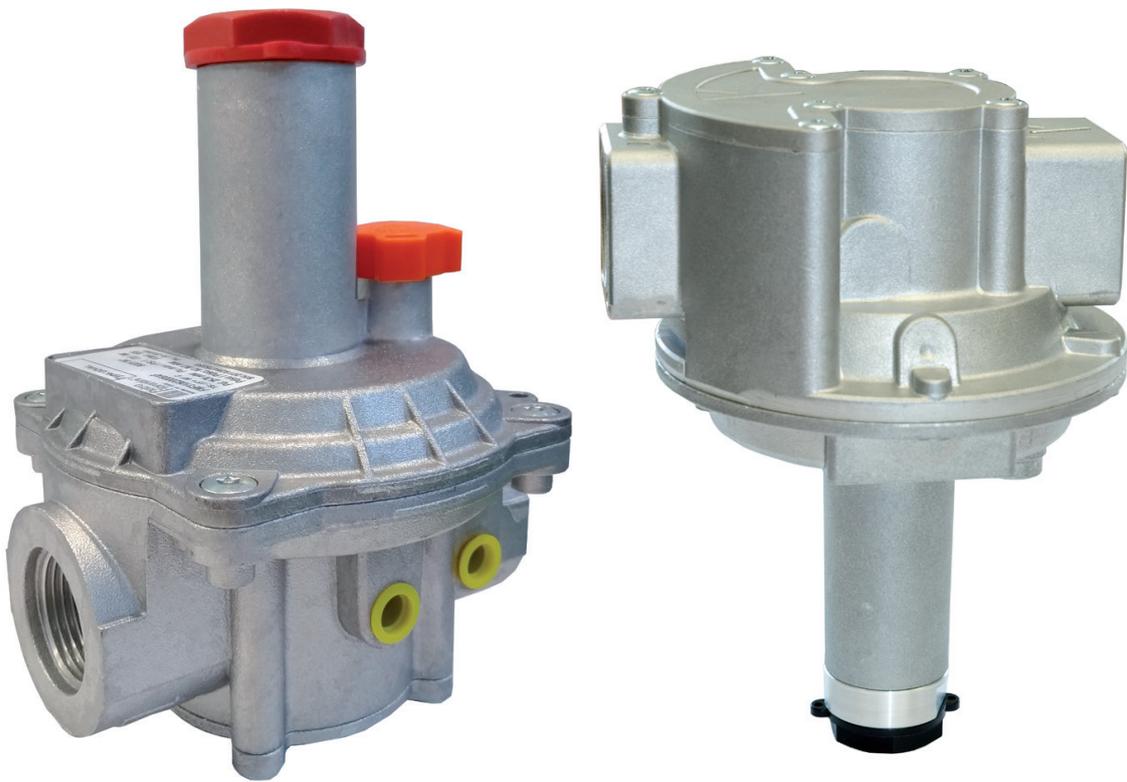


# GOVERNORS

Low pressure gas regulators



Revision A - Edition 09/2022



**USE, MAINTENANCE  
AND WARNING  
MANUAL**

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# 1 - INTRODUCTION

## FOREWORD

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The manufacturer is in no way responsible for the consequences of operations carried out in a manner not in accordance with the manual.

## GENERAL REMARKS

All the operating, maintenance instructions and recommendations described in this manual must be adhered to in order to:

- obtain the best possible performance from the equipment;
- keep the equipment in efficient conditions.

Training the personnel in charge is essential in order to:

- properly use the equipment;
- correctly apply the safety alerts and procedures recommended.

Revision: A

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## 1.1 - REVISION HISTORY

| Revision index | Date       | Revision contents |
|----------------|------------|-------------------|
| <b>A</b>       | 21/09/2022 | First issue       |
|                |            |                   |
|                |            |                   |

Tab. 1.1.

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## 2 - GENERAL INFORMATION

### 2.1 - MANUFACTURER IDENTIFICATION

|                     |   |
|---------------------|---|
| <b>Manufacturer</b> | PIETRO FIORENTINI S.P.A.  |
| <b>Address</b>      | Via Enrico Fermi, 8/10<br>36057 Arcugnano (VI) - ITALY<br><b>Tel. +39 0444 968511 Fax +39 0444 960468</b><br><b>www.fiorentini.com sales@fiorentini.com</b> |

Tab. 2.2.

### 2.2 - IDENTIFICATION OF THE PRODUCT

|                          |  |
|--------------------------|--|
| <b>Equipment</b>         | LOW-PRESSURE GAS REGULATOR   |
| <b>Series</b>            | GOVERNORS  |
| <b>Possible versions</b> | <ul style="list-style-type: none"> <li>• Standard.</li> <li>• Zero.</li> <li>• Ratio.</li> <li>• Goval.</li> </ul> |

Tab. 2.3.

### 2.3 - REGULATORY FRAMEWORK

PIETRO FIORENTINI S.P.A. with registered offices in Arcugnano (Italy) - Via E. Fermi, 8/10, declares that the equipment of GOVERNORS described in this manual is designed, manufactured, tested and checked in compliance with the requirements of standards: UNI EN 88-1:2016; UNI 11655:2016, UNI EN 16129:2013 where applicable.

#### **NOTICE!**

**For specific type approvals, see the appropriate section on the Manufacturer's website: <https://www.fiorentini.com>**

#### **NOTICE!**

**The declaration of conformity in its original version is delivered together with the equipment and this manual.**

## 2.4 - WARRANTY

PIETRO FIORENTINI S.P.A. guarantees that the equipment was manufactured using the best materials, with high quality workmanship, and complies with the quality requirements, specifications and performance set out in the order. The warranty shall be considered null and void and PIETRO FIORENTINI S.P.A. shall not be liable for any damage and/or malfunctions:

- due to any acts or omissions of the purchaser or end-user, or any of their carriers, employees, agents, or any third party or entity;
- in the event that the purchaser, or a third party, makes changes to the equipment supplied by PIETRO FIORENTINI S.P.A. without the prior written approval of the latter;
- in the event of failure by the purchaser to comply with the instructions contained in this manual, as provided by PIETRO FIORENTINI S.P.A.

### NOTICE!

**The warranty conditions are specified in the commercial contract.**

## 2.5 - ADDRESSEES, SUPPLY AND STORAGE OF THE INSTRUCTION MANUAL

The instruction manual is intended for qualified technicians responsible for operating and managing the equipment throughout its service life.

It contains the necessary information to properly use the equipment and keep its functional and qualitative characteristics unchanged over time. All information and warnings for safe, correct use are also provided.

The instruction manual, as well as the declaration of conformity and/or test certificate, is an integral part of the equipment and must always accompany it whenever it is moved or resold. It is up to the user to keep this documentation intact for reference throughout the lifespan of the equipment.

### WARNING!

**Removing, rewriting or editing the pages of the manual and their contents is not allowed.**

**Keep the instruction manual near the equipment, in an accessible place known by all qualified technicians involved in using and running it.**

**PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people, animals and property caused by failure to adhere to the warnings and operating procedures described in this instruction manual.**

## 2.6 - LANGUAGE

The original instruction manual was drawn up in Italian.

Any translations into additional languages are to be made from the original instruction manual.

### HAZARD!

**The translations into other languages cannot be fully verified. If any inconsistency is found, please refer to the original instruction manual.**

**If inconsistencies are found or the text does not make sense:**

- stop any actions;
- immediately contact PIETRO FIORENTINI S.p.A. at the addresses specified in paragraph 2.1.

### WARNING!

**PIETRO FIORENTINI S.p.A. shall be held liable for the information provided in the original manual only.**

## 2.7 - SYMBOLS USED IN THE MANUAL

| Symbol  | Definition  |
|---|---|
|  | Symbol used to identify important warnings for the safety of the operator and/or equipment.   |
|  | Symbol used to identify information of particular importance in the instruction manual. The information may also concern the safety of the personnel involved in using the equipment. |
|  | Obligation to refer to the manual.<br>Indicates a requirement for the personnel to refer to (and understand) the instruction manual before working with or on the equipment.          |

Tab. 2.4.

### **HAZARD!**

Alerts to a hazard with a high level of risk, an imminent hazardous situation which, if not prevented, will result in death or severe damage.

### **WARNING!**

Alerts to a hazard with a medium level of risk, a potentially hazardous situation which, if not prevented, may result in death or severe damage.

### **ATTENTION!**

Alerts to a hazard with a low level of risk, a potentially hazardous situation which, if not prevented, could result in minor or moderate damage.

### **NOTICE!**

Alerts to specific warnings, directions or notes of particular concern, that are not related to physical injury, as well as practices for which physical injury is not likely to occur.

## 2.8 - APPLIED RATING PLATES

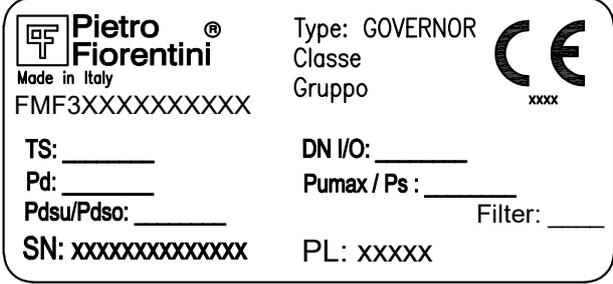
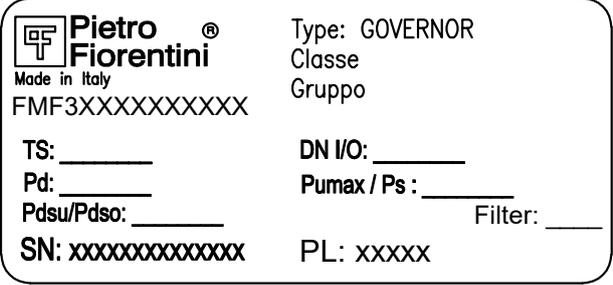
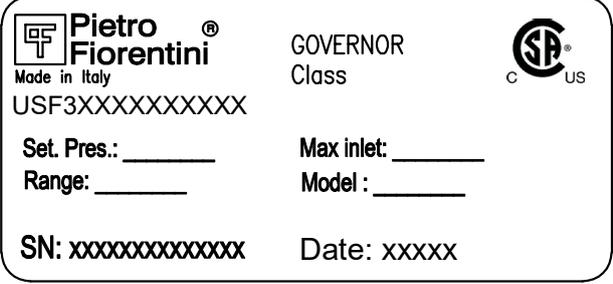
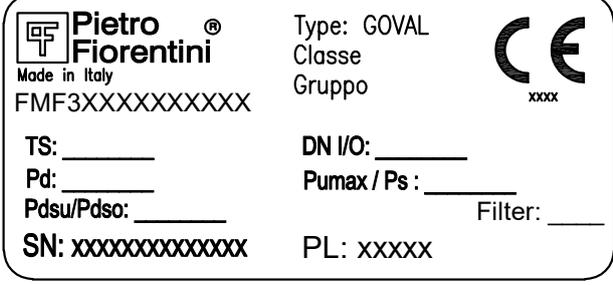
### WARNING!

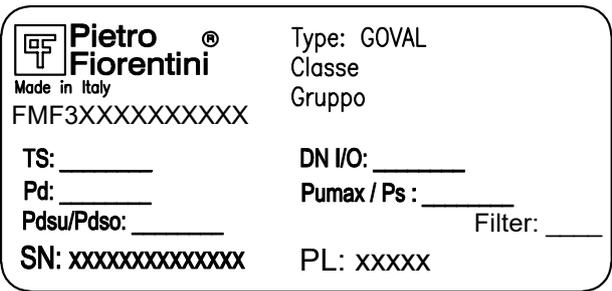
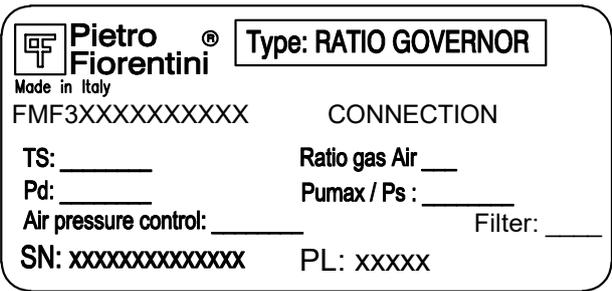
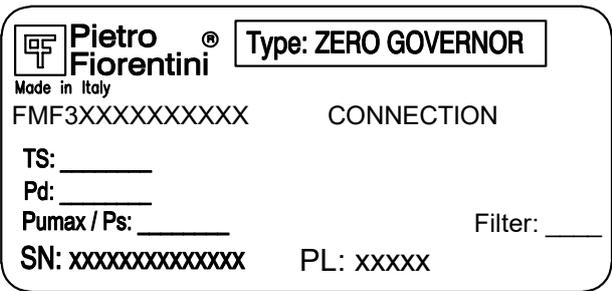
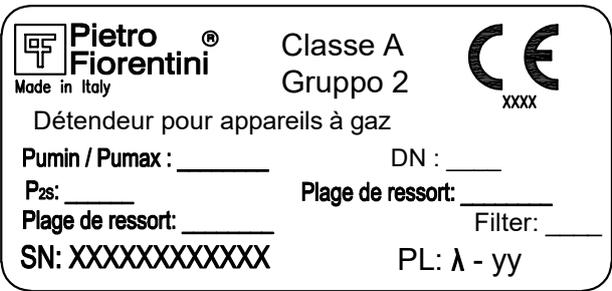
Removing nameplates and/or replacing them with other plates is strictly not allowed.  
Should the plates be unintentionally damaged or removed, the customer must notify  
**PIETRO FIORENTINI S.p.A.**

The equipment and its accessories are provided with nameplates (from Id.1 to Id.8).

The nameplates specify identification details of the equipment and its accessories to be mentioned in case of need to PIETRO FIORENTINI S.p.A.

List of the rating plates applied:

| Id. | Type                    | Image  |
|-----|-------------------------|--|
| 1   | STANDARD CE LABEL       |  <p>  <b>Pietro Fiorentini</b><sup>®</sup><br/>           Made in Italy<br/>           FMF3XXXXXXXXXX<br/>           Type: GOVERNOR<br/>           Classe<br/>           Gruppo<br/>           TS: _____ DN I/O: _____<br/>           Pd: _____ Pumax / Ps : _____<br/>           Pdsu/Pdso: _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx<br/>  </p>    |
| 2   | STANDARD LABEL (non-CE) |  <p>  <b>Pietro Fiorentini</b><sup>®</sup><br/>           Made in Italy<br/>           FMF3XXXXXXXXXX<br/>           Type: GOVERNOR<br/>           Classe<br/>           Gruppo<br/>           TS: _____ DN I/O: _____<br/>           Pd: _____ Pumax / Ps : _____<br/>           Pdsu/Pdso: _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx         </p>   |
| 3   | STANDARD CSA LABEL      |  <p>  <b>Pietro Fiorentini</b><sup>®</sup><br/>           Made in Italy<br/>           USF3XXXXXXXXXX<br/>           GOVERNOR<br/>           Class<br/>           Set. Pres.: _____ Max inlet: _____<br/>           Range: _____ Model : _____<br/>           SN: xxxxxxxxxxxxxx Date: xxxxx<br/>  </p>  |
| 4   | GOVAL CE LABEL          |  <p>  <b>Pietro Fiorentini</b><sup>®</sup><br/>           Made in Italy<br/>           FMF3XXXXXXXXXX<br/>           Type: GOVAL<br/>           Classe<br/>           Gruppo<br/>           TS: _____ DN I/O: _____<br/>           Pd: _____ Pumax / Ps : _____<br/>           Pdsu/Pdso: _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx<br/>  </p> |

| Id. | Type                 | Image   |
|-----|----------------------|---|
| 5   | GOVAL LABEL (non-CE) |  <p> <b>Pietro Fiorentini</b>®<br/> <small>Made in Italy</small><br/>           FMF3XXXXXXXXXX<br/>           Type: GOVAL<br/>           Classe<br/>           Gruppo<br/>           TS: _____ DN I/O: _____<br/>           Pd: _____ P<sub>max</sub> / P<sub>s</sub> : _____<br/>           P<sub>dsu</sub>/P<sub>dso</sub>: _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx         </p>  |
| 6   | RATIO LABEL          |  <p> <b>Pietro Fiorentini</b>® <b>Type: RATIO GOVERNOR</b><br/> <small>Made in Italy</small><br/>           FMF3XXXXXXXXXX CONNECTION<br/>           TS: _____ Ratio gas Air _____<br/>           Pd: _____ P<sub>max</sub> / P<sub>s</sub> : _____<br/>           Air pressure control: _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx         </p>   |
| 7   | ZERO LABEL           |  <p> <b>Pietro Fiorentini</b>® <b>Type: ZERO GOVERNOR</b><br/> <small>Made in Italy</small><br/>           FMF3XXXXXXXXXX CONNECTION<br/>           TS: _____<br/>           Pd: _____<br/>           P<sub>max</sub> / P<sub>s</sub> : _____ Filter: _____<br/>           SN: xxxxxxxxxxxxxx PL: xxxxx         </p>   |
| 8   | NF LABEL             |  <p> <b>Pietro Fiorentini</b>® <b>Classe A</b> <br/> <small>Made in Italy</small> <b>Gruppo 2</b><br/>           Détendeur pour appareils à gaz<br/>           P<sub>min</sub> / P<sub>max</sub> : _____ DN : _____<br/>           P<sub>zs</sub>: _____ Plage de ressort: _____<br/>           Plage de ressort: _____ Filter: _____<br/>           SN: XXXXXXXXXXXXX PL: λ - yy         </p> |

Tab. 2.5.

## 2.8.1 - GLOSSARY FOR NAMEPLATES

The terms and abbreviations used on the nameplate are described below:

| Description  | Label terms                                     |                  |             |                     |                    |   |
|--|---|------------------|-------------|---------------------|--------------------|---|
|  | Standard  | Russia           | Poland      | Turkey              | Romania            | Spain Kroms   |
| Inlet pressure range                                   | bpu   | bpu              | Pe          | Pg<br>max/min       | -                  | bpu   |
| Adjusted pressure                                      | pds   | Pd               | Pa          | Pç                  | -                  | Pd  |
| Tripping pressure<br>maximum pressure slam-shut device | Slam-shut<br>device<br>VIS<br>Slam Shut<br>pds  | ЛЗК Макс<br>Pdso | Zaw.up.     | EBÜ                 | -                  | Slam-shut<br>device<br>VIS<br>Slam Shut<br>Pdso<br>Pdsu |
| Tripping pressure<br>minimum pressure slam-shut device | Slam-shut<br>device<br>VIS<br>Slam Shut<br>pdsu | ЛЗК МИН<br>Pdsu  | Zaw.szybkz. | EBA                 | -                  | Slam-shut<br>device<br>VIS<br>Slam Shut<br>Pdso<br>Pdsu |
| Minimum nominal flow rate                              | Q pumin   | -                | -           | Q min/max           | -                  | Q Pumin   |
| Maximum nominal flow rate                              | Q pumax   | -                | Q max       | Q min/max           | -                  | Q Pumax   |
| Regulator model  | Reg.  | per.             | Type        | -                   | FE                 | Reg.  |
| Regulator production lot                               | P.L.  | ДАТА             | P.L.        | Data + bar-<br>code | Year               | P.L.  |
| Regulator serial number                                | S.N.  | С.н.             | No.         | barcode             | -                  | S.N.  |
| Regulator nominal flow rate                            | -   | Nom Q            | -           | -                   | -                  | -   |
| Inlet connections                                      | -   | -                | DNe         | -                   | DN /<br>Connection | -   |
| Outlet connection                                      | -   | -                | DNa         | -                   | DN /<br>Connection | -   |
| Operating temperature range                            | -   | -                | T3          | -                   | T                  | -   |
| Accuracy class   | -   | -                | -           | ÇT                  | -                  | -   |
| Shut-off class   | -   | -                | -           | KT                  | -                  | -   |
| Maximum pressure slam-shut device<br>Accuracy Group    | -   | -                | -           | ETA                 | -                  | -   |
| Minimum pressure slam-shut device<br>Accuracy Group    | -   | -                | -           | ETÜ                 | -                  | -   |
| Regulator head range                                   | -   | -                | -           | As                  | -                  | -   |
| Calibration spring range                               | -   | -                | -           | -                   | Wds                | -   |
| Maximum pressure slam-shut device<br>spring range      | -   | -                | -           | EBÜ                 | -                  | -   |
| Minimum pressure slam-shut device<br>spring range      | -   | -                | -           | EBA                 | -                  | -   |
| Design pressure  | -   | -                | -           | -                   | PS                 | -   |
| Type of fluid  | N.G.  | -                | -           | -                   | Fluid              | -   |

| Description        | Label terms |        |        |        |         |                               |
|--------------------|-------------|--------|--------|--------|---------|-------------------------------|
|                    | Standard    | Russia | Poland | Turkey | Romania | Spain Kroms                   |
| Relief calibration | -           | -      | -      | -      | -       | Relief<br>VAS<br>Relief Valve |

Tab. 2.6.

## 2.9 - GLOSSARY OF MEASUREMENT UNITS

| Type of measurement                         | Unit of measurement | Description                    |
|---|---------------------|--------------------------------|
| <b>Consumption and Volumetric flow rate</b> | Sm <sup>3</sup> /h  | Standard cubic metres per hour |
|   | Sm <sup>3</sup>     | Standard cubic metres          |
|   | m <sup>3</sup> /h   | Cubic metres per hour          |
|   | m <sup>3</sup>      | Cubic metres                   |
| <b>Pressure</b>                             | bar                 | Bar                            |
|   | ”wc                 | Water column inch              |
|   | Pa                  | Pascal                         |
| <b>Temperature</b>                          | °C                  | Degree centigrade              |
|   | K                   | Kelvin                         |
| <b>Tightening torque</b>                    | Nm                  | Newton metro                   |
| <b>Other measures</b>                       | V                   | Volt                           |
|   | W                   | Watt                           |
|   | Ω                   | Ohm                            |

Tab. 2.7.

