



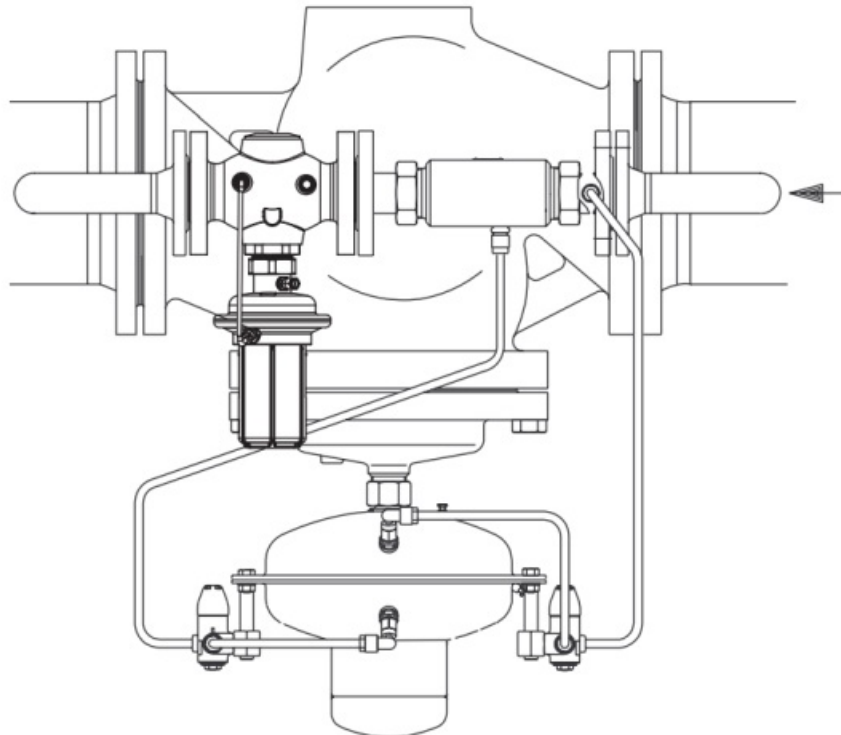
Danfoss DN 100-250 Pilot Controlled Differential Pressure Controller Instructions

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Instructions

Pilot-controlled Differential Pressure Controller
PCVP DN 100-250, PN 16/25

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Safety Notes



Prior to assembly and commissioning to avoid injury of persons and damages of the devices, it is absolutely necessary to carefully read and observe these instructions.

Necessary assembly, start-up, and maintenance work must be performed only by qualified, trained and authorized personnel.

Prior to assembly and maintenance work on the controller, the system must be: depressurized, cooled down, emptied and cleaned.

Please comply with the instructions of the system manufacturer or system operator.

Definition of Application

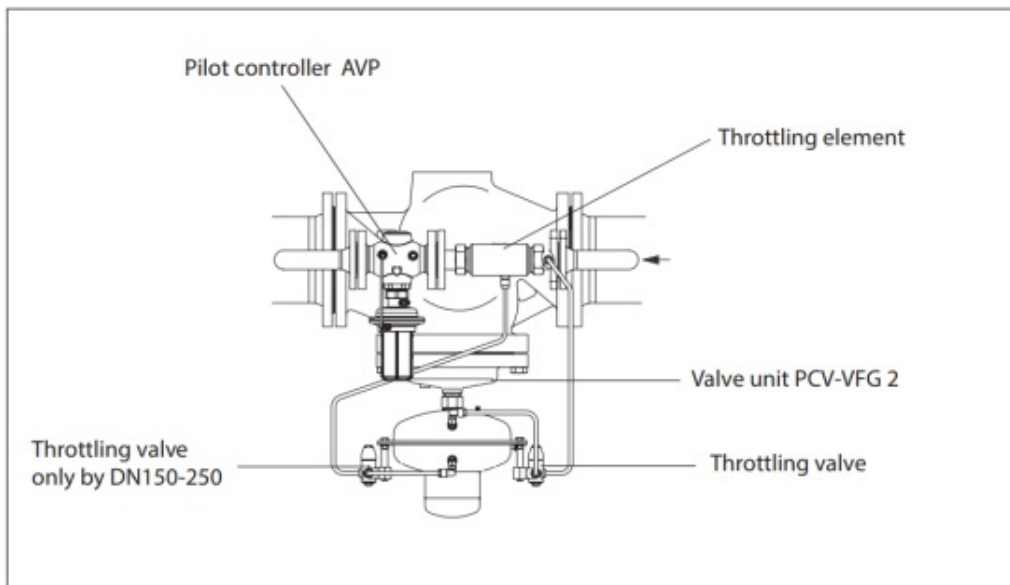
The controller is used for flow rate limitation of water for heating, district heating and cooling systems.

The admissible medium temperatures depend on the design and comprise 5-150 °C, 5-200 °C.

The technical data on the rating plates determine the use.

Description

3.1 Construction



3.2 Mode of Operation

The control unit consists of the PCV-VFG2 valve unit, installed in the main pipe, and the differential pressure controller AVP installed as pilot controllers in the bypass. In the bypass line, a throttle element is installed in front of the pilot controllers.

The controller keeps the differential pressure across the corresponding section on a constant level.

The valve and the pilot valves are pressurebalanced.

The setpoint for the differential pressure is adjusted by pre-stressing the setpoint spring of the pilot controller AVP. The valve unit in the main pipe is opening on rising pressure. The pilot controllers in the bypass line are closing on rising pressure.

In case of small flow rates, the valve in the main pipe remains closed through the pressure spring in the actuator of the valve unit. The pressure is exclusively controlled by the pilot controller.

If the flow rate in the bypass is increased, the pressure in the throttle element (Venturi nozzle) decreases.

The reduced pressure acts through an impulse tube upon the lower chamber of the actuator of the valve unit. The main valve is thus opened shock-free and continuously.

If the flow rate is reduced, the pressure in the throttle element raises and the main valve closes.

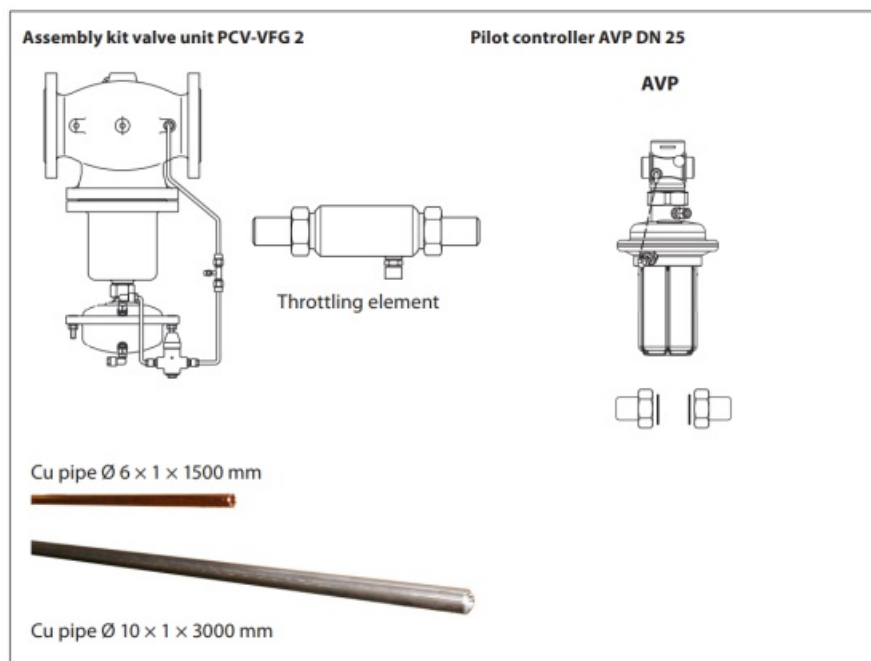
This sequential switching guarantees an operation free of vibrations and a small control deviation over a wide positioning range.

