

Instruction Manual

SAV 100025-100050 / SAV 10010-10020
 SAV 250025-250050

1. Target group

The target group of this manual is qualified personnel of the gas safety and regulating technology. Due to their specialist training, knowledge and experience, they should be capable of evaluating the work assigned to them and recognising possible dangers. Only they are permitted to carry out assembly, commissioning, settings and maintenance on the devices in compliance with the recognised rules for occupational safety.



Hang this instruction manual in a readily visible place inside the installation room! Do not carry out any work until you have read the safety instructions of this instruction manual and are qualified to do so.

2. Warnings

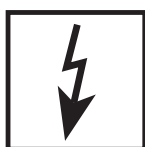
2.1 General warnings



The recognised occupational safety rules and accident prevention regulations must be observed and, if necessary, personal protective measures must be taken.



All adjustments and settings should only be performed in accordance with the instruction manuals of the connected machines.



Never carry out work as long as gas pressure or voltage is applied. Avoid open fire. Please observe public regulations.



Prior to assembly, the device must be inspected for transport damage.



The device must not be exposed to open fire. Protection against lightning strikes must be guaranteed.



Connected line systems must be free from dirt and contamination.



Protection from environmental impacts and weather conditions (corrosion, rain, snow, icing, humidity (e.g. by condensation), mould, UV radiation, harmful insects, poisonous, corrosive solutions/liquids (e.g. cutting and cooling fluids), must be guaranteed. Depending on the installation site, it may be necessary to take protective measures.



The device may only be operated in compliance with the operating conditions stated on the type plate.



The device must be protected from vibrations and mechanical impacts.



The device must not be used in areas with increased seismic risk.

Explanation of the symbols

1, 2, 3,...	=	Order of action
•	=	Instruction

2.2 Designated use

The device is used in accordance with its designated use if the following instructions are observed:

- Use of the device in gas transport and gas distribution networks, commercial and industrial plants.
- Use in pressure regulator stations according to EN 12186 and EN 12279.
- Use with gases of the 1st, 2nd and 3rd gas families according to EN 437 only.
- Use with dry and clean gases only, no aggressive media.
- Use only in compliance with the operating conditions stated on the type plate.
- Use in perfect condition only.
- Malfunctions and faults must be eliminated immediately.
- Use only in observance of the instructions given in this instruction manual and of national regulations.

2.3 Risks in case of misuse

- If used in accordance with their designated use, the devices are safe to operate.
- Non-observance of the regulations may result in personal injury or material damage, financial damage or environmental damage.
- Operator errors or misuse present risks to life and limb of the operators and also to the device and other material property.

3. Declaration of conformity

3.1 EU Declaration of conformity

Produkt / Product Produit / Producto	SAV 100025-100050 / SAV 10010-10020 SAV 250025-250050		Safety Shut-off Valve up to 25 bar	
Hersteller / Manufacturer Fabricant / El Fabricante	Karl Dungs GmbH & Co. KG Karl-Dungs-Platz 1 73660 Urbach, Germany			
bescheinigt hiermit, dass die in dieser Übersicht genannten Produkte einer EU-Baumusterprüfung (Baumuster) unterzogen wurden und die wesentlichen Sicherheitsanforderungen der: • EU-Druckgeräterichtlinie 2014/68/EU in der gültigen Fassung erfüllen. Bei einer von uns nicht freigegebenen Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit. Der oben beschriebene Gegenstand der Erklärung entspricht den einschlägigen Harmonisierungsrechtsvorschriften der Union. Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.	certifies herewith that the products named in this overview were subjected to an EU-Type Examination (production type) and meet the essential safety requirements: • EU-Pressure Equipment Directive “2014/68/EU” as amended. In the event of an alteration of the equipment not approved by us this declaration loses its validity. The object of the declaration described above conforms with the relevant Union harmonisation legislation. This declaration of conformity is issued under the sole responsibility of the manufacturer.	certifie par la présente que le produit mentionné dans cette vue d'ensemble a été soumis à un examen UE de type (type de fabrication) et qu'il est conforme aux exigences en matières de sécurité des dernières versions en vigueur de : • Directive européenne relative aux appareils sous pression 2014/68/UE Ce communiqué n'est plus valable si nous effectuons une modification libre de l'appareil. L'objet décrit ci-dessus de la présente déclaration correspond aux prescriptions légales applicables en matière d'harmonisation de l'Union. Le fabricant porte l'entière responsabilité pour l'établissement de la présente déclaration de conformité.	certifica que los productos mencionados en este resumen han sido sometidos a un examen UE de tipo (tipo de producción) y cumplen con los requisitos mínimos de seguridad de: • Directiva de equipos a presión de la UE 2014/68/UE en su versión vigente. En caso de una modificación no autorizada por nosotros, esta declaración pierde su validez. El objeto de la declaración descrita anteriormente es conforme a la legislación de armonización pertinente de la Unión. El fabricante es el único responsable de la expedición de esta declaración de conformidad.	
Prüfgrundlage der EU-Baumusterprüfung (Baumuster) Specified requirements of the EU-Type Examination (production type) Base d'essai de l'examen UE de type (type de fabrication) Requisitos específicos del examen UE de tipo (tipo de producción))		DIN EN 14382		
Bescheinigung Attestation Certificat Certificado		CE-0085DP0221		
Notifizierte Stelle (EU Baumusterprüfung: Modul B) Notified Body (EU type-examination: Module B) Organisme notifié (Examen de type de l'UE: module B) Organismo notificado (Examen tipo UE: Módulo B)		DVGW CERT GmbH Josef-Wirmer-Straße 1-3 D-53123 Bonn, Germany Notified Body number: 0085		
Überwachung des QM-Systems (Modul D) Monitoring of the QM system (module D) Contrôle de la gestion de l'assurance qualité (module D) Supervisión del sistema de calidad y seguridad módulo D)		TÜV SÜD Industrie Service GmbH Westendstraße 199 D-80686 München, Germany Notified Body number: 0036		
B. Sc., MBA, Simon P. Dungs Geschäftsführer / Chief Operating Officer Directeur / Gerente Urbach, 2024-08-14				

3.2 UKCA Declaration of conformity

Product	SAV 100025-100050 / SAV 10010-10020 SAV 250025-250050	Safety Shut-off Valve up to 25 bar
Manufacturer	Karl Dungs GmbH & Co. KG · Karl-Dungs-Platz 1 · D-73660 Urbach/Germany	
Certifies herewith that the products named in this overview were subjected to a Type Examination (production type) and meet the essential safety requirements: • The Pressure Equipment Safety Regulations, UKSI 2016:1105 (as amended by UKSI 2019: 969) In the event of an alteration of the equipment not approved by us this declaration loses its validity. The object of the declaration described above conforms with the relevant legislation. This declaration of conformity is issued under the sole responsibility of the manufacturer.		
Specified requirements of the Type Examination (production type)		DIN EN 14382
Term of validity		2032-05-17
Approved Body		2016 No. 1105 TUV SUD BABT Unlimited Octagon House, Concorde Way, Segensworth North, Fareham, Hampshire, PO15 5RL, United Kingdom Approved Body Number: 0168
Monitoring of the QA system		Conformity process adopted: Module B+D
B.Sc., MBA Simon P. Dungs, Chief Operating Officer Urbach, 2024-08-014		

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5. List of abbreviations

Abbreviation	Description
AG _o	Accuracy group for over-pressure monitoring
AG _u	Accuracy group for under-pressure monitoring
ASE	Safety shut-off valve (without housing)
K _G	Flow coefficient
DN	Nominal diameter
IS/DS	Integral strength type or differential strength type
Class A	Class A: SAV that close when damage to the pressure detecting element occurs
Class B	Class B: SAV that do not close when damage to the pressure detecting element occurs
p _d	Regulator pressure downstream
p _{do}	Trip pressure for over-pressure monitoring
p _{du}	Trip pressure for under-pressure monitoring
p _{max}	maximum component operating pressure
PN	nominal pressure
PS	maximum allowable pressure
SAV	Safety shut-off valve
SBV	Safety relief valve
S.n.	serial number
SW	Width across flats
W _{do}	set range for over-pressure monitoring
W _{du}	set range for under-pressure monitoring
W _{dso}	specific set range for over-pressure monitoring
W _{dsu}	specific set range for under-pressure monitoring
- 20 to + 60 °C	Operating temperature range

6. Features

6.1. Technical data

Technical data	SAV ...			
Device	Safety shut-off valve according to EN 14382			
Type	SAV 100... IS / SAV 250... DS			
Response time	≤ 2 s			
Type of gas	Family 1+2+3			
Nominal diameters	Connection flanges PN 25 according to EN 1092-1 or ANSI class 150 lbs (B16.5)			
Flange	DN	25	40	50
	NPS	1	1½	2
	Connection thread Rp (DIN EN 10226-1) or NPT (B1.20.1)			
	RP / NPT	1	1½	2
Inlet pressure	SAV100... : PS 10 bar (1 000 kPa) SAV250... : PS 25 bar (2 500 kPa)*			
Lower adjustment range W _{du}	10 mbar to 3 000 mbar			
Upper adjustment range W _{do}	60 mbar to 5 000 mbar			
Materials	Main body housing: cast iron EN-GJS 400-15 (EN-GJS 400-18 LT on request) Diaphragm housing: Aluminium (steel on request) Diaphragms: NBR			
Ambient temperature	- 20 °C to + 60 °C			

* 19 bar (1 900 kPa) with ANSI 150 flanges

6.2 Nomenclature

Example SAV 100025 ND	SAV	100	025	ND	ANSI
Type	Safety shut-off valve				
MOP	100 ... 10 000 mbar (1 000 kPa) 250 ... 25 000 mbar (2 500 kPa)				
Nominal diameter	10 1" 15 1½" 20 2" 025 DN 25 040 DN 40 050 DN 50				
Pressure ranges	ND-MD Low and medium pressure HD-UHD High and ultra high pressure				
Thread / flange type	ANSI with Standard PN 25 flanges or thread Rp NPT with ANSI 150 lbs with NPT threads				

6.3 Adjustment ranges

Type	Connection	Version	Order number	Lower switch- ing point	Upper switch- ing point
				W _{du}	W _{do}
SAV 100025 ND-MD	DN 25	ND-MD	270291	10-500 mbar	60-999 mbar
SAV 250025 HD-UHD	DN 25	HD-UHD	271122	150-3 000 mbar	600-5 000 mbar
SAV 100040 ND-MD	DN 40	ND-MD	270294	10-500 mbar	60-999 mbar
SAV 250040 HD-UHD	DN 40	HD-UHD	271123	150-3 000 mbar	600-5 000 mbar
SAV 100050 ND-MD	DN 50	ND-MD	270297	10-500 mbar	60-999 mbar
SAV 250050 HD-UHD	DN 50	HD-UHD	271124	150-3 000 mbar	600-5 000 mbar
SAV 100025 ND-MD ANSI	NPS 1"	ND-MD	277799	10-500 mbar	60-999 mbar
SAV 250025 HD-UHD ANSI	NPS 1"	HD-UHD	275186	150-3 000 mbar	600-5 000 mbar
SAV 100040 ND-MD ANSI	NPS 1½"	ND-MD	277802	10-500 mbar	60-999 mbar
SAV 250040 HD-UHD ANSI	NPS 1½"	HD-UHD	275184	150-3 000 mbar	600-5000 mbar
SAV 100050 ND-MD ANSI	NPS 2"	ND-MD	277805	10-500 mbar	60-999 mbar
SAV 250050 HD-UHD ANSI	NPS 2"	HD-UHD	273855	150-3 000 mbar	600-5 000 mbar

Type	Connection	Version	Order number	Lower switch- ing point	Upper switch- ing point
				W _{du}	W _{do}
SAV 10010 ND-MD	Rp 1"	ND-MD	287908	10-500 mbar	60-999 mbar
SAV 10010 HD-UHD	Rp 1"	HD-UHD	287909	150-3 000 mbar	600-5 000 mbar
SAV 10015 ND-MD	Rp 1½"	ND-MD	287911	10-500 mbar	60-999 mbar
SAV 10015 HD-UHD	Rp 1½"	HD-UHD	287912	150-3 000 mbar	600-5 000 mbar
SAV 10020 ND-MD	Rp 2"	ND-MD	287914	10-500 mbar	60-999 mbar
SAV 10020 HD-UHD	Rp 2"	HD-UHD	287915	150-3 000 mbar	600-5 000 mbar
SAV 10010 ND-MD NPT	NPT 1"	ND-MD	287917	10-500 mbar	60-999 mbar
SAV 10010 HD-UHD NPT	NPT 1"	HD-UHD	287918	150-3 000 mbar	600-5 000 mbar
SAV 10015 ND-MD NPT	NPT 1.1/2"	ND-MD	287920	10-500 mbar	60-999 mbar
SAV 10015 HD-UHD NPT	NPT 1.1/2"	HD-UHD	287921	150-3 000 mbar	600-5000 mbar
SAV 10020 ND-MD NPT	NPT 2"	ND-MD	287923	10-500 mbar	60-999 mbar
SAV 10020 HD-UHD NPT	NPT 2"	HD-UHD	287924	150-3 000 mbar	600-5 000 mbar

Accuracy Group

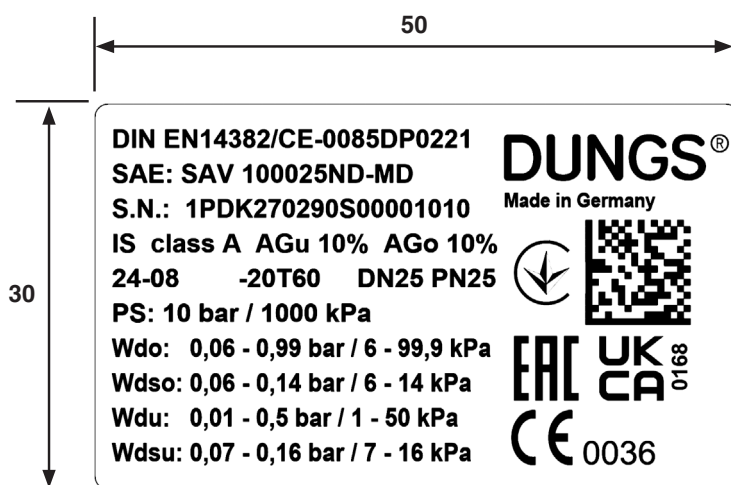
Type	W _{du}	AG	W _{do}	AG
ND-MD	10-70 mbar	AG 20	10-70 mbar	AG 20
	70-100 mbar	AG 10	70-999 mbar	AG 10
	100-500 mbar	AG 5	-	-
HD-UHD	150-200 mbar	AG 20	-	-
	200-250 mbar	AG 10	-	-
	250-3 000 mbar	AG 5	600-5 000 mbar	AG 5

6.4 Selection of springs

Specific adjustment range, underpressure W_{dsu}						
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]	
					ND-MD	HD-UHD
Yellow	303335	1,4	58,5	13	10 - 30	-
Blue	303336	1,6	58,2	13	25 - 90	150 - 290
Black	303337	1,8	58,3	13	70 - 160	250 - 560
Purple	303338	2	58,3	13	140 - 310	520 - 1100
Orange	303339	2,25	58,3	13	290 - 500	1 050 - 1 800
Pink	303340	2,5	58,2	13	-	1 650 - 3 000

Specific adjustment range, overpressure W_{dso}						
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]	
					ND-MD	HD-UHD
Silver	303321	2,4	55,2	30	60 - 140	-
Green	303322	2,8	55	30	80 - 220	-
Red	303323	3,2	54,6	30	160 - 450	600 - 1 700
Yellow	303324	3,6	54,5	30	300 - 680	1 250 - 2 500
Blue	303325	4	54,5	30	500 - 999	1 900 - 4 500
Black	303326	4,25	54,4	30	-	3 500 - 5 000

6.5 Type plate



Explanations of abbreviations on the label can be found in chapter 5 „List of abbreviations“

7. Function

The SAV protects downstream lines against pressures that are too high or too low. As soon as the pre-set triggering pressure falls below or exceeds a limit due to a fault, the SAV interrupts automatically the gas flow. Under normal operating condition the SAV is open.

The SAV complies with the requirements of EN 14382 as safety shut-off valve.

It is classified as a Class A device when both protections for over-pressure and under-pressure monitoring are installed. In case of not having the Under-pressure protection, it is functionally a Class B device and DS strenght type. In this conditions SAV stays open even when there is no pressure detected.

Note: When using a SAV functional Class B, it implies the hazard of no detecting a rupture on the diaphragm. With a combination of a failure in the regulator (fail to open), inlet pressure will be on the downstream side too with the corresponding risk to the components downstream.

