gAvilar
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Safety Shuttoff Valve Type SL - IZN/M/H.1

Instruction Manual

Contents

CE Declaration of Conformity

gAvilar BV
Kamerlingh Onnesweg 63
3316 GK Dordrecht

We declare in our own responsibility that the product
Safety shutoff valves SSV SL-IZ…

is in conformity with the following directives:

1. 2014/68/EU module B + D category IV; Pressure Equipment Directive (PED) with EC type-examination certificate: **CE-0085CP0108.**
   The module D is supervised by Notified Body DVGW-CERT GmbH, Zertifizierungsstelle (0085); Josef-Wirmer-Str. 1-3, D-53123 Bonn.

2. 2016/426/EU (Gas Appliances Regulation) together with EN 14382, with EC type-examination certificate: **CE-0085CP0108.**
   The Annex II, no. 3 is supervised by Notified Body DVGW-CERT GmbH, Zertifizierungsstelle (0085); Josef-Wirmer-Str. 1-3, D-53123 Bonn.

3. 2014/34/EU (ATEX) module A (Annex VIII), with marking
   Ref. 11501 ⟨Ex⟩ II 2 G EEx c IIC T5
   The technical documentation has been communicated to the Notified Body L.C.I.E (0081) 33, av. du Général Leclerc, 92266 Fontenay-aux-Roses France (Acknowledgment N° LCIE 03 AR 012).

4. For additional electrical devices only:
   2014/30/EU (electromagnetic compatibility)

Dordrecht, 08.04.2024

R. Neelen, Operations Manager

Important Precautions

- Keep this instruction manual handy .
- Use this appliance only with clean and dry gases . In case of use with aggressive fluids, please contact gAvilar for special versions . Do never use it with oxygen: danger of explosion!
- All national norms concerning the starting-up, the operation and the maintenance of gas appliances must be respected .
- Handle the appliance using the lifting eye .
- Before its installation, the appliance should be checked for possible transport damage . The appliance must be in perfect condition in order to be assembled . Possible lacquer damage should be touched up . Check that the sealing surfaces of the flanges are not damaged or dirty .
- Provide enough working space for operating and maintaining the appliance .
- Install the appliance in a way that it works without being interfered by other installation components .
- When tightening screws, do not use torque values higher than the ones indicated . The screws used for the flange connection must be appropriate to the flange size and the temperature range of the device . Tighten the screws crosswise .
- For the flange connections use screws whose shaft exceeds the nut by at least one thread .
- The internal chamber volume under pressure in litres is:

DN	25	50	80
Typ SL-	IZ	IZ	IZ
V=L	1	1,5	3

- The safety valve must be installed tension free in the piping . The torque (for the screws property class 5 .6 or 8 .8) given in the following table should not be exceeded:

	DN25	DN50	DN80
PN16 F .K . 5 .6	**35Nm** (M12)	**85Nm** (M16)	**85Nm** (M16)
PN25 F . K . 5 .6	**35Nm** (M12)	**85Nm** (M16)	**85Nm** (M16)
PN40 F .K . 5 .6	**35Nm** (M12)	**85Nm** (M16)	**85Nm** (M16)
ANSI150 F .K . 5 .6	**55Nm** (M14)	**85Nm** (M16)	**85Nm** (M16)
ANSI300 F .K . 8 .8	**120Nm** (M16)	**120Nm** (M16)	**200Nm** (M20)
ANSI600 F .K . 8 .8	**120Nm** (M16)	**120Nm** (M16)	**200Nm** (M20)

- These torque values refer to a single screw and apply to metal soft material gaskets (specified as $k_0 x K_D = 45 b_D$ and $k_1 = 2{,}2 b_D$) . Other gaskets may require different torque values .
- After installing the device, ensure that the connection is leak-free .
- The operating conditions indicated on the nameplates must be ensured; eventually provide appropriate security equipment .
- Repairs to the appliance must be performed by skilled staff or properly instructed personnel only . Repairs must be followed by a leakage test with 1 .1 x PS . When changing pressurised parts, ensure that they meet the Pressure Equipment Directive . Guarantee only covers repairs done by gAvilar .
- n case of internal or external corrosion, the product is to inspect regularly . If it clearly affected by corrosion, the device has to be replaced .

