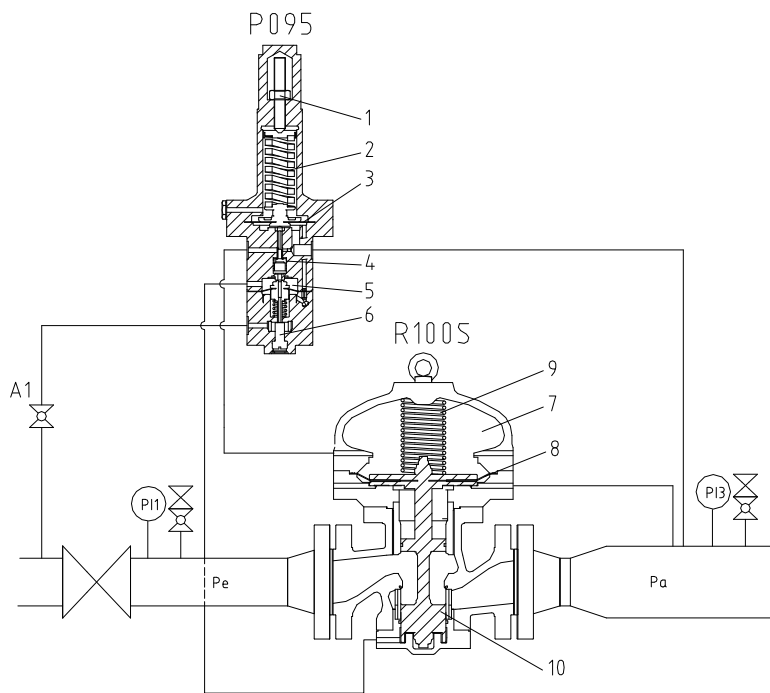


Gas Pressure Reducing Systems HON R100S-SO-(M)

Commissioning Manual



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1.1 Commissioning Notes

Single stage pressure reduction, spring-closed active

Warning

Never pressurize a reducing run by first opening the outlet block valve. This may provoke overload of the valve internals and diaphragms.

Pressurizing and depressurizing needs time, do not push it !

Before getting started:

Familiarise yourself with the applicable safety regulations and operations instructions

The reducing run between the slam shut or inlet block valve and the outlet block valve should be completely depressurized (check if the outlet block valve is closed).

To depressurize the run:

- Isolate the gas run and slightly open the purge valve
- Do not relax the setpoint adjusting screw of the pilot until after the run is depressurized.

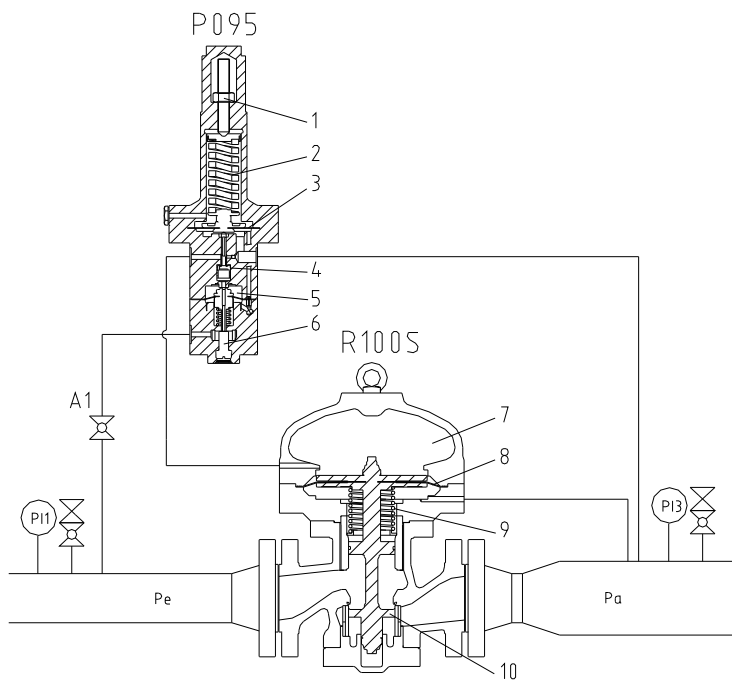


Figure 1 Schematic of single stage gas reducing run with spring-closed active

1 Commissioning

Recommendations:

Prior to commissioning and start-up consider the following :

