Danfoss AFP 2 Differential Pressure Controller User Guide

Contents

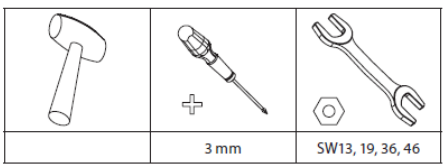
Danfoss AFP 2 Differential Pressure Controller

Specifications

- Model: AFP 2 / VFG 2 (21) DN 15-250, VFG 22 (221) DN 65-250
- Maintenance: Maintenance Free
- Size Range: DN 15-50
- Operating Pressure: PN 16, PN 25, PN 40

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 pressure reduction of water and water glycol mixtures for heating, district heating and cooling systems.
The technical data on the label plates determine the use.

Scope of Delivery 1

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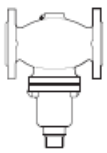
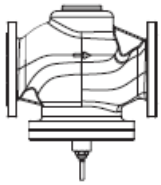
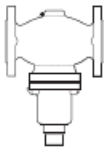
DN 15-50 T_{max} = 150 °C	DN 65-250 T_{max} = 150 °C	DN 15-250 T_{max} = 200 °C
		
Bellows VFG2, VFG21	Piston VFG22, VFG221	Bellows VFG2
 adapter **003G1780**		 adapter **003G1780**
 AFP 2	 AFP 2	 AFP 2
		 1× V1, V2 (630 cm²)
 AF (2×)*	 AF (2×)*	 AF (2×)*

Impulse tube AF, accessory 2

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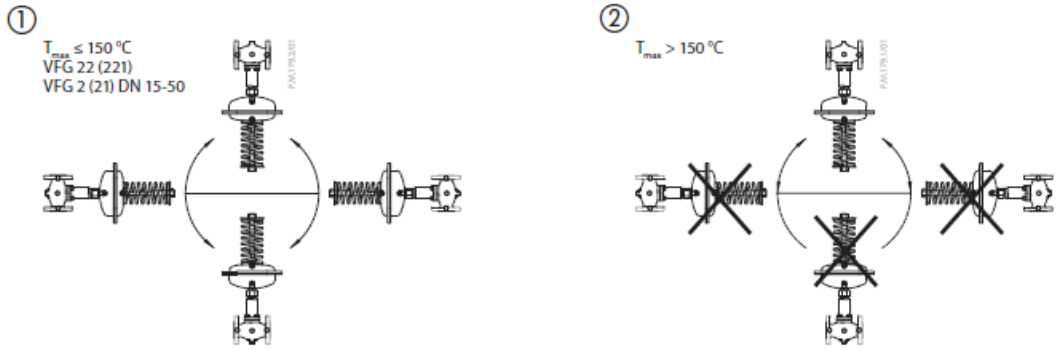
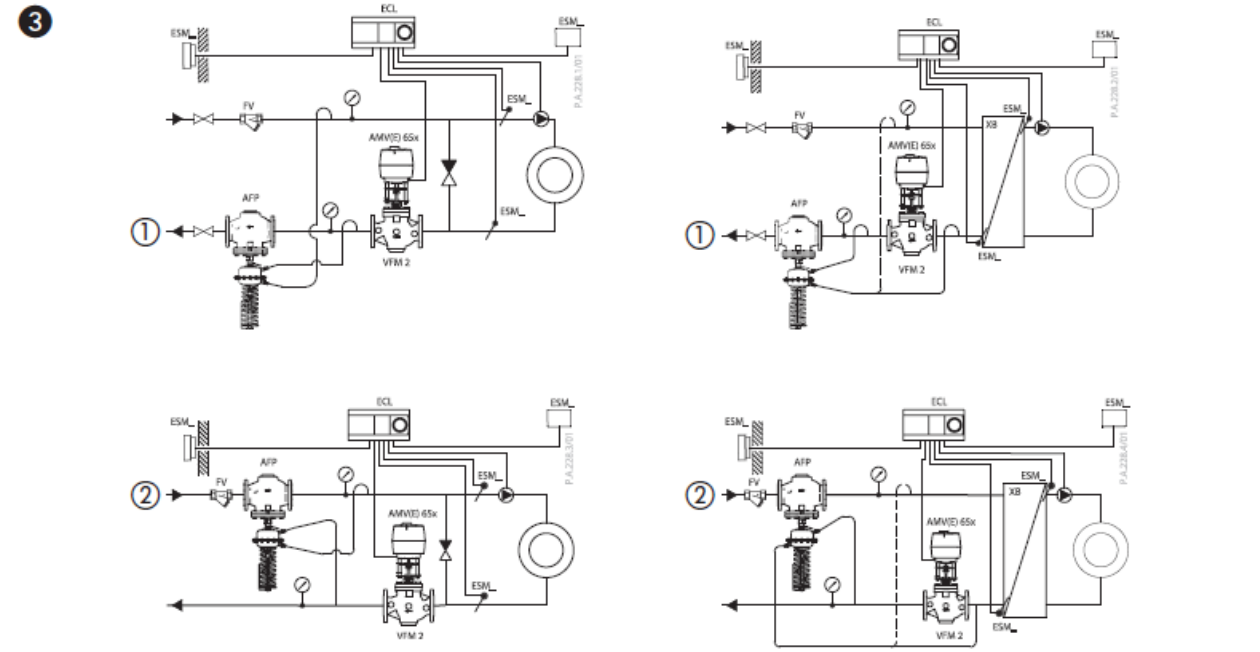