Main components

- A1** Protective cap
- A2** Intermediate protective cap for sealing settings
- B** Adjusting screw for p_{do}
- C** Adjusting screw p_{du}
- D** Washer for W_{dso} spring
- E** Setpoint spring for p_{do}
- F** Setpoint spring for p_{du}
- G** Spring dome
- H** Spring centering
- I** Push rod
- J** Working diaphragm
- K** Chamber with the pressure to be monitored
- L** Ball catch / trigger mechanism
- M** Closing spring
- N** Valve disc

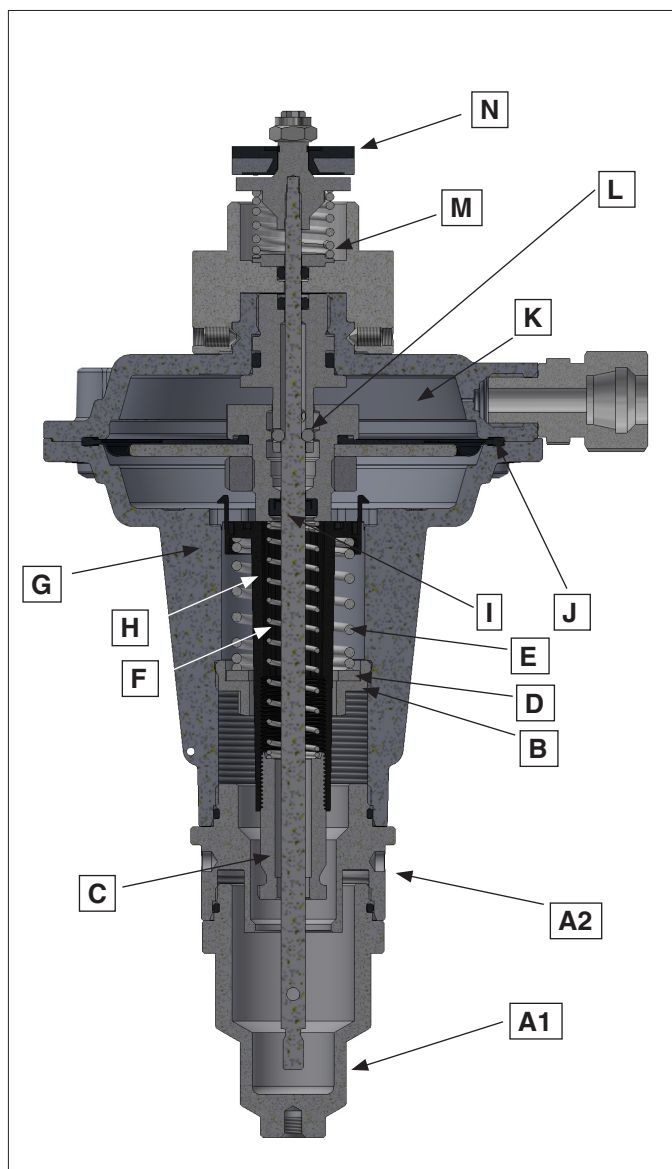
Function

Chamber **K** is connected to the outlet pressure via a pulse line.

The pressure to be checked acts on the working diaphragm **J**. The force of the setpoint springs **E** and **F** acts as counterforce.

In case of an unbalance of forces (overpressure or underpressure), the SAV is actuated and the gas supply is blocked.

If the outlet side of the gas pressure regulator and/or the fittings and devices of the succeeding gas line section, inclusive its equipment until the gas-consuming device, are not designed for the highest supply pressure (inlet pressure to the gas pressure regulator in case of an error), a SAV must be installed to shut down the gas supply before the gas pressure becomes too high:



Function in case of overpressure: Outlet pressure exceeds pressure value p_{do}

1. Diaphragm **J** is moved downwards against the force of the adjustment spring p_{do} **E**.
2. The balls of the ball lock **L** move outwards.
3. The locking mechanism of the push rod is released.
4. Closing spring **M** presses the valve disc **N** with the push rod onto the valve seat.
5. The SAV is in the closed position.

Function in case of underpressure: Outlet pressure falls below set value p_{du}

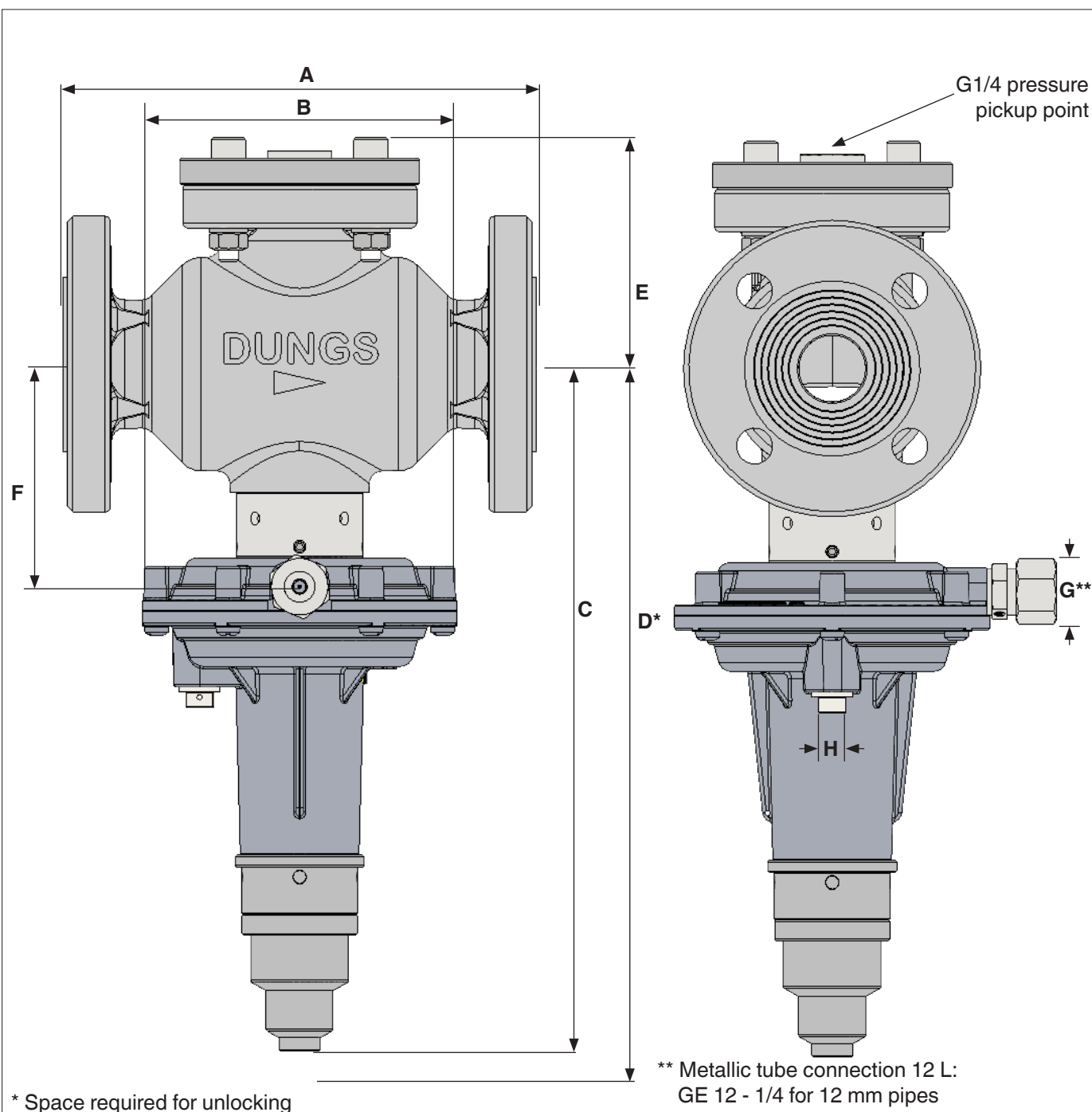
1. Diaphragm **J** is moved upwards by the force of the adjusting spring p_{du} **F**.
2. The balls of the ball lock **L** move outwards.
3. The locking mechanism of the push rod is released.
4. Closing spring **M** presses the valve disc **N** to the valve seat via the push rod.
5. The SAV is in the closed position.

Unlocking the SAV (see also chapter 11.3)

1. The SAV can only be opened manually.
2. Unscrew and rotate protective cap **A1**.
3. Screw protective cap **A1** onto the push rod.
4. Use protective cap **A1** as a handle
5. Compensate pressure by opening the compensation valve on the valve disc: Pull protective cap **A1** downwards, approx. 2 mm.
6. Make sure that the correct pressure has been reached in chamber **K** for opening and pull protective cap **A1** as far as it will go and lock into place.
7. The SAV is open.

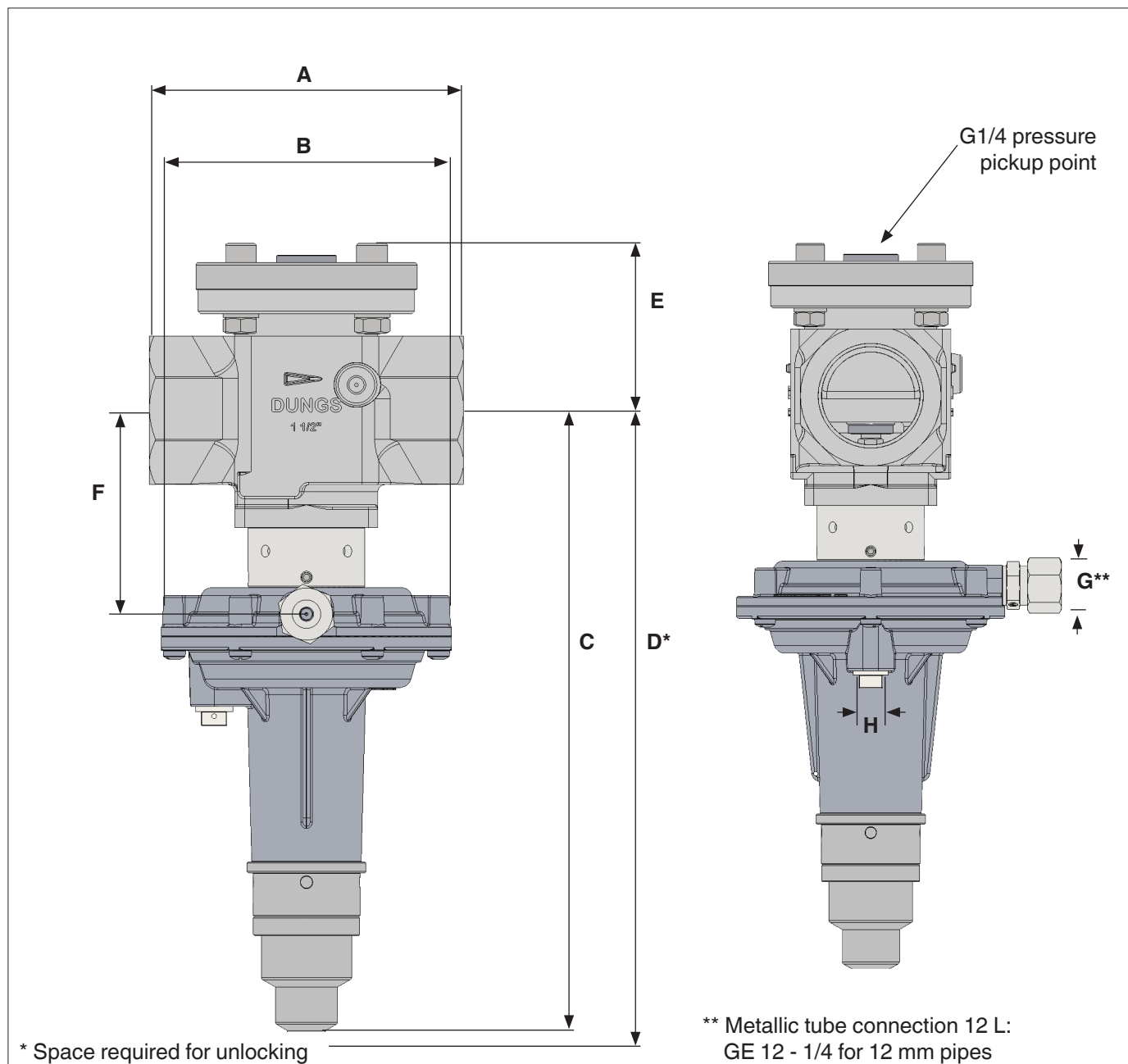
8. Dimensions

8.1 Dimensions SAV flanged



Type	Order number		p máx. [bar/kPa]	DN	Dimensions [mm]								Weight [kg]
	DN	NPS			A	B	C	D	E	F	G	H	
SAV 100025 ND-MD	270291	277799	10 / 1 000	25	184	122	267	317	88	86,5	12	G 1/4	7,6
SAV 250025 HD-UHD	271122	275186	25 / 2 500	25	184	122	267	317	88	86,5	12	G 1/4	7,6
SAV 100040 ND-MD	270294	277802	10 / 1 000	40	223	122	273	323	104	96,5	12	G 1/4	13,3
SAV 250040 HD-UHD	271123	275184	25 / 2 500	40	223	122	273	323	104	96,5	12	G 1/4	13,3
SAV 100050 ND-MD	270297	277805	10 / 1 000	50	254	122	276	326	116	105	12	G 1/4	16,0
SAV 250050 HD-UHD	271124	273855	25 / 2 500	50	254	122	276	326	116	105	12	G 1/4	16,0

8.2 Dimensions SAV threaded



Type	Order number		p máx. [bar/kPa]	Con- nection	Dimensions [mm]								Weight [kg]
	Rp	NPT			A	B	C	D	E	F	G	H	
SAV 10010 ND-MD	287908	287917	10 / 1 000	1"	104	122	267	317	69,5	86,5	12	G ¼	4,1
SAV 10010 HD-UHD	287909	287918	10 / 1 000	1"	104	122	267	317	69,5	86,5	12	G ¼	4,1
SAV 10015 ND-MD	287911	287920	10 / 1 000	1½"	132	122	263	313	69,5	86,5	12	G ¼	5,4
SAV 10015 HD-UHD	287912	287921	10 / 1 000	1½"	132	122	263	313	69,5	86,5	12	G ¼	5,4
SAV 10020 ND-MD	287914	287923	10 / 1 000	2"	156	122	268	318	103	97,5	12	G ¼	8,7
SAV 10020 HD-UHD	287915	287924	10 / 1 000	2"	156	122	268	318	103	97,5	12	G ¼	8,7

9. Installation

9.1 General information



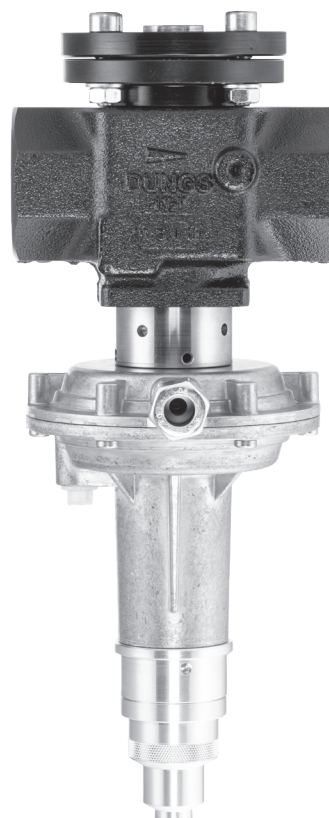
- **This device can only be installed in compliance with the applicable rules and standards and in accordance with the local regulations and authorisations that may be necessary.**
- **The device can only be installed in a building or in a housing.**
- **The work area must be provided with general safety devices.**
- **The lifting devices used must be suitable for the load to be lifted.**
- **Enough installation space for operation and maintenance has to be provided.**
- **It is recommended installing a filter with a pore size $\leq 50 \mu\text{m}$ upstream of the regulator.**
- **The installation must not impair the functioning of other components.**
- The performance data on the type plate correspond to the ordering data.
- Flanges on the inlet side and outlet side of the connecting line are parallel.
- The sealing surfaces of the flange are undamaged and clean.
- The maximum inlet pressure of the system is lower than the maximum admissible pressure of the regulator.
- Protective caps at the connecting flange must be removed.
- The minimum distances for the setting must be observed.
- The pipeline on the inlet side must be free of water and dirt.
- The SAV must be in the closed position.

Check prior to installation!

- Shut-off valves both on the inlet and outlet side are closed.
- Lines are free from combustible gas.
- Prevent explosive gas-air mixture: the room atmosphere must constantly be monitored through gas concentration measuring devices for the detection of gas leakages.
- Ensure electrically conductive bridging. Prevent contact voltage and ignitable flashover.

Make sure during installation!

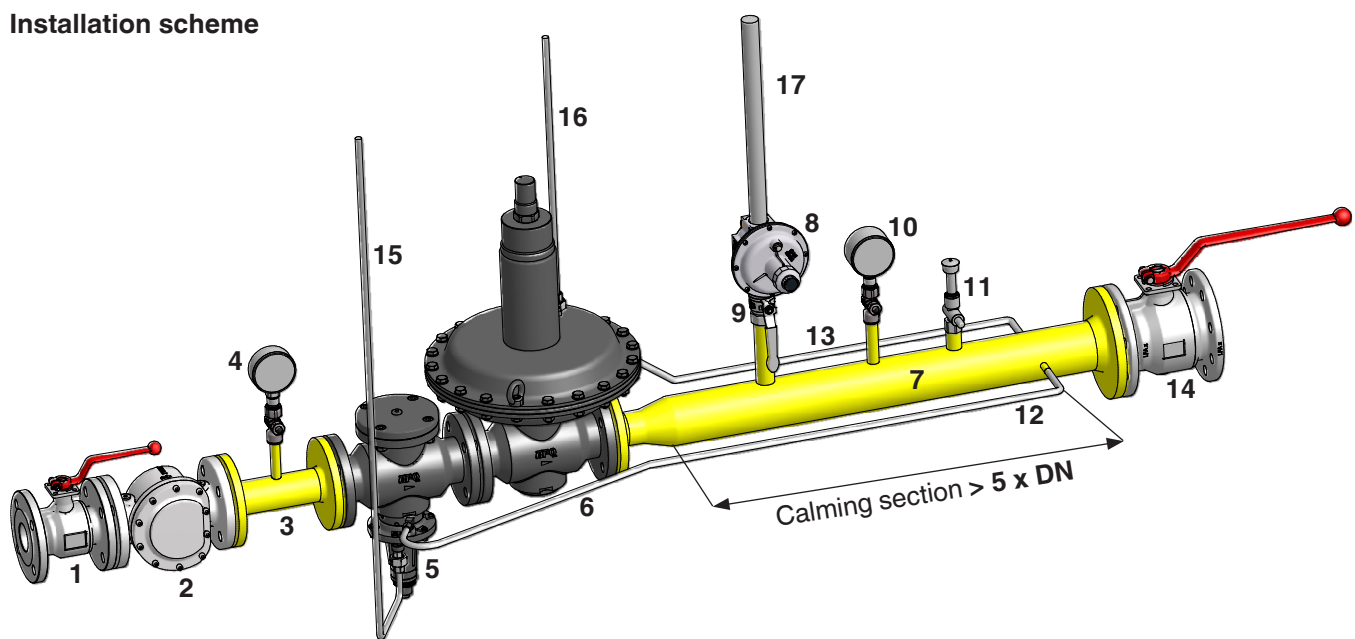
- Tighten the screws crosswise.
- Tightening torques must be observed.
- Breather line and exhaust lines have to be positioned individually.
- Breather line must end in free space.
- The pulse lines may not be shut off.
- The specified distance between the measuring points of the pulse lines must be observed.
- The flow direction (arrow) on the housing must be followed.



