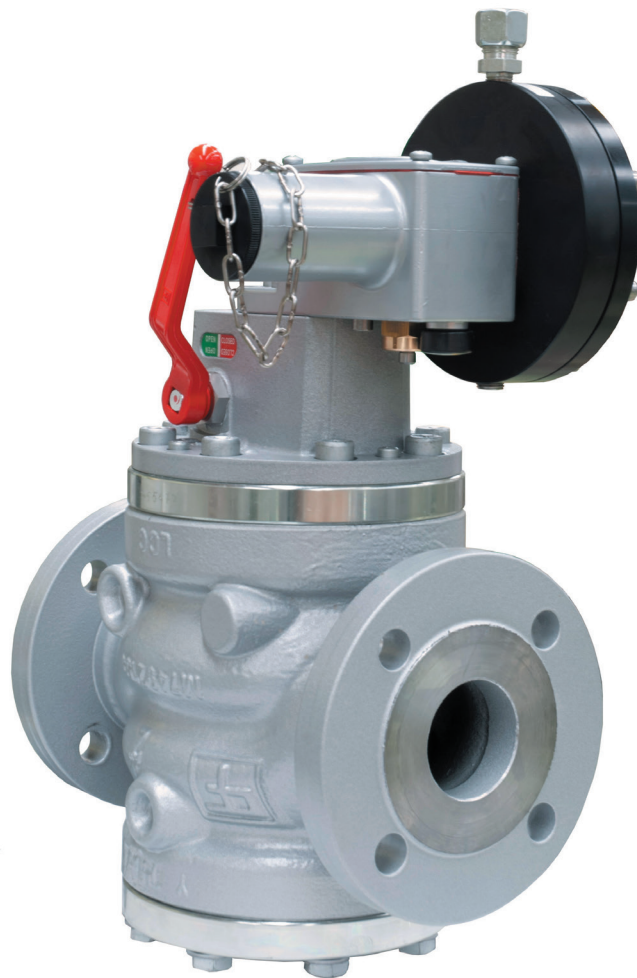


# SBC 782

Slam-shut valve



Revision A - Edition 02/2023

**USE, MAINTENANCE  
AND WARNING  
MANUAL**



# 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 operating, maintenance instructions and recommendations described in this manual must be observed. In order to obtain the best performance and to keep the equipment in efficient condition, the manufacturer recommends that maintenance operations be carried out regularly.

It is of particular importance that the personnel responsible for the equipment be trained in its use, maintenance and application of the safety instructions and procedures indicated in this manual.

Revision: A

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## 1.1 - REVISION HISTORY

Revision index	Date	Revision contents
<b>A</b>	02/2023	First issue

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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 36057 Arcugnano (VI) - ITALY <b>Tel. +39 0444 968511 Fax +39 0444 960468</b> <b>www.fiorentini.com sales@fiorentini.com</b>

Tab. 2.2

### 2.2 - IDENTIFICATION OF THE PRODUCT

<b>Equipment</b>	VALVOLA DI BLOCCO
<b>Model</b>	SBC 782

Tab. 2.3

### 2.3 - REGULATORY FRAMEWORK

PIETRO FIORENTINI S.P.A., with registered office in Arcugnano (Italy) - Via E. Fermi, 8/10, declares under its sole responsibility that the equipment in the SBC 782 series, which is the subject of this manual, is designed, manufactured, tested and controlled in accordance with the requirements of standard EN 14382.

The equipment complies with the requirements of Directive 2014/68/EU ("Pressure Equipment Directive" PED). The assessment procedure adopted is in accordance with module H1 as per Annex III of the Directive.

#### **NOTICE!**

**The declaration of conformity in its original version is delivered together with the equipment and this operating and warning 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 - 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 consult the instruction manual/booklet. Indicates a requirement for the personnel to refer to (and understand) the operating and warning instructions of the machine before working with or on it.

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.**

## 2.6 - 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.**

## 2.7 - 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 Manufacturer is not responsible for any incomplete translations. If any inconsistency is found, please refer to the text of the original manual.**

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

- stop any actions;
- immediately contact the relevant offices of PIETRO FIORENTINI S.p.A.

### **WARNING!**

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

## 2.8 - APPLIED RATING PLATES

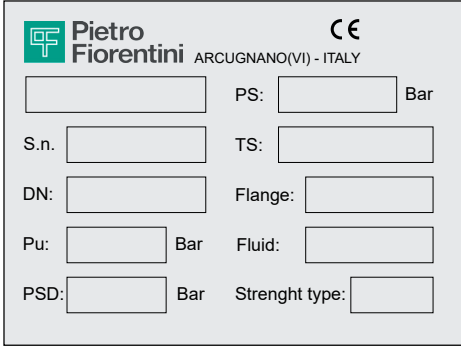
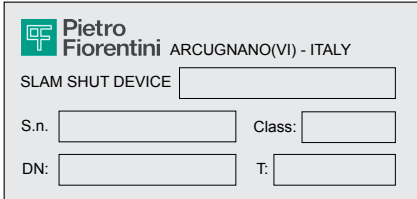
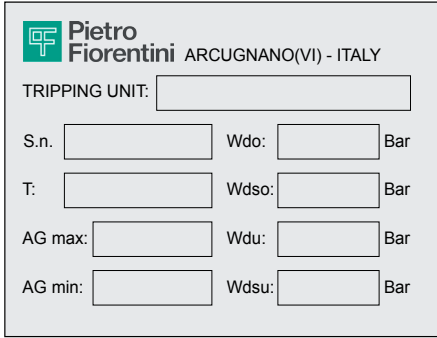
### WARNING!

**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.3).

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

“Tab. 2.5.” shows the nameplates applied:

Id.	Type	Image
1	NAMEPLATE EQUIPMENT (CE version)	
2	NAMEPLATE SLAM-SHUT VALVE	
3	NAMEPLATE PRESSURE SWITCH	

Tab. 2.5.

## 2.8.1 - GLOSSARY FOR NAMEPLATES

The terms and abbreviations used on nameplates are described in “Tab. 2.6”:

Term	Description
<b>AC</b>	Accuracy class.
<b>AG max</b>	Slam-shut valve accuracy class due to pressure increase. “OPSO” (Over pressure shut off).
<b>AG min</b>	Slam-shut valve accuracy class due to pressure decrease. ”UPSO”(Under pressure shut off).
<b>bpu</b>	Range of inlet pressure for which the regulator ensures a given accuracy class.
<b>CE</b>	Marking certifying compliance with applicable European directives.
<b>Cg</b>	Flow rate coefficient.
<b>Class</b>	Alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics for flanges, in accordance with the relevant parts of EN 1759 series, which includes the word Class followed by a dimensionless whole number.
<b>DN</b>	Nominal size of connections.
<b>Fail safe mode</b>	Regulator reaction mode (Fail open or Fail close).
<b>Flange</b>	Type of flanged connections or type of connection thread.
<b>Fluid</b>	Type of fluid compatible with the equipment.
<b>ID no.</b>	Number of the Notified Body participating in the conformity assessment of the equipment.
<b>Pilot</b>	Pilot family.
<b>PS</b>	Maximum permissible pressure for which the equipment was designed.
<b>Pumax</b>	Maximum inlet pressure at which the regulator can operate continuously under specific conditions.
<b>REGULATOR</b>	Equipment family.
<b>SG</b>	Shut-off pressure class.
<b>Slam-shut device</b>	Slam-shut valve family.
<b>S.n.</b>	Equipment serial number.
<b>Strength type</b>	Strength class: Integral strength or differential strength (DS).
<b>T</b>	Permissible temperature range (min. and max.) for which the equipment was designed.
<b>Tripping unit</b>	Pressure switch family.
<b>Type</b>	Accessory type and family.
<b>Wd</b>	Full setpoint range that can be obtained from the regulator by adjusting and/or replacing certain components (e.g. replacement of valve seat or control element, e.g. spring).
<b>Wdo</b>	Full setpoint range with regard to tripping caused by increased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting and/or replacing the components (for example, spring or sensitive element).
<b>Wds</b>	Full setpoint range that can be obtained from the regulator by adjusting but not replacing the components.
<b>Wdso</b>	Full setpoint range with regard to tripping caused by increased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting but not replacing the components.
<b>Wdu</b>	Full setpoint range with regard to tripping caused by decreased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting and/or replacing the components (for example, spring or sensitive element).

Term	Description
<b>Wdsu</b>	Full setpoint range with regard to tripping caused by decreased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting but not replacing the components.

Tab. 2.6

## 2.9 - GLOSSARY OF MEASUREMENT UNITS

Type of measurement	Unit of measurement	Description
<b>Volumetric flow rate</b>	Sm <sup>3</sup> /h	Standard cubic metres per hour
	Scfh	Standard cubic feet per hour
<b>Pressure</b>	bar	Unit of measurement in the CGS system
	psi	Pounds per square inch
	"wc	Water column inch
	Pa	Pascal
<b>Temperature</b>	°C	Degree centigrade
	°F	Fahrenheit degree
	K	Kelvin
<b>Tightening torque</b>	Nm	Newton-metre
	ft-lbs	Foot per pound
<b>Sound pressure</b>	dB	Decibel
<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>Mechanical maintenance technician</b>	<p>Qualified technician able to:</p> <ul style="list-style-type: none"> <li>perform preventive/corrective maintenance operations on all mechanical parts of the equipment subject to maintenance or repair;</li> <li>access all device parts for visual inspection, equipment checks, adjustments and calibrations.</li> </ul> <p>The maintenance mechanical technician is not authorised to operate on live electrical systems (if any).</p>
<b>Electrical maintenance technician</b>	<p>Qualified technician able to:</p> <ul style="list-style-type: none"> <li>perform preventive/corrective maintenance operations on all electrical parts of the device subject to maintenance or repair;</li> <li>read wiring diagrams and check the correct functional cycle;</li> <li>perform adjustments and operate on electrical systems for maintenance, repair and replacement of worn parts.</li> </ul> <p>The electrical maintenance technician can operate in the presence of voltage inside electrical panels, junction boxes, control equipment etc. only if he/she is deemed to be suitable (S.P.).</p> <p>For general requirements, refer to the IEC EN 50110-1:2014 standard.</p>
<b>Worker in charge of transport, handling, unloading and placement on site</b>	<p>Operator qualified to:</p> <ul style="list-style-type: none"> <li>use lifting equipment;</li> <li>handle materials and equipment.</li> </ul> <p>The equipment must be lifted and handled strictly in accordance with the instructions provided by the manufacturer as well as the regulations in force at the place where the equipment is installed.</p>
<b>Installer</b>	<p>Qualified operator able to:</p> <ul style="list-style-type: none"> <li>carry out all the operations necessary to properly install the equipment;</li> <li>perform all the operations necessary for the proper functioning of the equipment and the system in safety.</li> </ul>
<b>User's technician</b>	<p>Technician trained and authorized to use and manage the equipment for the activities for which it was supplied. They must:</p> <ul style="list-style-type: none"> <li>be able to perform all operations required to properly run the equipment and the system, ensuring their own safety and that of any personnel on site;</li> <li>have proven experience in properly using the equipment similar to that described in this instruction manual, and be trained, informed and instructed in this regard.</li> </ul> <p>The technician may carry out maintenance only if authorised/qualified to do so.</p>

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 lengthen 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

"Tab. 3.9" shows the personal protective equipment (PPE) and its description. An obligation is associated with each symbol.

Personal protective equipment means any equipment intended to be worn by the worker in order to protect them against one or several risks that are likely to threaten their safety or health during work.

For the operators in charge, depending on the type of work requested, the most appropriate PPE of the following will be reported and must be used:

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

Tab. 3.9

#### **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 any deficiencies in the equipment and devices, as well as any dangerous conditions they may become aware of.**

### **3.3 - RESIDUAL RISKS**

In accordance with the requirements of PED 2014/68/EU, point 1.2 of Annex I, below is an assessment of the risks associated with the equipment and an indication of the principles adopted for their prevention, 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.

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

Risk and hazard	Event and Cause	Effect and consequence	Solution and prevention
<b>Pressurised gas leakage. 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 in the instructions for use and warning.</p>
<b>Pressurised gas leakage. Projection of metallic and non-metallic 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 the specifications on the data plate.</p>
<b>Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.</b>	<ul style="list-style-type: none"> <li>Operation at temperatures below the minimum permissible 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 temperature and/or insulate the equipment adequately.</p> <p>b. The minimum temperature allowed is indicated on the data plate.</p>
<b>Pressurised gas leakage. Projection of metallic and non-pressurised parts. 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 maximum allowable pressure is highlighted on the appropriate plate on the equipment.</p>
<b>Falling of the equipment.</b>	<ul style="list-style-type: none"> <li>Dangerous handling.</li> </ul>	<ul style="list-style-type: none"> <li>Deformation;</li> <li>Cracking;</li> <li>Breakage.</li> </ul>	<p>b. The user must have suitably sized lifting equipment.</p> <p>c. The above requirements are referred to in the equipment use and warning manual.</p>
<b>Pressurised fluid leakage. Projection of metallic and non-metallic 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 user must ensure correct fixing to the line.</p> <p>c. Directions in the instructions for use and warning.</p>
<b>Explosion of the device. Pressurised fluid leakage. 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 and breakage of the device;</li> <li>Explosion.</li> </ul>	<p>a. The user must equip the system with suitable safety and control devices.</p> <p>b. The maximum temperature allowed is indicated on the data plate.</p>
<b>Pressurised gas leakage.</b>	<ul style="list-style-type: none"> <li>Device maintenance with the system running.</li> </ul>	<ul style="list-style-type: none"> <li>Inappropriate opening of pressurised chambers.</li> </ul>	<p>a. The user must perform any maintenance with the equipment not in operation.</p> <p>b. The above requirements are referred to in the use and warning manual.</p>

Risk and hazard	Event and Cause	Effect and consequence	Solution and prevention
<b>Pressurised gas leakage.</b> <b>Projection of metallic and non-metallic pressurised parts.</b>	<ul style="list-style-type: none"> <li>External loads bearing on the device.</li> </ul>	<ul style="list-style-type: none"> <li>Deformation;</li> <li>Cracking and slot formation;</li> <li>If under pressure, burst also.</li> </ul>	a. With the exclusion of what is set out in the project, the user must verify that no additional concentrated load bears on the device.
<b>Pressurised gas leakage.</b> <b>Projection of metallic and non-metallic 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>	b. The user must equip the device with the necessary protection and earthing devices. c. The above requirements are referred to in the use and warning manual.
<b>Pressurised gas leakage.</b> <b>Projection of metallic and non-metallic 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 periodically check the state of conservation of the external surfaces. b. The above requirements are referred to in the use and warning manual.

Tab. 3.10

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

“Tab. 3.11” shows the conditions that can lead to the generation of a potentially explosive atmosphere by the slam-shut valve SBC 782

Considering that the silencer does not have active functional parts, in this analysis it is considered an integral part of the SBC 782 regulator.

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

**There must be no effective sources of ignition in “danger zones” and in close proximity thereto.**

Operating conditions	Potentially explosive atmosphere	Regulatory references	Management measures included in the instructions for use and warning
<b>First start-up</b>	No	<ul style="list-style-type: none"> <li>During the production cycle and before the CE marking according to Directive 2014/68/EU, the external tightness of the equipment is checked at a value of 1.1 PS, in accordance with Standard EN 14382.</li> <li>Before commissioning, the external sealing of the system portion on which the equipment is installed is checked at a suitable pressure (in accordance with the provisions of standards EN 12186 and EN 12279).</li> </ul>	The instructions for use indicate the need to meet the requirements in Standards EN 12186 and EN 12279.
<b>Operation in normal conditions</b>	No	<p>The indications in the previous point apply, in addition:</p> <ul style="list-style-type: none"> <li>the equipment is installed outdoors or in an environment with natural ventilation (in accordance with Standards EN 12186 and EN 12279);</li> <li>the installation is subject to surveillance according to current national rules/good practice/the equipment manufacturer's instructions (in accordance with the provisions of Standard EN 12186 and Standard EN 12279).</li> </ul>	<p>The instructions for use indicate that:</p> <ul style="list-style-type: none"> <li>any environment in which the equipment is installed must meet the requirement of Standards EN 12186 and EN 12279;</li> <li>periodic checks and maintenance 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 the control head diaphragm (malfunction)</b>	No	<p>This event must be considered a rare malfunction.</p> <p>All atmospheric pressure chambers delimited on at least one side by a diaphragm must be channelled to a safe area (in accordance with the provisions of Standard EN 12186 and Standard EN 12279).</p>	The instructions for use indicate the need to meet the requirements of Standards EN 12186 and EN 12279.



Operating conditions	Potentially explosive atmosphere	Regulatory references	Management measures included in the instructions for use and warning
<b>Breakage of other non-metallic parts (malfunction)</b>	No	This type of malfunction is not reasonably expected as it involves static sealing (to the outside).	-
<b>Decommissioning</b>	No	<ul style="list-style-type: none"> <li>The pressure of the system section in which the equipment is installed must be reduced with appropriate vent lines channelled to a safe area (in accordance with the provisions of Standard EN 12186 and Standard EN 12279).</li> <li>The residual gas must be discharged as indicated above.</li> </ul>	The instructions for use indicate the need to meet the requirements of Standards EN 12186 and EN 12279
<b>Reboot</b>	No	<ul style="list-style-type: none"> <li>After reassembling the regulator, carry out an external leakage test at a convenient 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 at a suitable pressure (in accordance with the provisions of standards EN 12186 and EN 12279).</li> </ul>	The instructions for use indicate: <ul style="list-style-type: none"> <li>the minimum conditions for testing internal leakage;</li> <li>the need to meet the requirements of Standards EN 12186 and EN 12279.</li> </ul>

Tab. 3.11

### 3.4 - OBLIGATIONS AND PROHIBITIONS

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

It is mandatory to:



- carefully read and understand the instructions for use and warning;
- 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, the data on the nameplates must be checked;
- Avoid violent shocks and impacts that could damage the equipment and, as a result, cause the pressure fluid to escape.

It is forbidden to:

- operate in various capacities on the equipment without the PPE indicated in the work procedures described in these use and warning instructions;
- 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 on the nameplate and in these use and warning instructions;
- use the equipment outside the operating temperature range specified on the nameplate and in these use and warning instructions;
- service the equipment with the system portion, on which it is installed, running;
- install or use the equipment in environments other than those specified in these instructions for use and warning.

### 3.5 - SAFETY PICTOGRAMS

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

Symbol	Meaning
	Symbol used to identify an ELECTRICAL HAZARD.
	Symbol used to identify a GENERIC HAZARD.

Tab. 3.12

#### 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.**

### 3.6 - 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.**

## 4 - DESCRIPTION AND OPERATION

### 4.1 - GENERAL DESCRIPTION

The slam-shut valve SBC 782 is a safety device that shuts off gas if the controlled pressure reaches the calibration value set for its tripping.

The slam-shut valve SBC 782 can be installed individually or upstream of a regulator.

If the slam-shut valve is mounted individually, the pressure switch takes the pressure downstream of the slam-shut valve.

If the slam-shut valve is mounted upstream of the regulator, the control pressure reaching the pressure switch is taken downstream of the regulator.

The slam-shut valve SBC 782 can be operated:

- by the pressure switch;
- manually;
- with remote control (optional).

The main features are:

- tripping due to downstream pressure increase and/or decrease;
- design pressure: 102 bar for all accessory components;
- local shut-off button;
- manual reset only with internal bypass activated by the reset lever.

The main elements of the equipment are (see Fig. 4.1):

Pos.	Description		
1	Plug	7	Spring for maximum tripping
2	Control pressure switch	8	Control device
3	Reset lever	9	Spring
4	Slam-shut valve body	10	Release button
5	Stem	11	10" bypass device
6	Spring for minimum tripping		

Tab. 4.13

### 4.2 - OPERATION

The tripping pressure acts on the control element of the control pressure switch (2), which is solidly connected to the stem (5), and receives an antagonistic force through the springs due to maximum (7) and minimum (6) pressure tripping, calibrated to the pre-set values.

The translation of the stem (5) causes the control device (8) of the mobile system to be released and, through the action of the spring (9), the plug (1) to be shut off.

To reset the device, it is necessary to act on the reset lever (3) which:

- in the first part of the stroke opens an internal bypass allowing the upstream pressure to be transferred from the inlet chamber to the outlet chamber of the slam-shut valve body (4) by balancing the pressure on the plug (1);
- re-couples the control device (8) of the mobile system.

The release of the control device (8) of the mobile system can also be controlled manually by means of a button (10).

#### NOTICE!

**For the 10" version, bypassing must be performed using the HP2/2 bypass device (Fig. 4.2, ref. 11).**

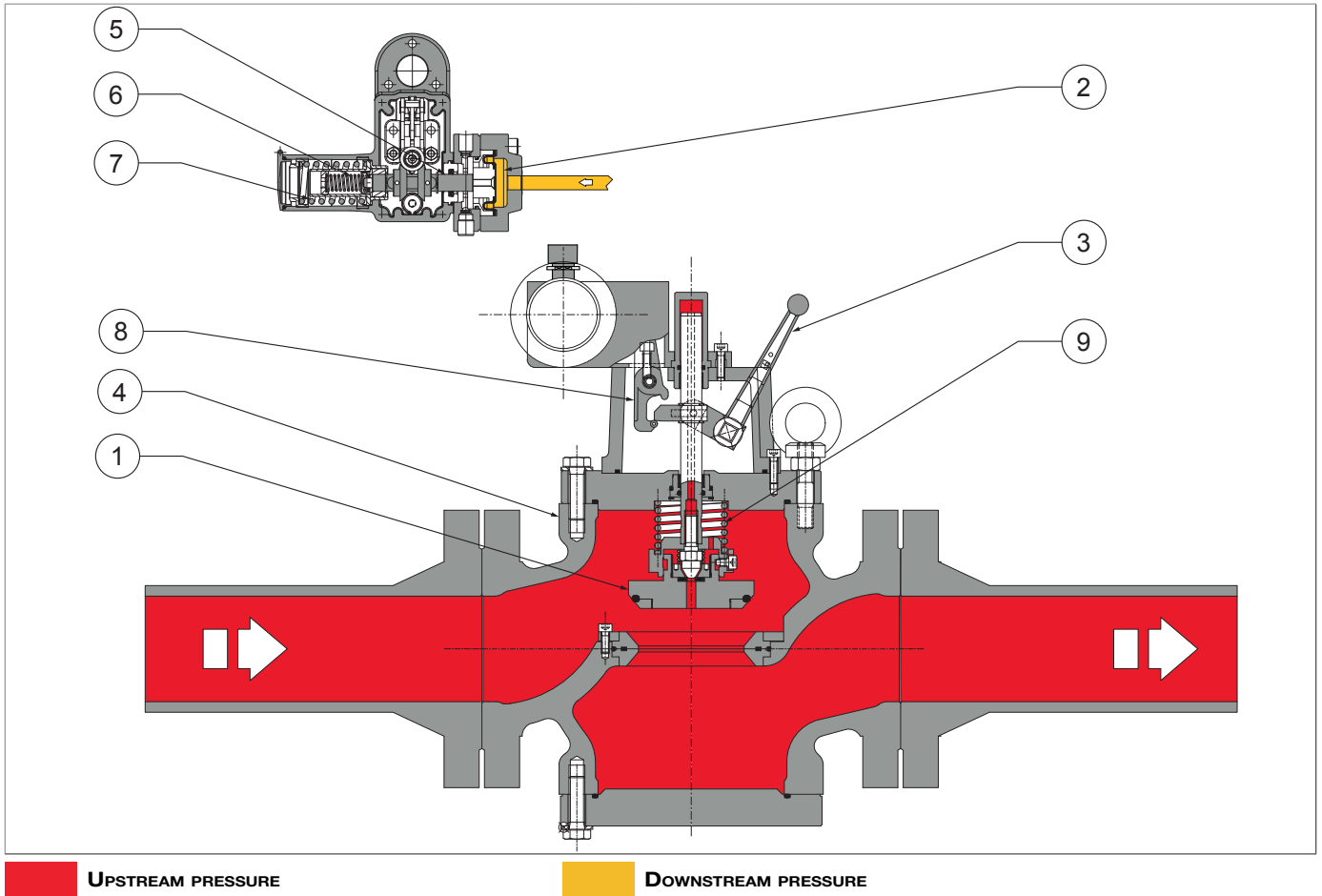


Fig. 4.1. General description SBC 782

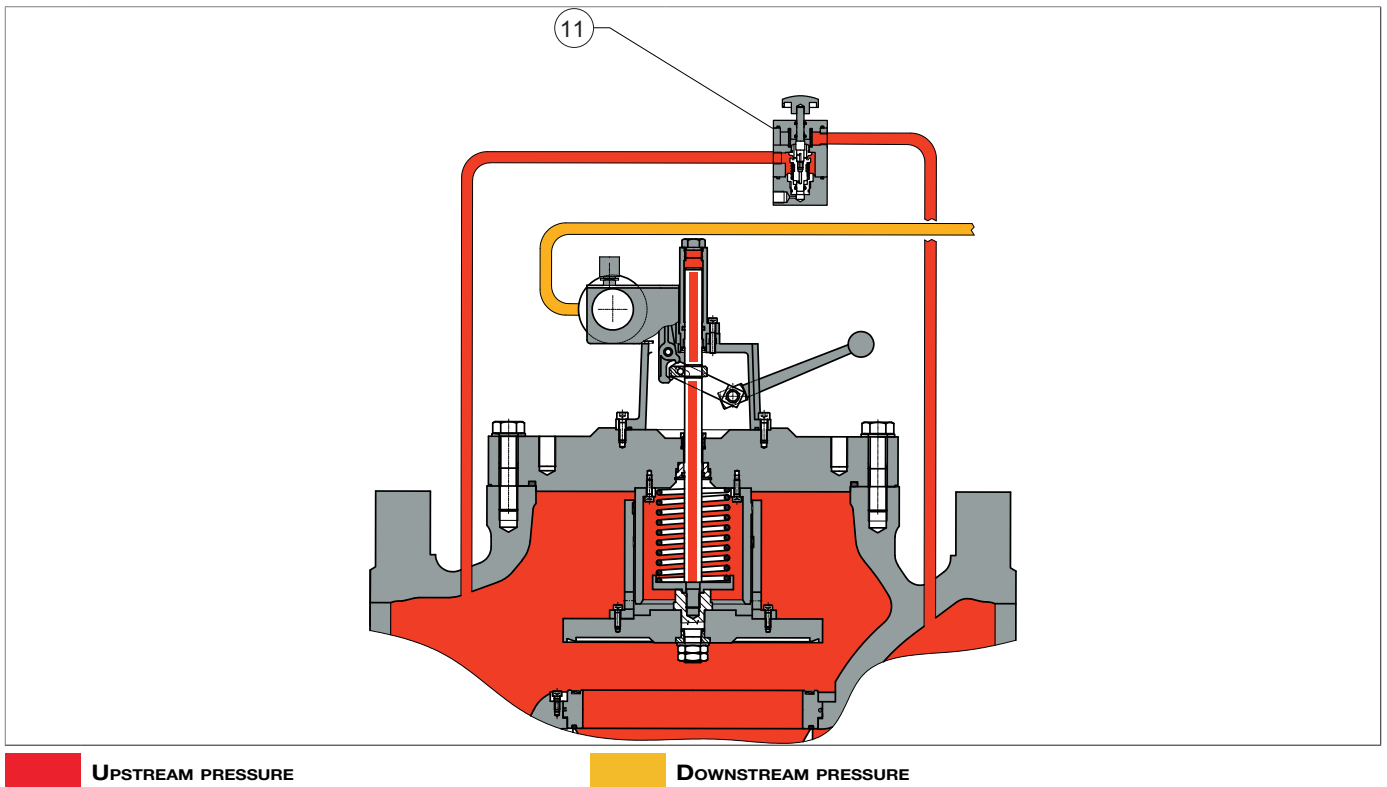


Fig. 4.2. HP2/2 bypass detail for slam-shut valve SBC 782 10"

## 4.3 - INTENDED USE

### 4.3.1 - ENVISAGED USE

The equipment in question is intended for:

Operation	Permitted	Not permitted	Work environment
<b>Pressure value monitoring:</b>	Gaseous, and non-corrosive, fluids that have been filtered beforehand.	<ul style="list-style-type: none"> <li>Liquids.</li> <li>Any product other than those permitted.</li> </ul>	Installations for the transport and distribution of gas fuel to supply networks for: <ul style="list-style-type: none"> <li>civil use;</li> <li>industrial use.</li> </ul>

Tab. 4.14

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

Safe work conditions are as follows:

- use within the limits stated on the nameplate and in this manual;
- compliance with the user manual procedures;
- routine maintenance to be carried out when and how recommended;
- special maintenance to be carried out if required;
- do not tamper with and/or bypass the safety devices.

### 4.3.2 - REASONABLY FORESEEABLE MISUSE

Reasonably foreseeable misuse 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;
- using the equipment in a manner other than that referred to under “4.3.1 - Envisaged 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.

### 4.3.3 - TYPES OF FLUIDS

The equipment works with combustible gases used:

- in pressure control stations according to EN 12186 or EN 12279;
- in transmission and distribution networks.
- in commercial and industrial plants (after checking by contacting the Manufacturer).

#### NOTICE!

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

#### 4.4 - TECHNICAL FEATURES/PERFORMANCE

Slam-shut valve SBC 782 is suitable for medium and high pressure.

SBC 782 is a “top entry” valve, therefore it allows easy maintenance without removing it from the line.

It is also equipped with a button for local closing.

The main specifications of this slam-shut valve are:

Technical features	
<b>Maximum allowable pressure</b>	Up to 102 bar
<b>Inlet gas temperature range</b>	-10 °C + 60 °C (class 1) -20 °C + 60 °C (class 2)
<b>Ambient temperature range</b>	-20 °C + 60 °C
<b>Inlet pressure range (bpu)</b>	1 - 100 bar
<b>Accuracy class (AG)</b>	up to 2.5 for OPSO (depending on working conditions) up to 2.5 for UPSO (depending on working conditions)
<b>Max. pressure tripping range (Wdso)</b>	OPSO 0.2 - 90 bar
<b>Min. pressure tripping range (Wdsu)</b>	UPSO 0.1 - 90 bar

Tab. 4.15.