Technical Data

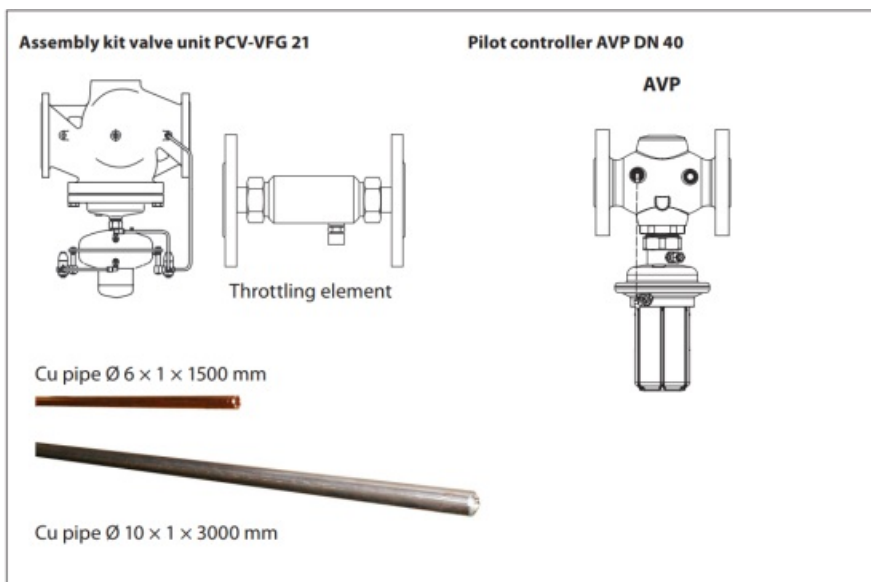
Technical data, see rating plates and the PCV data sheet.

Scope of Delivery

DN 100-125



DN 150-250



Assembly

6.1 Prior to Assembly:



CAUTION!

Depressurized system before any assembly work !

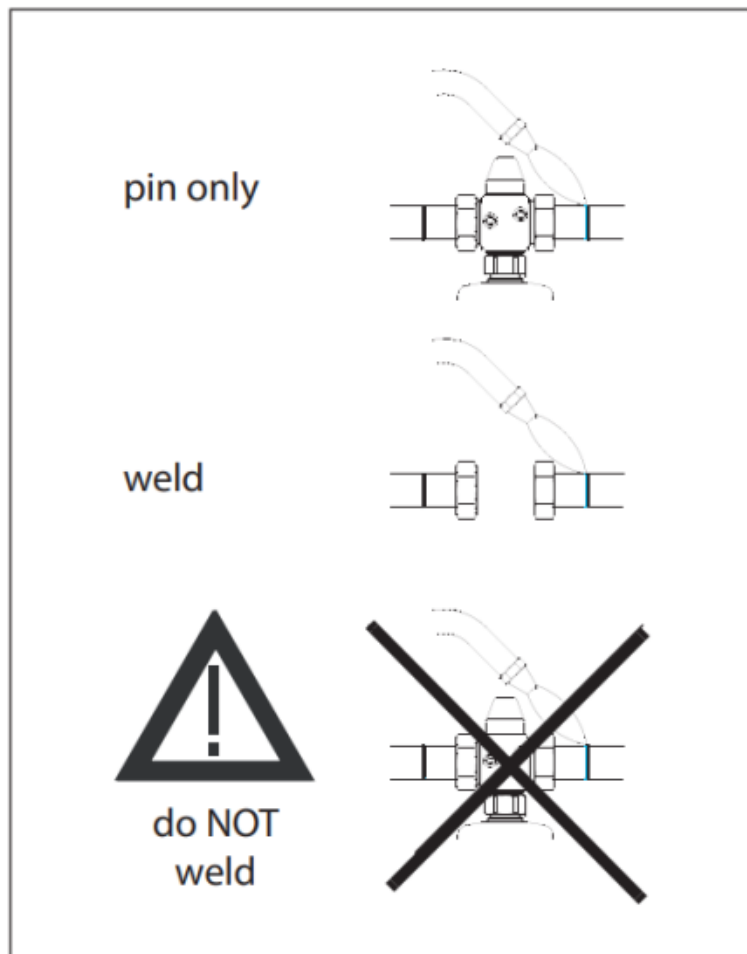
- Clean pipeline system.
- Install strainer in front of the controller.
- Install shut-off units in front of and behind the controller.

6.2 Installation Position, Installation Place

- Installation is only permitted in horizontal pipelines with the actuators hanging in a downward position.
- The controller may be installed in the supply as well as in the return line.

6.3 When installing:

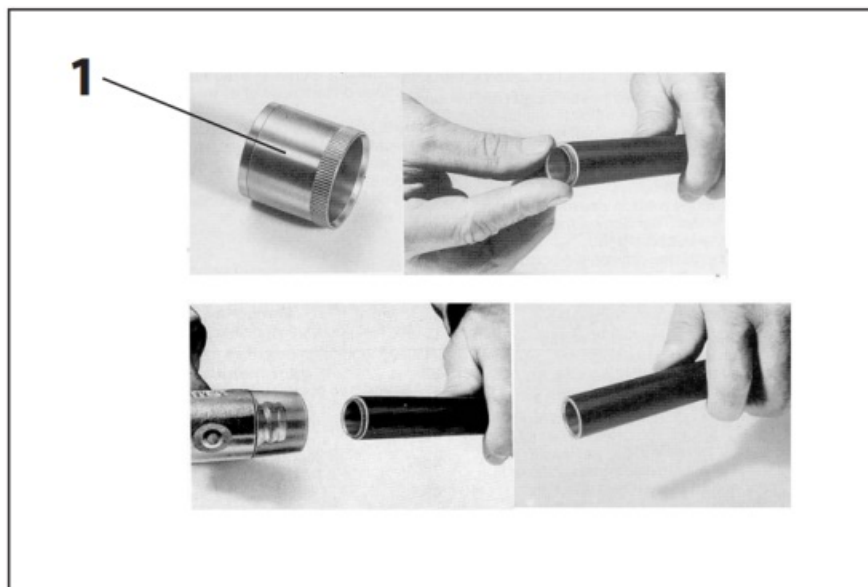
- Observe direction of flow.
- Design with welded ends:
- Loads on the valve body and the throttle element by the pipes are not permitted.



