

Safety Shut-off Valve SL/SID/RSL

- ▶ High accuracy shut-off
- ▶ Low pressure loss
- ▶ Operating temperature up to -30 °C
- ▶ Easy maintenance
- ▶ DVGW-approval

Applications

They are designed for transmission and distribution networks, as well as commercial and industrial supplies.

Description

These shut-off valves are systems designed for high and low shut-off. They automatically interrupt the gas flow when the outlet pressure of the regulator diverges from the acceptable value.

Technical features

Inlet pressure range	Pi: up to 101.2 bar
OPSO* range	Pso: 20 mbar – 60.0 bar
UPSO* range	Psu: 5 mbar – 20.0 bar
Accuracy class	AG 1 to AG 30
Operating temperature	-30°C to +60°C
Acceptable gases	Natural gas, propane, butane, air, nitrogen and all non-corrosive gases.

* OPSO/UPSO: Over- and under-pressure shut-off

Connections

Sizes	DN 25, 50, 80, 100, 150, 200
Orifice diameter (mm)	Ø 28, 40, 65, 95, 145, 195
Body lengths	see table
Flanges	PN16, 25, 40, 63 ANSI 150, 300, 600
Thread	1"-NPT

Construction

Body	GGG 40 / GS-C 25N / GS C 45
Actuator SSV	Steel, zinc coated / Al Mg Si F 28
Orifice	Brass, steel, zinc coated/Stainless steel
Internal parts	Brass, Steel, zinc coated/Stainless steel
Seals / O-Rings	NBR rubber/Viton
Diaphragm	NBR rubber/NBR rubber, reinforced fabric



▶ SL/SID/RSL



► Safety Shut-off Valve SL/SID/RSL

SSV	Pemax / Orifice - ø	Design
SL-IZN1	101.2 bar	SSV for over-pressure shut-off (Command range Who 35 mbar – 60 bar)
SL-IZM1		
SL-IZH1		
SSV 022	16 bar	SSV for over-pressure and under-pressure shut-off Command Ranges Who 0.035 bar – 1.7 bar – Whu 0.01 bar – 0.22 bar
SID-NN	19.3 bar	
SID-MNS*	50.6 bar	SSV for over-pressure and under-pressure shut-off
SID-MM	50.6 bar	Command Ranges
SID-HMS*	101.2 bar	Who 0.035 bar – 22.0 bar – Whu 0.005 bar – 20.0 bar
SID-HH	101.2 bar	
RSL	101.2 bar	SSV for over-pressure and under-pressure shut-off Command Ranges Who 18.0 bar – 60.0 bar – Whu 1.0 bar – 20.0 bar
1" NPT**	Orifice Ø 21 mm	Thread 1" NPT
DN 25	Orifice Ø 28 mm	
DN 50	Orifice Ø 40 mm	
DN 80	Orifice Ø 65 mm	Flange
DN 100	Orifice Ø 95 mm	
DN 150	Orifice Ø 145 mm	
DN 200	Orifice Ø 195 mm	
PN 16		
PN 40		Flanges according to DIN, PN 16, PN 40
PN 63		and PN 63 with seal Form C
ANSI 150		Flanges according to ANSI 150, 300, and 600 RF
ANSI 300		

* with protection of safety relief valve, type 285 D
** Pi max 100 bar

Example of designation: Safety shut-off valve, type **SL-IZM1**, DN 50, PN 16

Spring range and accuracy class AG

Type SL-IZ...

Type	Spring range Who (bar)	Spring number	Colour	Wire Ø mm	Range) Who (bar)	Accuracy class
SL-IZN1	0.035 – 0.25	955-202-36	red	1,8	0.035 – 0.1	AG10
	0.2 – 0.8	955-202-37	green	2,5	>0.1 – 0.8	AG 5
SL-IZM1	0.6 – 6.6	955-202-38	yellow	3,6	0.6 – 6.6	AG 5
SL-IZH1	3.5 – 10.5	955-201-68	black	6,0	3.5 – 10.5	AG 2.5
	10.5 – 21.0	955-201-69	grey	7,0	>10.5 – 60.0	AG 1
	18.0 – 60.0	955-202-84	yellow	10,0		

DIN-DVGW-No., DN 25 to DN 200 : **NG-4303 AU 2402**

Design and Function SL-IZ type

The SL-IZ type of safety shut-off valves are designed to automatically interrupt the gas flow in the gas pressure regulating systems as soon as the pressure in the system to be protected reaches an upper response pressure (over-pressure).

