

Instruction Manual

FRSBV 20010...
FRSBV 5010...

1. Target group

The target group of this manual are specialised gas safety and control technology personnel. They can assess the work assigned to them and potential hazards on the basis of their technical training, knowledge and experiences. In accordance with the accepted rules of industrial safety only these persons are permitted to carry out the installation, start-up, adjustment and servicing of the equipment.



Place this user manual in an easily viewable location in the installation room! Perform work only after the safety instructions in this user manual have been read.

2. Warnings

2.1 General warnings



Follow the accepted rules of industrial safety and the accident prevention regulations must be followed, if necessary take safety measures to ensure the protection of persons.



Execute all settings and setting values subject to compliance with the user manual for the machine connected.



Never perform work when gas pressure or voltage is present. Avoid open fire. Comply with government regulations.



Check the device for transport damage prior to installation.



The device must not be exposed to an open flame. Protection against lightening must be provided.



Pipelines connected must be free of dirt and fouling.



Protection against environmental and climatic influences (corrosion, rain, snow, icing, moisture (e.g. due to condensation)), mould, UV radiation, harmful insects, and toxic, corrosive solutions / liquids (e.g. cutting / cooling fluids) must be ensured. Subject to the installation site, take safety measures must when necessary.



The device may only be operated in accordance with the operating conditions specified on the rating plate.



The device protect against vibrations and mechanical impacts.



The device must not be used in areas with heightened risk of earthquakes.

Explanation of the characters

1, 2, 3, ... = Take action consecutively
• = Instruction

2.2 Normal use

Normal use of the equipment is deemed to pertain provided the following instructions are followed:

- Use of the equipment in gas transport and gas distribution networks as well as in commercial and industrial systems.
- Use in pressure regulating systems according to EN 12186 and EN 12279.
- Use only with gases of the 1st, 2nd 3rd gas family according to EN 437.
- Use only with dry and clean gases, no aggressive media.
- Use only in accordance with the operating conditions specified on the rating plate.
- Use only in good order and condition.
- Malfunctions and faults must be corrected immediately.
- Use only when following the instructions in this user manual and the national regulations.

2.3 Risks in case of misuse

- The equipment is reliable in operation when used normally.
- Personal or consequential material damage, financial damage or environmental damage cannot be ruled out in the event of non-observance of the instructions.
- In the event of misuse or misapplication life and limb of the operator is threatened and serious damage to the device and other material assets is risked as well.

3. EU Declaration of conformity

Produkt / Product Produit / Producto	FRSBV...	Safety pressure relief valve	
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 33821	
Gültigkeitsdauer/Bescheinigung Term of validity/attestation Validité/certificat Periodo de validez / Certificado		2029-11-13 CE-0085CU0351	
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, 2023-02-08			

3. Declaration of conformity

Product	FRSBV	Safety pressure relief valve
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 33821	
Term of validity	2032-07-17	
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, 2023-02-08		

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5. List of abbreviations

Abbreviation	Description
AC	Accuracy class
SG	Closing pressure group
K_G	Flow coefficient
Rp	Threaded connection
p_{do}	Upper response pressure
p_{du}	Lower response pressure
p_{max}	Maximum operating pressure
PN	Nominal flange pressure
PS	Maximum permissible pressure
SBV	Safety pressure relief valve
SN	Serial number
SW	Width across flats
W_{do}	Adjustment range for the upper response pressure by use of the adjusting springs available
W_{du}	Adjustment range for the lower response pressure by use of the adjusting springs available
W_{dso}	Specific adjustment range of the adjusting spring installed for the upper response pressure
W_{dsu}	Specific adjustment range of the adjusting spring installed for the lower response pressure

6. Features

6.1. Technical data

Technical data	FRSBV ...
Device	Safety pressure relief valve according to DIN 33821
Type	FRSBV 5010...
Type of gas	Family 1+2+3
Nominal diameters	Connecting threads according to BSP (ISO 228/1) or NPT (B1.20.1)
Thread	G1" NPT 1"
Input pressure	FRSBV 5010... 5 bar (5 000 kPa)
Trigger range	45 mbar to 2 bar (4.5-200 kPa)
Materials	Main housing: Aluminium Al 2521, Al 2011 Diaphragm housing: Aluminium Al 2011 Diaphragms: NBR according to EN 549
Ambient temperature	-20 °C to +60 °C

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Type	FRSBV 20010...
Type of gas	Family 1+2+3
Nominal diameters	Connecting threads according to BSP (ISO 228/1) or NPT (B1.20.1)
Thread	G1" NPT 1"
Input pressure	FRSBV 20010... 20 bar (2 000 kPa)
Trigger range	200 mbar to 8 bar (20-800 kPa)
Materials	Main housing: Steel F-114 (FRSBV 200...) Diaphragm housing: Steel F-114 (FRSBV 200...) Diaphragms: NBR according to EN 549
Ambient temperature	-20 °C to +60 °C

