



DGI GmbH

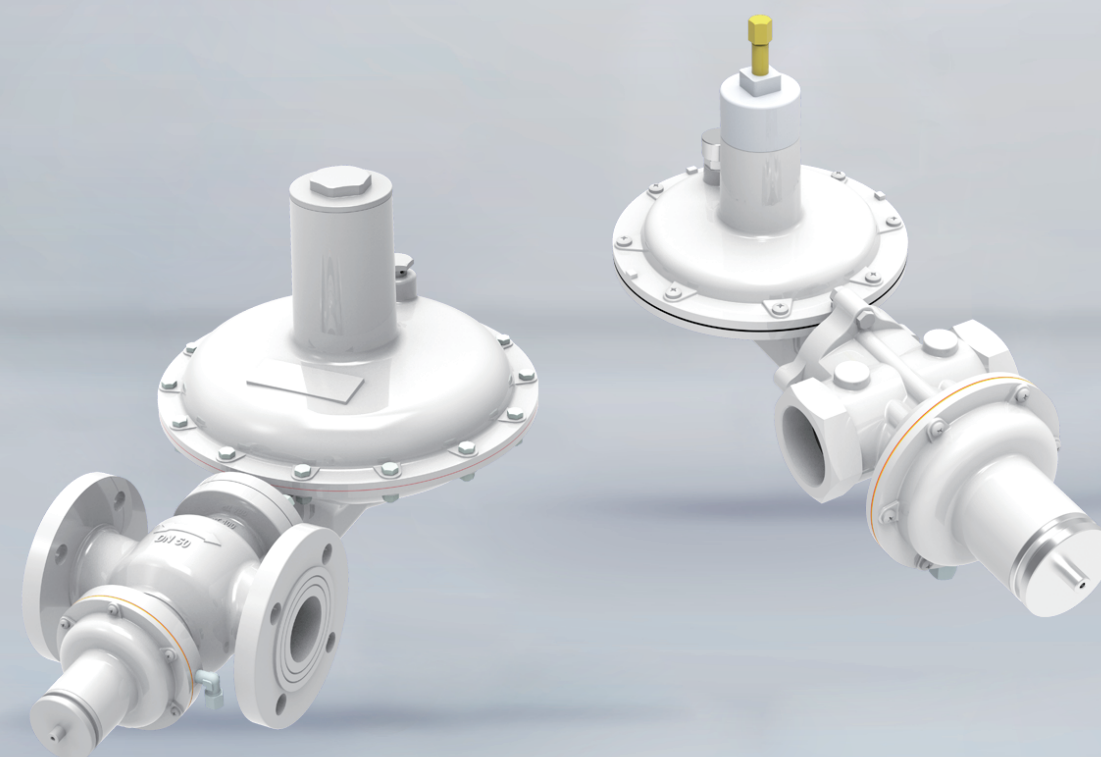
Friedrichstraße 95
10117 Berlin

Tel: +49-335-23386916
<http://www.dgi-reg.com>



This data is not binding. We reserve the right to make changes without prior notice.

DGI GmbH



H Series Pressure Regulator Manual

DGI provides a professional solution for natural gas transmission and distribution.





General	1
Specifications	1
Structural Principles	4
Installation	6
Regulator Operation	7
Shut-off Valve Operation	9
Troubleshooting	10
Spring Gauge Chart	11
Parts List	13
Product Maintenance	15

Warning

Regulation installations must respect legal directives and norms in force in the country of installation, with particular attention to the health and safety of persons, domestic animals, and property.

Pay special attention to norms and restrictions in matters of positioning for installations, with respect to distance from roads with intense traffic and the geology of the territory, adopting necessary precautions, or contact our technical department for specific installation solutions.

Furthermore, we recommend to contact our technical department in case of installation in a location with special characteristics (chemical installations, refineries, or in extreme climactic and environmental conditions) in order to verify the instruments suitability.

General

Description

The series D pressure regulator, equipped with loaded spring, controlling diaphragm and balanced valve, is suitable for low and medium pressure.

The regulators are widely used in both civil and industrial installations using Natural Gas, LPG and other non-corrosive gases.

Features

- High flow coefficient
- High accuracy, even at high flow rates
- Reduced lock-up pressure zone and lock-up pressure
- Reduced response time, no internal leakage at zero flow rate
- Fail to open
- Periodic maintenance without disassembling the valve from the pipeline
- Configure the SD200 with overpressure and underpressure slam-shut without altering the existing pipeline.

Specification

Operating Parameters

- Maximum inlet pressure:5bar
- Outlet pressure range:from 15 to 4000mbar
- Overpressure setting range:from 25 to 5000mbar
- Underpressure setting range:from 10 to 2000mbar
- Accuracy class(AC): up to 5
- Lock up pressure class(SG): up to 10
- Working temperature: -20℃ - +60℃

Flow Coefficient(Cg):

H200	H400	H600
260	530	730

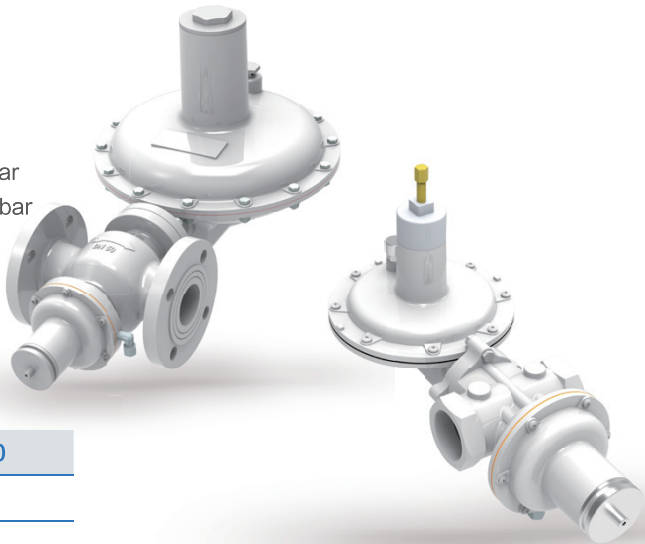
Connecting Parameters

Type	H200	H400	H600
Connecting size	Rp1-1/2"	Rp2"	DN50
Standard	ISO 7/1	ISO 7/1	PN16/25 ANSI150

*Flange rating standard: PN16/25 follows to EN 1092, ISO7005; ANSI150 follows ANSI B16.5.