## 2.10 - QUALIFIED PROFESSIONAL FIGURES

Qualified operators in charge of using and managing the equipment throughout its technical service life:

| Professional figure                                       | Definition   |
|---|--|
| <b>Installer</b>  | <p>Qualified operator able to:</p> <ul style="list-style-type: none"> <li>• handle materials and equipment.</li> <li>• carry out all the operations necessary to properly install the equipment;</li> <li>• perform all the operations necessary to safely operate the equipment and system;</li> <li>• be able to perform all the operations necessary to uninstall and subsequently dispose of the equipment in compliance with the regulations in force in the country of installation.</li> </ul>  |
| <b>Specialised technician/<br/>Maintenance technician</b> | <p>Trained and authorised technician on the management and use of the equipment, who must:</p> <ul style="list-style-type: none"> <li>• be able to perform all operations required for the proper functioning of the equipment and the system, and for their safety and that of any third parties present;</li> <li>• perform maintenance on all parts of the equipment subject to maintenance (board and batteries);</li> <li>• access all device parts for visual inspection, checking equipment status, making adjustments and calibrations;</li> <li>• have proven experience in properly using the equipment similar to that described in this manual, and be trained, informed and instructed in this regard.</li> </ul> |

Tab. 2.8.

## 3 - SAFETY

### 3.1 - GENERAL SAFETY WARNINGS

#### WARNING!

The equipment described in this instruction manual is:

- a device subjected to pressure in pressurised systems;
- normally installed in systems carrying flammable gases (for example: natural gas).

#### WARNING!

If the gas used is a combustible gas, the installation area of the equipment is defined as a “danger zone” as there are residual risks that potentially explosive atmospheres may be generated.

In “danger zones” and in close proximity thereto:

- there must not be any effective sources of ignition;
- smoking is not allowed.

#### ATTENTION!

Authorised operators must not carry out operations or services on their own initiative that do not fall within their competence.

Never operate the equipment:

- while under the influence of intoxicating substances such as alcohol;
- if you are using drugs that may slow reaction times.

#### NOTICE!

The employer must train and inform operators on how to behave during operations and on the equipment to be used.

Before installation, commissioning or maintenance, operators must:

- take note of the safety regulations applicable to the place of installation they are working in;
- obtain the necessary permits to operate when required;
- wear the personal protective equipment required by the procedures described in this instruction manual;
- ensure that the required collective protective equipment and safety information are available in the area they are operating in.

### 3.2 - PERSONAL PROTECTIVE EQUIPMENT

#### NOTICE!

**Personal Protective Equipment (PPE) means any equipment intended to be worn by the worker for the purpose of protecting him against one or more risks likely to threaten his safety or health at work.**

Depending on the type of intervention required, the appropriate PPE will be indicated (and must be used). Tab. 3.9., the Personal Protective Equipment (PPE) and its description are listed. An obligation is associated with each symbol.

| Symbol  | Meaning   |
|---|---|
|    | <b>Obligation to use safety or insulated gloves.</b><br>Indicates a requirement for the personnel to use safety or insulated gloves.                      |
|    | <b>Obligation to use safety goggles.</b><br>Indicates a requirement for personnel to use protective goggles for eye protection.                           |
|    | <b>Obligation to use safety shoes.</b><br>Indicates a requirement for the personnel to use accident-prevention safety shoes.                              |
|   | <b>Obligation to use noise protection equipment.</b><br>Indicates a requirement for the personnel to use ear muffs or ear plugs to protect their hearing. |
|  | <b>Obligation to wear protective clothing.</b><br>Indicates a requirement for the personnel to wear specific protective clothing.                         |
|  | <b>Obligation to use a protective mask.</b><br>Indicates a requirement for the personnel to use respiratory masks in the event of a chemical risk.        |
|  | <b>Obligation to use a protective helmet.</b><br>Indicates a requirement for the personnel to use protective helmets.                                     |
|  | <b>Obligation to wear high visibility vests.</b><br>Indicates a requirement for the personnel to use high visibility vests.                               |

Tab. 3.8.

#### WARNING!

Each licensed operator is obliged to:

- take care of his/her own health and safety and that of other people in the workplace who are affected by his/her actions or omissions, in accordance with the training, instructions and equipment provided by the employer;
- appropriately use the PPE made available;
- immediately report to the employer, the manager or the person in charge of the deficiencies of the means and devices as well as any possible dangerous conditions of which they become aware.

### 3.3 - OBLIGATIONS AND PROHIBITIONS

The following is a list of obligations and prohibitions to be observed for the safety of the operator:

- carefully read and understand the use, maintenance and warning manual;
- check whether the downstream equipment is suitably sized according to the performance required of the regulator in the actual operating condition;
- before installing the equipment, strictly refer to the details specified on the nameplates and in the manual;
- avoid violent shocks and impacts that could damage the equipment and cause the fluid under pressure to escape.

It is strictly forbidden to:

- operate in various capacities on the equipment without the PPE indicated in the work procedures described in this manual;
- operate in the presence of open flames or bring open flames close to the work area;
- smoke near the equipment or while working on it;
- use the equipment with parameters other than those indicated on the nameplate;
- use the equipment with fluids other than those indicated in this manual;
- use the equipment outside the operating temperature range specified in this manual;
- install or use the equipment in environments other than those specified in this manual.

### 3.4 - SAFETY PICTOGRAMS

The following safety pictograms may be shown on the equipment and/or packaging PIETRO FIORENTINI S.p.A.:

| Symbol  | Definition                                    |
|---|---|
|   | Symbol used to identify an ELECTRICAL HAZARD. |
|  | Symbol used to identify a GENERIC HAZARD.     |

Tab. 3.9.

#### **HAZARD!**

**It is absolutely forbidden to remove the safety pictograms on the equipment.**

**The user is required to replace the safety pictograms which, following wear, removal or tampering, are illegible.**

### 3.5 - RISK LEVEL

Depending on the operating conditions, use and configuration required, the equipment may generate noise beyond the limits allowed by current legislation in the country of installation.

For the value of the noise generated by the equipment and further information, contact PIETRO FIORENTINI S.p.A.

#### **ATTENTION!**

**The obligation to use earmuffs or ear plugs to protect the operator's hearing remains in the event that the noise in the installation environment of the equipment (depending on specific operating conditions) exceeds the value of 85 dBA.**

### 3.6 - RESIDUAL RISKS

 **NOTICE!**

The equipment of STABILIZZATORI does not fall within the scope of the PED 2014/68/EU directive.

 **WARNING!**

**If there are any functional faults, do not operate.  
Immediately contact PIETRO FIORENTINI S.p.A. for the necessary directions.**

The equipment does not present residual risks for the operator related to its normal operation.

The risks associated with the equipment are assessed below and the principles adopted for their prevention are indicated, according to the following classification:

- a) Elimination and/or reduction of the risk.
- b) Application of appropriate protective measures.
- c) information to users about residual risks.

### 3.6.1 - TABLE SHOWING RESIDUAL RISKS DUE TO PRESSURE

| Risk and Hazard  | Event and Cause  | Effect and Consequence  | Solution and Prevention  |
|--|--|---|--|
| <b>Pressurised gas leakage.<br/>Projection of metallic and non-pressurised parts.</b>                | <ul style="list-style-type: none"> <li>Violent impact.</li> <li>Impact (also due to falling, improper handling, etc.).</li> </ul>  | <ul style="list-style-type: none"> <li>Deformation.</li> <li>Broken connections and, if pressurised, even burst.</li> </ul>       | <p>a. Handling and installation with appropriate devices to avoid localised stress.</p> <p>b. Installation in suitable places and spaces with appropriate guards and packaging.</p> <p>c. Information/directions contained in this manual.</p> |
| <b>Pressurised gas leakage.<br/>Projection of metallic and non-pressurised parts.</b>                | <ul style="list-style-type: none"> <li>Use of inappropriate fluids.</li> </ul>   | <ul style="list-style-type: none"> <li>Corrosion.</li> <li>Embrittlement.</li> <li>Explosion.</li> </ul>                          | <p>a. The user must check compliance of the used fluid with what is indicated on the installation sheet.</p>   |
| <b>Pressurised gas leakage.<br/>Projection of metallic and non-pressurised parts.</b>                | <ul style="list-style-type: none"> <li>Operation at temperatures below the minimum design temperature.</li> </ul>                  | <ul style="list-style-type: none"> <li>Embrittlement.</li> <li>Breakage.</li> <li>Explosion.</li> </ul>                           | <p>a. Install in places where the temperature is not below the minimum permissible value and/or insulate the equipment adequately.</p> <p>b. The minimum allowable temperature is specified in this manual (refer to paragraph 4.5).</p>       |
| <b>Pressurised gas leakage.<br/>Projection of metallic and non-pressurised parts.<br/>Explosion.</b> | <ul style="list-style-type: none"> <li>Overpressure or exceedance of the rated limit values (maximum pressure allowed).</li> </ul> | <ul style="list-style-type: none"> <li>Explosion.</li> <li>Breaks.</li> <li>Cracks.</li> <li>Permanent deformations.</li> </ul>   | <p>a. The device has appropriate design safety margins.</p> <p>b. The user must check the maximum pressure applicable to the equipment.</p> <p>c. The design pressure is specified in this manual (refer to paragraph 4.5).</p>                |
| <b>Pressurised fluid leakage.<br/>Projection of metallic and non-pressurised parts.</b>              | <ul style="list-style-type: none"> <li>Incorrect fixing of the equipment.</li> </ul>   | <ul style="list-style-type: none"> <li>Deformation.</li> <li>Breakage.</li> </ul>   | <p>a. The device is equipped with unified type process connections and compression fittings.</p> <p>b. The installer must ensure correct fixing to the line.</p> <p>c. Information/directions contained in this manual.</p>                    |
| <b>Explosion of the appliance<br/>pressurised fluid leakage.<br/>Projection of metallic parts.</b>   | <ul style="list-style-type: none"> <li>Operation at temperatures above the maximum permissible temperature.</li> </ul>             | <ul style="list-style-type: none"> <li>Reduction of mechanical resistance, breakage of the device.</li> <li>Explosion.</li> </ul> | <p>a. The commissioning technician must equip the system with suitable control and safety devices.</p> <p>b. The maximum allowable temperature is specified in this manual (refer to paragraph 4.5).</p>                                       |
| <b>Pressurised gas leakage.<br/>Projection of metallic and non-pressurised parts.</b>                | <ul style="list-style-type: none"> <li>Electrostatic potential differential stray currents.</li> </ul>                             | <ul style="list-style-type: none"> <li>Corrosion localised in the device.</li> </ul>  | <p>a. The commissioning technician must check the equipment for proper earthing.</p>   |

| Risk and Hazard   | Event and Cause   | Effect and Consequence  | Solution and Prevention   |
|---|---|---|---|
| <b>Pressurised gas leakage.</b><br><b>Projection of metallic and non-pressurised parts.</b> | <ul style="list-style-type: none"> <li>• Humidity.</li> <li>• Environments with aggressive atmosphere.</li> </ul> | <ul style="list-style-type: none"> <li>• Deterioration of external surfaces.</li> <li>• corrosion.</li> </ul> | a. The user must shut off the line and contact PIETRO FIORENTINI S.p.A. |

Tab. 3.10.

### 3.6.2 - TABLE OF RESIDUAL RISKS FOR POTENTIALLY EXPLOSIVE ATMOSPHERES

Table 3.12 shows the conditions that can lead the pressure regulators STABILIZZATORI to generate a potentially explosive atmosphere.

The table is valid for use with natural gas with a density of no more than 0.8; for different densities, the installation and environmental conditions must also be evaluated.

#### **WARNING!**

**If the gas used is a combustible gas, the area where the equipment is installed is defined as a “hazardous area”, because there are residual risks associated with the formation of potentially explosive atmospheres, where no effective ignition sources must be present.**

| Operating conditions                                      | Atmosphere potentially explosive | Normative references   | Management measures included in the use, maintenance and warning manual   |
|---|----------------------------------|--|---|
| <b>First start-up</b>                                     | No                               | <ul style="list-style-type: none"> <li>During the production cycle, the external sealing of the equipment is checked according to the UNI 11655:2016 standard.</li> <li>Before commissioning, the external sealing of the system portion on which the equipment is installed is checked according to the requirements applicable in the place of installation (when installed in pressure reduction systems, the provisions of 12186:2014 and UNI EN12279:2007 must be adhered to).</li> </ul> | The manual refers to the need to check the external sealing and, when applicable, meet the requirements of the UNI EN 12186:2014 and UNI EN 12279: 2007 standards.  |
| <b>Operation in normal conditions</b>                     | No                               | <p>The provisions in the previous point apply and, in addition:</p> <ul style="list-style-type: none"> <li>the equipment is installed outdoors or in an environment with natural ventilation according to the regulations in force in the place of installation, or, when applicable, standards EN 12186:2014 and EN 12279:2007;</li> <li>is monitored according to the national rules in force, good practice and the instructions of the equipment manufacturer.</li> </ul>                  | <p>The manual reports that:</p> <ul style="list-style-type: none"> <li>any room that the equipment is installed in must meet the ventilation requirement for the place of installation, or, when applicable, the provisions in standards EN 12186:2014 and EN 12279:2007;</li> <li>periodic checks must be carried out during surveillance in accordance with the national rules in force, if any, and with the specific manufacturer's recommendations.</li> </ul> |
| <b>Breakage of diaphragms</b>                             | No                               | This event must be considered a rare malfunction.  | The manual refers to the need to meet the periodic check requirements in accordance with the regulations in force in the place of installation.   |
| <b>Breakage of other non-metallic parts (malfunction)</b> | No                               | This type of malfunction is not reasonably expected as it involves static seals (to the outside) that cannot generate any external leakage.  | -   |

| Operating conditions   | Atmosphere potentially explosive | Normative references  | Management measures included in the use, maintenance and warning manual  |
|------------------------|----------------------------------|---|--|
| <b>Decommissioning</b> | No                               | <ul style="list-style-type: none"> <li>Pressure must be reduced in the system section, where the equipment is installed, inside a suitably ventilated room.</li> <li>The residual gas must be discharged as indicated above.</li> </ul>   | The manual refers to the need to operate in a suitably ventilated environment.   |
| <b>Reboot</b>          | No                               | <ul style="list-style-type: none"> <li>After reassembling the regulator, carry out an external leakage test at a suitable pressure value, as specified by the Manufacturer.</li> <li>Before commissioning, the external sealing of the system portion on which the equipment is installed is checked according to the requirements applicable in the place of installation (when installed in pressure reduction systems, the provisions of 12186:2014 and UNI EN12279:2007 must be adhered to).</li> </ul> | <p>The following is referred to in the manual:</p> <ul style="list-style-type: none"> <li>the minimum conditions for testing the equipment for external leakage;</li> <li>the need to check external sealing and, when applicable, meet the requirements of the UNI EN 12186:2014 and UNI EN 12279: 2007 standards.</li> </ul> |

Tab. 3.11.

## 4 - DESCRIPTION AND OPERATION

### 4.1 - VERSIONS, MODELS AND CONFIGURATIONS

**! NOTICE!**

The different versions of the equipment must be:

- contractually established;
- set up at PIETRO FIORENTINI S.p.A. plants only

Typical versions of GOVERNORS are listed in Tab. 4.13:

| Type                    | Image   | Description   |
|-------------------------|---|---|
| <b>Standard Version</b> |    | <p>This version has a maximum inlet pressure of 0.5 bar and can be supplied with:</p> <ul style="list-style-type: none"> <li>• internal filter element to protect the plugs;</li> <li>• slam-shut valve for maximum and minimum downstream pressure.</li> </ul> |
| <b>Zero Version</b>     |   | <p>This version can be used as a zero device, i.e. keeping the downstream pressure at zero when the flow demand changes.</p>  |
| <b>Ratio Version</b>    |  | <p>This version can be used as a gas/air ratio device keeping the gas/air mixture constant as the flow rate changes.</p> <p><b>! NOTICE!</b><br/> <b>The device can be calibrated to achieve a 1:1 gas/air mixture.</b></p>                                     |
| <b>Goval Version</b>    |  | <p>Compared to the standard version, this version has a max. inlet pressure extended to 1 bar.</p>  |
| <b>Painted version</b>  | -   | <p>This version is suitable for:</p> <ul style="list-style-type: none"> <li>• marine environments (against salt corrosion);</li> <li>• highly humid atmospheres.</li> </ul>   |

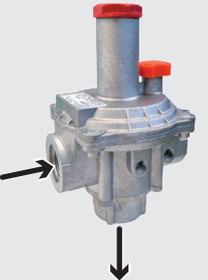
Tab. 4.12.

The different models of GOVERNORS are identified, based on the type of connections, as shown in Tab. 4.14.:

| Regulator trade name | Version | Connections |
|----------------------|---------|-------------|
| 30051                | Compact | 1/2"        |
| 30052                | Compact | 3/4"        |
| 30053                | Compact | 1"          |
| 30150                | -       | 1/2"        |
| 30151                | -       | 3/4"        |
| 30152                | -       | 1"          |
| 30153                | -       | 1"1/4"      |
| 30154                | -       | 1"1/2"      |
| 30155                | -       | 2"          |
| 30156                | -       | DN65        |
| 30157                | -       | DN80        |
| 30158                | -       | DN100       |

Tab. 4.13.

Different configurations can be set up depending on the positioning of the input/output connections:

| Type                                      | Image  |
|---|--|
| Horizontal output                         |  |
| Vertical output<br>(compact version only) |  |

Tab. 4.14.

#### 4.1.1 - SURFACE TREATMENTS

##### NOTICE!

**Surface treatments (special painting, anticorrosive treatments, galvanising,...) are foreseen for specific needs and/or particular environmental conditions.**

## 4.2 - GENERAL DESCRIPTION

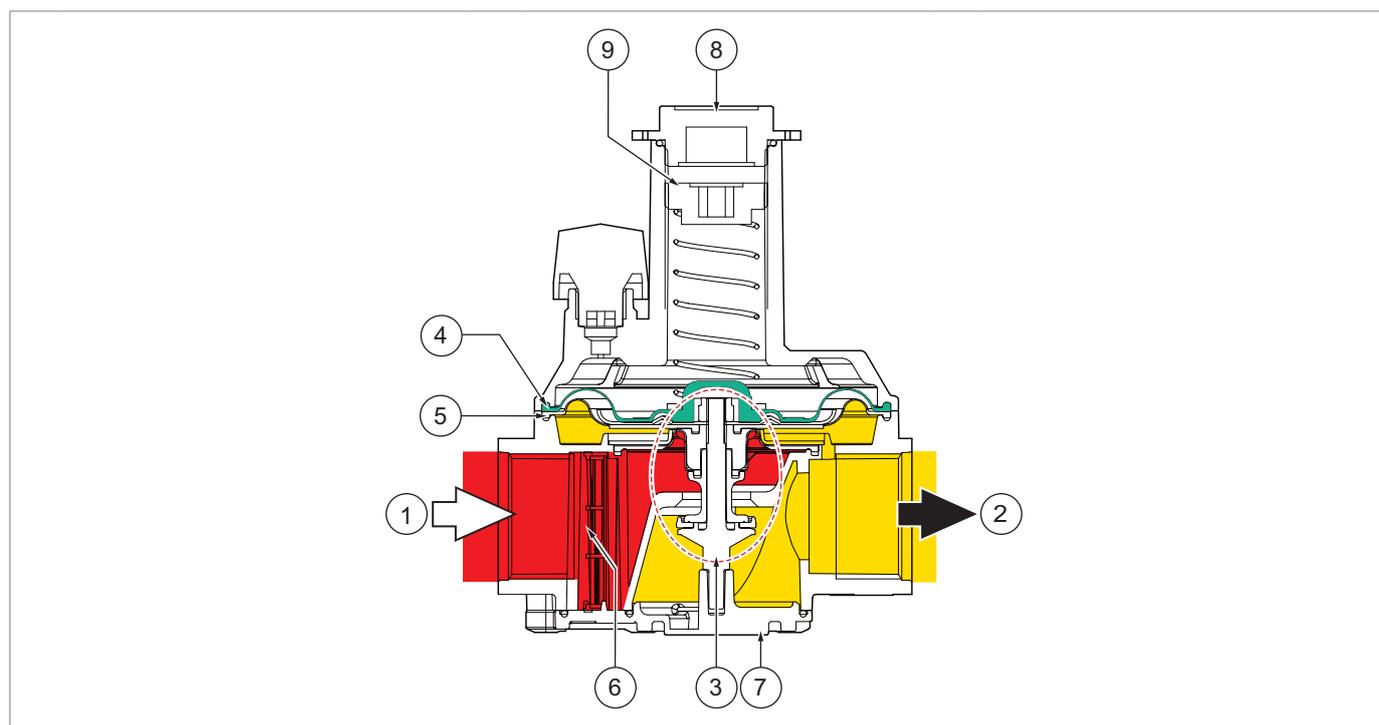
The equipment is a self-operated low-pressure regulator suitable for gaseous fluids such as:

- natural gas;
- GPL;
- propane gas;
- non-corrosive gases.

The balanced plug system guarantees a constant outlet pressure value as the inlet pressure and required flow rate vary. The main elements of the equipment are specified in Tab. 4.16.:

| Pos. | Description       | Pos. | Description                 |
|------|-------------------|------|-----------------------------|
| 1    | Inlet connections | 6    | Filter cartridge (optional) |
| 2    | Outlet connection | 7    | Lower cover                 |
| 3    | Balanced shutter  | 8    | Upper cap                   |
| 4    | Safety diaphragm  | 9    | Adjustment ring nut         |
| 5    | Working diaphragm | -    | -                           |

Tab. 4.15.