6.2 Nomenclature

Using the FRSBV 5010 HD as an example	FRSBV	50	10	HD	NPT
Type	Pressure relief valve				
MOP	50 ... 5 bar 200 ... 20 bar				
Nominal diameter	10 1"				
Pressure ranges	ND Low pressure HD High pressure				
Thread type	NPT With BSP thread With NPT threads				

6.3 Adjustment ranges

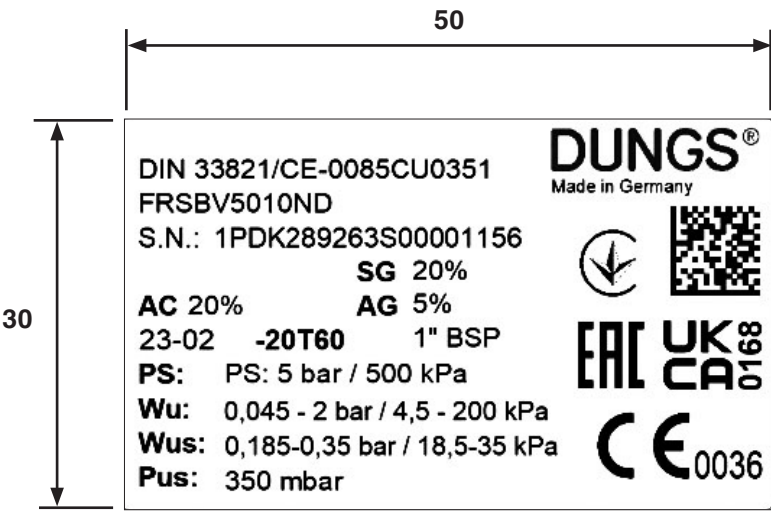
Type	Threaded connection	Version	Item number	Closing pressure [SG]	Specific adjustment range
FRSBV 5010 ND	G1"	ND	289263	SG 20	45-2 000 mbar
FRSBV 20010 HD	G1"	HD	on request	SG 20	200-8 000 mbar
FRSBV 5010 ND NPT	NPT 1"	ND	289268	SG 20	45-2 000 mbar
FRSBV 20010 HD NPT	NPT 1"	HD	on request	SG 20	200-8 000 mbar

6.4 Spring selection

Setpoint range for springs FRSBV 5010...					
Spring colour	Replacement item number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]
					ND
Yellow	290942	1.3	60	20	45-65
Black	290943	1.5	60	20	65-95
Purple	290944	1.6	60	20	85-125
Pink	290945	1.8	60	20	125-185
White	290946	2.2	60	20	185-350
Blue	290947	2.5	50	20	350-580
Orange	290948	2.8	50	20	580-1 000
Silver	290950	3.5	45	20	1 000-1 700
Grey	290951	3.8	45	20	1 600-2 000

Setpoint range for springs FRSBV 20010...					
Spring colour	Replacement item number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]
					HD
Green	290952	3.5	110	35	200-1 000
Red	290953	4.0	100	35	250-1 500
White	290954	4.5	100	35	300-2 000
Yellow	290955	5.0	100	35	500-3 000
Blue	290956	5.5	100	35	750-4 000
Black	290957	6.0	100	35	1 000-8 000

6.5 Type plate



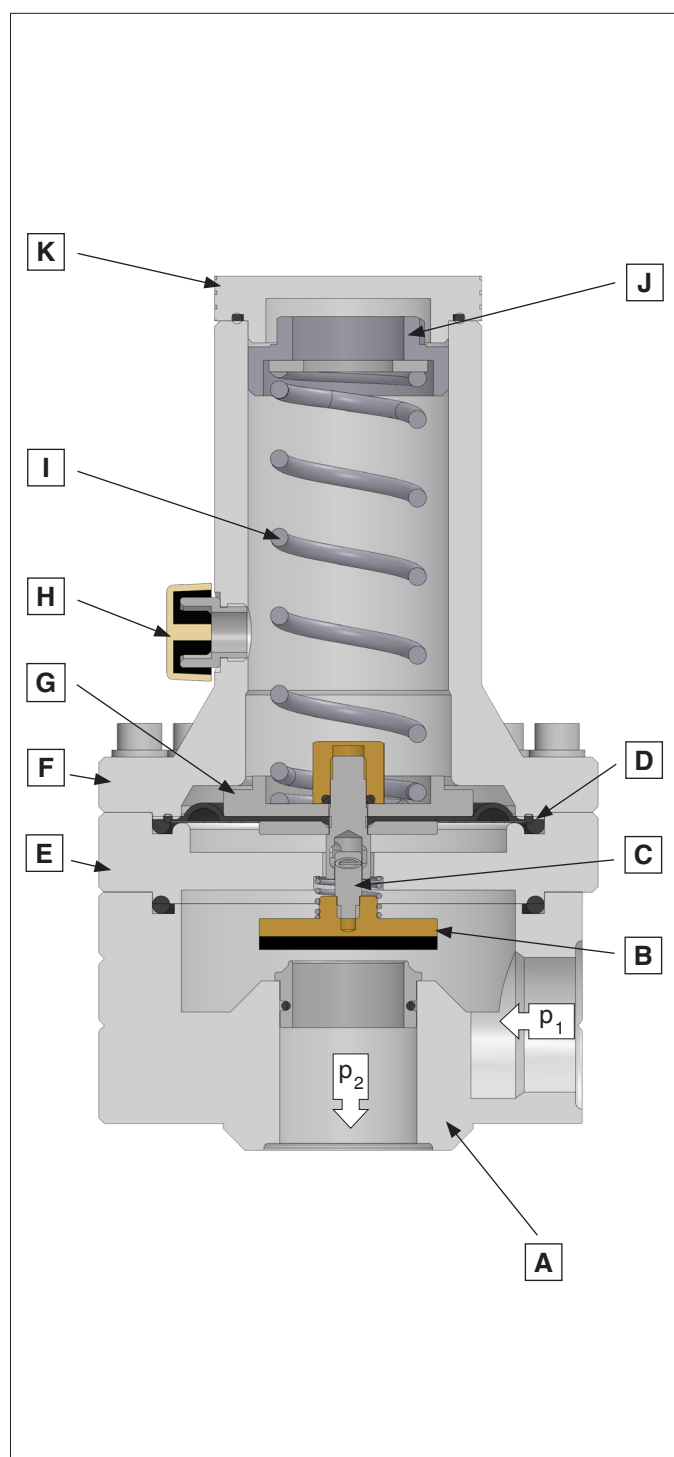
Abbreviation	Description
SG	Closing pressure
AC	Accuracy class
AG	Response pressure group
Rp	Thread diameter
-20T60	Operating temperature range
PS	Maximum permissible pressure
SBV	Safety pressure relief valve
SN	Serial number
W _{us}	Adjustment range of the spring installed for the lower response pressure