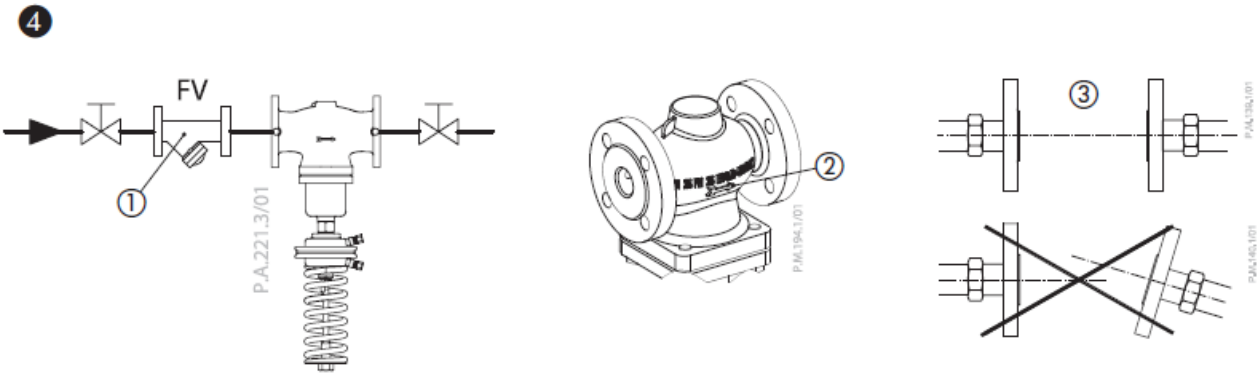
Assembly

Admissible Installation Positions

1. media temperatures up to 150 °C: Can be installed in any position.
2. media temperatures > 150 °C. Installation permitted only in horizontal pipelines with the actuator oriented downwards.