The devices consist of a control unit (1), which act pneumatically on a switching unit (2), and releases a flap valve (3). The switching unit and the control unit are mounted on the actuator body (4).

The pressure to be monitored is transmitted to a diaphragm measuring unit (5); the measuring connection is connection "A". At the top of the measuring unit, the force of the setting spring (6) is active. The desired response pressure can be adjusted by means of the setting screw (7).

Turn clockwise (7) pressure = increase in switching

Turn anti-clockwise (7) pressure = decrease in switching

When the set response pressure is exceeded, the diaphragm unit (5) is lifted, and an overflow volume is released through the nozzle (8). The resulting increase in pressure acts on the switching diaphragm (9).

The switching diaphragm acts against the force of a weak, cylindrical coil spring (10), or against the friction force of a locking unit. When pressure acts on the switching unit the detent (11), is released, and the flap valve (3) is closed by the force of one or more (ANSI 300 and higher) torsion springs (12)*.

Due to the dimensions of the closing springs, tightness is guaranteed even at a very low operating pressure.

Pressure compensation at the valve flap is possible with a manipulation valve (18).

* For the assembly of the torsion spring (12) a special tool (spring tensioning key) is required.

Diaphragm Break Protection

The safety shut-off valves meet all requirements of the DIN 3381 standard, June 1984 Edition. According to this standard, the devices must have a unit that closes the control unit (1) of the SSV in case the diaphragm is damaged (5).

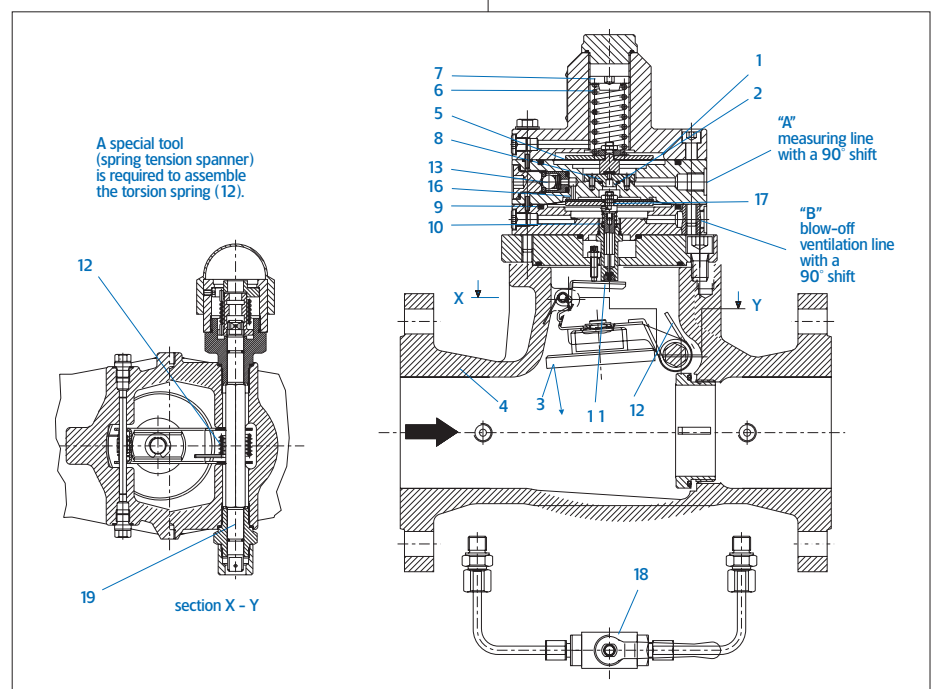
For this reason, these types of safety shut-off valves are equipped with an over-pressure valve (13). In addition, the switching process is released by the overflowing volume, which flows through the bore (16).

Pressure builds up, thereby opening an over-pressure valve (13). In addition, the switching process is released by the overflowing volume, which flows through the bore (16).

