



A Cavagna Group Company

REGULATORS SERIES **S23**

SPRING LOADED PRESSURE REGULATORS



1 DESCRIPTION

The **S23** regulators are a new line of pressure regulators – direct operating type – designed to guarantee a high regulation accuracy and an utmost easiness in use. These devices are usually used in distribution and industrial systems and are designed to be installed in regulation units in gas grids of natural, manufactured and lpg gas or other non corrosive gases, filtered at first. The **S23** pressure regulators are “fail to open” type, which means that in case of malfunction due to breaking of the main diaphragm or as a result of a lack of impulse downstream, the regulator will open up completely. The **S23** pressure regulators are “top entry” type, which allows for maintenance operations without having to remove the body from the pipes. Modularity allows for variation in its configuration even when already installed in stream. In addition, the modules can be easily disassembled for eventual controls.

2 VERSIONS AVAILABLE

- .BP**
for an inlet pressure range of 0,5 ÷ 5 bar
for an outlet pressure range of 10 ÷ 80 mbar
- .MP**
for an inlet pressure range of 0,5 ÷ 5 bar
for an outlet pressure range of 75 ÷ 500 mbar
- .AP**
for an inlet pressure range of 0,5 ÷ 5 bar
for an outlet pressure range of 500 ÷ 4000 mbar
- .APA**
for an inlet pressure range of 0,5 ÷ 5 bar
for an outlet pressure range of 500 ÷ 4000 mbar

3 MATERIALS

- Body in cast iron (GJS-400-18LT UNI EN 1563)
- Covers in pressed steel
- Diaphragms in rubber with cloth enforcement
- Seats in stainless steel
- Springs in stainless steel
- Available with internal pressure pulse only

4 FEATURES

- Counterbalanced regulating device
- Anti-pumping device
- Diaphragm shock absorber or relief valve
- Top entry construction
- In accordance to PED 2014/68/UE - EN334
- Working Temperature: -20 (-30) ÷ 60
- Regulating Class: up to A.C. 5
- Closing Pressure Class: up to S.G. 10

5 TECHNICAL DATA

	INLET PRESSURE			OUTLET PRESSURE				CG (VALVE COEFFICIENT)	CONNECTIONS
	BP, MP, AP	APS	APA	BP	MP	AP	AP, APA		
	BAR			MBAR					
S23- 1	5 or 6		19	10 ÷ 80	75 ÷ 500	500 ÷ 4000	500÷ 4000		DN50
S23- 2	5 or 6							3380	DN80

AVAILABLE VERSIONS:

- B: WITH OPSO/UPSO SHUT-OFF VALVE
- M: WORKING AS MONITOR

5.1 DIMENSIONING

The choice of the regulator is made using the **C_g** valve coefficient.

C_g coefficient is numerically equivalent to the value of air flow in Scfh in critical conditions with full open regulator operating with an upstream pressure of 1 psia and a temperature of 15° C.

Flow rates with maximum operating at different operating conditions can be calculated as follows:

a. in non critical conditions (when $P_e < 2 \text{ Pa}$)

$$Q = 0,526 * C_g * P_e * \sin \left(93,5 * \sqrt{\frac{(P_e - P_a)}{P_e}} \right)^{D_{eg}}$$

b. in critical conditions (when $P_e \geq 2 \text{ Pa}$)

where:

$$Q = 0,526 * C_g * P_e$$

Q=capacity [Stm3/h]

Pe= absolute upstream pressure [bar]

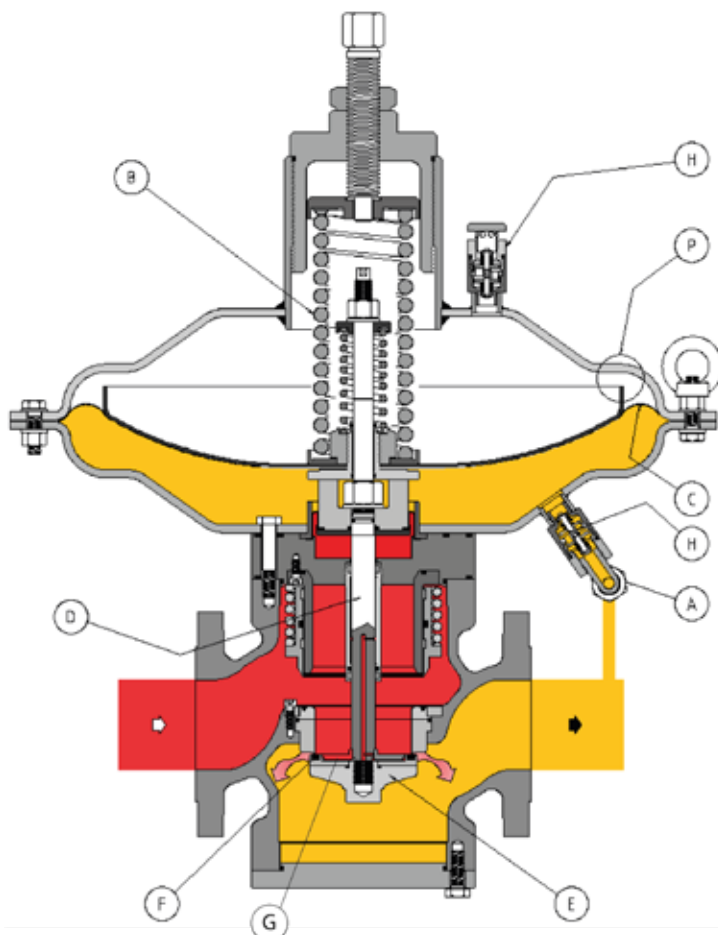
Pa= absolute downstream pressure [bar]