- **Any** water residue left from hydrostatic testing will cause trouble to the operation of both main line valves and pilots; therefore purge and dry the upstream pipe line thoroughly and increase the outlet temperature temporarily
- **Any** particles left from welding, grinding, tapping or any solid contamination resulting from corrosion in the piping between filter and regulator (also the heat exchanger) will damage the valve disc and/or it's guide cylinder, therefore clean this part thoroughly
- Should contamination be found then act as follows to minimize damage
 - remove bottom cover (incl. silencer and cage) of main line valve
 - remove valve plug and stem guide spacer
 - purge the run thoroughly via the open regulator
 - assemble the regulator without silencer and cage,
 - refit the silencer and cage only if contamination can be excluded
- Check all instrument lines for proper arrangement and all fittings for proper connection
- Provide 'emergency' spares

Sequence of Commissioning

1. **Fully Unwind the Adjusting Screw** (1) on top of the Pilot.
2. **Preset the Auxiliary Pressure** of the Pilot:
 - fully turn the adjusting screw (located at bottom of the pilot) inward (CW) carefully until it just stops on to the seat inside
 - then screw the adjusting screw out again (turning CCW) one (1) complete turn
3. **Slowly Pressurize the Regulator and Pilot**
 - by either cracking the upstream block valve or opening the bypass over the slam shut(s)
4. **Adjust the Auxiliary Pressure:**

The minimum setting for the auxiliary pressure differential on HON P095 pilots should be as follows :

Note: "Differential" refers to the difference between the setpoint of the auxilliary pressure and the setpoint pressure of the pilot.

- 200..600 kPa normal range for general purpose
- 200 kPa lower end of range, used to slow-down pilot response (small regulators)
- 600 kPa higher end of range, used to speed-up pilot response (large regulators)

Adjustment notes:

- adjust pilots for active regulators to approx. 300 kPa pressure differential
- adjust pilots for monitor regulators to approx. 400 kPa pressure differential
- make adjustments to the auxilliary pressure adjusting screw only when the pilot is operating (supplying condition)
- adjust the set screw carefully, checking after each adjustment for lock-up

Check if fine-tuning is required after commisioning the equipment

- adjust auxiliary pressure differential to slow-down or speed-up the pilot response
- if the aux. setting has been adjusted, then correct the setpoint

- So without the need for adjustment the auxiliary pressure differential should range between 300 and 400 kPa above outlet pressure

* Activate the pilot by slightly opening the purge valve and tensioning the set spring a little

1 Commissioning

5. **Check the Regulator for Lock-up.**
 - (first unload or relax the set spring of pilot)
 - slowly apply full inlet pressure to the upstream side of the regulator by either cracking the block valve or opening the bypass of the slam shut.
 - Check the downstream pressure for leakage of the MLV and the pilot
6. If necessary **slowly** turn adjusting screw of pilot (1) CW to increase the outlet pressure above the UPSO setting of the slam shut valve(s).
7. **Open the Slam Shut Valve.**
8. **Check or Set the Slam Shut Valve.**
 - increase the outlet pressure to the OPSO setting by slowly advancing the adjust screw (1) of the pilot.
 - for adjustment itself consult the manual of the relevant slam shut
 - repeat this action to test the **safety relief valve** (to be blocked while testing the SSV)
9. **Check and Test the Regulator.**
 - slightly open the purge valve and decrease the outlet pressure by slowly backing out the adjusting screw of pilot (1) CCW.
 - close the purge valve to check the regulator and pilot for lock-up (tightness).
10. **Check Operation** by opening the outlet block valve
Normally the regulator will be set slightly lower than the network pressure. The pilot setting can be increased and fine-adjusted to it's setpoint after fully opening the outlet block valve
11. **After Completing Commissioning Lock the Adjust Screw**
 - with the nut provided for this purpose.
12. **To take the run out of operation and depressurize it, act as follows :**
 - close the inlet block valve
 - Allow the pressure upstream of the regulator to drop to outlet pressure
 - close the block valve in the supply to the pilot (if provided)
 - close the outlet block valve
 - slightly open the downstream purge valve to depressurize the run

1.2 Commissioning Notes

Single stage pressure reduction, spring-closed active and monitor

Warning

Never pressurize a reducing run by first opening the outlet block valve. This may provoke overload of the valve internals and diaphragms.

Pressurizing and depressurizing needs time, do not push it !

Before getting started:

Familiarise yourself with the applicable safety regulations and operations instructions

The reducing run between the slam shut or inlet block valve and the outlet block valve should be completely depressurized (check if the outlet block valve is closed).

To depressurize the run:

- Isolate the gas run and slightly open the purge valve
- Do not relax the setpoint adjusting screw of the pilots until after the run is depressurized.