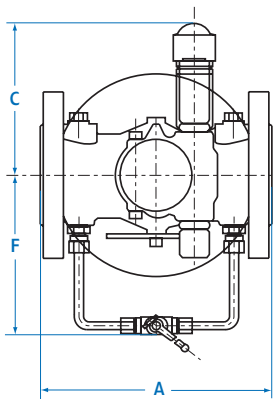
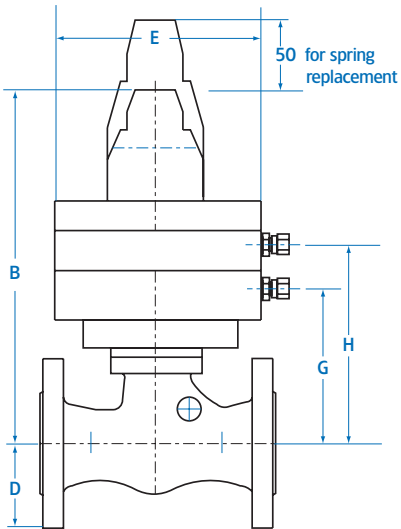
The pressure in the switching unit (2) decreases again by means of a small bore (17), which is located in the switching unit.

The gas is discharged through the blow-off/ventilation connection "B".

This connection also carries gas if the existing control pressure (e.g., pressure test) is above the set response pressure.



Dimensions



Safety shut-off valve, Type SL-IZN.1 /-M.1 /-H.1

DN	A		B		C	D						E	F	G	H			
Orifice	PN 16, 40 ANSI 150	PN 63, ANSI 300, 400, 600	SL-IZ		1" NPT and PN 40	PN 16	PN 40	PN 63	PN 100	ANSI 150	ANSI 300, 400	ANSI 600	SL-IZ N1, M1, H1			I		
			N1 M1	H1									<PN 40	1" NPT and >PN 40				
1" NPT	21	160	240	280	105			300	300				140	150				
25	28	160	230	240	280	105	575	575	700	700	540	620	620	140	PN 16 =110	150	105	135
50	40	230	300	245	285	110	825	825	975	975	760	825	825	140	110	110	108	135
80	65	310	380	285	330	145	1000	1000	1150	1150	955	1050	1050	155	145	145	154	181
100	95	350	430	320	360	185	1100	1175	1250	1325	1145	1270	1365	235	175	175	184	212
150	145	480	550	385	425	235	1425	1500	1725	1725	1395	1590	1780	370	245	245	253	281
200	195	600	650	430	470	270	1700	1875	2075	2150	1715	1905	2085	440	295	295	307	335

Safety shut-off valve Type SID

for over-pressure and under-pressure shut-off

Function

► Increasing outlet pressure
due to a defect in the regulating system lifts the diaphragm in the measuring unit for p_{so} (1) against the set spring force (2). A rod (3) acts on a lever system (4) and releases the actuating drive (6) with the attached actuator (7), which is under the tension of the closing spring (5). The actuating unit (8) is locked (8).

► Decreasing outlet pressure
due to the set force of the spring, the diaphragm in the measuring unit for P_{su} is pressed against the pressure rod (9) which releases the lever mechanism (4).

High-pressure measuring unit - H
Medium-pressure measuring unit - M
Low-pressure measuring unit - N

SID-N / M / H

Measuring

Adjustable Ranges SID-

Spring Range	Spring No.	Wire Ø (mm)
Low-pressure measuring unit N for OPSO and UPSO		
5 – 110 mbar	955-201-65	3.2
80 – 220 mbar	955-201-66	4.0
Medium-pressure measuring unit M for OPSO and UPSO		
100 – 250 mbar	955-201-65	3.2
200 – 470 mbar	955-201-66	4.0
0.45 – 1.5 bar	955-201-67	5.6
1.0 – 2.5 bar	955-201-68	6.0
2.0 – 4.0 bar	955-201-69	7.0
3.0 – 6.6 bar	955-201-70	8.5
High-pressure measuring unit H for OPSO		
5.0 – 12.0 bar	955-201-69	7.0
11.0 – 22.0 bar	955-203-64	8.0
High-pressure measuring unit H for UPSO		
1.0 – 20.0 bar	955-201-70	8.5

RSL Measuring Unit

Spring Range	Spring No.	Wire Ø (mm)
HH OPSO	955-202-84	10.0
18.0 – 60.0 bar		
HH UPSO	955-201-70	8.5
1.0 – 20.0		

OPSO = over-pressure shut-off UPSO = under-pressure shut-off

DIN-DVGW Registration Numbers: DN 25 to DN 200: **NG-4303 AU 2402**

Note

In the combination low-pressure / medium-pressure measuring unit (SID-MN), the upper switching point must not exceed 1.5 bar.