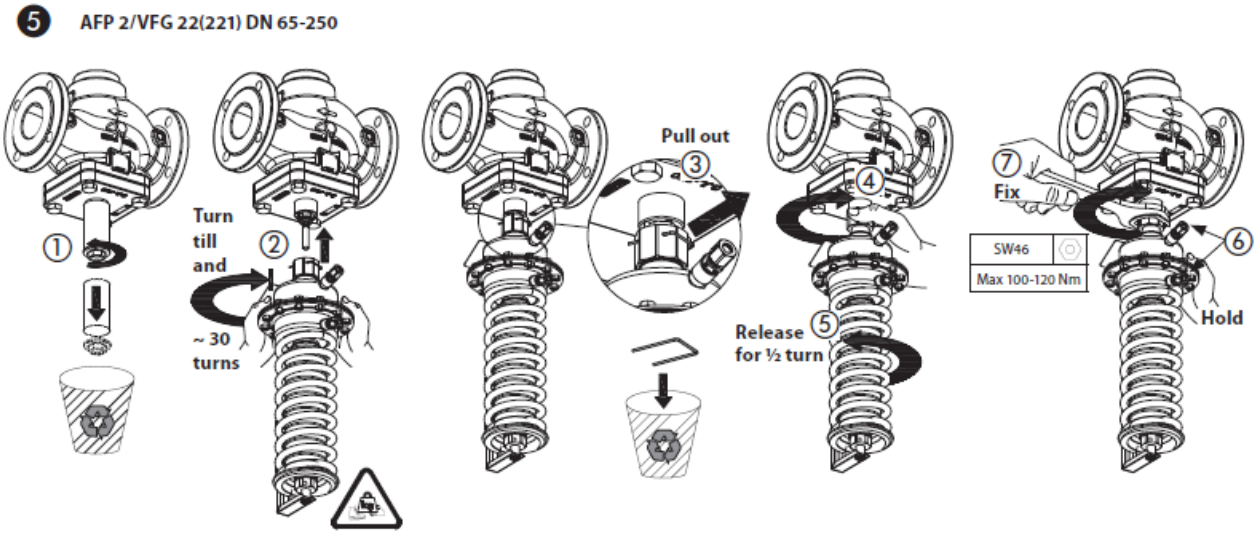
Installation Location and Installation Scheme 3 4





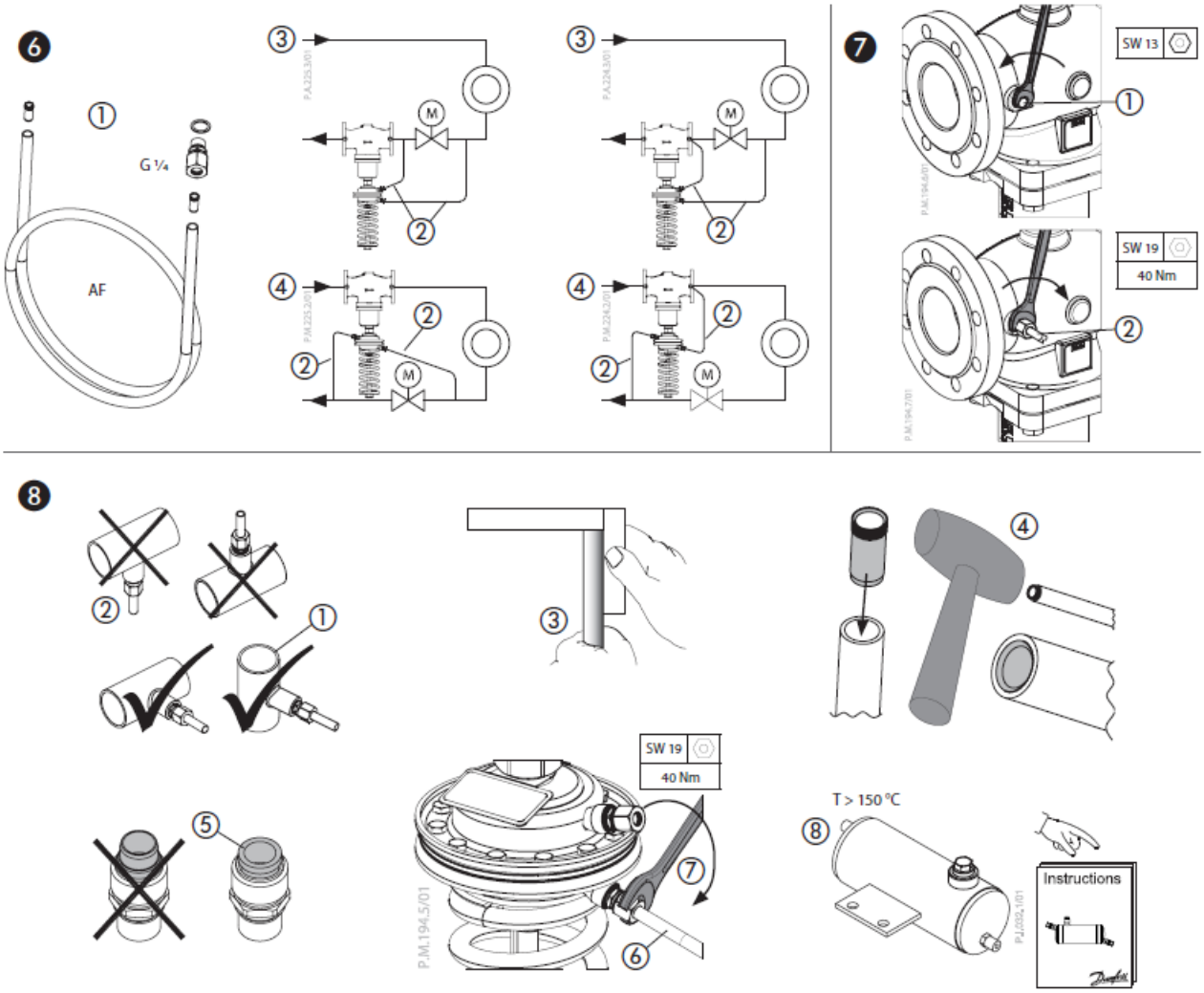
The valve is open without pressure and is closing on rising pressure.
System must be protected behind the pressure reducer by a safety monitoring unit ①.