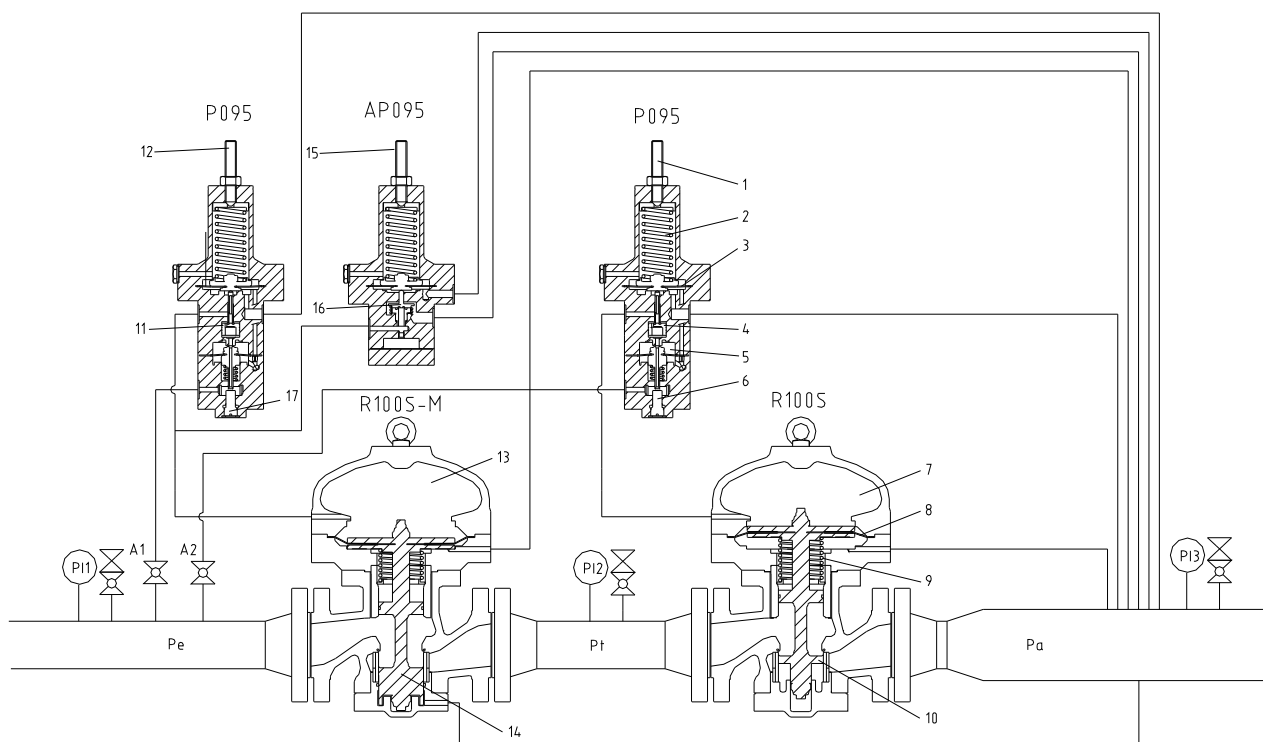


Figure 2 Schematic of gas reducing run with spring closed active and monitor

1 Commissioning

Recommendations:

Prior to commissioning and start-up consider the following :

- **Any** residual water left from hydrostatic testing will trouble operation of both main line valves and pilots; therefore purge and dry the upstream pipe line thoroughly and increase the outlet temperature temporarily
- **Any** particles left from welding, grinding or tapping and any solid contaminants resulting from corrosion in the piping between filter and regulator (also the heat exchanger) will damage the valve disc and/or it's guide cylinder, therefore clean this part thoroughly
- Should contamination be found then act as follows to minimize damage
 - remove bottom cover (incl. silencer and cage) of the monitor main line valve
 - remove:piston, valve plug and stem guiding
 - purge the run thoroughly via the open monitor
 - assemble the monitor without silencer and cage
 - refit the silencer and cage only if contamination can be excluded
 - repeat this action for the regulator
- Check all instrument lines for proper arrangement and all fittings for proper connection
- Provide 'emergency' spares

Commissioning sequence

1. **Fully Unwind the Adjusting Screws**
 - of the active and monitor Pilots (items 1 & 12, fig.2).
2. **Turn Adjust Screw of the Accelerator fully Inward.**
 - (item 15)
3. **Preset Auxiliary Pressure of the Pilots:**
 - fully turn the adjusting screw (located at bottom of the pilot) inward (CW) carefully until it just stops on to the seat inside
 - then screw the adjusting screw out again (turning CCW) one (1) complete turn
4. **Slowly Pressurize Upstream of the Monitor**
 - by either cracking the upstream block valve or opening the bypass over the slam shut valve(s)

5. Adjust the Auxiliary Pressure:

The setting of the auxiliary pressure differential on the HON P095 pilots should be as follows :

Note: “Differential” refers to the difference between the setpoint of the auxiliary pressure and the setpoint pressure of the pilot.