Materials

Valve Body	Covers	Diaphragm	Seat	O-ring
Ductile cast iron(GJS 400-18-LT EN1563)	Aluminum EN AC 46000	Enhanced		
Optional: Cast steel(ASTM A216 WCB)	EN 1706	fiber rubber	Stainless Steel	Nitrile rubber



Model Introduction

Model				Description
H				Series H Pressure Regulator
	2			The different numbers represent different capacity A greater value means a greater capacity
	4			
	6			
		1		With Shut-off Valve
		2		Without Shut-off Valve
		1		P1 ≤ 5bar, 15mbar ≤ P2 ≤ 150mbar, With diaphragm balanced valve*
		2		P1 ≤ 5bar, 0.1bar ≤ P2 ≤ 0.5bar, With diaphragm balanced valve
		3		P1 ≤ 5bar, 0.4bar ≤ P2 ≤ 1.5bar, With diaphragm balanced valve
		3TR		P1 ≤ 5bar, 1.5bar ≤ P2 ≤ 4bar, With diaphragm balanced valve
			R	With internal relief, omit R means no relief

*P1: 进口压力 , P2: 出口压力

Model				Description
SD				Series SD Shut-off valve
	2			Type 200 Shut-off valve
		1		With over pressure and under pressure shut-off
		2		With over pressure shut-off
		1		25mbar ≤ OPSO ≤ 324mbar, 10mbar ≤ UPSO ≤ 110mbar*
		2		290mbar ≤ OPSO ≤ 840mbar, 100mbar ≤ UPSO ≤ 300mbar
		3		658mbar ≤ OPSO ≤ 5000mbar, 235mbar ≤ UPSO ≤ 2000mbar

*OPSO: Over pressure shut-off value,UPSO: Under pressure shut-off value

Nameplate

DGReg

Type

DN

PN

Year

Ts

Ps

Wd

Wds

Pumax

Bpu

Fluid

Relief

Cg

AC

SG

Made In Germany

DGReg

Type

SN

Year

Ts

PS

Wdu

Wdsu

Functional

AG

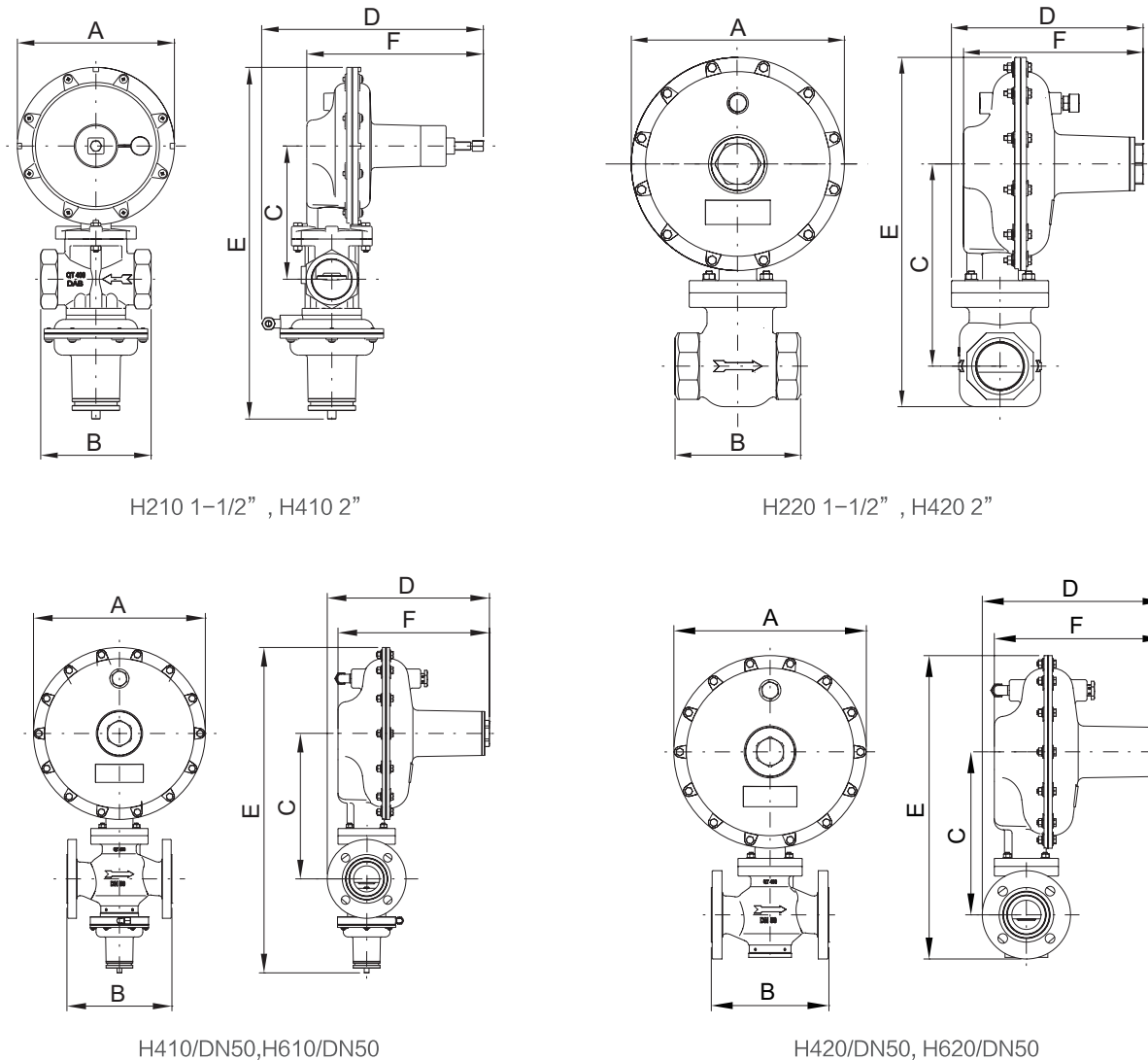
Wdo

Wdso

Made In Germany

TS:	Operating temperature range	Wdsu:	Underpressure range of the spring
PS:	Allowable pressure	Wdo:	Overpressure setting range
Wd:	Outlet pressure range	Wdso:	Overpressure range of the spring
Wds:	Pressure range of the spring	Cg:	Flow Coefficient
Pumax:	Maximum inlet pressure	AC:	Accuracy class
Bpu:	Inlet pressure range	SG:	Lock-up pressure class
Wdu:	Underpressure Setting range	AG:	Accuracy class of shutoff

Structure Dimensions



Unit: mm

Model	A	B	C	D	E	F	Weight (Kg)
H210	185	130	156.8	274	413.8	219.5	4.5
H220				237.5	281.6		4.5
H410 2"		155		246.4	569.3		10.9
H410 DN50		200		268.1	578.3		16.6
H420 2"	263	155	257	246.4	447	227.4	10.9
H420 DN50		200		268.1	453		16.6
H611/H612	360		304.5	339.8	681.3	317.3	21.8
H621/H622		220			567		19.7
H613/H613TR	263		257	430.5	585.3	389.6	18.0

Structure Principles

Main Regulator

Unless otherwise specified, all H Series pressure regulators operate on the same operating principle, as described below:

The H series pressure regulator is a direct-acting device to control pressure through external/internal and external sensing.