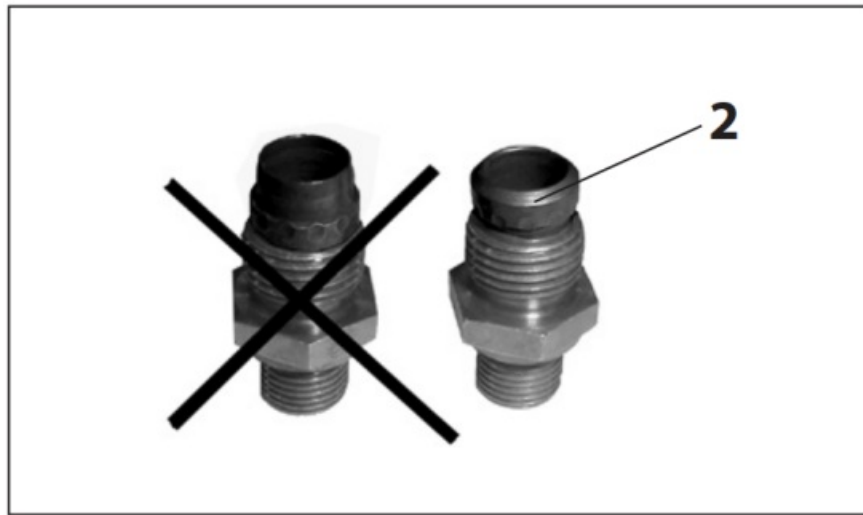
6.4 Impulse Tube Installation

See installation scheme, section 6.6.

For CU pipes $\varnothing 10 \times 1$, insert sockets 1 on both sides.



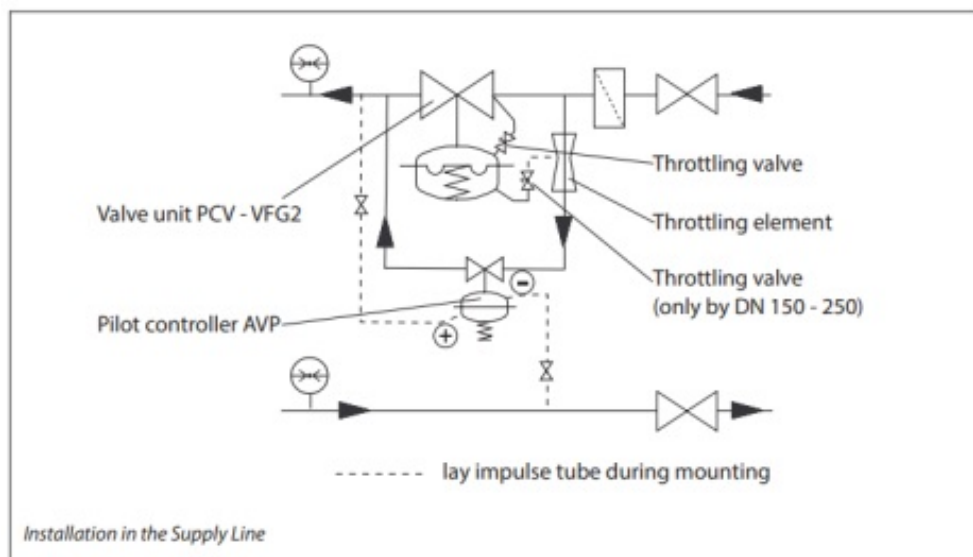
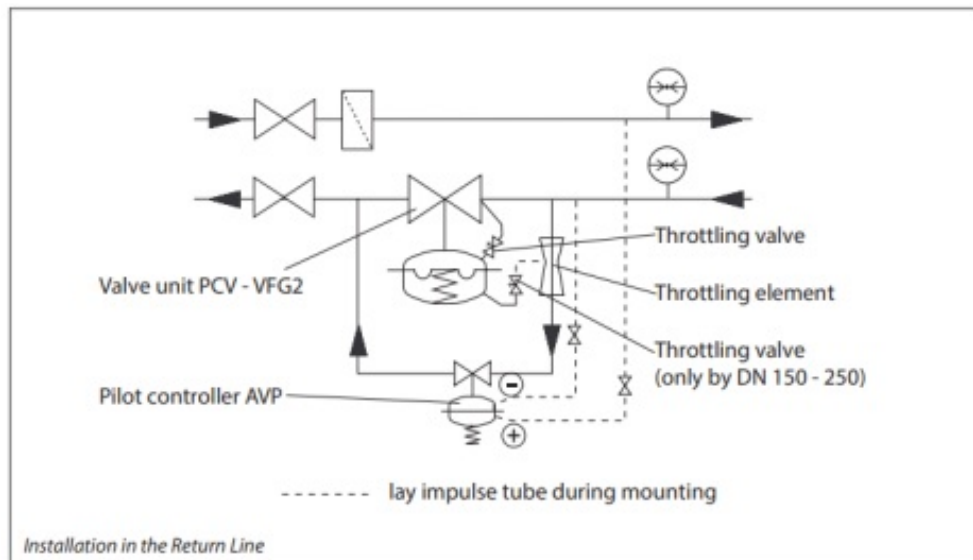
Care for correct position of the cutting rings 2.



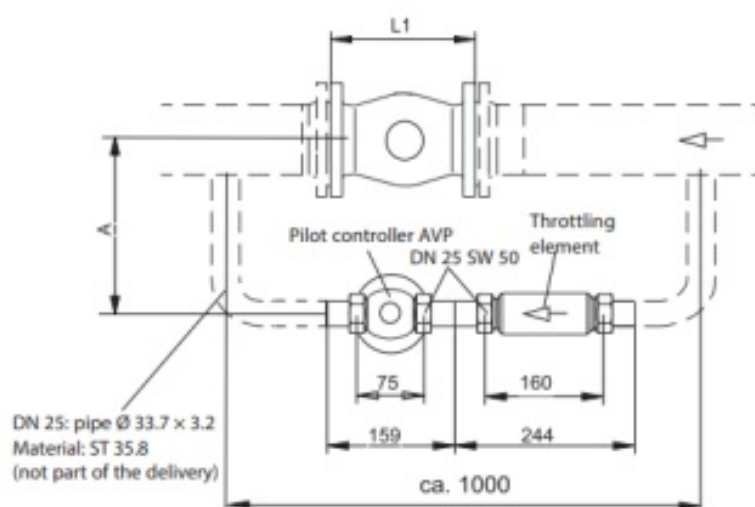
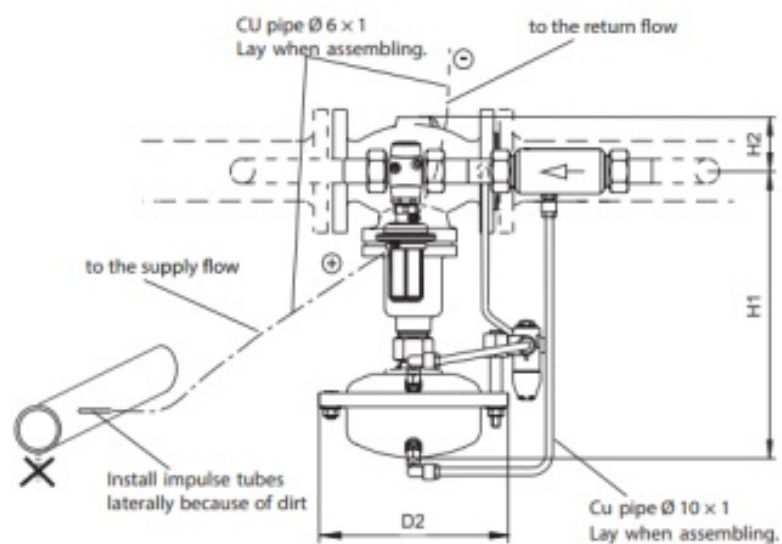
6.5 Insulation

The diaphragm actuators must not be insulated when insulating system parts.