- 200..600 kPa above the regulator setpoint is the normal range for general purpose
- 200 kPa at the lower end of the range is used to slow the pilot response (small regulators)
- 600 kPa at the higher end of the range is used to speed-up pilot response (large regulators)

Adjustment notes:

- adjust pilots for active regulators to approx. 300 kPa pressure differential
- adjust pilots for monitor regulators to approx. 400 kPa pressure differential
- make adjustments to the auxiliary pressure adjusting screw only when the pilot is operating (supplying condition)
- adjust the set screw carefully, checking after each adjustment for lock-up

Check if fine-tuning is required after commissioning the equipment

- adjust auxiliary pressure differential to slow-down or speed-up the pilot response
- if the aux. setting has been adjusted, then correct the setpoint

So without the need for adjustment the auxiliary pressure differential should range between 300 and 400 kPa above outlet pressure

* Activate the pilot by slightly opening the purge valve and tensioning the set spring a little

6. Check the Monitor for Lock-up.

- Completely unwind the adjustment screws of both the active and the monitor pilots
- Slowly apply full inlet pressure to upstream of the monitor by either cracking the upstream block valve or opening the bypass of the slam shut.
- Check the intermediate pressure for leakage of the MLV
- Check the downstream pressure for leakage of both pilots
- Take note that test valves A1 and A2 enable differentiation between the pilots

7. Check the Regulator MLV for lock-up.

- Put full inlet pressure upstream of the regulator by tensioning the set spring of the monitor pilot temporarily until it opens.
- Completely unwind the adjustment screws of both the active and the monitor pilots
- Use the bypass valve of the slam shut valve if necessary to repressurise upstream of the monitor
- check the outlet pressure for leakage of the MLV

Note that the regulator pilot has been checked already

8. Fail the Regulator Wide-Open

- by advancing the adjusting screw (1) fully inward. Open the purge valve slightly to depressurize the outlet and vent the pilot bleed of the regulator

9. If necessary **slowly** turn adjusting screw of pilot (12) CW to increase the outlet pressure above the UPSO setting of the slam shut valve(s).

10. Open the slam shut.

1 Commissioning

- 12. Check or Set the Slam Shut Valve.**
 - Increase the outlet pressure to the OPSO setting by slowly advancing the adjust screw (12) of the monitor pilot.
 - For adjustment itself consult the manual of the relevant slam shut
 - Repeat this action to test the **safety relief valve** (to be blocked while testing the SSV)

- 13. Check or Set the Accelerator.**
 - Decrease the outlet pressure to the accelerator setting by slowly backing out the adjust screw (12) of the monitor pilot
 - Now open the purge valve enough to open the monitor MLV
 - Back out the adjust screw (15) of the accelerator until it interferes with the pressure control.
 - A slight drop in the outlet pressure indicates activation of the accelerator pilot

- 14. Set and Check the Monitor.**
 - Decrease the outlet pressure by slowly backing out the adjusting screw of the monitor pilot (12) CCW.
 - Open & Close the purge valve to check the monitor for response
 - Be aware of the pilot bleed from the active regulator which is searching for a higher setpoint at this time.

- 15. Set and Check the Regulator.**
 - Decrease the outlet pressure by slowly backing out the adjusting screw of the regulator pilot (1) CCW.
 - Take note that the regulator does not have an accelerator pilot to speed-up take over
 - Open the purge valve enough to vent the pilot bleed of the monitor
 - A rise of the intermediate pressure indicates take-over
 - Open & Close the purge valve to check the regulator for response
 - Be aware of the pilot bleed from the monitor regulator which is searching for a higher setpoint at this time.

- 16. Check the System for Lock-up.**
 - Close the purge valve
 - Check the outlet pressure for leakage
 - The outlet pressure will first rise to regulator lock-up, then rise to monitor lock-up
 - A further rise will occur as the pressure from the monitor motorization is equalized with the outlet pressure
 - You may vent temporarily a little to reduce this outlet pressure to monitor lock-up

- 17. Check Operation**

Slowly open the outlet block valve. Normally the regulator will be set slightly lower than the network pressure. The pilot setting can be increased and finely-adjusted to it's setpoint after fully opening the outlet block valve.

- 18. After Completing Commissioning**

Lock the Adjust Screws with the nut provided for this purpose.

- 19. To take the Run out of Operation and Depressurize it, act as follows :**
 - Close the inlet block valve
 - Allow the pressure upstream of the regulators to drop to outlet pressure
 - Close the block valve in the supply to the pilots (if provided)
 - Close the outlet block valve
 - Slightly open the downstream purge valve to depressurize the run

1.3 Commissioning Notes

Single stage pressure reduction, spring open active

Warning

Never pressurize a reducing run by first opening the outlet block valve. This may provoke overload of the valve internals and diaphragms.