9.2 Installation instructions

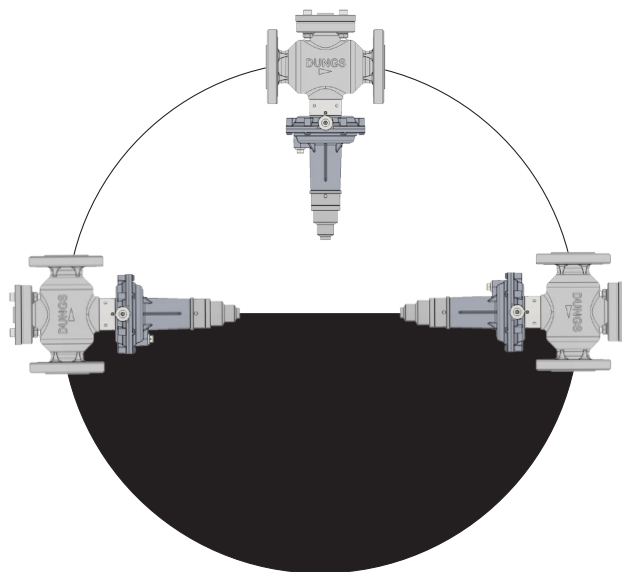
- The installation must be carried out according to the installation scheme specified below.
- Install the safety shut-off valve in the flow direction (arrow/housing).
- Design a straight calming section with the same diameter.
- Make sure that the pulse tap at the calming section is clean and free from burrs. Distance $> 5 \times \text{DN}$.
- The following components can have an influence on the pulse line. A calming section of $> 3 \times \text{DN}$ is therefore recommended after the impulse line.
- Maximum flow velocity in the calming section: $\leq 30 \text{ m/s}$.
- Version of the pulse lines: steel pipe $D = 12 \text{ mm}$.
- Avoid accumulation of condensate: install the pulse lines with a gradient.

Installation scheme



Pos.	Designation
1	Shut-off valve, inlet side (e.g. ball valve or butterfly valve)
2	Filter
3	Welded part
4	Pressure gauge, inlet side
5	SAV
6	Regulator
7	Calming section
8	SBV
9	Ball valve
10	Pressure gauge, outlet side
11	Test burner
12	Pulse line SAV
13	Pulse line regulator
14	Shut-off valve, outlet side (e.g. ball valve or butterfly valve)
15	SAV vent line
16	Regulator vent line
17	SBV relief line

Mounting position

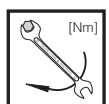
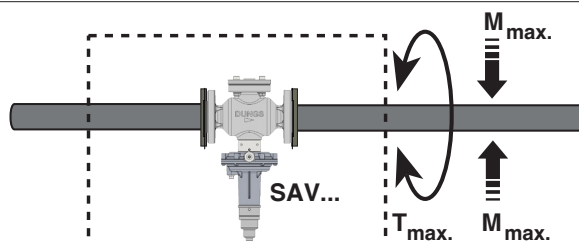


9.3 Torques



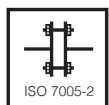
Use adequate tools!
Tighten the screws crosswise!

The device must not be used as lever.



Max. torque of system accessories

M ... / G ...	M 4	M 5	M 6	M 8	G 1/8	G 1/4	G 1/2	G 3/4
M _{max.} [Nm]	2.5 Nm	5 Nm	7 Nm	15 Nm	5 Nm	7 Nm	10 Nm	15 Nm



Max. torque of flanged joint

Stud bolt	M 12 x 55 (DIN 939)	M 16 x 65 (DIN 939)
M _{max.} [Nm]	75 Nm	75 Nm

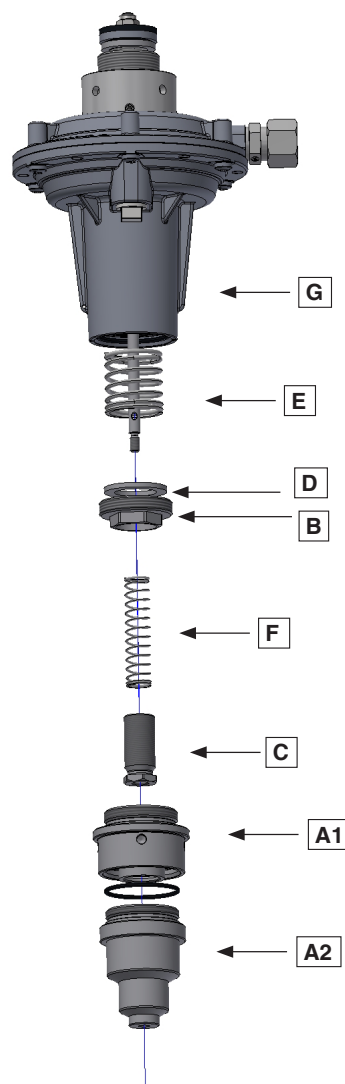
10. Setting overpressure/underpressure

Trip pressure setting in case of overpressure p_{do}

1. Remove intermediate cap **A1 + A2**.
2. Turning the external adjusting screw **B** using a socket wrench SW 24.
3. Turning clockwise: increases (+) the upper trip pressure p_{do} .
4. Turning counter-clockwise: reduces (-) the upper trip pressure p_{do} .
5. After setting: screw on the intermediate cap **A1** and protective cap **A2**.

Trip pressure setting in case of underpressure p_{du}

1. Remove intermediate cap **A1 + A2**.
2. Turning the internal adjusting screw **C** using a socket wrench SW 16.
3. Turning clockwise: increases (+) the lower trip pressure p_{du} .
4. Turning counter-clockwise: reduces (-) the lower trip pressure p_{du} .
5. After setting: screw on the intermediate cap **A1** and protective cap **A2**.



10.1 Recommended set values

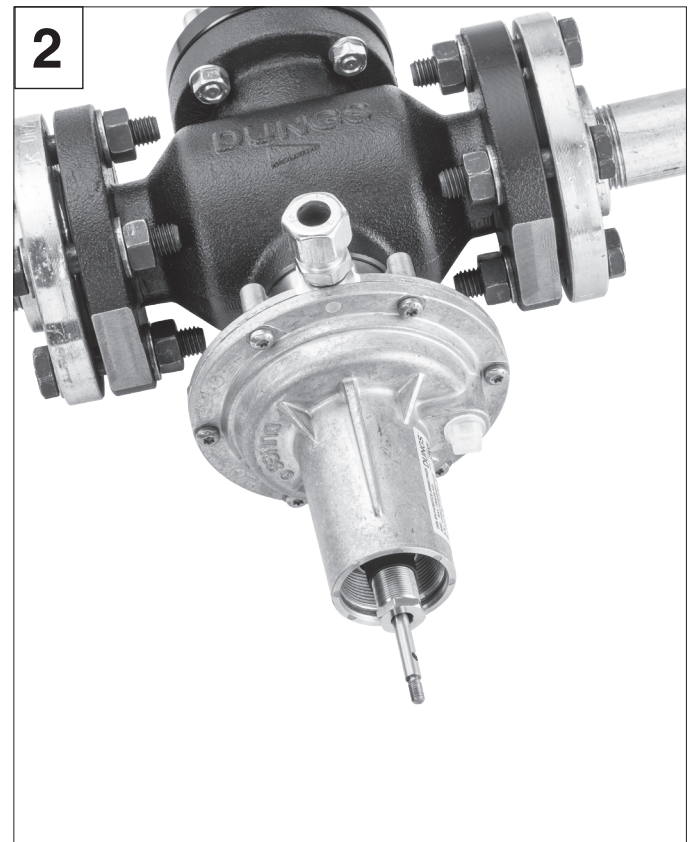
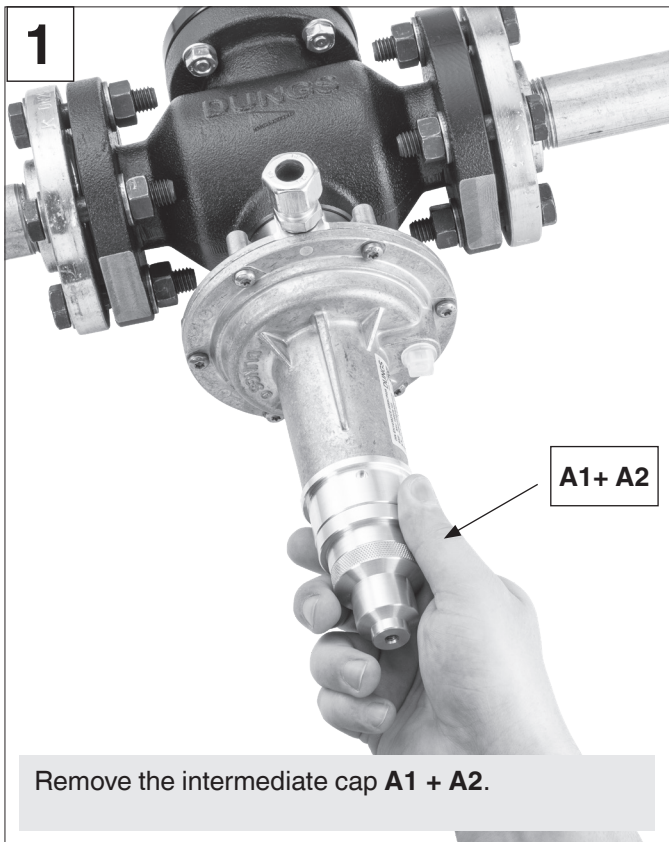
Mutual interference of pressure regulator and safety shut-off device must be excluded.

Calculation of recommended set values according to the regulator outlet pressure p_d

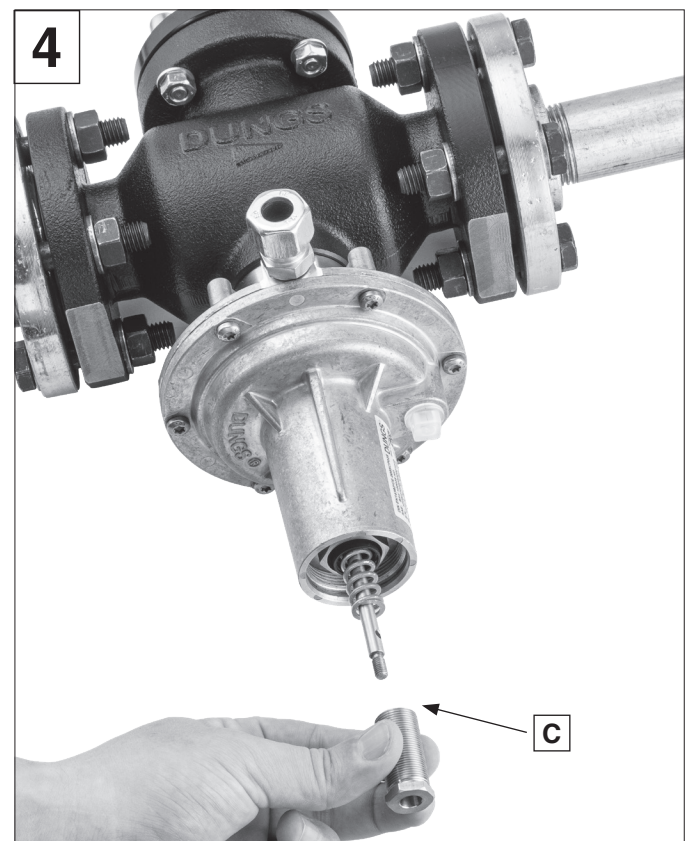
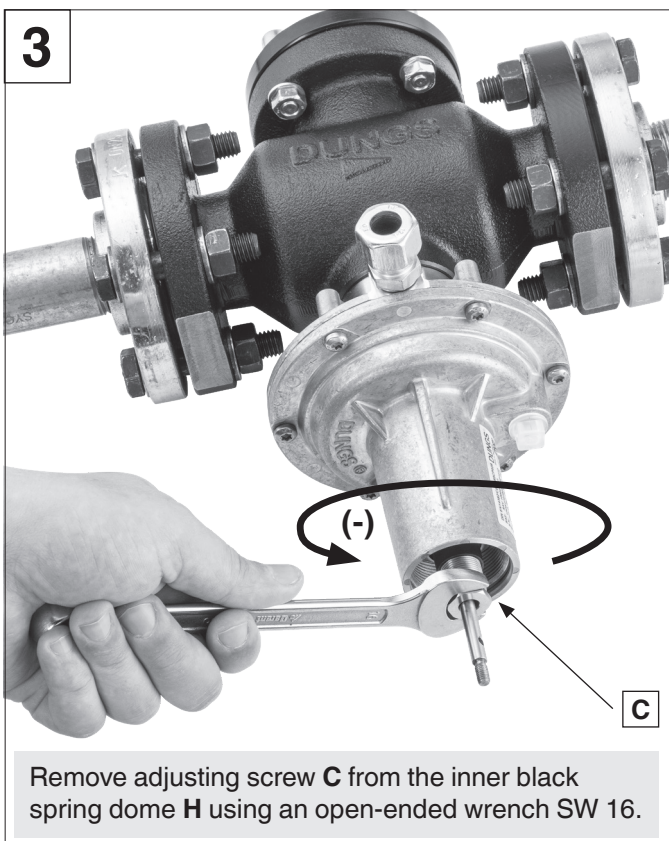
ND-MD	HD-UHD
$p_{du} < p_d - 40 \text{ mbar}$	$p_{du} < p_d - 200 \text{ mbar}$
$p_{do} > p_d + 40 \text{ mbar}$	$p_{do} > p_d + 250 \text{ mbar}$

- The SAV must lock as soon as 1.1 times the max. system-specific operating pressure downstream is reached.
- The SAV set values must be defined taking into account the settings and tolerances of the pressure regulator.
- The tolerances and set values of additional safety devices must also be considered when setting the SAV.
- In case of a fault or regular shut-down of the downstream shut-off valve, the SAV may not respond. The upper shut-down pressure must be determined accordingly.