 **UPSTREAM (INLET) PRESSURE**

 **DOWNSTREAM (OUTLET) PRESSURE**

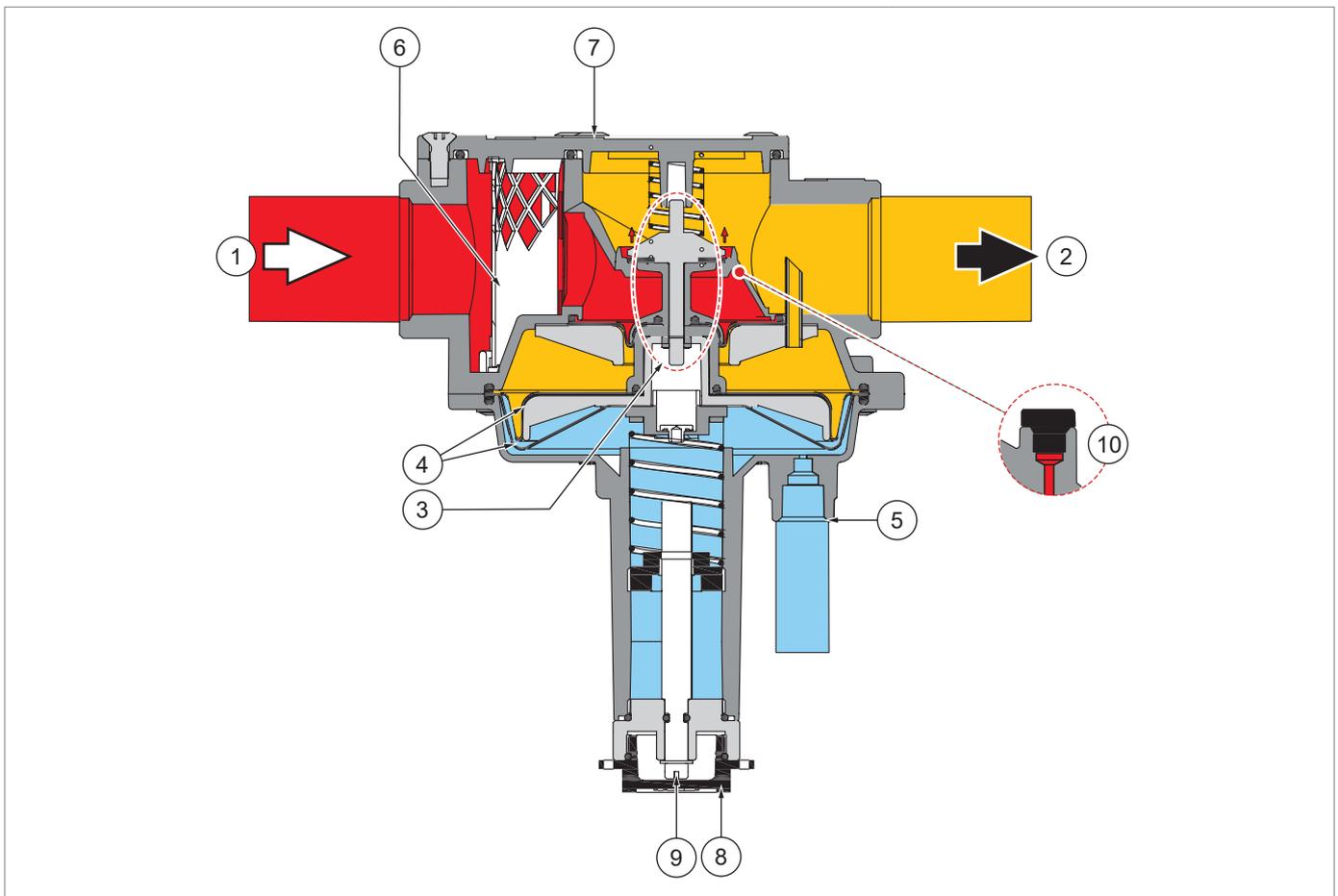
Fig. 4.1. General description

#### 4.2.1 - ZERO VERSION DESCRIPTION

The main elements of version zero are shown in Tab. 4.17.:

| Pos. | Description                           | Pos. | Description                 |
|------|---------------------------------------|------|-----------------------------|
| 1    | Inlet connections                     | 6    | Filter cartridge (optional) |
| 2    | Outlet connection                     | 7    | Lower cover                 |
| 3    | Balanced shutter                      | 8    | Upper cap                   |
| 4    | Double diaphragm (working and safety) | 9    | Adjusting screw             |
| 5    | Vent threaded connection              | 10   | By-pass                     |

Tab. 4.16.



**UPSTREAM (INLET) PRESSURE**      **DOWNSTREAM (OUTLET) PRESSURE**      **AIR PRESSURE**

Fig. 4.2. General description Zero version

### 4.3 - OPERATION

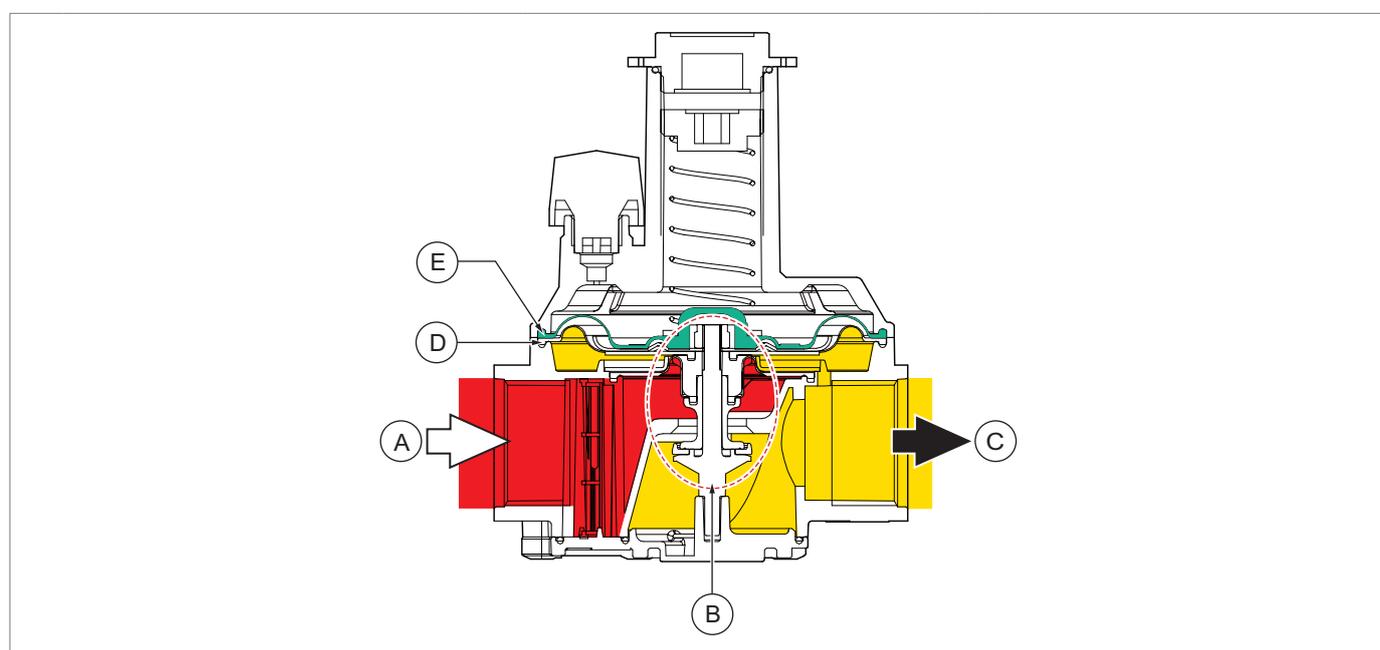
The GOVERNORS are regulators:

- self-operation;
- low pressure suitability;
- with safety diaphragm.

Tab. 4.18. describes the operation of the equipment in a simplified manner:

| Step | Description   |
|------|---|
| 1    | The upstream pressure (A): <ul style="list-style-type: none"> <li>• powers the regulator;</li> <li>• is regulated by the balanced plug system (B) to the downstream pressure value (C) required by the user.</li> </ul> |
| 2    | In the event of a rupture of the working diaphragm (D), the presence of the safety diaphragm (E) limits gas dispersion into the atmosphere to 30 l/h.   |

Tab. 4.17.



 **UPSTREAM (INLET) PRESSURE**

 **DOWNSTREAM (OUTLET) PRESSURE**

Fig. 4.3. Operation GOVERNORS

## 4.4 - INTENDED USE

### 4.4.1 - ENVISAGED USE

#### NOTICE!

The **GOVERNORS** can be installed upstream of:

- user's gas meters;
- rising pillars;
- burners.

The equipment in question is intended for:

| Operation   | Permitted  | Unpermitted   | Work environment  |
|---|--|---|---|
| <b>Adjustment of the downstream pressure for:</b> | Gaseous, and non-aggressive or corrosive fluids filtered beforehand. | <ul style="list-style-type: none"> <li>• Liquids.</li> <li>• Any product other than those permitted.</li> </ul> | Installations for the distribution of natural gas to supply networks for: <ul style="list-style-type: none"> <li>• industrial use;</li> <li>• commercial use;</li> <li>• home use.</li> </ul> |

Tab. 4.18.

The equipment referred to was designed to be used exclusively within the limits specified on the nameplate and according to the instructions and limits of use specified in this manual.

Safe work conditions are as follows:

- use within the limits specified on the nameplate and in this manual;
- compliance with the operating and warning instructions as well as commissioning procedures (refer to chapter 8);
- do not tamper with and/or bypass the safety devices.

### 4.4.2 - REASONABLY FORESEEABLE MISUSE

Incorrect and reasonably foreseeable use means the use of the equipment in a way not foreseen in the phase but which can derive from easily predictable human behaviour:

- corrosive fluids;
- fluids not properly treated upstream;
- liquids;
- instinctive reaction of an operator in the event of a malfunction, accident or breakdown while using the equipment;
- behaviour resulting from pressure to keep the equipment running under all circumstances;
- behaviour resulting from carelessness;
- behaviour resulting from the use of the equipment by unauthorised and unsuitable people (children, disabled);
- using the equipment in a manner other than that referred to under "Intended use".

Any use of the equipment other than the intended use must be previously approved in writing by PIETRO FIORENTINI S.p.A. If no written approval is provided, use shall be considered improper.

In the event of "improper use", PIETRO FIORENTINI S.p.A. shall not be held liable for any damage caused to people or property, and any type of warranty on the equipment shall be deemed void.

### 4.4.3 - TYPES OF FLUIDS

The equipment works with combustible gases used:

- in pressure control stations according to UNI EN 12186:2014 and UNI EN 12279:2007 standards, or in installations carrying LPG;
- in commercial premises and industrial plants (after checking by contacting PIETRO FIORENTINI S.p.A.).

#### NOTICE!

**The equipment may be also used with inert gases, subject to verification by contacting the manufacturer.**

## 4.5 - TECHNICAL/FUNCTIONAL FEATURES

### NOTICE!

To classify the functional performance of the equipment, refer to standards UNI 11655:2016 and UNI EN 16129:2013.

The main specifications can be found in Tab.4.20.:

| Technical/functional features                  |   |  |
|--|---|--|
| <b>Design pressure (DP)</b>                    | Standard Version  | 0.1 MPa - 1 bar                                    |
|  | Ratio Version<br>Zero Version   | 0.035 MPa - 0.35 bar                               |
|  | Goval Version   | 0.25 MPa - 2.5 bar                                 |
| <b>Operating ambient temperature</b>           | Standard Version<br>Goval Version   | from -15°C to + 60°C<br>from -5°F to +140°F        |
|  | Ratio Version<br>Zero Version   | from -10°C to + 60°C<br>from 14°F to +140°F        |
| <b>Input pressure range</b>                    | Standard Version  | Wd+0.25 kPa to 50 kPa<br>Wd+2.5 mbar to 500 mbar   |
|  | Ratio Version<br>Zero Version   | Wd +2 kPa to 35 kPa<br>Wd+20 mbar to 350 mbar      |
|  | Goval Version   | Wd+0.75 kPa to 100 kPa<br>Wd+7.5 mbar to 1000 mbar |
| <b>Adjustment range of downstream pressure</b> | Standard Version<br>Goval Version   | from 0.5 KPa to 30 MPa<br>from 5 mbar to 300 mbar  |
|  | Ratio Version   | from 0.2 kPa to 15 kPa<br>2 mbar to 150 mbar       |
|  | Zero Version  | from -0.5 KPa to 0.5 MPa<br>from -5 mbar to 5 mbar |
| <b>Accessories</b>                             | <ul style="list-style-type: none"> <li>• Integrated input filter.</li> <li>• Inlet and outlet pressure outlets.</li> </ul>  |  |
| <b>Accuracy class (AC)</b>                     | up to 15  |  |
| <b>Shut-off overpressure (SG)</b>              | up to 30 (minimum 0.75 KPa - 7.5 mbar)  |  |
| <b>Flow coefficients</b>                       | See Tab.4.21 and Tab.4.22 in section 4.5.1  |  |
| <b>Modular connections</b>                     | <ul style="list-style-type: none"> <li>• Gas (according to EN ISO 228-1:2003).</li> <li>• Flat swivel joint (as per NF E29-533: 2014 and NF E29-536: 2017).</li> <li>• NPT (according to ASME B1.20.1, excluding connections with metal/metal sealing).</li> <li>• Special accessories (on request).</li> </ul> |  |

Tab. 4.19.

#### 4.5.1 - FLOW COEFFICIENTS

The flow coefficients (Cg) of governors without filter are given in Tab. 4.21. (as per DIN EN 334):

| Flow coefficients (governors without filter)                    |          |         |      |     |                |      |     |        |        |      |        |      |      |
|---|----------|---------|------|-----|----------------|------|-----|--------|--------|------|--------|------|------|
| Version   |          | Compact |      |     | High flow rate |      |     |        |        |      |        |      |      |
| Diameter  | [mm]     | 15      | 20   | 25  | 15             | 20   | 25  | 32     | 40     | 50   | 65     | 80   | 100  |
|   | [inches] | 1/2"    | 3/4" | 1"  | 1/2"           | 3/4" | 1"  | 1" 1/4 | 1" 1/2 | 2"   | 2" 1/2 | 3"   | 4"   |
| <b>Cg<br/>(Standard Version)</b>                                |          | 80      | 100  | 130 | 190            | 240  | 285 | 680    | 710    | 1300 | 1650   | 2000 | 3500 |
| <b>Cg<br/>(Zero/Ratio versions)</b>                             |          | -       | -    | -   | 160            | 205  | 240 | 580    | 610    | 1100 | 1400   | 1700 | 2980 |
| <b>Cg<br/>(Goval version)<br/>Pu ≤ 350 bar<br/>Pd ≤ 35 mbar</b> |          | 56      | 70   | 90  | 135            | 170  | 200 | 545    | 570    | 1200 | 1480   | 1800 | 3150 |

Tab. 4.20.

The flow coefficients (Cg) of governors with filter are given in Tab. 4.22. (as per DIN EN 334):

| Flow coefficients (governors with filter)                       |          |         |      |     |                |      |     |        |        |      |        |      |      |
|---|----------|---------|------|-----|----------------|------|-----|--------|--------|------|--------|------|------|
| Version   |          | Compact |      |     | High flow rate |      |     |        |        |      |        |      |      |
| Diameter  | [mm]     | 15      | 20   | 25  | 15             | 20   | 25  | 32     | 40     | 50   | 65     | 80   | 100  |
|   | [inches] | 1/2"    | 3/4" | 1"  | 1/2"           | 3/4" | 1"  | 1" 1/4 | 1" 1/2 | 2"   | 2" 1/2 | 3"   | 4"   |
| <b>Cg<br/>(Standard Version)</b>                                |          | 68      | 82   | 110 | 135            | 158  | 200 | 460    | 570    | 1150 | 1450   | 1600 | 2850 |
| <b>Cg<br/>(Zero/Ratio versions)</b>                             |          | -       | -    | -   | 116            | 135  | 170 | 390    | 485    | 980  | 1250   | 1380 | 2430 |
| <b>Cg<br/>(Goval version)<br/>Pu ≤ 350 bar<br/>Pd ≤ 35 mbar</b> |          | 56      | 70   | 90  | 108            | 140  | 162 | 440    | 550    | 1100 | 1380   | 1500 | 2700 |

Tab. 4.21.

## 4.6 - SAFETY DEVICES

In order to avoid tripping the safety devices during normal service (when the user has no faults), no purging of the downstream line should be carried out with the reducer installed.

### 4.6.1 - SAFETY DIAPHRAGM

#### NOTICE!

**Tripping of the safety diaphragm (A) leads to replacement of the regulator.**

The safety diaphragm (A) is a device that limits the dispersion of gas into the atmosphere in the event of a rupture of the working diaphragm (B).

The tripping of the safety diaphragm (A) ensures a gas dispersion to the atmosphere of a maximum value of 30 l/h. The micro-dispersion of gas into the atmosphere will allow the rupture of the working diaphragm (B) to be detected.

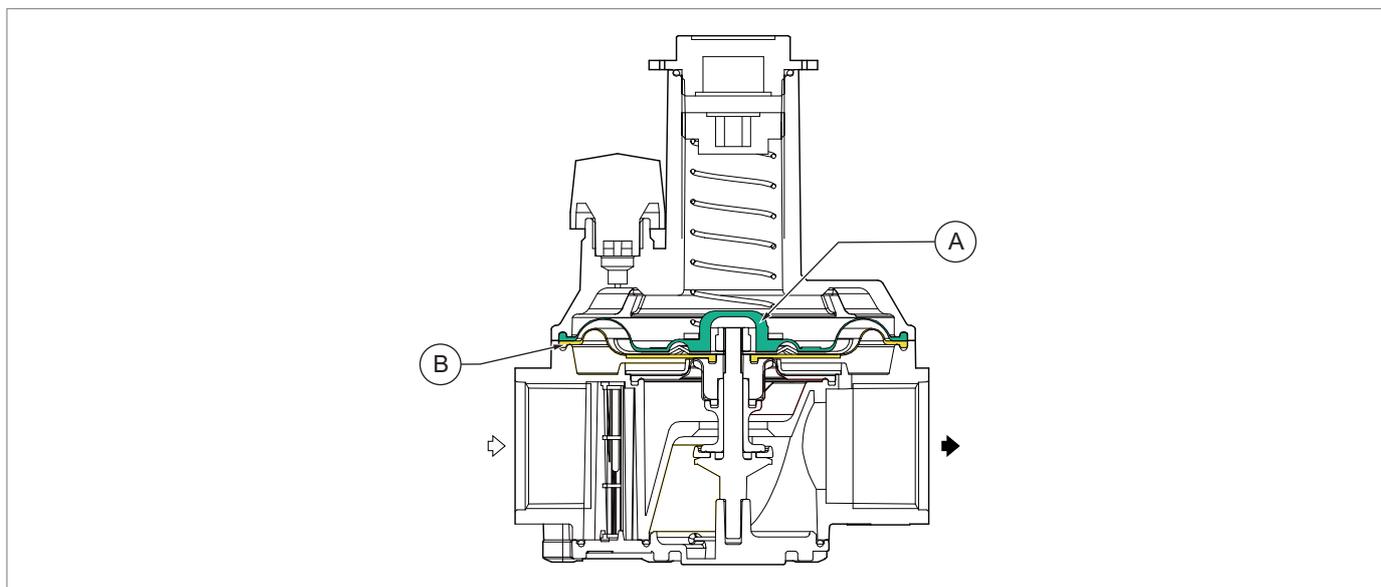


Fig. 4.4. Safety diaphragm

#### 4.6.2 - SLAM-SHUT VALVE FOR MINIMUM AND MAXIMUM PRESSURE

 **NOTICE!**

**If the valve trips, service will be interrupted.**

The minimum and maximum pressure slam-shut valve (A), if fitted, is a safety device whose function is to remain in the open position under normal service conditions and to automatically and completely shut off the upstream gas flow when the downstream pressure is beyond the set values:

- higher value for maximum pressure;
- lower for minimum pressure.