6 OPERATING PRINCIPLE

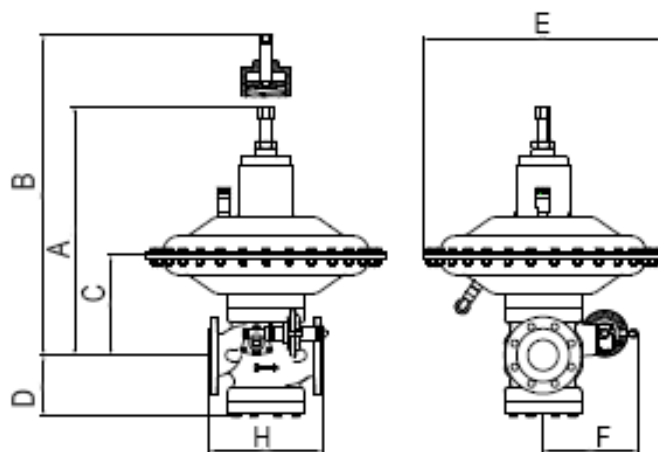
The operating principle for the **S23** regulators is the same as for all models, with the exception of certain marginal differences, exemplified below. The **S23** pressure regulator is a direct action type instrument with pressure control downstream through external impulse (**A**).

The downstream pressure is controlled by comparing the spring load (**B**) and the thrust deriving from the downstream pressure on the diaphragm (**C**). The diaphragm's movement is transmitted by the lever system (**D**) to the rod (**E**). The rubber pad (**F**) is vulcanized on the stopper (**G**) and assures hermetic closing when the required capacity is nil. If during operation the thrust deriving from the downstream pressure is less than the spring load (**B**), the diaphragm (**C**) lower itself, and draws the stopper (**G**) away from the valve housing until the downstream pressure once again attains the pre-set calibration value.

The regulator has incorporated two anti-pumping devices (**H**) that have the function of slowing the inflow / outflow of the gas to the head in the transitory phases in order to eliminate possible phenomena of commutation.

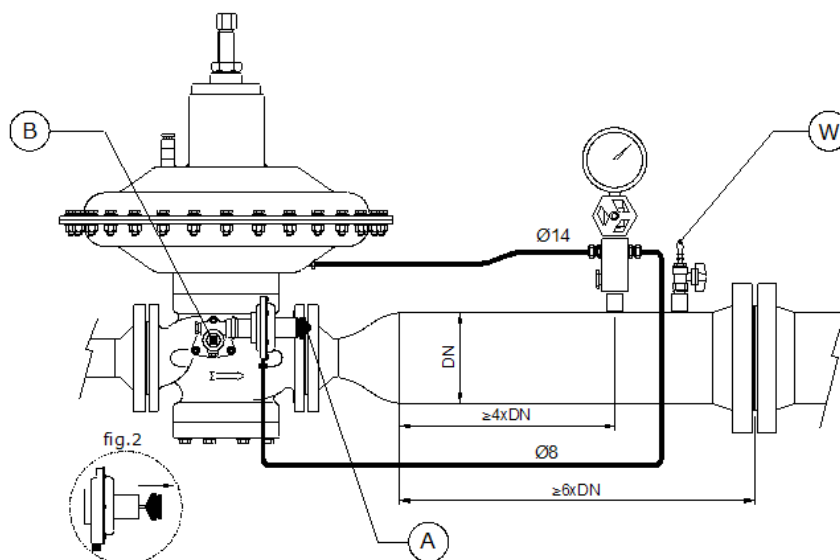


7.1 OVERALL DIMENSIONS S23



	H			A	B	C	D	F	E			
	DN 65	DN 80	DN 100						OUTLET PRESSURE RANGE (MBAR)			
	MM			MM					MM			
S23-1 B		298		750	960	500	210	160	630	630 TR	380	380 TR
									10 ÷ 80	75 ÷ 500	470 ÷ 2000	1900 ÷ 4000

7.2 INSTALLATION S23



Annex 2

Warranty conditions

LPG-NATURAL GAS-COMPRESSED GASES REGULATOR PRODUCTS WARRANTY | Not valid for USA and Canada

1 – Compliance of the brand new products

The original seller of the brand new product (hereinafter referred to as Product) hereby warrants that the Product corresponds in quantity, quality, and type as specified in the sales contract (or, if missing, in the order's confirmation) for the Product and that the Product is without defects that could render it unfit for the use to which it is intended. The original seller of the Product is identified on the invoice for the Product and is referred to herein as the "Warrantor."