Cg and K1 coefficients								
<b>Nominal diameter [mm]</b>	25	50	65	80	100	150	200	250
<b>Size [inches]</b>	1"	2"	2" ½	3"	4"	6"	8"	10"
<b>Coefficient Cg</b>	575	2220	3320	4937	8000	16607	25933	36525
<b>Coefficient K1</b>	106.78	106.78	106.78	106.78	106.78	106.78	106.78	106.78

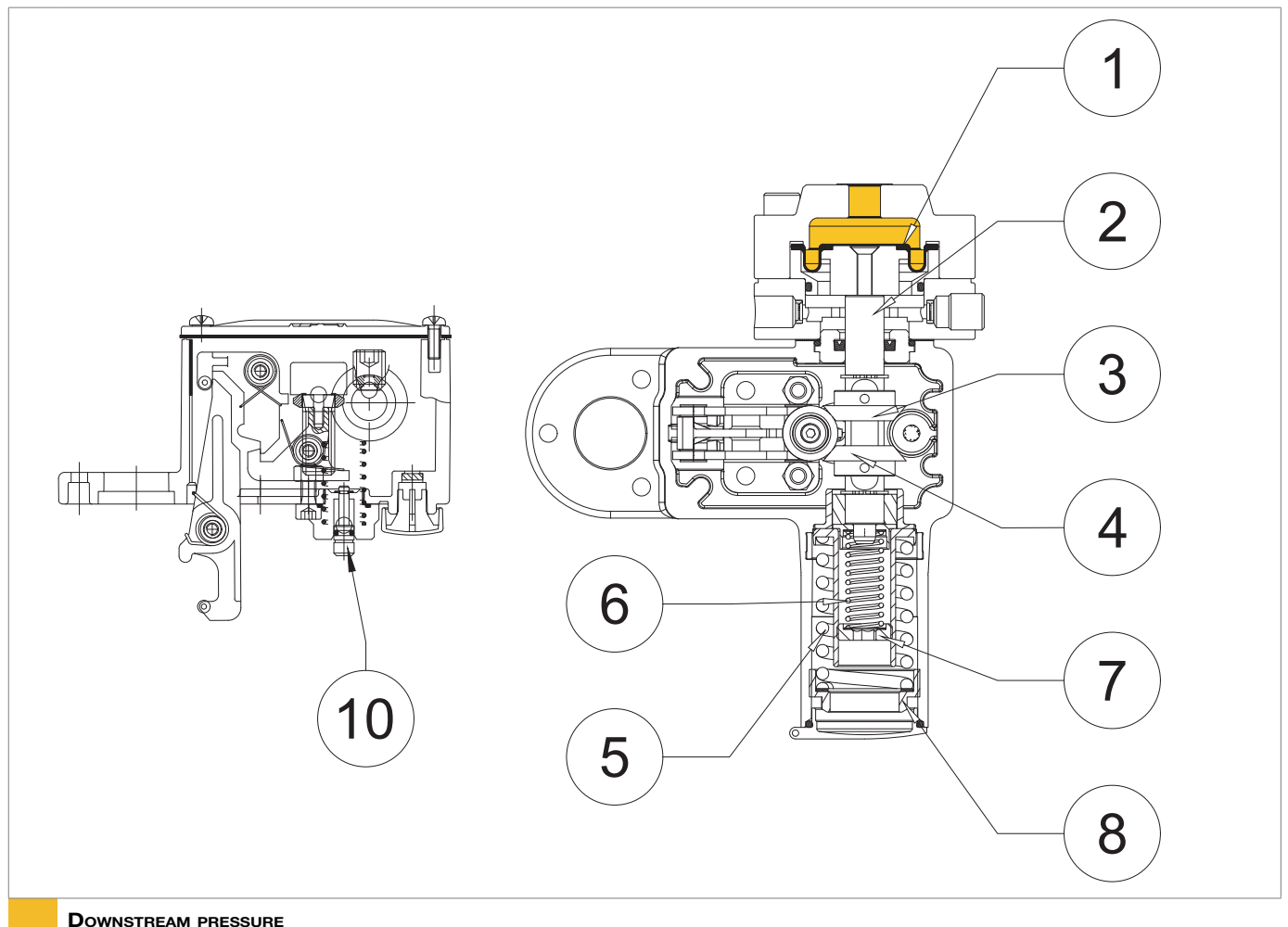
Tab. 4.16.

#### 4.4.1 - SLAM-SHUT VALVE PRESSURE SWITCHES

The pressure switch is a control device consisting of:

Pos.	Description
1	Control element. <b>NOTICE!</b> <b>The control element can be a diaphragm or a piston.</b>
2	Stem.
3-4	Adjustment feeler gauges.
5	Spring for maximum pressure tripping.
6	Spring for minimum pressure tripping.
7	UPSO minimum spring adjustment ring nut (6).
8	OPSO maximum pressure spring adjustment ring nut (5).
10	Release button.

Tab. 4.17.



**DOWNSTREAM PRESSURE**

Fig. 4.3. Slam-shut valve pressure switch



Models of possible pressure switches for this valve are listed at Tab. 4.18:

<b>Model pressure switch</b>	<b>Min [bar]</b>	<b>Max [bar]</b>
<b>102M</b>	0.2 - 2.8	0.2 - 5.5
<b>102MH</b>	2.2 - 5.5	0.2 - 5.5
<b>103M</b>	0.2 - 8	2 - 22
<b>103MH</b>	8 - 19	2 - 22
<b>104M</b>	1.6 - 18	15 - 45
<b>104MH</b>	18 - 41	15 - 45
<b>105M</b>	3 - 44	30 - 90
<b>105MH</b>	44 - 90	30 - 90

*Tab. 4.18.*



## 5 - TRANSPORT AND HANDLING



### 5.1 - SPECIFIC WARNINGS FOR TRANSPORT AND HANDLING

#### NOTICE!

Transport and handling must be carried out by personnel:

- qualified (specially trained);
- who are familiar with accident prevention and workplace safety regulations;
- authorised to use lifting equipment;
- in compliance with the regulations in force in the country of destination of the equipment.

#### Transport with forklift or crane

<b>Operator qualification</b>	Person in charge of transport, handling, unloading and placing on site
<b>PPE required</b>	 <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>
<b>Lifting equipment</b>	Hoist crane, forklift truck or other suitable equipment.
<b>Weights and dimensions of the equipment</b>	For dimensions and weights please refer to “5.2 - Physical characteristics of the equipment”.

Tab. 5.19

### 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 and spare parts must be kept in their packaging until they are installed.




Upon receiving the equipment:

- 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. 5.20” shows the types of packaging used:

Ref.	Type of packaging	Image
A	Cardboard box	
B	Wooden box	
C	Pallet	

Tab. 5.20



## 5.2 - PHYSICAL CHARACTERISTICS OF THE EQUIPMENT

### 5.2.1 - SBC 782

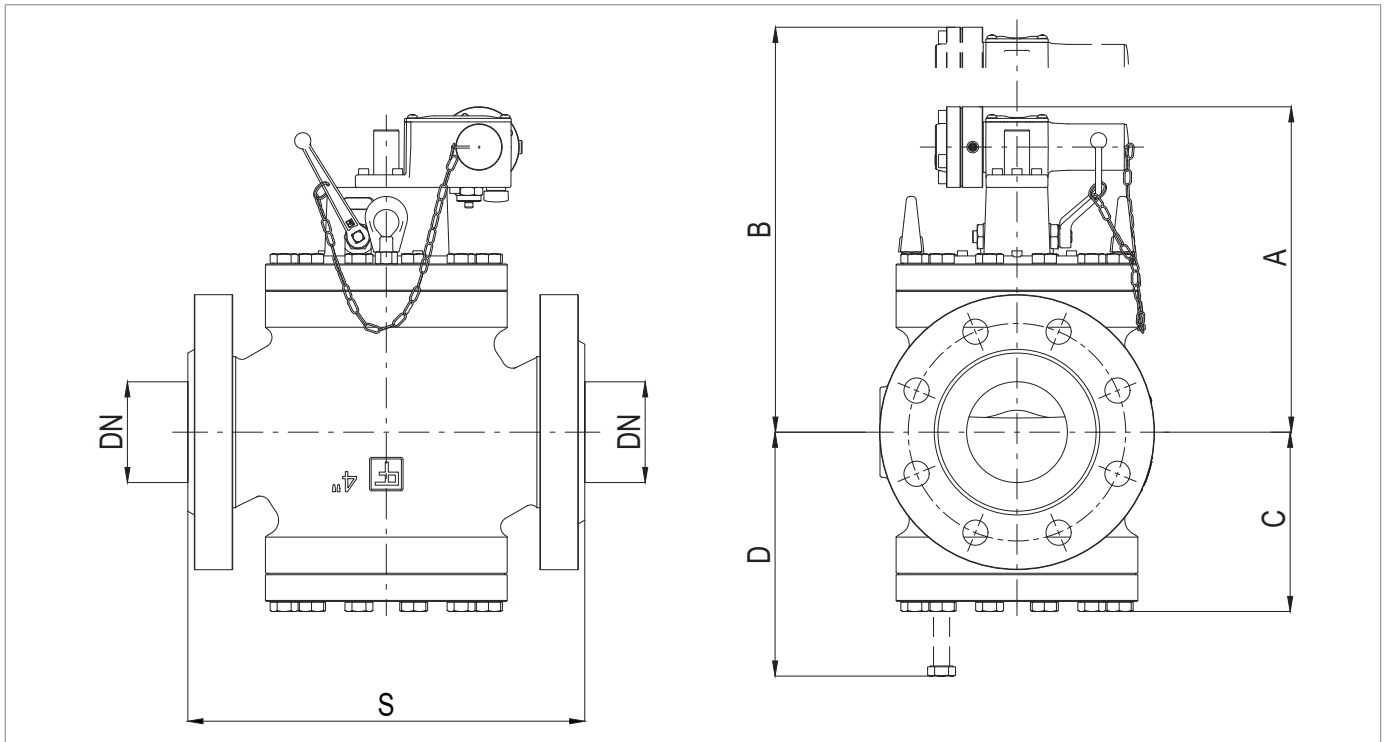


Fig. 5.4. SBC 782 physical characteristics

SBC 782 overall dimensions								
Size [inches]	1"	2"	2" ½	3"	4"	6"	8"	10"
Nominal diameter [mm]	25	50	65	80	100	150	200	250
S - ANSI 150/PN16	183	254	277	298	352	451	543	673
S - ANSI 300	197	267	-	317	368	473	568	708
S - ANSI 600	210	286	-	336	394	508	609	752
A	215	240	270	315	300	375	450	530
B	280	330	380	425	440	560	625	730
C	100	130	140	150	190	225	265	340
D	130	160	180	200	250	275	320	440
Connecting pneumatic connections	Øe 10mm x Øi 8mm							

Tab. 5.21

Weight SBC 782								
ANSI 150/PN16	21	37	45	51	79	154	255	430
ANSI 300	22	40	48	54	95	190	290	577
ANSI 600	23	42	51	57	100	210	335	577

Tab. 5.22

### 5.3 - EQUIPMENT ANCHORING AND LIFTING METHOD

 **HAZARD!**

**Before moving the equipment, make sure that the capacity of the lifting equipment is suitable for the load.**

 **WARNING!**

Unloading, transport and handling activities must be carried out by operators qualified and specially trained:

- on accident prevention rules;
- on maximum safety in the workplace;
- on the use of lifting equipment.

 **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.

### 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!

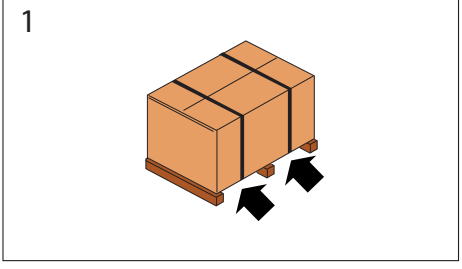




The following is not allowed on forklifts:

- carrying passengers;
- lifting people.

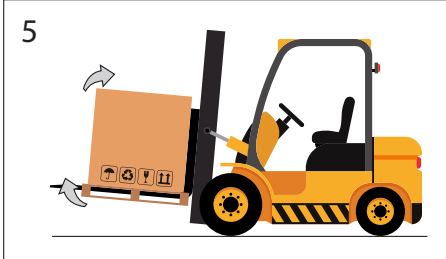

#### NOTICE!

Packaging must always be handled in a vertical position

Proceed as described at "Tab. 5.23":

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. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <b>NOTICE!</b>  <b>Fasten the load to the forks with clamps or similar devices if required.</b> </div>	
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 positioned 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. <div style="background-color: #f4a460; padding: 5px; margin: 5px 0;">  <b>WARNING!</b> </div> <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. 5.23

### 5.3.2 - CRANE HANDLING METHOD

#### **WARNING!**

It is mandatory to use CE marked chains, ropes and eyebolts or marked with conformity marks/markings in accordance with the regulations in force in the place of installation. Do not use chains connected to each other by bolts.

Always check that:

- the safety catch of the hook returns to the initial position;
- the ropes are in excellent condition and have adequate sections.


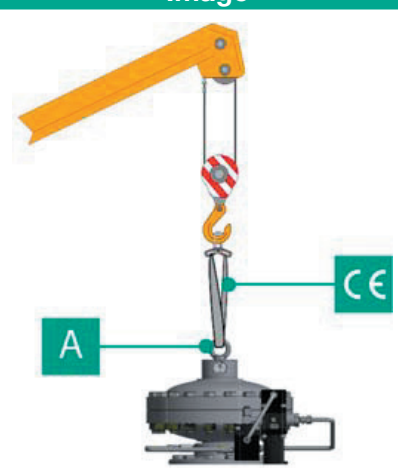

It is forbidden to:

- drag the load on the ground;
- operate near power lines;
- stand within the range of action of the crane.

#### **NOTICE!**


**Packaging must be always handled in a vertical position.**

The equipment must be handled using the lifting points provided on the equipment itself. For proper transport, follow the procedure in "Tab. 5.24":

Step	Action	Image
1	Attach the lifting rope or chain to the appropriate supports.  <b>WARNING!</b> <b>The lifting point is sized for lifting only the equipment, and not other parts of the system connected to it.</b>	
2	Slightly lift the load making sure the ropes or chains are secure.  <b>NOTICE!</b> <b>Check whether the load is properly balanced.</b>	
3	Handle the load avoiding sudden movements.	
4	Place the load in the chosen installation area.	

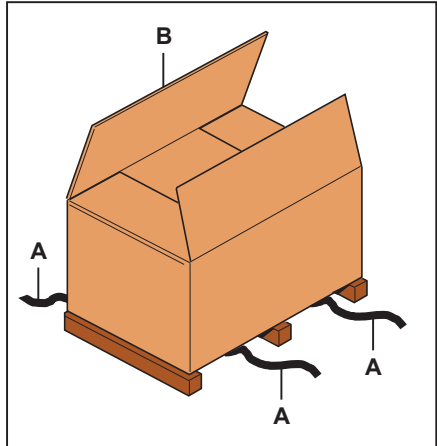
Tab. 5.24

## 5.4 - PACKAGING REMOVAL

Packaging removal	
Operator qualification	<ul style="list-style-type: none"> <li>Person in charge of transport, handling, unloading and placing on site;</li> <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>any information provided by the Safety Manager at the installation facility.</li> </ul>

Tab. 5.25

To unpack the equipment in a cardboard box, proceed as described in “Tab. 5.26”:

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>Have at least 2 operators manually move the equipment, if required due to its dimensions/weight.</p>	

Tab. 5.26

### **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

If the equipment needs to be stored for an extended period, the minimum environmental conditions for the intended storage are provided. Only by complying with these requirements can the declared performance be guaranteed:

Conditions	Data
Maximum storage period	Maximum 3 years. <div style="border: 1px solid blue; padding: 5px;">  <b>NOTICE!</b>  <b>For installations in later periods, see paragraph “5.5.1 - Pre-installation warnings after prolonged storage”.</b> </div>
Temperature	Not above 40°C
Humidity	Not above 70%
Radiation	Away from radiation sources according to UNI ISO 2230:2009

Tab. 5.27

### 5.5.1 - PRE-INSTALLATION WARNINGS AFTER PROLONGED STORAGE

For installations that have been stored for longer than 3 years, the condition of all rubber parts must be checked and, if found to be damaged, they must be replaced in order to ensure the correct functioning of the equipment.

For the replacement of the rubber parts of the equipment, please refer to “9 - Maintenance and functional checks”.

 **NOTICE!**

**PIETRO FIORENTINI S.p.A. recommends checking the condition of rubber parts in case of downtime or storage longer than 3 years.**

## 6 - INSTALLATION

### 6.1 - INSTALLATION PRE-REQUISITES

#### 6.1.1 - ALLOWED ENVIRONMENTAL CONDITIONS

##### WARNING!

**To safely use the equipment, in full respect of the allowed environmental conditions, follow the data shown on the regulator plate and on any accessories (refer to paragraph “2.8 - Applied rating plates”).**

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.

##### NOTICE!

**The equipment must operate in places that are properly lit by artificial lighting suitable for the protection of the operator (in compliance with UNI EN 12464-1:2011 and UNI EN 12464-2:2014). If maintenance work is to be performed in areas and/or parts that are poorly lit, it is mandatory to:**

- use all the light sources of the installation plant;
- be equipped with a handheld lighting system or connected to the power mains, compliant with Directive 2014/34/EU (ATEX) for use in environments at risk of explosion.

## 6.1.2 - CHECKS BEFORE INSTALLATION

The equipment does not require any further upstream safety device for protection against any overpressure with respect to its **PS admissible pressure** when, for the upstream reduction station, the maximum incidental downstream pressure is:

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

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

### **ATTENTION!**







**If the installation of the equipment requires the 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 expected dimensions of the installation site are compatible with those of the equipment;
- there is a space around the equipment that facilitates maintenance operations for employees;
- the upstream and downstream pipes are at the same level and can bear the weight of the equipment;
- the inlet and outlet connections of the pipes are aligned on the flanges;
- the inlet and outlet connections of the equipment are clean and flawless;
- the inside of the upstream pipe is clean and free of processing residues such as welding slag, sand, paint residues, water, etc...

Installation	
<b>Operator qualification</b>	Installer
<b>PPE required</b>	<div style="display: flex; align-items: center; gap: 10px;">      </div> <div style="background-color: #ff8c00; padding: 5px; margin-top: 5px;">  <b>WARNING!</b> </div> <p><b>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:</b></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>
<b>Equipment required</b>	Please refer to the chapter "7 - Commissioning/maintenance equipment".

Tab. 6.28

## 6.2 - 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.

### 6.3 - GENERAL INFORMATION ON CONNECTIONS

The equipment must be installed in-line with an arrow on the body pointing to the gas flow direction. They must be present in the online installation (see Fig. 6.5):

Pos.	Description
1	1 <b>shut-off valve upstream</b> of the equipment.
2	2 <b>vent valves</b> one upstream and one downstream of the equipment.
3	2 <b>pressure gauges</b> one upstream and one downstream of the equipment.
4	1 <b>slam-shut valve</b> .
5	1 <b>shut-off valve downstream</b> of the equipment.

Tab. 6.29

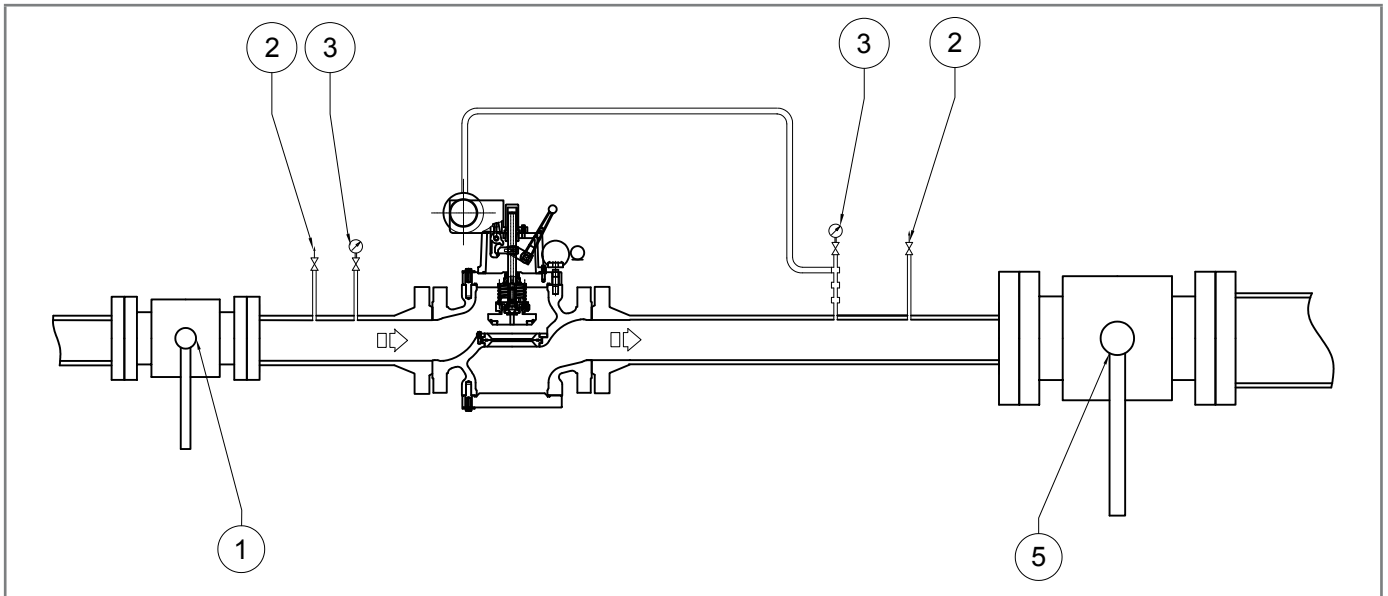


Fig. 6.5. In-line installation

#### NOTICE!

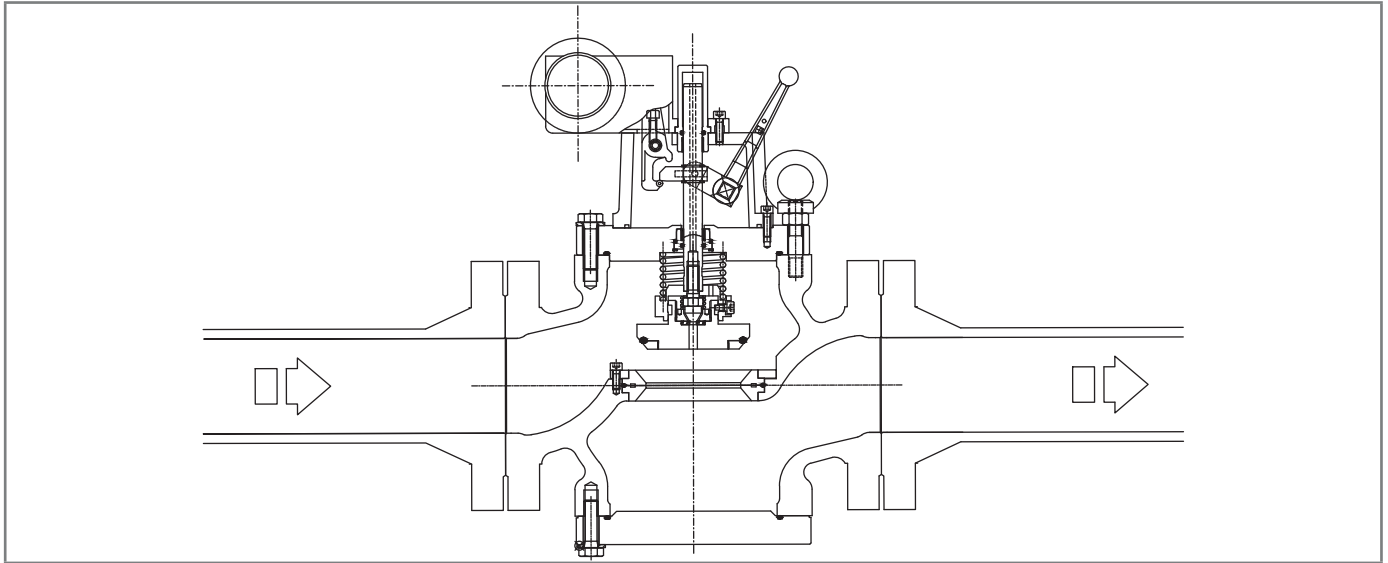
**When used in gas pressure reduction stations, the device must be installed at least according to the requirements of standards UNI EN 12186:2014 or UNI EN 12279:2007.**

**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.**

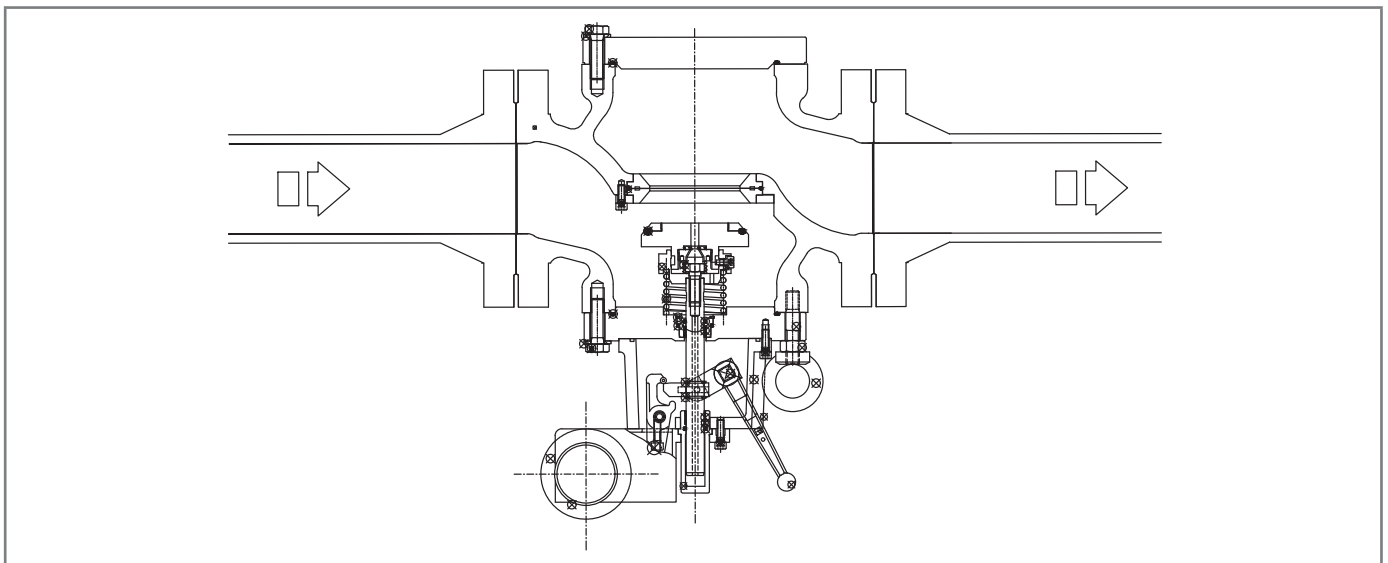


## 6.4 - REGULATOR INSTALLATION POSITIONS

Fig. 6.6 and Fig. 6.7 illustrate typical regulator arrangements:



*Fig. 6.6. Standard position*



*Fig. 6.7. Inverted position*

## 6.5 - INSTALLATION PROCEDURES

### 6.5.1 - EQUIPMENT INSTALLATION PROCEDURES

Step	Action
1	Place the equipment in the section of the line designated for it.
2	Place the gaskets between the line flanges and the regulator flanges.
3	Insert the bolts into the appropriate holes of the connecting flanges.
4	Screw the bolts following the technical rules for tightening flanges.

Tab. 6.30

#### NOTICE!

For installation after maintenance, replace the seals.

### 6.5.2 - CONNECTION OF THE SENSING LINES TO THE DOWNSTREAM PIPING

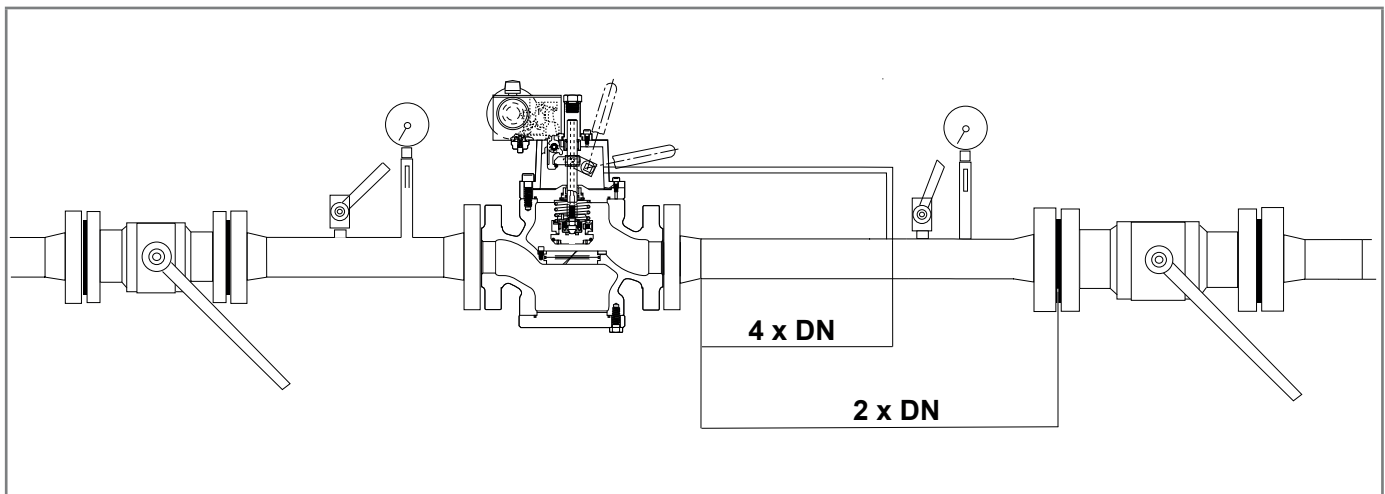


Fig. 6.8. Connection of sensing lines to the downstream piping

For proper adjustment, it is essential that:

- the downstream shut-off valve is placed at a distance of at least 6 times the nominal diameter of the pipe downstream of the regulator;
- the downstream sensing lines are placed on a straight section of pipe (with uniform diameter) having a length equal to at least 4 times the rated diameter of the pipe itself.

For optimum performance, the velocity of the pressurised fluid at the intake point should not exceed the following values:

$$V_{\max} = 30 \text{ m/s for } P_a > 5 \text{ bar}$$

$$V_{\max} = 25 \text{ m/s for } P_a < 5 \text{ bar}$$

As a limitation of use, the velocity of the pressurised fluid at the intake point does not exceed the following values:

$$V_{\max} = 40 \text{ m/s for } P_a > 5 \text{ bar}$$

To calculate the flow rate, use the following formula:

$$V = 345,92 \times \frac{Q}{DN^2} \times \frac{1 - 0,002 \times Pd}{1 + Pd}$$

**V** = gas velocity in m/sec

**Q** = gas flow rate Sm<sup>3</sup>/h

**DN** = nominal pipe diameter in mm

**Dp** = regulator outlet pressure in barg

**NOTICE!**

**All on-site pneumatic connections must have pipes with a minimum internal diameter of 8 mm.**

To prevent the pneumatic connections of the sensing lines from collecting impurities and condensation, it is necessary that:

- the connections of the pneumatic connection are always welded to the top or horizontal axis of the pipe itself (refer to Fig. 6.9);
- the hole in the piping has no burrs or internal protrusions;
- the slope of the pneumatic connection is always 5-10% towards the downstream pipe connection.