Valve Installation 5



1. Install strainer ① before the controller.
2. Rinse system prior to installing the valve.
3. Observe flow direction ② on valve body. Flanges ③ in the pipeline must be in parallel position and sealing surfaces must be clean and without any damage.
4. Install valve.
5. Tighten screws crosswise in 3 steps up to the max. torque.

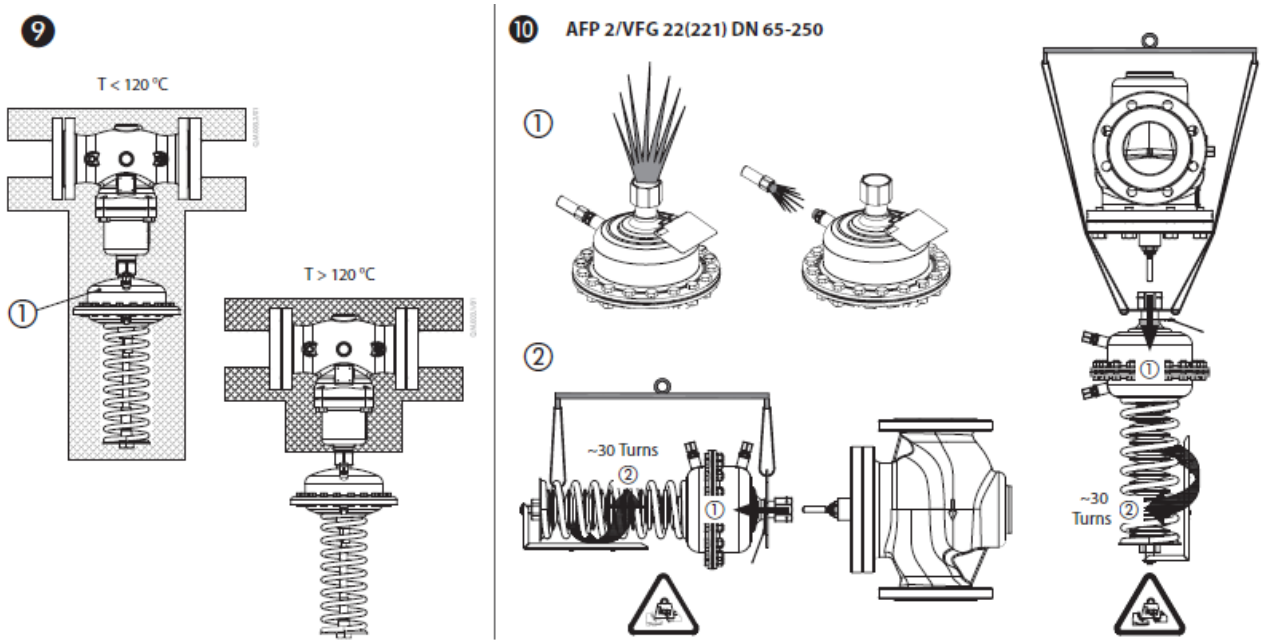
Actuator Installation 6 7 8



The actuator stem must be screwed into the valve stem. Spring on the pressure actuator is factory adjusted (released) for proper installation.

1. Remove the spindle protection cup and release the valve spindle by removing the nut, washer and cardboard tube.
2. Align the actuator stem with the valve stem, connect both stems and turn gently the whole pressure actuator clockwise with both hands, until the stems are fully connected (valve stem fully screwed into the actuator stem).