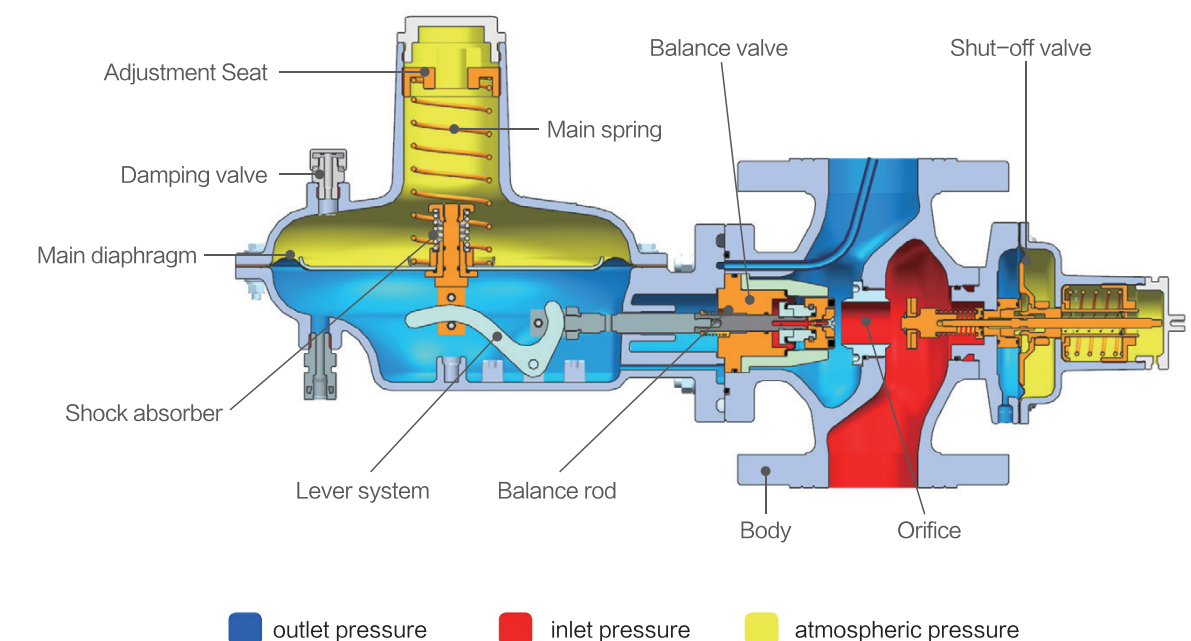
The downstream pressure is controlled by comparing the spring load and the thrust deriving from the downstream pressure on the diaphragm. The diaphragm's movement is transmitted by the lever system to the balance rod and valve pad. The valve pad is vulcanized with rubber and assures hermetic closing with the orifice when the required capacity is nil. During operation if the downstream flow increase, the downstream pressure will decrease. So the thrust deriving from the downstream pressure is less than the spring load, the diaphragm lowers itself, and draws the valve pad away from the orifice, so more gas can be provided. And if the downstream flow decrease, the downstream pressure will increase. So the pressure under the main diaphragm is larger than the spring load, the diaphragm raises itself and draws the valve pad closer to the orifice. The flow will decrease.

These models are also equipped with several incorporated devices benefit to the performance of the regulator:

Balance valve: It helps the regulator to prevent the downstream pressure being changed when the upstream pressure verified. The upstream pressure is led to the upper balance diaphragm. So the upstream pressure is loaded both on the bottom valve pad and the upper balance diaphragm, they are balanced. When the upstream pressure verifies, it will not affect to the moving of the valve pad.

Shock absorber: It protect the valve pad from damage due to abrupt increases in the regulated pressure. When the valve pad comes up against the orifice, and the regulated pressure exceeds the normal overload value, the mobile equipment stops, the main diaphragm will compress the spring of the shock absorber and move up alone until the gas release.

Damping valve: It reduce the inflow of the gas to the actuator during transitory phases, in order to exclude pumping phenomenon.