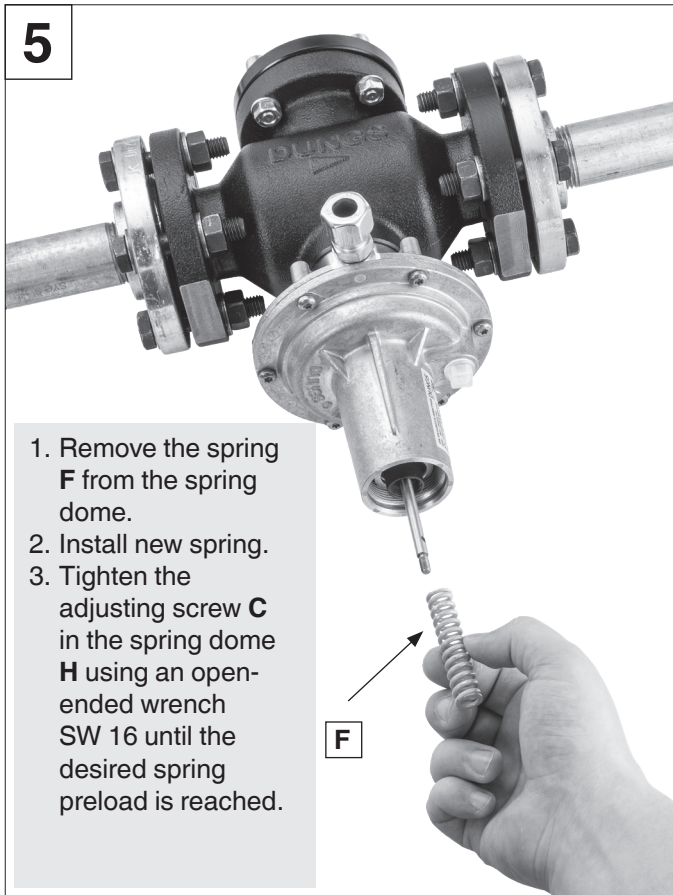
10.2 Spring replacement



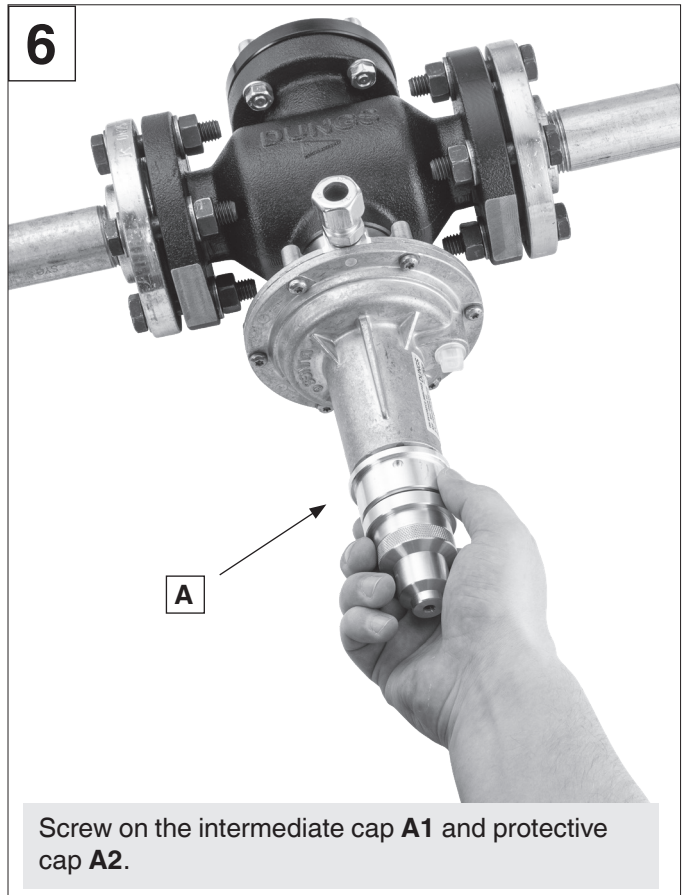
10.2.1 Spring replacement W_{dsu}



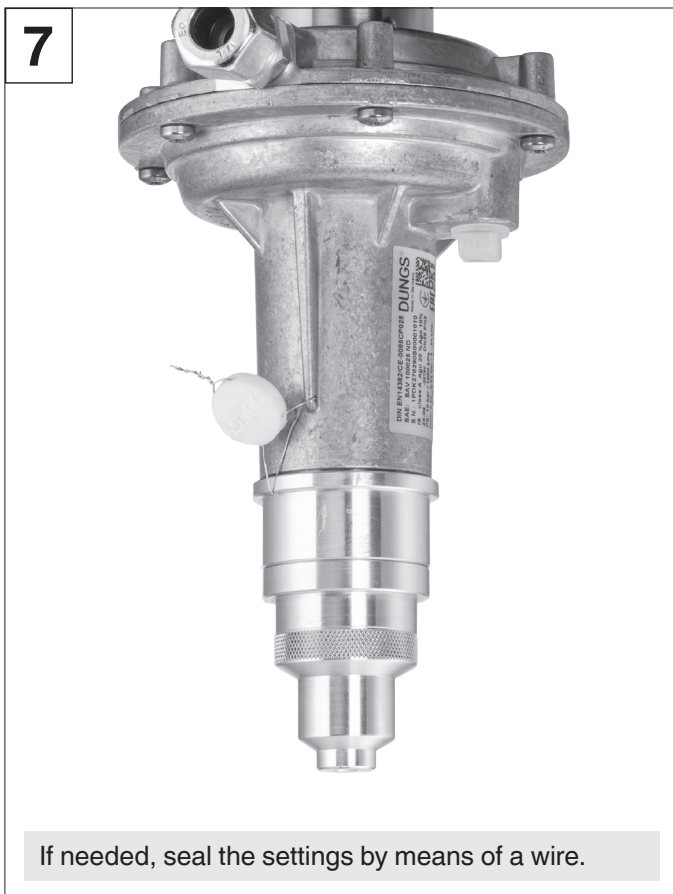
5



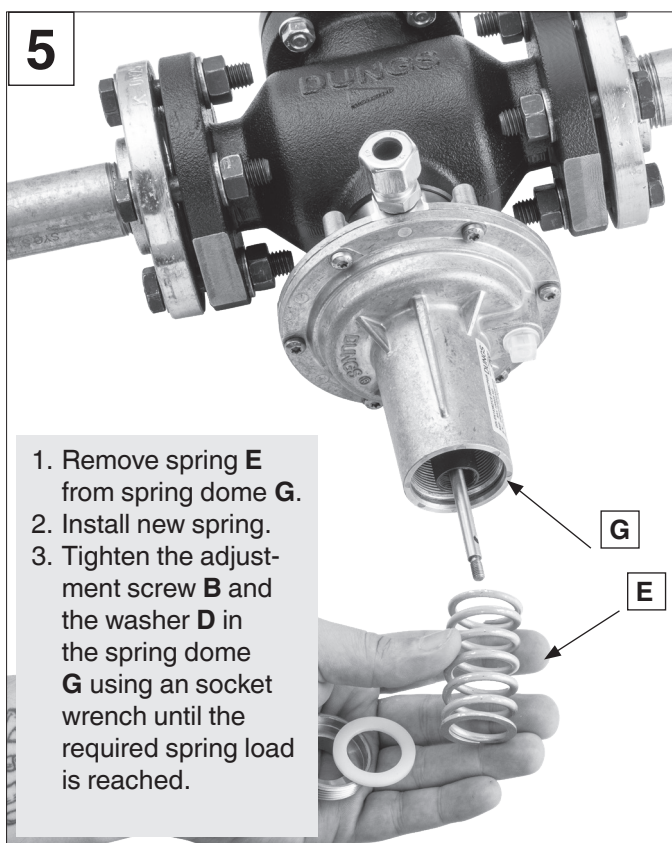
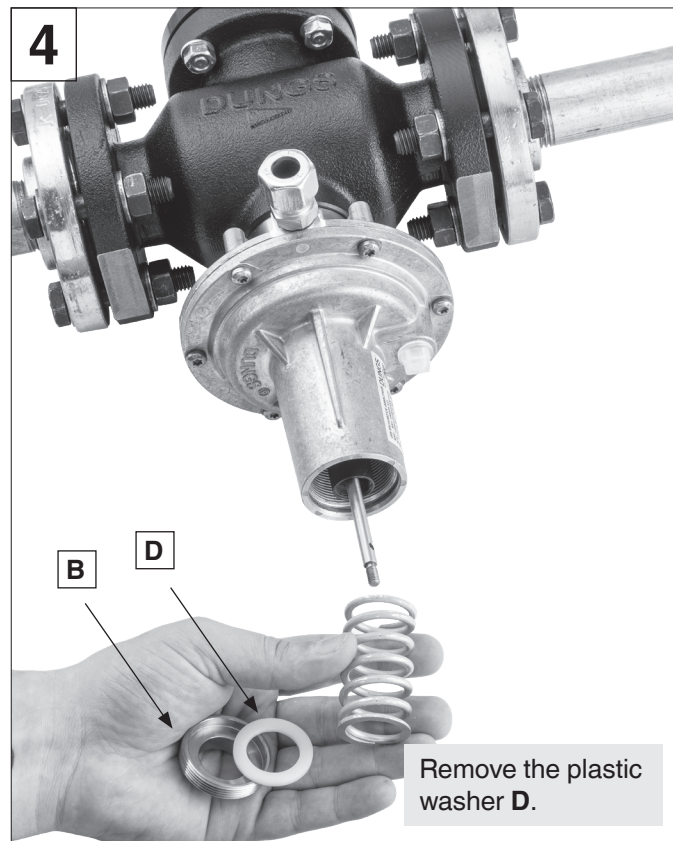
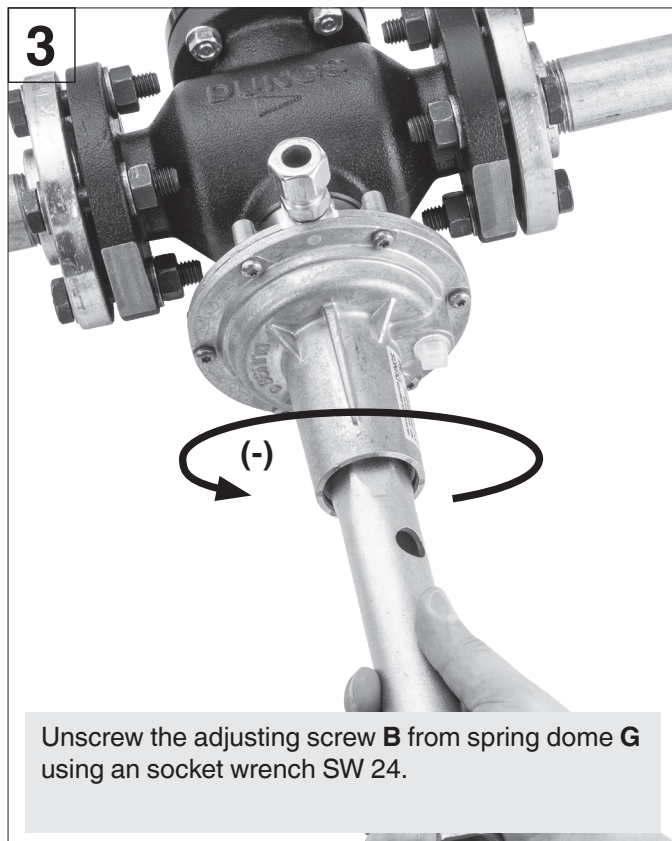
6



7



10.2.2 Spring replacement W_{dso}



10.2.3 Reinstalling W_{dsu} centering spring

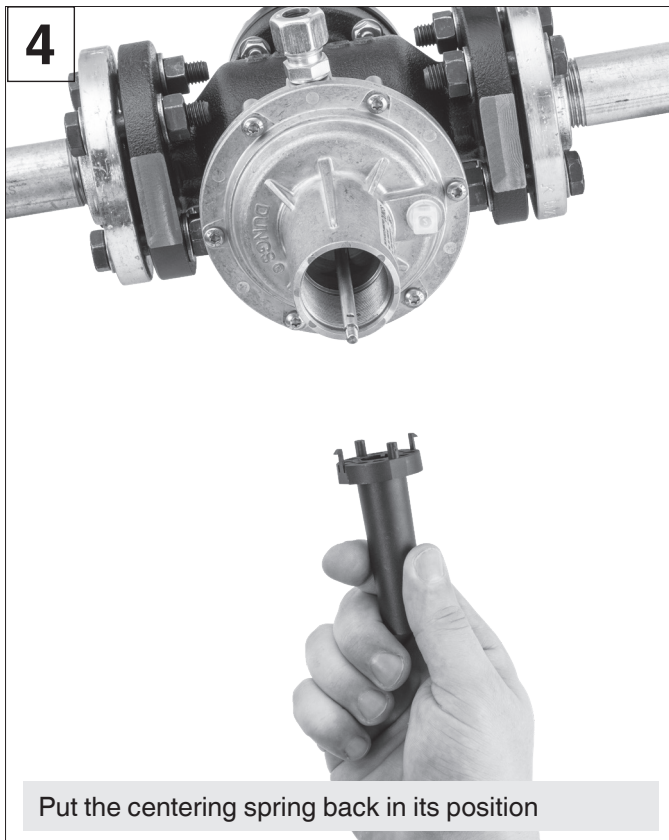
If W_{dsu} spring is removed before W_{dsu} , the spring centering component might be moved outside. In that case, to install it back follow the steps.

3



Remove the adjusting screw **C** and the W_{dsu} spring from the spring centering part.

4



Put the centering spring back in its position

5



Make sure that the taps fits in the slots and twisting is not possible.

11. Commissioning and Decommissioning

11.1 General information



Prior to commissioning

- The performance data on the type plate correspond to the ordering data.
- Prevent explosive gas-air mixture: the room atmosphere must constantly be monitored through gas concentration measuring devices for the detection of gas leakages.
- Operate the device only if all safety devices are fully functional.
- Only qualified personnel is allowed to carry out the commissioning.

11.2 Leakage test

Before commissioning the SAV, check for internal and external leakage.

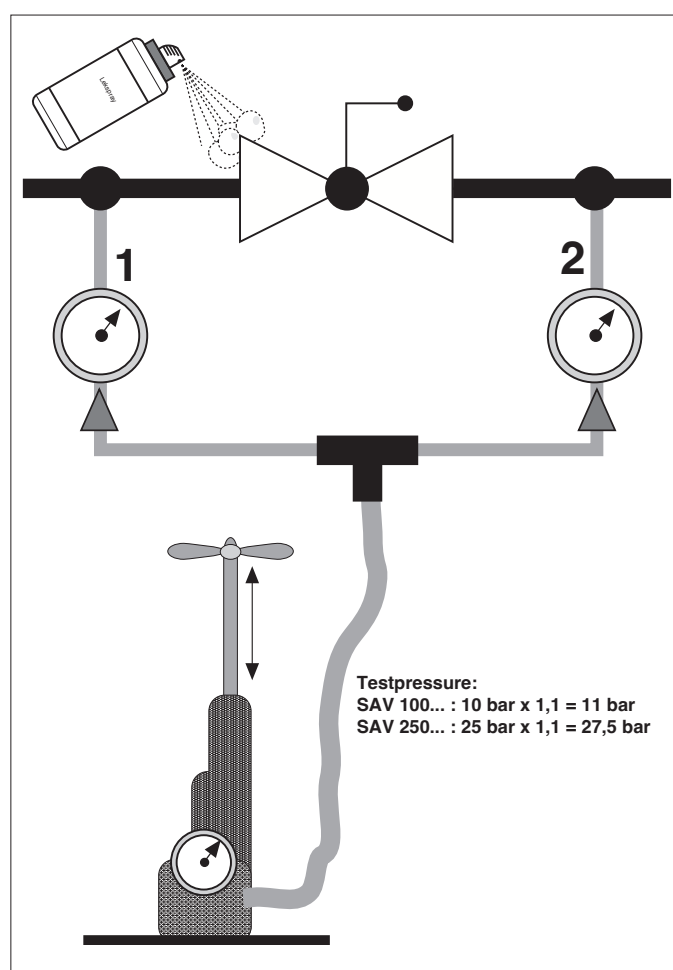
1. Test gas of the leakage test: air or inert gases.
2. Upstream and downstream shut-off valves must be closed.
3. Release the test section. Release the gas in a controlled and safe manner into the atmosphere.
4. Test pressure > blow-off pressure SBV: Block the line upstream of the SBV.
5. Connect the test section to the test device and apply pressure.
6. Test pressure: 1.1 x the system-specific operating pressure. Maximum PS of the SAV (SAV 100... 10 bar/SAV 250... 25 bar). Please take into account the different compressive strengths of the system.
7. Observe the waiting time necessary for the pressure compensation according to the system-specific volume.

External leakage

8. Use a suitable leak detection spray on the SAV.
9. Monitor the foam formation.

Internal leakage

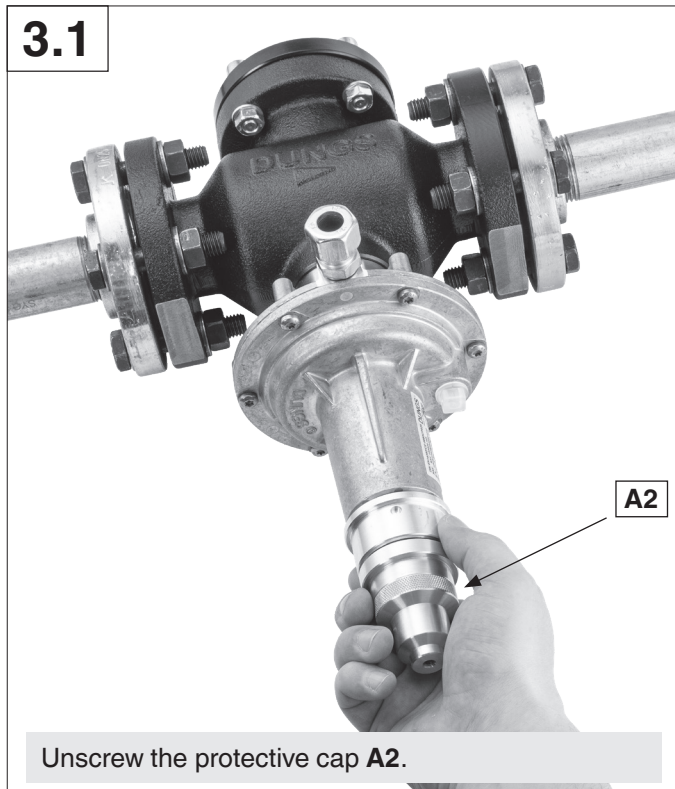
10. Release the pressure in the test section downstream of the SAV.
11. Monitor the pressure increase on the outlet side: Pressure gauge accuracy 0.1 mbar.
12. Once the leakage test has been carried out, open the shut-off valve upstream of the SBV.
13. Release pressure in the test section.