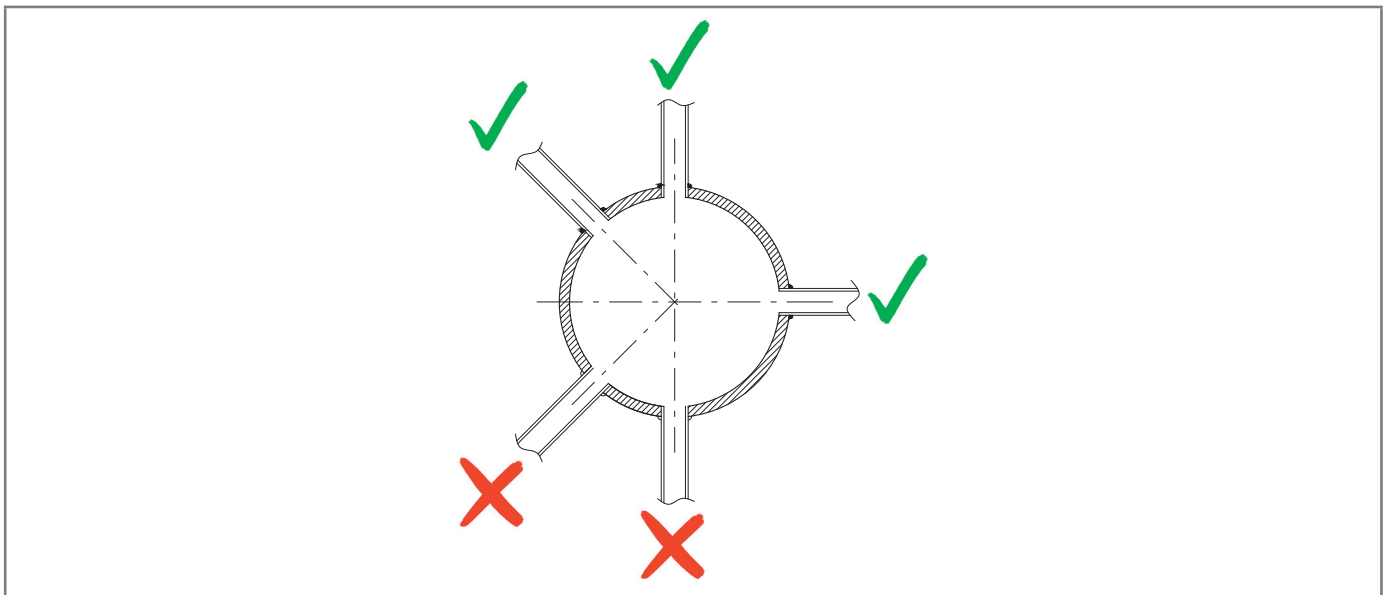


Fig. 6.9. Welded pipe connections

If there is a multiple sensing line, connect the equipment connections as shown below:

- 1 and 2 free sensing lines
- 3 and 4 regulator sensing lines (if applicable)
- 5 and 6 pressure switch sensing lines.

**! NOTICE!**

**If there is a multiple sensing line, it is not recommended to place shut-off valves on sensing lines.  
In any case, follow the regulations in force in the place of installation and use of the equipment.**

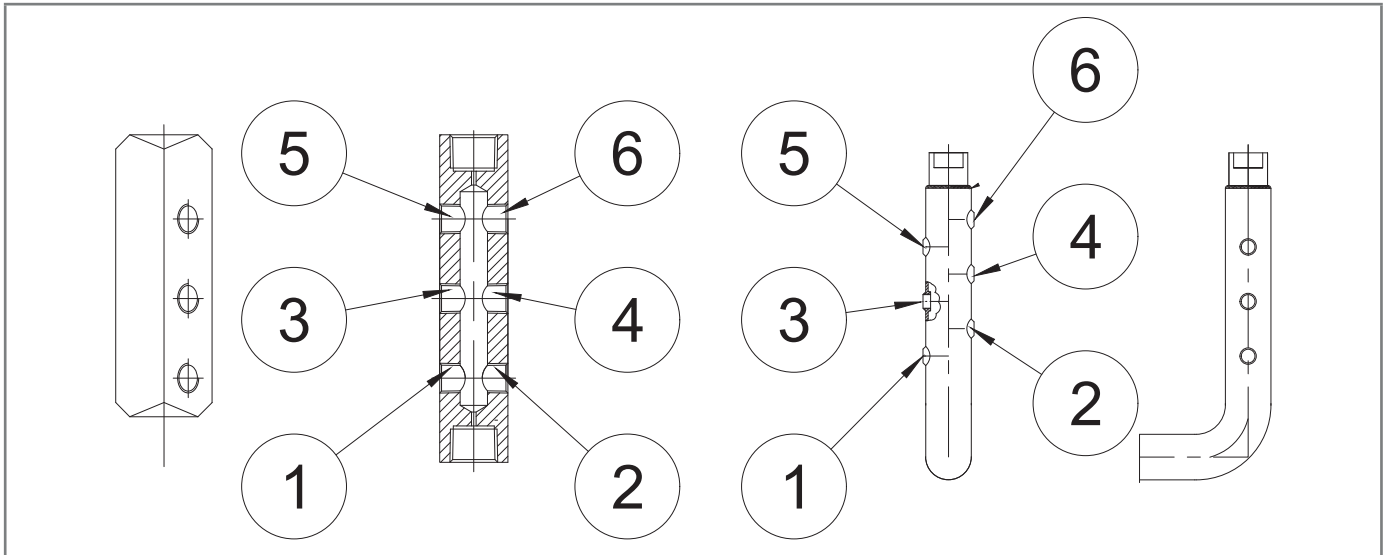


Fig. 6.10. Equipment connections


## 6.6 - POST-INSTALLATION AND PRE-COMMISSIONING CHECKS

When the equipment is operating, make sure that all connections are:

- properly secured/tightened to prevent any leakage during commissioning;
- connected correctly.



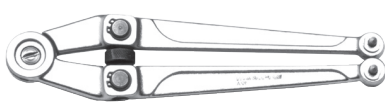



## 7 - COMMISSIONING/MAINTENANCE EQUIPMENT




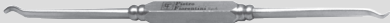

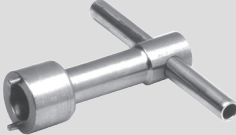


### 7.1 - LIST OF EQUIPMENT

Use of commissioning/maintenance equipment	
<b>Operator qualification</b>	<ul style="list-style-type: none"> <li>• Mechanical maintenance technician;</li> <li>• Electrical maintenance technician;</li> <li>• Installer;</li> <li>• Name of the user.</li> </ul>
<b>PPE required</b>	<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>• any information provided by the Safety Manager at the installation facility.</li> </ul>

Tab. 7.31

The types of equipment required to commission and service the equipment are described in “Tab. 7.32”:

Ref.	Equipment type	Image
<b>A</b>	Combination wrench	
<b>B</b>	Adjustable wrench	
<b>C</b>	Roller compass spanner	
<b>D</b>	Double ended bi-hex tubular socket wrench	
<b>E</b>	Bent male hex key	
<b>F</b>	Male T-handle hex wrench	

Ref.	Equipment type	Image
<b>G</b>	T-handle hex socket wrench	
<b>H</b>	Phillips screwdriver	
<b>I</b>	Slotted screwdriver	
<b>L</b>	O-ring extraction tool	
<b>M</b>	Circlip pliers	
<b>N</b>	Fiorentini special key	
<b>O</b>	Fiorentini special key	
<b>P</b>	Fiorentini special tool	

Tab. 7.32

## 7.2 - EQUIPMENT NEEDED FOR THE DIFFERENT CONFIGURATIONS

Tab. 7.34 is distinguished by:

Term	Description
<b>K./Wr.</b>	Key, with reference to the equipment indicated in "Tab. 7.32".
<b>Code</b>	Code, referring to the equipment.
<b>DN</b>	Indicates the Nominal Diameter of the reference configuration.
<b>L.</b>	Length, referred to the equipment.
<b>Ref.</b>	Reference to the equipment.
<b>Type</b>	Type (size) or code of the equipment.

Tab. 7.33

SBC 782										
Equipment		Size [inches]   DN [mm]								
Ref.	Type	1"   25	2"   50	2" ½   65	3"   80	4"   100	6"   150	8"   200	10"   250	
<b>A</b>	K./Wr.	8-13-14- 15-17-19- 24-27-32	8-13-14- 15-17-19- 24-27-32	8-13-14- 15-17-19- 24-27-32	8-13-14- 15-17-19- 24-27-32	8-13-14- 15-17-19- 24-27-32	8-13-14- 15-17-19- 24-27-30- 32	8-13-14- 15-17-19- 24-27-32-	8-13-14- 15-17-19- 24-27-32-	8-13-14- 15-17-19- 24-27-32- 36-41
<b>B</b>	L.	300								
<b>C</b>	Ø	4								
<b>D</b>	K./Wr.	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24-27	
<b>E</b>	K./Wr.	2-3-4-8	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24	9-10- 15-24-27	
<b>F</b>	K./Wr.	2-3-4-8	2-3-4-10	2-3-4-10	2-3-4	2-3-4	2-3-4	2-3-4	2-3-4	
<b>G</b>	K./Wr.	9-17-20	9-17-20	9-17-20	9-17-19- 22	9-17-19- 22	9-22	9-22	-	
<b>I</b>	L-	6.5 x 100								
<b>L</b>	Code	7999099								
<b>M</b>	Ø	19 - 60								
<b>N</b>	Code	7999019								

Tab. 7.34





## 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, any unauthorised personnel must keep away.  
The no entry area has to be marked with signs and/or boundaries.

##### NOTICE!

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

The equipment is supplied with the pressure switch / control device already calibrated.



##### NOTICE!

It is possible that for various reasons (e.g. vibrations during transport) the calibration of the equipment's accessories may vary, although within the values indicated on the identification plates.

Before commissioning the equipment, it is necessary to check that:

- all shut-off valves (inlet, outlet, any bypass) are closed;
- the gas is at a temperature within the limits specified on the data plate.

#### Commissioning

<b>Operator qualification</b>	<ul style="list-style-type: none"> <li>• Installer;</li> <li>• Qualified 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>
<b>Equipment required</b>	Please refer to the chapter "7 - Commissioning/maintenance equipment".

Tab. 8.35

## 8.2 - PRELIMINARY PROCEDURES FOR COMMISSIONING

### HAZARD!

Before commissioning the equipment, it must be ensured that any source of explosion has been eliminated if there is such a danger.

### WARNING!

Before commissioning, you need to make sure that the characteristics of the equipment are suitable for the conditions of use.


### 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.

Commissioning can be carried out using two different procedures:

### Commissioning types

<b>Injection of an inert fluid</b>	Pressurising the equipment by injecting an inert fluid (e.g. nitrogen) to avoid potentially explosive mixtures for services with combustible gases. <div style="background-color: #f4a460; padding: 5px;"><b> WARNING!</b></div> <b>During pressurisation, always check that the equipment has no leaks.</b>
<b>Direct injection</b>	Direct injection of gas into pipes, keeping the gas velocity in the pipes as low as possible (maximum permitted value of 5 m/s).

Tab. 8.36

### 8.3 - PROPER COMMISSIONING CHECK

Completely sprinkle the equipment with a foaming solution (or equivalent control system) in order to check the tightness of the external surfaces of the regulator and the connections made during the installation.

### 8.4 - CALIBRATION OF EQUIPMENT AND ACCESSORIES INSTALLED

 **NOTICE!**

To properly calibrate the equipment and accessories present, refer to the accuracy class indicated on the nameplates (see section “2.8 - Applied rating plates”).

## 8.5 - SLAM-SHUT VALVE COMMISSIONING PROCEDURE SBC 782

### 8.5.1 - CHECKING THE TIGHTNESS OF THE SLAM-SHUT VALVE SBC 782

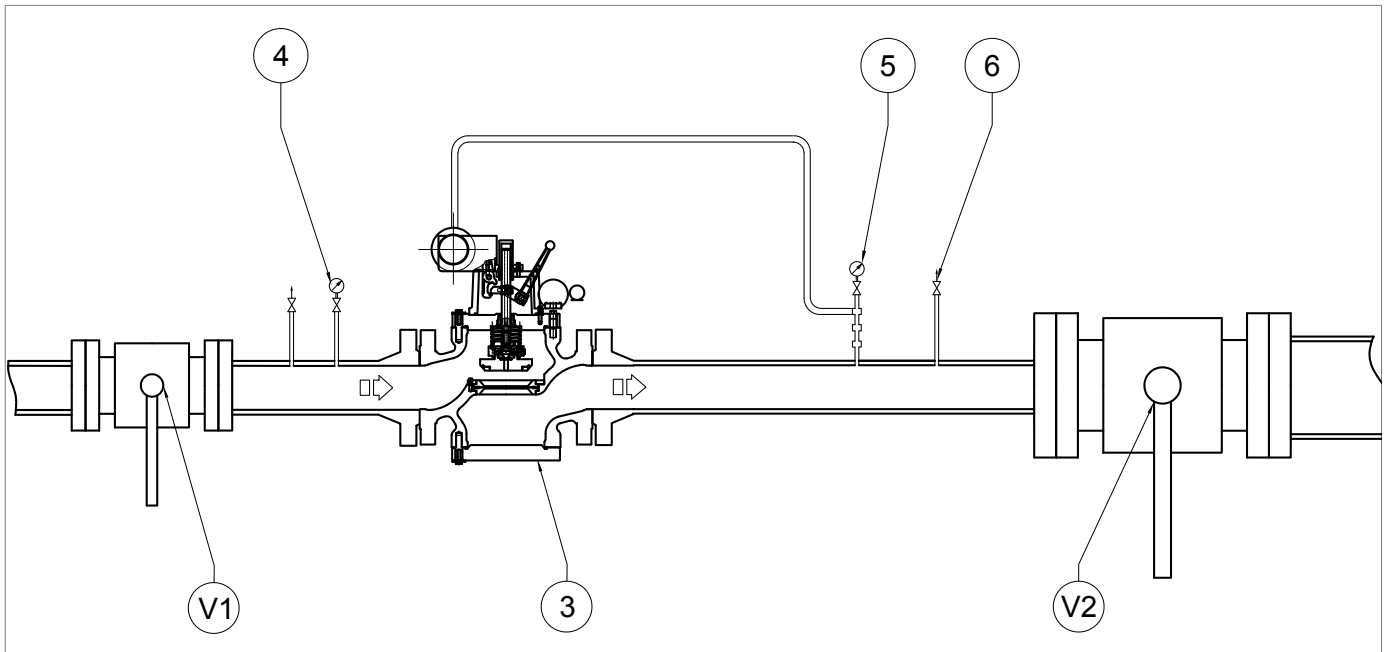


Fig. 8.11. Checking the tightness of the slam-shut valve SBC 782

Step	Action
1	Check that the slam-shut valve is in the shut-off position.
2	Open the bleed cock (6) to fully discharge the downstream section.
3	Slowly open the upstream shut-off valve (V1).
4	Check the internal tightness of the slam-shut valve by means of the bleed cock (6). <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTICE!</b></p> <ul style="list-style-type: none"> <li>• Check the seal with a foaming substance;</li> <li>• In case of leaks, please refer to the chapter “10 - Troubleshooting” to clear the causes of malfunctions.</li> </ul> </div>

Tab. 8.37



**8.5.2 - START-UP OF THE SLAM-SHUT VALVE SBC 782**

For the following procedure, please refer to “Fig. 8.12. Start-up of the slam-shut valve SBC 782”.

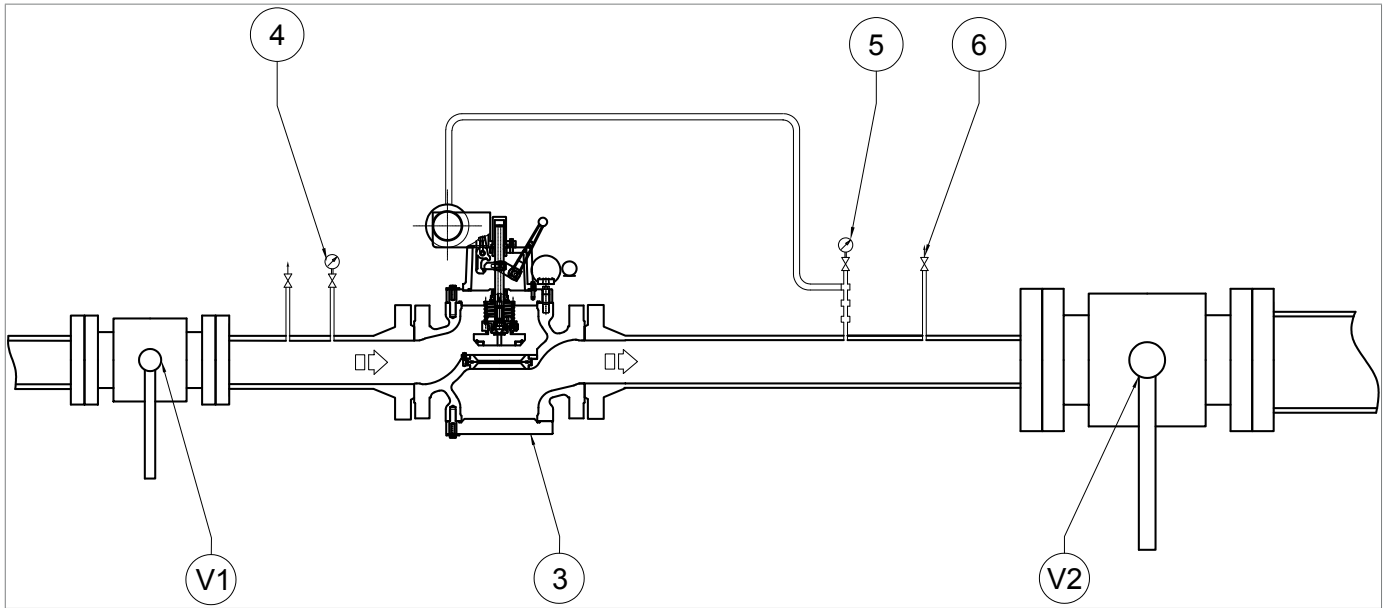


Fig. 8.12. Start-up of the slam-shut valve SBC 782

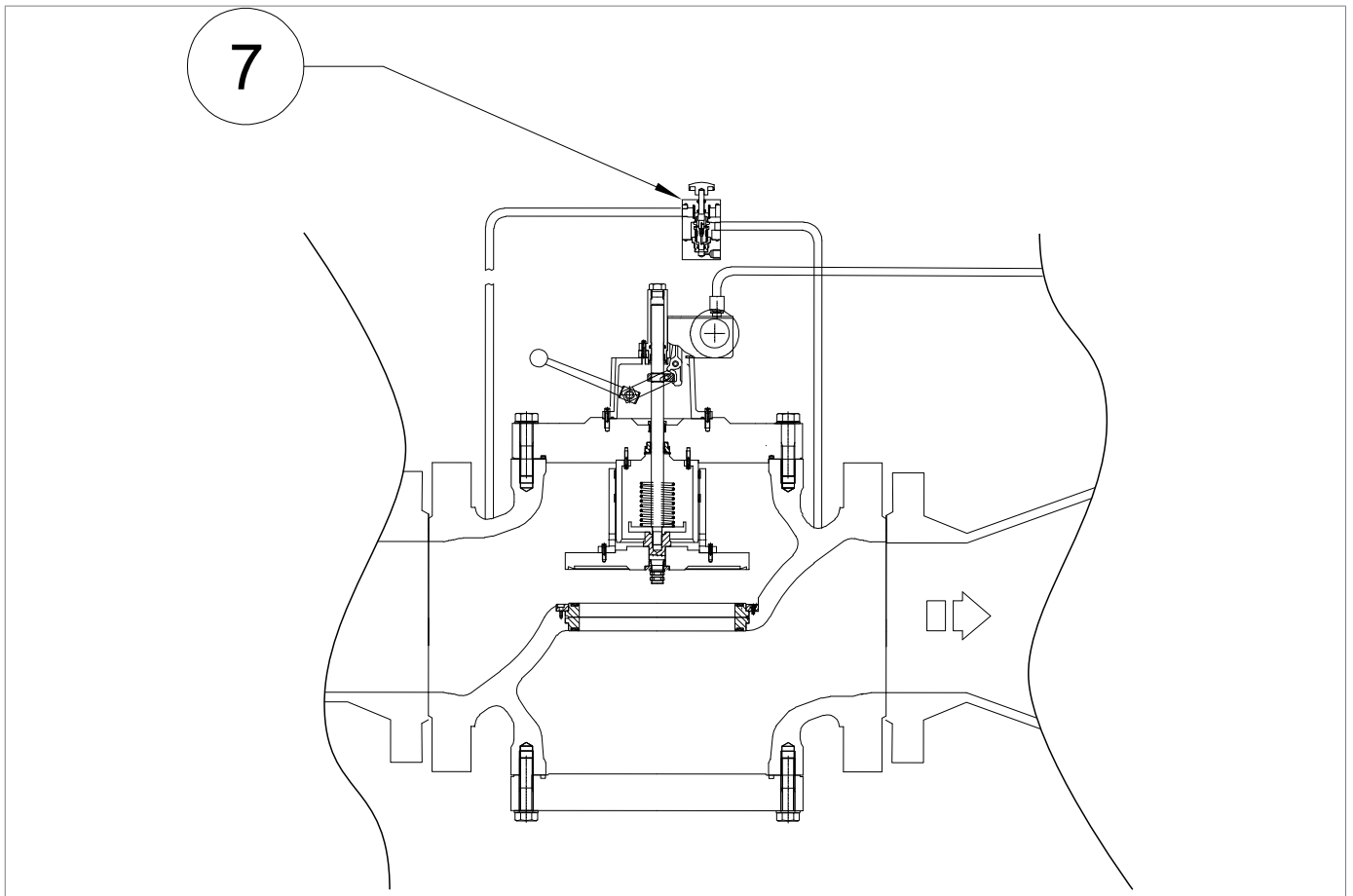





Fig. 8.13. HP2/2 by-pass detail only valid for 10".

Step	Action
1	<p><b>a- VALID FOR VALVE MOUNTED INDIVIDUALLY</b> Check that the drain cock (6) is closed.</p> <p><b>b- VALID FOR VALVE MOUNTED UPSTREAM OF THE REGULATOR</b> Make sure that the bleed cock (6) is partially open.</p>
2	<p>Check that the slam-shut valve (3) is in the closed position.</p> <div style="border: 1px solid blue; padding: 5px;"> <p> <b>NOTICE!</b> <b>If the slam-shut valve (3) is in the open position, close it using the manual button (Fig. 8.15, ref. 10).</b></p> </div>
3	Partially open the upstream shut-off valve (V1), checking the pressure indicated by the upstream pressure gauge (4).
4	<p>Perform the internal tightness check of the LA slam-shut valve, referring to paragraph 8.5.1.</p> <div style="border: 1px solid blue; padding: 5px;"> <p> <b>NOTICE!</b> <b>In case of leaks, please refer to the chapter "10 - Troubleshooting" to clear the causes of malfunctions.</b></p> </div>
5	<p><b>a- VALID FROM 1" TO 8"</b> Slowly pressurise the conveying or control line, acting on the reset lever (Fig. 8.15, ref. 16) of the slam-shut valve (refer to the "Operation" section of par. 4.2), checking that the downstream pressure (Dp) indicated by the downstream pressure gauge (5) is 20% lower than the pressure switch intervention value.</p> <p><b>b - APPLICABLE TO 10" ONLY</b> Slowly pressurise the conveying or control line by pressing the HP2/2 by-pass button (Fig. 8.13, ref. 7) of the slam-shut valve (refer to the "Operation" section of par. 4.2), checking that the downstream pressure (Dp) indicated by the downstream pressure gauge (5) is 20% lower than the pressure switch intervention value.</p>
6	Open the upstream shut-off valve (V1) completely.
7	Check calibrations of the pressure switch of the slam-shut valve by referring to paragraph 8.5.4.
8	Check the downstream pressure (Dp) referring to the downstream pressure gauge (5).
9	<p><b>VALID FOR VALVE MOUNTED UPSTREAM OF THE REGULATOR</b> Close the bleed cock (6).</p>
10	<p>Check the tightness of all the fittings between the shut-off valves (V1, V2).</p> <div style="border: 1px solid blue; padding: 5px;"> <p> <b>NOTICE!</b> <b>Check for sealing with a foaming substance.</b></p> </div>
11	If external leaks are noticed, eliminate the leak points and repeat the procedure from step 6.
12	Open downstream shut-off valve (V2) very slowly until the pipeline fills completely.

Tab. 8.38.

### 8.5.3 - PRESSURISING WITH EXTERNAL SOURCE

It is possible to pressurise the chamber (A) of the pressure switch control head (1) using an external source. The introduced pressure is controlled by using pressure gauges or transducers.

To correctly discharge the introduced pressure, make sure there is an additional bleed cock (2).

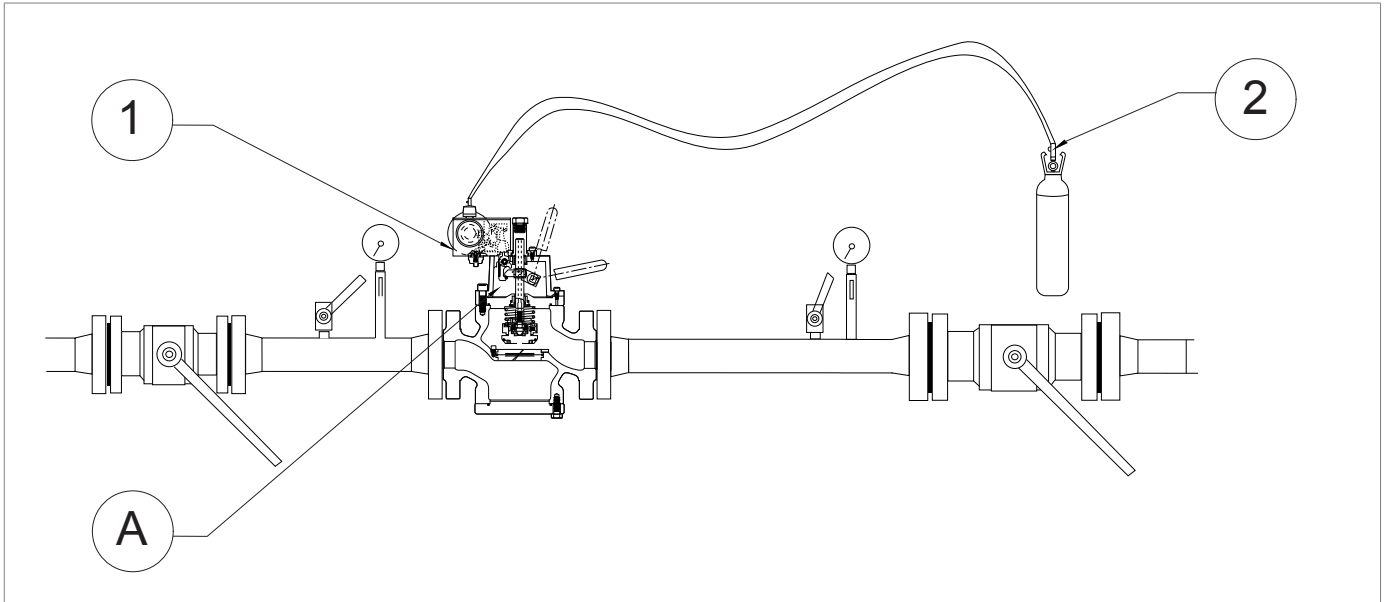


Fig. 8.14. *Pressurisation with external pressure source*





## 8.5.4 - CALIBRATION PROCEDURE FOR PRESSURE SWITCHES MOD. 100

### 8.5.4.1 - CALIBRATION PROCEDURE WITHOUT REGULATOR

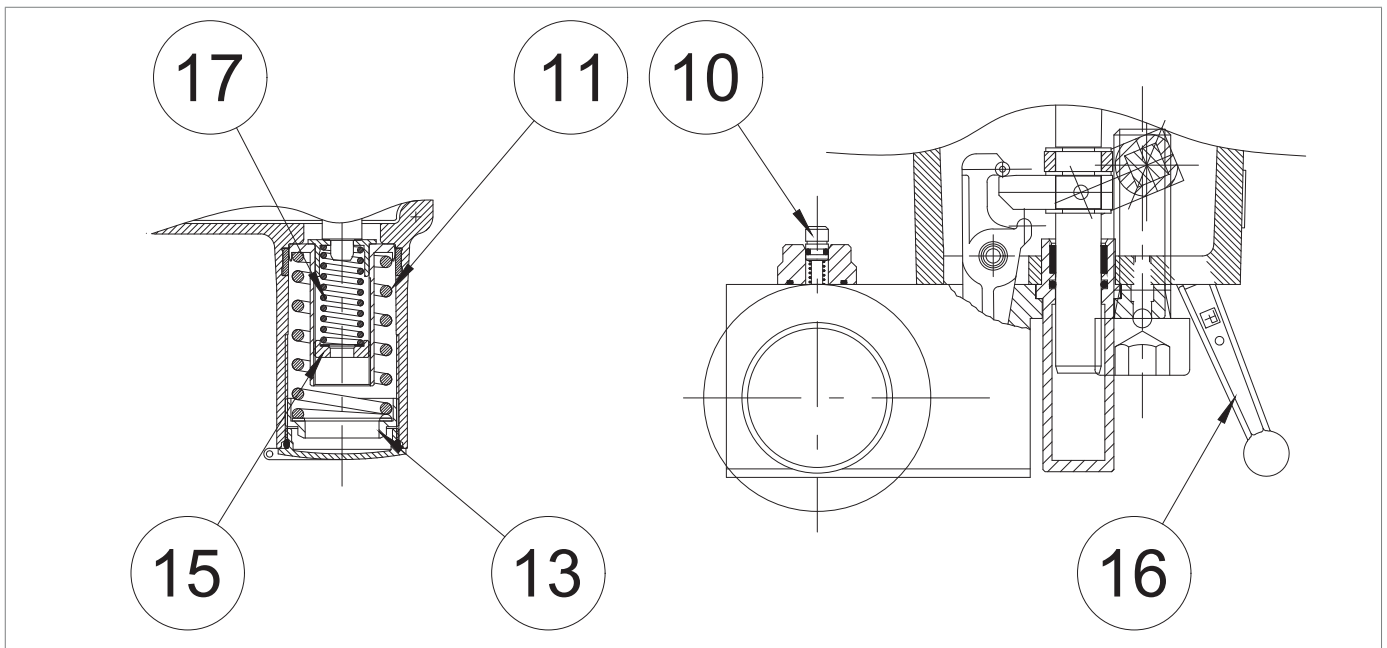


Fig. 8.15. Calibration of pressure switches Mod.100

### SPRING CALIBRATION FOR MAXIMUM PRESSURE TRIP

Step	Action
1	<p>Increase the downstream pressure (<math>D_p</math>) to check correct calibration:</p> <ul style="list-style-type: none"> <li>of the line, using an external pressure source</li> <li>of the pressure switch head, referring to "8.5.3 - Pressurising with external source".</li> </ul> <p><b>! NOTICE!</b></p> <p><b>Check the pressure referring to the downstream pressure gauge (Fig. 8.11, ref. 5).</b></p> <p><b>If the slam-shut valve:</b></p> <ul style="list-style-type: none"> <li><b>trips before the expected pressure value: screw in (clockwise) the adjustment ring nut (13) so as to further compress the spring (11);</b></li> <li><b>does not trip at the expected pressure value: unscrew (anti-clockwise) the adjustment ring nut (13) so as to relieve the spring (11).</b></li> </ul>
2	Decrease the pressure in the pressure switch head using the drain cock (3) of the external source or the drain cock (Fig. 8.11, ref. 6)
3	Reset the slam-shut valve by acting on the reset lever (16).
4	<p>Repeat steps 1-2-3 at least three times.</p> <p><b>! NOTICE!</b></p> <p><b>The calibration value must comply with the operating limits specified on the plate.</b></p>
5	If present, disconnect the external pressure source from the pressure switch sensing line and reconnect the sensing line between pressure switch and line.