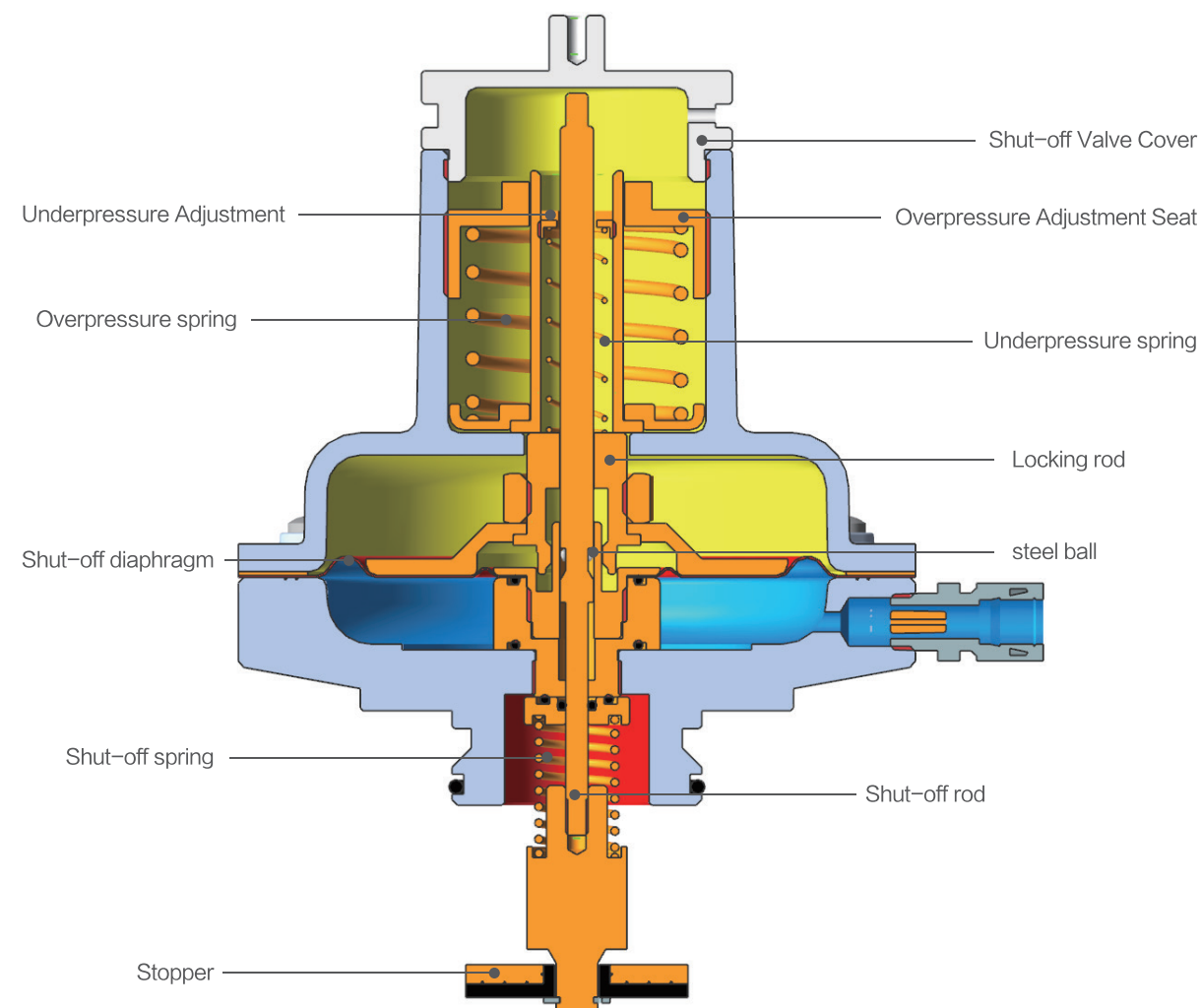


Shut-off valve

The shut-off valve consists of a sensing device and a shut-off section. It operates independently and is structurally separated from the main pressure regulator, shutting off the upstream pressure of the pressure regulator.

The operation of the shut-off valve is based on the locking system of the shut-off rod. The top of the shut-off rod is equipped with a stopper. If the pressure below the shut-off diaphragm is equal to the underpressure spring load, the shut-off diaphragm is in a balanced position. The steel ball inside the locking rod will restrict the movement of the shut-off rod, preventing the stopper from moving forward. When the pressure below the diaphragm is significantly less than the underpressure spring load, the shut-off diaphragm moves downward, allowing the steel ball to move freely, releasing the shut-off rod. The stopper moves under the action of the shut-off spring. When the pressure below the diaphragm is significantly greater than the overpressure spring load, the shut-off diaphragm moves upward, and the steel ball is also in a free state, releasing the shut-off stem. The stopper moves under the action of the shut-off spring.

When the pressure returns to normal, rotate the shut-off valve cover into the shut-off rod, pull the shut-off rod, and reset the shut-off valve.



Installation

General Indications

The following is a list of general aspects which must be taken into consideration in using the instruments in gas regulation systems:

- A. Install a suitable filter upstream from the regulator to avoid damage due to impurities;
- B. Install instruments and regulation systems to protect environments such as containment kiosks or cement housings;
- C. Transport the instruments to the installation site in their original packing and make certain lifting mechanisms are available which are suited to the weight of the instrument, proceeding with handling operations using the lifting supports situated on the head;
- D. Carry out a visual check of the instrument, to make certain there has been no damage to the packing, such as dents to the heads, cracks on the body, and scratches in the flange sealing areas;
- E. Verify that the type of installation allows for a connection of the instrument impulse sockets, in accordance with norms in force;
- F. Verify that the part of pipes downstream from the instrument up to the impulse sockets presents no stop valves or other flow disruptors;
- G. Verify that the tightening of bolts and tie-rods is uniform, in order to avoid tensions, and that, for the flanged connections, gaskets are applied that are suitable for the type of fluid employed;
- H. Verify that in case of use with On/Off installations, there must be an adequate volume of gas between the instrument and the burner, so as to partly absorb pressure swings caused by rapid capacity variations.

Preliminary operations

Before installing the regulator, check for the following:

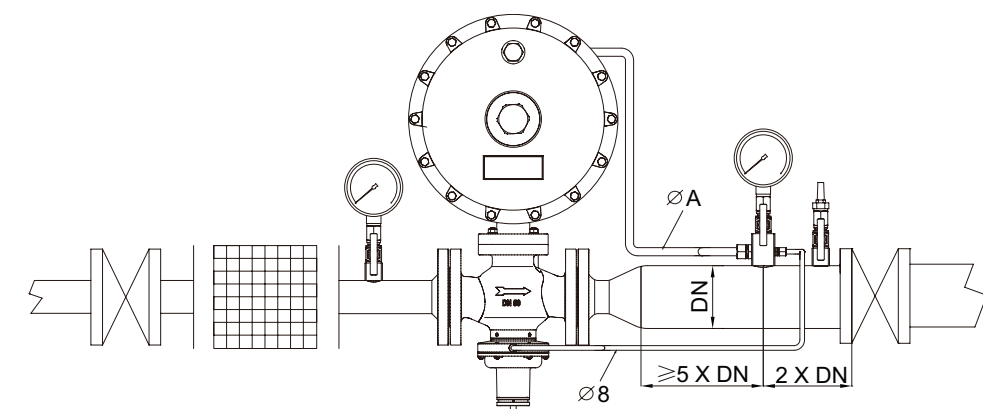
- A. Sufficient space for pressure regulator installation and operation;
- B. The pipes upstream and downstream are aligned, correctly centered and capable of sustaining the regulator's weight without transmitting flex-torsion stress to the regulator body;
- C. The connection flanges are parallel and clean, the pipes upstream has been cleaned of any impurities (welding residue and slag), and flushed out of any residues of paint, water, etc.;

When the installation requirements demand it, the regulator can also be installed upside down. Pay attention to the fact that for this usage, the spring and calibration range for the device are different from standard settings. Please remember to specify the type of installation when ordering.