3. Release the uninon nut by pulling out the blocking spring.
4. Tight the union nut
5. Release the pressure actuator by turning it counter clockwise for approximately half a turn.
6. Observe the position of impulse tubes connection to the valve and align the actuator accordingly.
7. Hold the actuator in the position and tight the union nut to the valve with 100- 120 Nm torque.

Impulse Tube mounting 9 10

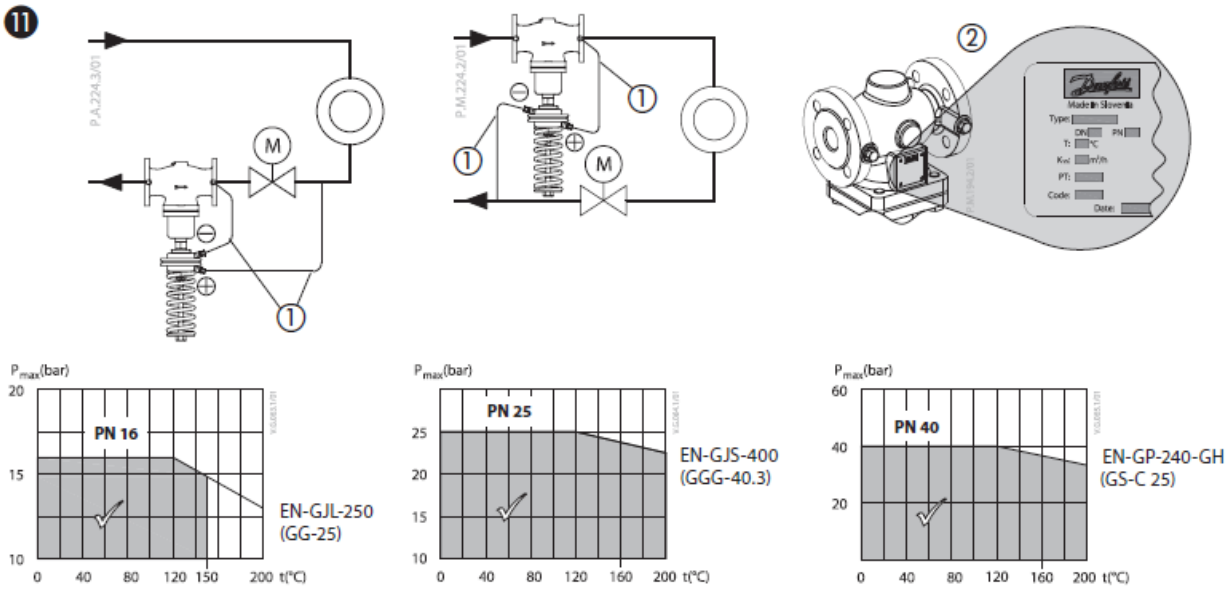


Which impulse tubes to use?
The impulse tube set AF (2×) ❻① can be used: Order No.: 003G1391 or use the following pipes:

Stainless steel	Ø 10×0.8	DIN 17458, DIN 2391
Steel	Ø 10×1	DIN 2391
Copper	Ø 10×1	DIN 1754

The impulse tube ③ can be connected directly to the valve ④ o tr o the pipeline ⑤.
ventilation socket, do not connect impulse tube.

