interchangeable nozzle seat. Insert the nozzle into its seat inside the first stage body, as shown in the picture.



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MC9 1st STAGE INT - DIN

Assembling procedures

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Insert the backup ring into the HP housing, being careful not to scratch its internal sealing surface.



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HZ 800057



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After lubricating it carefully, insert the O-Ring into the balancing chamber. Note: a rich and thorough lubrication is unavoidable to make the HP valve work perfectly.





MC9 1st STAGE INT - DIN

Assembling procedures

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Place the piston spring on the balancing chamber and the HP piston inside the latter, as shown in the picture.

Note:

Make sure the hole through the HP piston stem is NOT blocked up with impurities.



HZ800085

HZ 800057



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Assembling procedures

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Insert the new HP piston jacket bush into the first stage body as shown in the picture.



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HZ 800059



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Insert the assembled HP valve into the first stage body as shown in the picture.



HZ 800058



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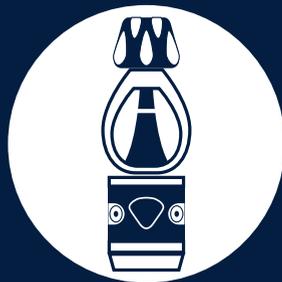
MC9 1st STAGE INT - DIN

Assembling procedures

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Place the sintered filter on the valve as shown in the picture.





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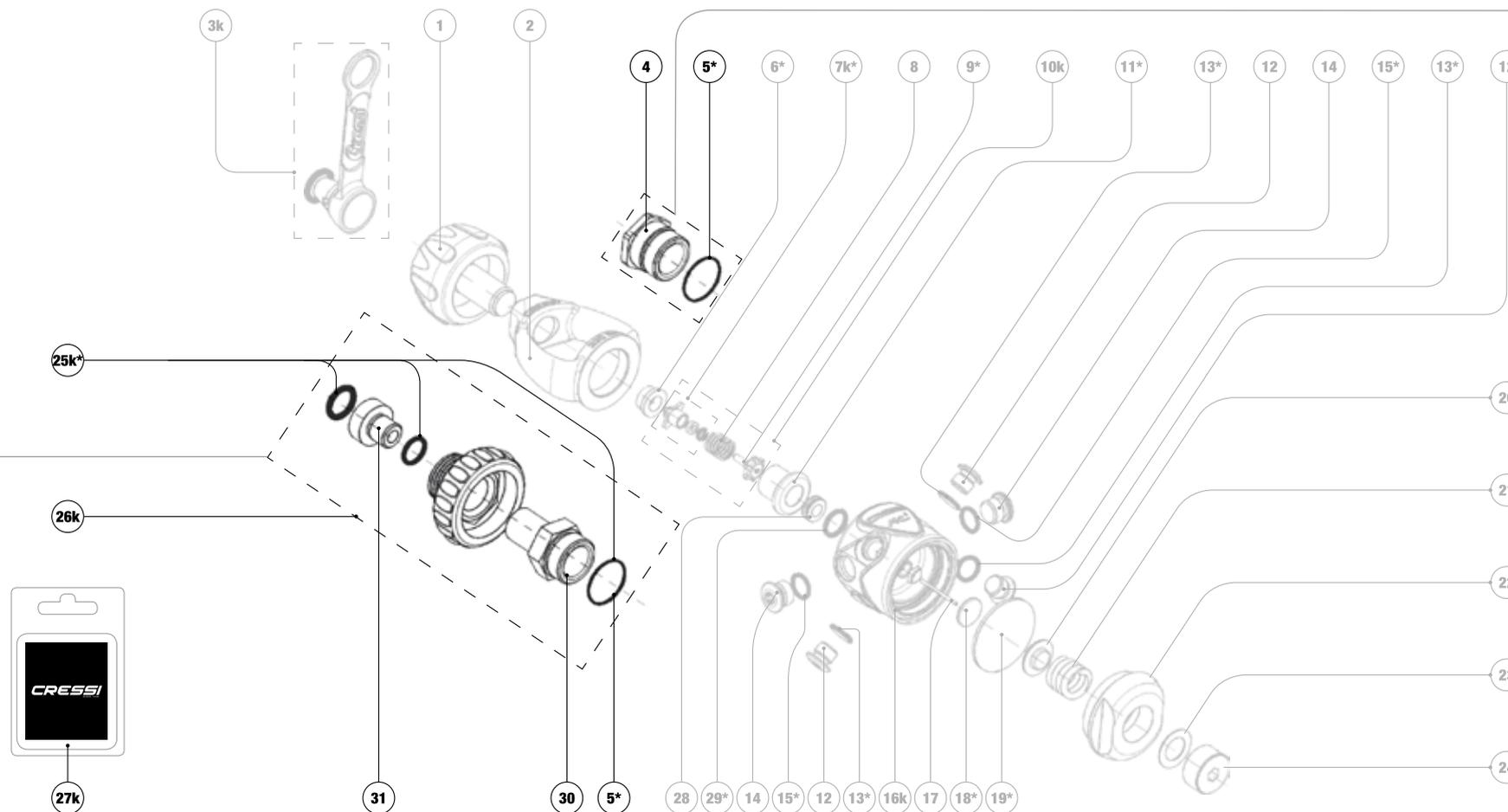
MC9 1st STAGE INT - DIN