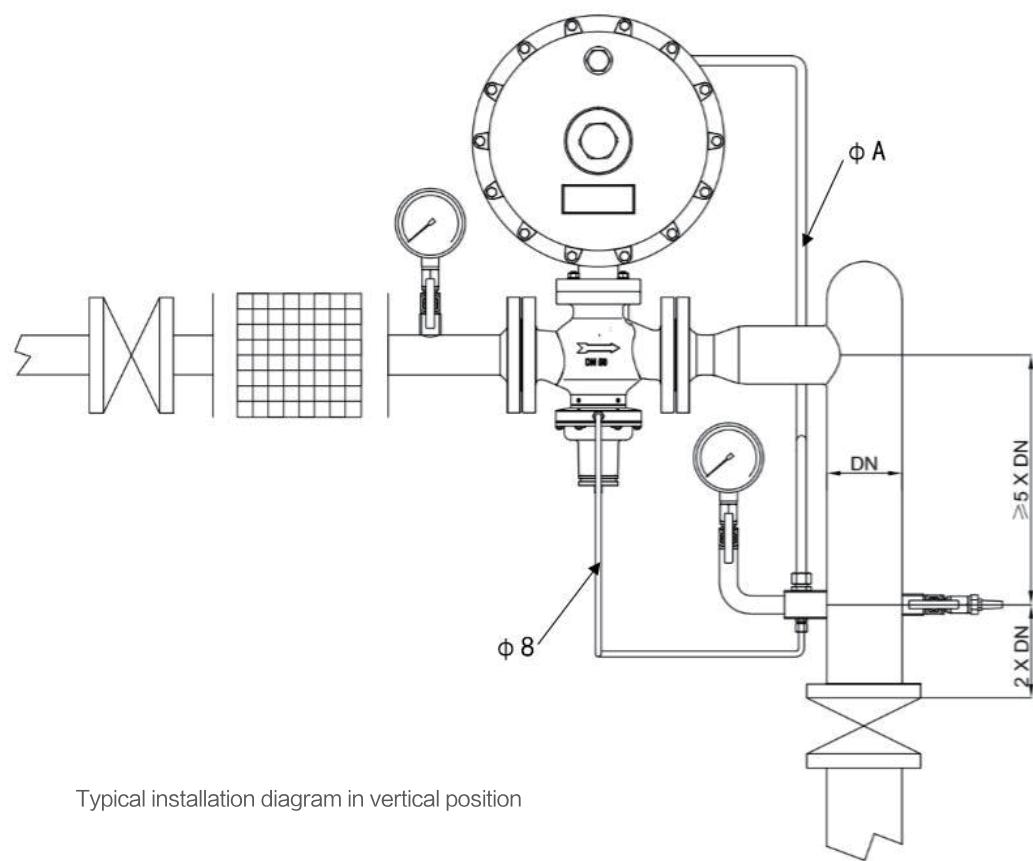
Connections

A. Be sure the regulator has been assembled so that the direction of gas flow corresponds to the direction of the arrow on the body of the instrument.

B. Connect the pressure regulator as shown in the diagram, which illustrates the typical installation method.



Typical installation diagram in horizontal position



Typical installation diagram in vertical position

Type	H200	H400	H600
ϕA	10	10	14

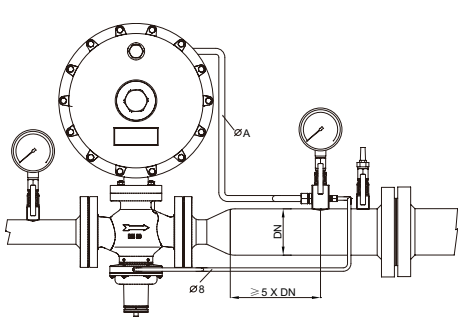
Operation of the Regulator

General Indications

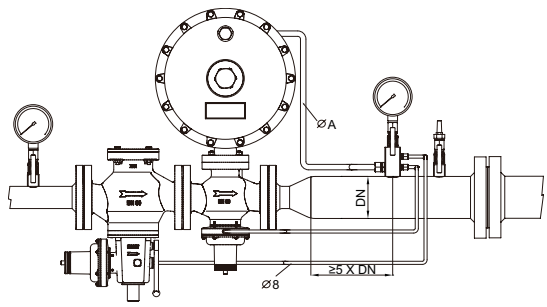
- A. After installation, ensure that the input and output valves, as well as the by-pass valve, are closed, and that the pressure regulator cover is properly installed.
- B. Before start-up, we recommend checking that the instrument specifications conform to operating conditions. Check the instrument nameplate identification data.
- C. Before proceeding with the instrument start-up, we also recommend verifying that the system is sealed towards the outside. Proceed by spreading soapy water or some other foamy product over those areas which can allow the passage of gas between the inside and outside of the instrument (contact area of covers, screw housings, surface areas, etc.). If a leak is present, swelling and/or bubbles will be noted.
- D. The instruments are generally supplied already calibrated at our manufacturing plant, based on customer order specifications. In any case, we recommend verifying that the calibration values requested for the regulator and its accessories correspond to the data on the identification nameplate.
- E. For pressure systems with 2 or more streams, when starting, proceed with the start-up of one stream at a time, starting with the one designated as the standby.
- F. We recommend activating the stop valves very slowly and keep the gauge being closed during the valve opening phase. Otherwise it could damage the instrument.

Start up

- A. Slightly open the downstream shut-off valve to allow the minimum required flow.
- B. Slowly open the upstream valve.
- C. Gradually open the shut-off valve; initially, open it to a small degree. Wait for the downstream pressure to rise near the set pressure before fully lifting the shut-off valve.
- D. If there are both independent shut-off valves and built-in shut-off valves installed on the pipeline, follow step C and first open the shut-off valve closest to the input valves on the flow direction.