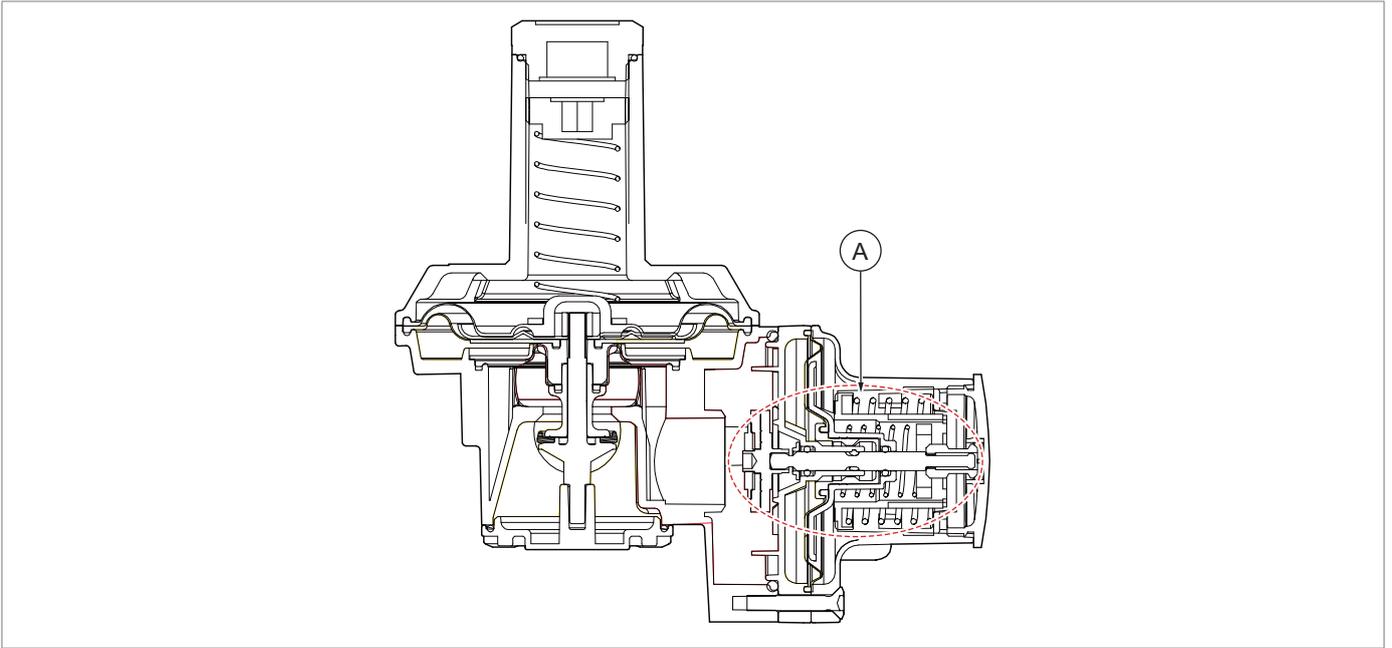


Fig. 4.5. Slam-shut valve for minimum and maximum pressure

### 4.6.3 - PRESSURE OUTLET

The integrated pressure outlet point (A) at the regulator is required for field testing of safety devices:

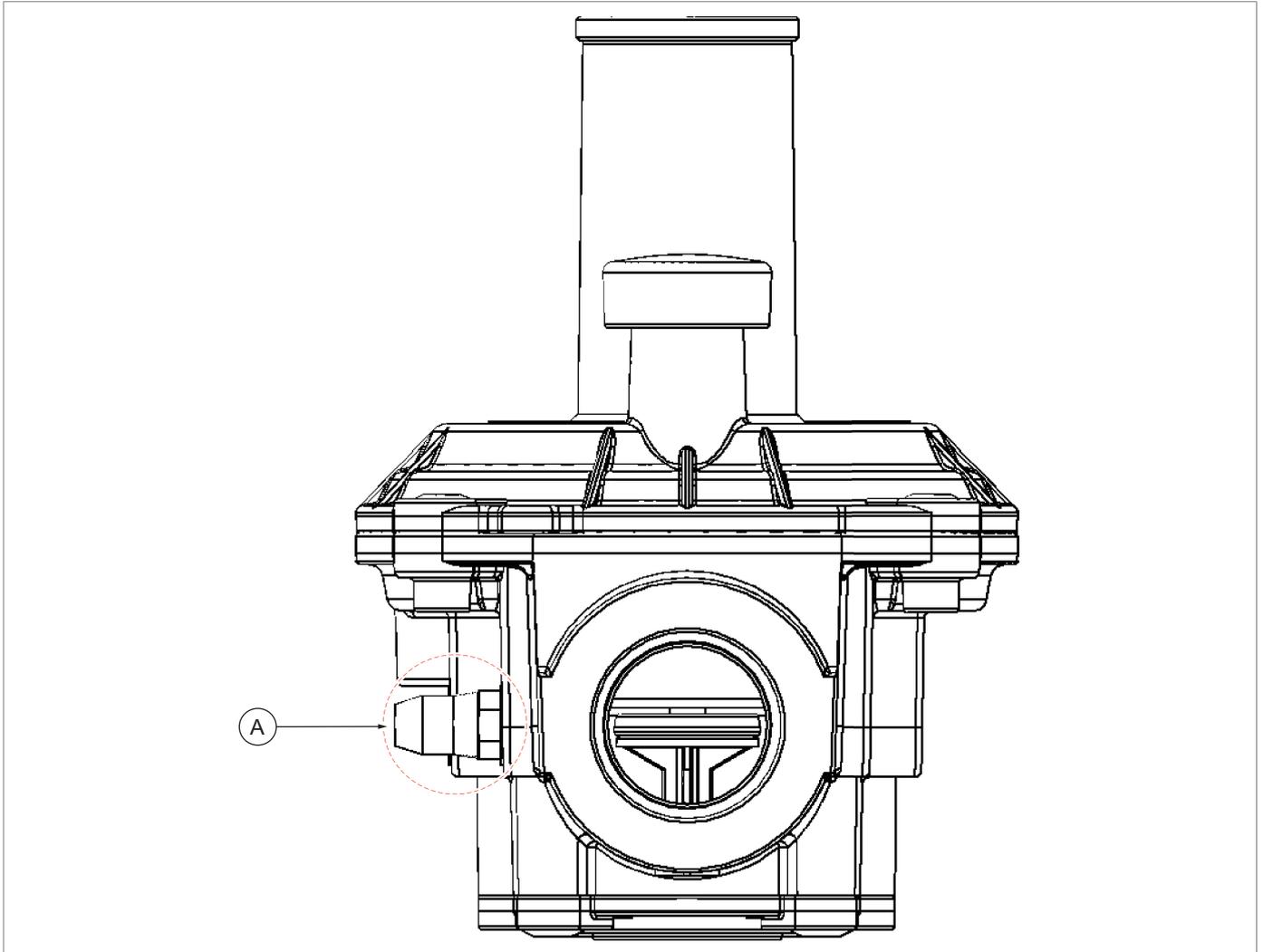


Fig. 4.6. Standard pressure outlets

#### 4.6.3.1 - PROCEDURE OF USE WITH STANDARD PRESSURE OUTLET

**⚠ ATTENTION!**

**The maximum operating pressure for the standard pressure outlet is 0.5 bar.**

To use the standard pressure outlet (A), proceed as shown in Tab.4.23:

| Step | Action   |
|------|--|
| 1    | Undo the locking screw (B).  |
| 2    | Fit the rubber tube on the tang (C) making sure that the connection is sealed.         |
| 3    | Tighten the locking screw (B) making sure there are no leaks from the pressure outlet. |

Tab. 4.22.

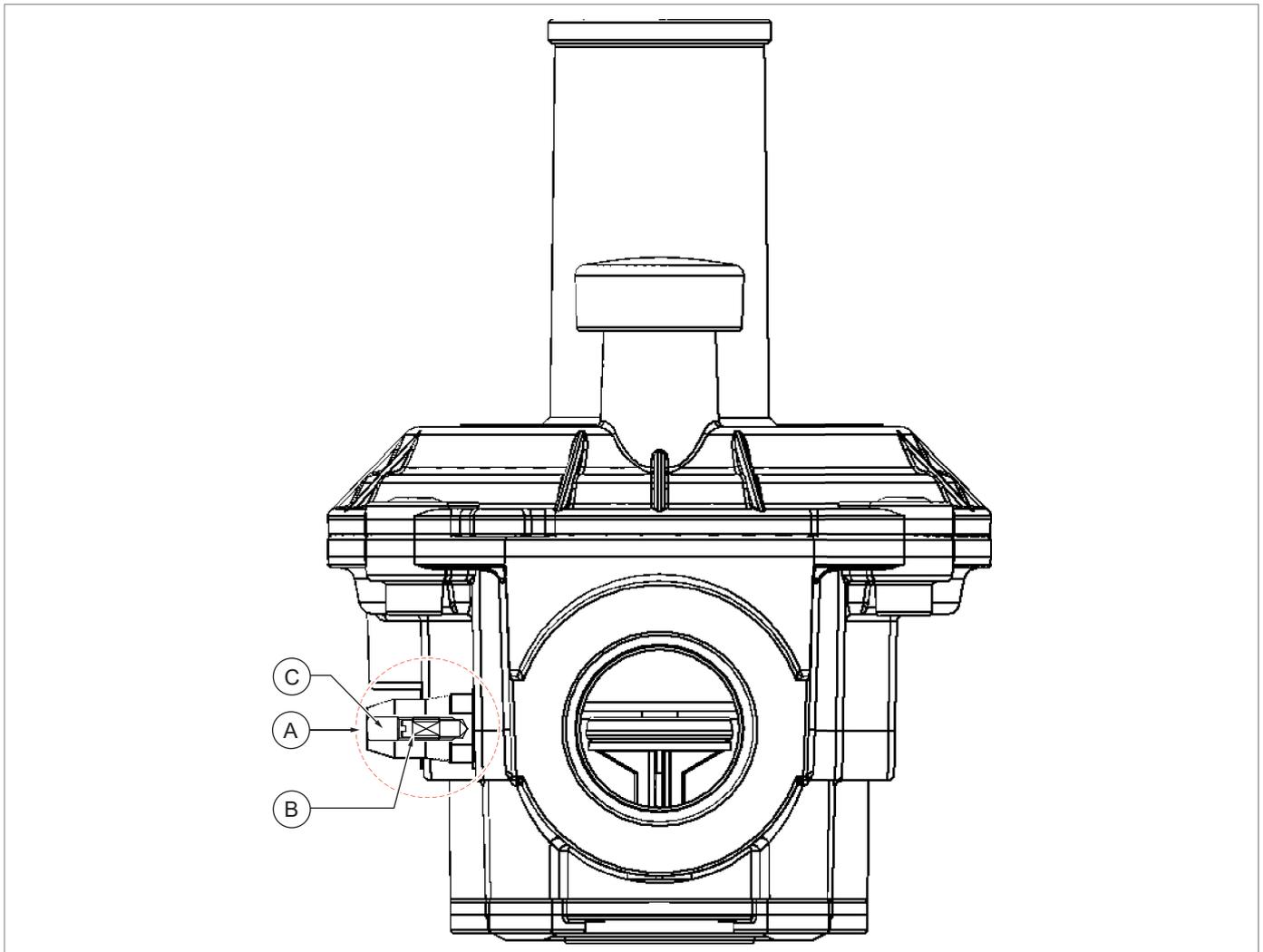


Fig. 4.7. Standard pressure outlet use

## 5 - TRANSPORT AND HANDLING

### 5.1 - SPECIFIC WARNINGS FOR TRANSPORT AND HANDLING

#### NOTICE!

Transport and handling must be carried out in compliance with the regulations in force in the country of installation by personnel who are:

- qualified (specially trained);
- who are familiar with accident prevention and workplace safety regulations;
- authorised to use lifting equipment.

#### Transport and handling

|   |   |
|---|---|
| Operator qualification                  | <ul style="list-style-type: none"> <li>• Installer.</li> </ul>  |
| PPE required                            | <div style="display: flex; align-items: center;">     </div> <div style="background-color: #f4a460; padding: 5px; margin-top: 5px;">  <b>WARNING!</b> </div> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>• the regulations in force in the country of installation;</li> <li>• <u>any information provided by the Safety Manager at the installation facility.</u></li> </ul> |
| Weights and dimensions of the equipment | For dimensions and weights, refer to paragraph 5.2 "Physical characteristics of the equipment".   |

Tab. 5.23.

### 5.1.1 - PACKAGING AND FASTENERS USED FOR TRANSPORT

The transport packaging is designed and manufactured to avoid damage during normal transport, storage and handling. The equipment must be kept in the packaging until installation.

Upon receiving the equipment, please:

- make sure that no part has been damaged during transport and/or handling;
- immediately report any damage found to PIETRO FIORENTINI S.p.A..

#### NOTICE!

**PIETRO FIORENTINI S.p.A. shall not be liable for any damage to people or property caused by accidents due to failure to comply with the instructions provided in this manual.**

Tab. 5.25. describes the types of packaging used:

| Ref. | Type of packaging        | Image  |
|------|--------------------------|--|
| A    | Multiple cardboard box * |   |
| B    | Single cardboard box     |  |

\*Only for versions with 1/2" - 3/4" - 1" connections

Tab. 5.24.

## 5.2 - PHYSICAL CHARACTERISTICS OF GOVERNOR WITH AND WITHOUT FILTER

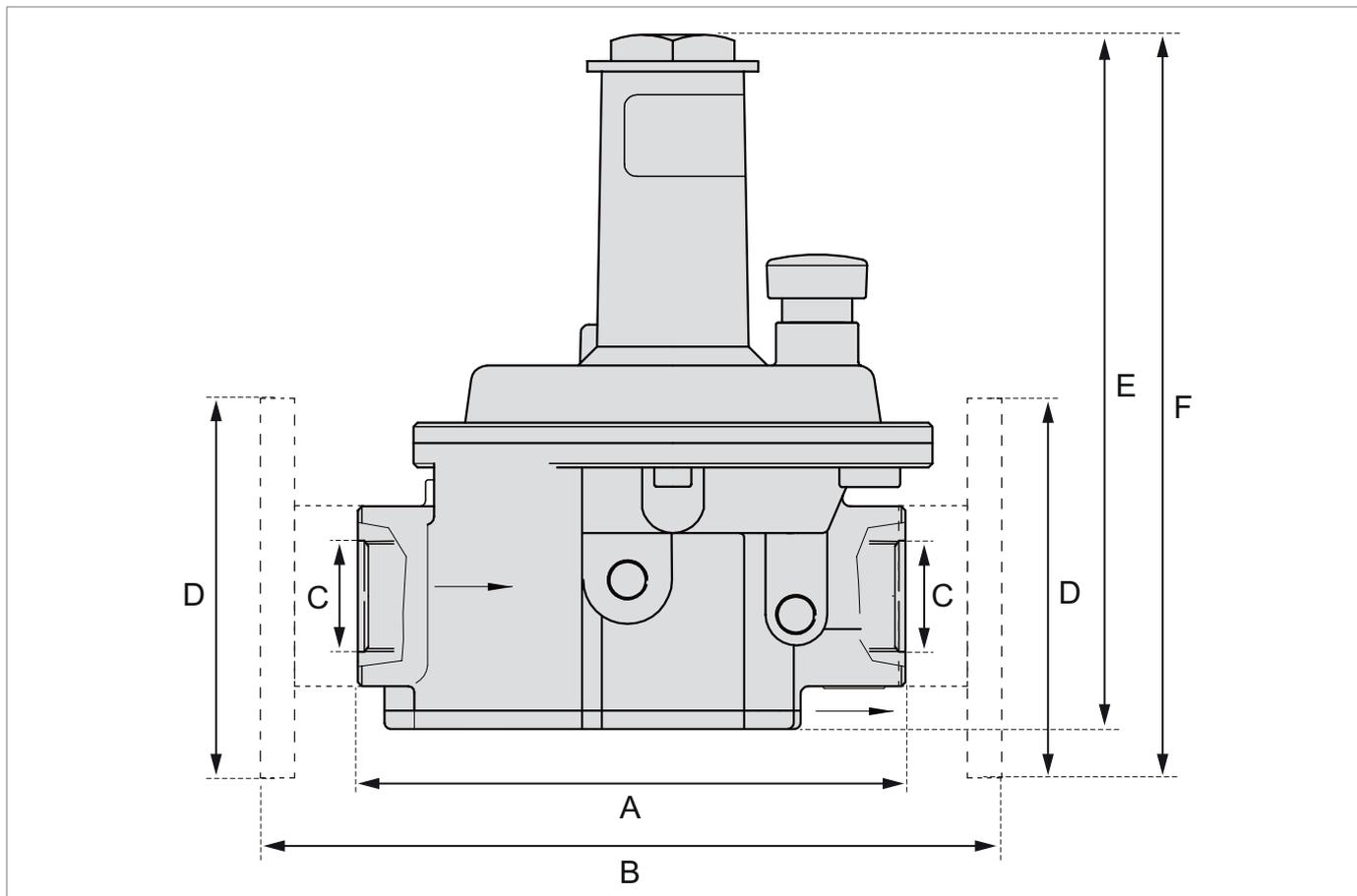


Fig. 5.8. Physical characteristics of governor with and without filter

| Dimensions              |             | A    | B    | C        | D        | E    | F     | Weight |
|-------------------------|-------------|------|------|----------|----------|------|-------|--------|
| Version                 |             | [mm] | [mm] | [inches] | [inches] | [mm] | [mm]  | [Kg]   |
| Threaded Compact        | 1/2"        | 104  | -    | 1/2"     | -        | 140  | -     | 0.3    |
|                         | 3/4"        | 104  | -    | 3/4"     | -        | 140  | -     | 0.3    |
|                         | 1"          | 104  | -    | 1"       | -        | 140  | -     | 0.3    |
| Threaded High flow rate | 1/2"        | 120  | -    | 1/2"     | -        | 171  | -     | 0.4    |
|                         | 3/4"        | 120  | -    | 3/4"     | -        | 171  | -     | 0.4    |
|                         | 1"          | 120  | -    | 1"       | -        | 171  | -     | 0.4    |
| Threaded                | 1" 1/4      | 196  | -    | 1" 1/4   | -        | 241  | -     | 3.2    |
|                         | 1" 1/2      | 196  | -    | 1" 1/2   | -        | 241  | -     | 3.2    |
|                         | 2"          | 234  | -    | 2"       | -        | 303  | -     | 4.9    |
| Flanged                 | 2" 1/2 DN65 | -    | 430  | -        | 2" 1/2   | -    | 428.5 | 13.8   |
|                         | 3" DN80     | -    | 430  | -        | 3"       | -    | 428.5 | 13.8   |
|                         | 4" DN100    | -    | 430  | -        | 4"       | -    | 428.5 | 13.8   |

Tab. 5.25.

### 5.2.1 - PHYSICAL CHARACTERISTICS OF GOVERNOR WITH SLAM-SHUT VALVE

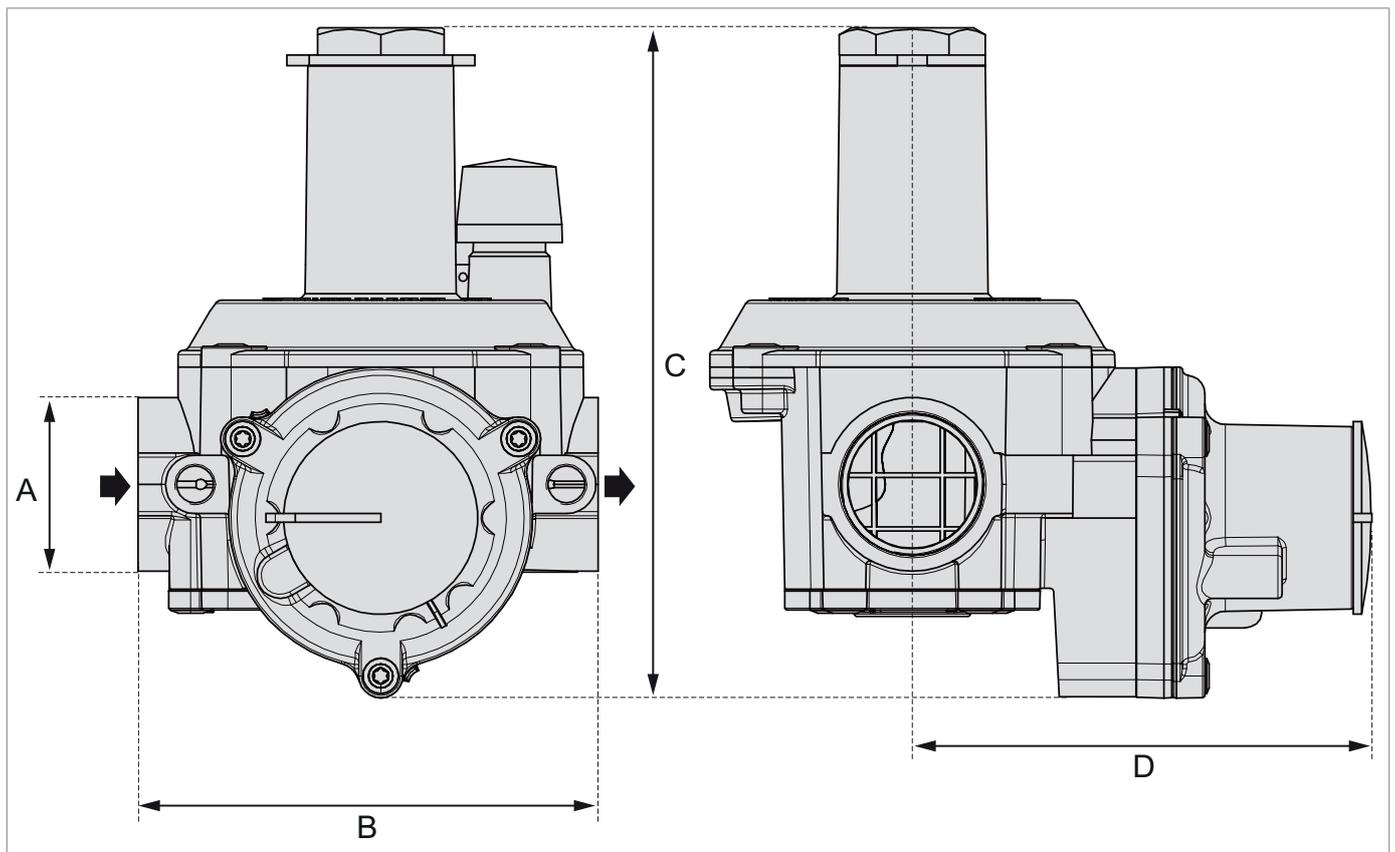


Fig. 5.9. Physical characteristics of governor with slam-shut valve

| Dimensions |               |           |           |           |                |
|------------|---------------|-----------|-----------|-----------|----------------|
| Version    | A<br>[inches] | B<br>[mm] | C<br>[mm] | D<br>[mm] | Weight<br>[Kg] |
| Compact    | 1/2"          | 104       | 160       | 109       | 0.3            |
|            | 3/4"          | 104       | 160       | 109       | 0.3            |
|            | 1"            | 104       | 160       | 109       | 0.3            |

Tab. 5.26.