Pressurizing and depressurizing needs time, do not push it !

Before getting started:

Familiarise yourself with the applicable safety regulations and operations instructions

The reducing run between the slam shut or inlet block valve and the outlet block valve should be completely depressurized (check if the outlet block valve is closed).

To depressurize the run:

- Isolate the gas run and slightly open the purge valve
- Do not relax the setpoint adjusting screw of the pilots until after the run is depressurized.

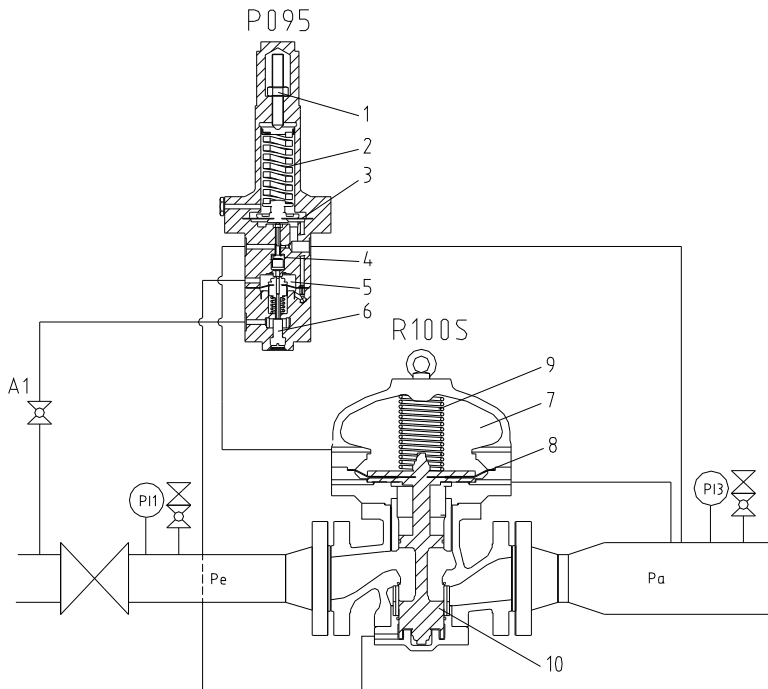


Figure 3 Schematic of single stage gas reducing run with spring-open active

1 Commissioning

Recommendations:

Prior to commissioning and start-up consider the following:

- **Any** water residue left from hydrostatic testing will cause trouble to the operation of both main line valves and pilots; therefore purge and dry the upstream pipe line thoroughly and increase the outlet temperature temporarily
- **Any** particles left from welding, grinding, tapping or any solid contamination resulting from corrosion in the piping between filter and regulator (also the heat exchanger) will damage the valve disc and/or it's guide cylinder, therefore clean this part thoroughly
- Should contamination be found then act as follows to minimize damage
 - remove bottom cover (incl. silencer and cage) of main line valve
 - remove valve plug and stem guide spacer
 - purge the run thoroughly via the open regulator
 - assemble the regulator without silencer and cage,
 - refit the silencer and cage only if contamination can be excluded
- Check all instrument lines for proper arrangement and all fittings for proper connection
- Provide 'emergency' spares

Sequence of Commissioning

1. **Fully Unwind the Adjusting Screw** (1) on top of the Pilot.
2. **Preset the Auxiliary Pressure** of the Pilot:
 - fully turn the adjusting screw (located at bottom of the pilot) inward (CW) carefully until it just stops on to the seat inside
 - then screw the adjusting screw out again (turning CCW) one (1) complete turn
3. **Slowly Pressurize the Pilot**
 - by either cracking the upstream block valve or opening the bypass over the slam shut(s)
4. **Adjust the Auxiliary Pressure:**

The minimum setting for the auxiliary pressure differential on HON P095 pilots should be as follows:

Note: "Differential" refers to the difference between the setpoint of the auxilliary pressure and the setpoint pressure of the pilot.