Measuring unit N

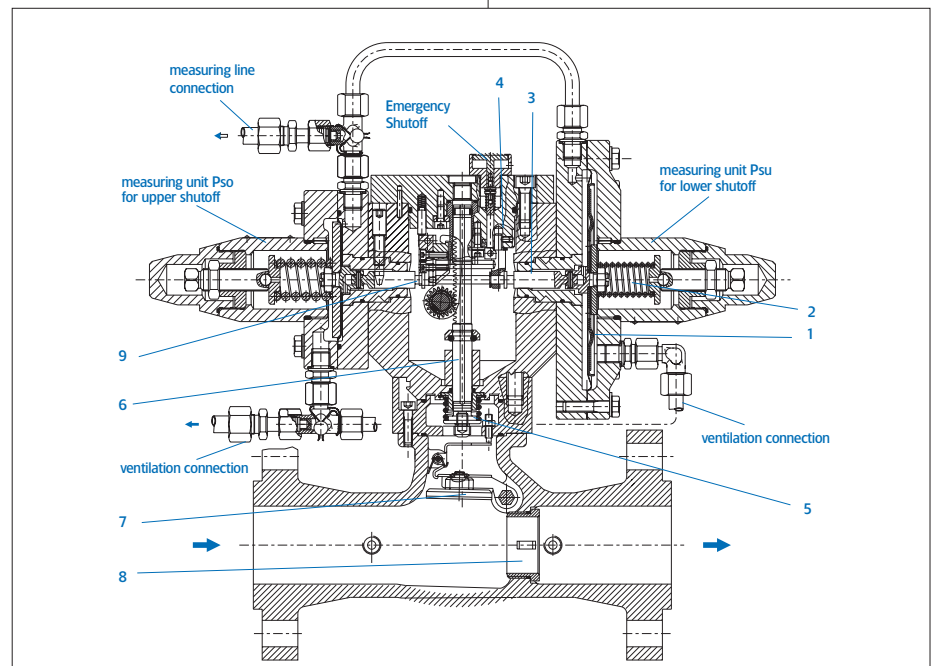
The pressure difference between the pressure to be protected and the lower switching point has to be at least 10 mbar.
For over-pressure shut-off, a pressure difference of 20 mbar minimum is required.

SID- Measuring Unit/Accuracy Class AG

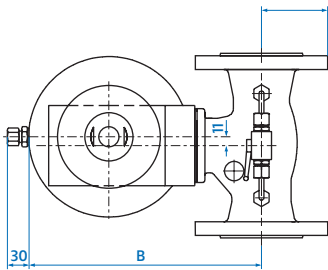
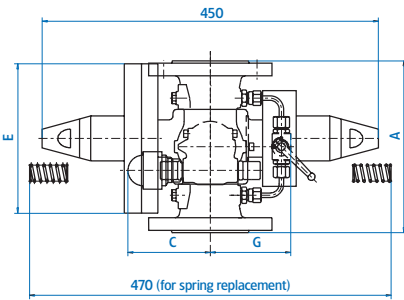
Measuring Unit N (0.005 bar – 0.22 bar)		
Upper adjustable range:	0.02 bar – 0.04 bar:	AG 10
	0.04 bar 0.22 bar:	AG 15
Lower adjustable range:	0.005 bar – 0.02 bar:	AG 30
	0.02 bar 0.11 bar:	AG 15
	0.04 bar 0.22 bar:	AG 15
Measuring Unit M (0.1 bar 6.6 bar)		
Upper adjustable range:	0.1 bar 0.45 bar:	AG 10
	0.45 bar 1.0 bar:	AG 5
	1.0 bar 6.6 bar:	AG 1
Lower adjustable range:	0.1 bar 0.45 bar:	AG 15
	0.45 bar 6.6 bar:	AG 5
Measuring Unit H (1.0 bar 22.0 bar)		
Upper adjustable range:	5.0 bar 6.0 bar:	AG 5
	6.0 bar 22.0 bar:	AG 1
Lower adjustable	1.0 bar 20.0 bar:	AG 5

