

# VVR bleeding & fill procedure

Fill the system using a manual or electric pump

At this point, air bleed valve should be opened

## Notes:

- It is highly recommended to:
  - Have a fill pump permanently installed near the VVR
  - To use **dry disconnect type couplers**
- Filling should be done on **main return line side**



Drain return  
or from drain collector manifold  
(For multiple pumps / motors)

Kidney loop return  
or low leakage drain return

Air bleed

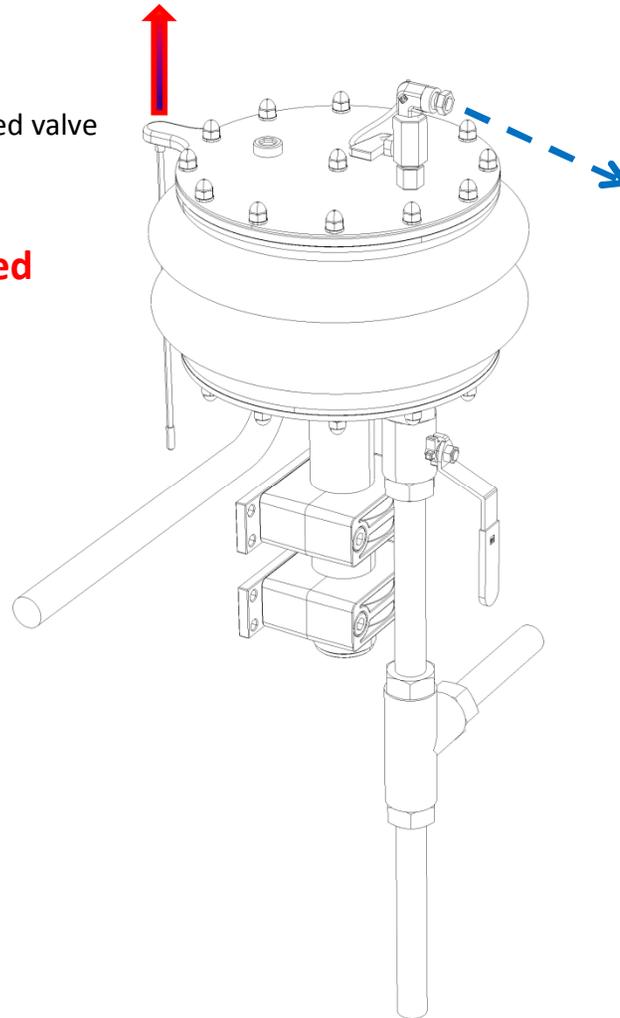
To pump inlet  
or inlet manifold  
(For multiple pumps)

System main return

The VVR should expand while air is expelled out of the bleed valve



**Note: All cylinders must be retracted**



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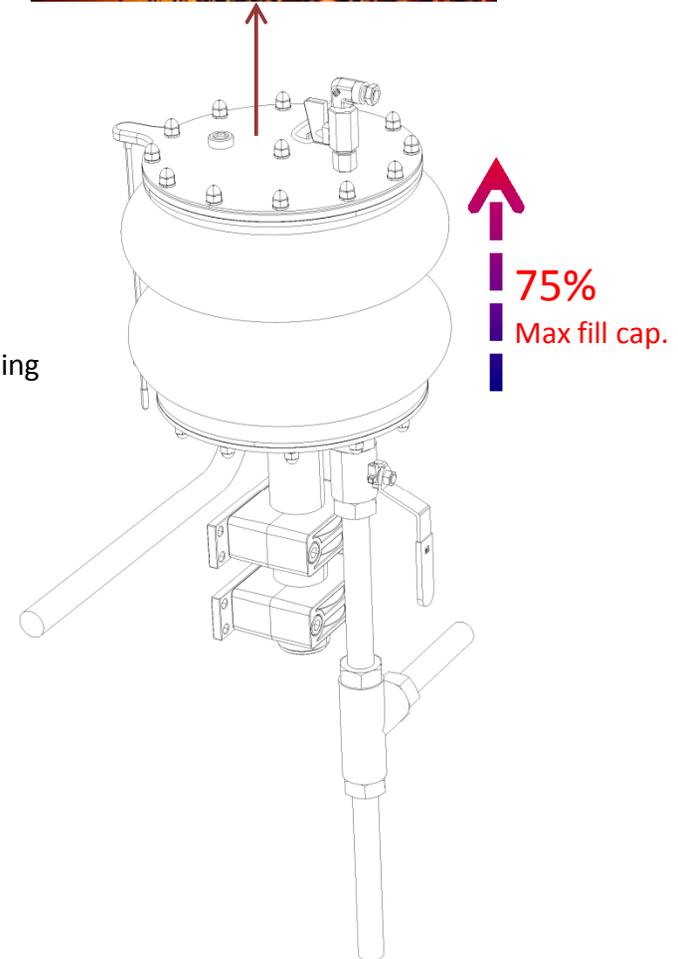
## This procedure applies to single network or multiple networks system



- 1- Stop filling at 70-75% level
- 2- Close bleed valve when oil only appears on top cover
- 3- System can be started ... **With no load**
- 4- Activate a valve to operate a motor or cylinder ...  
At this point, network will fill with fluid while air will be forced out at the pump return line ...  
Most returning air will gather in the VVR, visible on top cover
- 5- Open air bleed valve (level should go down)  
**Stop system if the VVR level goes down under 20-30% level**
- 6- Re fill the VVR to 70-75% level (bleed air if necessary)
- 7- Activate the same valve again (on both directions)  
and monitor incoming air back to the VVR. Proceed with air bleeding
- 8- Repeat cycling until very little air is present on top cover
- 9- Repeat procedure for all actuators ...

*Note 1: If actuator is a differential cylinder, VVR level might drop rapidly while VVR is compensating for rod volume.  
Caution must be applied.*

*Note 2: Fluid foaming and micro bubbles can appear on top cover instead of large bubbles. With time they will gather into a larger bubble where it will be easier to bleed*



When main bleeding procedure is completed, the VVR can be set at 70 - 75% level (max)



**Only if cylinders are all retracted**

Remaining volume is for fluid thermal compensation



**Note:** A lower final level can be established if network and / or motor(s) housing fill volume are rather important thus more compensation will be required

Machine can be operated and loaded (low speed)  
Monitor the VVR level and top cover for possible extra bleeding

After one hour of full load operation, again monitor the VVR level and if additional bleeding (if required)

It is always good practice to monitor the VVR on a weekly basis

On certain selected machines, the use of a permanent kidney loop can be beneficial for multiple reasons;

- System first fill
- System fill after maintenance
- Maintain fluid cleanliness to low ISO code
- Collect air on return line and forced to gather on top cover

Please, contact **SmartReservoir – Engineering** for support.