## 5.2.2 - PHYSICAL CHARACTERISTICS ZERO VERSION

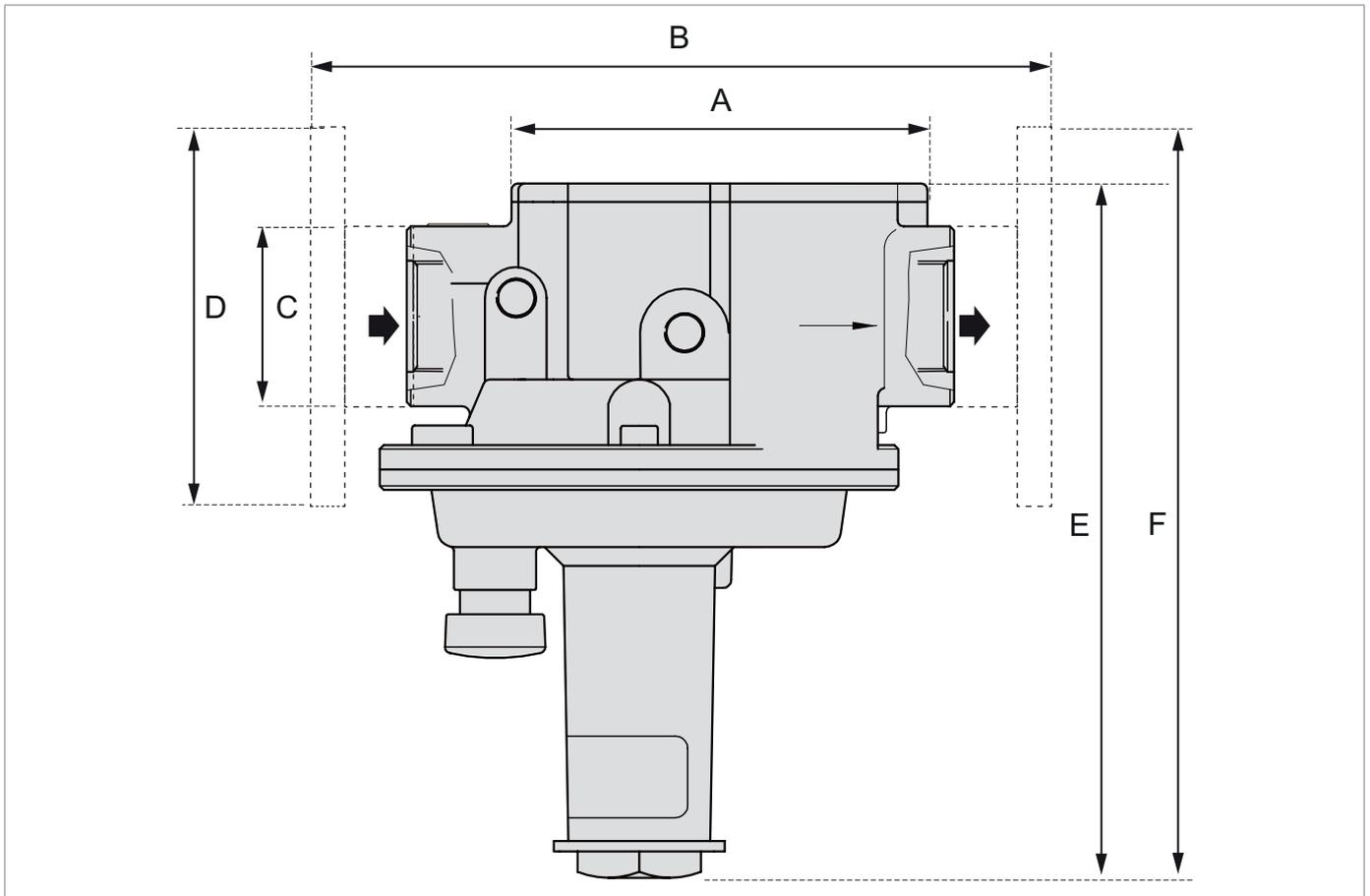


Fig. 5.10. Physical characteristics Zero version

| Dimensions          |                | A    | B    | C        | D        | E    | F     | Weight |
|---------------------|----------------|------|------|----------|----------|------|-------|--------|
| Version             |                | [mm] | [mm] | [inches] | [inches] | [mm] | [mm]  | [Kg]   |
| L150-R150-Y150-V150 | 1/2"           | 120  | -    | 1/2"     | -        | 171  | -     | 0.4    |
| L151-R151-Y151-V151 | 3/4"           | 120  | -    | 3/4"     | -        | 171  | -     | 0.4    |
| L152-R152-Y152-V152 | 1"             | 120  | -    | 1"       | -        | 171  | -     | 0.4    |
| L153-R153-Y153      | 1" 1/4         | 196  | -    | 1" 1/4   | -        | 241  | -     | 3.2    |
| L154-R154-Y154      | 1" 1/2         | 196  | -    | 1" 1/2   | -        | 241  | -     | 3.2    |
| L155-R155-Y155      | 2"             | 234  | -    | 2"       | -        | 303  | -     | 4.9    |
| L156-R156-Y156      | 2" 1/2<br>DN65 | -    | 430  | -        | 2" 1/2   | -    | 428.5 | 13.8   |
| L157-R157-Y157      | 3"<br>DN80     | -    | 430  | -        | 3"       | -    | 428.5 | 13.8   |
| L158-R158-Y158      | 4"<br>DN100    | -    | 430  | -        | 4"       | -    | 428.5 | 13.8   |

Tab. 5.27.

### 5.2.3 - PHYSICAL CHARACTERISTICS RATIO VERSION

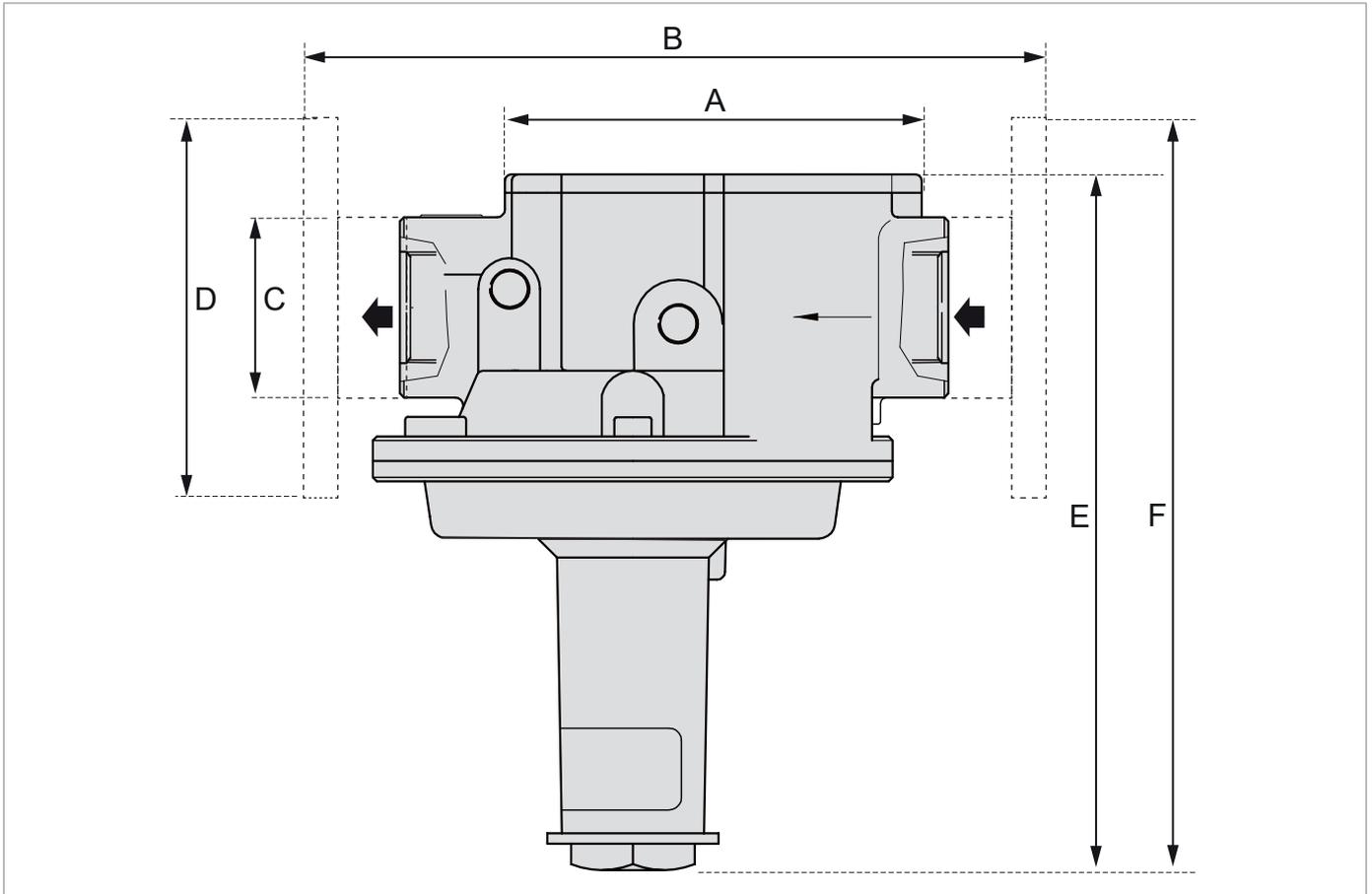


Fig. 5.11. Physical characteristics Ratio version

| Dimensions |                | A    | B    | C        | D        | E     | F     | Weight |
|------------|----------------|------|------|----------|----------|-------|-------|--------|
| Version    |                | [mm] | [mm] | [inches] | [inches] | [mm]  | [mm]  | [Kg]   |
| L150-Y150  | 1/2"           | 120  | -    | 1/2"     | -        | 182.5 | -     | 0.5    |
| L151-Y151  | 3/4"           | 120  | -    | 3/4"     | -        | 182.5 | -     | 0.5    |
| L152-Y152  | 1"             | 120  | -    | 1"       | -        | 182.5 | -     | 0.5    |
| L153-Y153  | 1" 1/4         | 196  | -    | 1" 1/4   | -        | 249.5 | -     | 3.4    |
| L154-Y154  | 1" 1/2         | 196  | -    | 1" 1/2   | -        | 249.5 | -     | 3.4    |
| L155-Y155  | 2"             | 234  | -    | 2"       | -        | 312   | -     | 5.2    |
| L156-Y156  | 2" 1/2<br>DN65 | -    | 430  | -        | 2" 1/2   | -     | 437.5 | 14.2   |
| L157-Y157  | 3"<br>DN80     | -    | 430  | -        | 3"       | -     | 437.5 | 14.2   |
| L158-Y158  | 4"<br>DN100    | -    | 430  | -        | 4"       | -     | 437.5 | 14.2   |

Tab. 5.28.

### 5.3 - EQUIPMENT ANCHORING AND LIFTING METHOD

 **HAZARD!**

Using lifting equipment (if necessary) for unloading, carrying and handling packages is reserved only for skilled operators who have been properly trained (and are appropriately qualified if required by the regulations in force in the country of installation) and are familiar with:

- accident prevention rules;
- workplace safety provisions;
- lifting equipment features and limits.

 **HAZARD!**

Before handling a load, make sure that its weight does not exceed the load capacity of the lifting equipment (and any other lifting tools) specified on the specific plate.

 **ATTENTION!**

Before moving the equipment:

- remove any movable or hanging component or firmly secure it to the load;
- protect fragile equipment;
- check that the load is stable;
- make sure to have perfect visibility along the route.

### 5.3.1 - FORKLIFT HANDLING METHOD

**HAZARD!**

It is forbidden to:

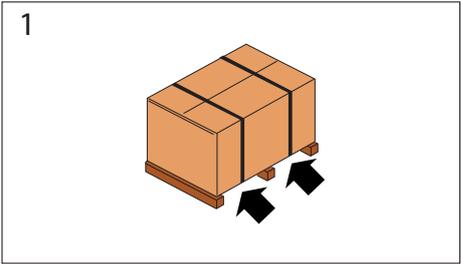
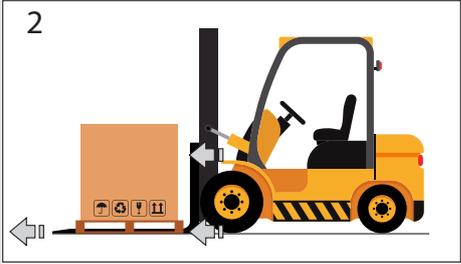
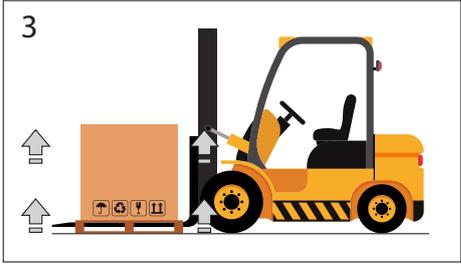
- Do not transit under suspended loads;
- Do not move the load over the personnel operating in the site/plant area.

**WARNING!**

The following is not allowed on forklifts:

- carrying passengers;
- lifting people.

If cardboard boxes (single or multiple) are carried on a pallet, proceed as indicated in Tab. 5.30.:

| Step | Action   | Image   |
|------|--|---|
| 1    | Place the forks of the forklift under the load surface.  |    |
| 2    | Make sure that the forks protrude from the front of the load (by at least 5 cm), far enough to eliminate any risk of the transported load tipping.                 |  |
| 3    | Raise the forks until they are touching the load.<br><b>NOTICE!</b><br>Fasten the load to the forks with clamps or similar devices if required.                    |  |
| 4    | Slowly lift the load by a few dozen centimetres and check its stability, making sure that the centre of gravity of the load is at the centre of the lifting forks. |  |

| Step | Action   | Image   |
|------|--|---|
| 5    | Tilt the mast backwards (towards the driver's seat) to help the over-turning moment and to ensure greater load stability during transport.   |  |
| 6    | Adjust transport speed according to the type of floor and load, avoiding sudden manoeuvres.<br><b>⚠ WARNING!</b><br><b>In case of:</b> <ul style="list-style-type: none"> <li>• <b>obstacles along the path;</b></li> <li>• <b>particular operating situations;</b></li> </ul> <b>hinder operator visibility, the assistance of a ground operator is required, standing outside the range of action of the lifting equipment, with the task of signalling.</b> | -   |
| 7    | Place the load in the chosen installation area.  | -   |

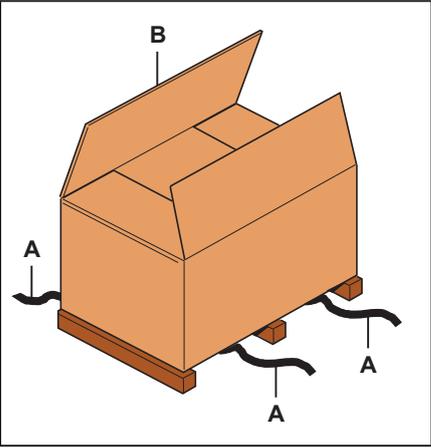
Tab. 5.29.

## 5.4 - PACKAGING REMOVAL

| Packaging removal      |   |
|------------------------|---|
| Operator qualification | <ul style="list-style-type: none"> <li>Installer.</li> </ul>  |
| PPE required           |  <p><b>WARNING!</b></p> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE necessary to protect against risks associated with the workplace or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>the regulations in force in the country of installation;</li> <li><u>any information provided by the Safety Manager at the installation facility.</u></li> </ul> |

Tab. 5.30.

To unpack the equipment in a cardboard box, proceed as specified in Tab.5.32:

| Step | Action   | Image  |
|------|--|--|
| 1    | Remove the straps (A).   |  |
| 2    | Remove the packaging cardboard (B).  |  |
| 3    | Remove the fasteners that secure the equipment to the base (if any).   |  |
| 4    | <p>Move the equipment from the base to the place intended for it.</p> <p><b>NOTICE!</b></p> <p><b>Have at least 2 operators manually move the packages if required due to their dimensions/weight.</b></p> |  |

Tab. 5.31.

### **NOTICE!**

After removing all packaging materials, check for any anomalies.

If there are anomalies:

- do not install the equipment;
- contact PIETRO FIORENTINI S.p.A. and specify the details provided on the equipment nameplate.

### 5.4.1 - PACKAGING DISPOSAL

### **NOTICE!**

Sort the various materials making up the packaging and dispose of them in compliance with the regulations in force in the country of installation.

## 5.5 - STORAGE AND ENVIRONMENTAL CONDITIONS

### **WARNING!**

**Protect the regulator from blows and impacts, even accidental, until it is installed.**

If the equipment needs to be stored for an extended period, the minimum environmental conditions for the intended storage are provided in Tab.5.33. Compliance with these conditions will guarantee the declared performance:

| Conditions                  | Data   |
|-----------------------------|--|
| Maximum storage period      | 5 years.   |
| Temperature                 | Not above 40°C   |
| Humidity                    | Not above 70%  |
| Radiation and light sources | Away from radiation and light sources according to UNI ISO 2230:2009 |

*Tab. 5.32.*

### 5.5.1 - STORAGE LASTING LONGER THAN THE MAXIMUM TIME ALLOWED

#### **NOTICE!**

**After a storage period exceeding the maximum time allowed (5 years), the equipment must be scrapped.**

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## 6 - COMMISSIONING/MAINTENANCE EQUIPMENT

### 6.1 - LIST OF EQUIPMENT

| Use of installation/commissioning/maintenance equipment |  |
|---|--|
| Operator qualification                                  | <ul style="list-style-type: none"> <li>• Installer.</li> <li>• Specialised technician/maintenance technician.</li> </ul>   |
| PPE required  | <div style="display: flex; align-items: center;">  </div> <div style="background-color: #f4a460; padding: 5px; margin-top: 5px;"> <p><b>⚠ WARNING!</b></p> </div> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>• the regulations in force in the country of installation;</li> <li>• <u>any information provided by the Safety Manager at the installation facility.</u></li> </ul> |

Tab. 6.33.

We list the types of equipment required for installation, commissioning and maintenance:

| Ref. | Equipment type                             | Image   |
|------|--|---|
| A    | Double ended bi-hex tubular socket wrench. |  |
| B    | Bent male hex key.                         |  |
| C    | Phillips screwdriver.                      |  |
| D    | Slotted screwdriver.                       |  |

Tab. 6.34.

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## 7 - INSTALLATION

### 7.1 - INSTALLATION PRE-REQUISITES

#### 7.1.1 - ALLOWED ENVIRONMENTAL CONDITIONS

 **WARNING!**

For the safe use of the equipment, observing the permissible environmental conditions, observe the data on the applied rating plate and any accessories (refer to section 2.8 "").

 **WARNING!**

**The equipment must be installed away from atmospheric agents and direct sunlight.**

The installation site must be suitable for the safe use of the equipment.

The installation area of the equipment must be properly lit to ensure proper operator visibility during working on the equipment.

#### 7.1.2 - STORAGE LASTING LONGER THAN THE MAXIMUM TIME ALLOWED

 **WARNING!**

**Installing the equipment after storage exceeding the maximum admissible time (5 years) is not allowed. After a storage period exceeding the maximum time allowed, the equipment must be scrapped.**

### 7.1.3 - CHECKS BEFORE INSTALLATION

With respect to its **design pressure (DP)**, the equipment does not require any further safety device upstream to protect against any overpressure when, for the upstream reduction station, the maximum incidental downstream pressure is:

$$\text{MIPd} \leq 1.1 \text{ DP}$$

**MIPd** = Maximum incidental downstream pressure value (for further information, see UNI EN 12186:2014).

#### **ATTENTION!**

**If the installation of the equipment requires the field application of compression fittings, these must be installed in accordance with the instructions of the manufacturer of the fittings themselves.**

**The choice of fittings must be compatible with:**

- **the use specified for the equipment;**
- **the plant specifications when required.**

Before installation, it must be ensured that:

- the flow direction is observed as shown on the equipment;
- at least one shut-off valve is installed upstream;
- at least one shut-off valve is installed downstream;
- the data on the identification plates attached to the equipment (see section 2.8 of the manual) correspond to the requirements of the connected combustion appliance(s);
- the equipment has not been damaged during transport;
- the intended installation compartment meets the provisions in force on safety and is away from any possible damage of mechanical origin, away from sources of heat or naked flames, in a dry place and protected from external agents;
- there are no impediments that could hinder the installation operations;
- the inlet and outlet pipes are at the same level and able to support the weight of the equipment;
- on the input/output connections are totally free of mechanical stress;
- inlet/outlet pipe connections are parallel, clean and undamaged;
- the inside of the upstream pipe is clean and free of processing residues such as welding slag, sand, paint residues, water, etc....

## 7.2 - SPECIFIC SAFETY INSTRUCTIONS FOR THE INSTALLATION STEP

### **WARNING!**

Before proceeding with installation, make sure that the upstream and downstream valves installed on the line are shut off.

### **WARNING!**

Installation may also take place in areas where there is a risk of explosion, which implies that all necessary prevention and protection measures have to be taken.

For these measures, please refer to the regulations in force at the place of installation.

### **WARNING!**

Near the equipment, do not:

- use open flames (e.g. for welding operations);
- smoke.

### **WARNING!**

The room where the equipment is installed must:

- be properly aerated/ventilated;
- have an ambient temperature of use as indicated in paragraph 4.5 (“Technical characteristics/performance”).

### **WARNING!**

The installer must:

- use the fittings and gaskets supplied with the equipment by PIETRO FIORENTINI S.p.A.
- fix the swivel joints (when provided) according to the tightening torques specified by standards: NF E29-533: 2014 and NF E29-536: 2017.

### **ATTENTION!**

Do not use the equipment as a reference template (available on request).

### 7.3 - GENERAL INFORMATION ON THE LINE

The equipment must be installed on the line in compliance with:

- the direction of gas flow as indicated by the arrow on the equipment itself;
- the correct mounting position:

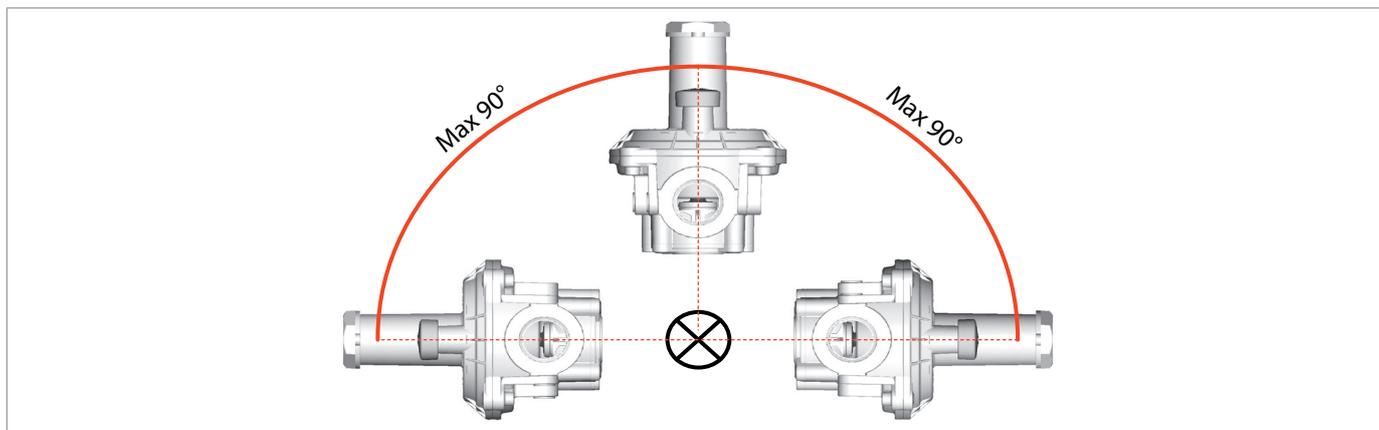


Fig. 7.12. Correct installation position Standard/Goval versions

#### NOTICE!

**When used in gas pressure reduction stations, the device must be installed at least according to the requirements of standards UNI EN 12186:2014 or UNI EN 12279:2007.**

**Equipment vents must be ducted in accordance with UNI EN 12186:2014 or UNI EN 12279:2007 or the standards in force at the place of installation of the equipment.**

### 7.3.1 - INSTALLATION TYPE (STANDARD/GOVAL VERSION)

In the standard installation of the equipment and in the Goval version, the following must be present:

| Pos.     | Description   |
|----------|---|
| <b>A</b> | Pressure regulator.   |
| <b>B</b> | Shut-off valve upstream of the regulator (A).               |
| <b>C</b> | Shut-off valve downstream of the equipment (when required). |
| <b>D</b> | Burner.   |

Tab. 7.35.