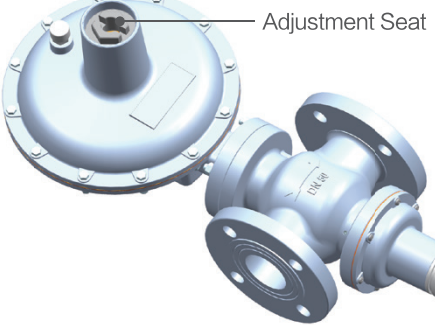
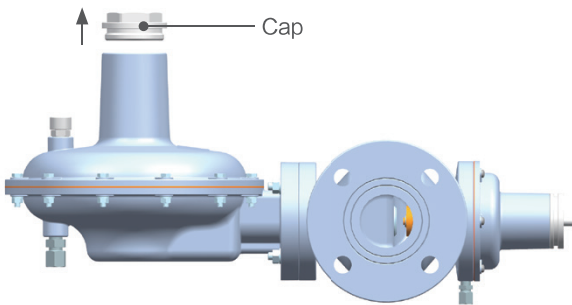
Regulator with slam shut device



Regulator with slam shut + slam shut device

Calibration

- The pressure regulator is preset according to user order requirements before leaving the factory. If adjustments are necessary, they should be made within the allowable range of the installed spring. After adjusting the set pressure, verify whether the shutoff pressure needs to be adjusted synchronously.
- Calibration should be proceed as follows:
- A. Install a pressure gauge downstream of the pressure regulator to check the regulated pressure.
 - B. Remove the cap.
 - C. Slowly open the gauge downstream and the stop valve upstream,
 - D. Turn the adjustment seat of the regulator (clockwise to increase the pressure and counter-clockwise to reduce it). If there is a significant difference between the pressure that needs to be adjusted to and the originally set pressure, it may be necessary to replace the spring, selecting a spring, the most suitable from the table of springs.



Operation of the Shut-off Valve

When the set pressure of the regulator is adjusted or the shut-off valve is abnormally shut off during normal operation, the shut-off valve needs to be adjusted synchronously.

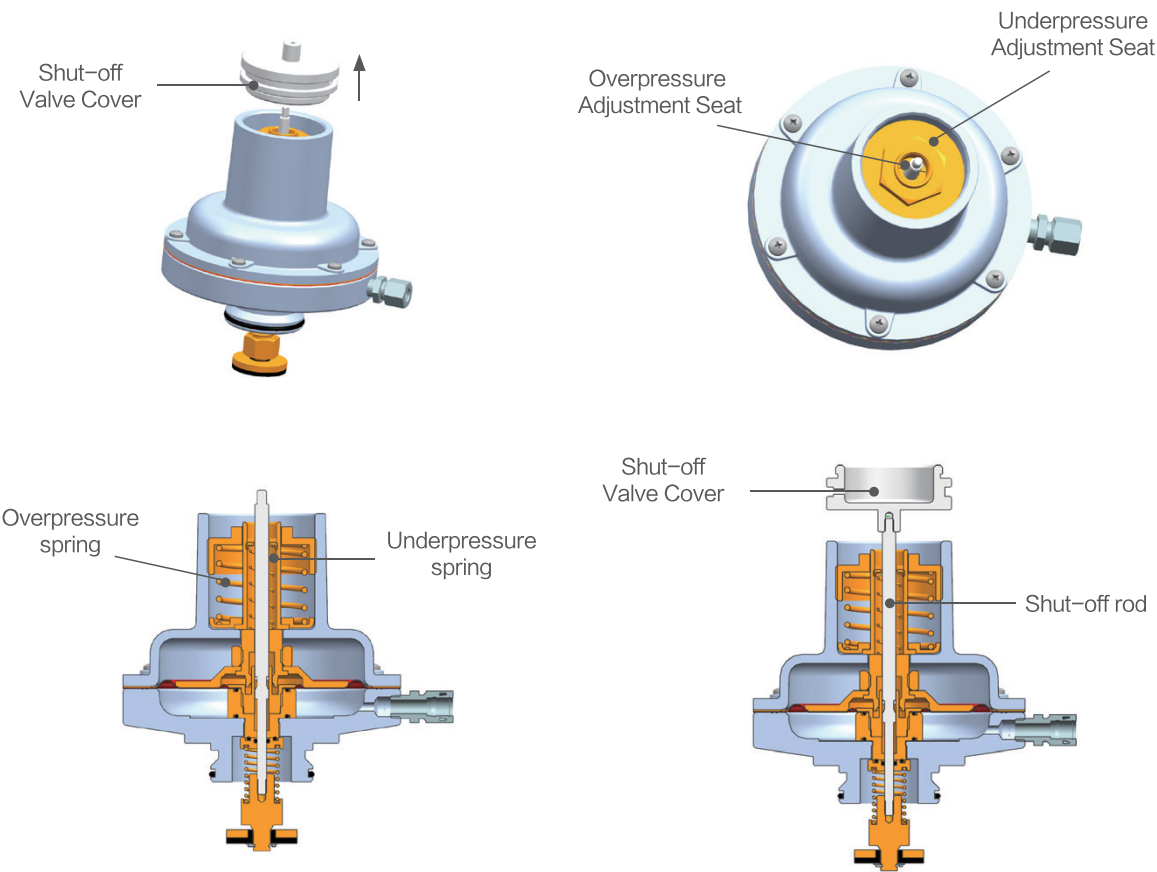
A.Remove the Shut-off Valve Cover

B.Turn the overpressure adjustment seat for overpressure shut-off and the underpressure adjustment seat for underpressure shut-off.Both adjustment seat are turned clockwise to increase the pressure and counter clockwise to reduce it.

C.If you need to achieve a pressure significantly different from the originally set pressure, you may need to replace the overpressure/underpressure spring.Select a suitable spring from the spring chart, dismantle the overpressure / underpressure adjustment seat and the original spring, install the new spring, and screw back the overpressure / underpressure adjustment seat.Adjust the shutoff pressure following step B.

D.Reset the shut-off valve.When the shutoff reason is removed, pull the reset handle and release it slowly until the shut-off valve is reset.

E.After adjustment, reset the pull cover of the shut-off valve



Troubleshooting

At times, due to normal wear and tear of parts, special operating conditions, gas type variations, or during the initial operational phase, the pressure regulator may experience certain malfunctions.The table below lists common causes and solutions.These tables are not a substitute for professional troubleshooting and are intended only as an initial reference for problem-solving.If issues persist, please contact our technical department or authorized distributor for assistance.