- 300..600 kPa normal range for general purpose
- 300 kPa lower end of range, used to slow-down pilot response (small regulators)
- 600 kPa higher end of range, used to speed-up pilot response (large regulators)

Adjustment notes:

- adjust pilots for active regulators to approx. 300 kPa pressure differential
- adjust pilots for monitor regulators to approx. 400 kPa pressure differential
- make adjustments to the auxilliary pressure adjusting screw only when the pilot is operating (supplying condition)
- adjust the set screw carefully, checking after each adjustment for lock-up

Check if fine-tuning is required after commisioning the equipment

- adjust auxiliary pressure differential to slow-down or speed-up the pilot response
- if the aux. setting has been adjusted, then correct the setpoint

- So without the need for adjustment the auxiliary pressure differential should range between 300 and 400 kPa above outlet pressure

* Activate the pilot by slightly opening the purge valve and tensioning the set spring a little

1 Commissioning

5. **Slowly pressurize the Regulator**
 - by opening the inlet block valve or bypass
6. **Check the Regulator for Lock-up.**
 - (first unload or relax the set spring of pilot)
 - slowly apply full inlet pressure to the upstream side of the regulator by either cracking the block valve or opening the bypass of the slam shut.
 - check the downstream pressure for leakage of the MLV and the pilot
 - *note that while closing from wide-open position the actuator will built-up pressure and outlet pressure may rise temporarily*
7. If necessary **slowly** turn adjusting screw of pilot (1) CW to increase the outlet pressure above the UPSO setting of the slam shut valve(s).
8. **Open the Slam Shut Valve.**
9. **Check or Set the Slam Shut Valve.**
 - increase the outlet pressure to the OPSO setting by slowly advancing the adjust screw (1) of the pilot.
 - for adjustment itself consult the manual of the relevant slam shut
 - repeat this action to test the **safety relief valve** (to be blocked while testing the SSV)
10. **Check and Test the Regulator.**
 - slightly open the purge valve and decrease the outlet pressure by slowly backing out the adjusting screw of pilot (1) CCW.
 - close the purge valve to check the regulator and pilot for lock-up (tightness).
 - if an adjustable restrictor has been provided to fine-tune MLV respons, open initially restrictor one (1) full turn; higher settings result in faster respons but may provoke instability at low flow conditions
11. **Check Operation** by opening the outlet block valve
Normally the regulator will be set slightly lower than the network pressure. The pilot setting can be increased and fine-adjusted to it's setpoint after fully opening the outlet block valve
12. **After Completing Commissioning Lock the Adjust Screw**
 - with the nut provided for this purpose.
13. **To take the run out of operation and depressurize it, act as follows :**
 - close the inlet block valve
 - Allow the pressure upstream of the regulator to drop to outlet pressure
 - close the block valve in the supply to the pilot (if provided)
 - close the outlet block valve
 - slightly open the downstream purge valve to depressurize the run

1.4 Commissioning Notes

Single stage pressure reduction, spring open active, spring closed monitor

Warning

Never pressurize a reducing run by first opening the outlet block valve. This may provoke overload of the valve internals and diaphragms.

Pressurizing and depressurizing needs time, do not push it !

Before getting started:

Familiarise yourself with the applicable safety regulations and operations instructions

The reducing run between the slam shut or inlet block valve and the outlet block valve should be completely depressurized (check if the outlet block valve is closed).

To depressurize the run:

- Isolate the gas run and slightly open the purge valve
- Do not relax the setpoint adjusting screw of the pilots until after the run is depressurized.