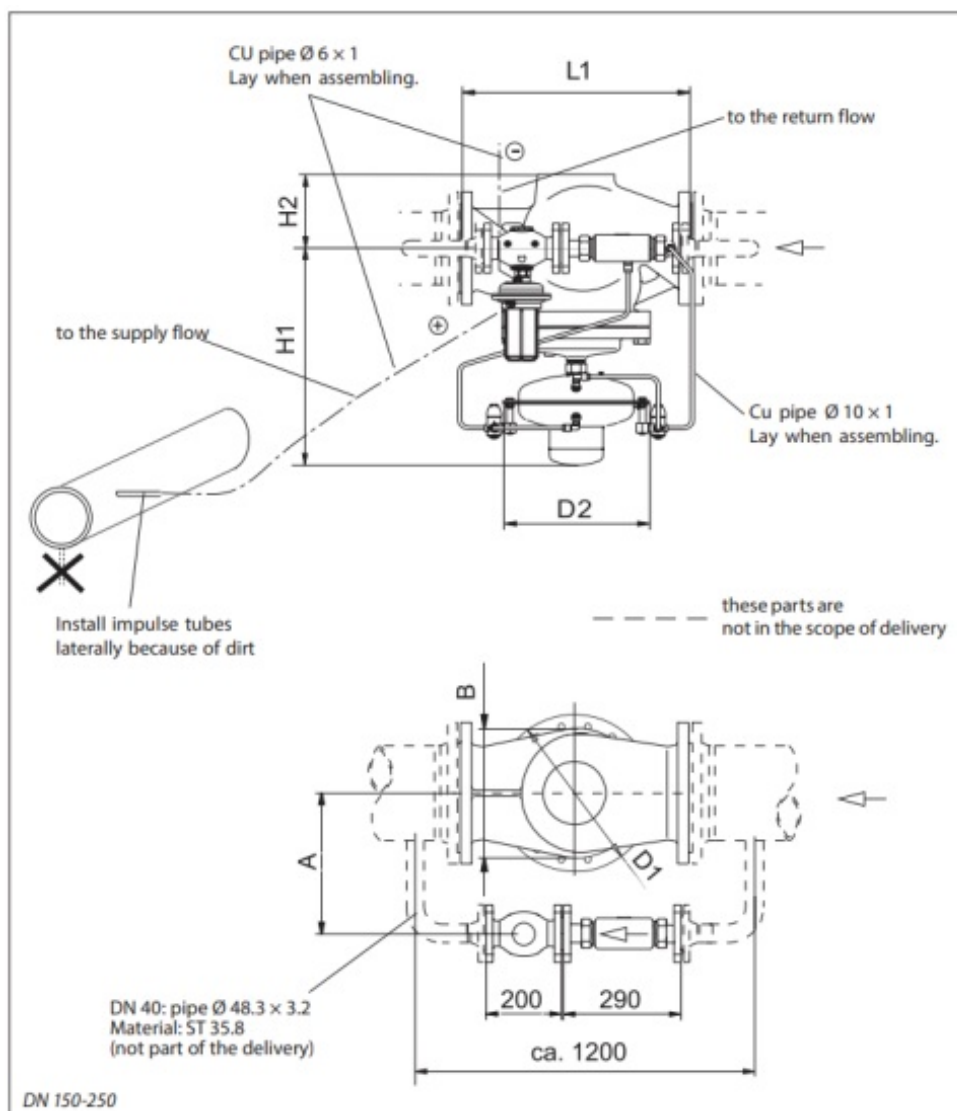
6.6 Installation Scheme



6.7 Assembly Drawings, Dimensions



— — — — these parts are not in the scope of delivery



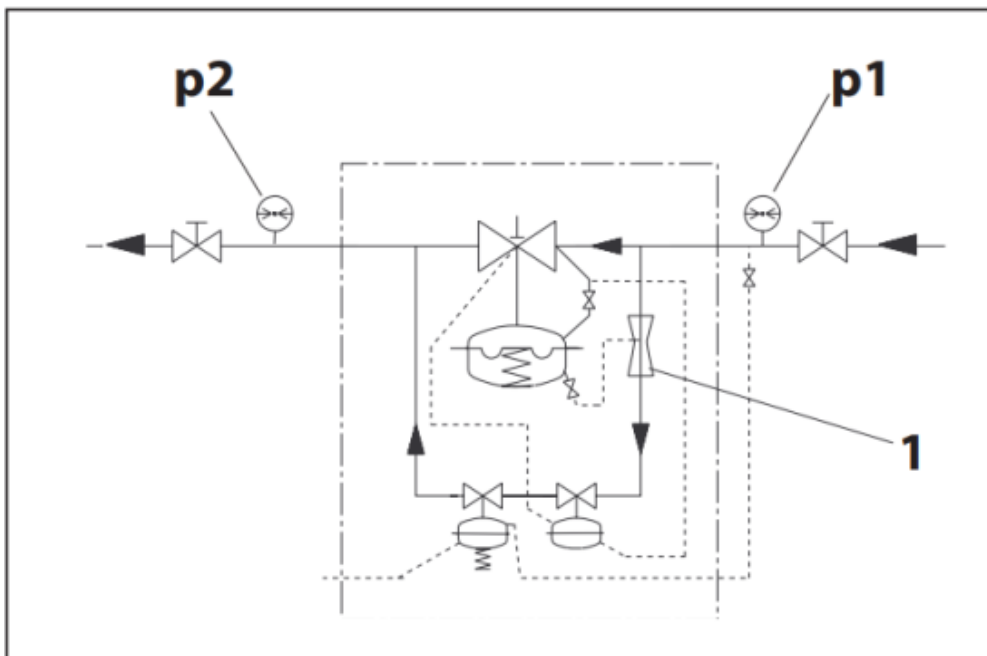
Dimensions

Nominal diameter	DN	100	125	150	200	250
L1	mm	350	400	480	600	730
H1		530	530	619	647	697
H2				174	229	254
D2		263		380		
D1		250		350	385	500
B		200	210	310	336	412
A		290		320	350	410

Start-up

7.1 Required Static Pressure

The static pressure p_1 in front of the controller must not fall below 1,5 bar (excess pressure). Non-observance may lead to cavitation and damages in the throttling element 1.