No.	Problem	Reason	Solution
1	Regulator wide open	Main diaphragm damaged	Replace the diaphragm
		Main spring is soft and being solid pressed	Check the adjustment range of the spring and replace the spring
		The outlet pressure feed is not connected to the bottom diaphragm cavity	Connect the outlet pressure
2	Imperfect seal	Seal pad or orifice is worn out	Replace the pad or orifice
		Dirt in seal area	Clean the seal area
		Balancing diaphragm damaged	Replace the balancing diaphragm
3	No flow	Shut-off device is in closing position	Open the shut-off device
		Upstream valve is closed	Open the upstream valve
4	The outlet pressure reduced	The upstream pressure is too weak	Increase the upstream pressure
		Valve upstream is not widely open	Widely open the upstream valve
		Capacity request is more than instrument capacity	Decrease the flow or replace a larger regulator
5	The shut-off valve is not worked	Filter upstream is clogged	Clean the filter
		The shut-off diaphragm is broken	Replace the diaphragm
		The feed pipe to the shut-off valve is clogged	Clean the pipe
		The shut-off spring is solid pressed	Decrease the shutoff pressure value or replace a hard spring
6	The shut-off valve couldn't be set	The pressure downstream is not removed	Find the reason and remove it
		The pressure downstream is too high	Decrease the pressure downstream or adjust the shutoff spring to increase the shutoff pressure

Spring Gauge Chart

Pressure range of the regulator spring

Model	version	Outlet pressure range (mbar)	Part number	Color
H200	H211 / H221	18–31	19010803213	green
		28–45	19010803214	blue
		35–62	19010803215	red
		60–90	19010803216	black
		70–120	19010803217	white
		95–160	19010803218	yellow
	H212 / H222	100–190	19010803218	yellow
		140–250	19010803219	green
		200–350	190108032110	blue
		280–550	190108032111	red
H400	H411 / H421	18–32	19010805233	green
		24–40	19010805234	blue
		30–55	19010805235	red
		40–70	19010805236	black
		60–100	19010805238	yellow
		85–180	190108052310	blue
	H412 / H422	120–220	190108052311	red
		180–320	190108052312	black
		300–550	190108052313	white

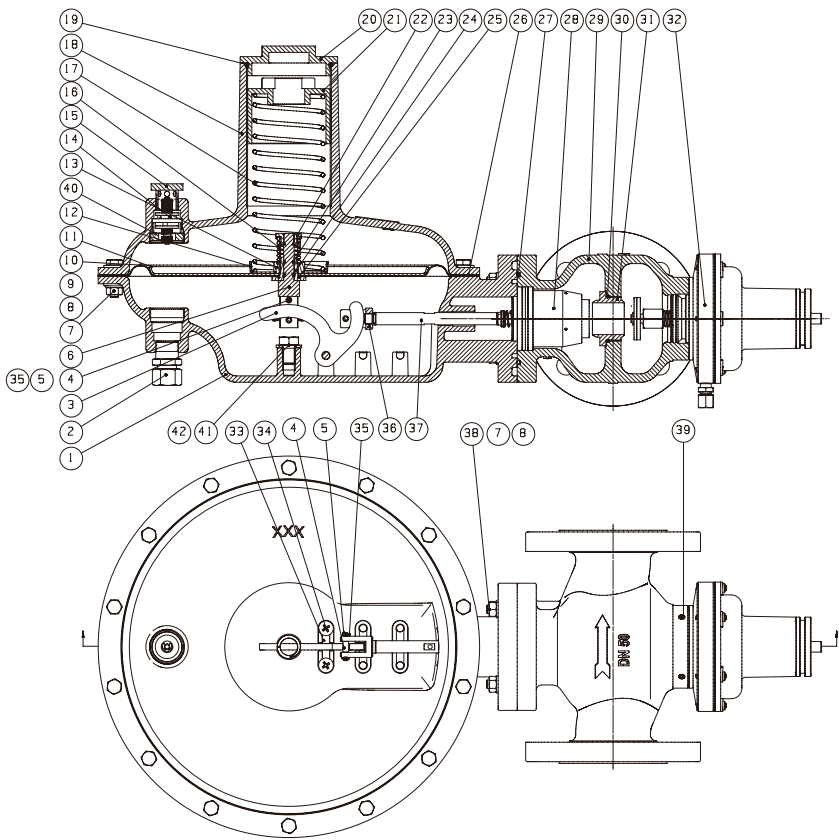
Model	version	Outlet pressure range (mbar)	Part number	Color
H600	H611 / H621	20–30	19010804172	yellow
		33–50	19010804173	green
		45–70	19010804174	blue
		65–115	19010804175	red
		105–185	19010804176	black
	H612 / H622	100–150	19010804176	black
		142–230	19010804177	white
		215–330	19010804178	yellow
		320–520	19010804179	green
	H613 / H623	500–800	190108200411	red
		650–1200	190108200412	black
		1000–1600	190108200413	white
	H613TR / H623TR	1500–2500	190108200414	yellow
		2200–3400	190108200415	green
		3000–4200	190108200416	blue

Pressure range of the shut-off spring

Model	version	Shut-off pressure range (mbar)	Part number	Color
Over pressure shut-off	SD201	27–65	19010801658	yellow
		45–110	19010801651	white
		90–240	19010801652	yellow
	SD202	185–460	19010801653	green
		330–650	19010801654	blue
		450–900	19010801655	red
	SD203	850–1600	19010801653	green
		1560–3400	19010801654	blue
		3260–5000	19010801656	black
Under pressure shut-off	SD201	5–18	19010700311	white
		16–54	19010700312	yellow
		50–110	19010700313	green
	SD202	100–190	19010700314	blue
		170–300	19010700315	red
	SD203	235–435	19010700313	green
		405–930	19010700314	blue
		900–2000	19010700316	black

Parts List

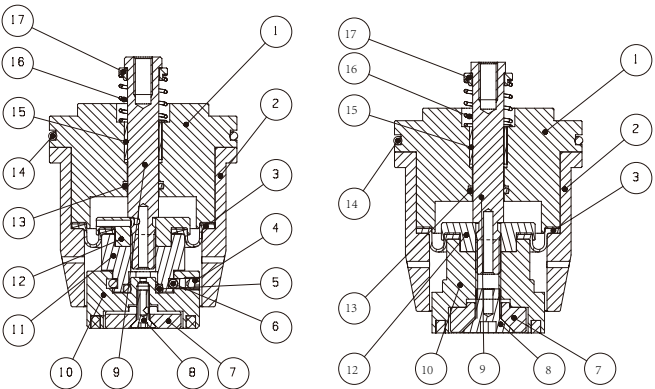
Main Regulator



No.	Name	No.	Name	No.	Name
1	Bottom cover	15	Damping valve cover	29	Valve body
2	Ferrule connector	16	Release spring	30	O-ring *
3	Lever	17	Main spring	31	Orifice *
4	Pin	18	Top cover	32	Shut-off valve
5	Shaft sleeve	19	O-ring *	33	rotor
6	Retainer ring	20	Cap	34	screw
7	Nut	21	Adjustment seat	35	Retainer ring
8	Washer	22	Set screw	36	Extension sleeve
9	Hexagon bolt	23	O-ring *	37	Extension bar
10	Diaphragm *	24	Diaphragm base	38	Screw bolt
11	Liner	25	O-ring *	39	screw
12	Spring pad	26	Sealing gasket *	40	blanking cap
13	Nut	27	O-ring *	41	Flat gasket
14	Damping valve	28	Balanced valve	42	Hexagon bolt