- Do not use any solvent or cleaning product with an alcohol base to clean the device .
- The appliance is not designed to withstand earthquakes and floods .
- Relieve pressure completely before removing the appliance . Ensure proper ventilation because of possible escapes of residual gas .
- Eventual noise suppression measures have to be taken depending on the mounting location of the device .

Remarks for use in potentially explosive atmospheres (ATEX):

- If film of rust is possible (flying rust in the immediate product surroundings), all outer aluminium parts have to be protected accordingly (e .g . by varnish) .
- For installation, removing or repair of the product on site, only tools allowed for the corresponding explosion area can be used .
- The product shall not be exposed to: flames, ionised radiation and ultra-sound .

For electrical additional devices only:

- The product must be electrically connected to adequately earthed installation .
- The following sensors are used for the position indicators:
  a) Type REED: Reed switch; those “passive components” belong to a group of
  simple electrical working means NEN-EN-IEC 60079-11; and they are in conformity with the NEN-EN-IEC 60079-0 .
  b) Type SN: Inductive sensor SJ3,5-H manufacturer P&F
  with marking: **PTB 99 ATEX 2219 X**  **II 2 G EEx ia IIC T6.**

The technical parameters of the power supply connected to the sensors SJ3,5-H / -N must not exceed no one of the following values:
Ui = 16 V; Ii = 25 mA; Pi = 64 mA; Ci = 50 nF; Li = 250 mH .

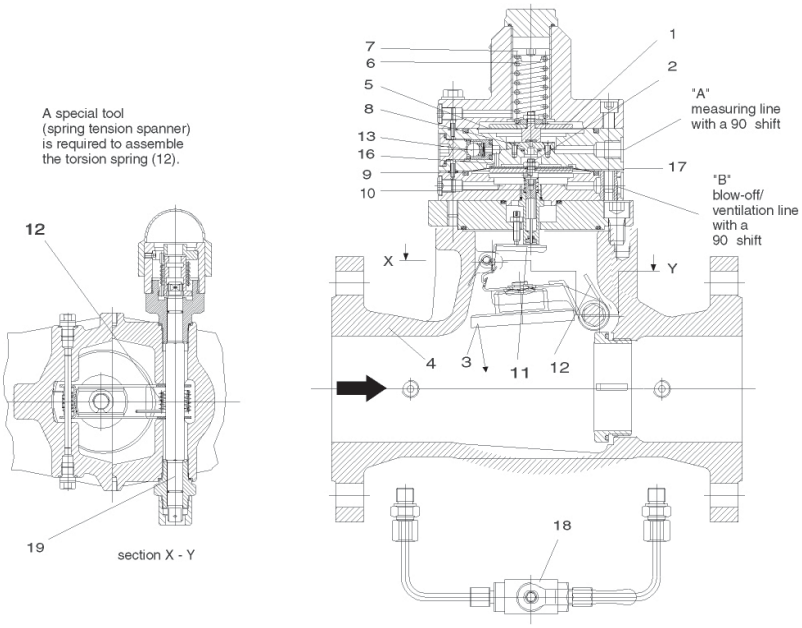
- Position indicators must be connected only to intrinsic safe circuits, according to NEN-EN-IEC 60079-11 .

  Further markings or ATEX certification are not necessary .

Safety shutoff valve type SL-IZN.1/SL-IZM.1/ SL-IZH.1 with diaphragm break protection

Task, design and functions

SL-IZN.1/SL-IZM.1 and SL-IZH.1 safety shutoff valves have the task of automatically shutting off the gas flow in the gas pressure regulating system as soon as the pressure in the system to be protected reaches an upper response pressure (overpressure).
The devices consist of a control unit (1), which acts pneumatically on a switching unit (2) and releases the flap valve (3) . The switching unit and the control unit are both mounted on the actuator body (4) .
The pressure to be monitored is applied to the diaphragm measuring unit (5), the measuring line is connected to connection „A“ . The spring force of the adjusting spring (6) acts on the upper side of the measuring unit . The desired response pressure can be adjusted by means of the adjusting screw (7) .