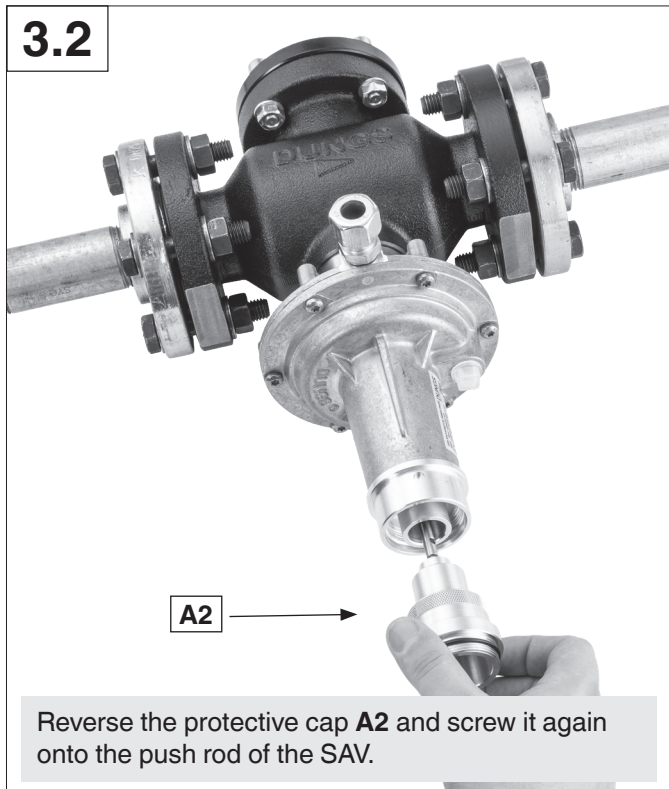
11.3 Commissioning / unlocking / venting

1. Slowly open the shut-off valve on the inlet side. The ball valve on the outlet side remains closed.
2. Monitor the pressure increase on the pressure gauge on the inlet side upstream of the SAV.
3. Slowly open the SAV:

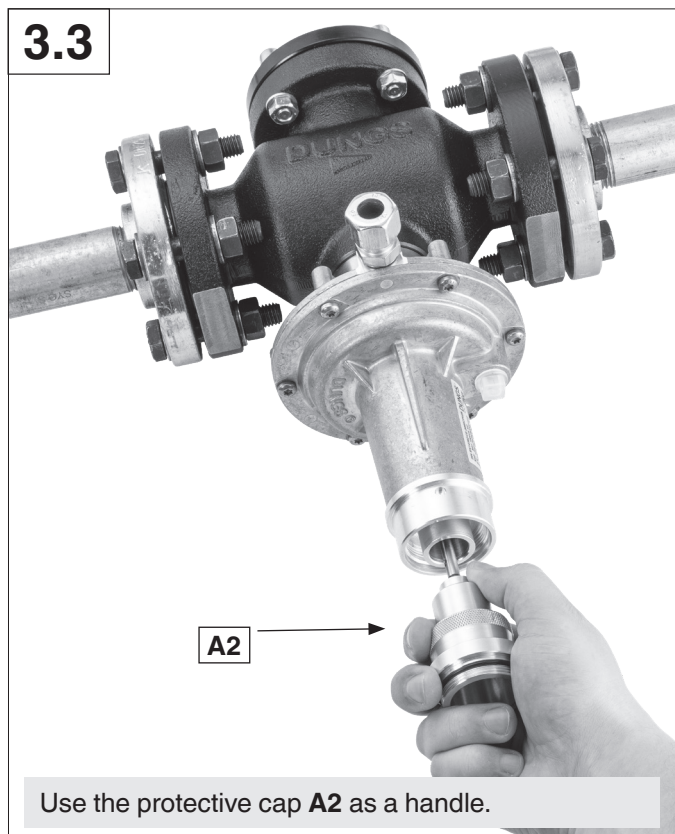
3.1



3.2



3.3

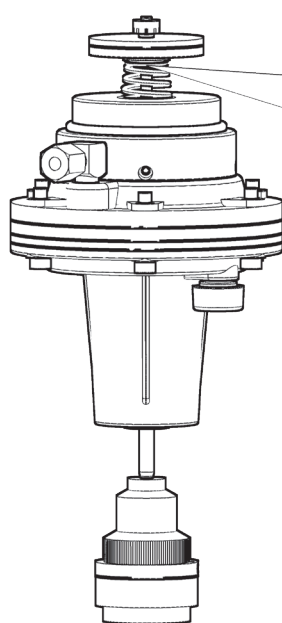


Unlocking the SAV

1. Compensate pressure by opening the compensation valve on the valve disc: Pull protective cap **A2** downwards, approx. 2 mm.
2. Monitor the pressure increase on the outlet side on the pressure gauge.
3. Operating pressure on the outlet side reached: pull the protective cap **A2** to the stop and lock it.
4. The SAV is open.
5. Unscrew the protective cap **A2** from the push rod and screw it again on the spring dome.
6. Vent the test section into the atmosphere using a suitable hose. Do not use a test burner for venting.
7. The test section must be completely filled with gas: make sure that the test section is free from air by using a test burner. Close the stop-cock on the venting hose and screw on the plug.
8. Remove the hose.
9. Slowly open the shut-off valve on the outlet side.

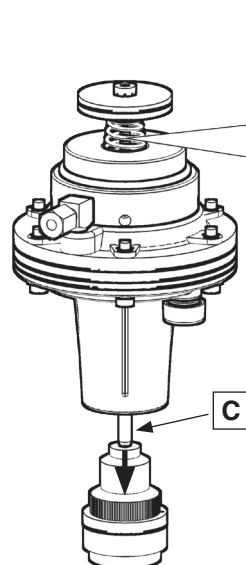
For an explanation of pressure compensation, see chapter 11.4 →

11.4 Pressure compensation



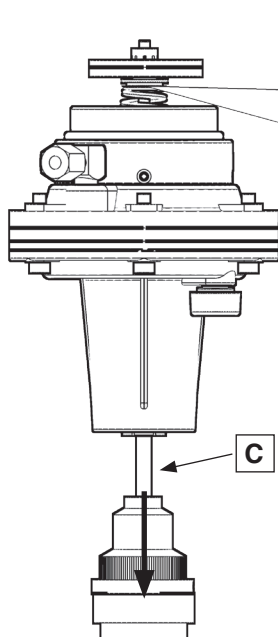
1. SAV closed

Valve disc **A** is pressed onto the valve seat by means of closing spring **B**.



2. Compensation valve open/pressure compensation

Short pull on push rod **C** will open compensation valve **D**. While doing so, valve disc **A** will remain on the valve seat.



3. SAV open

Continued pulling on push rod **C** lifts the valve disc off the valve seat against the force of the closing spring **B**. Valve is open.

11.5 Checking the setting

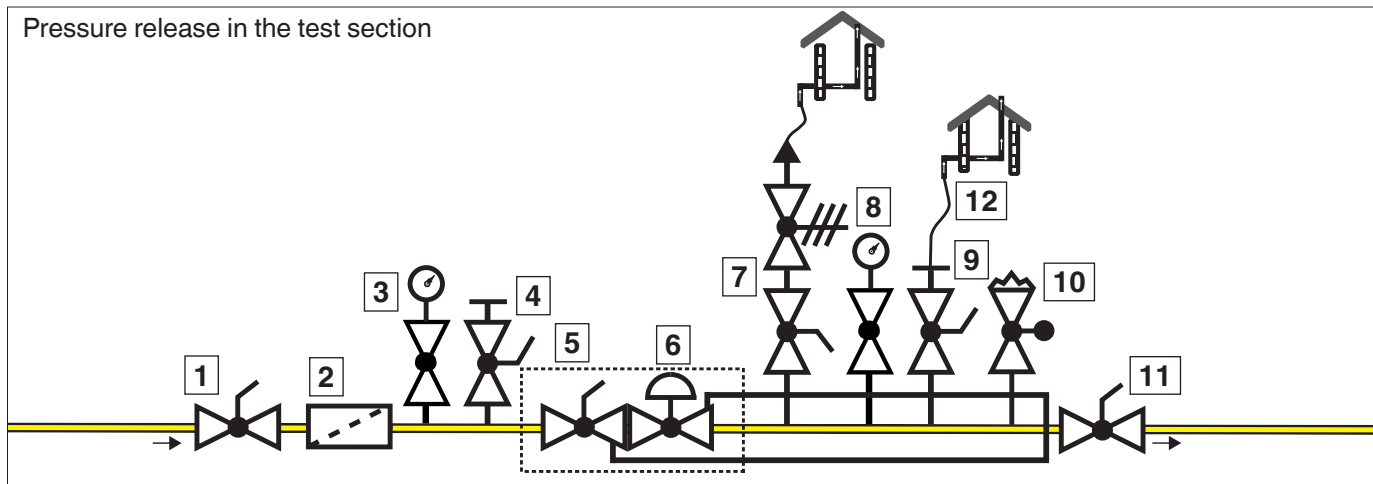
Checking the upper shut-down pressure p_{du}

1. Slowly close the shut-off valve on the outlet side:
2. SBV installation on the outlet side: block the line upstream of the SBV.
3. Check the upper trip pressure of the SAV: create test pressure on the outlet side (pressure tap to sensing line).
4. Create a lockable connection between the inlet and outlet side.
5. Conduct the inlet pressure to the outlet side by slowly opening the stopcock in the bypass.
6. Monitor the pressure increase on the outlet side on the pressure gauge.
7. Avoid an inadmissibly high pressure on the outlet side: After triggering the SAV, stop applying pressure immediately.
8. Read the upper response pressure on the pressure gauge on the outlet side and compare it with the setpoint.
9. If necessary, correct the response pressure according to the specifications under "Setting" and check it again.

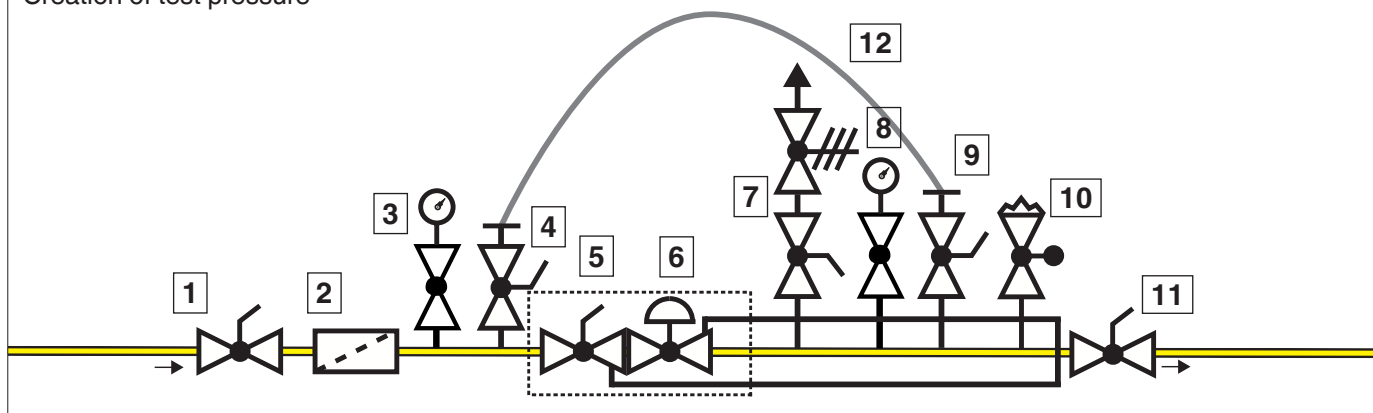
Checking the lower shut-down pressure p_{dl}

1. Release the pressure in the test section on the outlet side until the operating pressure is reached.
2. Release the gas in a controlled and safe manner into the atmosphere.
3. Monitor pressure drop on the pressure gauge.
4. Unlock the SAV.
5. Continue to release the gas selectively and safely on the outlet side into the atmosphere.
6. After triggering the SAV: Read the lower response pressure on the pressure gauge on the outlet side and compare it with the setpoint.
7. If necessary, correct the response pressure according to the specifications under "Setting" and check it again.

Pressure release in the test section



Creation of test pressure



Pos.	Designation
1	Shut-off valve, inlet side
2	Filter
3	Pressure gauge with pushbutton cock
4	Venting ball valve
5	SAV
6	Pressure regulator

Pos.	Designation
7	SBV with shut-off valve
8	Pressure gauge with pushbutton cock
9	Venting ball valve
10	Test burner
11	Shut-off valve, outlet side
12	Hose

11.6 Recommissioning

1. Close the shut-off valve upstream of the bypass.
2. Remove the hose.
3. Open the ball valve upstream of the SBV.
4. Slowly open the SAV, see section 11.3.
5. Once SAV has been opened completely, open the shut-off valve on the outlet side.

11.7 Decommissioning

1. Slowly close the shut-off valve on the outlet side.
2. Slowly close the shut-off valve on the inlet side.
3. Release gas in the test section in a controlled and safe manner into the atmosphere.

12. Faults



- Repair work on the device must only be performed by authorised and skilled personnel.
- Use only original spare parts.

Fault	Possible causes	Troubleshooting
It is not possible to open/activate the SAV.	The pulse line is not installed.	Install the pulse line.
	The pulse line is clogged.	Clean the pulse line.
	The pulse line is bent.	Replace the pulse line.
	The pulse pressure is outside the adjustment range.	Set the outlet pressure.
	The adjusting springs are not suitable for the application.	Replace the adjusting spring.
	The adjustment range of the SAV is outside the outlet pressure.	Replace the SAV or the ASE.
The SAV does not switch or does not respond.	The pulse line is not installed.	Connect/install the pulse line.
	The pulse line is clogged.	Clean the pulse line.
	The pulse line is bent.	Replace the pulse line.
	The pulse pressure is outside the adjustment range.	Replace the pulse line.
	The adjusting springs are not suitable for the application.	Replace the adjusting spring.
The SAV switches, but does not seal.	The valve disc is damaged or worn out.	Replace the ASE or have it repaired by DUNGS.
	The valve seat is damaged.	Replace the valve seat.
	The movable parts are contaminated with foreign particles.	Clean the movable parts or replace the ASE.
	The drive is damaged.	Replace the ASE.
	The O-ring is damaged.	Replace the O-ring or the ASE.
The SAV is leaking towards the atmosphere.	The working diaphragm is damaged.	Change the working diaphragm or replace the ASE.
	The sealing ring between the ASE and the housing of the SAV is damaged.	Replace the sealing ring or the ASE.
	The O-ring in the ASE is damaged.	Replace the O-ring or the ASE.

13. Maintenance

13.1 General information



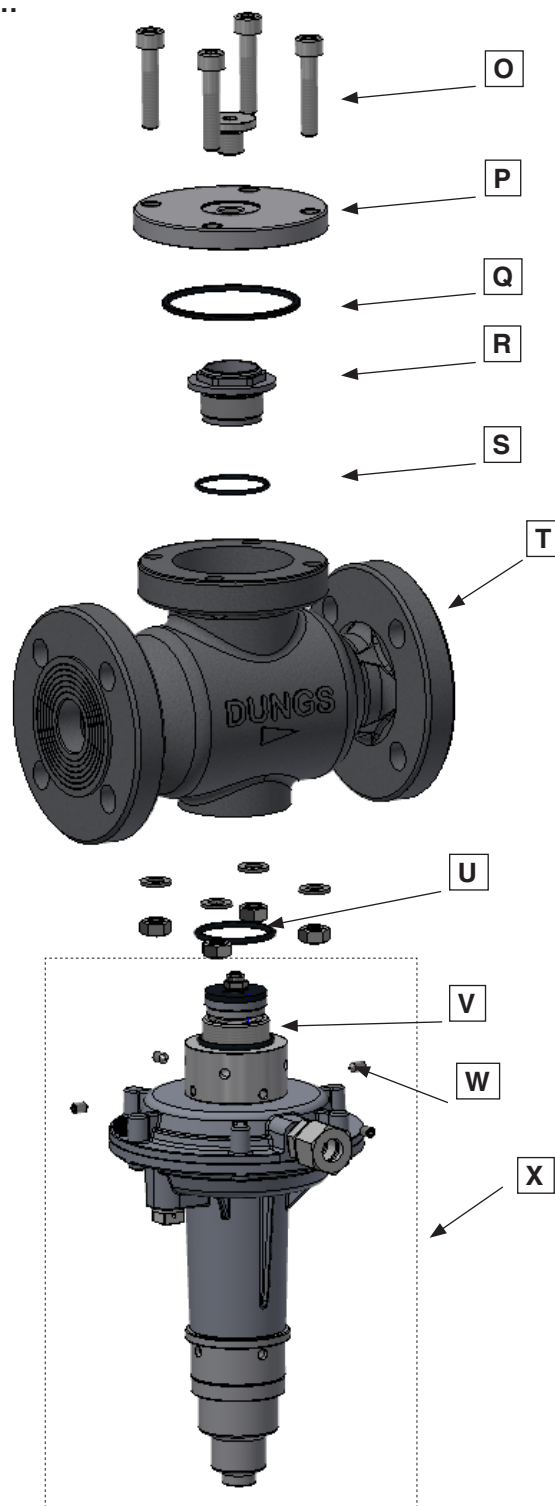
- The Pressure Equipment Directive (PED) requires the regulator to be checked at regular intervals to ensure: safety and correct functioning of the device, high long-term utilisation ratios, resulting in minimum environmental impact.
- The maintenance of the device can only be carried out in compliance with the applicable rules and standards and in accordance with current local regulations.
- Maintenance work on the device must only be performed by authorised and skilled personnel.
- Adhere to the maintenance intervals indicated.
- The risks in case of an escape of flammable or noxious gases into the atmosphere have to be assessed.
- Always install new seals after replacement or modification of parts.
- Use only original spare parts.
- Do not use alcohol-based or solvent-containing cleaning solutions for cleaning the device.

Prior to maintenance

- Shut-off valves both on the inlet and outlet side are closed.
- Line is depressurised and free from combustible gas.
- Prevent explosive gas-air mixture: the room atmosphere must constantly be monitored through gas concentration measuring devices for the detection of gas leakages.
- SAV is in the closed position.
- Original spare parts are available.