2 – Extent of the guarantee

The warranty is limited only to defects in a) the design of the Product, b) the materials in the Product or c) the construction of the Product, which can be attributed to the Warrantor. The warranty does not apply in the case where the buyer is unable to prove correct storage and maintenance of the brand new products, or in the case the buyer has modified the Product without the prior written agreement of the Warrantor. Furthermore, the Warrantor is not liable for defects in the brand new product due to the normal wear and deterioration of those parts of the Product, which by their nature, are subject to rapid and continuous wear and tear (e.g.: lining, etc.).

In general, in no case shall the Warrantor be liable for defects in compliance that arise after the transfer of risk or possession of the Product to the buyer has taken place.

The warranty is valid only when the brand new products are installed, used and maintained in conformity with the warnings and instructions provided by the Warrantor in the instruction manual or other Product literature and in conformity with the applicable laws, standards or regulations existing in the location where the brand new products are used or, in the absence of any applicable laws, standards or regulations, in conformity with the best practices in the applicable industry or trade.

3 – Claims

The buyer is required to check the compliance of the brand new Products and confirm the absence of flaws. The buyer should report any flaws or defects in brand new Products, in the following ways and time. Failure to properly and timely report a defect will void the warranty:

Claims for shortage or damages that could have been apparent from an examination of the exterior of the Product's packaging contents must be reported as soon as the brand new Products arrive at their place of destination or, in any event, no more than 5 days after that time.

Claims relevant to quantity, colour, quality flaws or defects or non-compliance that the buyer should have been able to identify as soon as it took possession of the Product, must be made shortly after the time when the brand new Product arrives at its place of destination or, in any event, no more than 15 days after that time;

Hidden flaws, defects or non-compliance (that is, those not identifiable according to the inspection imposed by law and by the preceding subparagraphs) must be reported within 30 days after the discovery or in any event, no more than 5 years from the delivery date.

Claims must be sent by registered letter, addressed to the head office of the Warrantor and must describe in detail the alleged defect, flaw or non-compliance.

In order to preserve this warranty, the buyer must not attempt any disassembly repairs or modifications on the brand new product without the Warrantor's prior written agreement.

The buyer forfeits and waives its rights under this warranty if the buyer does not consent to every reasonable request of the Warrantor, or if after the Warrantor has requested the return of the defective brand new products at buyer's own expenses, the buyer fails to return the Product within 5 working days from the request.

In the event that the warranty claim is ultimately determined, in the sole discretion of Warrantor, to be unfounded, the buyer will reimburse the Warrantor all expenses incurred by Warrantor in evaluating the warranty claim (travel, expert valuations, transport expenses etc.).

4 – Remedies

Following a report by the buyer duly made in accordance with the previous point 3, the Warrantor, within a reasonable period depending on the type of claim, may, at Warrantor's sole reasonable discretion:

- a) Supply to the buyer products of the same kind and quantity as those that have been proven to be defective or not in compliance with the contract: in such a case the Warrantor can require the return of the defective product, which becomes property of the Warrantor. Such products will be supplied FCA Warrantor's facility (Incoterms ® 2020);
- b) Communicate in writing the cancellation of the contract and offering a refund of the amount paid for the replaced product;
- c) Repair the products proven to be defective at its premises and supply the repaired products to the buyer FCA Warrantor's facility (Incoterms ® 2020).

No other cost (such as disassembling and/or reassembling of the products, transportation from/to the premises of buyer's customers, etc.) shall be charged to or paid by the Warrantor, unless previously expressly agreed in writing by the Warrantor.

5 – Limit of seller's liability

The Warranty provided herein supersedes all legal warranty for defects and compliance, and excludes any other possible liability of the Warrantor, however originating, from the brand new products supplied by Warrantor. In particular, the buyer cannot put forward another claim for compensation in respect of any further damages, request any reduction of the contract price or cancellation of the contract. Once the period of the Warranty has expired no claim can be made against the Warrantor.

In no event shall Warrantor be liable to buyer for any direct, incidental, indirect, consequential or exemplary damages, including without limitation any claim for damages based on lost revenues or profits, however caused.

No exceptions to or modification of this Warranty will be permitted unless expressly and specifically defined and accepted by the parties in writing.

6 – Technical regulations

As far as the brand new product characteristics and specifications are concerned, the Warrantor complies with the legislation and the technical regulations prevailing in Italy and the European Directives, unless otherwise specified in the contractual documentation (i.e. contract, order's confirmation, invoice, installation/fitting or use and maintenance manual); The buyer assumes the risk of any difference between the European Directives plus the Italian regulations and those of the country of destination,