7. Function

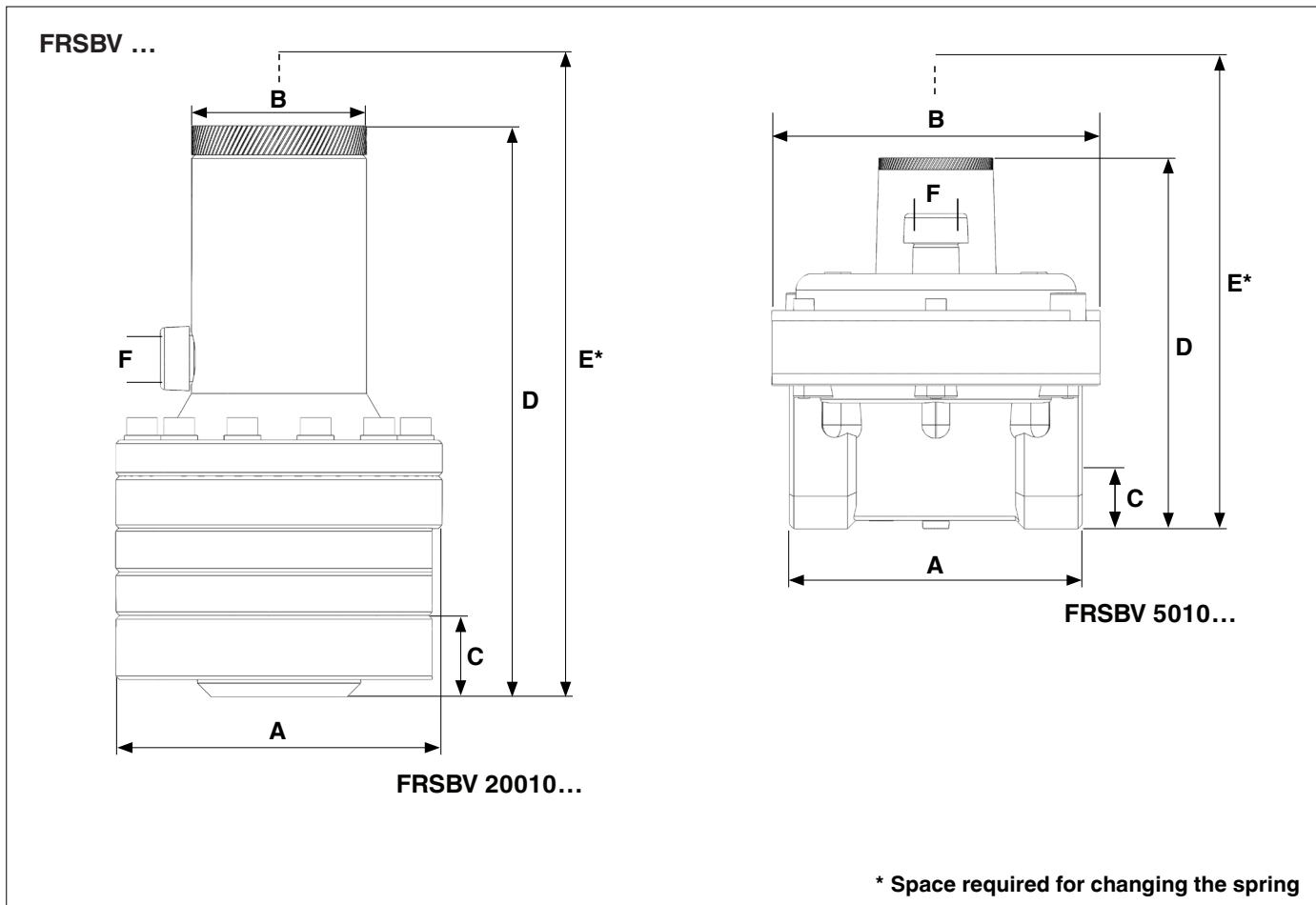
The FRSBV type safety valve is a safety pressure relief valve (SBV) with an adjustable response pressure. The response pressure results from the force that the movable parts exert on the adjusting spring installed. The full response pressure range can be covered by changing the adjusting springs. The valve has an internal response pressure tap.