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

Turn clockwise =
Increase shutoff pressure
Turn anticlockwise =
Decrease shutoff pressure
When the pressure exceeds the set response pressure the diaphragm unit (5) is lifted and an overflow volume is released through the nozzle (8) . The resulting pressure increase acts on the switching diaphragm and works aganist the force of a weak, cylindrical coil spring (10) or against the friction forces from the locking unit.
When the switching unit is set under pressure the catch (11) is released and the flap valve (3) closes due to the force of one or more (ANSI 300 or higher) torsion springs (12)* . Due to the dimensioning of the closing springs, a tight closure even at a very low operating pressure is guaranteed.
Pressure compensation at the valve flap (3) is made possible by a manipulation valve (18) . The SSV can then be opened again by turning the reset shaft (19) .
* For the assembly of the torsion spring (12), a special tool (spring tensioning key) is required .

Diaphragm break protection

In all points, the safety shutoff valves correspond to EN 14382 . According to this standard, the devices have to be equipped with a unit that closes the SSV in case the diaphragm (5) of the control unit (1) is damaged .
For this reason, gAvilar safety shutoff valves feature a pressure control valve (13) which is installed in the control unit (1) . If the comparator diaphragm (5) is damaged, gas flows to the upper side of the diaphragm . A pressure develops thereby opening the pressure control valve (13) . The overflow volume, which flows through the bore (16), initiates the switching procedure . The pressure in the switching unit (2) is released through a small bore (17), which is located in the switching unit . The gas flows off through the ventilation connection „B“ .
This connection also carries gas if the existing control pressure (e .g . pressure test) is higher than the set response pressure .

Adjusting ranges

	Command Range	Part Numbers	Colour Marking	Wire Ø (mm)
SL-IZN.1	35 - 250 mbar	64146 (955-202-36)	red	1,8
	200 - 800 mbar	64147 (955-202-37)	green	2,5
SL-IZM.1	0,6 - 6,6 bar	64148 (955-202-38)	yellow	3,6
SL-IZH.1	3,5 - 10,5 bar	64149 (955-201-68)	black	6,0
	10,5 - 21,0 bar	64150 (955-201-69)	grey	7,0
	18,0 - 60,0 bar	64151 (955-202-84)	yellow	10,0

Technical data

Pressure stage (bar) : PN 16 up to PN 40
Nominal size : DN 25, DN 50, DN 80
Connections : DIN - PN 16 to PN 40 flanges, ANSI flanges
ANSI 150 to ANSI 600

Adjusting ranges
SL-IZN .1 : w_{ho} = 0 .035 – 0 .8 bar
SL-IZM .1 : w_{ho} = 0 .6 – 6 .6 bar
SL-IZH .1 : w_{ho} = 3 .5 – 60 .0 bar

Response groups

Measuring unit N :	0,035	–	0,10 bar	AG	10
	0,10	–	0,80 bar	AG	5
Measuring unit M :	0,6	–	6,6 bar	AG	5
Measuring unit H :	3,5	–	10,5 bar	AG	2,5
	10,5	–	50,0 bar	AG	1

Operating temperature : –20°C to +60°C
Fluid : suitable for all gases according to DVGW Work Sheet G 260

Materials

Actuator body	GGG 40 (up to PN 40) G20Mn5 QT (ANSI 300 and up)
Interior parts	steel, brass, stainless steel
Diaphragm	perbunan with tissue insert (SL-IZN.1/SL-IZM.1) steel (SL-IZH.1)
O-rings	perbunan, viton

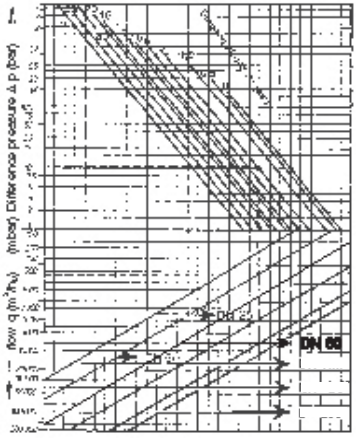
DIN-DVGW Registration Numbers

DN 25 ÷ DN 80
DG-4303CL 0019

Type examination according to EN 14382 „Safety Equipment for Gas Supply Systems with Operating Pressures up to 100 bar“.