RSL Measuring Unit/Accuracy Class AG

Upper adjustable range:	18.0 bar 30.0 bar:	AG 2.5
	30.0 bar 50.0 bar:	AG 1
Lower adjustable	1.0 bar 20.0 bar:	AG 5



Dimensions



DN	Orifice ø (mm)	A (mm)			B (mm)		C (mm) 1"-NPT > PN 40
		PN 16 40	ANSI 150	PN 64 ANSI 300, 600	N	M, H	
1"NPT	21			160	290	280	105
25	28	160		230	290	280	105
50	40	230		300	290	280	110
80	65	310		380	355	345	145
100	95	350		430	400	390	185
150	145	480		550	470	460	235
200	195	600		650	525	515	270

DN	Orifice ø (mm)	D (mm)						
		PN 16	PN 40	PN 64	PN 100	ANSI 150	ANSI 300	ANSI 600
1"NPT	21			30.0	30.0			
25	28	57.5	57.5	70.0	70.0	54.0	62.0	62.0
50	40	82.5	82.5	97.5	97.5	76.0	82.5	82.5
80	65	100.0	100.0	115.0	115.0	95.5	105.0	105.0
100	95	110.0	117.5	125.0	132.5	114.5	127.0	136.5
150	145	142.5	150.0	172.5	177.5	139.5	159.0	178.0
200	195	170.0	187.5	207.5	215.0	171.5	190.5	208.5

DN	Orifice ø (mm)	E (mm)			G (mm)	
		N	M	H	≤PN 40	1" NPT >PN 40
1"NPT	21	ø 200	ø 130	100		150
25	28	ø 200	ø 130	100	PN16=110 / PN40=165	150
50	40	ø 200	ø 130	100	110	110
80	65	ø 200	ø 130	100	145	145
100	95	ø 200	ø 130	100	175	175
150	145	ø 200	ø 130	100	245	245
200	195	ø 200	ø 130	100	295	295

Type SL/SID/RSL

DN	Reset Shaft		Weight in kg	
	Shaft -Ø	Spanner Size SW (mm)	PN 16 / PN 40 ANSI 150	PN 63 ANSI 300 / 600
25	8	square 6	11	17
50	8	square 6	16	20
80	11.8	two-edged 9	26	39
100	14	two-edged 10	84	113
150	20	two-edged 13	142	265
200	20	two-edged 13	209	344

Installation Position

- ▶ DN 25 and DN 50 = no restriction.
- ▶ DN 80 ≤ PN 40 = with a vertical installation, flow direction upwards (weight of the SSV flap has an opening effect), with additional spring only! With all other installation positions, there are no restrictions.
DN 80 > PN 40 = no restriction.
- ▶ DN 100 to DN 200 = should only be installed horizontally with the measuring unit pointing upwards.

Safety shut-off valve, Type 022

For over-pressure and under-pressure shut-off

Technical data

Pressure stage	PN 16, ANSI 150
Nominal width	DN 25, 50, 80 and 100
Model	Flange in DIN and ANSI, Female thread 1"-NPT
Pe max	16 bar
Who	0.04 bar to 1.7 bar
Whu	0.01 bar to 0.22 bar

Construction

Body	GGG 40
Measuring unit:	Al Mg Si 1 F 28
SSV-Body	hot-pressed brass
Interior parts	steel, brass, aluminium, perbunan
Operating temperature	-20°C to +60°C
Ambient temperature	-30°C to +60°C
Connection Po - pulse:	G 1/4"