Main components

- A** Housing
- B** Regulating cup
- C** Push rod
- D** Working diaphragm
- E** Intermediate housing
- F** Upper protective cover
- G** Upper diaphragm case
- H** Vent connection
- I** Adjusting spring
- J** Adjusting nut
- K** Protective cap



8. Dimensions



Type	Item number		p max. [bar / kPa]	Thread G	Dimensions [mm]						Weight [kg]
	BSP	NPT			A	B	C	D	E	F	
FRSBV 5010 ND	289263	289268	5 / 500	1"	100	112	22	127	227	G $\frac{1}{4}$ "	0.89
FRSBV 20010 HD	on request	on request	20 / 2 000	1"	112	60	28	197	297	G $\frac{1}{4}$ "	6.15

9. Installation

9.1 General instructions



- Installation only in accordance with applicable policies and subject to compliance with local regulations, obtain permits required if necessary.
- Install the device in a building or enclosure, no outdoor installation absent appropriate safety measures!
- Fit the working range with conventional safeguards.
- The lifting gear used must be suited for the loads to be lifted.
- Provide sufficient installation space for maintenance and cleaning.
- The installation must not impair the operation of other components.

Check before installing!

- The in- and output side shut-off valves are closed.
- The line is combustion gas free.
- Prevent a gas / air mixture: Monitor the room atmosphere for leaking gas on an ongoing basis using suitable gas concentration testers.
- Ensure electrically conductive bridging. Prevent touch voltage and ignitable spark discharge.
- The rating plate's performance data agree with the order data.

- The maximum input pressure of the system is less than the maximum permissible pressure of the valve.
- Remove the connecting threads' protective cap – if present.
- Maintain minimum clearances for adjustment.
- The input side pipeline is free of dirt and water.

Bear in mind during installation!

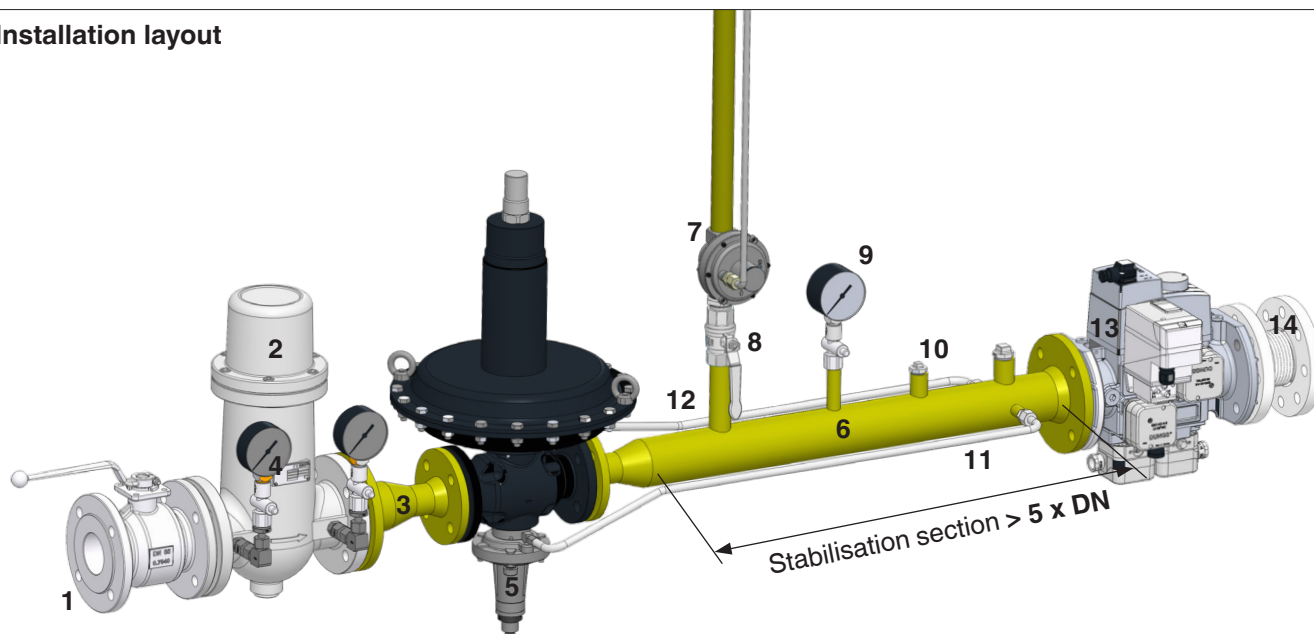
- Lay the air feed and extraction lines separately.
- Route the ventilation lines into the open: The gas has to be able to escape into safe surroundings.
- Pay attention to the flow direction (arrow) on the housing.