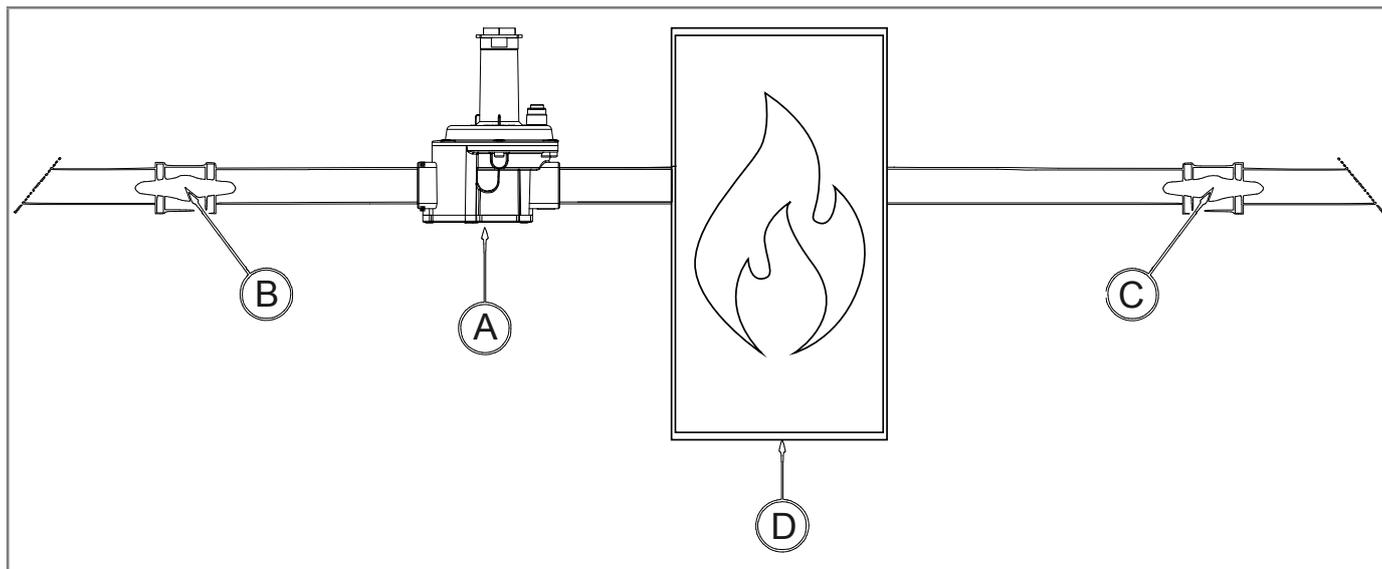


Fig. 7.13. Connection example Standard/Goval versions

### 7.3.2 - ZERO VERSION INSTALLATION

When installing the Zero version of the equipment, the following must be present:

| Pos.     | Description            |
|----------|------------------------|
| <b>A</b> | Filter                 |
| <b>B</b> | Solenoid valve         |
| <b>C</b> | Zero version regulator |
| <b>D</b> | Motor                  |

Tab. 7.36.

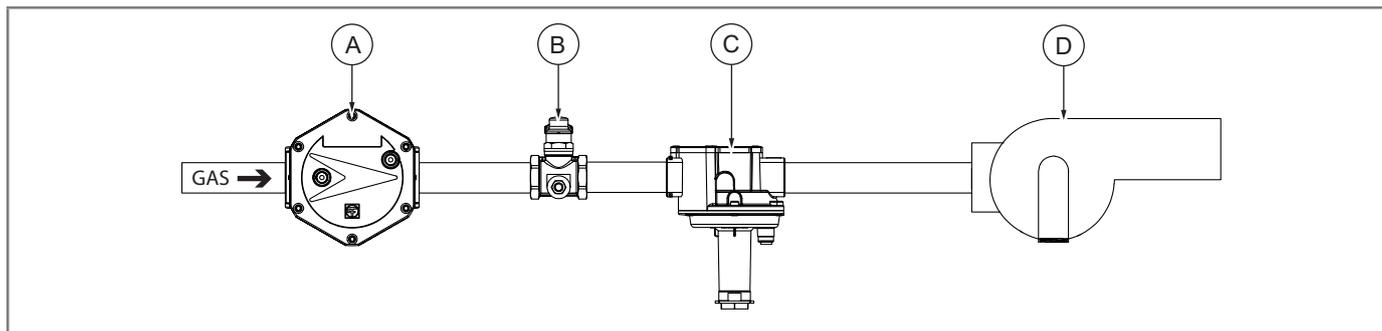


Fig. 7.14. Zero version connection examples

### 7.3.3 - INSTALLATION RATIO VERSION

When installing the equipment in the Ratio version, the following must be present:

| Pos.     | Description                 |
|----------|-----------------------------|
| <b>A</b> | Filter                      |
| <b>B</b> | Regulator Ratio version 1:1 |
| <b>C</b> | Solenoid valve              |
| <b>D</b> | Solenoid valve              |

Tab. 7.37.

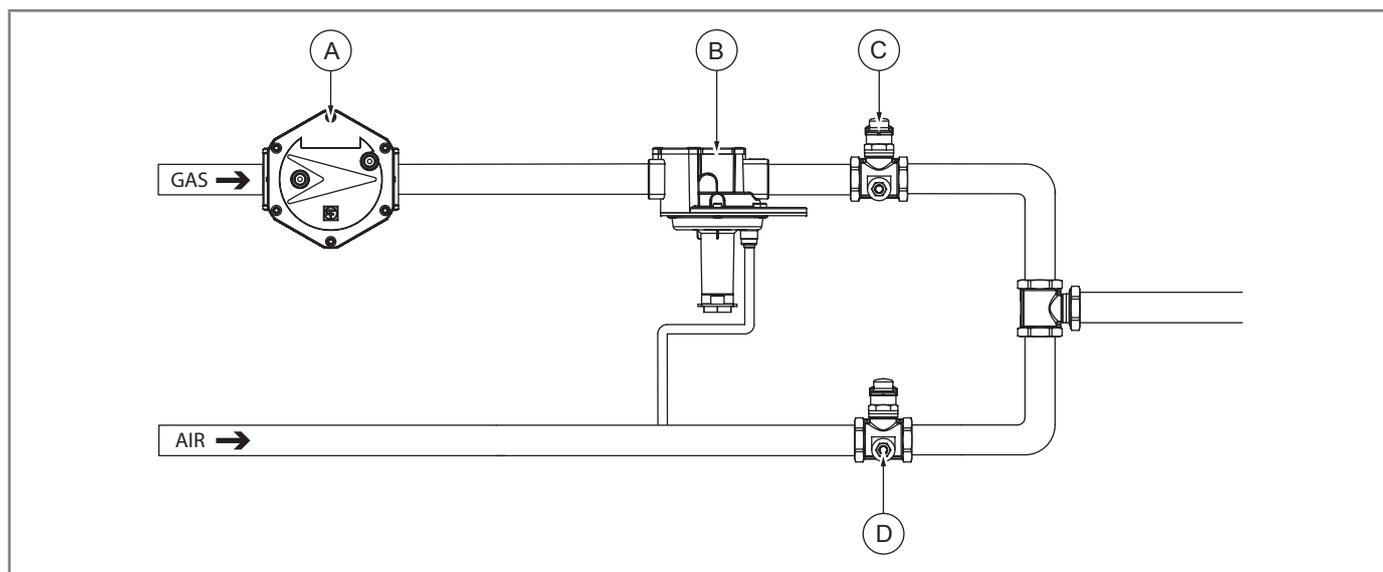


Fig. 7.15. Ratio version connection examples

## 7.4 - INSTALLATION PROCEDURES

| Installation           |  |
|------------------------|--|
| Operator qualification | <ul style="list-style-type: none"> <li>Installer.</li> </ul>   |
| PPE required           |  <p><b>WARNING!</b></p> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>the regulations in force in the country of installation;</li> <li><u>any information provided by the Safety Manager at the installation facility.</u></li> </ul> |

Tab. 7.38.

|  |
|--|
| <p><b>NOTICE!</b></p> <ul style="list-style-type: none"> <li>With natural gas or other non-corrosive gases that are not subject to recondensation, the equipment can be installed in any flow direction.</li> <li>Please avoid any mounting positions with outlet flow facing upwards in installations using LPG.</li> </ul> |
|--|

To install the equipment, proceed as specified in Tab. 7.40.:

| Step | Action   |
|------|--|
| 1    | Apply the checks in paragraph 7.1.3 ("Checks before installation").  |
| 2    | Remove any type of packaging/equipment protection (if any).  |
| 3    | Purge the line of any air.   |
| 4    | <p>Connect making sure that:</p> <ul style="list-style-type: none"> <li>the inlet and outlet pipes do not exert excessive bending or tensile forces on the body of the equipment in relation to their non-alignment. If necessary, clamp the inlet/outlet pipes for proper alignment;</li> <li>the connections and/or terminals of the inlet and outlet pipes are suitable for and compatible with the fittings on the equipment.</li> </ul> <p><b>NOTICE!</b></p> <ul style="list-style-type: none"> <li>If there are swivel connectors, use the gaskets supplied by PIETRO FIORENTINI S.p.A.</li> <li>When assembling directly to the equipment body, use only cylindrical GAS connections (ref. UNI EN ISO 228-1).</li> </ul> |

Tab. 7.39.

|   |
|---|
| <p><b>NOTICE!</b></p> <p>The warranty shall be deemed null and void and PIETRO FIORENTINI S.p.A. shall not be held liable for any damage and/or malfunctions if the fittings used during installation are not those supplied.</p> |
|---|

### 7.4.1 - POST-INSTALLATION INSTRUCTIONS

#### **ATTENTION!**

Check when installation is complete:

- the ignition of connected combustion appliances;
- the operating pressure in dynamic phase with variable flow rates and static phase with zero flow rate.

#### **WARNING!**

Make sure all connections are properly tightened to prevent any leakage during commissioning.

#### **WARNING!**

Protect the equipment from blows and impacts, even accidental.

## 7.5 - EQUIPMENT ADJUSTMENTS

#### **NOTICE!**

All regulators are calibrated to the values requested by the customer directly at PIETRO FIORENTINI S.p.A. factory.

No further adjustments are required.

The calibration values are specified on the nameplate (refer to paragraph 2.8).

#### Adjustment

|                        |  |
|------------------------|--|
| Operator qualification | <ul style="list-style-type: none"> <li>• Installer.</li> </ul>   |
| PPE required           | <div style="display: flex; align-items: center;">  </div> <div style="background-color: #f4a460; padding: 5px; margin-top: 5px;">  <b>WARNING!</b> </div> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>• the regulations in force in the country of installation;</li> <li>• any information provided by the Safety Manager at the installation facility.</li> </ul> |

Tab. 7.40.

#### **NOTICE!**

The relief valve pressure does not need to be adjusted.

#### **WARNING!**

Contact PIETRO FIORENTINI S.p.A. for any further need.

Do not make any unauthorised changes to the equipment without the approval of PIETRO FIORENTINI S.p.A.

### 7.5.1 - ADJUSTMENTS STANDARD VERSION

Should it be necessary, for standard regulators with or without slam-shut valve, to change the setting values in order to increase or decrease the operating pressure, proceed as shown in Tab.7.42:

| Step | Action   | Necessary equipment         |
|------|--|-----------------------------|
| 1    | Remove the upper cap (A) of the regulator.   | -                           |
| 2    | Turn the ring nut (B) clockwise: <ul style="list-style-type: none"> <li>hourly to increase downstream pressure;</li> <li>anti-clockwise to decrease the downstream pressure.</li> </ul>  | Allen key CH 11 mm          |
| 3    | Put the upper cap (A) of the regulator back in place.  | -                           |
| 4    | Remove the cap of the slam-shut device (C).  | -                           |
| 5    | Turn the ring nut (D): <ul style="list-style-type: none"> <li>clockwise to increase the slam-shut valve's cut-in pressure for maximum downstream pressure;</li> <li>anti-clockwise to decrease the slam-shut valve's tripping pressure due to maximum downstream pressure.</li> </ul>                  | 27 mm tubular socket wrench |
| 5    | Turn the ring nut (E) in the direction: <ul style="list-style-type: none"> <li>clockwise to increase the slam-shut valve's cut-in pressure for minimum downstream pressure;</li> <li>anti-clockwise to decrease the slam-shut valve's tripping pressure due to minimum downstream pressure.</li> </ul> | Slotted screwdriver         |
| 7    | Put the cap of the slam-shut device (C) back in place.   | -                           |

Tab. 7.41.

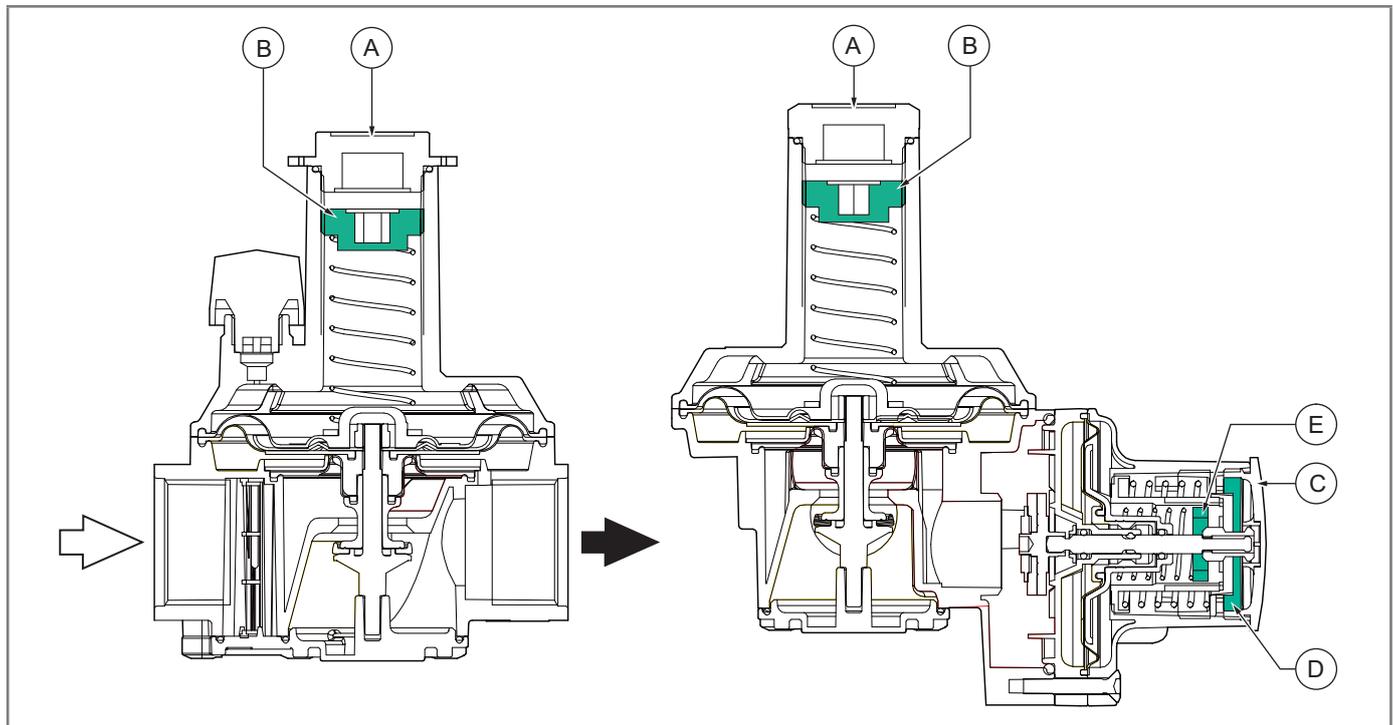


Fig. 7.16. Operating pressure regulation (Standard version)

**NOTICE!**

Minor  $\pm 10\%$  calibration changes with respect to the nameplate value (see paragraph 2.8 “Applied rating plates”) can be made only by adhering to the spring ranges specified in the tables in chapter 10 (“Calibration tables”).

## 7.5.2 - ZERO VERSION ADJUSTMENTS

If it is necessary to change the setting values of the zero regulator in order to increase or decrease the zero pressure, proceed as shown in Tab.7.43:

| Step | Action  | Necessary equipment |
|------|---|---------------------|
| 1    | Remove the upper cap (A) of the regulator.  | -                   |
| 2    | Turn the ring nut (B) clockwise: <ul style="list-style-type: none"> <li>hourly to increase downstream pressure;</li> <li>anti-clockwise to decrease the downstream pressure.</li> </ul> | Allen key CH11 mm   |
| 3    | Put the upper cap (A) of the regulator back in place.   | -                   |

Tab. 7.42.

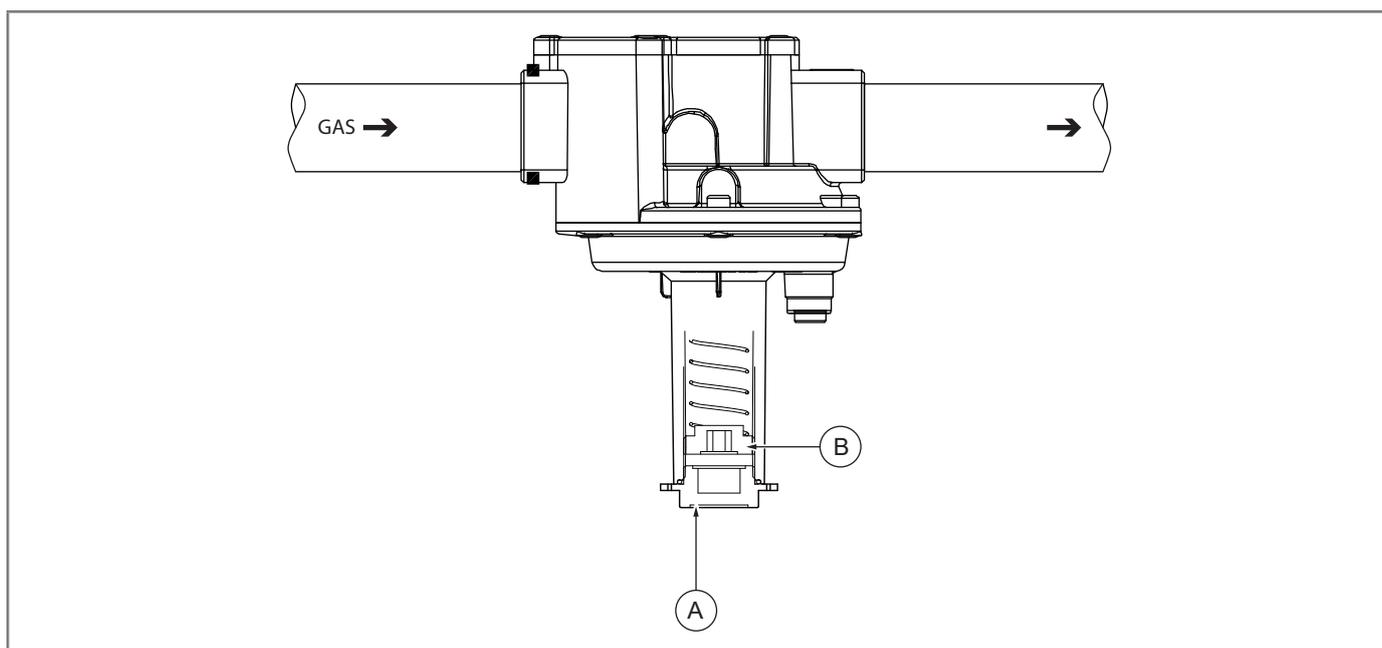


Fig. 7.17. Zero version operating pressure regulation

### 7.5.3 - RATIO VERSION ADJUSTMENTS

#### ! NOTICE!

The ratio regulator is driven by air line pressure.

The gas outlet pressure is set at a ratio of 1:1 to the control air pressure.

- The burner power can be varied by adjusting the air regulator.
- Pressure fluctuations in the combustion chamber have an equivalent effect on gas and air flow.

In this way, the gas/air mixture does not change.

If it is necessary to change the setting values of the Ratio version regulator, in order to increase or decrease the operating pressure, proceed as shown in Tab.7.44:

| Step | Action  | Necessary equipment                     |
|------|---|---|
| 1    | Remove the upper cap (A) of the regulator.  | -                                       |
| 2    | Turn the adjustment screw (B)<br><ul style="list-style-type: none"> <li>• clockwise to increase the downstream pressure;</li> <li>• anti-clockwise to decrease the downstream pressure.</li> </ul> <div style="border: 1px solid blue; padding: 5px; margin-top: 5px;"> <h4>! NOTICE!</h4> <p><b>During adjustment, check the outlet pressure with a pressure gauge.</b></p> </div> | Slotted screwdriver.<br>Pressure gauge. |
| 3    | Put the upper cap (A) of the regulator back in place.   | -                                       |

Tab. 7.43.