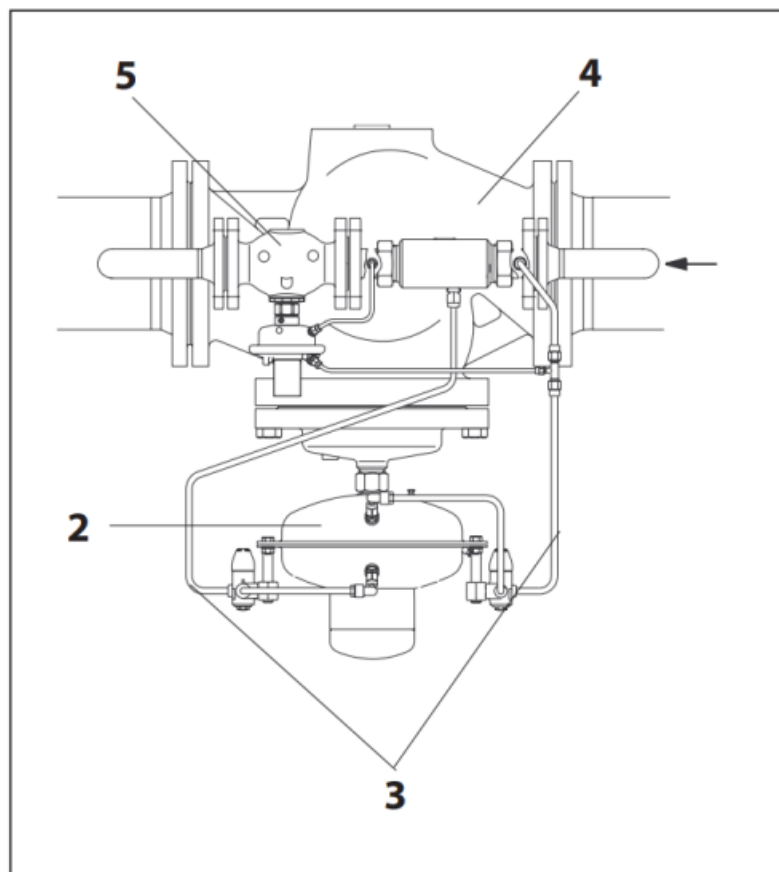
7.2 Leak and Pressure Tests

⚠ To avoid too high pressures at the diaphragm actuators, the following should be observed prior to any pressure tests:

Actuator of valve unit:

The admissible operating excess pressure in the actuator 2 is 25 bar 1). For higher pressures, you must:

- Remove the impulse tubes 3 at the actuator and close the connections with a stopper.
- Prior to any leak or pressure test, the instructions in section 7.3 must be complied with.



1) Pre-condition: Same pressure on both sides of the diaphragm.

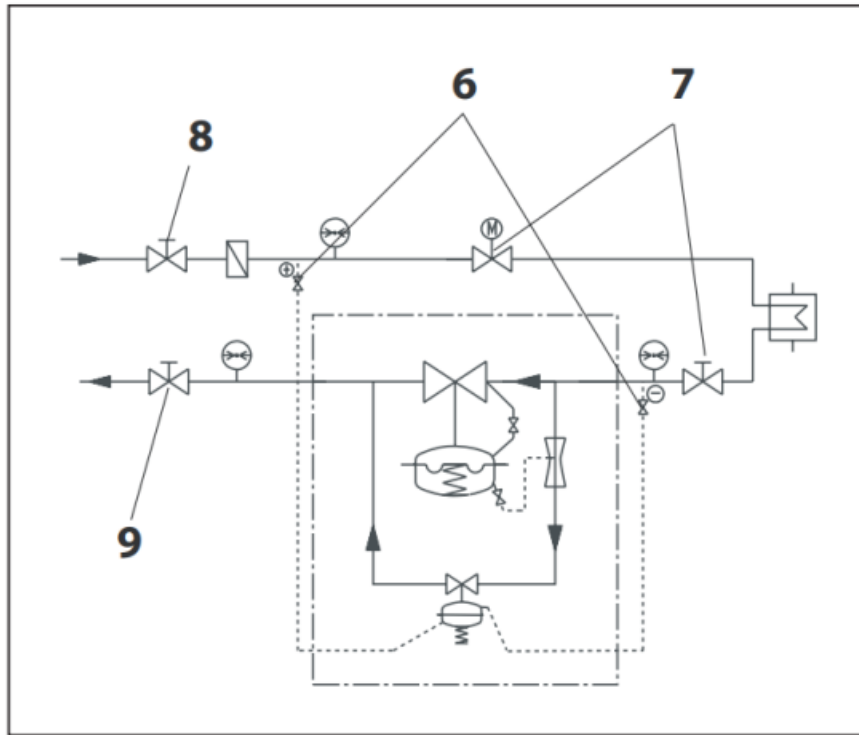
If the pressure load is one-sided, the (+)diaphragm chamber may have an excess pressure of 1 bar in comparison to the (-) diaphragm chamber.

7.3 Filling the System

Note:

The controller 4 is closed when no pressure is applied and only opens with a defined flow in the bypass.
The pilot controller 5 is closing on rising pressure.

1. Open shut-off valves 6 that possibly exist in the impulse tubes.
2. Open units 7 of the system.
3. Slowly open shut-off units in the supply flow 8 and the return flow 9.



7.4 Start-up

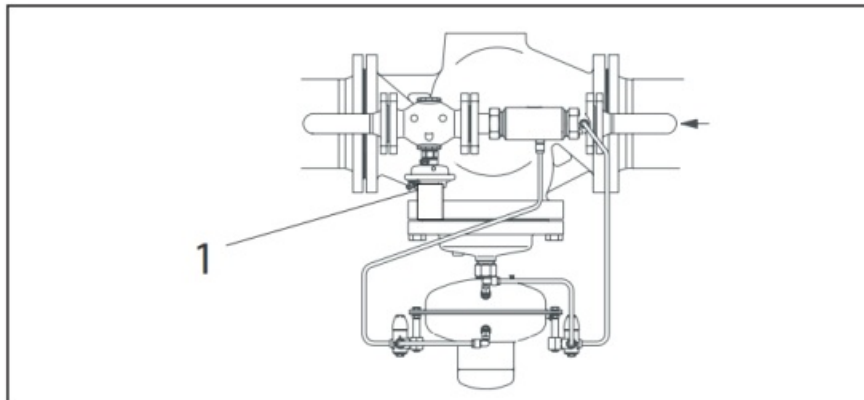
During starting-up the filled system, open the units in the same sequence as described in section 7.3.

7.5 Putting out of operation

When putting the system out of operation, first close the shut-off units in the supply flow and then those of the return flow.

7.6 Adjustment of the Differential Pressure

The setpoint of the differential pressure must be adjusted at the pilot controller AVP 1. The setpoint range is indicated on the rating plate of the actuator.