9.2 Description of installation

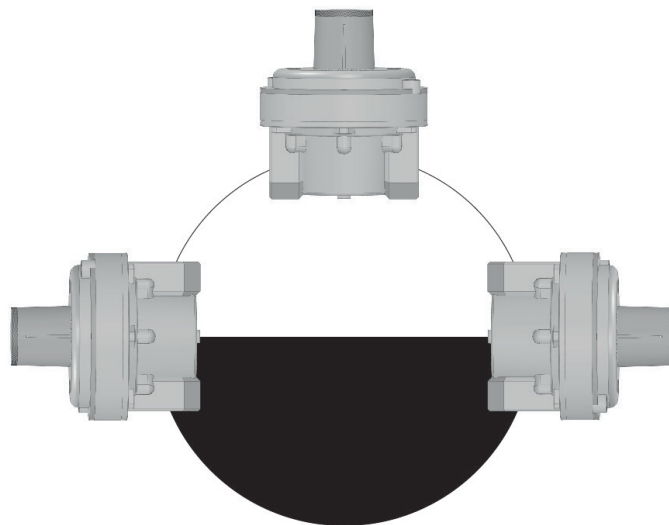
- Carry out the installation according to the installation layout indicated below.
- Install the safety pressure relief valve in the direction of flow (arrow / housing).
- Maximum flow velocity in the stabilisation section:
≤ 30 m/s.
- SBV drain pipeline 1" pipe.
- Prevent the accumulation of condensate: Lay the pulse lines on an incline.

Installation layout



Item	Designation
1	Input side shut-off valve (e.g. ball valve or shut-off flap)
2	Filter
3	Reducing adapter
4	Input side manometer
5	Controller
6	Stabilisation section
7	SBV
8	Ball valve
9	Output side manometer
10	Pressure tap
11	Pulse tap, SAV
12	Pulse tap, controller
13	Solenoid valve
14	Compensator

Installation position

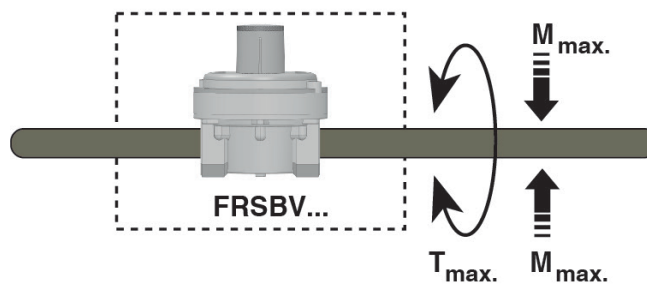


9.3 Torques

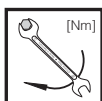


Use suitable tools!

Do not use the device as a lever!



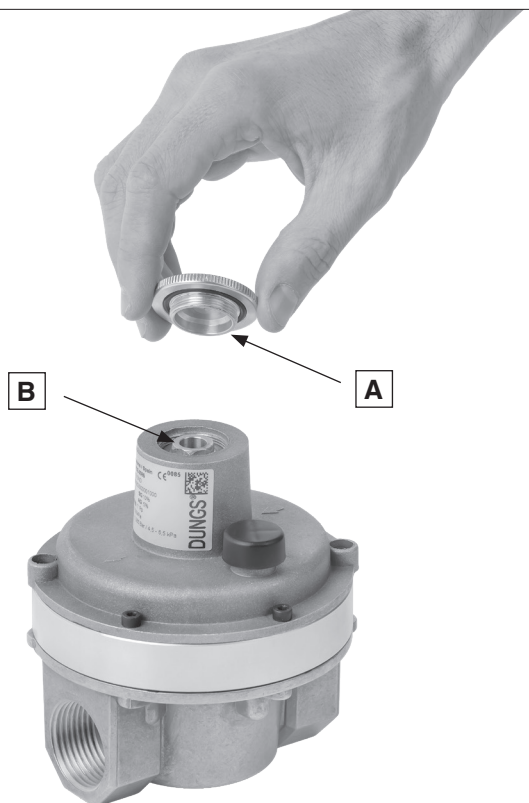
R_p	1
M_{max.} [Nm] t 10 s	340
T_{max.} [Nm] t 10 s	125



Max. torque of system accessories								
DN	--	--	--	25	40	50	65	80
M... / G...	M4	M5	M6	M8	G ¹ / ₈	G ¹ / ₄	G ¹ / ₂	G ³ / ₄
M_{max.} [Nm] t 10 s	2.5 Nm	5 Nm	7 Nm	15 Nm	5 Nm	7 Nm	10 Nm	15 Nm