Pressure loss (for natural gas d_n = 0.78 kg/m^3)

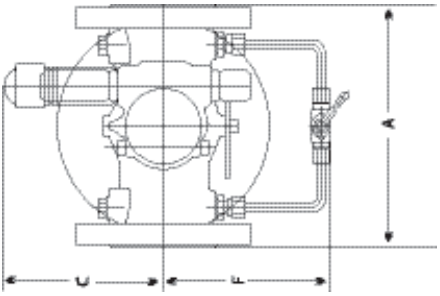
DN 25 - DN 80

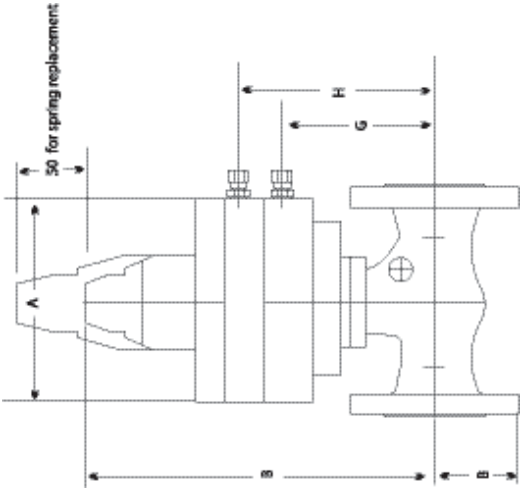


Example:

given:
QN = 600 m^3/h;
natural gas: p_1= 3 bar
used SAV DN 50,
result: Δp = 10 mbar

Dimensions



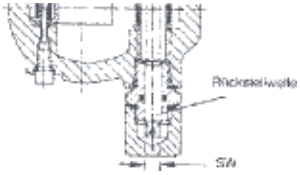


Dimensions

DN		A		B		C	D			E	F		G	H
Orifice		PN16, 25, 40 ANSI 150	AN-SI 300, 600	SL-IZ N.1, M.1	SL-IZ H.1	> PN 40	PN16, 25, 40	ANSI 150	ANSI 300, 600	SL-IZ N.1 M.1 H.1	≤ PN 40	> PN 40		
25	28	160	230	240	280	105	57.5	54	62	140	170	150	105	135
50	40	230	300	245	285	110	82.5	76	82	140	110	110	108	135
80	65	310	380	285	330	145	100	95.5	105	155	145	145	154	181

Reset shaft dimensions, weights

	Reset shaft		Weight in kg	
DN	Ø	Spanner width SW (mm)	PN16/PN40 ANSI150	PN63/100 ANSI300/600
25	8	square 6	11	17
50	8	square 6	16	20
80	11,8	2-edged 9	26	39



Installating position:

1. DN 25 and DN 50 = no restriction.
2. DN 80 ≤ PN 40 = with vertical installation, flow direction up-wards (weight of the SSV flap has an opening effect), with additional spring only!

All other positions no restrictions.
DN 80 > PN 40 = no restriction.

Line connections

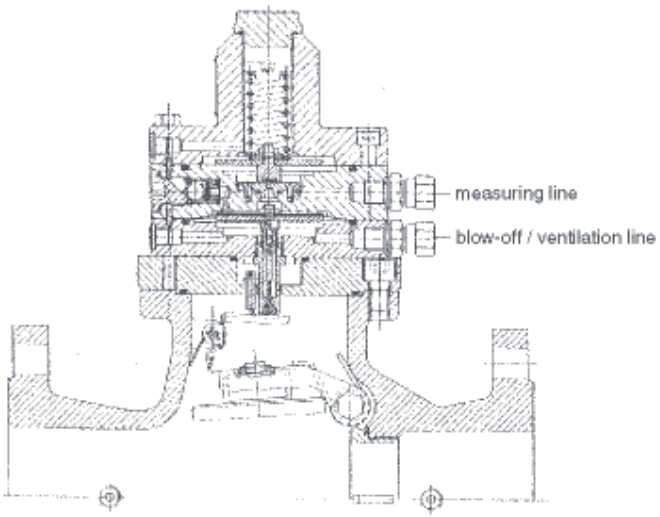
Measuring line Marking yellow	non-soldered taper-bush type pipe union according to DIN 2353 for 12 x 1 .5 pipe	Connecting thread G 1⁄4
Blow-off / Ventilation line Marking red	non-soldered taper-bush type pipe union according to DIN 2353 for 12 x 1 .5 pipe	Connecting thread G 1⁄4