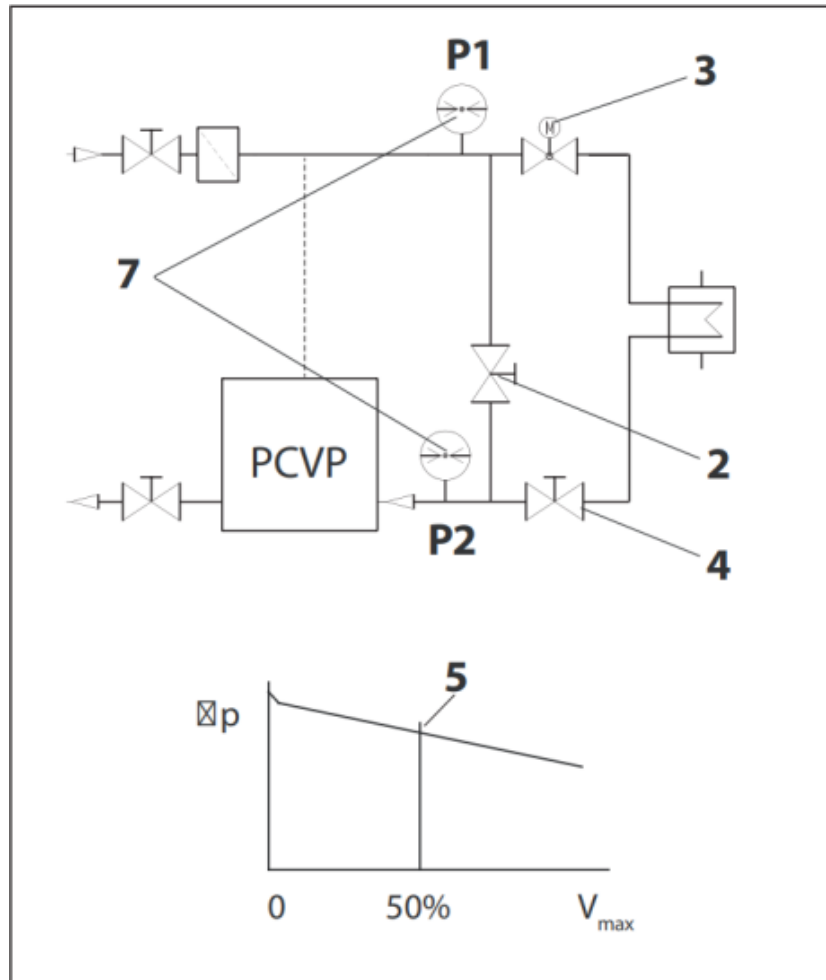
Procedure

1. Prior to the differential pressure adjustment, start the system as described in section 7.4.

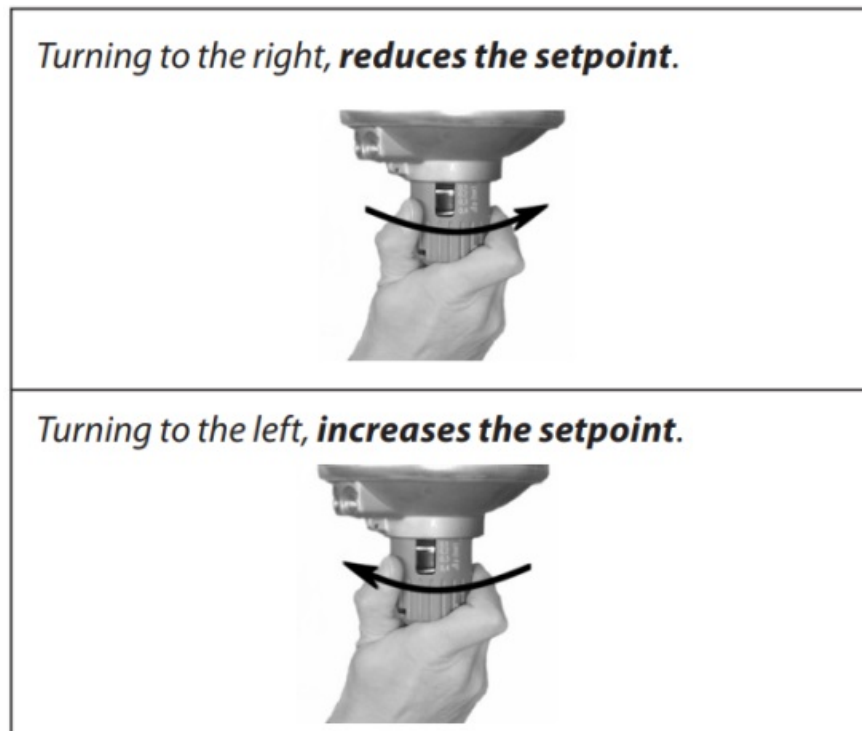
The differential pressure can also be adjusted while the bypass 2 is opened.

2. Adjust the flow rate at the unit by which the differential pressure is controlled.

Adjustment, e.g. at unit 3 or 4 or via bypass 2 to approx. 50 % of the max. flow rate 5.



3. Adjustment of the differential pressure setpoint by turning the setpoint adjuster 6.



4. Observe pressure indicators 7.

7.7 Sealing

The setpoint adjusters may be sealed.



7.8 Function Test

Differential pressure

Check the differential pressure on the pressure indicators by opening and closing a unit in the corresponding section of the system to be controlled.

If the differential pressure is exceeded in either direction, adjust the differential pressure as described in section 7.6.

Trouble Shooting

Fault	Possible cause	Remedy
Controller does not hold the differential pressure on a constant level	Air in the actuators	1. Loosen impulse tube connections at the actuators by approx. 1 rotation. 2. Deaerate, Caution hot water ! (move impulse tube until medium penetrates). 3. Tighten impulse tube connections.
	Impulse tubes or impulse tube connections are dirty or damaged.	1. Remove impulse tube. 2. Clean impulse tubes and impulse tube connections and check for free passage.
Differential pressure is too high	Pilot valve AVP does not close: Valve seat or plug is dirty or damaged.	1. Remove impulse tube. 2. Dismount actuator and trim. Procedure see section 9.4. 3. Clean seat and plug. 4. If damaged, replace trim or valve.
	Valve VFG2 does not close: Valve seat or plug is dirty or damaged.	1. Remove impulse tube. 2. Dismount actuator and trim ". Procedure, see section 9.2. 3. Clean seat and plug. 4. If damaged, replace trim or valve.
	Rolling diaphragm in the actuator AVP (pilot controller) is defective, i.e. valve AVP does not close.	1. Remove impulse tube. 2. Replace actuator, see section 9.2.
Differential pressure is too low	Valve plug of the pilot valve AVP does not open: Valve seat or plug is dirty or damaged, trim is dirty.	1. Remove impulse tube. 2. Dismount actuator and trim. Procedure, see section 9.4. 3. Clean seat and plug. 4. If damaged, replace trim or valve.
	Valve plug of the pilot valve VFG2 does not open: Valve seat or plug is dirty or damaged, trim is dirty.	1. Remove impulse tube. 2. Dismount actuator and trim ". Procedure, see sections 9.1 and 9.2. 3. Clean seat and plug. 4. If damaged, replace trim or valve.
	Rolling diaphragm in the actuator of the valve unit is defective, i.e. valve VFG2 does not open.	1. Remove impulse tube. 2. Loosen union nut SW 46 and remove actuator, see also section 9.1. 3. Replace actuator.