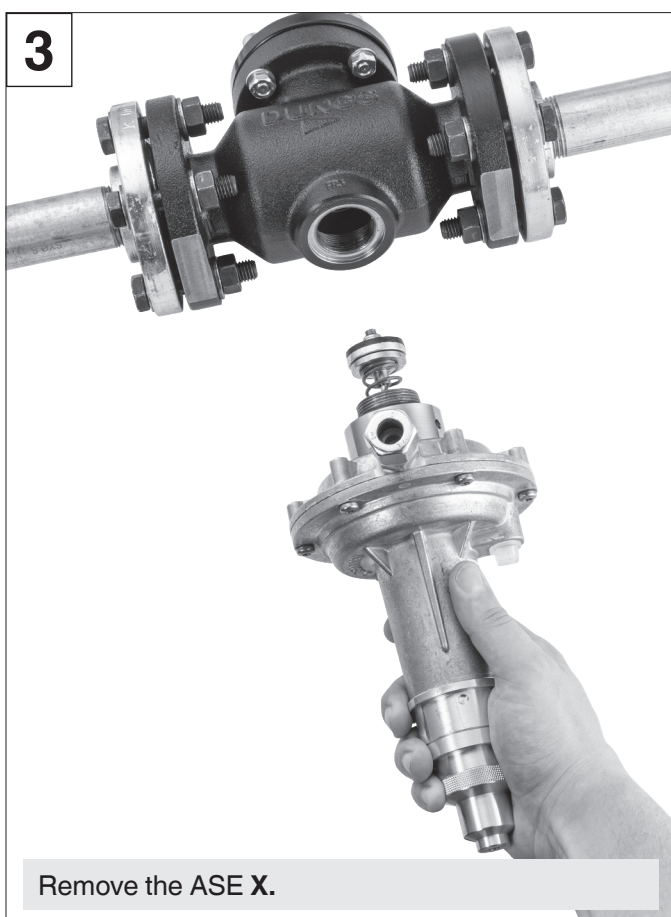
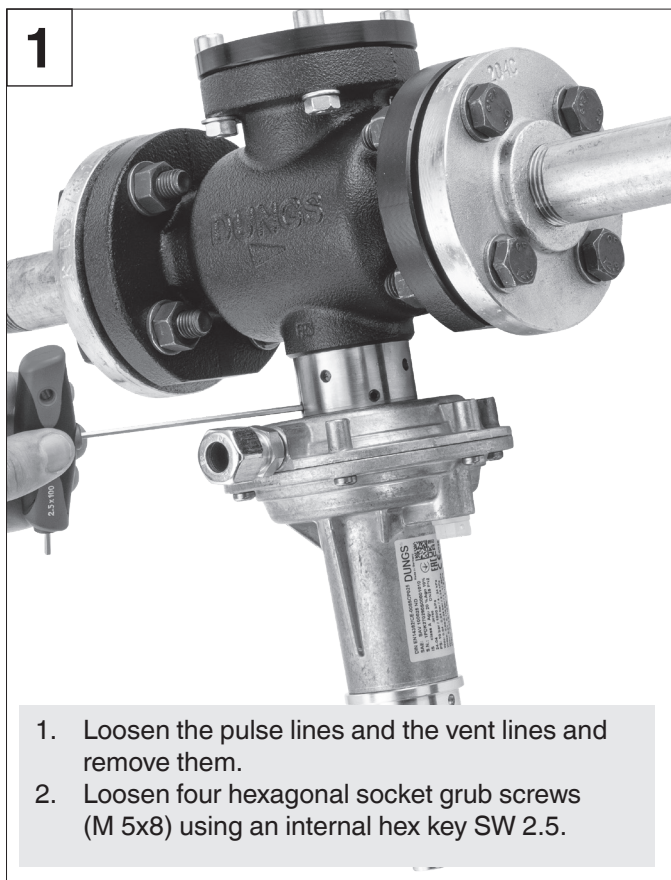
Pos.	Designation
O	Allen screws, 4 units
P	SAV cover
Q	O-ring
R	Valve seat
S	Sealing ring for valve seat
T	SAV housing
U	O-ring
V	ASE connecting piece / housing
W	Hexagonal socket grub screws, 4 units
X	ASE

SAV ...



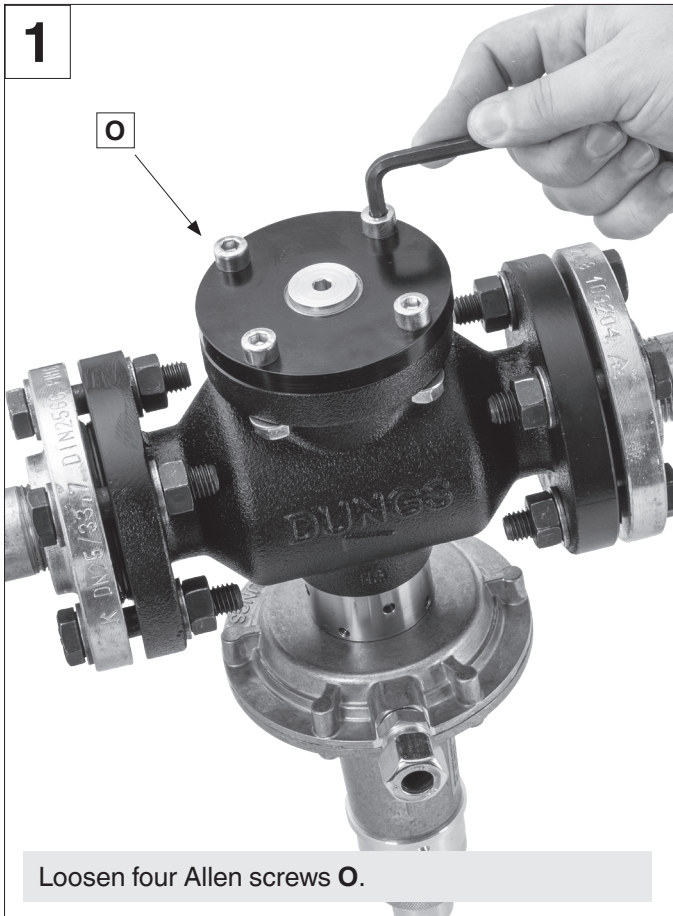
13.2 Maintenance instructions

13.2.1 Removing the ASE from the housing



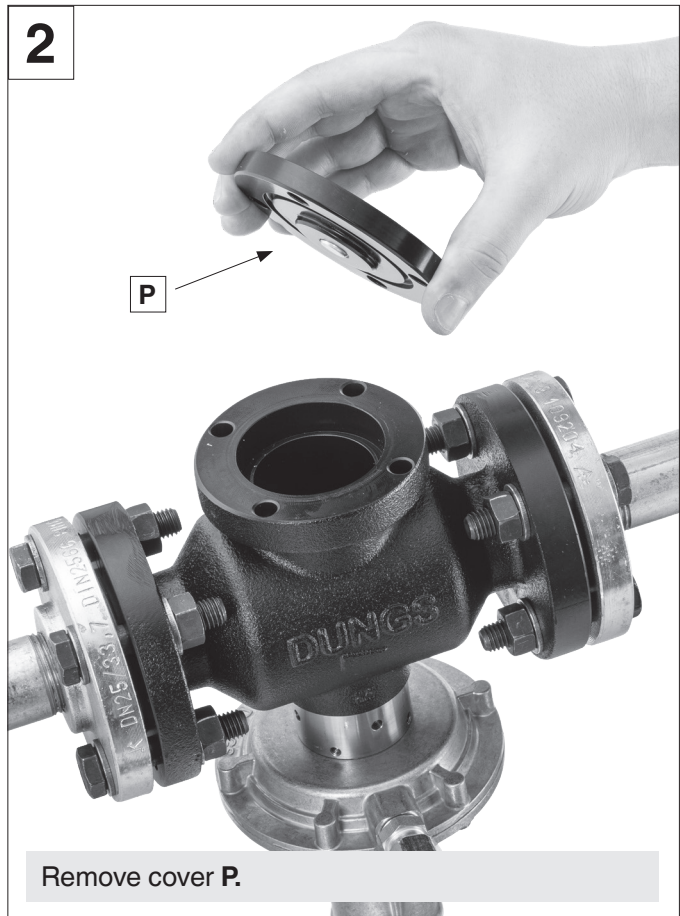
13.2.2 Checking/replacing the valve seat

1



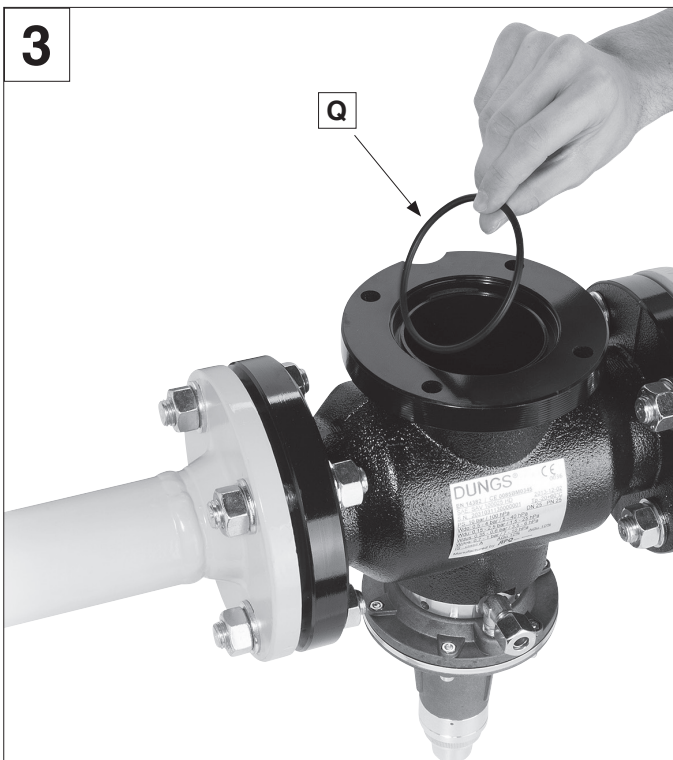
Loosen four Allen screws **O**.

2



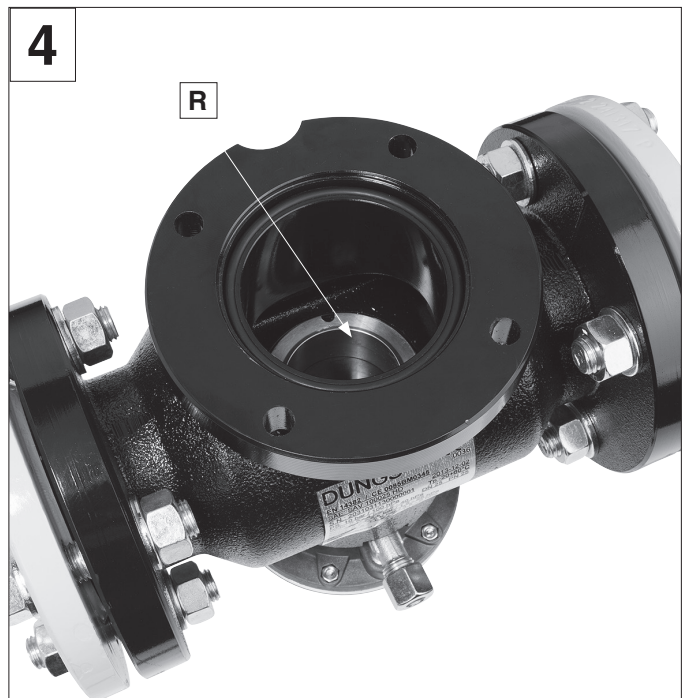
Remove cover **P**.

3

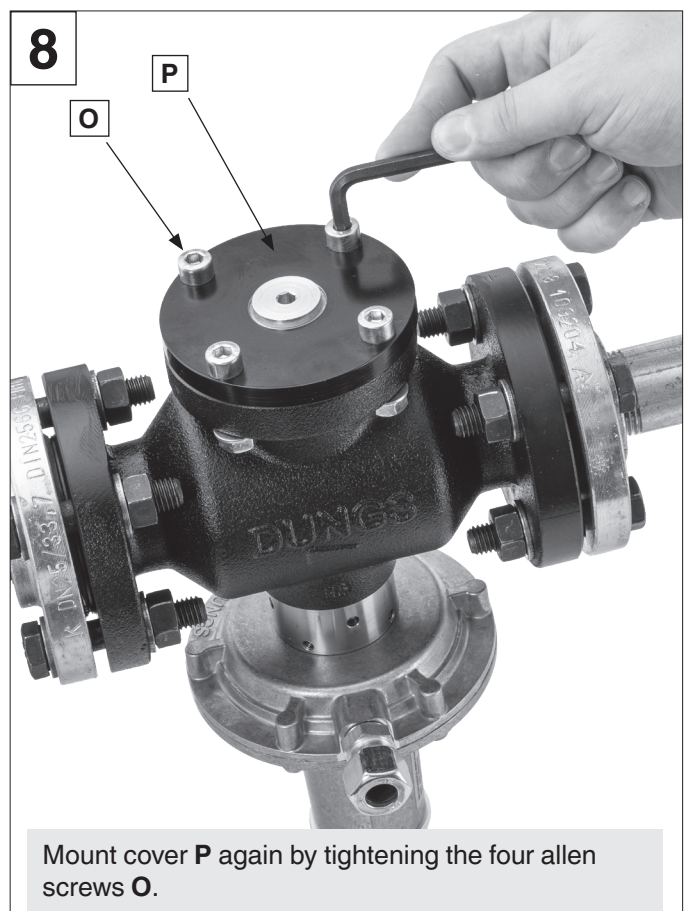
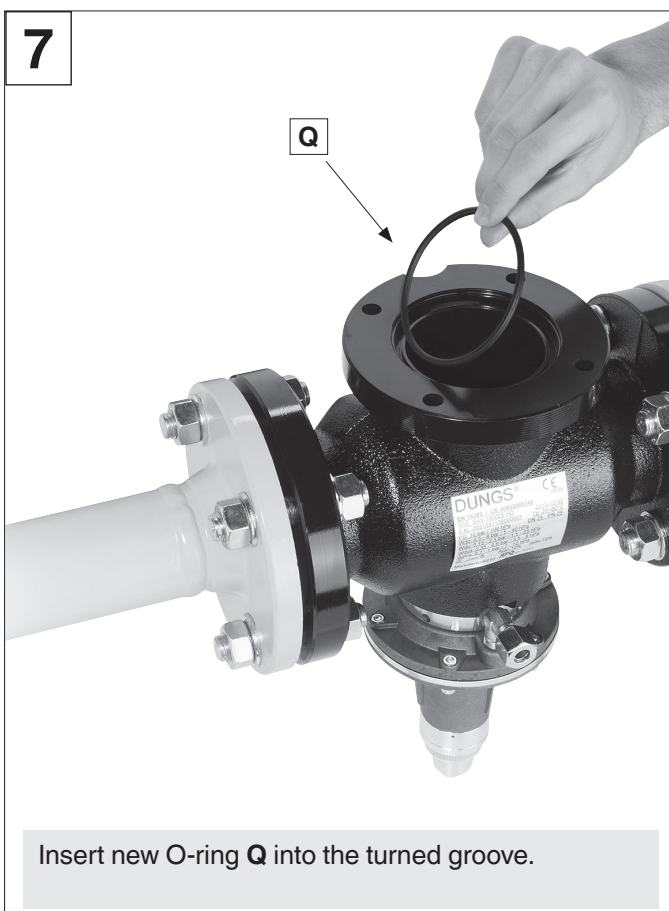
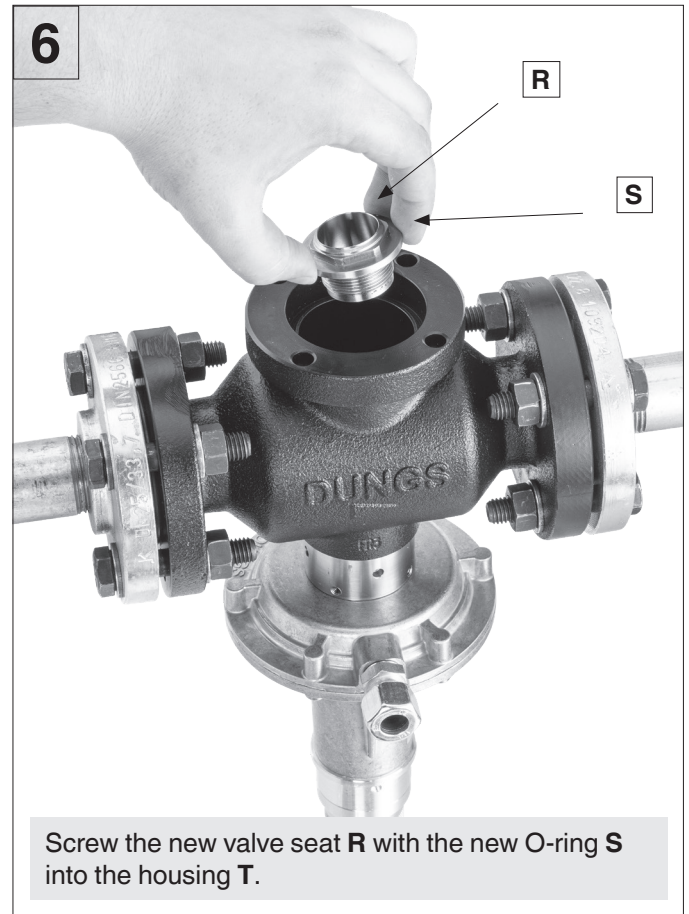
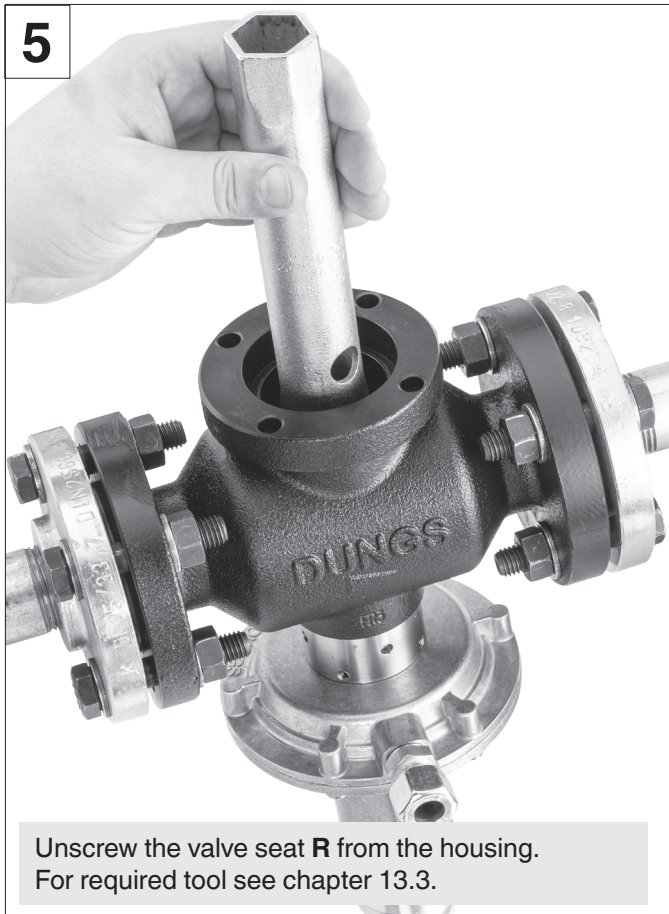


Remove the O-ring **Q**.