Tab. 8.39.

**SPRING CALIBRATION FOR MINIMUM PRESSURE TRIP (IF ANY)**

Step	Action
1	Partially open the drain cock (Fig. 8.11, ref. 6) and keep it open for the next steps.
2	<p>Decrease the downstream pressure to the minimum required slam-shut valve pressure.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Check the pressure referring to the downstream pressure gauge (Fig. 8.11, ref. 5).</b></p> <p><b>If the slam-shut valve:</b></p> <ul style="list-style-type: none"> <li>• <b>trips before the expected pressure value: unscrew (anti-clockwise) the adjustment ring nut (15) so as to relieve the spring (17);</b></li> <li>• <b>does not trip before the expected pressure value, screw in (clockwise) the adjustment ring nut (15) so as to further compress the spring (17).</b></li> </ul> </div>
3	Close the bleed cock (Fig. 8.11, ref. 6).
4	Move the slam-shut valve to open by acting on the reset lever (16) and keep it open manually.
5	<p>Increase the downstream pressure (Dp) to reset the block valve:</p> <ul style="list-style-type: none"> <li>• of the line, using an external pressure source</li> <li>• of the pressure switch head, referring to “8.5.3 - Pressurising with external source”.</li> </ul>
6	Reset the slam-shut valve by acting on the reset lever (16).
7	Check the minimum pressure spring for proper calibration by repeating steps 1-2-3-4 at least three times.
8	If present, disconnect the external pressure source from the pressure switch sensing line and reconnect the sensing line between pressure switch and line.

Tab. 8.40.

**8.5.4.2 - CALIBRATION PROCEDURE WITH REGULATOR**

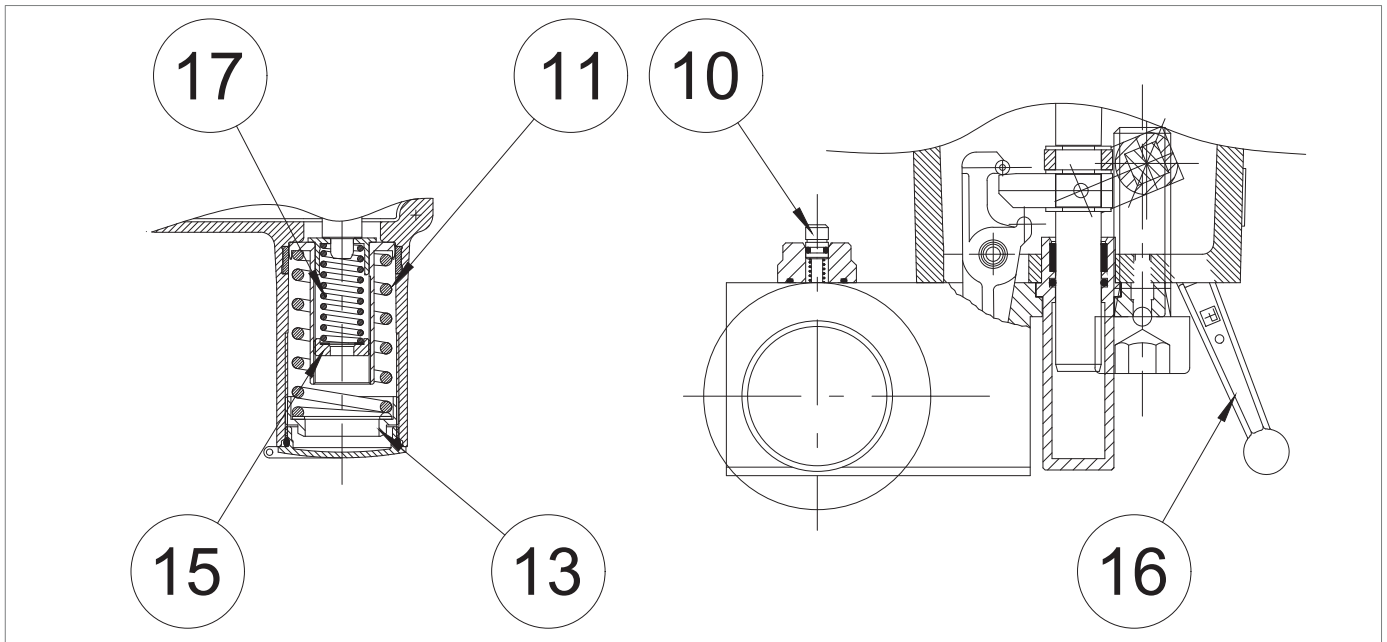


Fig. 8.16. Calibration of pressure switches Mod.100

**SPRING CALIBRATION FOR MAXIMUM PRESSURE TRIP**

Step	Action
1	<p>Increase the downstream pressure (<math>D_p</math>) to the slam-shut valve's tripping value to check the correct setting:</p> <ul style="list-style-type: none"> <li>• of the line, using an external pressure source</li> <li>• of the pressure switch head, referring to "8.5.3 - Pressurising with external source".</li> </ul> <p><b>! NOTICE!</b></p> <p><b>Check the pressure referring to the pressure gauge (Fig. 8.11ref. 5) downstream of the main regulator.</b></p> <p><b>If the slam-shut valve:</b></p> <ul style="list-style-type: none"> <li>• <b>trips before the expected pressure value: screw in (clockwise) the adjustment ring nut (13) so as to further compress the spring (11);</b></li> <li>• <b>does not trip at the expected pressure value: unscrew (anti-clockwise) the adjustment ring nut (13) so as to relieve the spring (11).</b></li> </ul>
2	By opening the vent (Fig. 8.11, ref. 6), decrease the pressure in the downstream section to the calibration value of the main regulator.
3	Close the air vent valve (Fig. 8.11, ref. 6).
4	Reset the slam-shut valve by acting on the reset lever (16).
5	<p>Repeat steps 1-2-3-4 at least three times.</p> <p><b>! NOTICE!</b></p> <p><b>The calibration value must comply with the operating limits specified on the plate.</b></p>

Tab. 8.41.

**SPRING CALIBRATION FOR MINIMUM PRESSURE TRIP (IF ANY)**

Step	Action
1	Partially open the drain cock (Fig. 8.11, ref. 6) and keep it open for the next steps.
2	<p>Decrease the downstream pressure to the minimum required slam-shut valve pressure.</p> <div style="border: 1px solid blue; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Check the pressure referring to the downstream pressure gauge (Fig. 8.11, ref. 5).</b></p> <p><b>If the slam-shut valve:</b></p> <ul style="list-style-type: none"> <li>• <b>trips before the expected pressure value: unscrew (anti-clockwise) the adjustment ring nut (15) so as to relieve the spring (17);</b></li> <li>• <b>does not trip before the expected pressure value, screw in (clockwise) the adjustment ring nut (15) so as to further compress the spring (17).</b></li> </ul> </div>
3	Close the bleed cock (Fig. 8.11, ref. 6).
4	Move the slam-shut valve to open by acting on the reset lever (16) and keep it open manually.
5	<p>Increase the downstream pressure (Dp) to reset the block valve:</p> <ul style="list-style-type: none"> <li>• of the line, using an external pressure source</li> <li>• of the pressure switch head, referring to “8.5.3 - Pressurising with external source”.</li> </ul>
6	Reset the slam-shut valve by acting on the reset lever (16).
7	Check the minimum pressure spring for proper calibration by repeating steps 1-2-3-4 at least three times.
8	If present, disconnect the external pressure source from the pressure switch sensing line and reconnect the sensing line between pressure switch and line.

Tab. 8.42.



## 9 - MAINTENANCE AND FUNCTIONAL CHECKS

### 9.1 - GENERAL WARNINGS

#### **HAZARD!**

- Maintenance work must be carried out by qualified personnel trained on safety in the workplace and authorised to carry out equipment-related activities.
- Each maintenance operation requires in-depth and specialised knowledge of the equipment, the necessary operations, the associated risks and the correct procedures to operate safely.
- Repair or maintenance work not provided for in this manual may be carried out only if approved by PIETRO FIORENTINI S.p.A.. PIETRO FIORENTINI S.p.A. shall not be held liable for damage to persons or property resulting from operations other than those described herein or carried out in ways other than as indicated.

#### **WARNING!**

Before conducting any work, make sure that the line on which the equipment is installed:

- has been shut off downstream and upstream;
- has been discharged.

#### **WARNING!**

In case of doubt, do not perform any work. Contact PIETRO FIORENTINI S.p.A. for the necessary clarifications.

The management and/or use of the equipment includes interventions that are necessary as a result of normal use such as:

- inspection and checks;
- functional checks;
- routine maintenance;
- special maintenance.

#### **NOTICE!**

Maintenance work is strictly related to:

- **the quality of the conveyed gas (impurities, humidity, gasoline, corrosive substances);**
- **the effectiveness of filtration;**
- **the equipment conditions of use.**

To properly run the equipment, one should:

- follow the service frequency referred to in the manual for functional checks and routine maintenance.
- not exceed the time interval between one service and the next. The time interval is to be understood as the maximum acceptable; it can, however, be shortened;
- promptly check the causes of any anomalies such as excessive noise, leakage of fluids or similar and remedy them. The timely removal of any causes of anomaly and/or malfunction prevents further damage to the equipment and ensures operator safety;

Before beginning disassembly of the equipment, make sure that:

- the spare parts and parts used in replacements have adequate requirements to ensure the original performance of the equipment. Use original, compliant spare parts;
- the operator must have the necessary equipment (see chapter “7 - Commissioning/maintenance equipment”).

**! NOTICE!**

**The recommended spare parts are unambiguously identified with tags indicating:**

- **the assembly drawing number of the equipment where they are installed (see Chapter “12 - Recommended spare parts”);**
- **The position specified in the assembly drawing of the equipment.**


The equipment maintenance operations are divided, from an operational point of view, into three main categories:

Commissioning and maintenance operations	
<b>Periodic checks and inspections</b>	All those checks that the operator must carry out on a regular basis to ensure that the equipment is in proper working order.
<b>Routine maintenance</b>	All those operations that the operator must preventively carry out to ensure proper operation of the device over time. Routine maintenance includes: <ul style="list-style-type: none"> <li>• inspection;</li> <li>• control;</li> <li>• adjustment;</li> <li>• cleaning;</li> <li>• lubrication;</li> <li>• replacement;</li> </ul> of all spare parts.
<b>Special maintenance</b>	All those operations to be carried out by the operator when the equipment requires them.

Tab. 9.43



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

Periodic checks and inspections	
<b>Operator qualification</b>	Mechanical maintenance technician
<b>PPE required</b>	 <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>

Tab. 9.44

“Tab. 9.45” lists checks and verifications, i.e. operations that do not require any manual intervention on the individual equipment.

Some items thereof can be replaced remotely using suitable remote control tools. The following is listed below:

Activity description	Equipment/accessories involved	Evaluation criterion	Minimum frequency
<b>Significant performance check*</b>	Pressure regulators	<ul style="list-style-type: none"> <li>No fluctuations in the adjusted pressure.</li> <li>Significant pressure values within pre-set limits.</li> </ul>	Monthly
	Gas flow slam-shut type safety devices (external position indicator)	<ul style="list-style-type: none"> <li>Fully open position.</li> </ul>	
	Stand-by monitor (external position indicator)	<ul style="list-style-type: none"> <li>Fully open position.</li> </ul>	
<b>Visual inspection of the equipment outside condition</b>	All	<ul style="list-style-type: none"> <li>No visible damage.</li> <li>External surface protection as per UNI 9571-1:2012.</li> </ul>	Half-yearly

Tab. 9.45

\* These checks may be carried out remotely if there is a remote control system capable of analysing the significant performance of the equipment and of sending alerts/alarms when pre-set thresholds are reached.

## 9.3 - ROUTINE MAINTENANCE

### 9.3.1 - GENERAL SAFETY WARNINGS

 **HAZARD!**

- Put the equipment in a safe condition (close the downstream shut-off valve and then the upstream one, and drain the line completely);
- ensure that the pressure upstream and downstream of the equipment is “0”.

 **NOTICE!**

**Before installing new sealing elements (o-rings, diaphragm, etc.), they must be checked for integrity.**

### 9.3.2 - REPLACEMENT FREQUENCY FOR COMPONENTS SUBJECT TO WEAR

**NOTICE!**

The following provisions shall apply to equipment components only.

The non-metallic parts of the equipment concerned are divided into the following two categories:

Preventive maintenance work	
<b>Category 1</b>	Parts subject to wear and/or abrasion, where: <ul style="list-style-type: none"> <li>wear and tear means the normal degradation of a part after prolonged use under normal operating conditions;</li> <li>abrasion is the mechanical action on the surface of the affected part resulting from the passage of gas under normal operating conditions.</li> </ul>
<b>Category 2</b>	Parts subject to aging only, including parts that also require lubrication and/or cleaning.

Tab. 9.46

**NOTICE!**


Check, within the minimum frequency specified in “Tab. 9.47”, the available components for wear/abrasion/aging.

Category	Part description	Evaluation criterion	Minimum replacement frequency
1	Valve seat sealing rings and non-metallic plugs	Pressure regulators	6 years
		Safety devices	
		Pressure safety system equipment	
1	Non-metallic parts with internal sealing function of valve seats and accessories of individual equipment	Pilots	6 years
		Pre-regulators	
		Accelerators	
		Any others	
1	Non-metallic parts with a sealing function between parts, at least one of which is in motion under normal working/operating conditions	Pressure regulators	6 years
		Gas flow slam-shut type safety devices	
		Relief devices with discharge to atmosphere	
1	Non-metallic parts with sealing function involved in disassembly operations during maintenance	Equipment subject to maintenance	6 years
2	Non-metallic parts providing feedback (sensing elements) of the controlled pressure of safety equipment	Safety equipment and/or accessories	6 years
2	Non-metallic parts with sealing and performance functions (diaphragms) of equipment	Pressure regulators and accessories	6 years
		Gas flow slam-shut type safety devices	6 years
		Relief device with discharge to atmosphere	6 years
2	Non-metallic parts of equipment with an internal sealing function: under normal operating conditions during maintenance	Relief valves	6 years
		Regulation lines disconnection equipment	If there are proven leaks
2	Non-metallic parts with a static sealing function only	Various equipment	If there are proven leaks

Category	Part description	Evaluation criterion	Minimum replacement frequency
2	Lubricating parts	Shut-off valves	Yearly
		Other equipment	Yearly
2	Filter elements	Filters	As needed

Tab. 9.47

## 9.4 - ROUTINE MAINTENANCE PROCEDURES

Routine maintenance	
Operator qualification	Operator qualification
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>
Equipment required	Please refer to the chapter “7 - Commissioning/maintenance equipment”.

Tab. 9.48

## 9.4.1 - TIGHTENING TORQUES

### 9.4.1.1 - SLAM-SHUT VALVE TIGHTENING TORQUES SBC 782

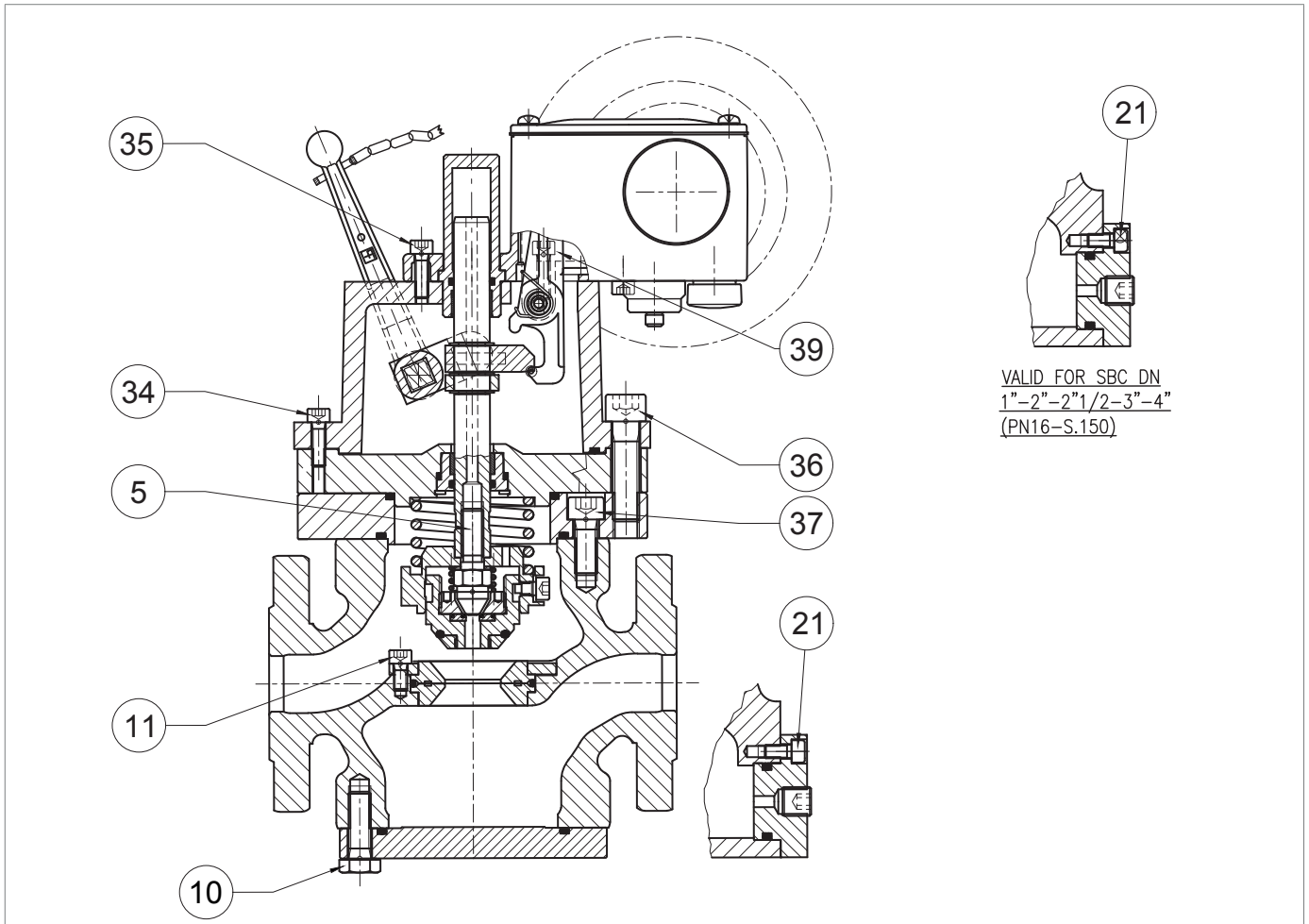


Fig. 9.17. Tightening torques SBC 782

SBC 782 1"			
Pos.	Description	Torque (Nm)	Torque (ft - lb)
11	Screw M6X12 UNI 5931	10	7
34	Screw M6X20 UNI 5931	10	7
35	Screw M6X20 UNI 5931	10	7
36	Screw M12X45 UNI 5931	80	59
37	Screw M10X25 UNI 5931	45	33
39	Screw M6X20 UNI 5931	10	7
64	Screw M10X30 UNI 5739	45	33

Tab. 9.49

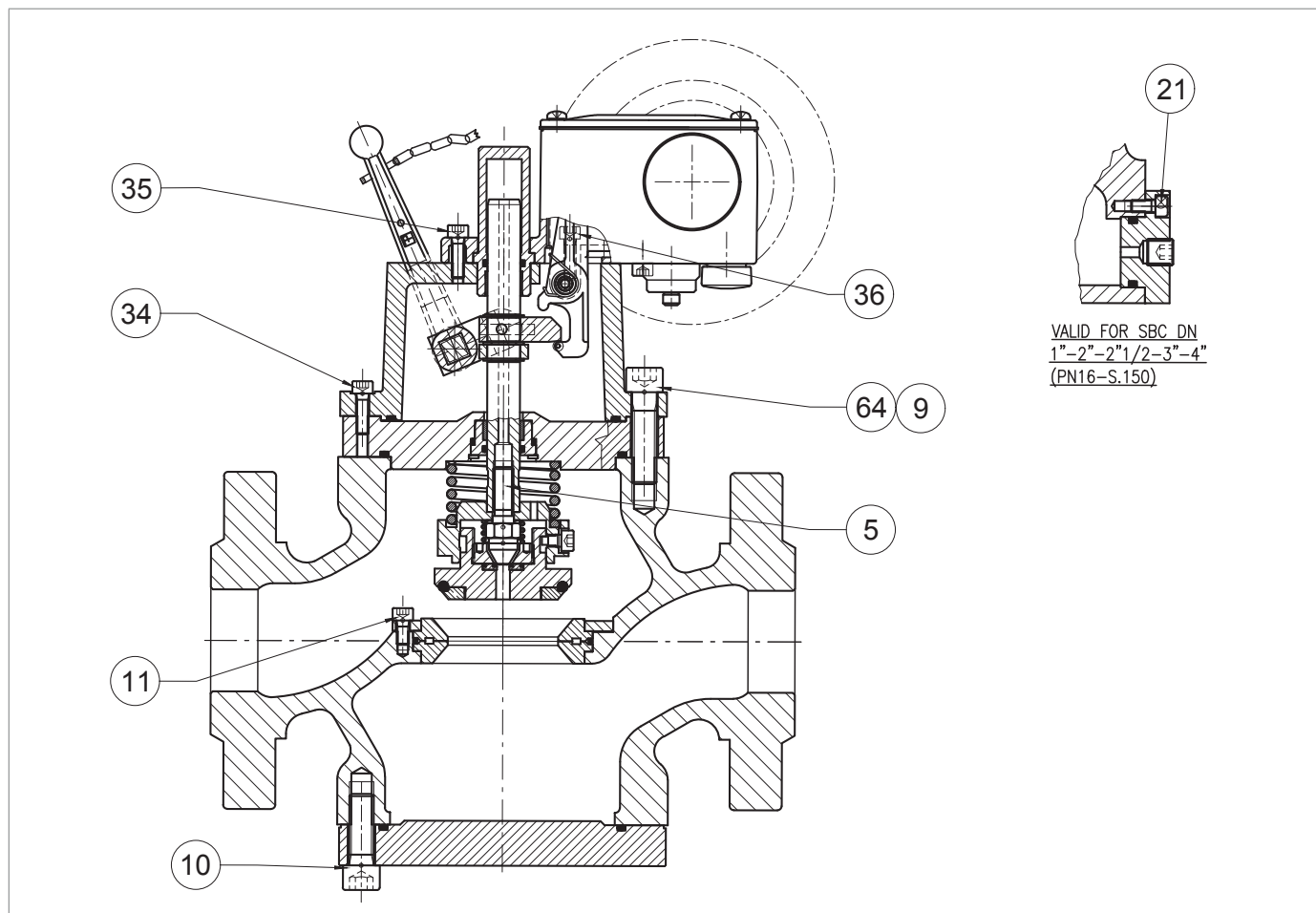


Fig. 9.18. Tightening torques SBC 782

### SBC 782 2"

Pos.	Description	Torque (Nm)	Torque (ft - lb)
100	Screw M12X35 UNI 5739	80	59
11	Screw M6X12 UNI 5931	10	5
34	Screw M6X20 UNI 5931	10	5
35	Screw M6X20 UNI 5931	10	5
36	Screw M6X20 UNI 5931	10	5
64	Screw M12X45 UNI 5931	80	59

Tab. 9.50

### SBC 782 2" 1/2

Pos.	Description	Torque (Nm)	Torque (ft - lb)
100	Screw M12X35 UNI 5739	80	59
11	Screw M6X14 UNI 5931	10	5
34	Screw M6X20 UNI 5931	10	5
35	Screw M6X20 UNI 5931	10	5
36	Screw M6X20 UNI 5931	10	5
64	Screw M12X40 UNI 5931	80	59

Tab. 9.51

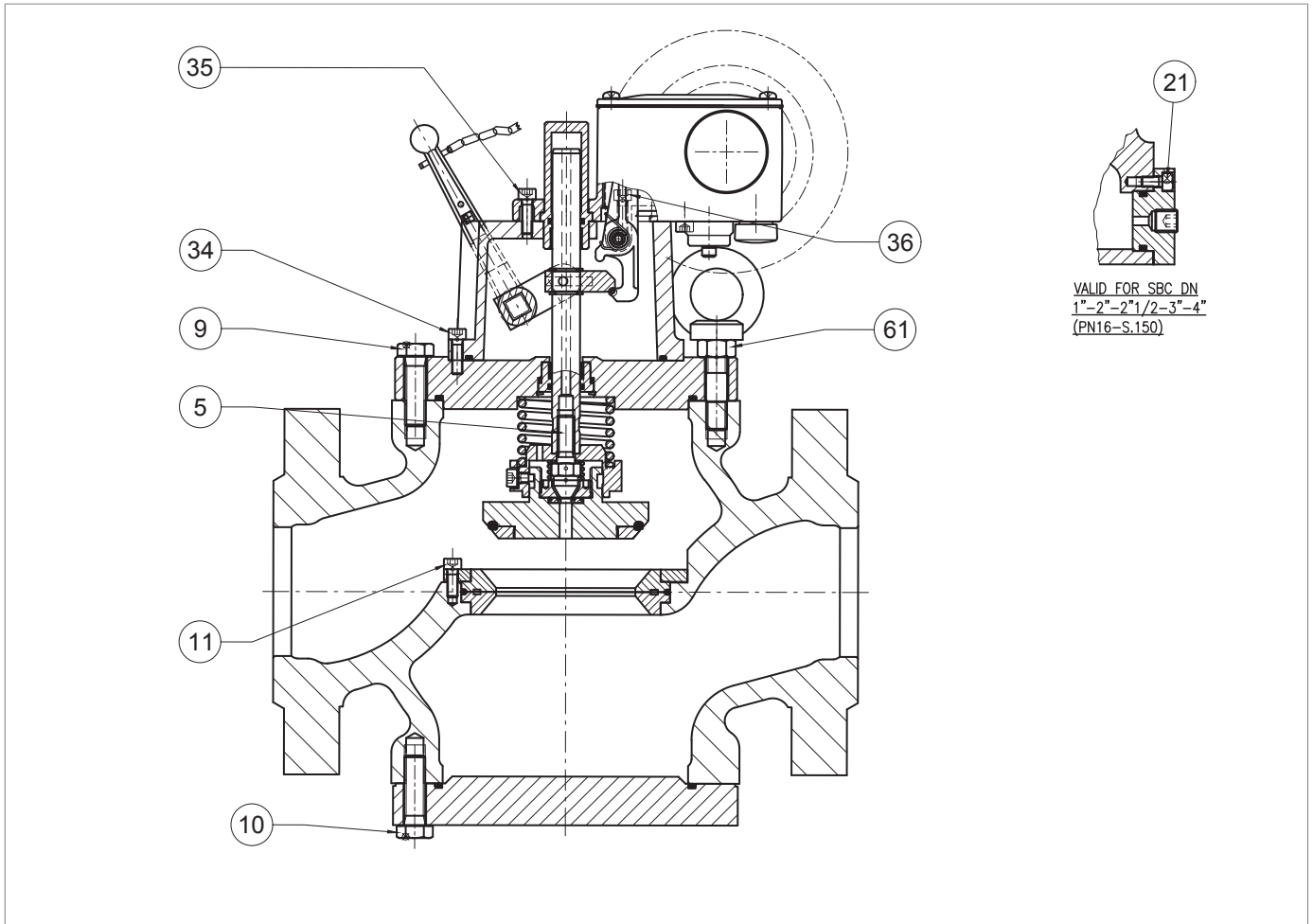


Fig. 9.19. Tightening torques SBC 782

<b>SBC 782 3"</b>			
<b>Pos.</b>	<b>Description</b>	<b>Torque (Nm)</b>	<b>Torque (ft - lb)</b>
64	Screw M12X40 UNI 5739	80	59
100	Screw M12X40 UNI 5739	80	59
11	Screw M6X12 UNI 5931	10	5
21	Screw M6X12 UNI 5931	10	7
34	Screw M6X20 UNI 5931	10	5
35	Screw M6X20 UNI 5931	10	5
36	Screw M6X20 UNI 5931	10	5
61	Nut M12 UNI 5588	80	59