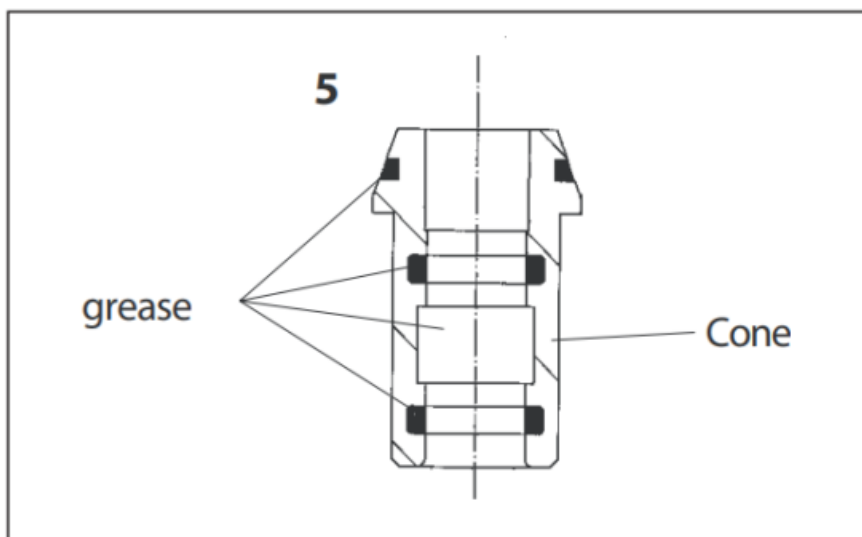
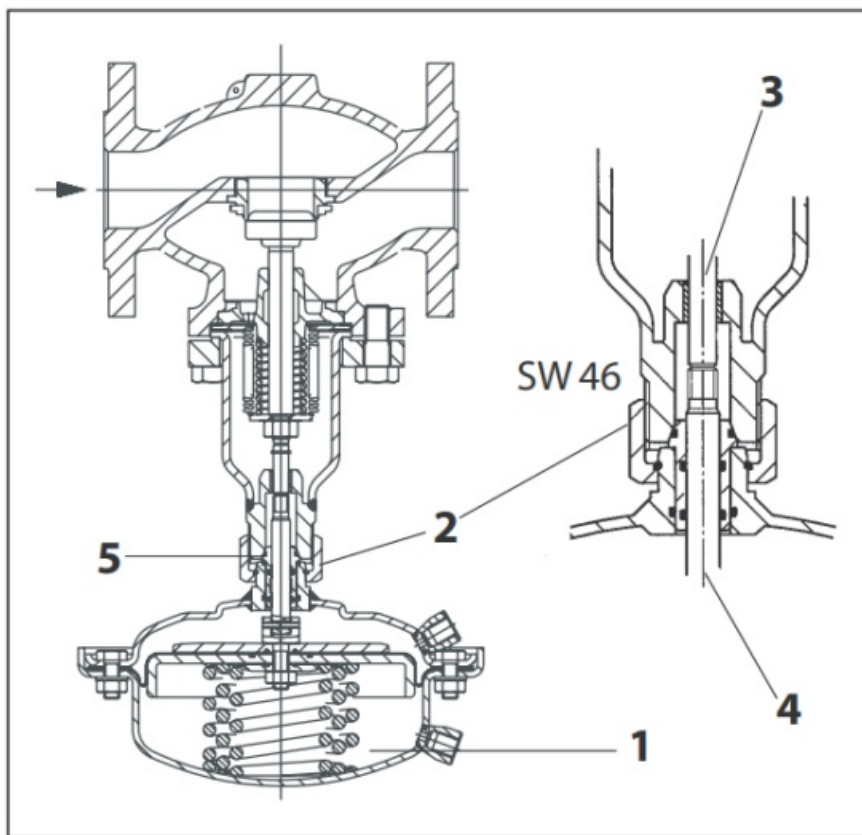
1) The trim can be replaced by qualified personnel up to DN 125.
From DN 150 replacement should be carried out by the Danfoss service personnel.

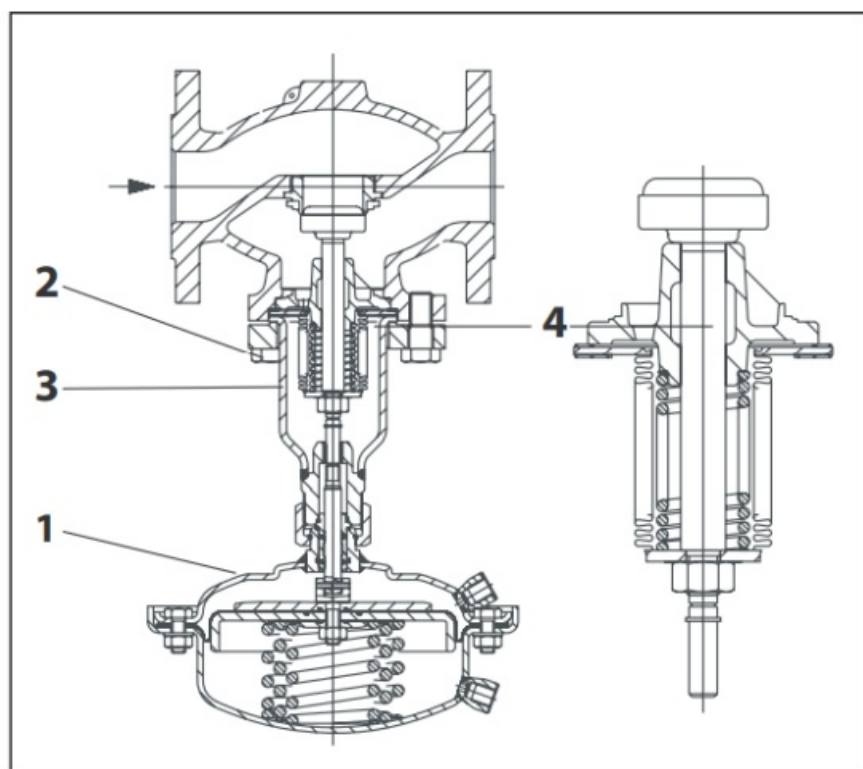
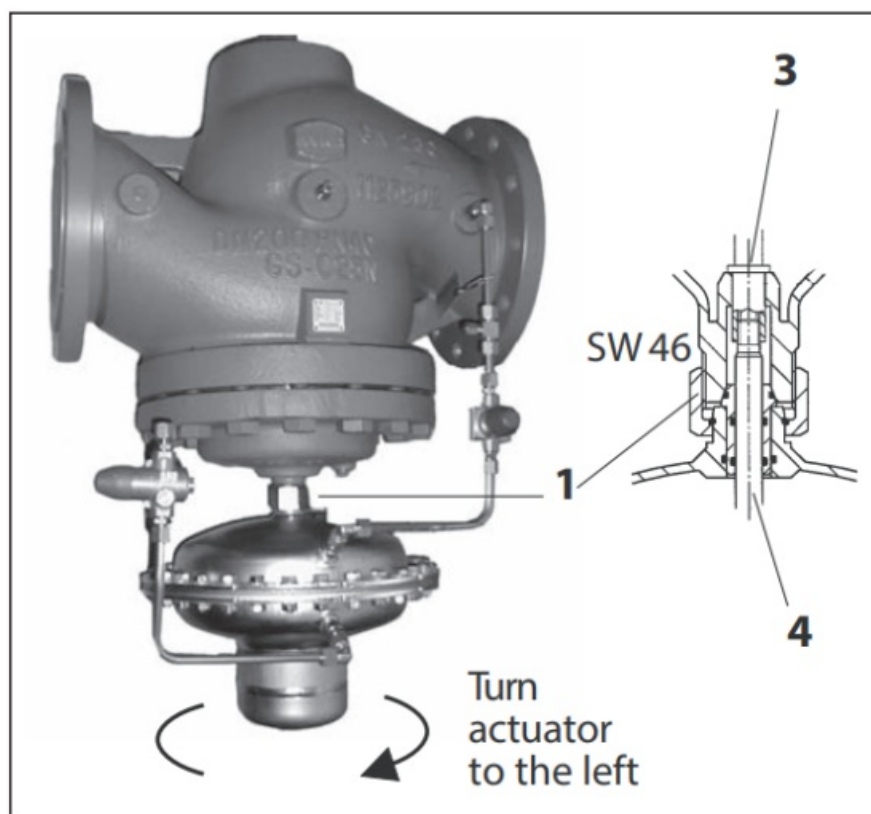
Replacement of Valve, Actuator, Trim