The measuring line and ventilation connections are marked. The flow direction is indicated by arrows on the actuator body.

Standard design

Measuring line connection	in flow direction	right
Blow-off/Ventilation connection	in flow direction	left
Manipulation valve	in flow direction	right

The position of the measuring and ventilation connections can also be changed. This, however, has to be indicated with your order.



Assembly and commissioning

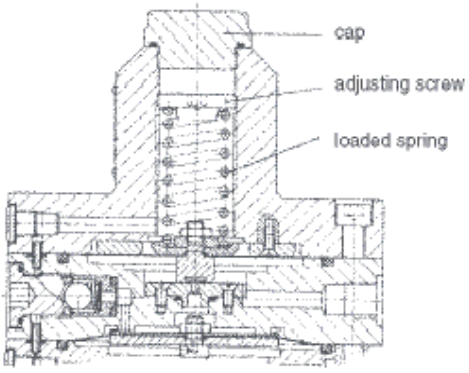
All safety shutoff valves delivered have undergone strength, leak and function tests according to EN 14382 and have been set to the desired response pressure pso .
Before installation, the protective caps at the inlet and outlet flanges of the SSV have to be removed . The connecting lines have to be free from dirt in order to prevent damage and malfunction .
Install SSV in pipe . The direction of the arrow on the actuator body indicates the flow direction . The SSV can be used in vertical and in horizontal flow direction* . The measuring line of the SSV has to be installed in a turbulence-free zone in the outlet pressure line . Afterwards, it is necessary to check all connections between the SSV and the pipeline for tightness .

During installation and commissioning, the respective directives and prescriptions of the DVGW, of the German Committee of Standards and of the employer's liability insurance association have to be observed .

* Note installating position page 14

Changing the works adjustment

Remove cap and readjust adjusting screw .
Turn the adjusting screw clockwise = **Increase** the switching pressure
Turn the adjusting screw anticlockwise = **Decrease** the switching pressure



Checking the opening position

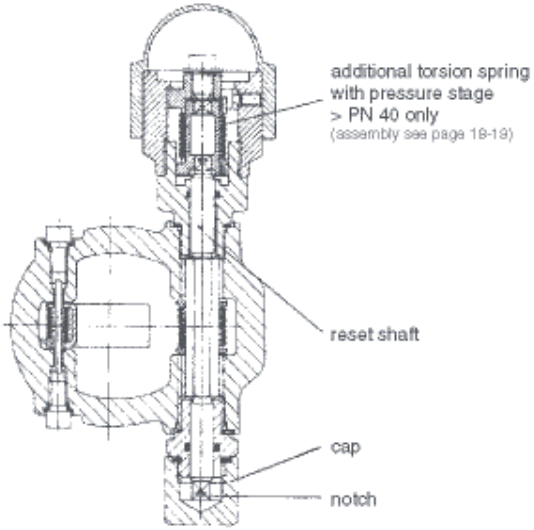
Remove closing cap from reset shaft . A notch at the front of the reset shaft indicates the valve position

➔ Notch pointing in flow direction = SSV open

↑ Notch vertical in flow direction = SSV closed .

If an opening position does not exist turn the reset shaft with the reset lever by 90° and bring the closing flap into the opening position . It is only possible to reset the closing flap if the response pressure has been released and if the pressures on both sides of the closing flap have been compensated by means of the manipulation line . For this purpose, the manipulation line of the SSV has to be opened and closed immediately after the pressure compensation . The engaging of the SSV mechanism can be heard clearly . The closing flap must not fall back after engaging * . The flap can only be engaged if the pressure to be monitored is smaller than the set switching pressure pso .