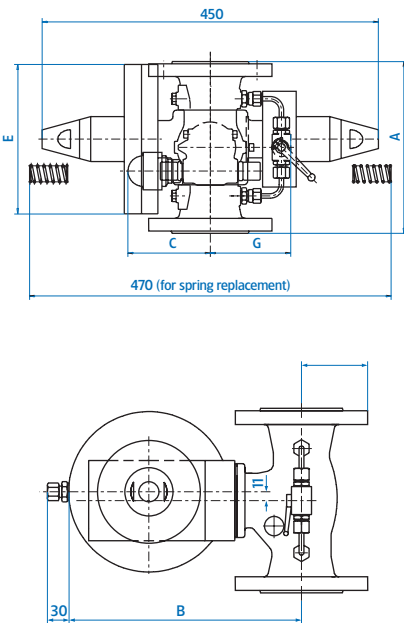
DIN-DVGW approval number

DN	DN 25	DN 50	DN 80	DN 100
N°	96.01 e 056	96.02 e 056	96.03 e 056	96.04 e 056

Spring Ranges/Shut-off Pressure Groups

Spring Range Pso/Spring-No./Colour			OPSO Range/Accuracy Class AG	
40 – 60 mbar	955-200-22	red	40 mbar – 400 mbar	AG 10
50 – 120 mbar	955-200-23	blue	40 mbar – 400 mbar	AG 10
100 – 450 mbar	955-200-24	green	40 mbar – 400 mbar	AG 10
350 – 1000 mbar	955-203-41	black	> 0.4 bar – 1.0 bar	AG 5
800 – 1700 mbar	955-203-42	yellow	> 1.0 bar – 1.7 bar	AG 2.5
Spring Range Pso/Spring-No./Colour			UPSO Range/Accuracy Class AG	
10 – 50 mbar	955-200-32	red	10 mbar – 20 mbar	AG 30
40 – 120 mbar	955-203-51	yellow	> 20 mbar – 220 mbar	AG 15
100 – 220 mbar	955-203-52	brown		

Dimensions



Description of the SSV

The SSV 022 is a later, improved version of the tried and tested SSV for upper and lower shut-off of the 133/233 series. It is mounted on the valve body by means of an adapter and can be turned 90°. Due to the SSV cap (1) which is equipped with a diaphragm, it is not necessary to install a ventilation line from the SSV into the open.

SSV Release Function

The pressure to be monitored Pa is transmitted to the external connection (9) of the SSV-022. When the set switching pressure Pso / Psu is exceeded or falls below the limit, the valve rod (2) is released and pushed against the release lever (3) of the SSV valve disk arm due to the force of the closing spring. The resulting force of the torsion spring (4) turns the valve disk arm and the valve disk (5) around the reset shaft (6) against the nozzle (7) and closes the SSV.

SSV 022 - Dimensions and Weights

Nominal Width	A	B	C	D	E	F	G	Weight/ Kg
1" NPT	160	252	177	30	165	287	88	10
DN 25	160	252	177	57.5	145	287	88	11
DN 50	230	255	180	82.5	150	290	91	15
DN 80	310	310	236	100	180	345	147	25
DN 100	350	340	270	110	310	375	178	75

Installation Position

- ▶ DN 25 and DN 40 = no restriction.
- ▶ DN 80 PN 40 = vertical installation (flow direction upwards) with additional spring only for all other positions, there are no restrictions. DN 80 > PN 40 = no restriction.
- ▶ DN 100 = horizontal installation only, with the measuring unit pointing upwards.

Pressure loss of the Safety shut-off valve Type SL-, SID/RSL and 022

These type of Safety shut-off valves have very low pressure loss. To calculate the pressure loss, the following formula can be used:

$$\Delta p (P \text{ inlet} - P \text{ outlet}) = \left(\frac{Q}{C_g} \right)^2 \times \frac{1}{P_i \text{ abs}} = [\text{bar}]$$

Example for

Inlet pressure $P_i = 3.0 \text{ bar}$

Flow rate $Q = 500 \text{ m}^3/\text{h}$ Natural gas

$Q =$ Flow rate (m^3/h Natural gas)

$C_g =$ Flow constant (see table)

$$\Delta p = \left(\frac{500}{2600} \right)^2 \times \frac{1}{4} = 0.0092 \text{ bar}$$

DN	25	50	80	100	150	200
C_g	600	2600	5100	9700	19500	33500

Note:

The max. velocity of SL-, SID/RSL and 022 is 70 m/s.