Tab. 9.52



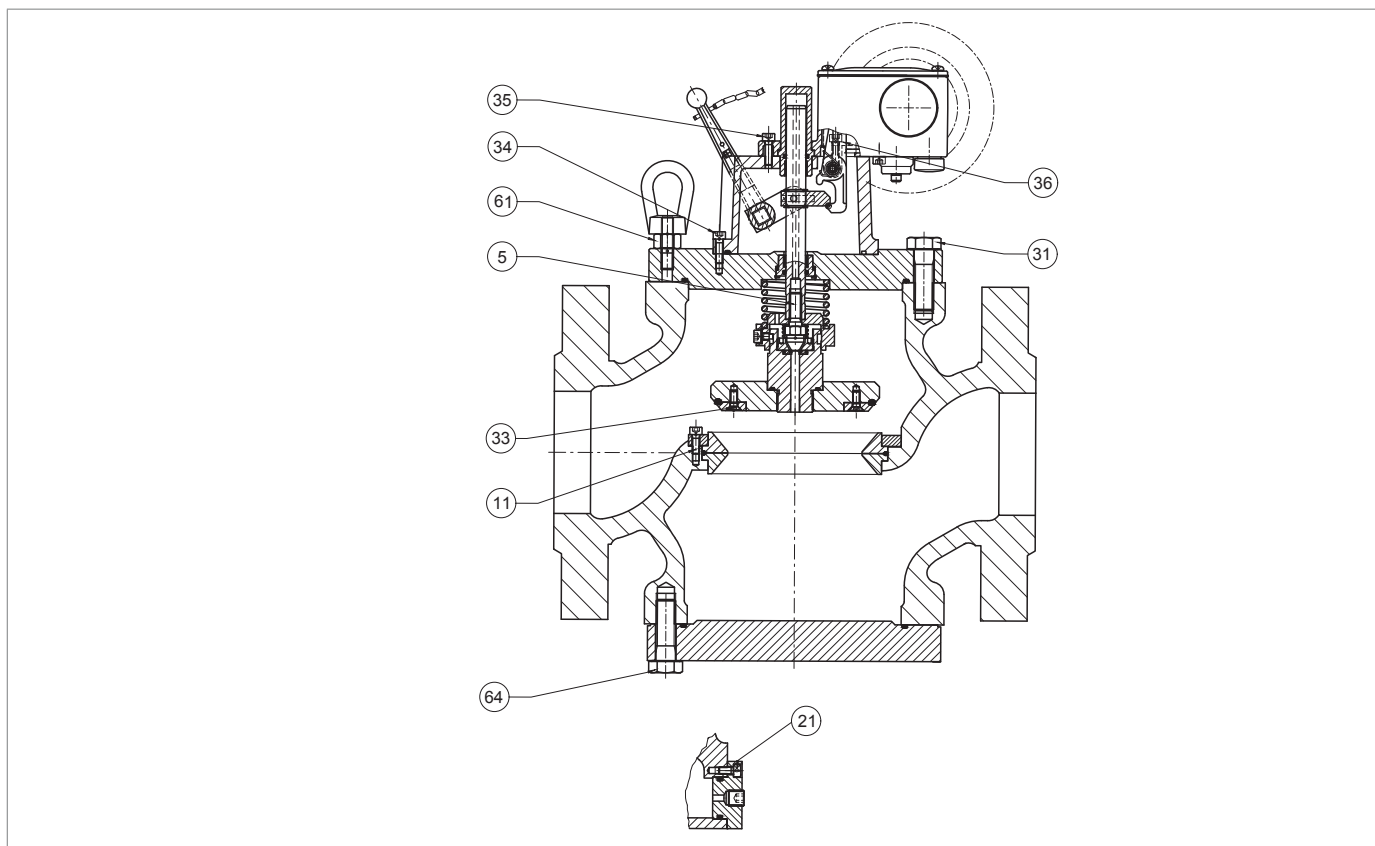


Fig. 9.20. Tightening torques SBC 782

#### SBC 782 4"

Pos.	Description	Torque (Nm)	Torque (ft - lb)
10	Screw M16X50 UNI 5739	150	59
11	Screw M6X16 UNI 5931	10	5
21	Screw M6X12 UNI 5931	10	7
33	Screw M6X14 UNI 5934	10	5
34	Screw M6X20 UNI 5931	10	5
35	Screw M6X14 UNI 5933	10	5
36	Screw M6X20 UNI 5931	10	5

Tab. 9.53

#### SBC 782 6"

Pos.	Description	Torque (Nm)	Torque (ft - lb)
10	Screw M14X50 UNI 5737	115	110
11	Screw M6X16 UNI 5931	10	5
33	Screw M6X10 UNI 5931	10	5
34	Screw M8X25 UNI 5931	20	14
35	Screw M6X40 UNI 5931	10	5
36	Screw M6X20 UNI 5931	10	5
61	Nut M14 UNI 5588	115	84

Tab. 9.54

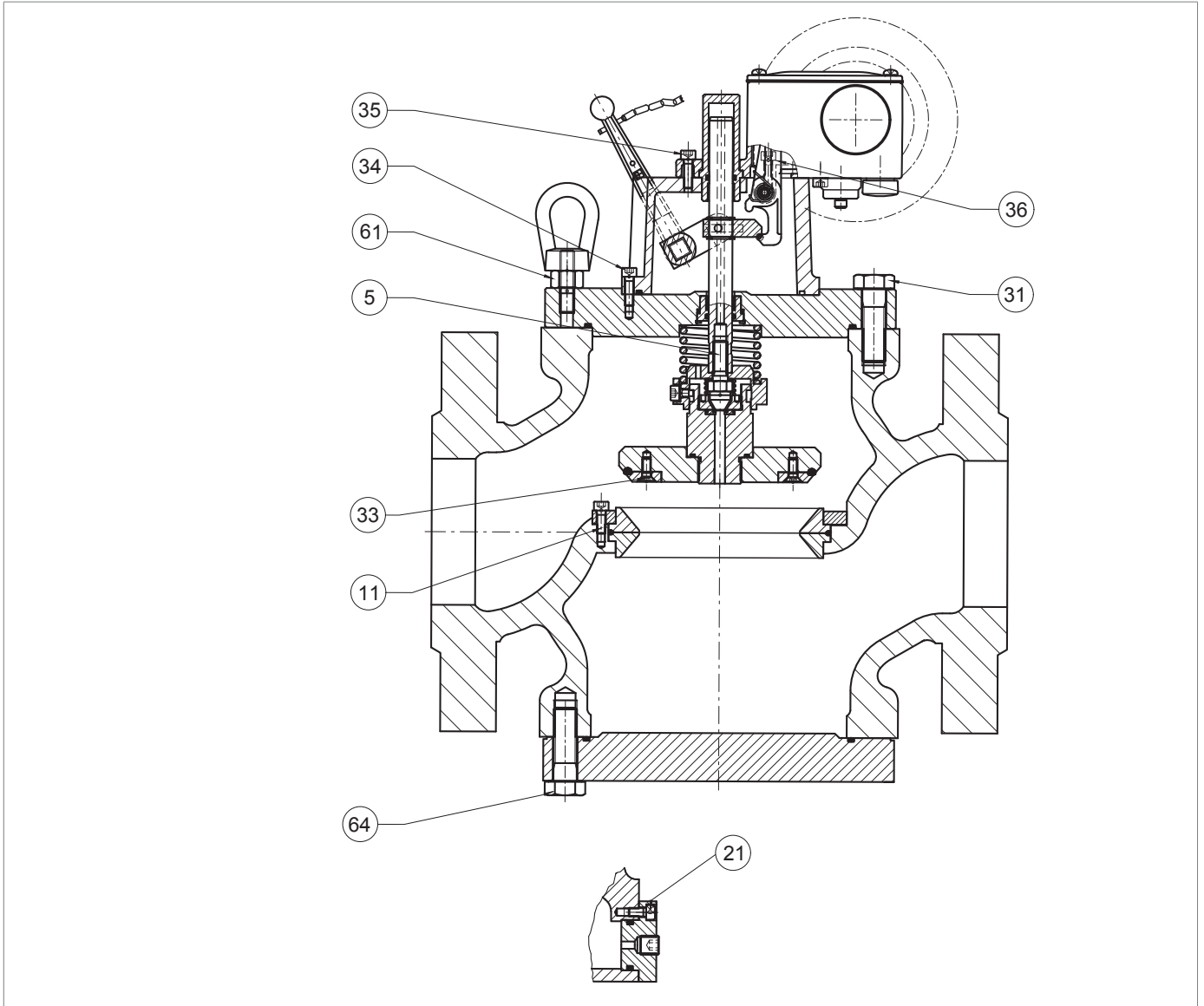


Fig. 9.21. Tightening torques SBC 782

<b>SBC 782 8"</b>			
<b>Pos.</b>	<b>Description</b>	<b>Torque (Nm)</b>	<b>Torque (ft - lb)</b>
5	Safety valve screw M10	40	29
10	Screw M14X55 UNI 5737	115	84
11	Screw M6X16 UNI 5931	10	5
33	Screw M6X10 UNI 5931	10	5
34	Screw M8X25 UNI 5931	20	14
35	Screw M6X40 UNI 5931	10	5
36	Screw M6X20 UNI 5931	10	5
61	Nut M14 UNI 5588	115	84

Tab. 9.55

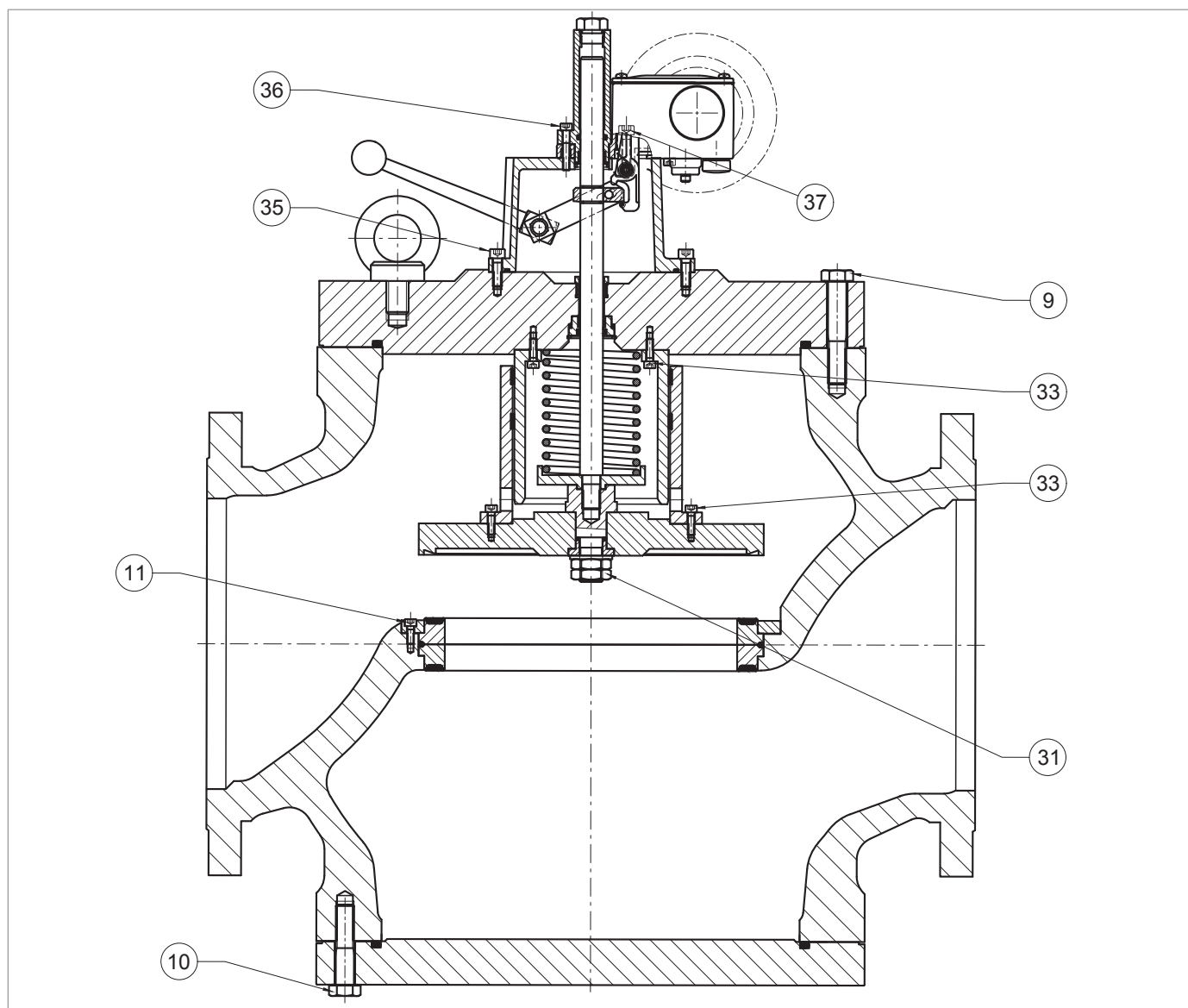


Fig. 9.22. Tightening torques SBC 782

### SBC 782 10"

Pos.	Description	Torque (Nm)	Torque (ft - lb)
9	Screw M16X90 UNI 5737	150	110
10	Screw M16X70 UNI 5737	150	110
11	Screw M6X16 UNI 5931	10	5
31	Nut M20 UNI 5589	250	184
33	Screw M6X20 UNI 5931	10	5
35	Screw M8X25 UNI 5931	20	14
36	Screw M6X35 UNI 5931	10	5
37	Screw M6X20 UNI 5931	10	5

Tab. 9.56

**9.4.1.2 - TIGHTENING TORQUES FOR PRESSURE SWITCHES MODELS 102M/102MH - 105M/105MH**

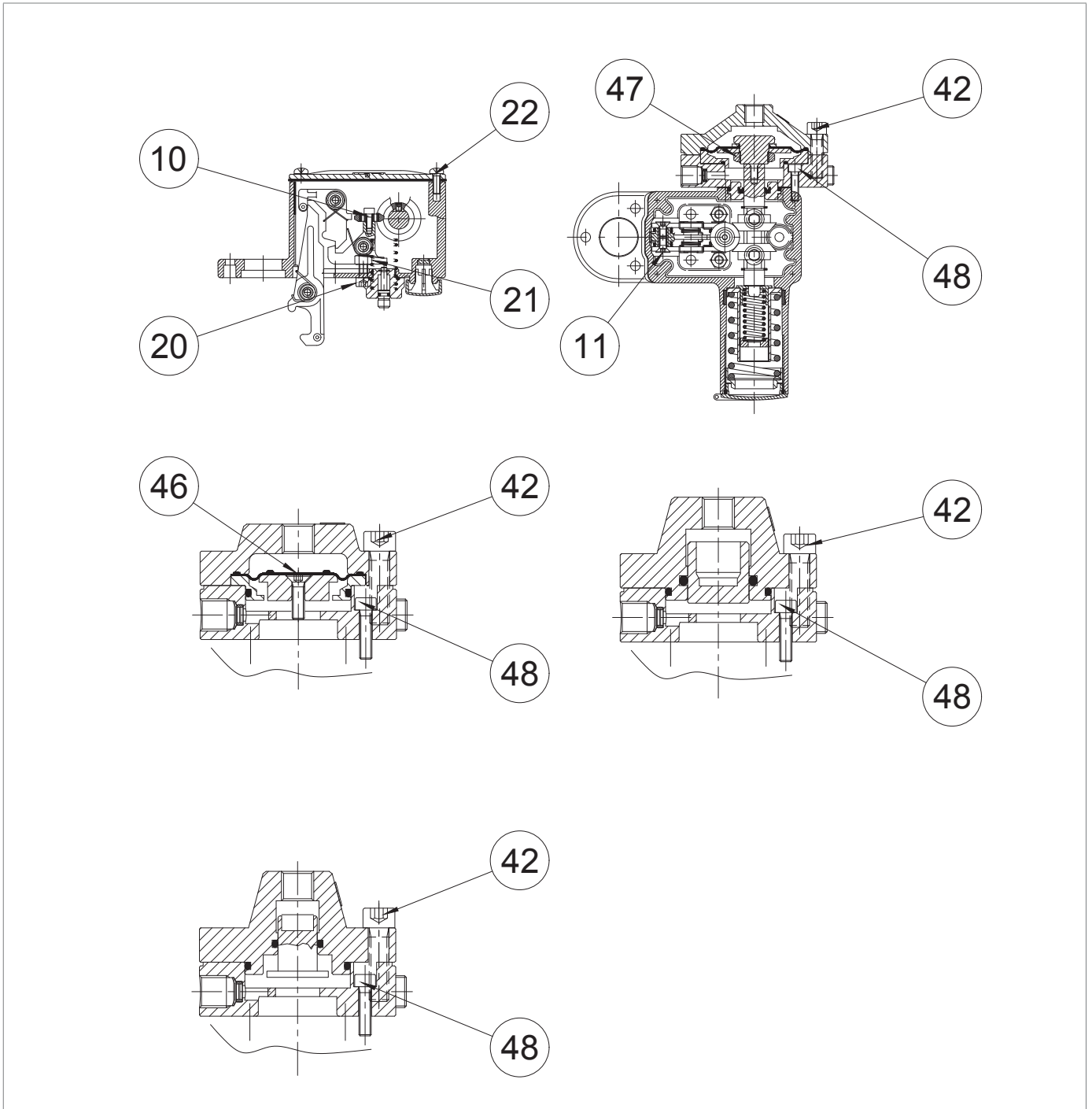


Fig. 9.23. Tightening torques for pressure switches models 102M/102MH - 105M/105MH

**MOD. 102M/102MH**

Pos.	Description	Torque (Nm)	Torque (ft - lb)
10	Screw M4X10 UNI 5931	3	2
11	Screw M5X10 UNI 5933	5	3
20	Screw M6X16 UNI 5931	10	7
21	Nut M6 UNI 5588	10	7
22	Screw M5X15 UNI 8112	5	3
42	Screw M6X25 UNI 5931	16	11
47	Nut M20X1	8	5
48	Screw M5X16 UNI 5931	5	3

*Tab. 9.57.*
**MOD. 103M/103MH**

Pos.	Description	Torque (Nm)	Torque (ft - lb)
10	Screw M4X10 UNI 5931	3	2
11	Screw M5X10 UNI 5933	5	3
20	Screw M6X16 UNI 5931	10	7
21	Nut M6 UNI 5588	10	7
22	Screw M5X15 UNI 8112	5	3
42	Screw M8X30 UNI 5931	16	11
46	Screw M5X18 UNI 5931	8	5
48	Screw M5X20 UNI 5931	5	3

*Tab. 9.58.*
**MOD. 104M/104MH - 105M/105MH**

Pos.	Description	Torque (Nm)	Torque (ft - lb)
10	Screw M4X10 UNI 5931	3	2
11	Screw M5X10 UNI 5933	5	3
20	Screw M6X16 UNI 5931	10	7
21	Nut M6 UNI 5588	10	7
22	Screw M5X15 UNI 8112	5	3
42	Screw M8X30 UNI 5931	16	11
48	Screw M5X20 UNI 5931	5	3

*Tab. 9.59.*



## 9.4.2 - REPLACING ELEMENTS SUBJECT TO WEAR AND ABRASION

### 9.4.2.1 - INITIAL OPERATIONS

#### ATTENTION!

Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

#### ATTENTION!

During assembly, make sure to tighten the screws as per the tables (tightening torques), according to the size for which maintenance is being carried out.

### 9.4.2.2 - CROSS DIAGRAM FOR TIGHTENING SCREWS

To tighten the screws, when required by the maintenance procedure, refer to the following diagram:

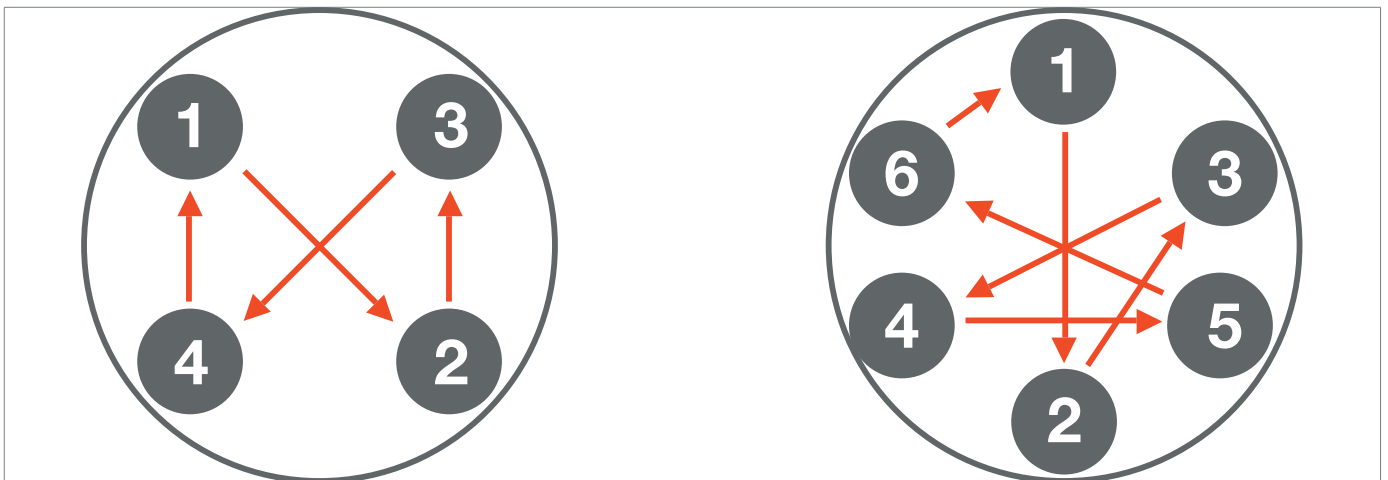


Fig. 9.24. Cross diagram

**9.4.3 - SLAM-SHUT VALVE MAINTENANCE PROCEDURE SBC 782**

**9.4.3.1 - SBC 782 1"**

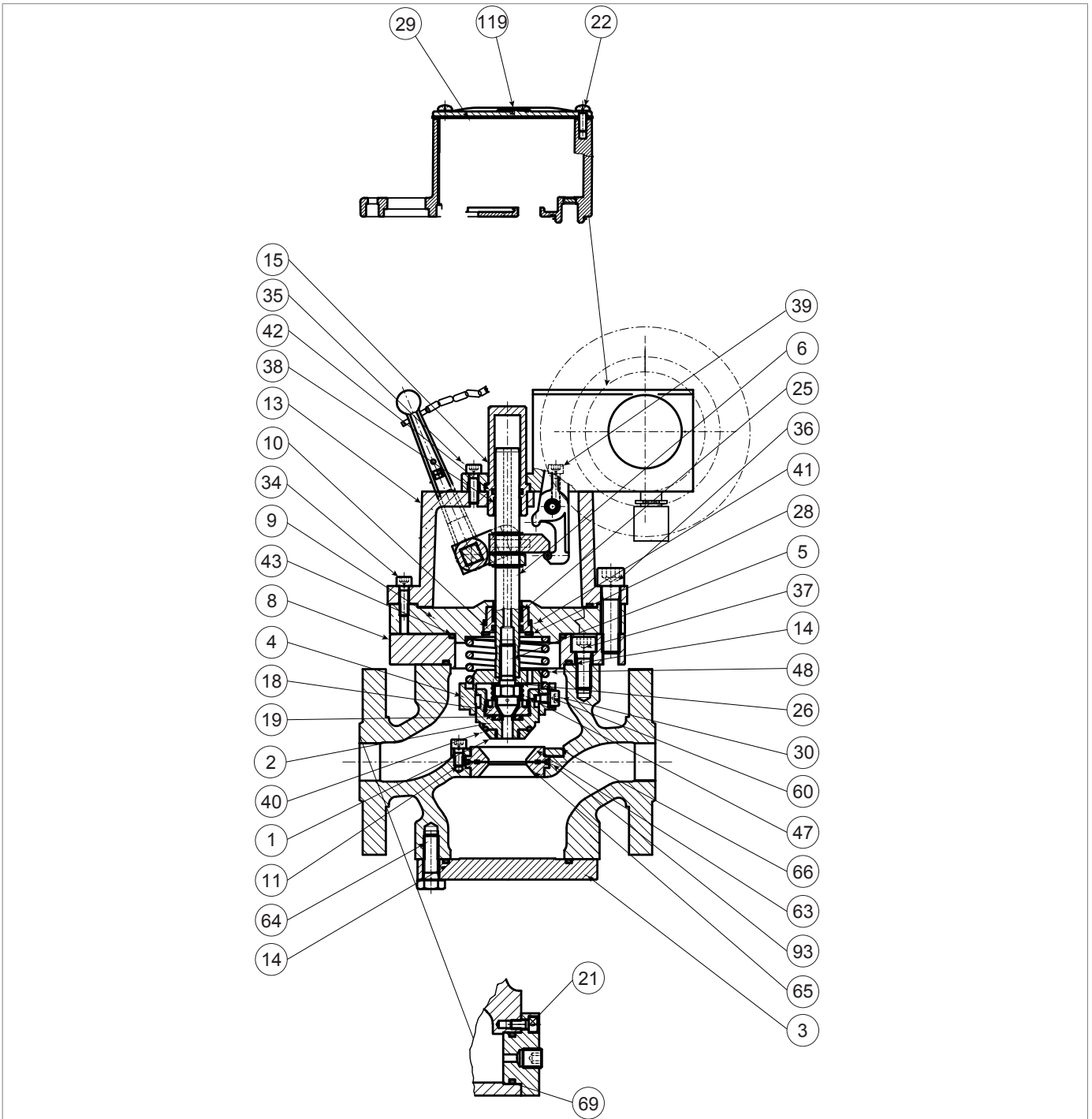
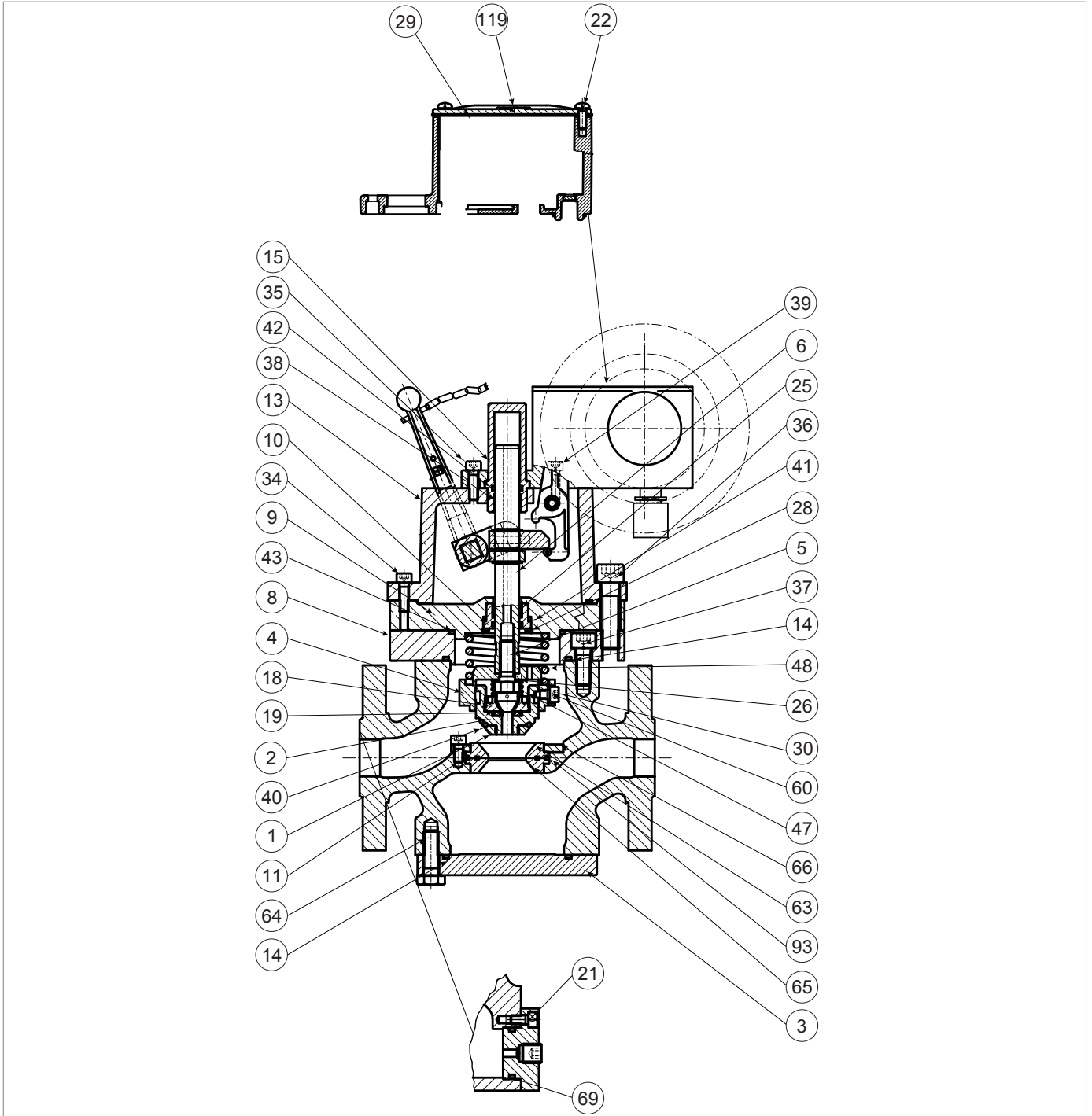









Fig. 9.25. SBC 782 1"

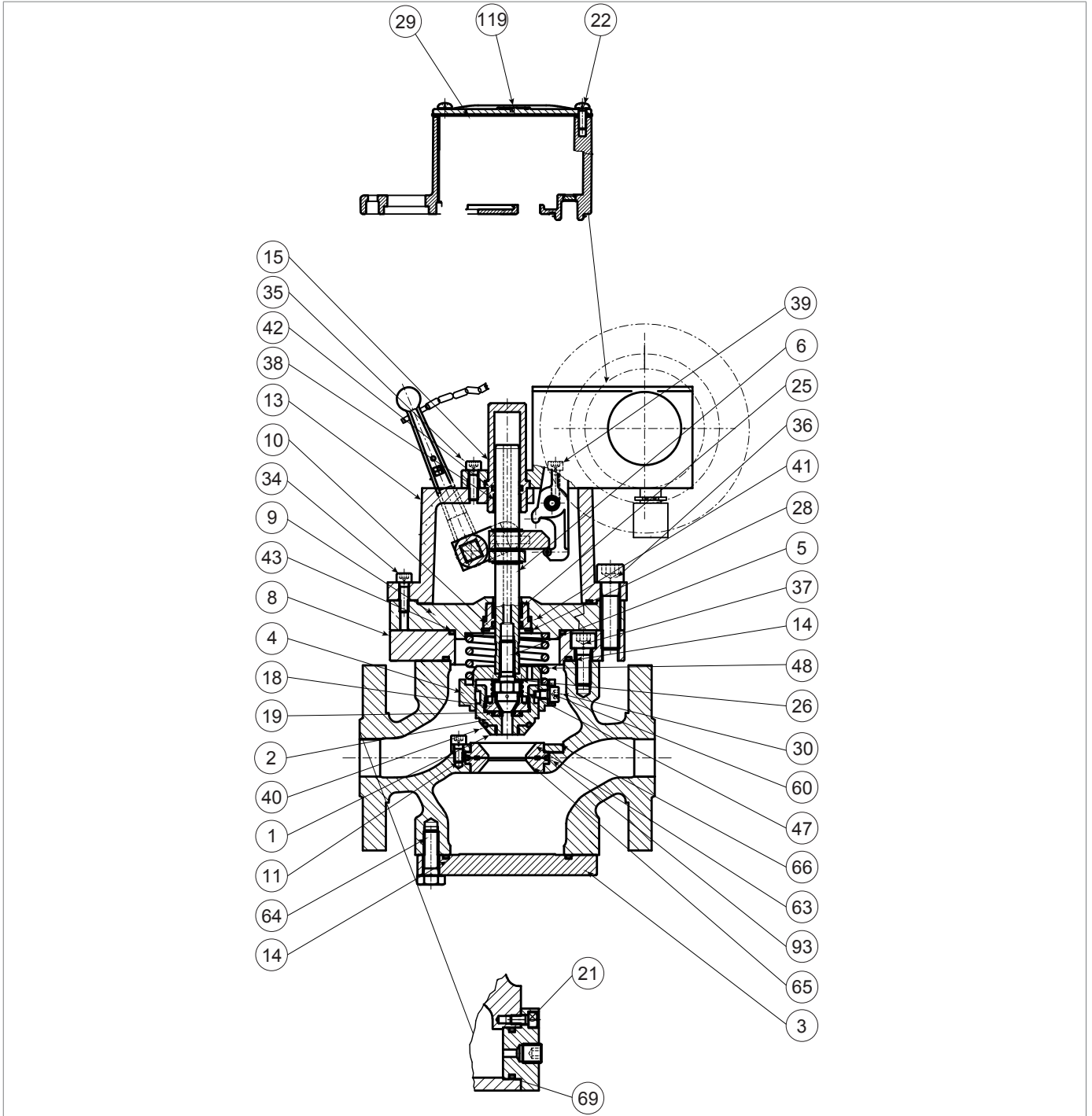


Step	Action
1	Unscrew and remove the screws (36), which secure the control head to the slam-shut valve body.
2	Unscrew and remove the screws (37) from the slam-shut valve body.
3	Remove the flange (8).
4	Remove the O-rings (43, 14) from the flange (8) and replace them, taking care to lubricate them with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.</b>
5	Unscrew and remove the screws (11) from the slam-shut valve body.
6	Remove the shaft collar (66).
7	Remove the conical seat (63), together with the ring (65) and O-ring (93).
8	Replace the O-ring (93) and lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
9	Fit the ring (65).
10	Position the O-ring (93).
11	Fit the conical seat (63).
12	Fit the locking collar (66).
13	Insert and fix the screws (11) according to the following tightening torque: • 1": Tab. 9.49 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "SBC 782 1"</b> .
14	Unscrew and remove the screws (30) from the plug unit.
15	Undo and remove the toothed washers (60).
16	Take out the plug unit (48, 4, 18, 1, 19, 40, 25, 2).
17	Remove the spring (48) and the spring support (4).
18	Unscrew and remove the ring nut (18). <b>NOTICE!</b> <b>Use the C key, "Tab. 7.31" of paragraph "7.1 - List of equipment"</b> .
19	Remove and replace the pad (19).
20	Position and secure the ring nut (18). <b>NOTICE!</b> <b>Use key C, "Tab. 7.31" of paragraph "7.1 - List of equipment"</b> .
21	Unscrew and remove the ring nut (1).
22	Remove the O-ring (40) from the plug (2) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
23	Position and secure the ring nut (1).