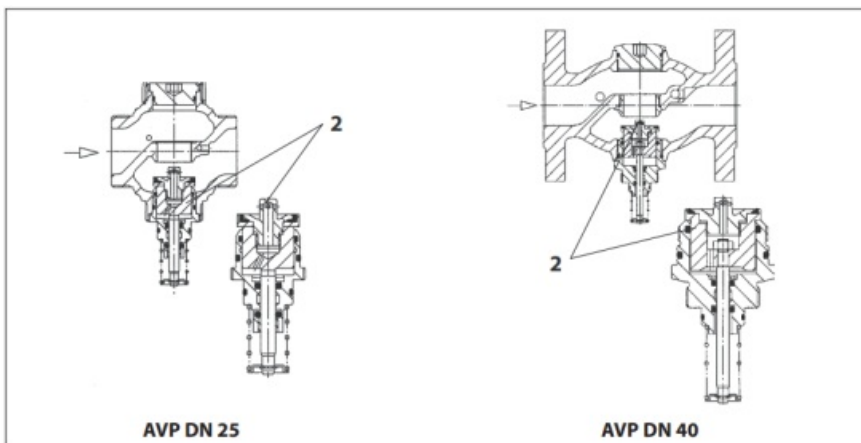
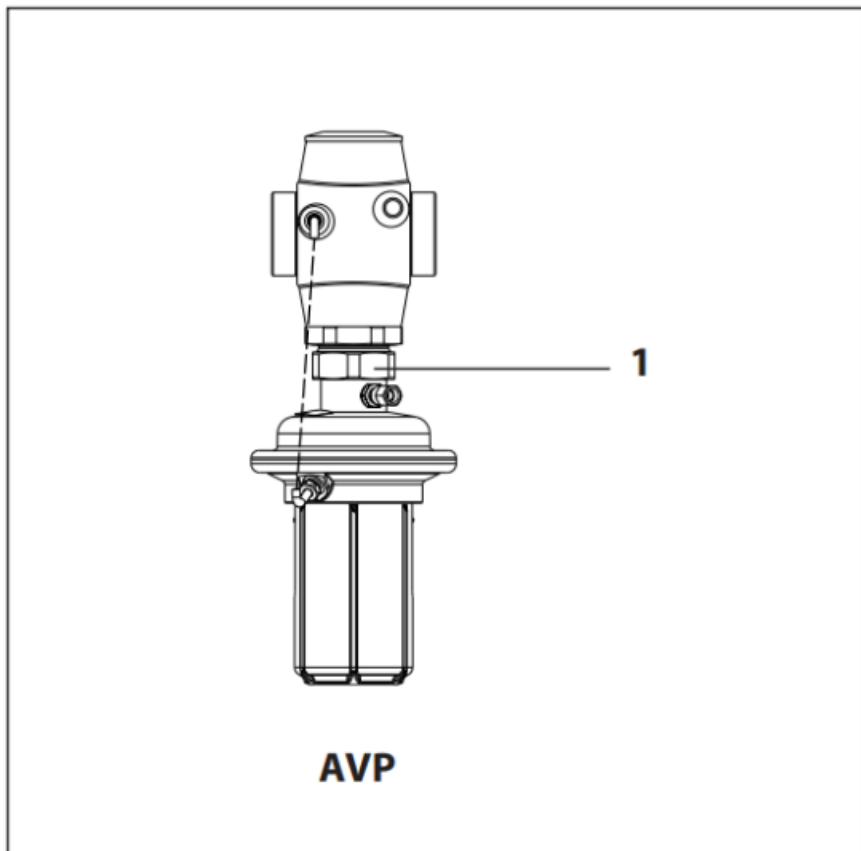
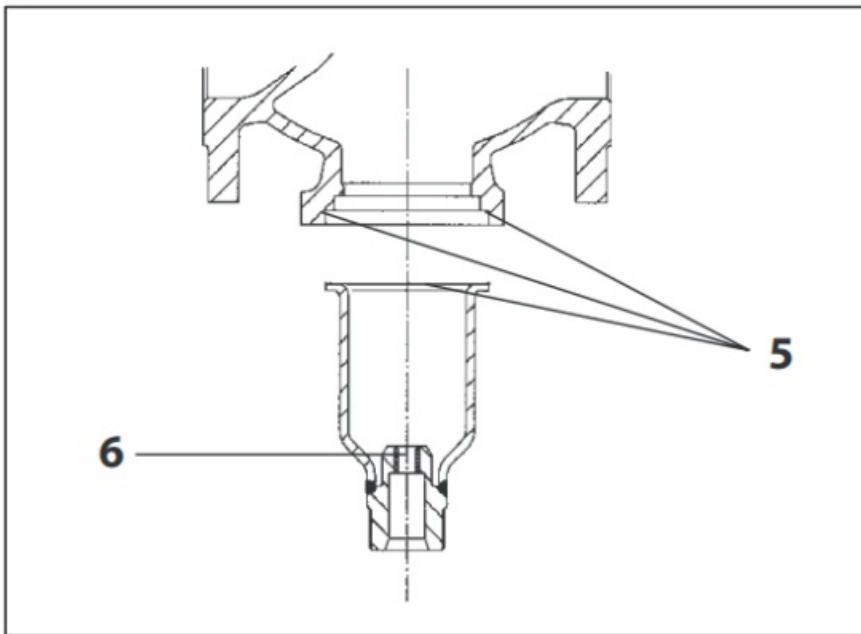
9.1 Dismounting and Mounting Actuator and Valve

Note:

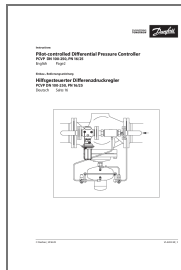
The springs 1 in the actuator are pre-stressed. Therefore, the actuator must be pushed upwards to be dismounted. You need a second person to do this.







Documents / Resources



[Danfoss DN 100-250 Pilot Controlled Differential Pressure Controller](#) [pdf] Instructions
DN 100-250, PN 16-25, DN 100-250 Pilot Controlled Differential Pressure Controller, DN 100-250, Pilot Controlled Differential Pressure Controller, Differential Pressure Controller, Pressure Controller

References

- [User Manual](#)

[Manuals+](#), [Privacy Policy](#)

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