Connection to the valve 11



1. Remove plug ① at the valve.

2. Screw in threaded joint G 1/4 ② with copper seal, Torque 40 Nm.

– or –

Connection to the Pipeline ❽①
No connection downwards/upwards ②, could bring dirt/air into an impulse tube.

1. Cut pipe in rectangular sections ③ and deburr.
2. For copper pipe: insert sockets ④ on both sides.
3. Verify the correct position of the cutting ring ⑤.
4. Press impulse tube ⑥ into the threaded joint up to its stop.
5. Tighten union nut ⑦ Torque 40 Nm.

When installing seal pots ❽⑧, please observe the Installation Instructions for the seal pots.

Insulation 12
For media temperatures up to 120 °C the pressure actua tor may be insulated ①.

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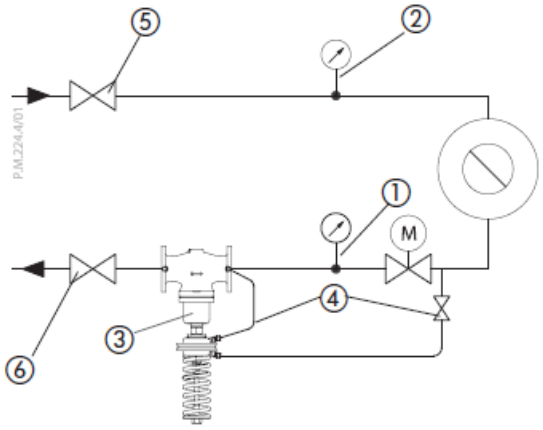

