

Technical Manual

A-320 Balanced 1st Stage



**A Manual for Repair and Maintenance Technicians
View: Select Full Screen mode to use page arrows.**

FEATURES

Extra durable satin chrome plated brass body.
Fully balanced and environmentally sealed.
3 year warranty on the high pressure seat.
New non stick Zeomic plating on internal components.
Either Yolk or DIN fitting
Reusable unique cylindrical stainless steel filter.

4 X LP Ports
2 X HP Ports



DIN Fitting



Yolk Fitting

CAUTION

This manual is designed to help technicians who are already experienced in workshop procedures and know how to handle servicing tools.

Only experienced technicians should attempt to use this manual.

Improper use of tools and / or procedures could result in personal injury to the user, the technician or at the least damage to the regulator.

To use this presentation effectively a parts exploded view must be on hand to determine the correct assembly order plus to check if any parts are missing prior to reassembly.

TOOLING REQUIREMENTS

- 12" adjustable wrench
- Apollo wrench No. TL00005
- 4mm & 6mm Allen key (wrench)
- Snap ring (circlip) pliers TL00000
- O ring pick TL00013
- Fine tweezers
- Nylon dowel - 10mm dia.
- Small screw driver. (blunt edges)
- Threaded rod (7/16" NF) handle
- Engineers vice with soft jaws
- Line pressure test gauge
- Ultrasonic Cleaner TL00047



Additional standard engineering tools will also be required.



DISASSEMBLY

Remove the DIN fitting
from the 1st Stage

Remove the stainless steel
filter from the housing by
removing the base o'ring

This is a stainless steel filter it
can be cleaned using an
ultrasonic cleaner MS20582.



DISASSEMBLY

Carefully remove the filter retaining ring and then the filter.

Remove the Yolk fitting from the 1st Stage. You can use tool TL00006 to do this.

This is a stainless steel filter it can be cleaned using an ultrasonic cleaner MS20582.



DISASSEMBLY

Hold the 1st stage in a soft jaw vice. Use old port plugs to avoid body damage.

Fit the Apollo adjusting wrench TL0005 to the body cap.

Use a 12" adjustable wrench, undo and lift off the body cap. Remove the piston assembly to expose the adjusting assembly.



DISASSEMBLY

Unscrew and then remove the adjusting screw and spring (Turn anti-clockwise to unscrew)



Using the bio adjusting spanner TL00008 unscrew the lock nut. (Turn anti-clockwise to unscrew)



Remove the spring pad

DISASSEMBLY

Place a low pressure air nozzle against one of the LP ports, use air pressure to lift the diaphragm off its seat.

Apply pressure gently, and place a rag over the top of the body to prevent the diaphragm from being blown out and possibly causing an injury.

If you have no intention of using the diaphragm again it can be removed with a pick. Make sure you do not scratch the sealing surface.

Remove and inspect the diaphragm.
Any sign of damage or creasing is cause for replacement.



DISASSEMBLY

Remove the push rod and pad using tweezers or nose ended pliers.

The HP module is removed next. Use the 1st stage driver TL00002
Do not use a screw driver this will damage the grooves.

NOTE: If the HP module is tight and appears to be locked in position do not force it. Check that there is no pressure behind it by replacing the push rod and pad and depressing it.



DISASSEMBLY

Place the HP module on a solid surface as shown. Exert a downward pressure with your thumb or finger while engaging the circlip pliers to the retaining ring.



While compressing the retaining ring gradually reduce the downward pressure. The HP assembly should now disengage the module...

**Remember this is under spring tension,
Wear eye protection.**

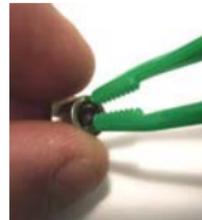


DISASSEMBLY

Using a curved o ring picker, carefully pick up the o ring and remove from the chamber and discard.

After removing the o ring check the teflon back up ring for damage. Any signs of damage (scoring etc) is cause for rejection, in this case a new balance chamber must be fitted.

Remove and inspect the o ring from the groove on the HP module



INSPECTION & CLEANING

Check the HP seat knife edge orifice (cone) for damage prior to re assembly.



The pushrod assembly must be inspected for corrosion on the pin, also any bending of the pin. If any damage is noted replace the shaft.



All threads are checked for damage, look for peeling chrome and damage caused by crossed threads.

INSPECTION & CLEANING

Rubber parts o rings etc. which are going to be re used should be washed in warm water and detergent.

After washing all o rings are to be carefully inspected for damage or distortion.

The polyurethane Hp Seat SP90031B is good for 3 years. If it is being re installed check it for any defects.

- Deep groove.
 - Holes.
 - Delaminating of the polyurethane face.
- Are all cause for rejection.



If you have any doubt on a part **REPLACE IT**

INSPECTION & CLEANING

A quick check of parts to be reused is carried out prior to cleaning. This will ensure you do not clean obviously defective parts.

All metal parts are cleaned using an ultrasonic cleaner. The recommended Cleaning solution is Lawrence Factor Wash. Apollo code TL00040.