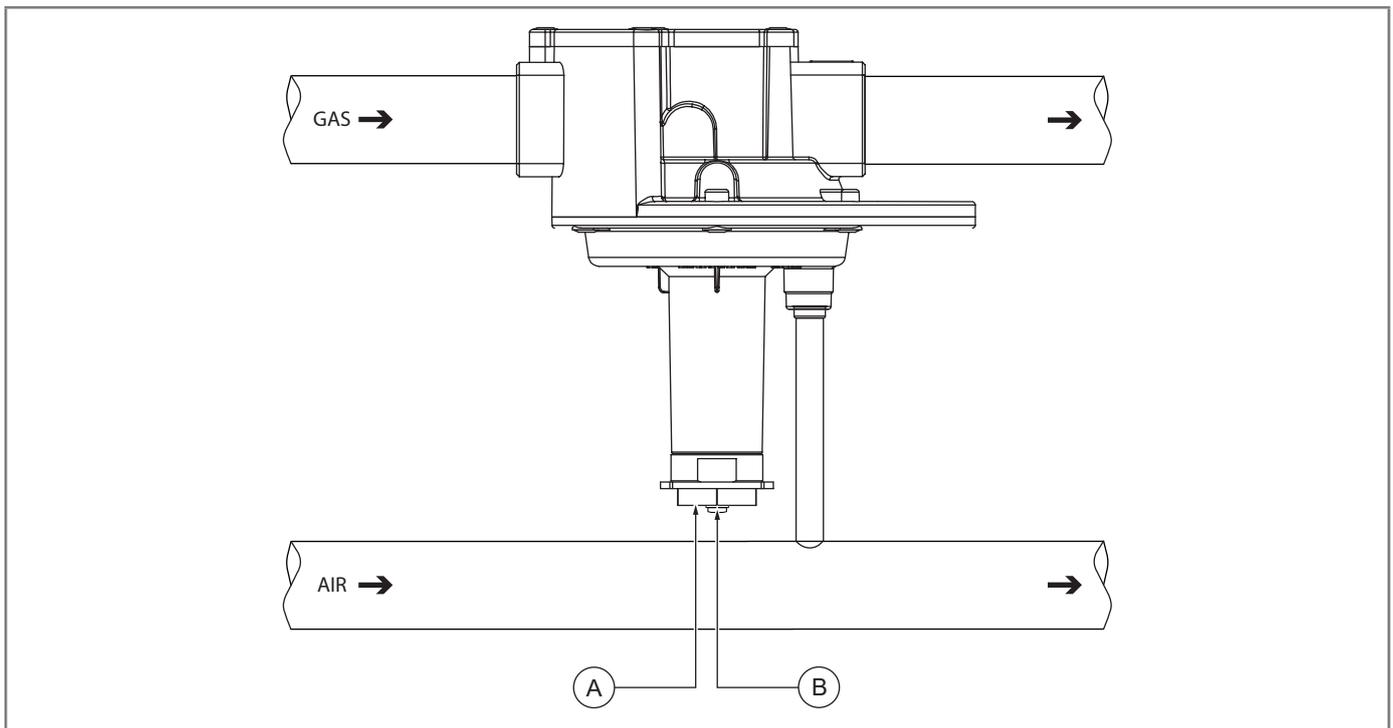


Fig. 7.18.

Operating pressure regulation ratio version

## 8 - COMMISSIONING

### 8.1 - GENERAL WARNINGS

#### 8.1.1 - SAFETY REQUIREMENTS FOR COMMISSIONING

##### HAZARD!

During commissioning the risks associated with any discharges to the atmosphere of flammable or noxious gases must be evaluated.

##### HAZARD!

In case of installation on distribution networks for natural gas, consider the risk associated with explosive mixtures (gas/air) being formed inside the piping, if the line is not subjected to inerting.

##### WARNING!

During commissioning, remove any unauthorised personnel.

##### NOTICE!

Commissioning has to be carried out by authorised and qualified personnel.

Before commissioning the equipment, it is necessary to check that all shut-off valves (inlet, outlet, bypass if any) are closed.

#### Commissioning

|                        |   |
|------------------------|---|
| Operator qualification | <ul style="list-style-type: none"> <li>Commissioning technician.</li> </ul>   |
| PPE required           | <div data-bbox="414 1167 758 1234" style="display: flex; justify-content: space-around; align-items: center;">      </div> <div data-bbox="414 1245 1484 1469" style="background-color: #f9a825; padding: 10px;"> <p> <b>WARNING!</b></p> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>the regulations in force in the country of installation;</li> <li>any information provided by the Safety Manager at the installation facility.</li> </ul> </div> |

Tab. 8.44.

## 8.2 - PRELIMINARY PROCEDURES FOR COMMISSIONING

### **HAZARD!**

Before commissioning the equipment, it must be ensured that any risk of explosion or ignition source has been eliminated.

### **WARNING!**

Before commissioning, it must be ensured that:

- the conditions of use comply with the characteristics of the equipment;
- during pressurisation, the equipment has no leaks.

### **ATTENTION!**

To protect the equipment from damage, never:

- pressurise the equipment through a valve located downstream of it;
- depressurise the equipment through a valve located upstream of it.

## 8.3 - CALIBRATION OF SAFETY DEVICES

### **NOTICE!**

The equipment is regulated at PIETRO FIORENTINI S.p.A. production plants

### **WARNING!**

Do not tamper with or make any unauthorised changes to the equipment without the approval of PIETRO FIORENTINI S.p.A.

## 8.4 - COMMISSIONING THE REGULATOR

### **NOTICE!**

**Commissioning has to be carried out by authorised and qualified personnel.**

Commissioning occurs by directly injecting gas into the pipes at a limited speed (maximum permitted value 20 m/s).

### 8.4.1 - COMMISSIONING OF THE STANDARD VERSION REGULATOR

For commissioning the regulator with and without slam-shut valve (A), proceed as shown in Tab. 8.46.:

| Step | Action   |
|------|--|
| 1    | Partially open the downstream air vent valve when present.   |
| 2    | Slowly open upstream shut-off devices (e.g. OPSO slam-shut valve, valve (B), etc.).  |
| 3    | Wait for the downstream pressure to stabilise at the spring setting P2 indicated on the nameplate.<br><div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p><b>! NOTICE!</b><br/> <b>For the values on the rating plate, please refer to section 2.8 'Applied rating plates' et seq.</b></p> </div> |
| 4    | Close the air vent valve.  |

Tab. 8.45.

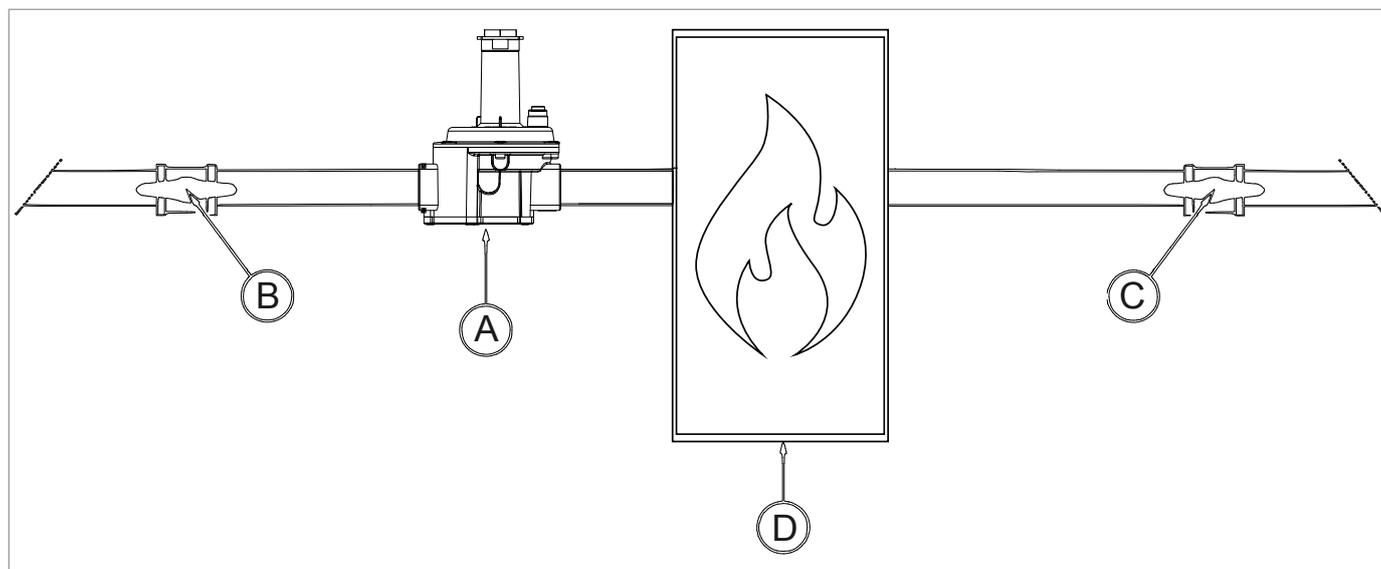


Fig. 8.19. Commissioning (Standard version)

## 8.4.2 - ZERO VERSION REGULATOR COMMISSIONING

To commission the Zero (C) version regulator, proceed as shown in Tab. 8.47.:

| Step | Action  |
|------|---|
| 1    | Partially open the downstream air vent valve when present.  |
| 2    | Slowly open upstream shut-off devices (e.g. solenoid valves, OPSO slam-shut valve, etc.).   |
| 3    | Wait for the downstream pressure to stabilise at the spring setting P2 indicated on the nameplate.<br><div style="border: 1px solid black; padding: 5px; margin-top: 5px;">  <b>NOTICE!</b><br/> <b>For the values on the rating plate, please refer to section 2.8 'Applied rating plates' et seq.</b> </div> |
| 4    | Proceed as described in section 7.5.2 'Zero version adjustments'.   |
| 5    | Close the air vent valve.   |

Tab. 8.46.

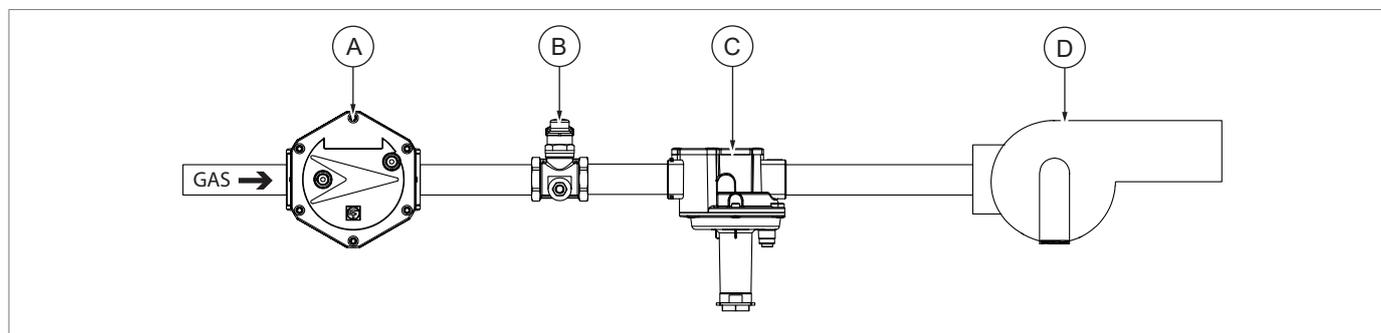


Fig. 8.20. Commissioning (Zero version)

### 8.4.3 - PUTTING THE RATIO VERSION REGULATOR INTO SERVICE

To commission the Ratio version regulator (B), proceed as shown in Tab. 8.48.:

| Step | Action   |
|------|--|
| 1    | Partially open the downstream air vent valve when present.   |
| 2    | Slowly open upstream shut-off devices (e.g. solenoid valves, OPSO slam-shut valve, etc.).  |
| 3    | Wait for the downstream pressure to stabilise at the spring setting P2 indicated on the nameplate.<br><b>NOTICE!</b><br><b>For the values on the rating plate, please refer to section 2.8 'Applied rating plates' et seq.</b> |
| 4    | Proceed as described in section 7.5.3 'Ratio Version Adjustments'.<br><b>NOTICE!</b><br><b>Turn the adjusting screw to calibrate the regulator by checking the gas outlet pressure with a pressure gauge.</b>                  |
| 5    | Close the air vent valve.  |

Tab. 8.47.

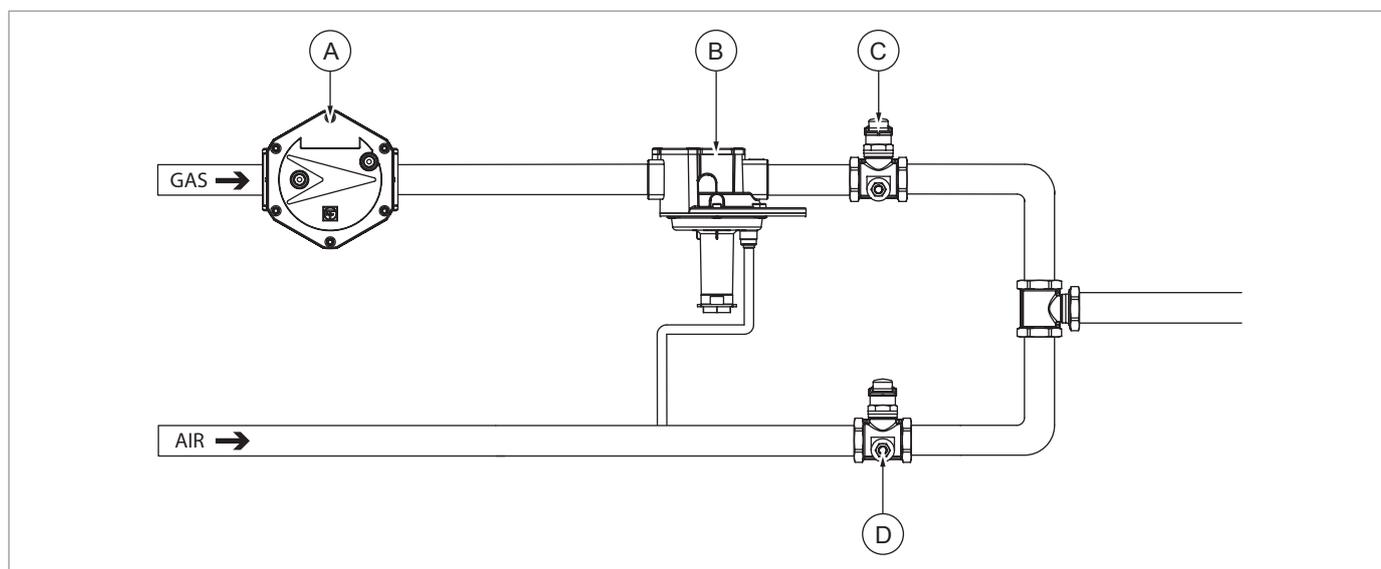


Fig. 8.21. Commissioning (Ratio version)

## **8.5 - PROPER COMMISSIONING CHECK**

Check the connections made during the installation of the equipment (refer to chapter 6 “Installation”) for proper sealing through a foaming solution (or equivalent control system).

## 9 - MAINTENANCE AND FUNCTIONAL CHECKS

### 9.1 - GENERAL WARNINGS

 **NOTICE!**

The equipment does not need any periodic checks and maintenance procedures.

 **HAZARD!**

PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people and property due to services provided without its approval.

 **WARNING!**

If you have doubts or there are any functional faults, do not operate. Contact PIETRO FIORENTINI S.p.A. for the necessary clarifications.

In the event of equipment faults, proceed as follows:

| Step | Action  |
|------|---|
| 1    | Close the shut-off valve downstream of the equipment.                     |
| 2    | Close the shut-off valve upstream of the equipment.                       |
| 3    | Ensure that the pressure upstream and downstream of the equipment is "0". |
| 4    | Contact PIETRO FIORENTINI S.p.A.  |

Tab. 9.48.

## 9.2 - PERIODICALLY CHECKING AND INSPECTING THE EQUIPMENT FOR PROPER OPERATION

### HAZARD!

Checks and inspections must be carried out only by qualified technicians.

#### Periodic checks and inspections

|                               |   |
|-------------------------------|---|
| <b>Operator qualification</b> | <ul style="list-style-type: none"> <li>Commissioning technician.</li> </ul>   |
| <b>PPE required</b>           | <div style="display: flex; align-items: center;">  </div> <div style="background-color: #f96; padding: 5px; margin-top: 5px;">  <b>WARNING!</b> </div> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>the regulations in force in the country of installation;</li> <li>any information provided by the Safety Manager at the installation facility.</li> </ul> |

Tab. 9.49.

### 9.2.1 - FUNCTIONAL CHECKS OF SAFETY DEVICES

To check the safety devices for proper operation, it is necessary:

- that the system has a shut-off valve downstream of the regulator;
- that the system is set up with a pressure outlet downstream of the regulator or that the regulator is equipped with a built-in pressure outlet (see paragraph 4.6.3);
- that an external pressure source with pressure control is available;
- that the external pressure source is connected to a pressure gauge and to a tap with a 4 mm maximum flow section.

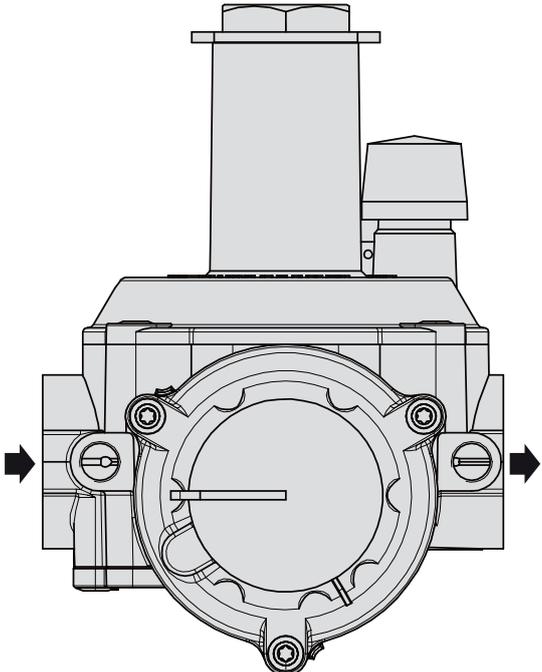
### NOTICE!

**Gas dispersions in the environment must be reduced to the bare minimum.**

**To minimise gas leakage into the atmosphere, connect/disconnect the external source as quickly as possible.**

To check the safety devices, proceed as described in Tab. 9.51.:

| Step | Action  |
|------|---|
| 1    | Close the valve downstream of the regulator.  |
| 2    | Prepare the external pressure source with a pressure gauge to monitor the pressure. <div style="border: 1px solid blue; padding: 5px; margin-top: 5px;">  <b>NOTICE!</b><br/> <b>The maximum pressure introduced downstream of the regulator must not exceed 400 mbar.</b> </div>                                    |
| 3    | Connect the external pressure source to the pressure outlet downstream of the system or, if any, to the pressure outlet on the regulator. <div style="border: 1px solid blue; padding: 5px; margin-top: 5px;">  <b>NOTICE!</b><br/> <b>To use the pressure outlet on the regulator, see paragraph 4.6.3.1</b> </div> |
| 4a   | <b>Pds (adjusted pressure) check:</b> <ol style="list-style-type: none"> <li>open the tap of the external pressure source;</li> <li>check that the pds value is <math>\pm 10\%</math> with respect to the value indicated on the nameplate applied.</li> </ol>  |
| 4b   | <b>Internal sealing check:</b> <ol style="list-style-type: none"> <li>close the tap of the external pressure source;</li> <li>check that the downstream pressure value is stable over time (wait for about 2 minutes).</li> </ol>   |

| Step | Action   |  |
|------|--|--|
| 4c   | <p><b>Checking the slam-shut device for tripping due to maximum/minimum downstream pressure:</b></p> <ol style="list-style-type: none"> <li>1. open the external pressure source by increasing the pressure by approx. 2 mbar/s until the maximum pressure lockout is triggered when the reset extension is triggered;</li> <li>2. check that the tripping value of the slam-shut device is <math>\pm 15\%</math> with respect to the value indicated on the nameplate applied (pdso);</li> <li>3. reset the regulator lock;</li> <li>4. close the external pressure source;</li> <li>5. close the tap located upstream of the regulator;</li> <li>6. open the tap of the external pressure source so that the pressure decreases by approx 2 mbar/s.</li> <li>7. check that the tripping value of the slam-shut device is <math>\pm 15\%</math> with respect to the value indicated on the nameplate applied (pdsu).</li> </ol> |  |
| 5    | Disconnect the external pressure source outlet.  |  |
| 6    | Close the downstream pressure outlet ( <b>Step 3</b> ).  |  |
| 7    | Open the shut-off valve which was closed in <b>Step 1</b> .  |  |
| 8    | Carry out commissioning as described in Section 7.4.   |  |
| 9    | Check that there are no leaks at the shut-off pressure outlet in <b>Step 6</b> .   |  |

Tab. 9.50.