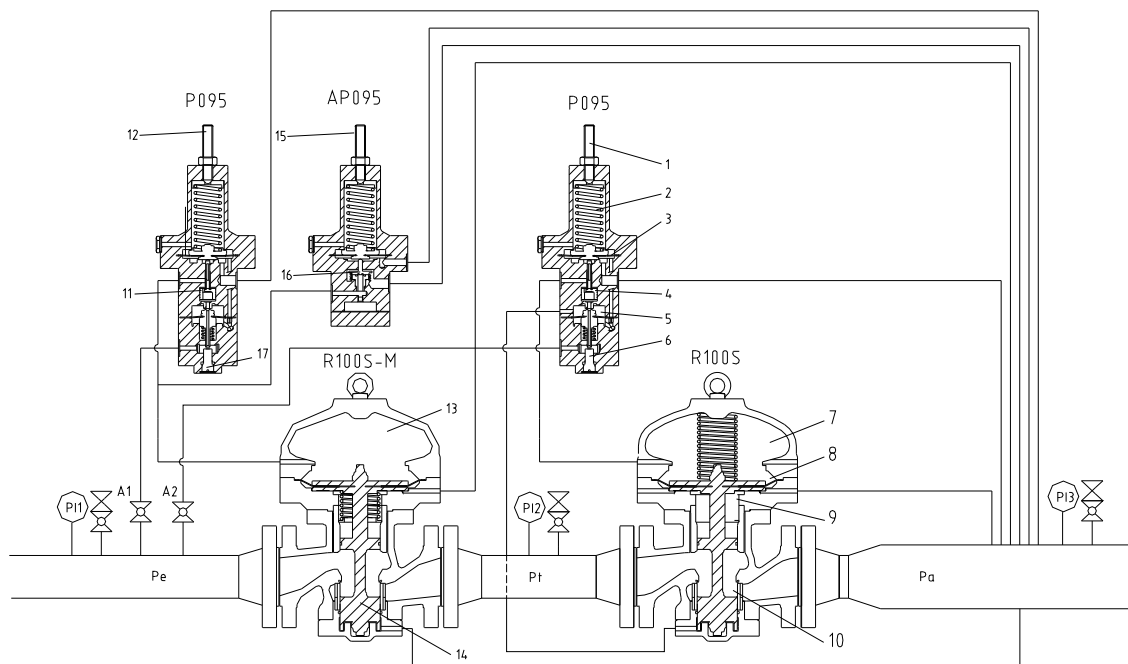


Figure 4 Schematic of gas reducing run with spring-open active and spring closed monitor

Recommendations:

Prior to commissioning and start-up consider the following :

- **Any** residual water left from hydrostatic testing will trouble operation of both main line valves and pilots; therefore purge and dry the upstream pipe line thoroughly and increase the outlet temperature temporarily
- **Any** particles left from welding, grinding or tapping and any solid contaminants resulting from corrosion in the piping between filter and regulator (also the heat exchanger) will damage the valve disc and/or it's guide cylinder, therefore clean this part thoroughly
- Should contamination be found then act as follows to minimize damage
 - remove bottom cover (incl. silencer and cage) of the monitor main line valve
 - remove:piston, valve plug and stem guiding
 - purge the run thoroughly via the open monitor
 - assemble the monitor without silencer and cage
 - refit the silencer and cage only if contamination can be excluded
 - repeat this action for the regulator
- Check all instrument lines for proper arrangement and all fittings for proper connection
- Provide 'emergency' spares

Commissioning sequence

1. **Fully Unwind the Adjusting Screws**
 - of the active and monitor Pilots (items 1 & 12, fig.2).
2. **Turn Adjust Screw of the Accelerator fully Inward.**
 - (item 15)
3. **Preset Auxiliary Pressure of the Pilots:**
 - fully turn the adjusting screw (located at bottom of the pilot) inward (CW) carefully until it just stops on to the seat inside
 - then screw the adjusting screw out again (turning CCW) one (1) complete turn
4. **Slowly Pressurize Upstream of the Monitor**
 - by either cracking the upstream block valve or opening the bypass over the slam shut valve(s)

5. Adjust the Auxiliary Pressure:

The setting of the auxiliary pressure differential on the HON P095 pilots should be as follows :

Note: “Differential” refers to the difference between the setpoint of the auxiliary pressure and the setpoint pressure of the pilot.

- 300..600 kPa above the regulator setpoint is the normal range for general purpose
- 300 kPa at the lower end of the range is used to slow the pilot response (small regulators)
- 600 kPa at the higher end of the range is used to speed-up pilot response (large regulators)

Adjustment notes:

- adjust pilots for active regulators to approx. 300 kPa pressure differential
- adjust pilots for monitor regulators to approx. 400 kPa pressure differential
- make adjustments to the auxiliary pressure adjusting screw only when the pilot is operating (supplying condition)
- adjust the set screw carefully, checking after each adjustment for lock-up

Check if fine-tuning is required after commissioning the equipment

- adjust auxiliary pressure differential to slow-down or speed-up the pilot response
- if the aux. setting has been adjusted, then correct the setpoint

So without the need for adjustment the auxiliary pressure differential should range between 300 and 400 kPa above outlet pressure

* Activate the pilot by slightly opening the purge valve and tensioning the set spring a little

7. Check the Monitor for Lock-up.

- Completely unwind the adjustment screws of both the active and the monitor pilots
- Slowly apply full inlet pressure to upstream of the monitor by either cracking the upstream block valve or opening the bypass of the slam shut.
- Check the intermediate pressure for leakage of the MLV
- Check the downstream pressure for leakage of both pilots
- Take note that test valves A1 and A2 enable differentiation between the pilots

8. Check the Regulator MLV for lock-up.

- Put full inlet pressure upstream of the regulator by tensioning the set spring of the monitor pilot temporarily until it opens.
- Completely unwind the adjustment screws of both the active and the monitor pilots
- Use the bypass valve of the slam shut valve if necessary to repressurise upstream of the monitor
- check the outlet pressure for leakage of the MLV
- *while closing from wide-open position the actuator of the active will built-up pressure and outlet pressure may rise temporarily*

Note that the regulator pilot has been checked already

9. Fail the Regulator Wide-Open

- by advancing the adjusting screw (1) fully inward. Open the purge valve slightly to depressurize the outlet and vent the pilot bleed of the regulator

11. If necessary **slowly** turn adjusting screw of pilot (12) CW to increase the outlet pressure above the UPSO setting of the slam shut valve(s).