*Recommended spare parts package parts

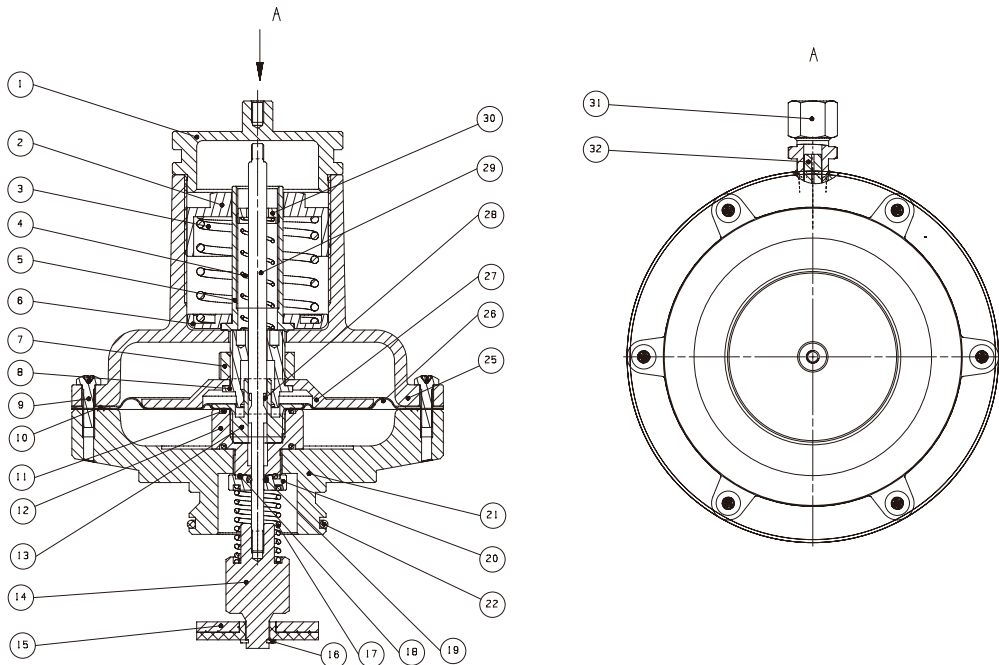
Balanced valve



No.	Name	No.	Name
1	Supporting seat	10	Valve Pad *
2	Liner	11	Plunger
3	Balanced diaphragm *	12	pressed block
4	screw	13	O-ring *
5	O-ring *	14	O-ring *
6	steel ball	15	bear
7	pressed block	16	spring
8	screw	17	washer
9	Balanced valve stem		

* Recommended spare parts package parts

Shut-off valve



No.	Name	No.	Name	No.	Name
1	Shut-off Valve Cover	11	O-ring *	21	Valve body
2	Overpressure adjustment seat*	12	Diaphragm seat	22	O-ring *
3	Overpressure spring	13	Steel ball seat	25	Top cover
4	Underpressure spring	14	Connection head	26	Diaphragm *
5	Underpressure spring chamber	15	Shut-off valve pad *	27	Liner
6	Overpressure spring plate	16	Retainer ring	28	Steel ball
7	Nut	17	Shut-off spring	29	Shut-off valve stem
8	Compression screw	18	O-ring *	30	Underpressure adjustment seat
9	Screw	19	O-ring *	31	Ferrule connector
10	Sealing gasket *	20	Gasket	32	damping block

*Recommended spare parts package parts

Product Maintenance

A correct maintenance program is indispensable for the proper operation of the instruments over time. Remember that all interventions on the equipment must be performed by technically qualified personnel. Before beginning disassembly operations on the instruments, be sure that you have available a series of wrenches and a series of spare parts. We recommend affixing indication signs on parts which may present problems of placement or positioning during the assembly phase.

A.Tightness test: Close the stop valve downstream from the instrument. An increase will be noted in pressure due to the normal overload in closing, which will stabilize after a few seconds. If, on the contrary, a pressure increase is noted downstream, even slowly, it is an obvious sign that the stopper is not providing a perfect seal. In this case, proceed with maintenance.








B.Trip test for slam shut device: Cut off the stream by means of the valves upstream and downstream, discharge the pressure by opening the valve. The slam shut device will release (if foreseen), connect suitable equipment to the valve to enable a variation in pressure, Increase the pressure up to the lock tripping value for maximum pressure, and check the value, continue to raise the pressure up to the trip of the 2nd slam shut (if present) and check the value, disconnect the test equipment, close the valve and service the stream.

C.Periodic maintenance: In order to prevent damage to the instruments and consequent installation shutdowns, we recommend carrying out the periodic replacement of components (mainly valve pad and main diaphragm) which can deteriorate due to normal mechanical wear .In conjunction, we recommend also verifying the accessory equipment on the decompression stream, such as, for example, filters, valves, etc.

Tool List

Before performing maintenance operations, ensure that the appropriate tools are available to ensure the successful disassembly or assembly. Refer to the specific tool list for the required tools.

No.	DN	H200	H400	H600
A	L	150	150	150
B	Ch.	10,14,19,22,24	10,11,14,19,24	10,11,14,19,24
C	Ch.	3,4	2,2.5,3,4	2,2.5,3,4
D	Ch.	8"	8"	8"
E	Ch.	1/2"	1/2"	1/2"
F	Ch.	19,27	24,27,36	24,27
G	L	2#	2#	2#
H	Ch.	2#	2#	2#
I	Ch.	1901080203GZzp	1901080521GZzp	1901080551GZzp
J	Ch.	/	7"	7"
K	Cod	1901000200GZzp	1901000200GZzp	1901000200GZzp
L	Cod	/	/	1901080415GZzp

					
A	Adjustable spanner	B	Combined spanner	C	Allen key
					
D	Tapared nose plier	E	Bent rod	F	Exagonal bushing spanner
					
G	Flat screwdriver	H	Philips screwdriver	I	Special tool for valve seat
					
J	Circlip plier	K	O-Ring extraction special tool	L	Special tool for adjusting seat