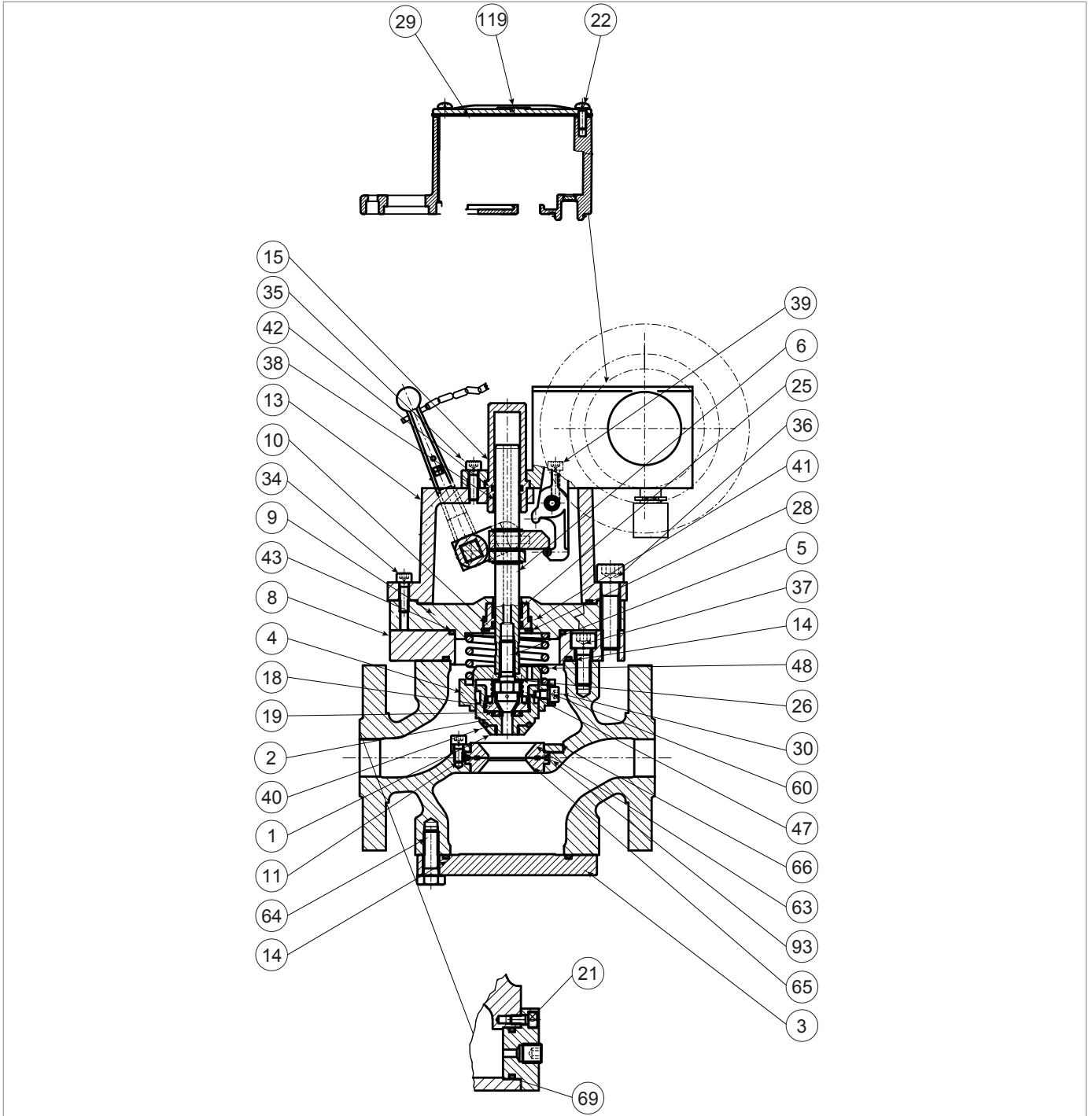
SBC 782 1"

Step	Action
24	Undo the plug screw (5).
25	Remove the washer (26).
26	Remove the spring (48) and the spring support (4).
27	Undo and remove the screws (22) of the pressure switch.
28	Remove the cover (119) together with the gasket (29).
29	Unscrew and remove the side screws (39) located inside the pressure switch.
30	Unscrew and remove the screws (35) from the pressure switch.
	Take out the pressure switch unit.
31	 <b>NOTICE!</b> <b>For the maintenance procedure of the pressure switch assembly, please refer to paragraph 9.4.4.</b>
32	Remove the cup (15).
	Remove the O-ring (42) from the cup (15) and replace it, taking care to lubricate it with synthetic grease.
33	 <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
	Remove the I/DWR ring (38) from the cup (15) and replace it, taking care to lubricate it with synthetic grease.
34	 <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
35	Unscrew and remove the screws (34) from the intermediate body (13).
36	Remove the intermediate body (13) from the flange (9).
37	Extract the stem (6) taking care not to damage it.
38	Remove the seeger ring (28) from the flange (9).
39	Remove the bush (10).
	Remove and replace the O-rings (41, 42) from the sleeve (10), lubricating them with synthetic grease.
40	 <b>NOTICE!</b> <b>Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.</b>
	Remove the I/DWR ring (25) from the bush (10) and replace it, taking care to lubricate it with synthetic grease.
41	 <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
	Fit the bush (10).
42	 <b>NOTICE!</b> <b>Take care not to damage the O-ring (41).</b>
43	Fit the seeger ring (28).
	Fit the stem (6).
44	 <b>NOTICE!</b> <b>Lubricate the stem surface with silicone grease.</b>
45	Fit the intermediate body (13).






SBC 782 1"

Step	Action
46	<p>Insert and fasten the screws (34) into the intermediate casing (13) according to the tightening torques:</p> <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
47	Fit the cup (15).
48	Fit the pressure switch unit.
49	<p>Insert and fix the screws (35) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
50	<p>Insert and fix the side screws (39) into the pressure switch according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
51	Fit the gasket (29) and the cover (119).
52	<p>Insert and fix the screws (22).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
53	Put the spring (48) and spring support (4) in place.
54	<p>Fit the washer (26).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Before inserting the screw (5), apply thread locking glue.</b></p> </div>
55	Insert and secure the plug screw (5).
56	Fit the spring (48).
57	Fit the plug unit.
58	<p>Insert the screws (30) together with the toothed washers (60).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Before inserting the screws (30), apply thread locking glue.</b></p> </div>
59	Fasten the screws (30), holding the shutter assembly to compress the spring (48) inside the shutter guide (90).
60	Place the flange (8) on the slam-shut valve body.
61	<p>Insert and fix the screws (37) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b></p> </div>



SBC 782 1"

Step	Action
62	Insert and fix the screws (36) according to the following tightening torque: <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b> </div>
63	Unscrew and remove the screws (64) from the lower flange (3).
64	Remove the lower flange (3).
65	Remove the O-ring (14) from the lower flange (3) and replace it, taking care to lubricate it with synthetic grease. <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b> </div>
66	Fit the lower flange (3).
67	Insert and fasten the screws (64) in the lower flange (3) according to the tightening torque: <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>

Tab. 9.60.

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

9.4.3.2 - SBC 782 2" - 3"

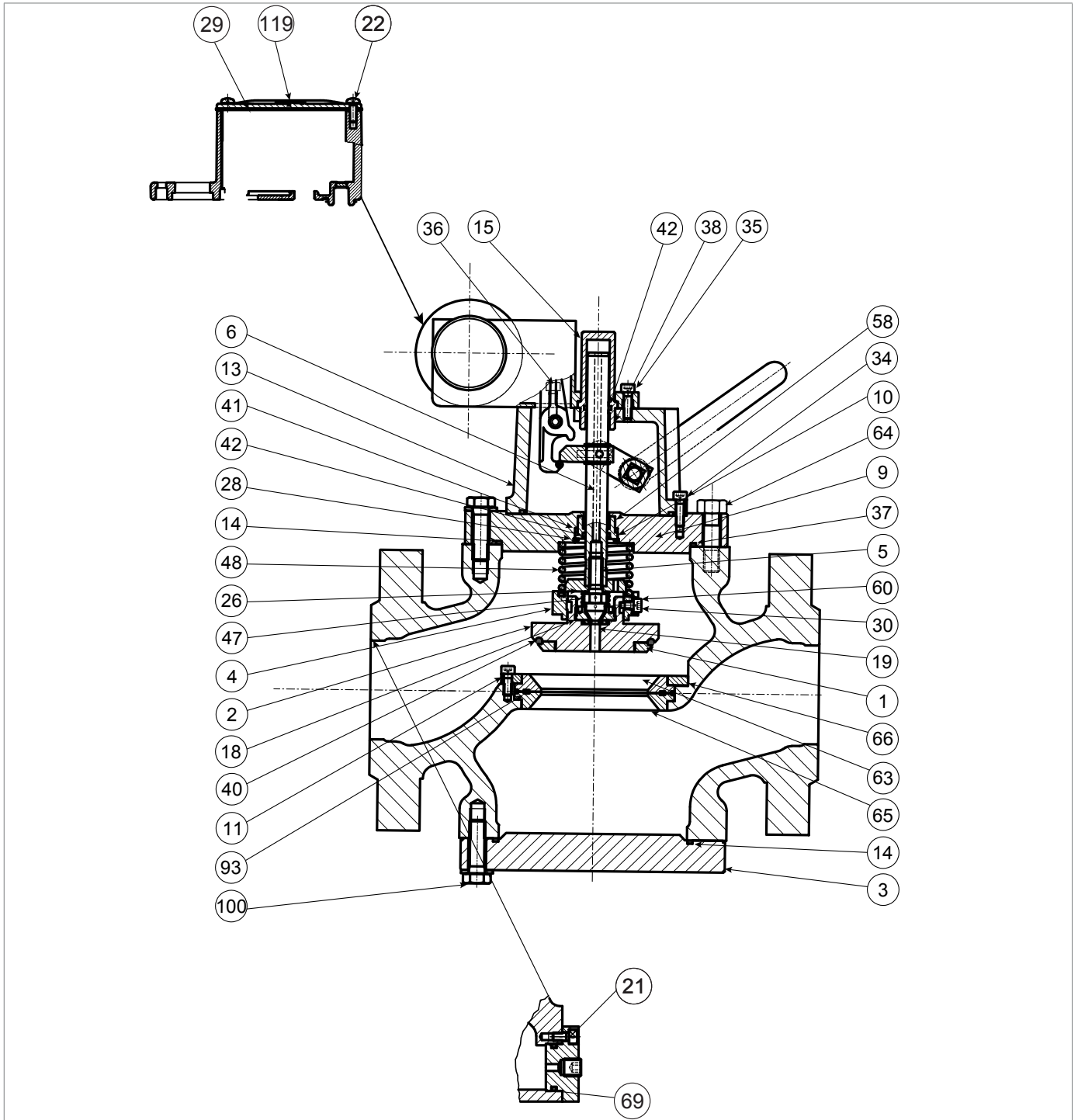
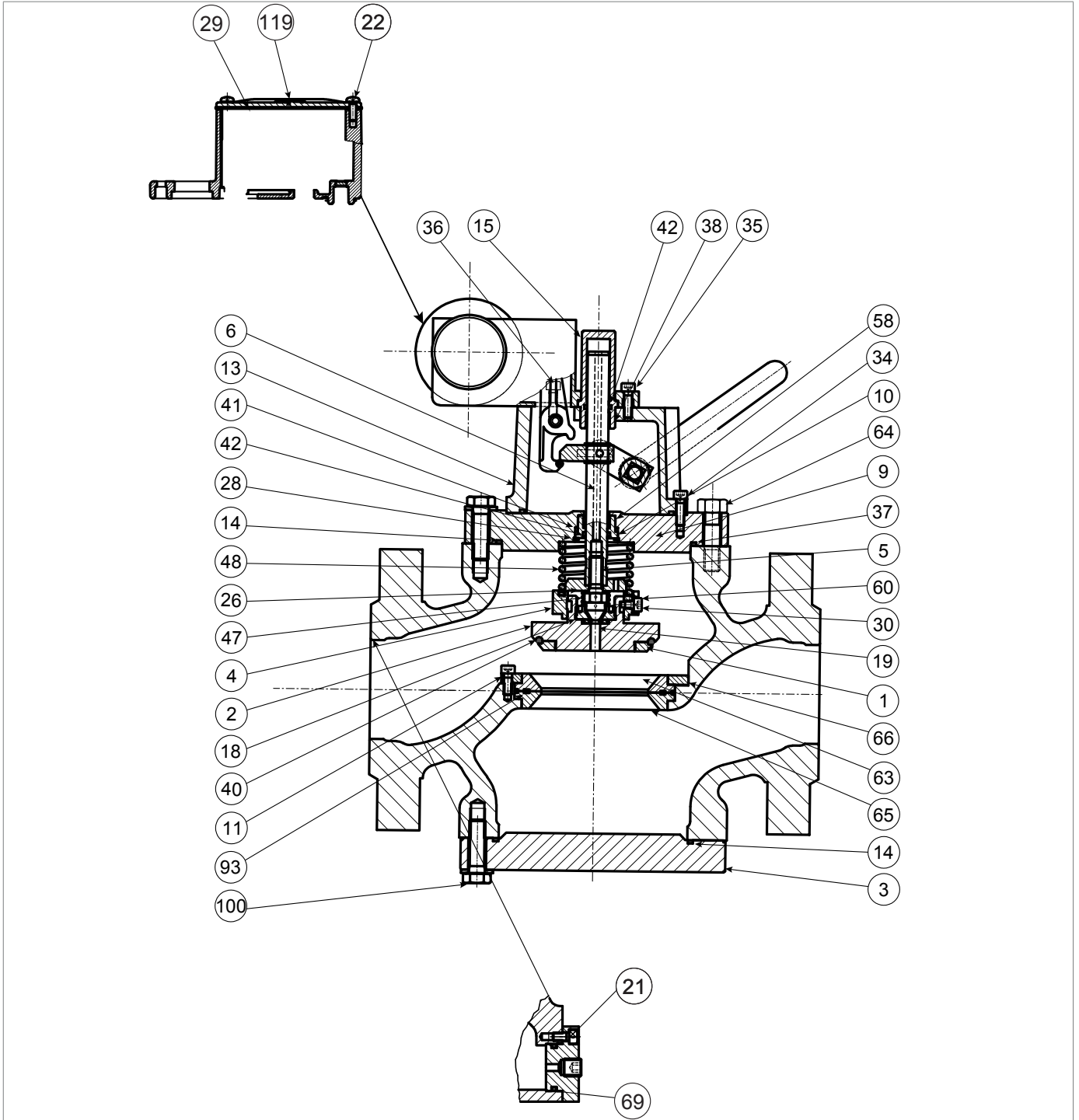









Fig. 9.26. SBC 782 2" - 3"

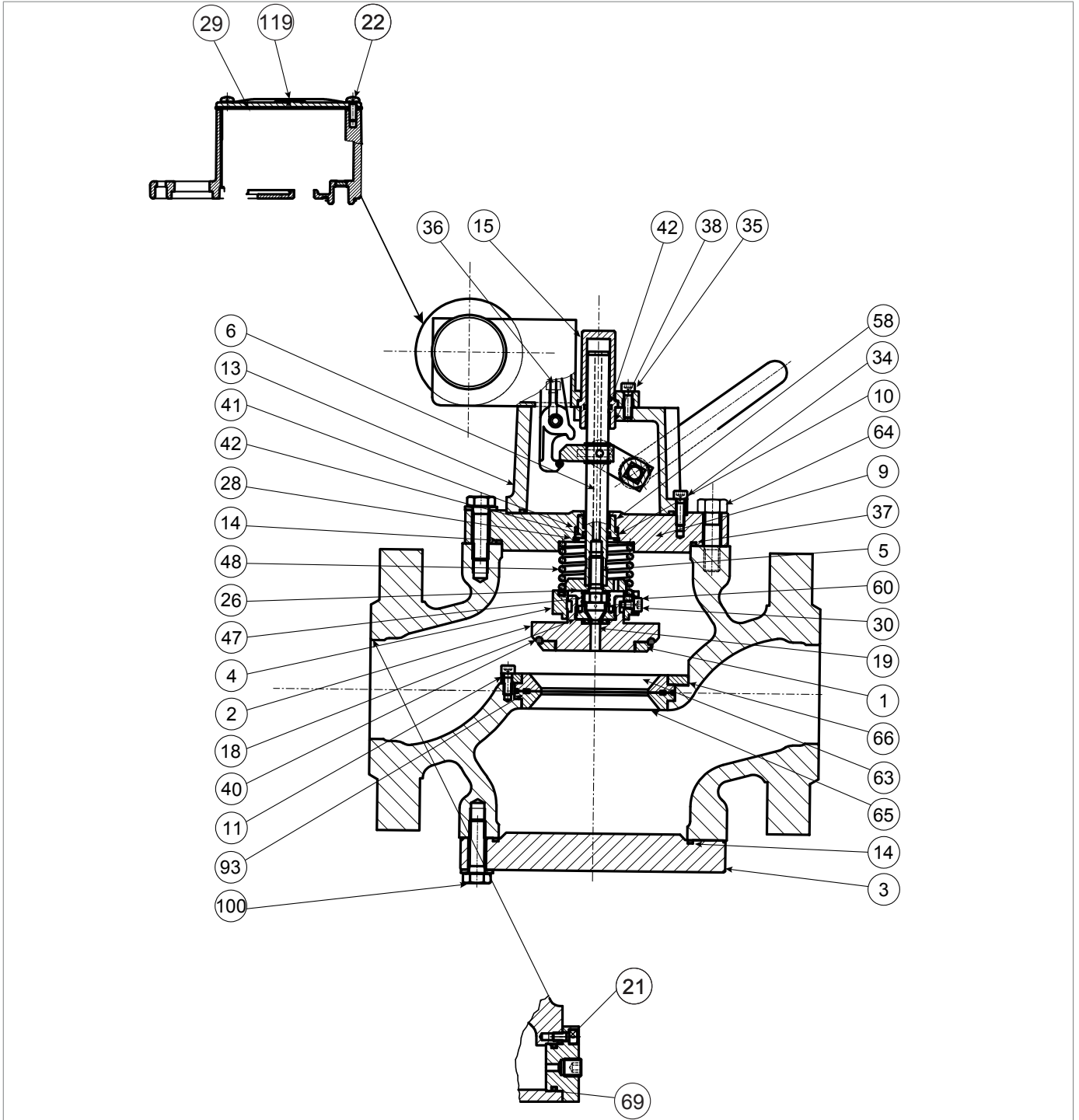


Step	Action
1	Unscrew and remove the upper screws (64) that secure the control head to the valve body.
2	Remove the O-ring (37, 14) from the flange (9) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Unscrew and remove the screws (11) from the slam-shut valve body.
4	Remove the shaft collar (66).
5	Remove the conical seat (63), together with the ring (65) and O-ring (93).
6	Replace the O-ring (93) and lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
7	Fit the ring (65).
8	Position the O-ring (93).
9	Fit the conical seat (63).
10	Fit the locking collar (66).
11	Insert and fix the screws (11) according to the following tightening torque: <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
12	Unscrew and remove the screws (30) together with the serrated washers (60).
13	Take out the plug unit (47, 4, 18, 1, 19, 40, 5, 2).
14	Remove the spring (47).
15	Unscrew and remove the ring nut (18). <b>NOTICE!</b> <b>Use key C, "Tab. 7.31" of paragraph "7.1 - List of equipment".</b>
16	Remove and replace the pad (19).
17	Position and secure the ring nut (18). <b>NOTICE!</b> <b>Use key C, "Tab. 7.31" of paragraph "7.1 - List of equipment".</b>
18	Unscrew and remove the ring nut (1).
19	Remove the O-ring (40) from the plug (2) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
20	Position and secure the ring nut (1).
21	Unscrew and remove the plug screw (5).
22	Remove the washer (26).
23	Remove the spring (48) and the spring support (4).



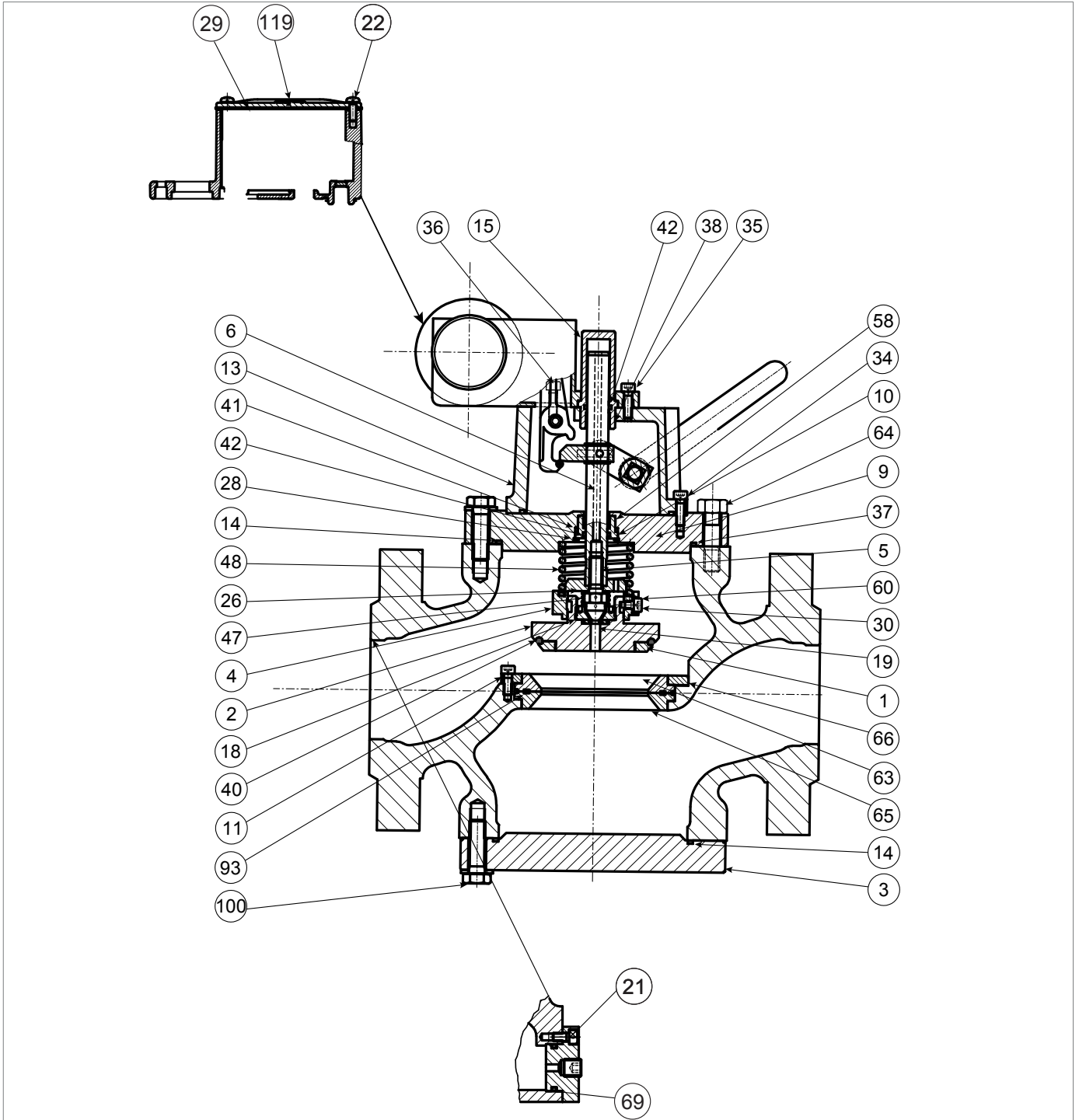
SBC 782 2" - 3"

Step	Action
24	Undo and remove the screws (22) of the pressure switch.
25	Remove the cover (119) together with the gasket (29).
26	Unscrew and remove the side screws (36) located inside the control pressure switch.
27	Undo and remove the outer screws (35).
	Take out the pressure switch unit.
28	 <b>NOTICE!</b> <b>For the maintenance procedure of the pressure switch assembly, please refer to paragraph 9.4.4.</b>
29	Remove the cup (15).
	Remove the O-ring (42) from the cup (15) and replace it, taking care to lubricate it with synthetic grease.
30	 <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
	Remove the I/DWR ring (38) from the cup (15) and replace it, taking care to lubricate it with synthetic grease.
31	 <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
32	Undo and remove the screws (34).
33	Remove the intermediate body (13).
34	Extract the stem (6) taking care not to damage it.
35	Remove the seeger ring (28) from the flange (9).
36	Remove the bush (10).
	Remove the O-ring (41) from the flange (9) and replace it, taking care to lubricate it with synthetic grease.
37	 <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
	Remove the O-ring (42) from the bush (10) and replace it, taking care to lubricate it with synthetic grease.
38	 <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
	Remove the I/DWR ring (25) from the bush (10) and replace it, taking care to lubricate it with synthetic grease.
39	 <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
40	Fit the valve seat (10), taking care not to damage the O-ring (41).
41	Place the seeger ring (28) in the flange (9).
	Place the stem (6) in the bush (10).
42	 <b>NOTICE!</b> <b>Lubricate the stem surface with silicone grease.</b>
43	Fit the intermediate body (13).