### 9.3 - TIGHTENING TORQUES

 **NOTICE!**

**For the tightening torques of the swivel joints, refer to standards: NF E29-533: 2014 and NF E29-536: 2017.**

**9.4 - GOVERNOR MAINTENANCE**

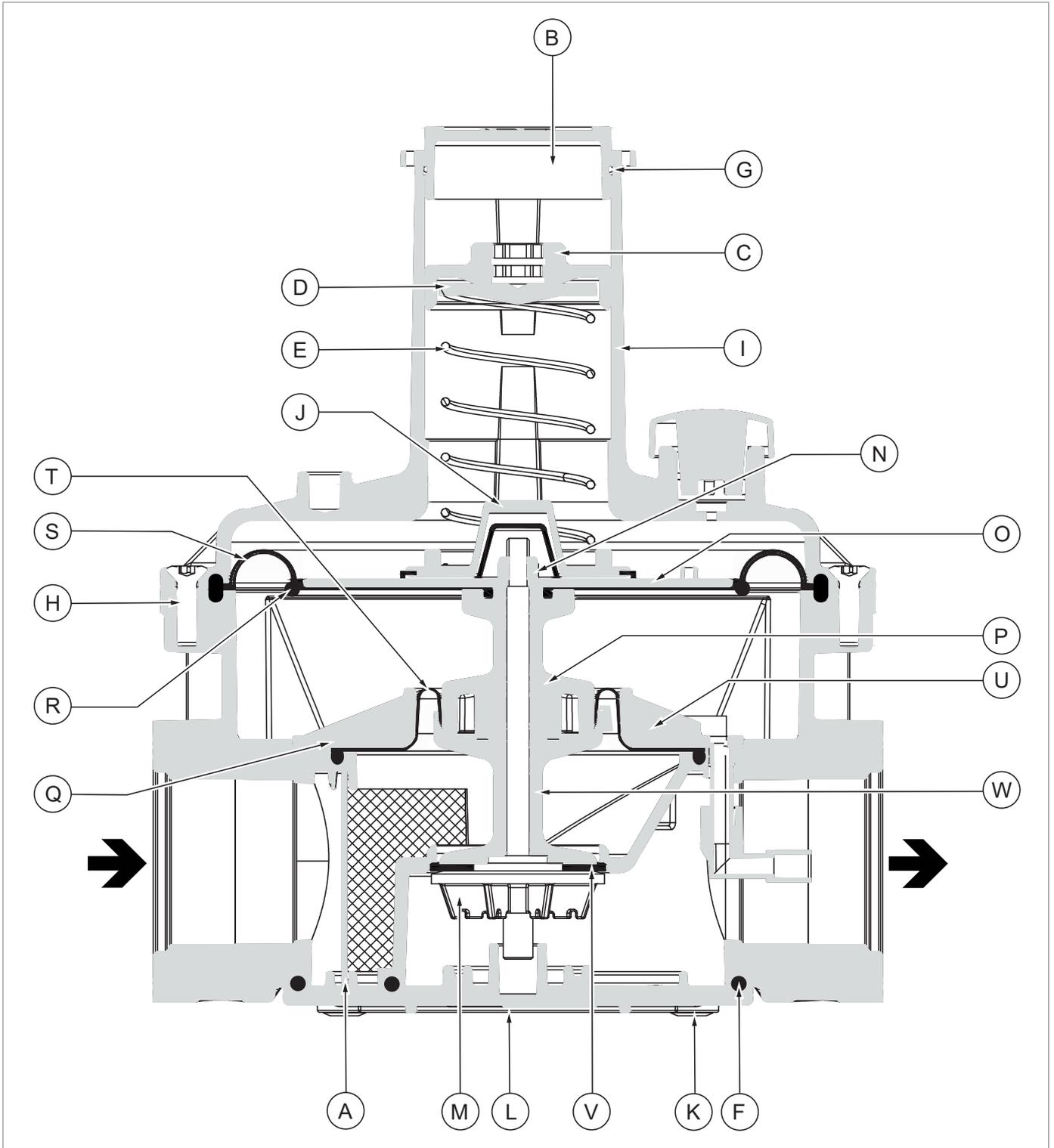
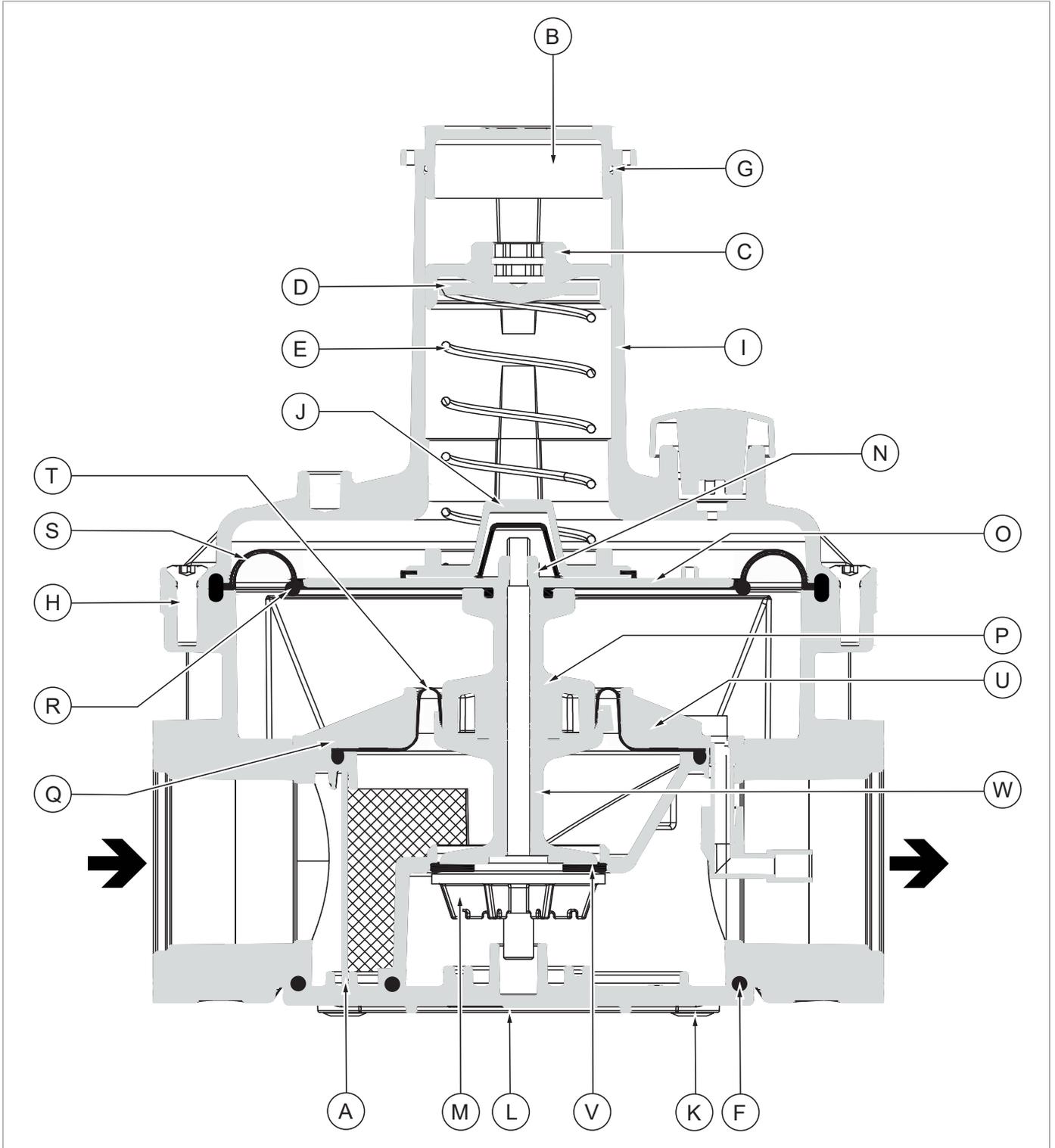


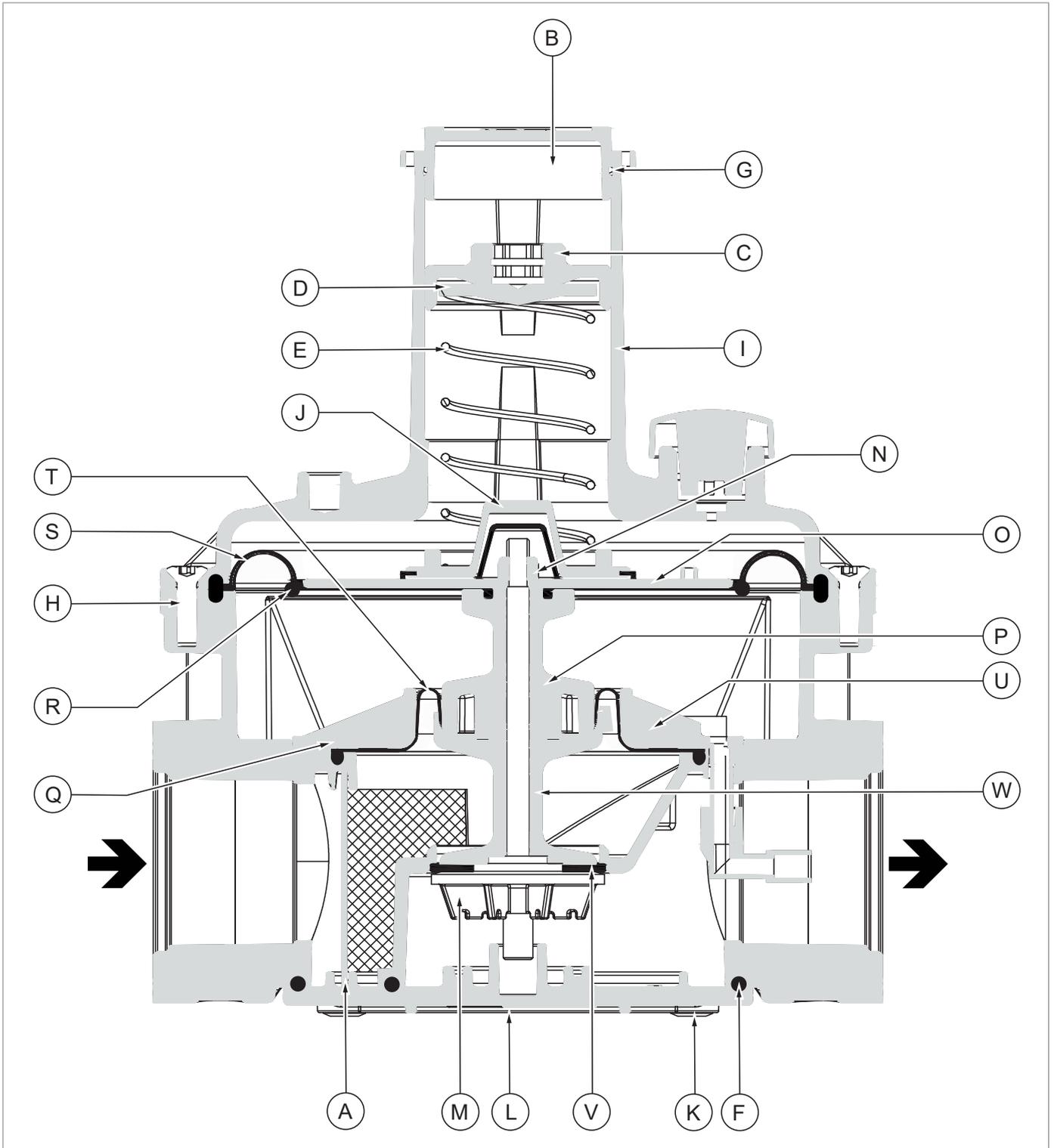
Fig. 9.22. Governor maintenance

| Step | Action  |
|------|---|
| 1    | Remove the cap (B) from the top cover (I).  |
| 2    | Unscrew and remove the adjustment ring nut (C) together with the spring press (D).  |
| 3    | Remove the calibration spring (E).  |
| 4    | Unscrew and remove the screws (H).<br><div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <ul style="list-style-type: none"> <li>• <b>Use the equipment (C) from Table 6.35.</b></li> <li>• <b>For replacement screws, contact the manufacturer (see section 2.1).</b></li> </ul> </div> |
| 5    | Remove the top cover (I).   |
| 6    | Remove the safety diaphragm (S).  |
| 7    | Remove and replace the spring guide (J).  |
| 8    | Undo and remove the screws (K).   |
| 9    | Remove the lower lid (L).   |
| 10   | Remove the O-ring (F).  |
| 11   | Remove the filter element (A).  |
| 12   | Turn the governor body upside down.   |
| 13   | Hold the governor body in place using the plug lock.  |
| 14   | Unscrew the nut (N).  |
| 15   | Slide out the working diaphragm disc (O).<br><div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>During this phase, hold the plug block still.</b></p> </div>  |
| 16   | Pull out the plug (M).  |
| 17   | Slide off the upper spacer (P).   |
| 18   | Remove the working diaphragm (R).   |
| 19   | Unscrew and remove the screws (Q) from the balancing diaphragm disc (U).  |
| 20   | Remove the balancing diaphragm disc (U).  |
| 21   | Fit the balancing diaphragm (T).  |
| 22   | Remove the lower spacer (V).  |
| 23   | Fit the plug (M).<br><div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <ul style="list-style-type: none"> <li>• <b>The edge of the sealing ring (F) must face upwards.</b></li> <li>• <b>Check the cleanliness of the plug base (M).</b></li> </ul> </div>                             |
| 24   | Insert the assembly (M, V) into the governor body.  |
| 25   | Insert the lower spacer (W) into the assembly (F, M).   |
| 26   | Insert balancing diaphragm (T).<br><div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <ul style="list-style-type: none"> <li>• <b>The O-ring of the balancing diaphragm (T) must be inside the groove.</b></li> <li>• <b>Check the cleanliness of the groove.</b></li> </ul> </div>     |



Governor maintenance

| Step | Action   |
|------|--|
| 27   | Insert the balancing diaphragm lock disc (U).<br> <b>NOTICE!</b><br><b>Take care to centre all holes.</b>   |
| 28   | Insert and fasten the screws (Q) according to the torque values of the guidelines and regulations in force.<br> <b>NOTICE!</b><br><b>Grease the holes before inserting the screw.</b>   |
| 29   | Insert the upper spacer (P).<br> <b>NOTICE!</b><br><b>The widest part of the spacer points downwards.</b>   |
| 30   | Insert working diaphragm (R).<br> <b>NOTICE!</b> <ul style="list-style-type: none"> <li>• <b>The O-ring of the working diaphragm (R) must be inside the groove.</b></li> <li>• <b>Check the cleanliness of the groove.</b></li> </ul> |
| 31   | Insert the balancing diaphragm lock disc (U).  |
| 32   | Insert and fasten the nut (N) according to the tightening torque values of the guidelines and regulations in force.  |
| 33   | Turn the governor body upside down.  |
| 34   | Insert the filter element (A).<br> <b>NOTICE!</b><br><b>Check the correct position within the housing.</b>  |
| 35   | Position the O-ring (F).<br> <b>NOTICE!</b><br><b>Check for cleanliness before inserting the O-ring.</b>  |
| 36   | Position the lower cover (L).<br> <b>NOTICE!</b><br><b>If the lower cover does not fit, check the correct position of the filter element (A) and the O-ring (F).</b>  |
| 37   | Insert and fasten the screws (K) according to the tightening torque values of the guidelines and regulations in force.<br> <b>NOTICE!</b><br><b>Grease the holes before inserting the screw.</b>                                    |
| 38   | Insert the safety diaphragm (S) together with the spring guide (J).<br> <b>NOTICE!</b><br><b>The spring guide (J) is in the centre of the safety diaphragm (S).</b>   |
| 40   | Insert the upper cover (I).<br> <b>NOTICE!</b><br><b>The vent hole is perpendicular to the outlet pipe.</b>   |



Governor maintenance

| Step | Action   |
|------|--|
| 41   | <p>Insert and fasten the screws (H) according to the tightening torque values of the applicable guidelines and regulations.</p> <div style="border: 1px solid black; padding: 5px;"> <p> <b>NOTICE!</b></p> <p><b>Grease the holes before inserting the screw.</b></p> </div> |
| 42   | Insert the calibration spring (E).   |
| 43   | Position the spring press (D).   |
| 44   | Insert and screw in the adjustment ring nut (C).   |
| 45   | Remove and replace the O-ring (G).   |
| 46   | Insert cap (B) into upper cover (I).   |

Tab. 9.51.

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## 10 - UNINSTALLATION AND DISPOSAL

### 10.1 - GENERAL SAFETY WARNINGS

#### HAZARD!

Make sure that there are no potentially explosive ignition sources in the work area set up to uninstall and/or dispose of the equipment.

#### WARNING!

Before proceeding with uninstallation and disposal, make the equipment safe by disconnecting it from any power supply.

### 10.2 - QUALIFICATION OF THE OPERATORS IN CHARGE

#### Commissioning

|                        |   |
|------------------------|---|
| Operator qualification | <ul style="list-style-type: none"> <li>Installer.</li> </ul>  |
| PPE required           | <div style="display: flex; align-items: center;">  </div> <div style="background-color: #f96; padding: 5px; margin-top: 5px;">  <b>WARNING!</b> </div> <p>The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to:</p> <ul style="list-style-type: none"> <li>the regulations in force in the country of installation;</li> <li>any information provided by the Safety Manager at the installation facility.</li> </ul> |

Tab. 10.52.

### 10.3 - UNINSTALLATION

#### ATTENTION!

Before uninstalling the equipment, completely drain the fluid in the reduction line and inside the equipment.

To properly uninstall the equipment, proceed as specified in Tab. 10.54.:

| Step | Action   |
|------|--|
| 1    | Close the valves upstream and downstream of the regulator.   |
| 2    | Depressurise the downstream system. <div style="border: 1px solid blue; padding: 5px; margin-top: 5px;">  <b>NOTICE!</b><br/> <b>If there is no pressure outlet downstream, loosen the outlet connection from the regulator, creating a slight leak towards the outside.</b> </div>             |
| 3    | Unscrew the inlet and outlet fittings of the regulator. <div style="background-color: #f96; padding: 5px; margin-top: 5px;">  <b>ATTENTION!</b><br/> <b>Although the system is depressurised (Step 2), there may be a small gas discharge while the inlet fittings are disassembled.</b> </div> |

Tab. 10.53.

## 10.4 - INFORMATION REQUIRED IN CASE OF NEW INSTALLATION

### NOTICE!

Should the equipment be reused after uninstallation, please refer to chapters: “Installation” and “Commissioning”.

## 10.5 - DISPOSAL INFORMATION

### NOTICE!

- Proper disposal prevents damage to humans and the environment and promotes the reuse of precious raw materials.
- Bear in mind that the regulations in force in the country of installation must be complied with.
- Illegal or improper disposal involves the application of the penalties provided for by the regulations in force in the country of installation.

The equipment was manufactured with materials that can be recycled by specialised companies. For proper disposal of the equipment, proceed as specified in Tab. 10.55.:

| Step | Action  |
|------|---|
| 1    | Set up a large work area free from obstacles where to safely dismantle the equipment.             |
| 2    | Sort the various components by type of material for easier recycling through separate collection. |
| 3    | Send the materials obtained in <b>Step 2</b> to a specialised company.                            |

Tab. 10.54.

The equipment in any configuration consists of the following materials:

| Material   | Present in  | Disposal/recycling indications  |
|--|---|---|
| <b>Nitrile rubber<br/>(TR rubberised canvas)</b> | <ul style="list-style-type: none"> <li>• Diaphragm</li> <li>• O-rings</li> </ul>    | It must be dismantled and disposed of separately.   |
| <b>Plastic</b>                                   | <ul style="list-style-type: none"> <li>• Caps</li> <li>• Diaphragm discs</li> </ul> | It must be dismantled and disposed of separately.   |
| <b>Steel</b>                                     | <ul style="list-style-type: none"> <li>• Springs</li> </ul>                         | Disassemble and collect separately.<br>It must be recycled through the specific collection centres. |
| <b>Aluminium alloy</b>                           | <ul style="list-style-type: none"> <li>• Equipment body</li> <li>• Lids</li> </ul>  | Disassemble and collect separately.<br>It must be recycled through the specific collection centres. |

Tab. 10.55.

### NOTICE!

The above materials refer to standard versions. Different materials can be provided for specific needs.

## 11 - CALIBRATION TABLES

### 11.1 - CALIBRATION TABLES

**! NOTICE!**

When the value indicated on the regulator plate is equal to the minimum or maximum value of a spring referred to in the tables (Tab.11.57., Tab.11.58. and Tab.11.59.), the spring installed in the regulator is the one featuring the minimum range value equal to the calibration value specified on the data plate.

| MODEL GOVERNOR |                 | 30051/52/53<br>31051/52/53 | 30150/51/52<br>31150/51/52 | 30153/54/54F<br>31153/54/54F | 30155/55F<br>31155/55F | 30156F/57F<br>30158F |
|----------------|-----------------|----------------------------|----------------------------|------------------------------|------------------------|----------------------|
| Range (mbar)   | Spring (colour) | Spring code                |                            |                              |                        |                      |
| 5 to 13        | Green           | 64470219                   | 64470228                   | 64470246                     | 64470255               | 64470320             |
| 7 to 20        | Red             | 64470220                   | 64470229                   | 64470247                     | 64470256               | 64470324             |
| 10 to 30       | White           | 64470221                   | 64470230                   | 64470248                     | 64470257               | 64470325             |
| 15 to 35       | Black           | 64470397                   | 64470380                   | 64470381                     | 64470382               | 64470383             |
| 25 -70         | Yellow          | 64470295                   | 64470297                   | 64470299                     | 64470301               | 64470321             |
| 60 - 150       | Purple          | 64470296                   | 64470298                   | 64470300                     | 64470302               | 64470322             |
| 140 to 300     | Orange          | -                          | 64470235                   | 64470253                     | 64470262               | 64470323             |

Tab. 11.56.

| SPRINGS FOR MINIMUM PRESSURE BLOCKING (UPSO) |              |        |
|--|--------------|--------|
| Code   | Range (mbar) | Colour |
| 64470120                                     | 8 to 21      | Blue   |
| 64470121                                     | 21 to 35     | Yellow |
| 64470122                                     | 35 to 55     | Green  |
| 64470202                                     | 55 to 80     | -      |

Tab. 11.57.

| SPRINGS FOR MAXIMUM PRESSURE BLOCKING (OPSO) |              |             |
|--|--------------|-------------|
| Code   | Range (mbar) | Range (KPa) |
| 64470197                                     | 35 to 50     | White       |
| 64470198                                     | 50 to 70     | White       |
| 64470199                                     | 70 to 100    | White       |
| 64470200                                     | 100 to 160   | White       |
| 64470113                                     | 160 to 220   | Sky blue    |
| 64470201                                     | 220 to 300   | White       |

Tab. 11.58.