Assembling procedures

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Click for INT
assembling procedures

Click for DIN assembling procedures





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MC9 1st STAGE INT

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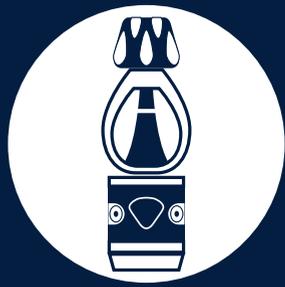
Assembling procedures

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After replacing the bracket nut O-Ring, place the INT bracket between the nut and the first stage body. Press the nut onto the filter and overcome the spring resistance down to the thread inside the first stage body. Screw the nut completely, keeping the first stage firmly on the work top, so that the O-ring will be placed correctly into its seat.





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Assembling procedures

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Yoke nut blocking with
dynamometric wrench:
30 N x m / 266 in-lbs



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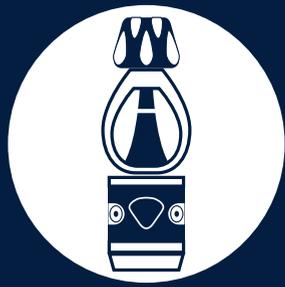
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Disassembling procedures

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Kit OR DIN
HZ 800066



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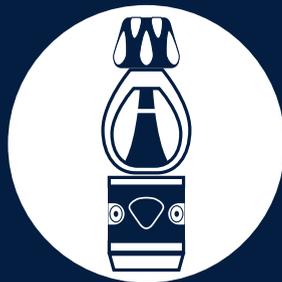
MC9 1st STAGE DIN

Assembling procedures

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After lubricating it, insert the DIN filter body O-Ring into its seat.





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Press the DIN filter body onto the filter and overcome the spring resistance down to the inner thread of the first stage body. Screw the filter body completely, keeping the first stage firmly on the work top, so that the O-ring will be placed correctly into its seat.



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Assembling procedures

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Tighten the first stage body in a vice through its threaded bar. Tighten the DIN filter body with a 24 mm. hexagonal dynamometric wrench, applying 30 N x m (266 in-lbs).



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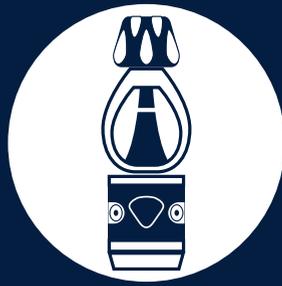
MC9 1st STAGE DIN

Assembling procedures

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After lubricating them carefully, insert the DIN connector O-Rings into their seats.





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After lubricating them carefully, insert the DIN connector O-Rings into their seats.