Only leave the parts in the ultrasonic cleaner until clean, do not leave in the bath for prolonged periods. Eg; over night.

The parts must be rinsed in **bicarbonate of soda** after removal from the ultrasonic cleaner, this helps to neutralise the acid. Rinse with fresh water and then blow dry with clean filtered air.

Metal parts must now be carefully inspected prior to refitting.

ASSEMBLY

The lubrication of parts, o rings and threads, for Apollo regulators is carried out using either Christo-lube or Silicone grease.

NOTE:

The use of Christo-lube throughout the regulator **DOES NOT** constitute a regulator approved for use with Nitrox or O2 enriched Breathing Air.

Other procedures (NOT covered by this manual) **MUST** be carried out prior to use with mixed gases other than standard air.

LUBRICATION.

STATIC O RINGS

Must be lightly lubricated.
Wipe off any excess lubricant prior to assembly.

DYNAMIC O RINGS

Can be liberally lubricated.
Do not wipe off excess lubricant.
Ensure excess lubricant **DOES NOT** enter the breathing air passages.

ASSEMBLY

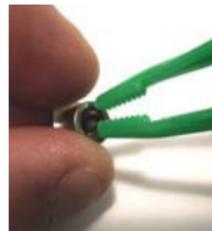
Apart from all parts being available individually, Apollo have a spare parts kit available for this 1st stage code SP00011. The kit does not include the HP seat or filter.

Replace the balance chamber o ring by using your fine tweezers as shown.

The o ring must sit on top of the Teflon washer

Place the HP module, on the bench and fit the HP seat, polyurethane face down.

Hp Module Assembly



ASSEMBLY

Next place the HP spring onto the seat.

Place the balance chamber onto the spring, the side with the o ring facing the seat and spring.



ASSEMBLY

Sit the retaining ring on top of the assembly. Ensure all parts are centred or you will have difficulty compressing the assembly and installing the retaining ring.

Compress the HP assembly and install the retaining ring.



ASSEMBLY

Check to ensure the retaining ring is located correctly in its groove.

CAUTION

When inspecting the retaining ring for security, be sure to wear eye protection and never point the assembly directly at your face.

Lubricate and install the o ring to the HP module groove.



ASSEMBLY

Lightly lubricate the o ring on the HP module, lubricate the threads very lightly (if at all) and install the module assembly.



Using the 1st stage driver TL00002, screw the module into position. DO NOT tighten down hard. Tighten until the module bottoms and then back out approximately 1/64 of a turn. This will prevent the module locking into position after use.



ASSEMBLY

Install the pushrod assembly. Be sure the pushrod engages the centre of the HP seat. Depress the assembly several times with your thumb to test the movement of the seat assembly.



Next install the diaphragm. Bend between thumb and forefinger to make the installation easier. Push the diaphragm down to the inner shoulder and release.



ASSEMBLY

Use your nylon drift (or your finger) to push the diaphragm flat all the way around against the inner shoulder.



Lubricate the lock nut.
The retainer must be tensioned using the bio adjusting TL00008 spanner.
Tighten sufficiently to ensure no leakage of air from under the diaphragm, but not so tight as to crush the diaphragm.
(Turn clockwise to tighten)



ASSEMBLY

The spring pad is dropped through the retainer.
Ensure the flat side is down, recessed side up.



Lightly lubricate both ends of the spring and then install onto the spring pad.



ASSEMBLY

Replace the adjusting screw. Only screw it in far enough to take up a little spring tension



Do not replace the adjustable piston, outer diaphragm and outer diaphragm holder at this stage.



ASSEMBLY

Re fit either the yolk or DIN to the 1st stage after replacing the filter.



Re fit the dust covers.



ASSEMBLY

Attach the Apollo low pressure test gauge to a low pressure port.

Fit the 1st stage to a source of high pressure air. Eg; a full tank.



ASSEMBLY

The Apollo test gauge has a bleed screw, this should be slightly open when turning the air on. Once the system is pressurised tighten the bleed screw.

NOTE: Ensure all the ports are blanked to carry out the adjustments.



ASSEMBLY

Use a 6mm Allen key wrench to set the intermediate (low) pressure. Turn clockwise to increase pressure, counter clockwise to decrease the pressure. When decreasing pressure remember to open and close the bleed screw to obtain the correct pressure reading.

Adjust the pressure to 9.8kg/cm +/- 0.5kg/cm. (140psi) Supply pressure should be 100 - 200bar. Purge the valve several times and check the low pressure is stable.



ASSEMBLY

Install the the piston with adjusting screw.

Place the piston height gauge on top of the lock nut and piston. Ensure that the clearance gap between the surface of the piston and the surface of the lock nut has a minimum 0.05mm to maximum 0.1mm. If the piston height is incorrect, adjust the height by turning the screw until the clearance gap is correct

Replace the outer diaphragm and holder using the Apollo adjusting wrench TL00005. The intermediate line pressure should not have moved.



ASSEMBLY



The first stage DIN or York are now ready for use. A final check for leakage should be carried out after the installation of the 2nd stage and any accessories. (BC hose etc.)