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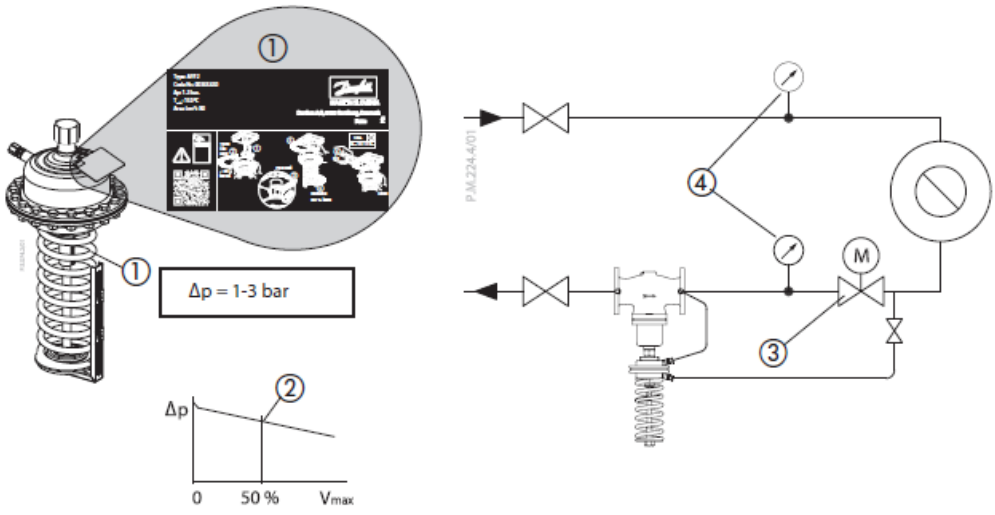
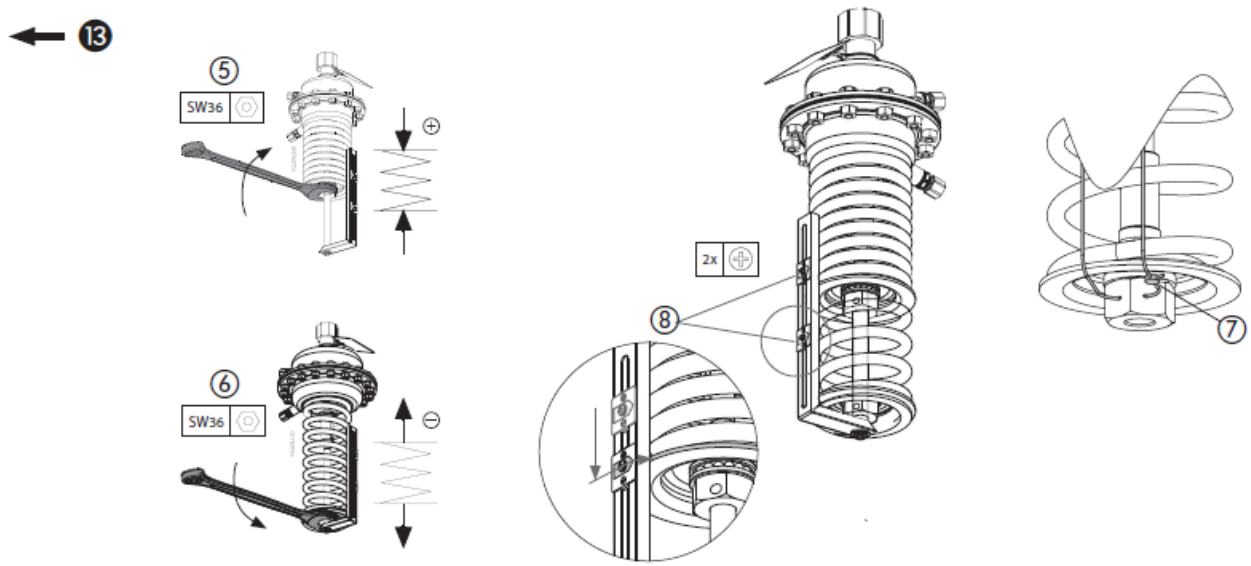


Dismounting 13



Danger

Danger of injury by hot water
Prior to dismounting the depressurize system or use shut off valves on the impulse tubes! ①
Carry out dismounting in following steps: ②

1. Fasten pressure actuator with the safety bands to the fixed points in surroundings
2. Before releasing the actuator, fully release the union nut
3. Hold the pressure actuator with both hands, and release it by turning it counter clockwise ~30 turns. During turning, control the actuator weight all the time to prevent unexpected fall of detached actuator.
4. Carefully remove the actuator from the valve.

Before installing actuator back to the valve, setting spring must be fully released again.

Leak and Pressure Test

Observe max. permitted pressure, see below.

- The pressure behind the valve ② must not exceed the pressure before the valve ①.
- Observe nominal pressure ⑤ of the valve.
- Prior to pressure tests, it is absolutely necessary to remove the impulse tube at the valve ④.
- Close connections with plugs G ¼ ISO 228.

Max. pressure [bar] with connected impulse tube:
Max. test pressure [bar] with disconnected impulse tube must not exceed the plant testing pressure and must always be lower than 1.5 × PN.
Non-compliance may cause damage at the controller ③.

Filling the System, Start-up

The pressure ② behind the valve must not exceed the pressure ① before the valve.

Non-compliance may cause damage at the controller ③.

1. Open shut-off devices ④ that are possibly available at the impulse tubes.
2. Slowly open valves in the system.
3. Slowly open shut-off devices ⑤ in the supply flow.
4. Slowly open shut-off devices ⑥ in the return flow.