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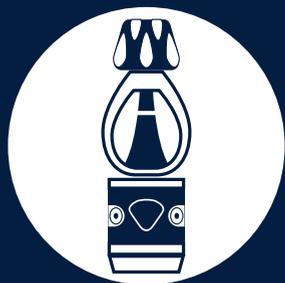
Assembling procedures

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Screw the DIN connector onto the relating thread of the DIN filter body, using a 6 mm. Allen wrench.
Tighten it using a 6 mm hexagonal dynamometric wrench, applying 10 N x m (88.5 in-lbs).



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Assembling procedures

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After connecting the HP valve including the filter through either the bracket nut (for INT model) or the DIN filter body (for DIN model), turn the body and insert the push pin into its seat.





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Assembling procedures

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Insert the pin
pusher and push
softly, to make sure
the device works
correctly.





Insert the diaphragm in the housing inside the body, making sure it that it is seated correctly in its operating position.

Then, pressing lightly on the diaphragm, check that the mechanism functions correctly in its operating position.



HZ 800082



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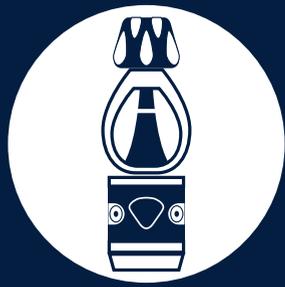
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Screw the diaphragm closing disk completely, using a 30 mm dynamometric wrench, applying 30 N x m (266 in-lbs).





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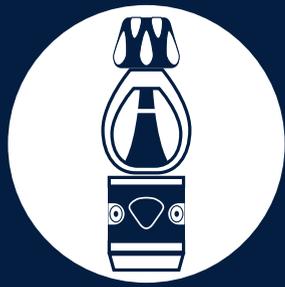
Assembling procedures

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Insert the spring washer into the first stage setting screw.



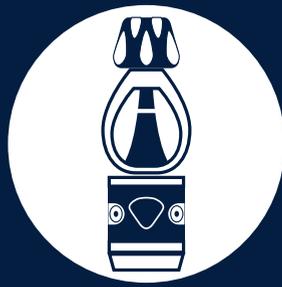
HZ 800064



Insert the spring guide plate onto the spring itself and connect the whole with the first stage as shown in the picture.

Screw without over tightening the setting screw onto its threaded seat until the plate will adhere to the diaphragm.





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Assembling procedures

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Screw the setting screw onto the threaded seat of the diaphragm closing disk, using a 6 mm Allen wrench, before carrying out the correct setting of the first stage.



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- **MC9 1st stage setting procedures, referring to the picture on page 57:**
- Connect the setting pressure gauge with one of the first stage LP ports
- Connect the whole regulator (including both 1st and 2nd stages) with a 200 bars (2900 psi) pressurized tank, or with an equally pressurized workbench.
- Note: even though the regulator is overbalanced (that is, the intermediate pressure increases as tank pressure decreases), it's a good idea to calibrate the first stage to 200 bar / 2900 psi to properly control how the regulator functions. Intermediate pressure will rise slightly as pressure in the tank drops (circa + 0.6 bar / + 9 psi at tank 50 bar / 725 psi).
- Turn slowly the air valve on, while pressing the second stage air outlet button.
- Do that some times more.



- Check the pressure on the gauge. MC9 first stage is correctly set at an intermediate pressure of 10 bars (146 psi). If it is different, close the air valve and discharge the regulator. Use a 6 mm. Allen wrench to turn *clockwise* (+) the setting screw, in order to increase the first stage intermediate pressure. Turning it *anticlockwise* (-), the pressure will on the contrary decrease.
- *Note: make sure to discharge the regulator before setting the intermediate pressure, in order to avoid incorrect reading on the gauge.*
- Make sure the intermediate pressure is reached swiftly and stays so, and does not increase after pressing the second stage discharge button for more times.
- After the setting, when pressing the second stage discharge button, the first stage pressure must decrease less than 1 bar (14.5 psi).



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Setting

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$\Delta < 1$ bar