12. Open the slam shut.

1 Commissioning

- 13. Check or Set the Slam Shut Valve.**
 - Increase the outlet pressure to the OPSO setting by slowly advancing the adjust screw (12) of the monitor pilot.
 - For adjustment itself consult the manual of the relevant slam shut
 - Repeat this action to test the **safety relief valve** (to be blocked while testing the SSV)

- 14. Check or Set the Accelerator.**
 - Decrease the outlet pressure to the accelerator setting by slowly backing out the adjust screw (12) of the monitor pilot
 - Now open the purge valve enough to open the monitor MLV
 - Back out the adjust screw (15) of the accelerator until it interferes with the pressure control.
 - A slight drop in the outlet pressure indicates activation of the accelerator pilot

- 15. Set and Check the Monitor.**
 - Decrease the outlet pressure by slowly backing out the adjusting screw of the monitor pilot (12) CCW.
 - Open & Close the purge valve to check the monitor for response
 - Be aware of the pilot bleed from the active regulator which is searching for a higher setpoint at this time.

- 16. Set and Check the Regulator.**
 - Decrease the outlet pressure by slowly backing out the adjusting screw of the regulator pilot (1) CCW.
 - Take note that the regulator does not have an accelerator pilot to speed-up take over
 - Open the purge valve enough to vent the pilot bleed of the monitor
 - A rise of the intermediate pressure indicates take-over
 - Open & Close the purge valve to check the regulator for response
 - Be aware of the pilot bleed from the monitor regulator which is searching for a higher setpoint at this time.
 - if an adjustable restrictor has been provided to fine-tune MLV respons, open initially restrictor one (1) full turn; higher settings result in faster respons but may provoke instability at low flow conditions

- 17. Check the System for Lock-up.**
 - Close the purge valve
 - Check the outlet pressure for leakage
 - The outlet pressure will first rise to regulator lock-up, then rise to monitor lock-up
 - A further rise will occur as the pressure from the monitor motorization is equalized with the outlet pressure
 - You may vent temporarily a little to reduce this outlet pressure to monitor lock-up

- 18. Check Operation**

Slowly open the outlet block valve. Normally the regulator will be set slightly lower than the network pressure. The pilot setting can be increased and finely-adjusted to it's setpoint after fully opening the outlet block valve.

- 20. After Completing Commissioning**

Lock the Adjust Screws with the nut provided for this purpose.

- 21. To take the Run out of Operation and Depressurize it, act as follows :**
 - Close the inlet block valve
 - Allow the pressure upstream of the regulators to drop to outlet pressure
 - Close the block valve in the supply to the pilots (if provided)
 - Close the outlet block valve
 - Slightly open the downstream purge valve to depressurize the run

1.5 Choice of Setpoints

• Accelerator

The following setpoints are advised:

setpoint HON AP095-MP : setpoint monitor regulator + 0.5 bar
 setpoint HON AP095-HP : setpoint monitor regulator + 1 bar

• Monitor

The setpoint of the monitor regulator should be chosen **high enough** to avoid interference during dynamic response of the regulator.

• Regulator:

The setpoint of the regulator should be chosen **low enough** to enable trouble-free relatching of the slam shut. (the minimum relatching differential)

The setpoints should be chosen **low enough** to comply with safety standards on operational pressure limits of the downstream piping system and equipment

For multiple stream installations consideration should be given to stream discrimination and stream protection in order to avoid spurious tripping.

1.6 Choice of Auxiliary Setting

The auxiliary pressure is the output of the first control stage of the P095 and is adjustable between approx. 2 and 6 bar above the outlet pressure. The 1st stage of the pilot determines the accuracy of the regulator and can be changed by adjusting it's setting with screws (6) and (17).

- High settings (turn CCW) result in higher amplification which equals improved accuracy and faster response of the pilot control loop. However settings that are too high may provoke instability.
- Low settings (turn CW) result in lower amplification which equals more stability and slower response of the pilot control loop. Settings that are too low may disable a valve to open (partly or fully).

Always check if the setting of the auxiliary pressure differential meets the installed operating conditions during set-up and testing. See also 'commissioning notes'

The amount of care to be taken while adjusting the auxiliary pressure must be accentuated as this may cause many problems during commissioning and start-up.

1.7 Choice of Outlet Pressure Setting Spring

The outlet pressure ranges can be chosen from the following table

Color	Code	MP-Range [bar]	HP-Range [bar]
Blue	850523ST12670	1.5 - 5	05 -15 **)
Red	850523ST12680	03 – 11	10 – 35
Yellow	850523ST12690	06 – 15 *)	20 – 50

*) DIN DVGW-approval up to 12 bar

***) DIN DVGW-approval from 8 bar on