SBC 782 2" - 3"

Step	Action
44	<p>Insert and fix the screws (34) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
45	Fit the cup (15).
46	Fit the pressure switch unit.
47	<p>Insert and fix the screws (35) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b></p> </div>
48	<p>Insert and fix the side screws (36) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
49	Fit the gasket (29) together with the cover (119).
50	<p>Insert and fix the screws (22).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b></p> </div>
51	Put the spring (48) and spring support (4) in place.
52	Fit the washer (26).
53	<p>Insert and secure the plug screw (5).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Apply threadlocking glue.</b></p> </div>
54	Fit the spring (47).
55	Fit the plug unit.
56	<p>Insert the screws (30) together with the toothed washers (60).</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Before inserting the screw (30), apply thread locking glue.</b></p> </div>



SBC 782 2" - 3"

Step	Action
57	Insert and fix the screws (64) according to the following tightening torque: <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <div style="border: 1px solid blue; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>
58	Unscrew and remove the screws (100) from the lower flange (3).
59	Remove the lower flange (3).
60	Remove the O-ring (14) from the lower flange (3) and replace it, taking care to lubricate it with synthetic grease. <div style="border: 1px solid blue; padding: 5px;">  <b>NOTICE!</b>  <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b> </div>
61	Fit the lower flange (3).
62	Insert and fasten the screws (100) in the lower flange (3) according to the tightening torque: <ul style="list-style-type: none"> <li>• 2": Tab. 9.50</li> <li>• 2" ½: Tab. 9.51</li> <li>• 3": Tab. 9.52</li> </ul> <div style="border: 1px solid blue; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>

Tab. 9.61

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

**9.4.3.3 - SBC 782 4" - 8"**

VALID FOR 6" - 8"

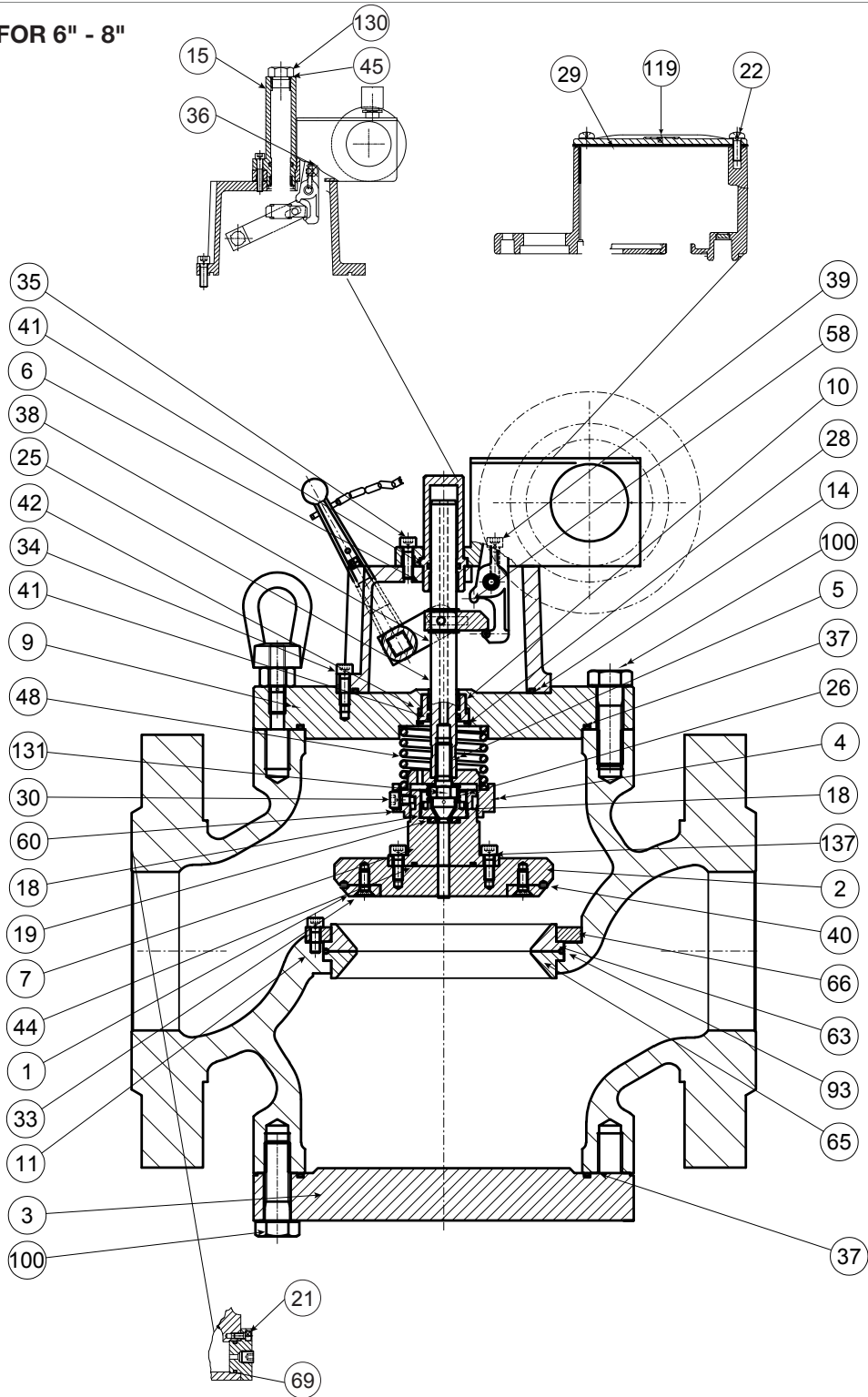
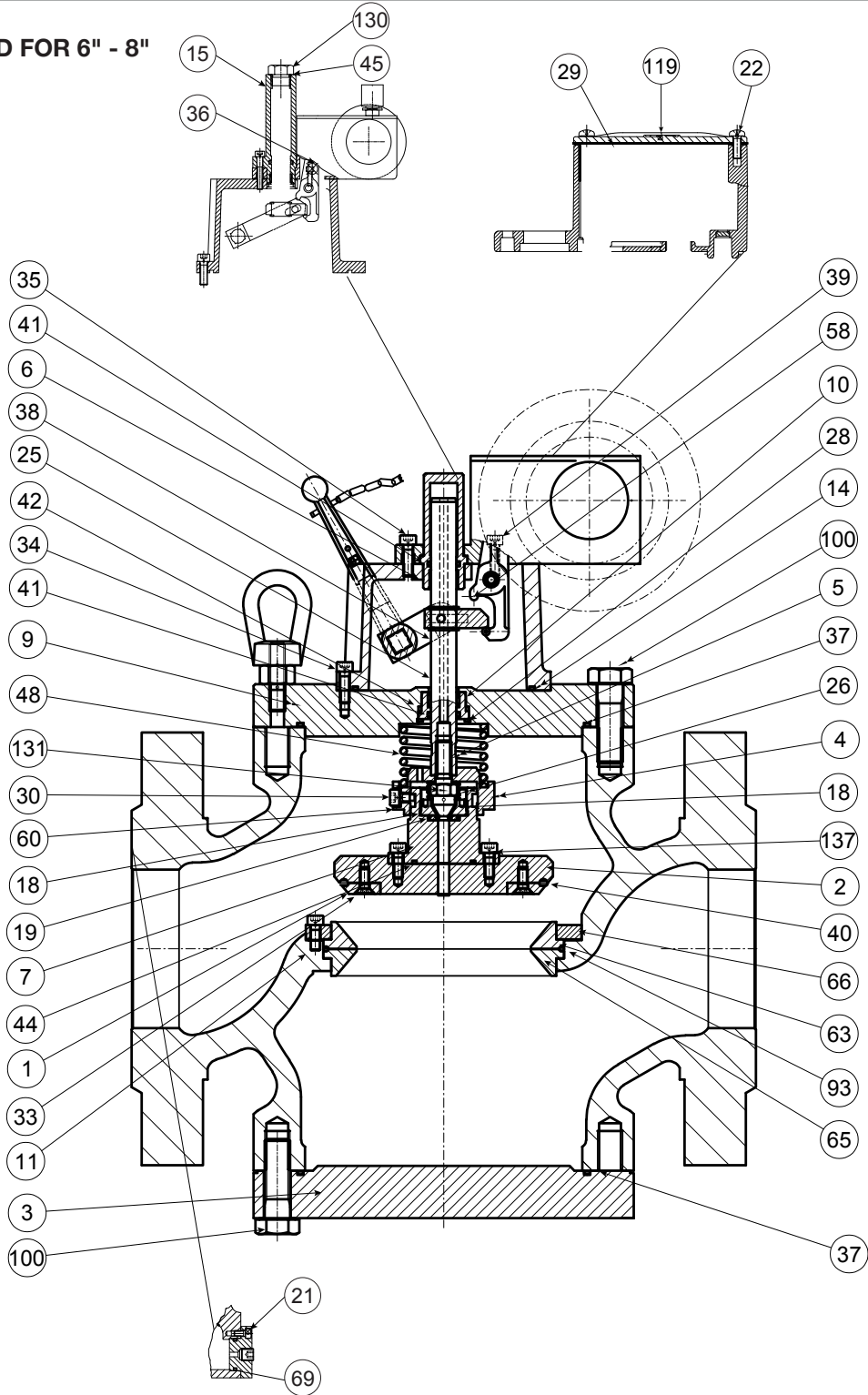


Fig. 9.27. SBC 782 4" - 8"



Step	Action
1	Unscrew and remove the screws (31) securing the control head to the regulator body.
2	Remove the O-ring (37, 14) from the flange (9) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Unscrew and remove the screws (11) from the slam-shut valve body.
4	Remove the shaft collar (66).
5	Remove the conical seat (63), together with the ring (65) and O-ring (93).
6	Replace the O-ring (93) from the valve seat (63), taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
7	Fit the ring (65).
8	Position the O-ring (93).
9	Fit the conical seat (63).
10	Fit the locking collar (66).
11	Insert and fix the screws (11) according to the following tightening torques: <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <b>! NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
12	Undo the screws (30) together with the toothed washers (32).
13	Take out the plug unit.
14	Remove the spring (47).
15	Unscrew and remove the ring nut (18). <b>! NOTICE!</b> <b>Use key C, "Tab. 7.31" of paragraph "7.1 - List of equipment".</b>
16	Remove and replace the pad (19).
17	Position and secure the ring nut (18). <b>! NOTICE!</b> <b>Use key C, "Tab. 7.31" of paragraph "7.1 - List of equipment".</b>
18	Undo and remove the screws (137).
19	Remove the O-ring (44) from the plug support (7) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
20	Undo the screws (33).
21	Remove the ring nut (1).

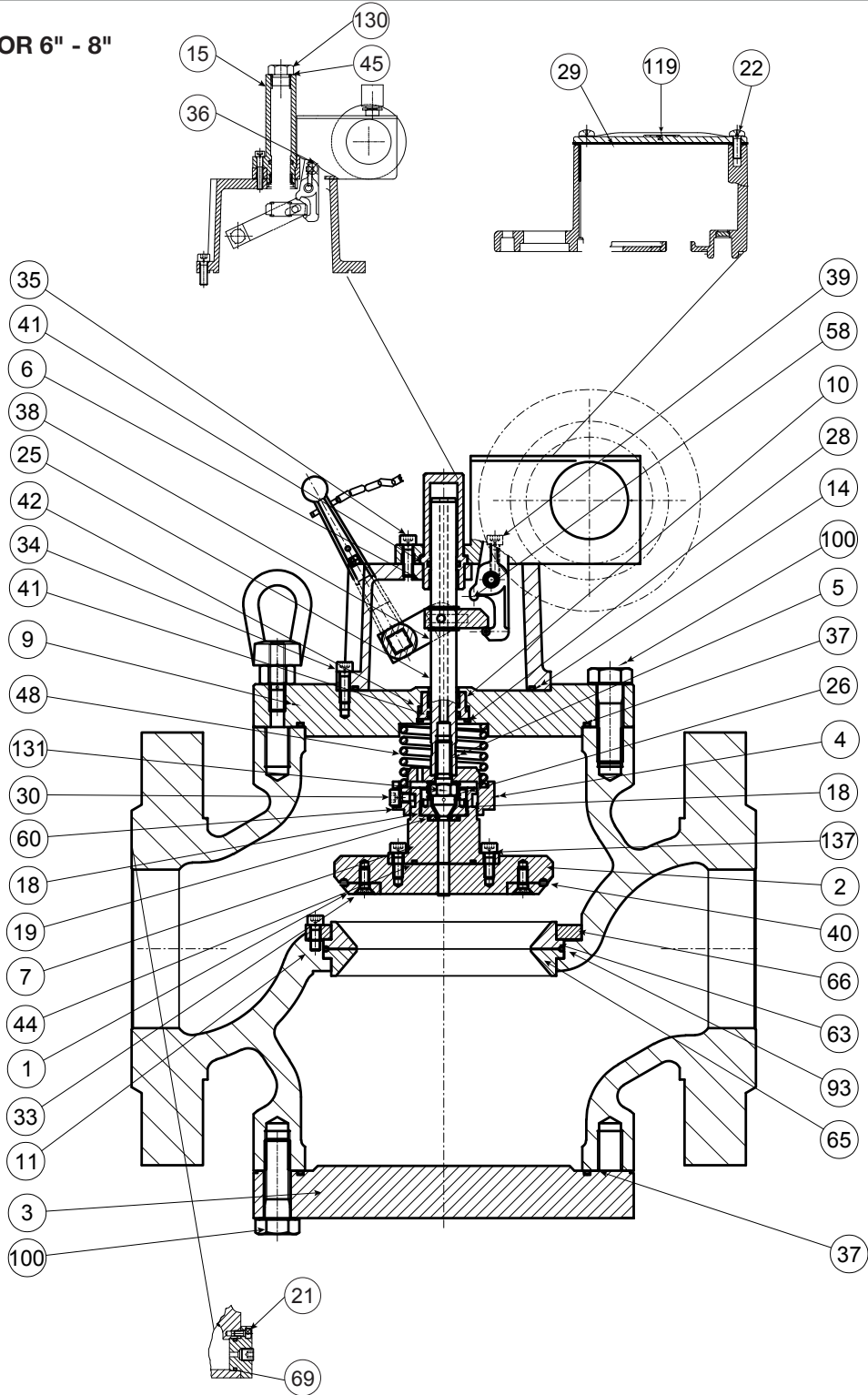
VALID FOR 6" - 8"



SBC 782 4" - 8"

Step	Action
22	Remove the O-ring (40) from the plug (2) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
23	Fit the ring nut (1).
24	Insert and fix the screws (33) according to the following tightening torques: <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <b>! NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b>
25	Place the plug (2) on the plug support (7).
26	Insert and fix the screws (137) according to the following tightening torques: <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <b>! NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b>
27	Unscrew and remove the plug screw (5).
28	Remove the washer (26).
29	Remove the spring (48) and the spring support (4).
30	Unscrew and remove the nut (131).
31	Undo and remove the screws (22) of the pressure switch.
32	Remove the cover (119) and the gasket (29).
33	Undo the side screws (36) inside the control pressure switch.
34	Undo the screws (35).
35	Remove the cup (15).
36	Remove the O-ring (41) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
37	Remove the I/DWR ring (38) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
38	<b>ONLY VALID FOR 6" - 8"</b> Remove the cap (130).
39	<b>ONLY VALID FOR 6" - 8"</b> Remove the O-ring (45) from the cap (130) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
40	Remove the seeger ring (58) from the cup (15).

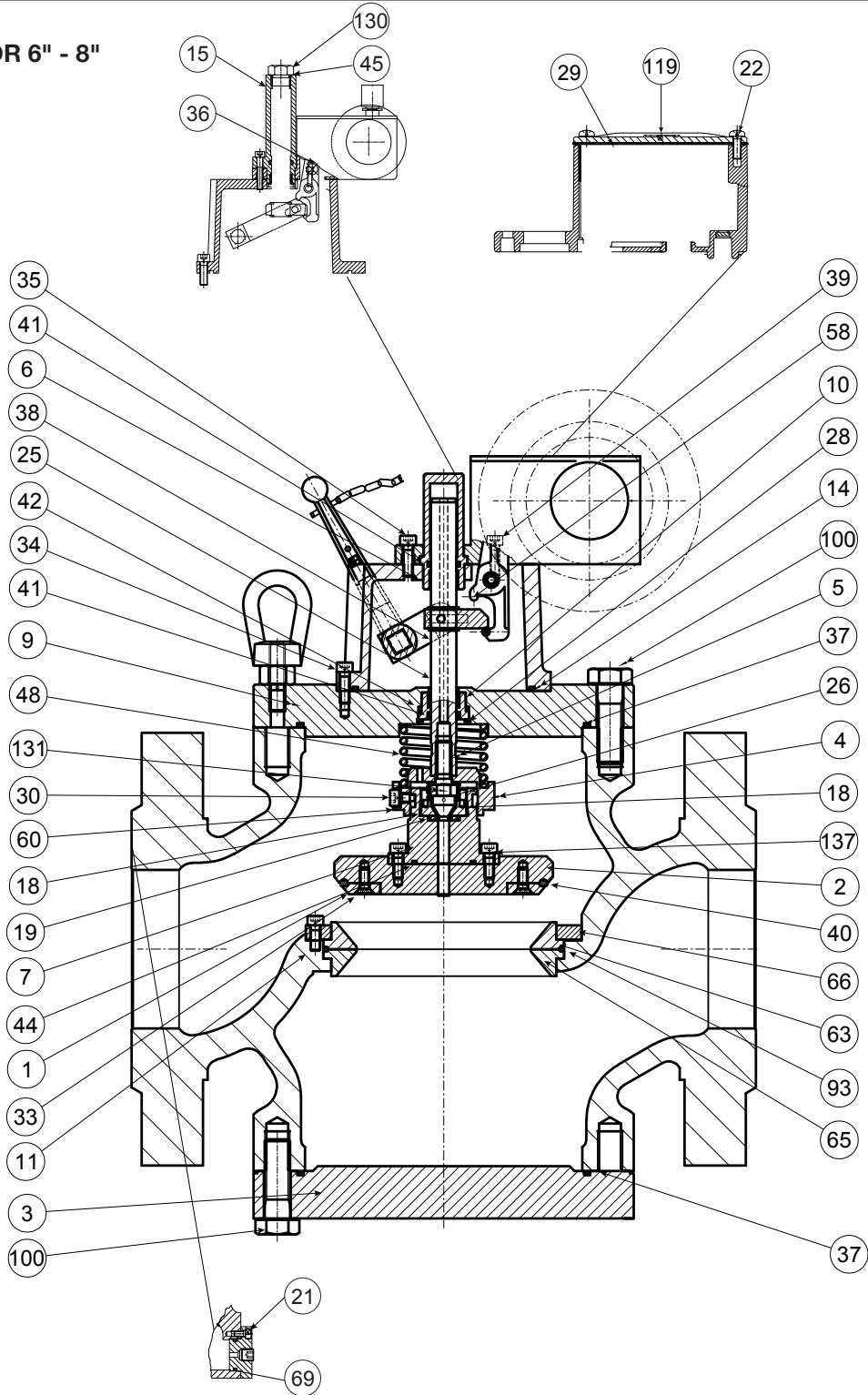
VALID FOR 6" - 8"








SBC 782 4" - 8"

Step	Action
41	Remove the I/DWR ring (25) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before fitting the replacement I/DWR ring, clean the retaining slots using a cleaning solution.</b>
42	Place the seeger ring (58) in the cup (15).
43	Take out the pressure switch unit. <b>NOTICE!</b> <b>For the maintenance procedure of the pressure switch assembly, please refer to paragraph 9.4.4.</b>
44	Undo and remove the screws (34).
45	Remove the intermediate body (13).
46	Remove the seeger ring (28) from the flange (9).
47	Remove the bush (10).
48	Remove the O-ring (41) from the flange (9) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
49	Remove the O-ring (42) from the bush (10) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
50	Remove the I/DWR ring (25) from the bush (10) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before fitting the replacement I/DWR ring, clean the retaining slots using a cleaning solution.</b>
51	Fit the valve seat (10), taking care not to damage the O-ring (41).
52	Place the seeger ring (28) in the flange (9).
53	Place the stem (6) in the bush (10). <b>NOTICE!</b> <b>Lubricate the stem surface with silicone grease.</b>
54	Fit the intermediate body (13).
55	Insert and fix the screws (34) according to the following tightening torques: <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b>
56	Fit the pressure switch unit.
57	Fit the cup (15).

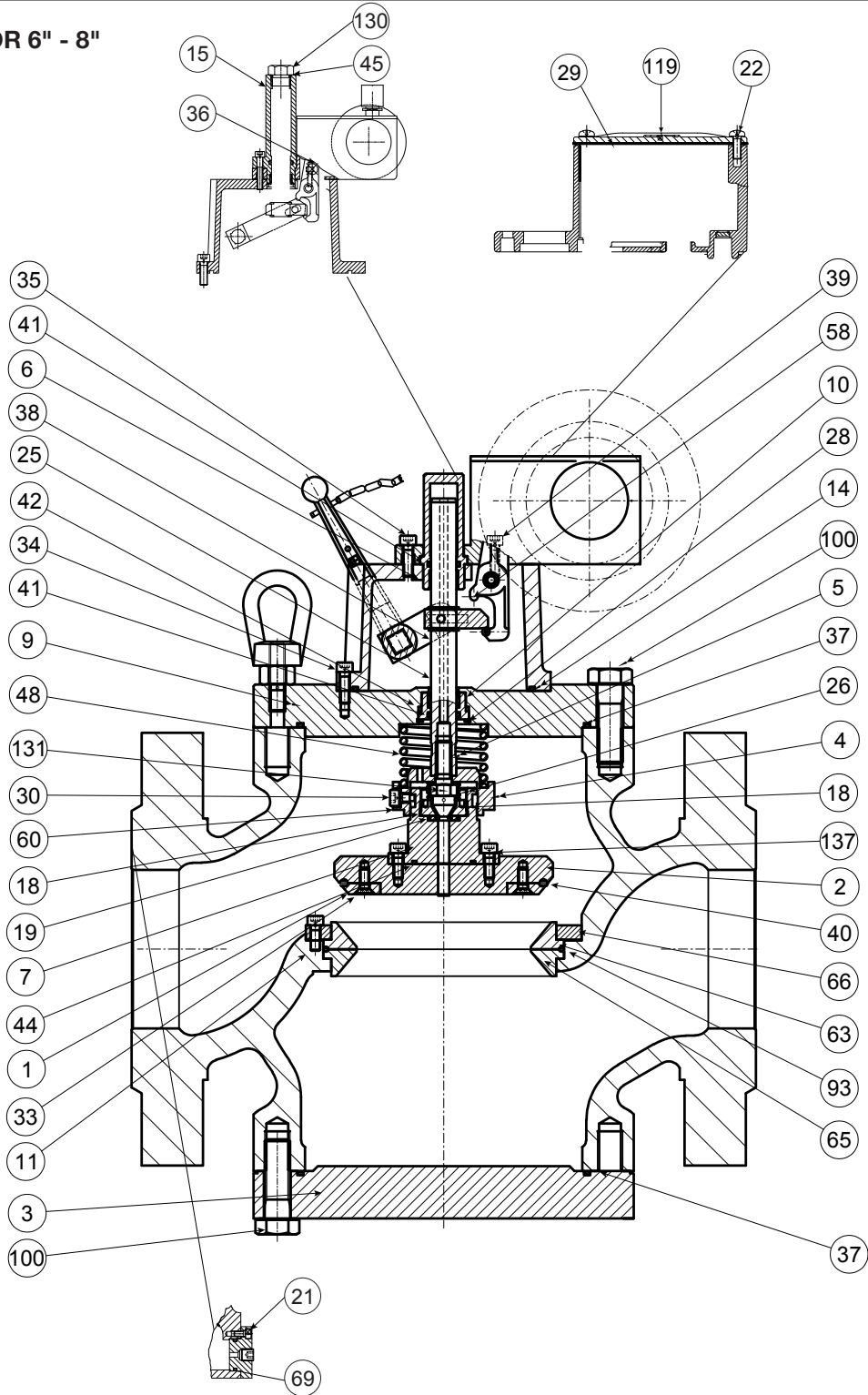
VALID FOR 6" - 8"



SBC 782 4" - 8"



Step	Action
58	<p>Insert and fix the screws (35) according to the following tightening torques:</p> <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>
59	<p>Insert and fix the side screws (36) into the pressure switch according to the following tightening torques:</p> <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>
60	<p><b>ONLY VALID FOR 6"- 8"</b> Fit and secure the cap (130).</p>
61	Fit the gasket (29) and the cover (119).
62	<p>Insert and fix the screws (22).</p> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>
63	Insert and fix the screws (131).
64	Put the spring (48) and spring support (4) in place.
65	Fit the washer (26).
66	Insert and secure the plug screw (5), applying threadlocking glue
67	Fit the spring (47).
68	Fit the plug unit.
69	<p>Insert the screws (30) together with the toothed washers (60).</p> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Before inserting the screw (30), apply thread locking glue.</b> </div>
70	Fasten the screws (30), holding the shutter assembly to compress the spring (48) inside the shutter guide (90).
71	<p>Insert and fix the screws (31) according to the following tightening torque:</p> <ul style="list-style-type: none"> <li>• 4": Tab. 9.53</li> <li>• 6": Tab. 9.54</li> <li>• 8": Tab. 9.55</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>
72	Unscrew and remove the screws (100) from the lower flange (3).
73	<p><b>ONLY VALID FOR 6"- 8"</b> Remove washers (101)</p>
74	Remove the lower flange (3).

VALID FOR 6" - 8"



SBC 782 4" - 8"



Step	Action
75	Remove the O-ring (14) from the lower flange (3) and replace it, taking care to lubricate it with synthetic grease. <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b> </div>
76	Fit the lower flange (3).
77	<b>ONLY VALID FOR 6" - 8"</b> Position the washers (101).
78	Insert and fasten the screws (100) in the lower flange (3) according to the tightening torque: <ul style="list-style-type: none"> <li>• 1": Tab. 9.49</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>

Tab. 9.62

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

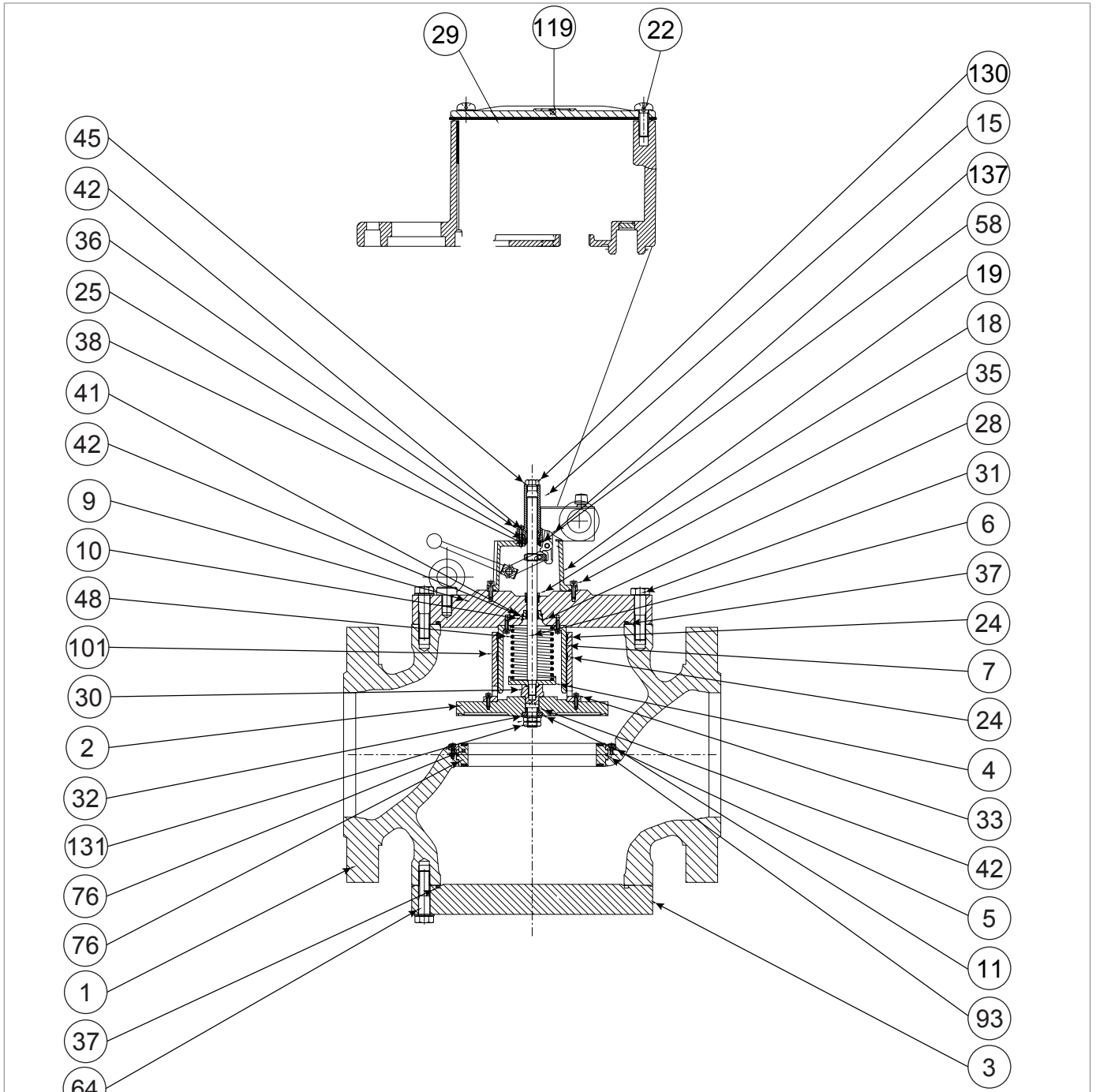
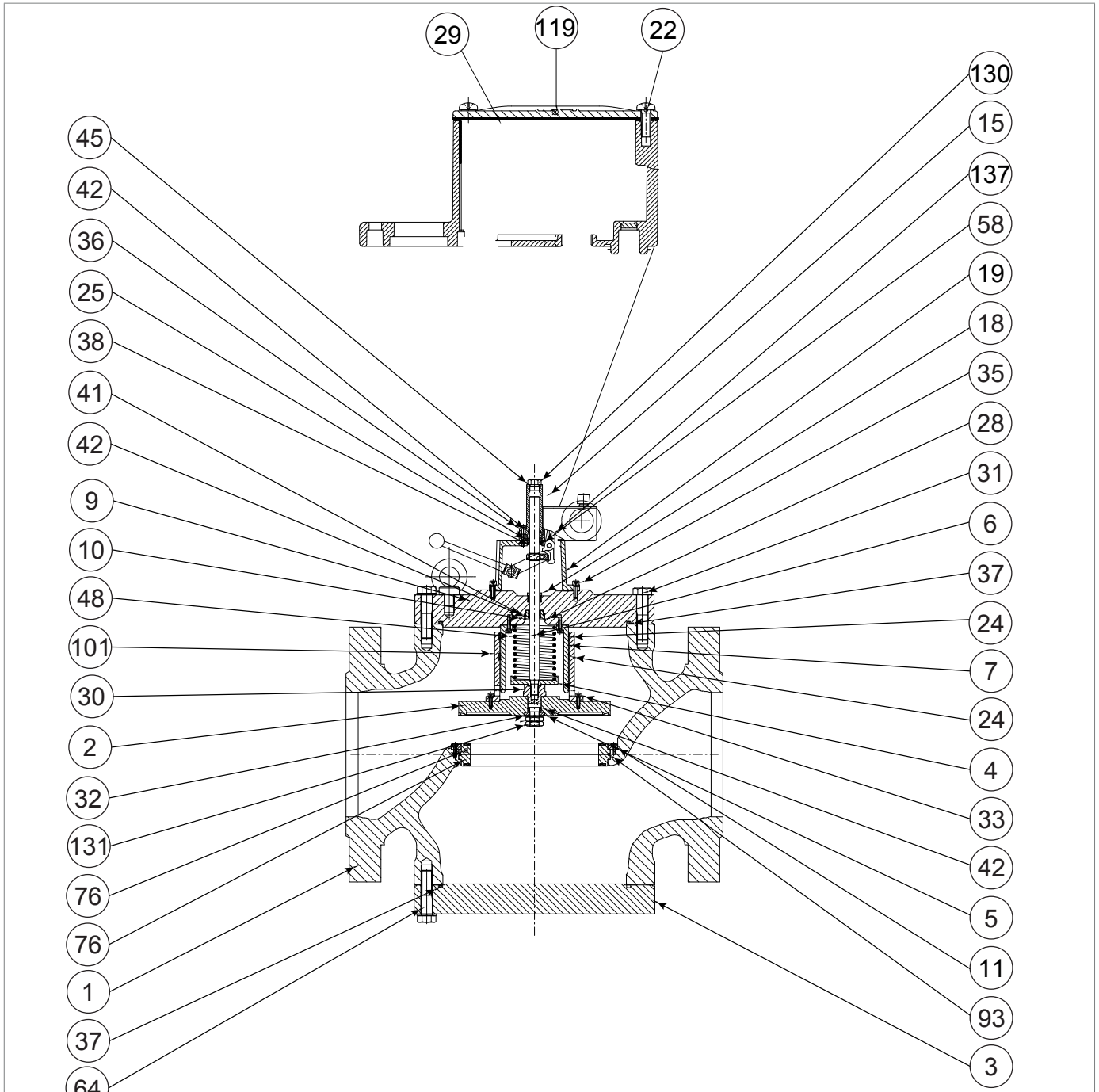


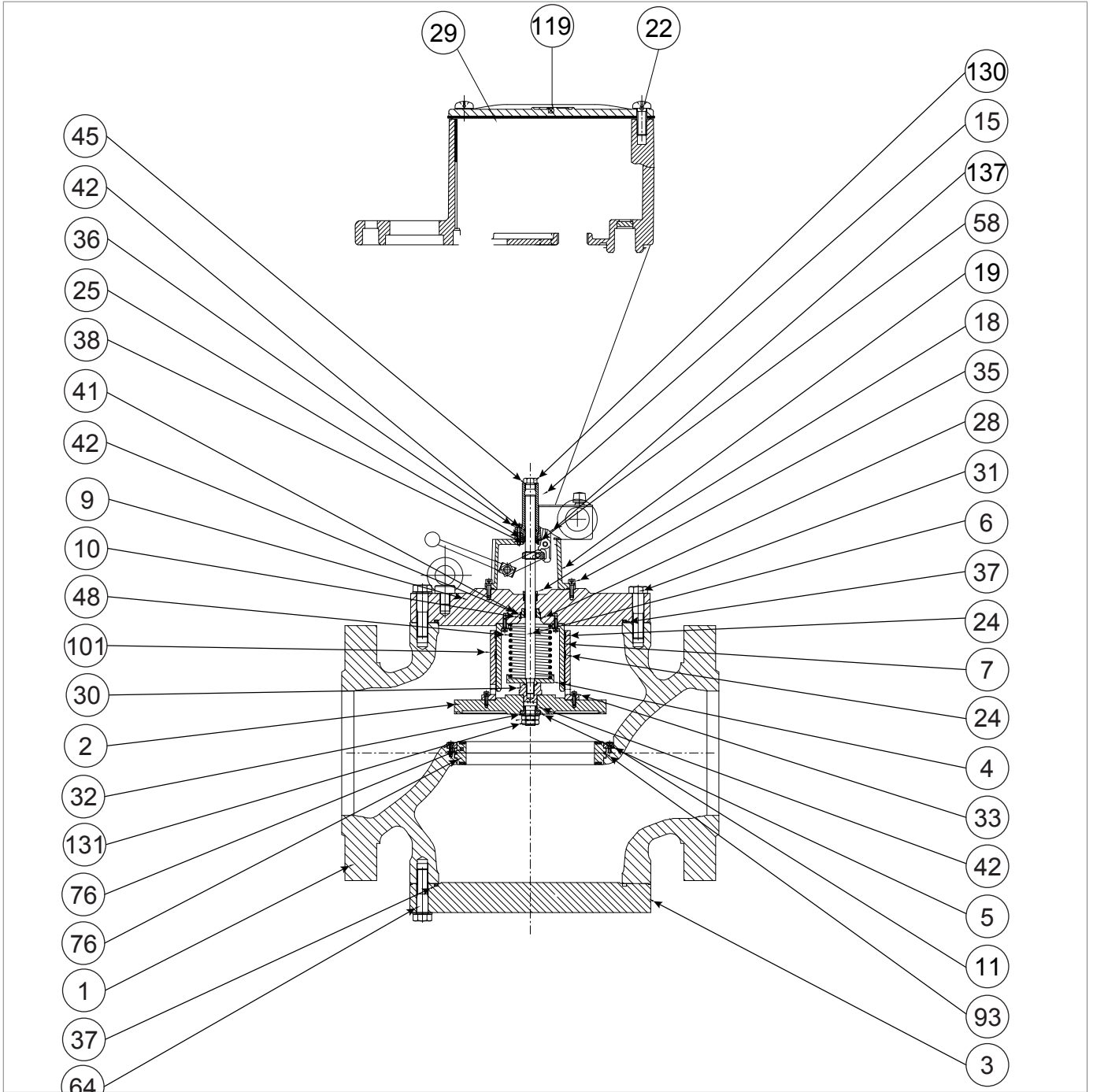
Fig. 9.28. SBC 782 10"

Step	Action
1	Unscrew and remove the screws (31) securing the control head to the regulator body.
2	Remove the O-ring (37) from the flange (9) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Unscrew and remove the screws (11) from the slam-shut valve body.
4	Remove the shaft collar (66).
5	Remove the upper (76) and lower (76) reinforced gasket together with the O-ring (93).
6	Replace the O-ring (93) and lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
7	Fit the reinforced gasket (65).
8	Position the O-ring (93).
9	Fit the reinforced gasket (63).
10	Fit the locking collar (66).
11	Insert and fix the screws (11) according to the following tightening torque: • 10": Tab. 9.56 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
12	Unscrew and remove the nuts (131) together with the washer (32).
13	Remove the plug (2) together with the plug sleeve (101) and the bush (5).
14	Pull the sleeve (5) out of the plug (2).
15	Remove the O-ring (42) from the bush (5) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
16	Undo and remove the screws (33).
17	Separate the plug (2) from the plug sleeve (101).
18	Remove the I/DWR rings (24) from the plug sleeve (101) and replace them, taking care to lubricate them with silicone grease. <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
19	Unscrew and remove the extension (30) from the stem (6). <b>NOTICE!</b> <b>During this phase, keep the stem (6) still.</b>
20	Remove the spring (48) and the spring support (4).
21	Undo and remove the screws (22) of the pressure switch.
22	Remove the cover (119) and the gasket (29).
23	Undo the side screws (137) inside the control pressure switch.