4



Clean the SAV housing on the inside. Check valve seat **R** for dirt and damage.



13.2.3 Mounting the ASE on the housing

1	Place the new O-ring U in the turned groove on the housing T intended for this purpose.
2	Screw the thread of the connecting piece V into the housing T using a hook wrench.
3	Fix the connecting piece V of the ASE X using 4 hexagonal socket grub screws W (M5x8).

13.3 Required tools



Order no. 271170

Work step		Tool designation	Pressure rating	Wrench size		
				DN 25	DN 40	DN 50
1	Loosen the pulse line.	Open-ended wrench (A)	ND/MD/HD/UHD	SW 24	SW 24	SW 24
2	Release the adjusting springs.	Socket wrench (B)	ND/MD/HD/UHD	SW 16	SW 16	SW 16
		Socket wrench (B)		SW 24	SW 24	SW 24
3	Remove ASE from the housing.	Internal hex key (C1)	ND/MD/HD/UHD	SW 2.5	SW 2.5	SW 2.5
		Jointed hook wrench with pins according to DIN 1810 (D)		35-60	60-90	60-90
4	Replace the valve seat.	Internal hex key (C2)	ND/MD/HD/UHD	SW 6	SW 8	SW 8
		Socket wrench/ valve seat wrench VSW (E)		SW 30	SW 46	VSW
5	Replace the working diaphragm on the ASE.	Internal hex key (C2)	ND/MD/HD/UHD	SW 4	SW 4	SW 4

13.4 Leakage test

After maintenance or repair work, check the SAV for internal and external leakages.

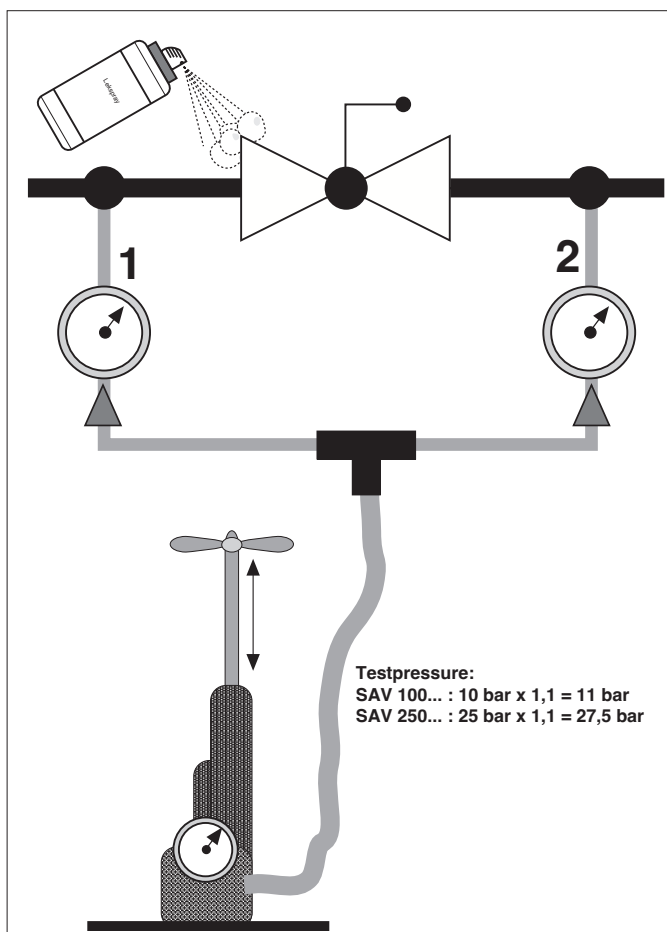
1. Test gas of the leakage test: air or inert gases.
2. Upstream and downstream shut-off valves must be closed.
3. Test pressure > blow-off pressure SBV: Block the line upstream of the SBV.
4. Connect the test section to the test device and apply pressure.
5. Test pressure: 1.1 x system-specific operating pressure. Maximum PS of the SAV (SAV 100... 10 bar/SAV 250...25 bar). Please take into account the different compressive strengths of the system.
6. Observe the waiting time necessary for the pressure compensation according to the system-specific volume.

External leakage

7. Use a suitable leak detection spray on the SAV.
8. Monitor the foam formation.

Internal leakage

9. Release the pressure in the test section downstream of the SAV.
10. Monitor the pressure increase on the outlet side:
Pressure gauge accuracy 0.1 mbar
11. Once the leakage test has been carried out, open the shut-off valve upstream of the SBV.
12. Release pressure in the test section.
13. Check the correct functioning and set values, see section 11.3.



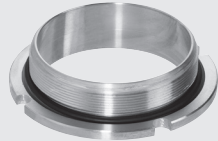
13.5 Recommended maintenance intervals

1. The maintenance intervals depend on the system-specific operating and environmental conditions, gas quality, condition of the pipelines, etc.
2. The maintenance intervals have to be set by the system operator according to the system requirements.
3. It is recommended performing a functional test on a monthly basis and carrying out maintenance work every year, in order to guarantee the system availability.
4. It is necessary to comply at least with the maintenance intervals specified in G 495.

Max. inlet pressure (bar)	Functional test	Maintenance
> 0.1 to 1	every 4 years	every 8 years
> 1 to 5	every 2 years	every 4 years
> 5	once a year	every 2 years

14. Spare parts

14.1 List of spare parts

Set	Spare part	Version	Order number	Image
1	Protective cap	SAV 100025-100050 ND-MD SAV 250025-250050 HD-UHD SAV 10010-10020 ND-MD/HD-UHD	on request	 A1 + A2
2	Valve seat with sealing ring and O-ring	SAV 100025 ND-MD SAV 250025 HD-UHD	303318	 Q R + S
		SAV 100040 ND-MD SAV 250040 HD-UHD	303319	
		SAV 100050 ND-MD SAV 250050 HD-UHD	303320	
3	ASE with O-ring	SAV 100025 ND-MD SAV 10010 ND-MD SAV 10015 ND-MD	303391	 X U
		SAV 250025 HD-UHD SAV 10010 HD-UHD SAV 10015 HD-UHD	303392	
		SAV 100040 ND-MD SAV 10020 ND-MD	303393	
		SAV 250040 HD-UHD SAV 10020 HD-UHD	303398	
		SAV 100050 ND-MD	303395	
		SAV 250050 HD-UHD	303396	

14.2 Springs for SAV produced from 08-2024

The following replacements are valid for devices (FRM FRM-NOC, SAV) with a serial number $\geq$ than 10000 (see the type plate, e.g. 1PDK270290**S00010000**)

Specific adjustment range, underpressure W_{dsu}						
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]	
					ND-MD	HD-UHD
Yellow	303335	1,4	58,5	13	10 - 30	-
Blue	303336	1,6	58,2	13	25 - 90	150 - 290
Black	303337	1,8	58,3	13	70 - 160	250 - 560
Purple	303338	2	58,3	13	140 - 310	520 - 1 100
Orange	303339	2,25	58,3	13	290 - 500	1 050 - 1 800
Pink	303340	2,5	58,2	13	-	1 650 - 3 000

Specific adjustment range, overpressure W_{dso}						
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]	
					ND-MD	HD-UHD
Silver	303321	2,4	55,2	30	60 - 140	-
Green	303322	2,8	55	30	80 - 220	-
Red	303323	3,2	54,6	30	160 - 450	600 - 1 700
Yellow	303324	3,6	54,5	30	300 - 680	1 250 - 2 500
Blue	303325	4	54,5	30	500 - 999	1 900 - 4 500
Black	303326	4,25	54,4	30	-	3 500 - 5 000

14.3 Old spare parts for SAV produced until 08-2024

The following replacements are valid for devices (FRM FRM-NOC, SAV) with a serial number < than 10000 (see the type plate, e.g. 1PDK270290**S00001000**)

Specific adjustment range, underpressure W_{dsu}							
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]		
					ND	MD	UHD
White	270353	1.2	60	10.0	10-32	-	-
Yellow	270355	1.5	55	12.3	24-40	-	-
Blue	270356	2.0	55	12.3	30-115	35-110	-
Black	270357	2.3	55	12.3	-	50-250	-
Purple	270358	2.5	55	12.3	-	80-400	150-500
Orange	270359	2.8	55	12.3	-	-	300-1 000
Silver	270360	3.0	60	15.0	-	-	800-1 400
Pink	276126	3.5	60	15.0	-	-	1 200-3 000

Specific adjustment range, overpressure W_{dso}							
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]		
					ND	MD	UHD
Silver	270361	2.2	60	30.0	40-130	-	-
Green	270366	2.5	60	30.0	60-190	180-290	-
Red	270367	2.7	60	30.0	90-240	230-370	-
Yellow	270368	3.2	60	30.0	-	300-500	-
Blue	270369	3.5	60	30.0	-	400-800	500-1 000
Black	270370	3.7	60	30.0	-	-	700-1 300
Purple	270371	4.0	60	30.0	-	-	1 000-1 800
Orange	270372	4.5	60	30.0	-	-	1 300-2 500
Pink	270373	4.8	60	30.0	-	-	1 800-3 500
White	271115	5.0	60	30.0	-	-	2 500-5 000

Set	Spare part	Version	Order number	Image
2	Valve seat with sealing ring and O-ring	SAV 100025 ND/MD/HD SAV 250025 UHD	270390	
		SAV 100040 ND/MD/HD SAV 250040 UHD	270391	
		SAV 100050 ND/MD/HD SAV 250050 UHD	270392	

14.4 Accessories

Spare part	Version	Order number	Image
Reed contact for open/close signal	SAV DN 25-50 SAV 1"-2"	288374	

14.5 Storage conditions

Basically, DIN 7716 (guidelines for storage, maintenance and cleaning of rubber products) applies to the storage of diaphragms and O-rings.

The ageing process mainly depends on the following factors:

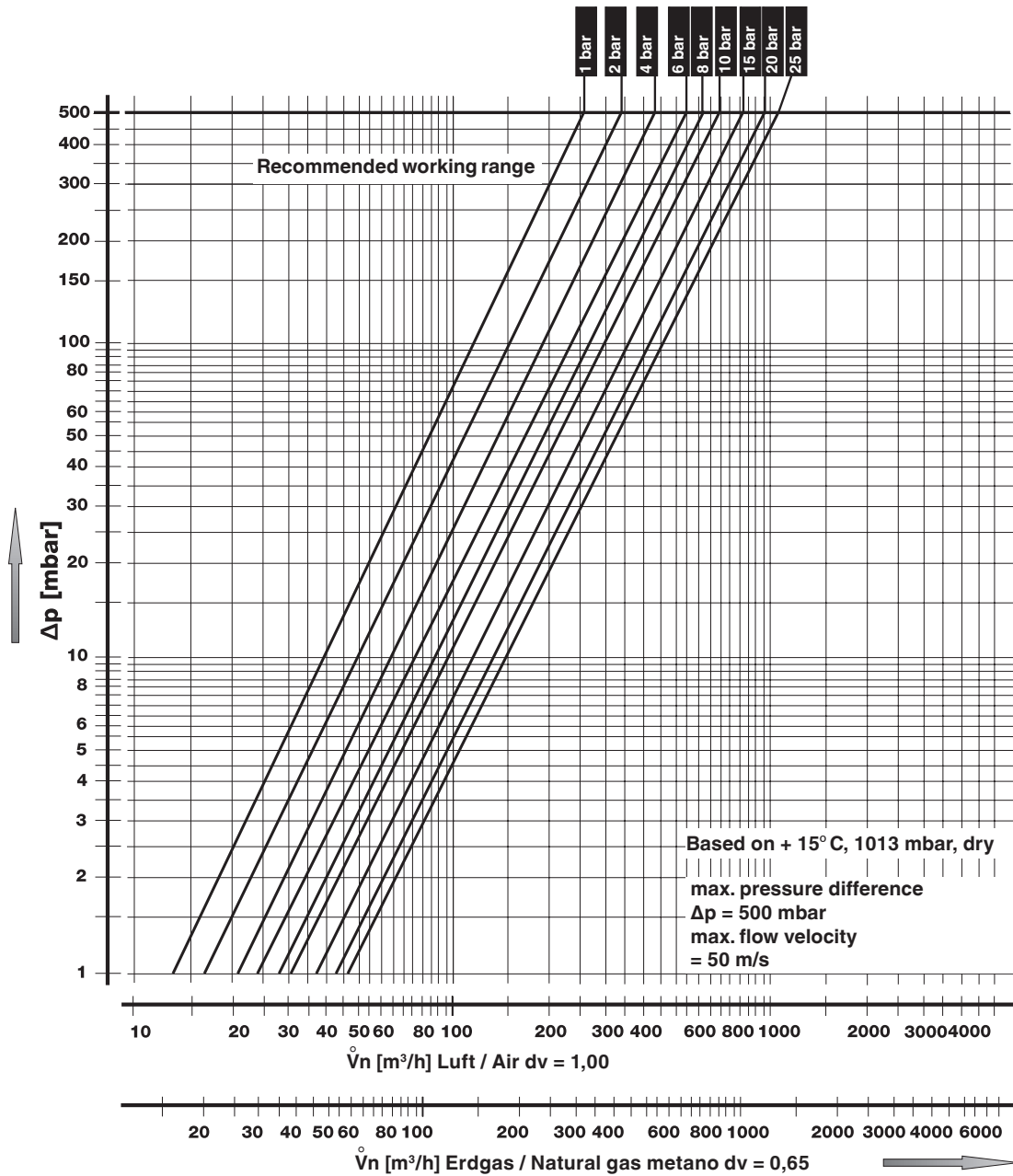
- Temperature
- Thermal radiation
- Solar radiation
- Humidity
- Relative humidity
- Ozone
- Stress condition of the component

Proper storage

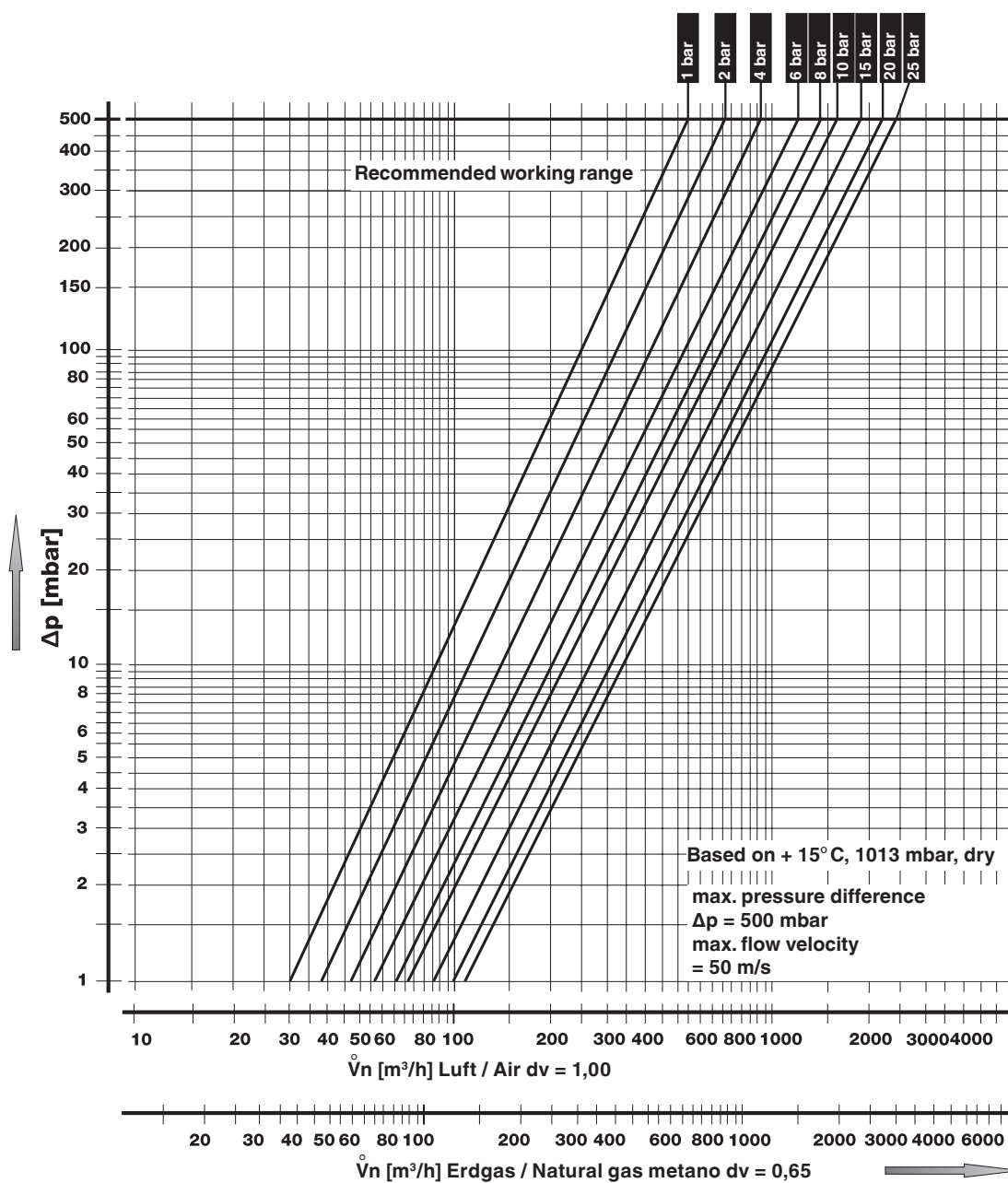
- Storage temperature between 0 °C and 45 °C
- No direct solar radiation
- No direct heat sources in the storage area
- No exposure to ozone
- Tension-free storage
- Storage in polyethylene bags
- Do not exceed the max. storage periods of 5 years