10. Adjusting the triggering pressure

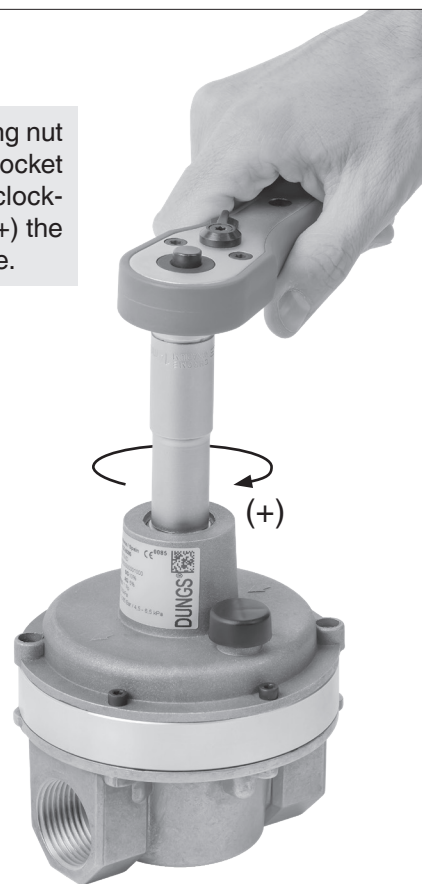
1



Remove protective cap **A**.

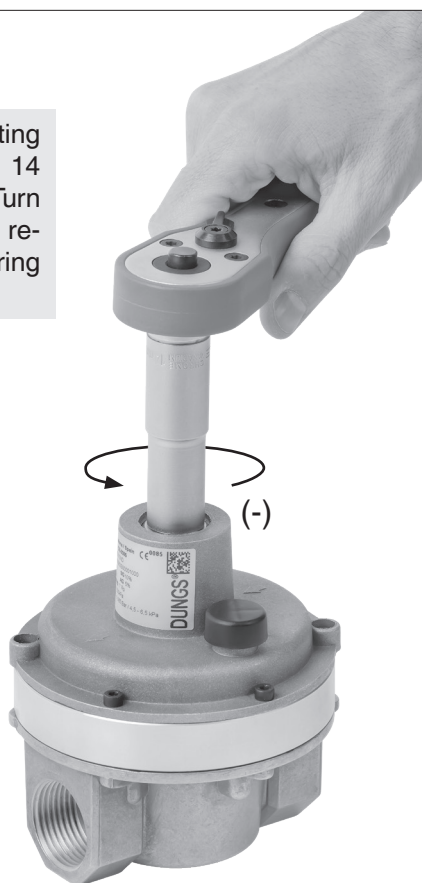
2

Turn out adjusting nut **B** with SW 22 socket spanner. Turn clockwise to increase (+) the triggering pressure.



3

Turn out adjusting nut **B** with SW 14 socket spanner. Turn anti-clockwise to reduce (-) the triggering pressure.



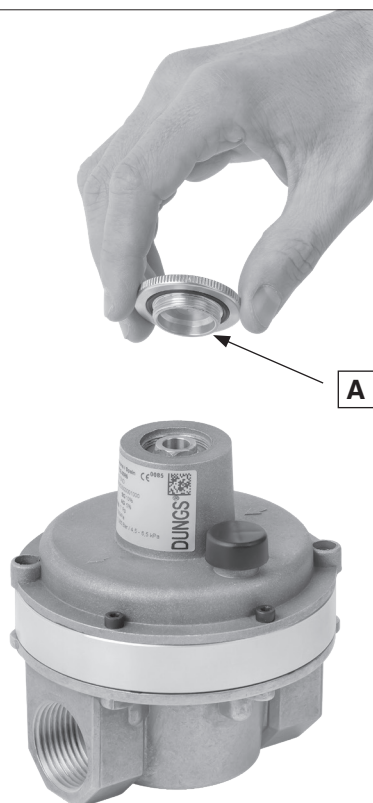
4



After the adjustment:
Screw protective cap **A** back on.