* Adjustment see page 20 .



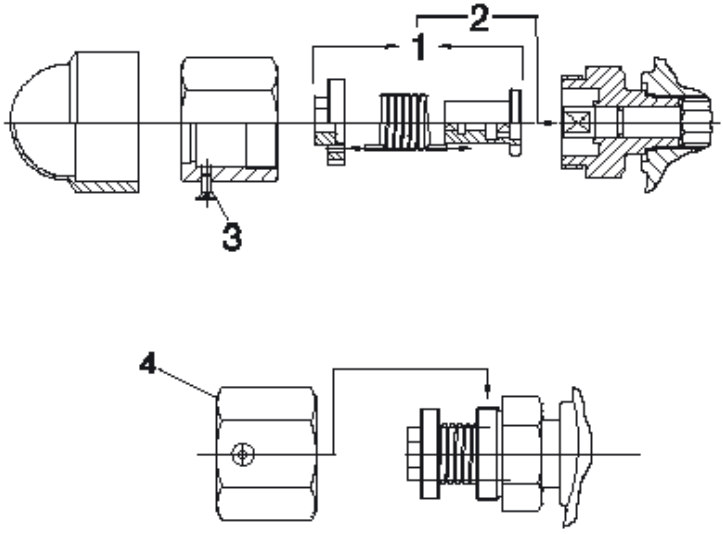
Assembly of the additional torsion spring
(DN 25 - DN 80 > PN 40)

a) Assembly

- Remove measuring unit
- Close SSV flap (release SSV)
- 1: Lubricate and assemble notched disk, torsion spring * and driving bushing While doing so, insert spring ends in the location bore or in the location slot .
- 2: Insert torsion spring with the square side in the screw bushing of the SSV . Thus, the square end of the reset shaft fits in the driving bushing .
- 3: Screw out the countersunk screw which is located in the hex nut up to 1 thread .
- 4: Mount hex nut on SSV screw bushing and tighten with ~ 50 Nm .

* Torsion spring **silver** ->
Flow direction of the SSV left-right,
Additional spring at the back

* Torsion spring **red** <-
Flow direction of the SSV right-left
Additional spring at the back



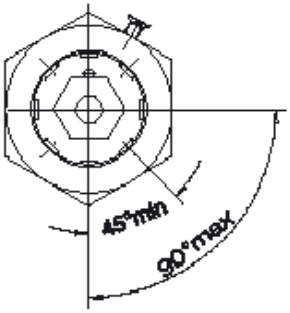
b) Spring adjustment

- Place ring spanner, box spanner (SW 13 DN 25-50; SW 17 DN 80) on notched disk and pretension it 45° to 90° :

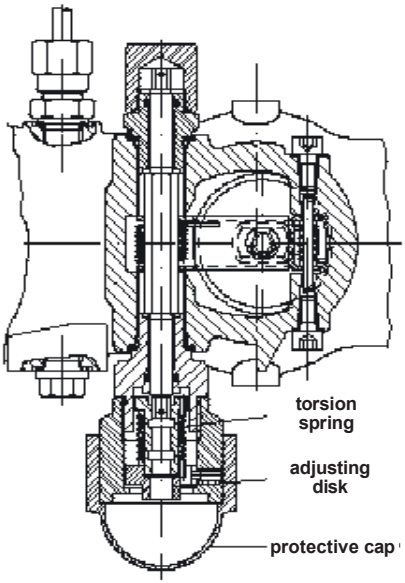
SSV -> left-right, spring **silver**
(standard assembly)
clockwise

SSV <- right-left, spring **red**
anticlockwise

Overlap with the respective notch with countersunk screw (SW 2 .5 DN 25-80) visible at the front and screw it in until it stops .
Then install protective hex cap (only possible if the countersunk screw has been screwed in the notch correctly!) .



Engage SSV by means of lever key and check shutoff . Then mount measuring unit and check SSV adjustment with air (gas) pressure .