15. Flow diagram

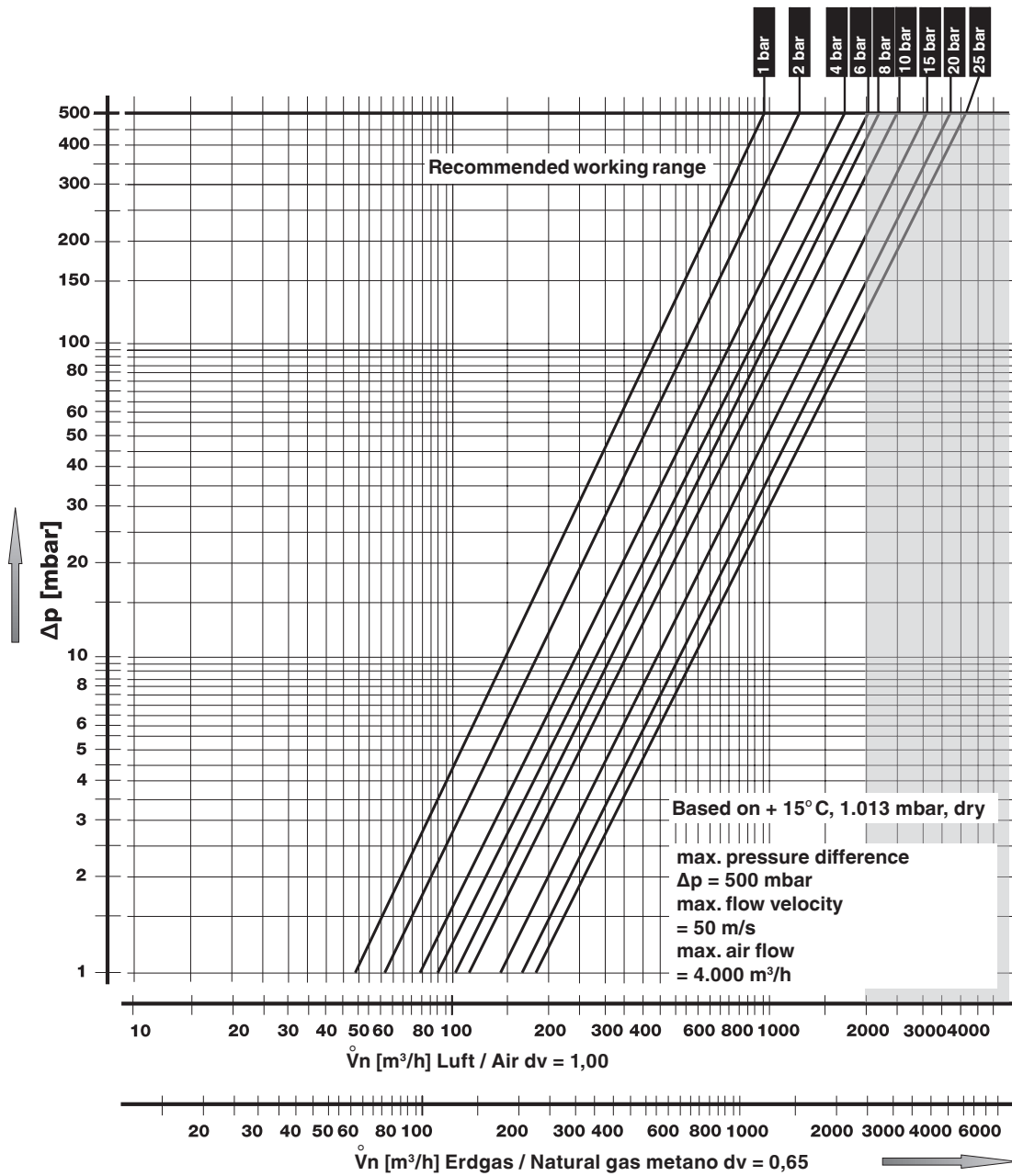
Flow diagram Δp SAV DN 25



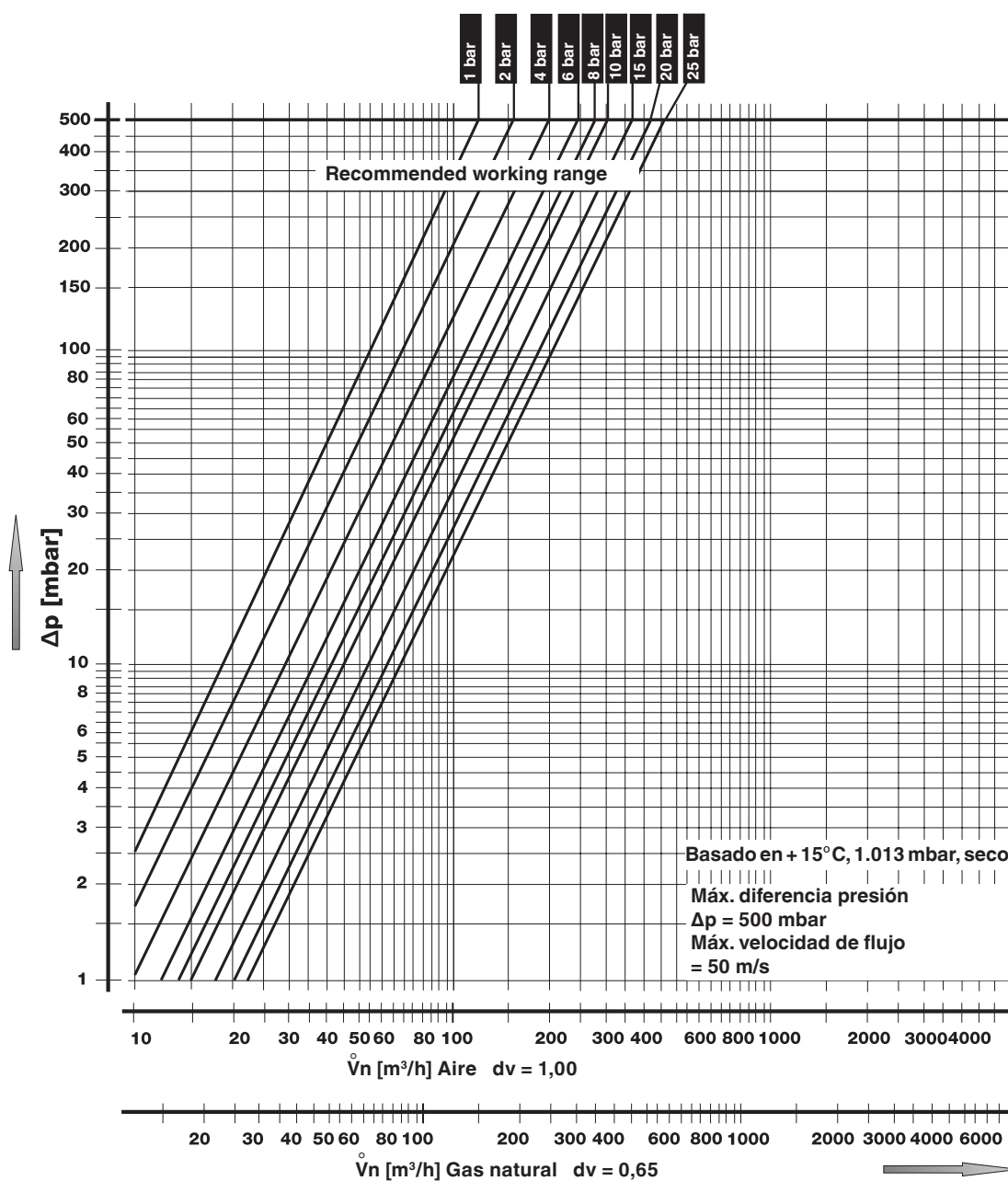
Flow diagram Δp SAV DN 40



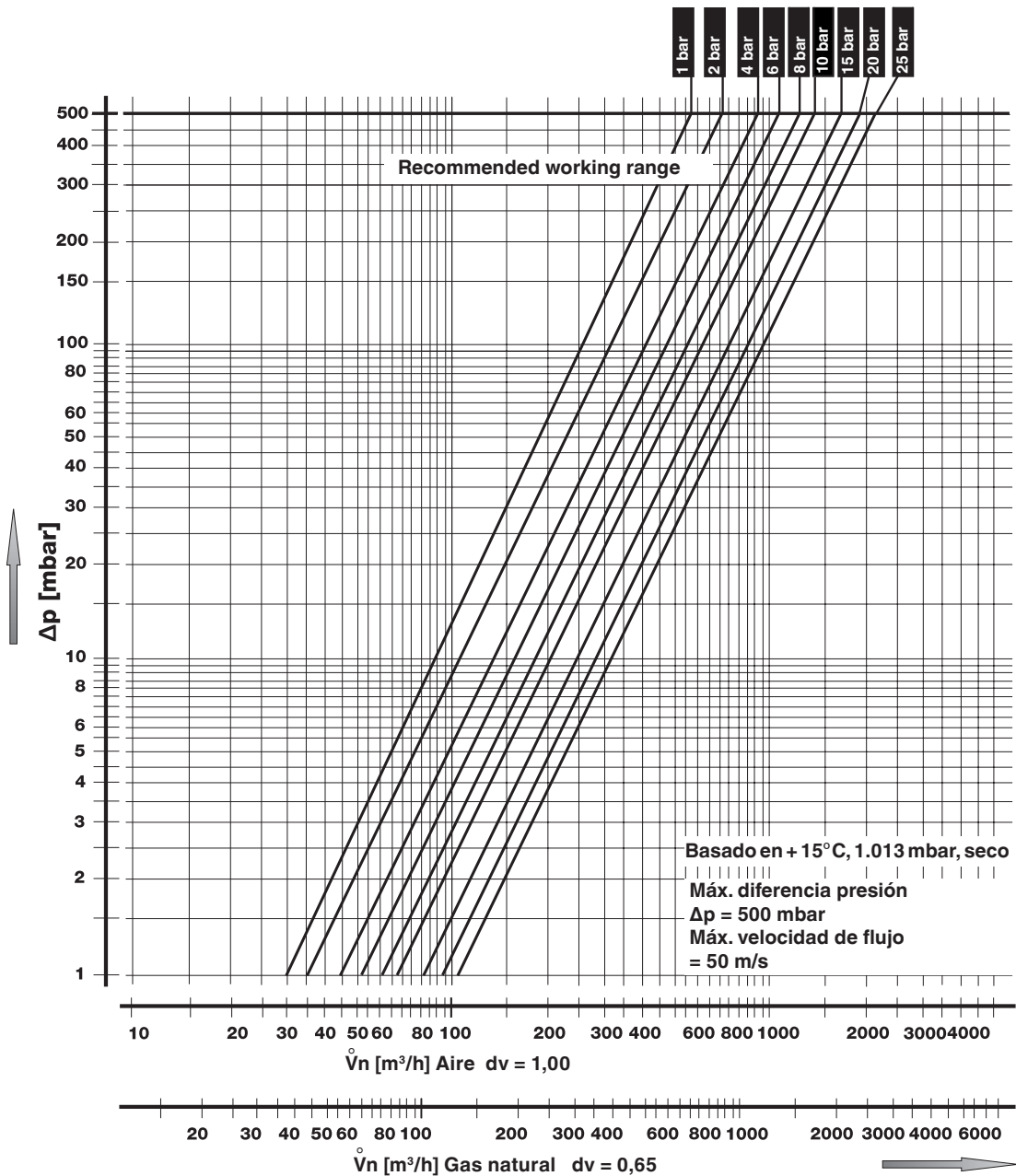
Flow diagram Δp SAV DN 50



Flow diagram Δp SAV 1", 1½"



Flow diagram Δp SAV 2"



$\dot{V}_{\text{gas used}} =$

$\dot{V}_{\text{air}} \times f$

$f =$

Air density
spec. weight of the gas used

Type of gas	Density [kg/m³]	dv	f
Natural gas	0.81	0.65	1.24
City gas	0.58	0.47	1.46
LPG	2.08	1.67	0.77
Air	1.24	1.00	1.00



The Pressure Equipment Directive (PED) and the Energy Performance of Buildings Directive (EPBD) require a periodic inspection of heat generators in order to ensure a high degree of efficiency over a long term and, consequently, the least environmental pollution.

It is necessary to replace safety-relevant components after they have reached the end of their useful life:

Sicherheitsrelevante Komponente Safety relevant component Composant relatif à la sécurité Componenti rilevanti dal punto di vista della sicurezza	Konstruktionsbedingte Lebensdauer Designed Lifetime Durée de vie prévue Durata di vita di progetto		Norm Standard Norme Norma	Dauerhafte Lagertemperatur Durable storage temperature Température de stockage permanente Temperatura di stoccaggio permanente
	Zyklenzahl Operating cycles Cycle d'opération Numero di cicli di funzionamento di progetto	Jahre Years Année Anni		
Ventilprüfsysteme / Valve proving systems / Systèmes de contrôle de vannes / Sistemi di controllo valvole	250 000	10	EN 1643	0...45 °C 32...113 °F
Gas / Gas / Gaz / Gas Druckwächter / Pressure switch / Manostat / Pressostati	50 000	10	EN 1854	
Luft / Air / Air / Aria Druckwächter / Pressure switch / Manostat / Pressostati	250 000	10	EN 1854	
Gas mangelschalter / Low gas pressure switch / Pressostat gaz basse pression / Pressostati gas di minima pressione	N/A	10	EN 1854	
Feuerungsmanager / Automatic burner control / Dispositif de gestion de chauffage / Gestione bruciatore	250 000	10	EN 298 EN 230	
UV-Flammenfühler¹ Flame detector (UV probes)¹ Capteur de flammes UV¹ Sensore fiamma UV¹	N/A	10 000 h³	---	
Gasdruckregelgeräte¹ Gas pressure regulators¹ Dispositifs de réglage de pression du gaz¹ Regolatori della pressione del gas¹	N/A	15	EN 88-1 EN 88-2	
Gasventil mit Ventilprüfsystem² Gas valve with valve testing system² Vanne de gaz avec système de contrôle de vanne² Valvola del gas con sistema di controllo valvola²	nach erkanntem Fehler after error detection après détection d'erreur dopo segnalazione di errore		EN 1643	
Gasventil ohne Ventilprüfsystem² Gas valve without valve testing system² Vanne de gaz sans système de contrôle de vanne² Valvola del gas senza sistema di controllo valvola²	DN ≤ 25 200 000 25 < DN ≤ 80 100 000 80 < DN ≤ 150 50 000	10	EN 161	
Gas-Luft-Verbundsysteme / Gas-air ratio control system / Systèmes combinés gaz/air / Sistemi di miscelazione gas-aria	N/A	10	EN 88-1 EN 12067-2	
¹ Nachlassende Betriebseigenschaften wegen Alterung / Performance decrease due to ageing / Réduction de performance due au vieillissement / Riduzione delle prestazioni dovuta all'invecchiamento ² Gasfamilien II, III / Gas families II, III / Familles de gaz II, III / per i gas delle famiglie II, III ³ Betriebsstunden / Operating hours / Heures de service / Ore di esercizio N/A nicht anwendbar / not applicable / ne peut pas être utilisé / non può essere usato				
Lagerzeiten / Storage times / Périodes de stockage / Tempi di stoccaggio				
Lagerzeiten ≤ 1 Jahr verkürzen nicht die konstruktionsbedingte Lebensdauer. Storage time ≤ 1 year does not reduce the designed lifetime. Les périodes de stockage ≤ 1 an ne réduisent pas la durée de vie liée à la conception. I tempi di stoccaggio ≤ 1 anno non riducono la durata di vita legata al design.				
DUNGS empfiehlt eine maximale Lagerzeit von 3 Jahren. DUNGS recommends a maximum storage time of 3 years. DUNGS recommande une durée de stockage maximale de 3 ans. DUNGS raccomanda un tempo massimo di stoccaggio di 3 anni.				

We reserve the right to make modifications in the course of technical development.

Head of office and factory

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