Putting out of Operation

1. Slowly close shut-off devices ⑤ in the supply flow.
2. Slowly close shut-off devices ⑥ in the return flow.

Setpoint Adjustment

Set-point range see rating plate ①

1. Start-up of system, see section
2. Set flow rate at the fitting ② after the pressure reducer ③,to about 50 % of max. flow rate ④
3. Adjustment of the pressure behind the valve ⑤
    - Observe pressure indicators.
    - Turning to the right ⑥ increases the set-point (stressing the spring)
    - Turning to the left ⑦ reduces the set-point (un-stressing the spring)
4. The set-point adjuster ⑧ may be sealed.
5. Release the not yet used pointer ⑨, move it to the set position and fix it with the screw

Dimensions

Flanges: connection dimensi ons acc. to DIN 2501, seal form C

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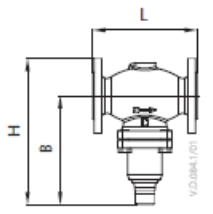
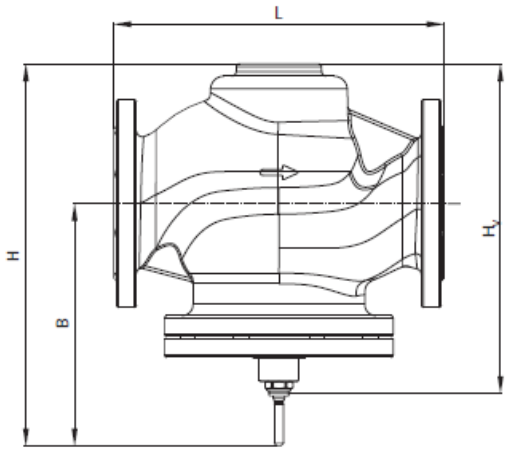


VFG 2 (21) DN 15-50

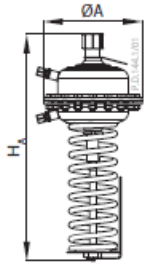
Adapter
003G1780

DN		15	20	25	32	40	50	65	80	100	125	150	200	250
L	mm	130	150	160	180	200	230	290	310	350	400	480	600	730
B		213	213	239	239	241	241	245	240	275	270	330	365	420
H		267	267	304	304	323	323	370	365	425	435	520	610	680



VFG 22(221) DN 65-250

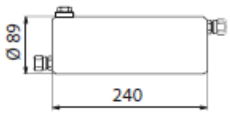
DN	L	B	H	H_v	Weight		
	mm				PN 16	PN 25	PN 40
					kg		
65	290	245	370	285	24	24	27
80	310	240	365	290	29	29	32
100	350	275	425	350	47	48	53
125	400	270	435	370	60	60	68
150	480	330	520	460	105	106	121
200	600	365	610	550	204	206	235
250	730	420	680	620	343	350	404



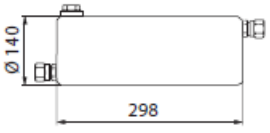
AFP 2 Actuator

Size (cm²)	ØA	H_A	H_{AI}	Weight (kg)	
			mm	AFP 2 PN 16	AFP 2 PN 40
80	175	490	590	9	16
160	230	510	610	11,5	23,5
320	300	510	610	15	35,5
640	300	630	730	38	58

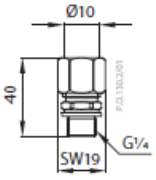
Total installation height of the controller (VFG 22(1) valve + AFP 2 pressure actuator) is sum of H_v and H_A



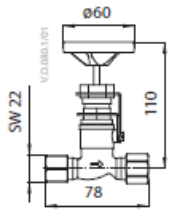
Seal pot V1



Seal pot V2



Compression fitting



Shut off valve

Danfoss A/S Climate
Solutions • danfoss.com • +45 7488 2222

FAQ

- **Q: Is maintenance required for this product?**

  A: The product is maintenance-free for normal operation. No specific maintenance is needed.
- **Q: What is the recommended pressure range for this product?**

A: The recommended pressure range is between 1-3 bar for optimal performance

Documents / Resources

	Danfoss AFP 2 Differential Pressure Controller [pdf] User Guide 21, 22, 221, AFP 2 Differential Pressure Controller, AFP 2, Differential Pressure Controller, Pressure Controller

References

- Engineering Tomorrow | Danfoss
- User Manual