10.1 Spring replacement

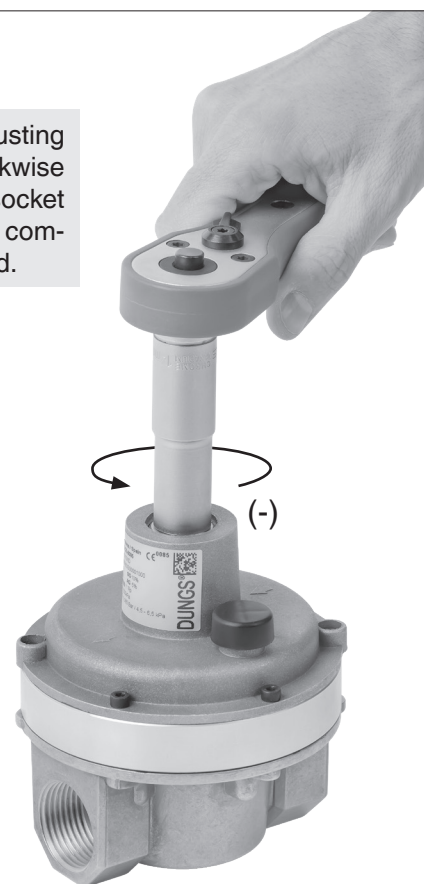
1



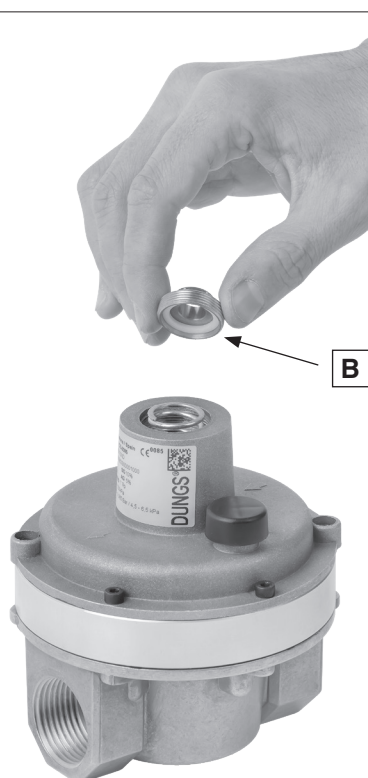
Remove protective cap **A**.

2

Turn outer adjusting nut **B** anti-clockwise with SW 14 socket spanner until it is completely unscrewed.



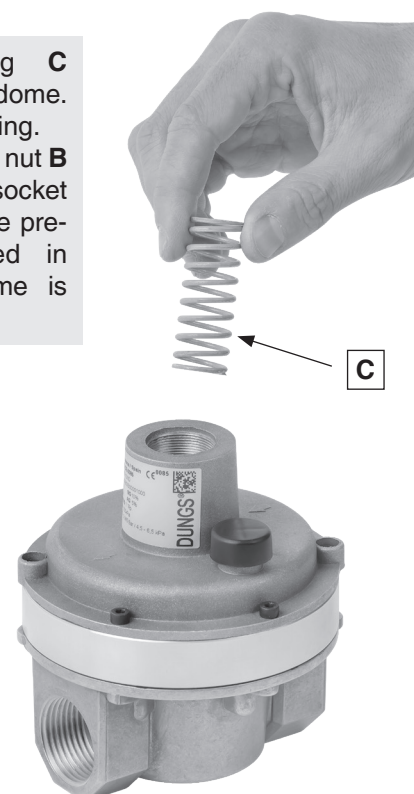
3



Remove adjusting nut **B**.

4

1. Remove spring **C** from the spring dome.
2. Insert a new spring.
3. Screw adjusting nut **B** in with SW 14 socket spanner until the pre-tension required in the spring dome is reached.



10.2 Tools required

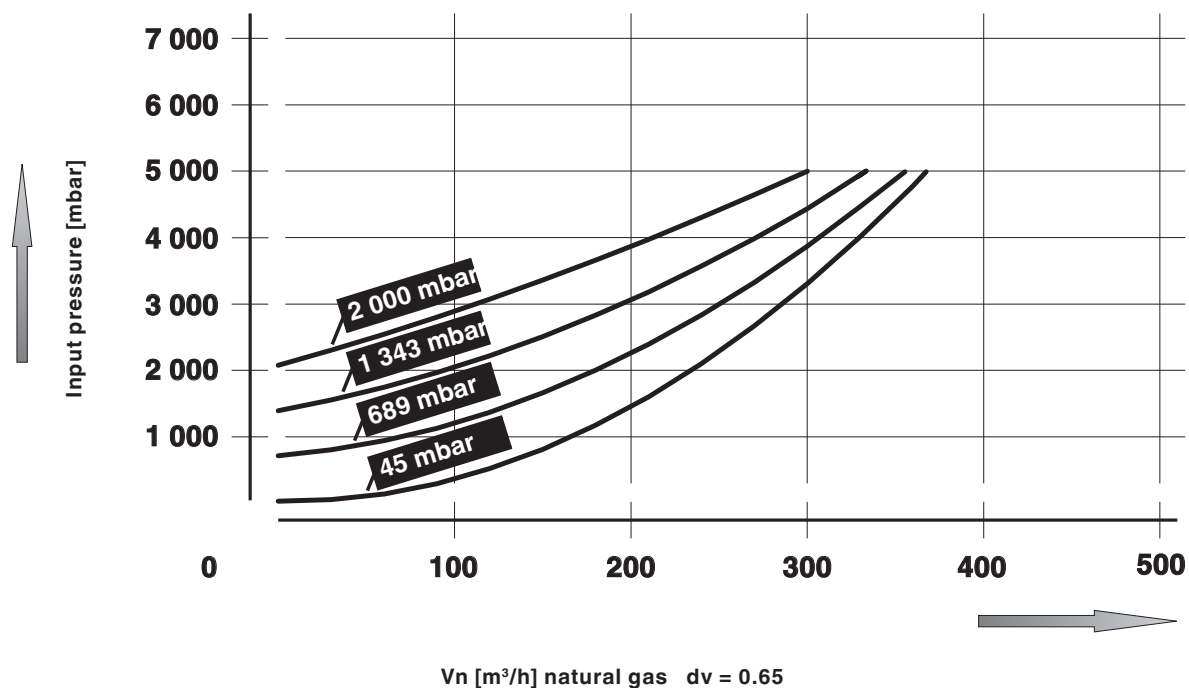
- The threshold level is adjusted and the spring replaced for all five pressure relief valve types in the same way. They differ only in the spanner used for the adjusting nuts' thread.
- A pipe socket spanner is needed for every FRSBV type:

FRSBV type	Width across the pipe socket spanner flats
FRSBV 5010 ND	SW 14
FRSBV 20010 HD	SW 30

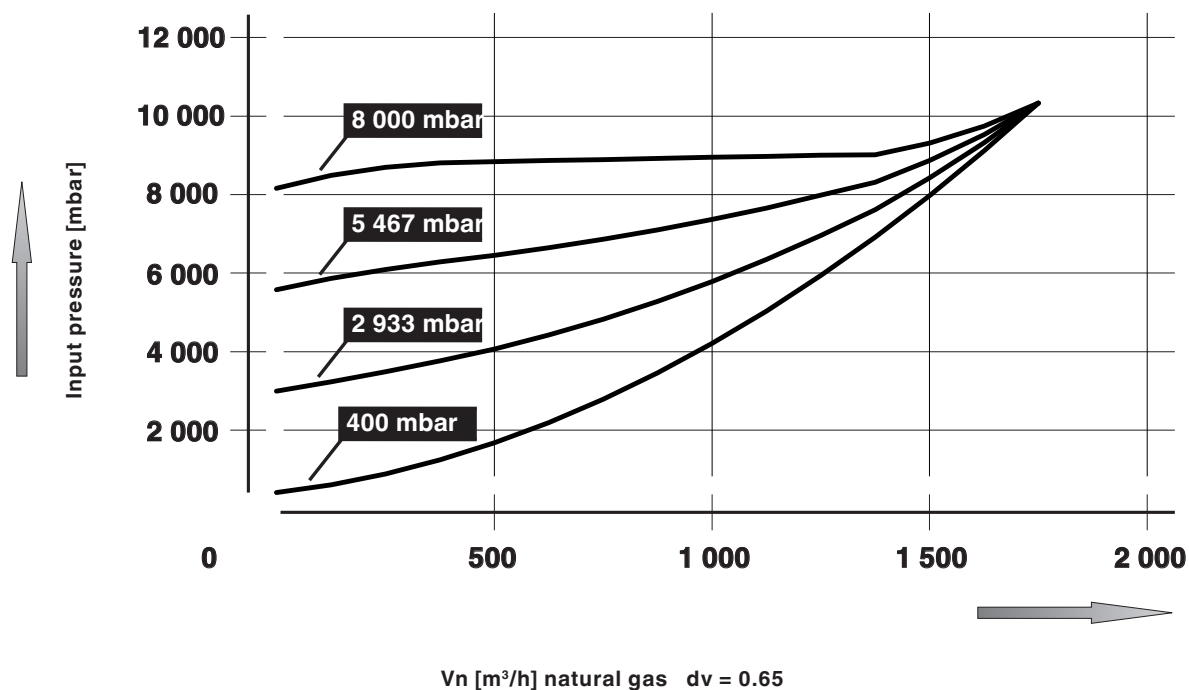
11. Flow tables

$\dot{V}_{\text{gas used}} =$	$\dot{V}_{\text{air}} \times f$	Type of gas	Spec. weight [kg/m³]	dv	f
$f = \sqrt{\frac{\text{Air density}}{\text{spec. weight of the gas used}}}$		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

Flow tables Δp FRSBV 5010 ND



Flow tables Δp FRSBV 20010 HD





The Pressure Equipment Directive (PED) and the Directive on the energy performance of buildings (EPBD) require a regular inspection of heat generators to guarantee a high degree of efficiency long term and minimum environmental impact as a result.

It is therefore necessary to replace safety-relevant components once their service life has elapsed.

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	
Gasmanagementschalter / 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-Flammenfühler ¹ Flame detector (UV probes) ¹ Capteur de flammes UV ¹ Sensore fiamma UV ¹	N/A	10 000 h ³	---	
Gasdruckregelgeräte ¹ Gas pressure regulators ¹ Dispositifs de réglage de pression du gaz ¹ Regolatori della pressione del gas ¹	N/A	15	EN 88-1 EN 88-2	
Gasventil mit Ventilprüfsystem ² Gas valve with valve testing system ² Vanne de gaz avec système de contrôle de vanne ² Valvola del gas con sistema di controllo valvola ²	nach erkanntem Fehler after error detection après détection d'erreur dopo segnalazione di errore		EN 1643	
Gasventil ohne Ventilprüfsystem ² Gas valve without valve testing system ² Vanne de gaz sans système de contrôle de vanne ² Valvola del gas senza sistema di controllo valvola ²	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.

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