Adjusting the SSV closing flap

1 Screw out the 4 hex bolts 1 .1M 8 x 90 (SW 13 spanner) .

2 Remove control unit minding the o-ring 2 .1 .

3 Remove counternut 3 .1 (SW 10 spanner), adjust adjusting screw 3 .2 (with SW 3 hex spanner):
Screw in
– smaller overlap –
Screw out
– greater overlap –

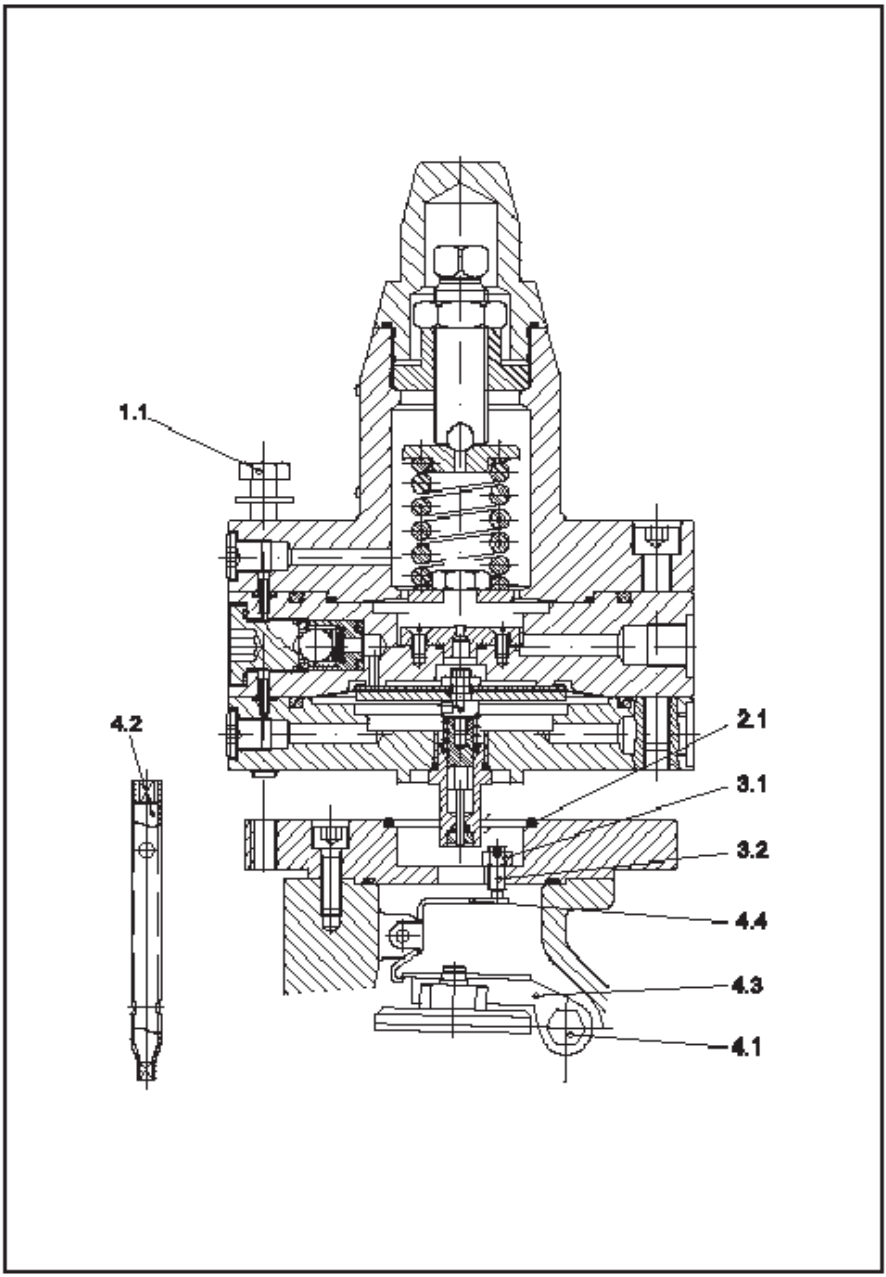
4 Adjustment:

- Screw in adjusting screw 3 .2 until the upper edge is even with the counternut 3 .1 .
- Using the key 4 .2, turn SSV closing flap 4 .3 over reset shaft 4 .1 until it stops and then turn back .
- Screw out adjusting screw 3 .2 with 1/4 to 1/2 rotational steps each .
- Repeat until SSV closing flap 4 .3 engages with light resistance .
- Release SSV manually by pressing down the release lever 4 .4 .
- Check engaged SSV for secure support (by turning the key 4 .2 mounted on the reset shaft) .
- Tighten counternut 3 .1 and hold upthe adjusting screw 3 .2 in the set screwing depth . Again check SSV release and secure support .

5. Mount control unit . Check o-ring 2 .1 for secure support .

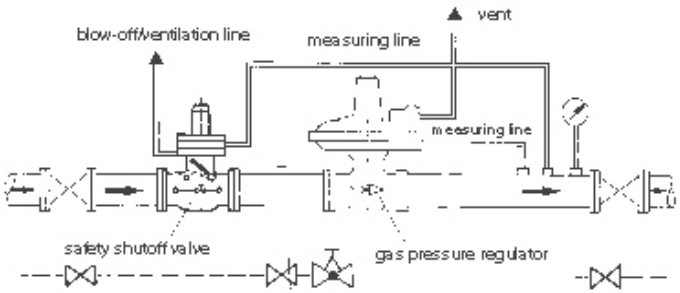
6. Reinstall 4 hex bolts M 8 .

7. Check o-ring 2 .1 for tightness .


1.1
4.2
2.1
3.1
3.2
4.4
4.3
4.1

Model installation

The figure shows an installation example of the gAvilar safety shutoff valve complete with measuring and manipulation lines.



*The integration of this combined blow-off / ventilation line in the main ventilation line is possible under the following conditions:

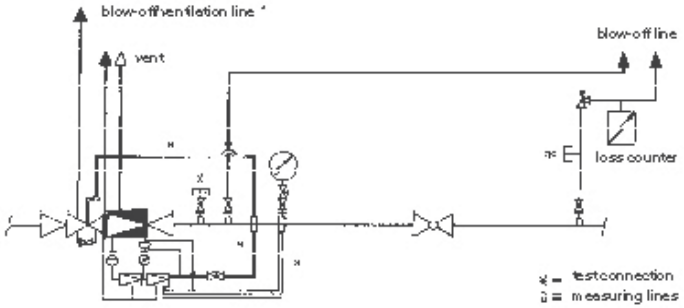
- The cross-sectional area of the ventilation line connected is max. 1/3 of the cross-sectional area of the main line.

- If several safety shutoff valves of this type are used all blow-off/ventilation lines of the individual devices are separately connected to the main line.

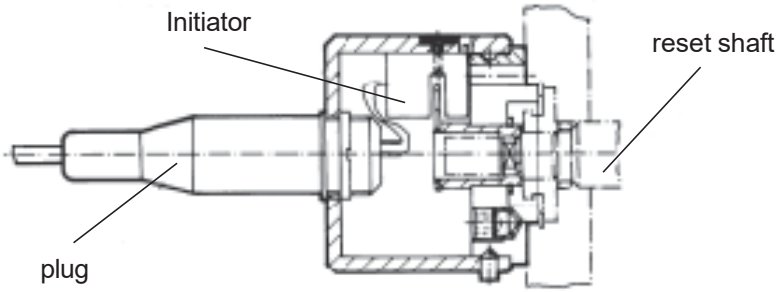
The main line has to lead into the open in the usual way without narrowings or blocking units.

Test lines

As far as the test line systems are not prescribed by the individual gas supply companies a simple way of testing can be recommended . Test procedures with own fluids through hoses or with foreign fluids (e .g . nitrogen) are preferred .
The diagram shows a pilot-action regulator preceded by an SSV .



SSV position indicator (option)



SSV position indicator for assembly* at the reset shaft, (pos No .19)

*order technical information No . 64185

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