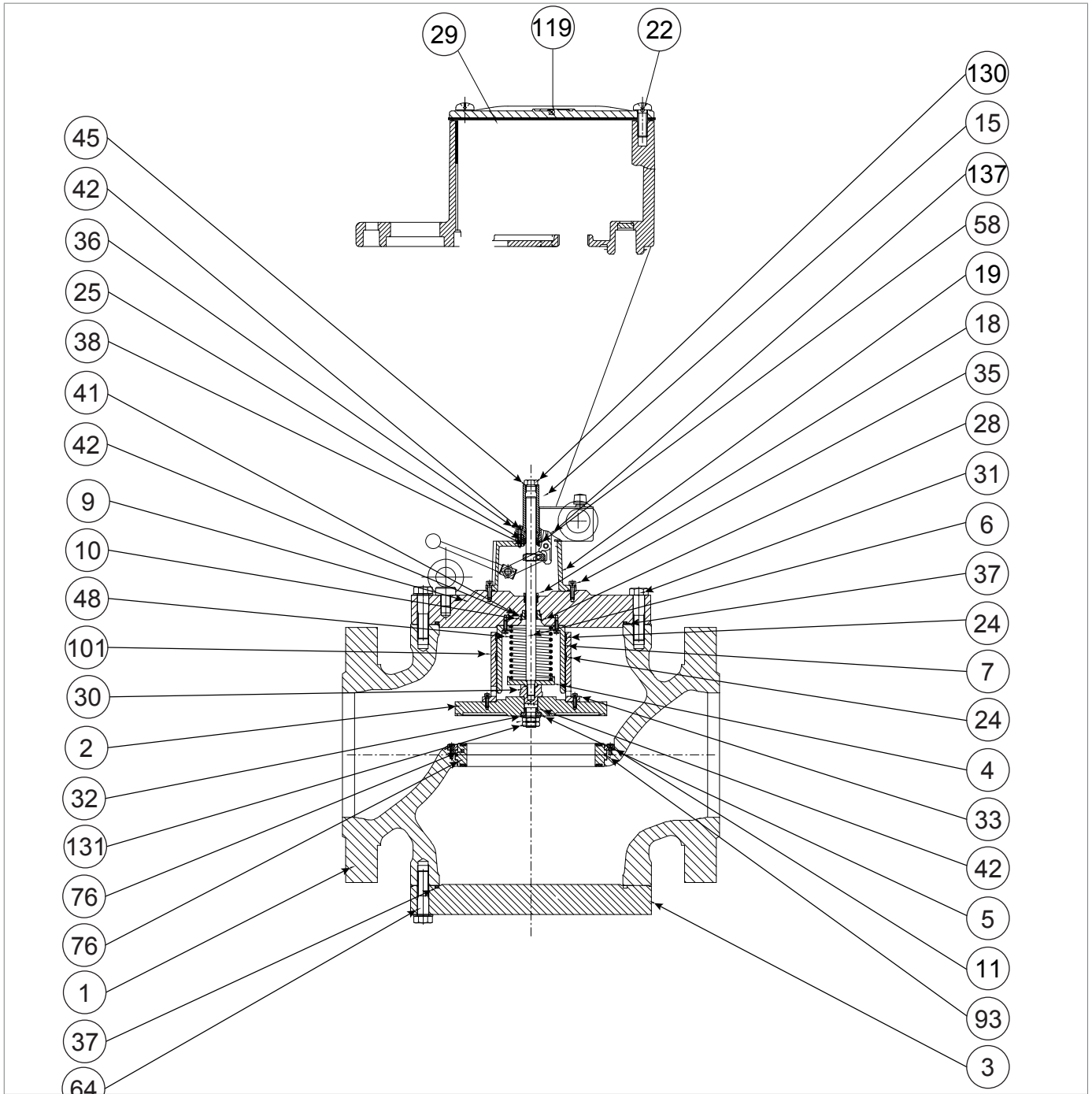
SBC 782 10"

Step	Action
24	Undo the screws (36).
25	Remove the cup (15).
26	Remove the O-ring (42) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
27	Remove the I/DWR ring (38) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
28	Remove the cap (130).
29	Remove the O-ring (45) from the cap (130) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
30	Remove the seeger ring (58) from the cup (15).
31	Remove the I/DWR ring (25) from the cup (15) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before fitting the replacement I/DWR ring, clean the retaining slots using a cleaning solution.</b>
32	Place the seeger ring (58) in the cup (15).
33	Take out the pressure switch unit. <b>NOTICE!</b> <b>For the maintenance procedure of the pressure switch assembly, please refer to paragraph 9.4.4.</b>
34	Undo and remove the screws (35).
35	Remove the intermediate body (13).
36	Remove the stem (6) taking care not to damage it.
37	Remove the seeger ring (28) from the flange (9).
38	Remove the bush (10).
39	Remove the O-ring (41) from the flange (9) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
40	Remove the O-ring (42) from the bush (10) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
41	Fit the valve seat (10), taking care not to damage the O-ring (41).
42	Place the seeger ring (28) in the flange (9).




SBC 782 10''

Step	Action
43	Place the stem (6) in the bush (10). <b>NOTICE!</b> <b>Lubricate the stem surface with silicone grease.</b>
44	Fit the intermediate body (13).
45	Fit the pressure switch unit.
46	Insert and fix the screws (35) according to the following tightening torque: • 10": Tab. 9.56 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Schema a croce per il serraggio delle viti".</b>
47	Fit the cup (15).
48	Insert and fix the screws (36) according to the following tightening torque: • 10": Tab. 9.56 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
49	Insert and fix the side screws (137) into the pressure switch according to the following tightening torque: • 10": Tab. 9.56 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
50	Fit and secure the cap (130) to the cup (15).
51	Fit the gasket (29) and the cover (19) of the pressure gauge.
52	Insert and fix the screws (22). <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
53	Place the plug sleeve (101) on the plug (2)
54	Insert and fix the screws (33) according to the following tightening torque: • 10": Tab. 9.56 <b>NOTICE!</b> <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b>
55	Fit the bush (5) in the plug (2).
56	Put the spring (48) and spring support (4) in place.
57	Position and screw the extension (30) to the stem (6). <b>NOTICE!</b> <b>During this phase, keep the stem (6) still.</b>
Step	Action
58	Remove the plug (2) together with the plug sleeve (101) on the stem guide (7). <b>NOTICE!</b> <b>Apply silicone grease to the plug (2).</b>



SBC 782 10''



Step	Action
59	Position and secure the nuts (131), together with the washer (32).
60	Insert and fix the screws (31) according to the following tightening torque: <ul style="list-style-type: none"> <li>• 10": Tab. 9.56</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at "9.4.2.2 - Cross diagram for tightening screws".</b> </div>

Tab. 9.63

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

**9.4.4 - MAINTENANCE PROCEDURE FOR PRESSURE SWITCHES MOD. 100**

**9.4.4.1 - PRESSURE SWITCH MOD. 102M/102MH**

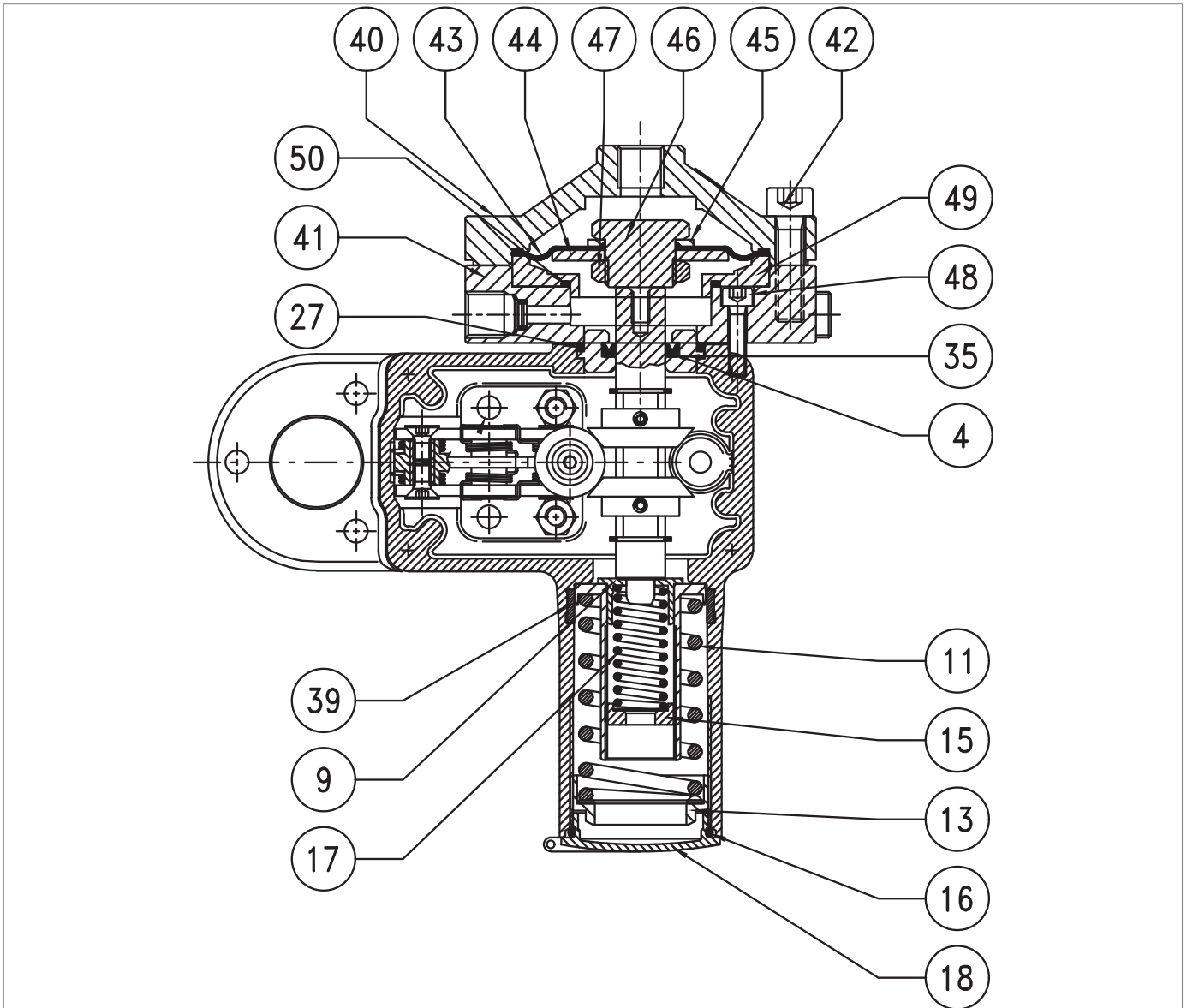
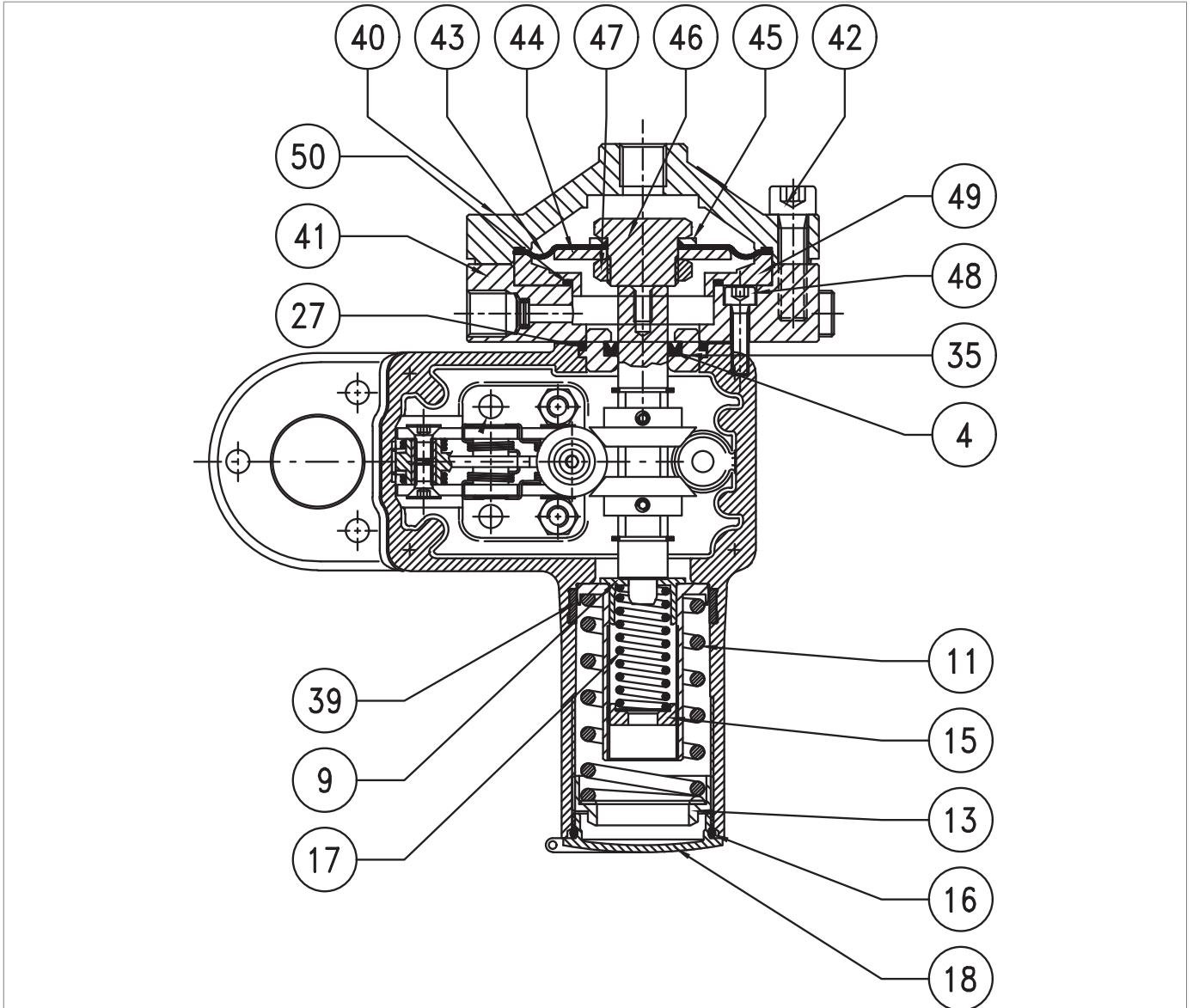






Fig. 9.29. Pressure switch Mod. 102M/102MH

Step	Action
1	Unscrew and remove the cap (18).
2	Remove the O-ring (16) from the cover (18) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Completely release the spring (11) by adjusting the ring nut (13).
4	Completely release the minimum pressure spring (17) by adjusting the ring nut (15). <b>! NOTICE!</b> <b>The minimum spring may not be installed.</b>
5	Remove the ring nut (13), the spring (11) and the spring support (17).
6	Remove the I/DWR ring (39) from the pressure switch sleeve and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement I/DWR ring, clean the retaining slots with a cleaning solution.</b>
7	Undo and remove the screws (42).
8	Remove the upper cover (40).
9	Take out the diaphragm unit (43, 44, 45, 46, 47).
10	Unscrew the nut (47).
11	Remove the diaphragm protection disc (44).
12	Remove and replace the diaphragm (43), taking care to lubricate the lanyard with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement diaphragm, clean the retaining slots with a cleaning solution.</b>
13	Fit the diaphragm protection disc (44).
14	Place and fix the nut (47) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 102: Tab. 9.57</li> </ul>
15	Remove the ring (49).
16	Undo and remove the screws (48).
17	Remove the lower lid (41).
18	Remove the O-ring (50) from the nut (49) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
19	Remove the bush (35).
20	Remove the O-ring (27) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
21	Remove the U-shaped ring (4) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>! NOTICE!</b> <b>Before inserting the replacement U-ring, clean the retaining slots with a cleaning solution.</b>



Pressure switch Mod. 102M/102MH

Step	Action
22	Position the bush (35) together with the O-ring (27). <div style="border: 1px solid black; padding: 2px;">  <b>NOTICE!</b> </div> <b>Before inserting the bush (35), lubricate the inner surface with silicone grease.</b>
23	Fit the lower cover (41). <div style="border: 1px solid black; padding: 2px;">  <b>NOTICE!</b> </div> <b>Make sure there is a gasket between the lower cover and the pressure switch body.</b>
24	Insert and fix the screws (48) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 102: Tab. 9.57</li> </ul> <div style="border: 1px solid black; padding: 2px;">  <b>NOTICE!</b> </div> <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”.</b>
25	Put the diaphragm unit in place (43, 44, 45, 46, 47).
26	Fit the lid (40).
27	Insert and fix the screws (42) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 102: Tab. 9.57</li> </ul> <div style="border: 1px solid black; padding: 2px;">  <b>NOTICE!</b> </div> <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”.</b>

Tab. 9.64

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

9.4.4.2 - PRESSURE SWITCH MOD. 103M/103MH

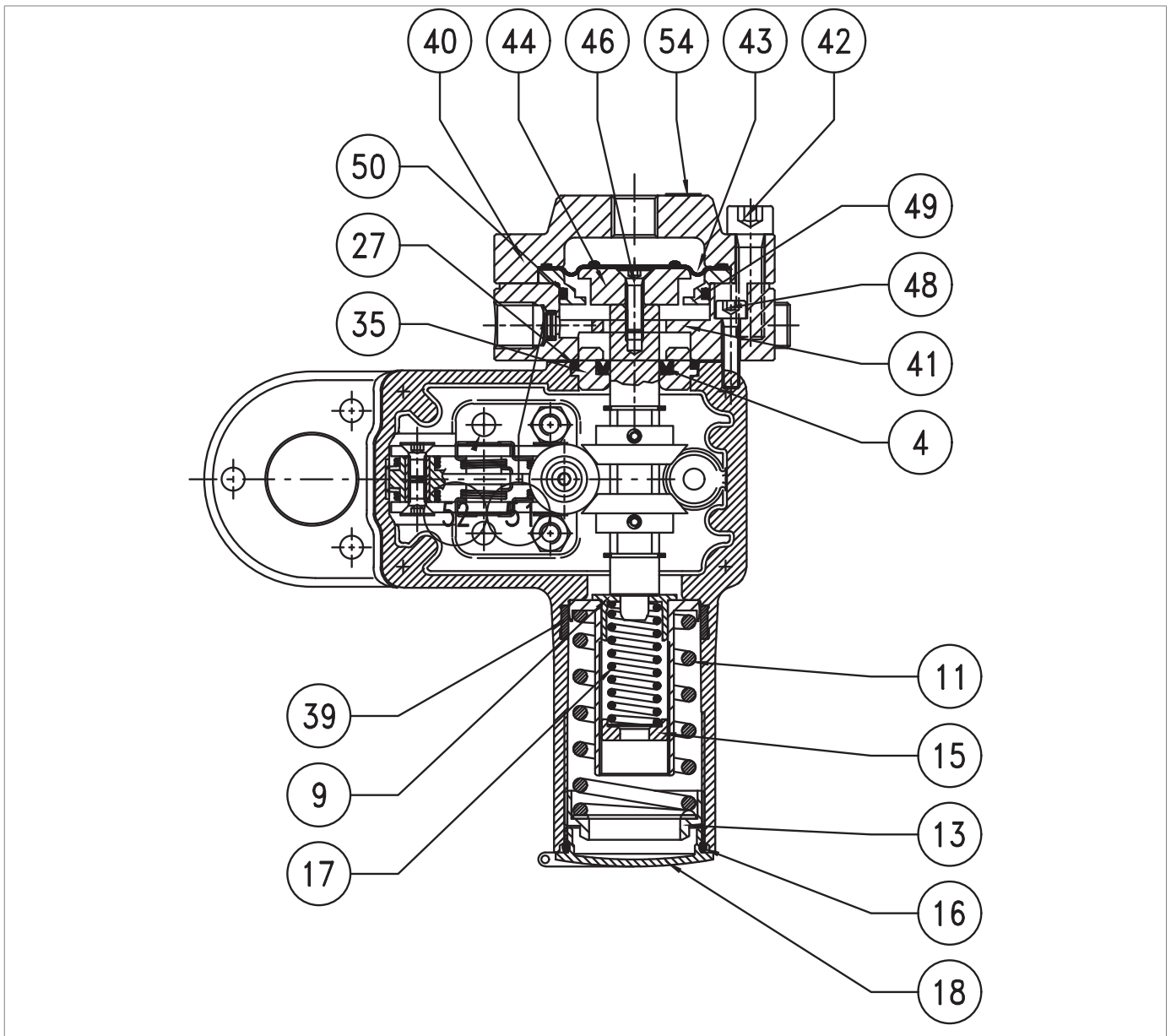
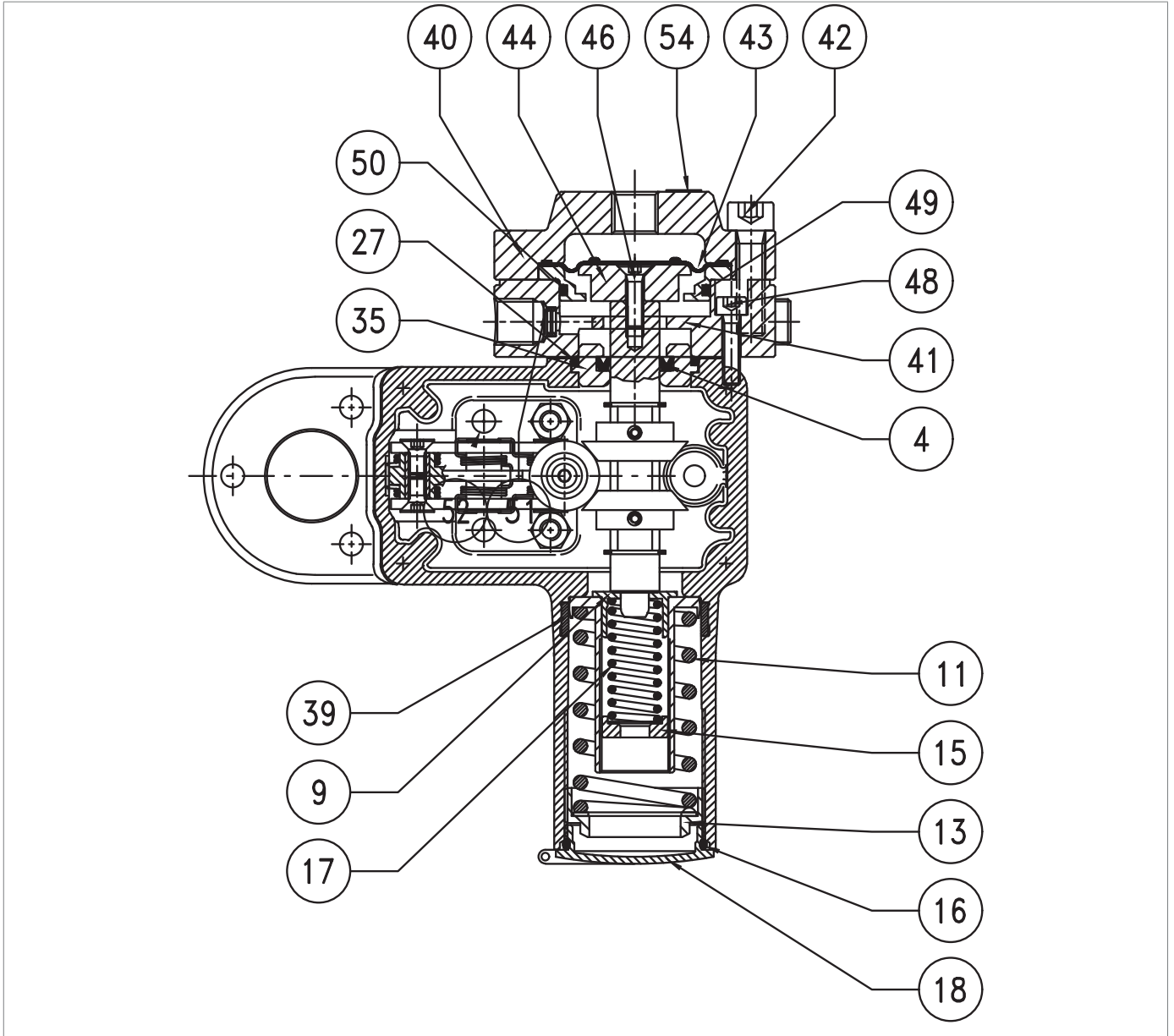


Fig. 9.30. Pressure switch Mod. 103M/103MH

Step	Action
1	Unscrew and remove the cap (18).
2	Remove the O-ring (16) from the cover (18) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Completely release the spring (11) by adjusting the ring nut (13).
4	Completely release the minimum pressure spring (17) by adjusting the ring nut (15). <b>NOTICE!</b> <b>The minimum spring may not be installed.</b>
5	Remove the ring nut (13), the spring (11) and the spring support (17).
6	Remove the I/DWR ring (39) from the pressure switch sleeve and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before fitting the replacement I/DWR ring, clean the retaining slots using a cleaning solution.</b>
7	Undo and remove the screws (42).
8	Remove the upper cover (40).
9	Remove and replace the diaphragm (43), taking care to lubricate the lanyard with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement diaphragm, clean the retaining slots with a cleaning solution.</b>
10	Undo and remove the screws (46).
11	Remove the ring (49).
12	Remove the O-ring (50) from the ring (49) and replace it. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
13	Undo and remove the screws (48).
14	Remove the lower lid (41).
15	Remove the bush (35).
16	Remove the O-ring (27) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
17	Remove the U-shaped ring (4) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement U-ring, clean the retaining slots with a cleaning solution.</b>
18	Position the bush (35) together with the O-ring (27). <b>NOTICE!</b> <b>Before inserting the bush (35), lubricate the internal surface with silicone grease.</b>
19	Remove the lower lid (41)



Pressure switch Mod. 103M/103MH



Step	Action
20	Insert and fix the screws (48) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 103: Tab. 9.58</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <ul style="list-style-type: none"> <li>• <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”;</b></li> <li>• <b>Make sure there is a gasket between the lower cover and the pressure switch body.</b></li> </ul> </div>
21	Fit the diaphragm protection disc (44).
22	Insert and fix the screws (46) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 103: Tab. 9.58</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <ul style="list-style-type: none"> <li>• <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”;</b></li> <li>• <b>Before inserting the screw (46), apply thread locking glue.</b></li> </ul> </div>
23	Fit the diaphragm (43).
24	Fit the lid (40).
25	Insert and fix the screws (42) according to the following tightening torque: <ul style="list-style-type: none"> <li>• Mod. 103: Tab. 9.58</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>! NOTICE!</b></p> <p><b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”.</b></p> </div>

Tab. 9.65

**! WARNING!**

**Ensure that all parts have been fitted correctly.**

9.4.4.3 - PRESSURE SWITCH MOD. 104M/104MH - 105M/105MH

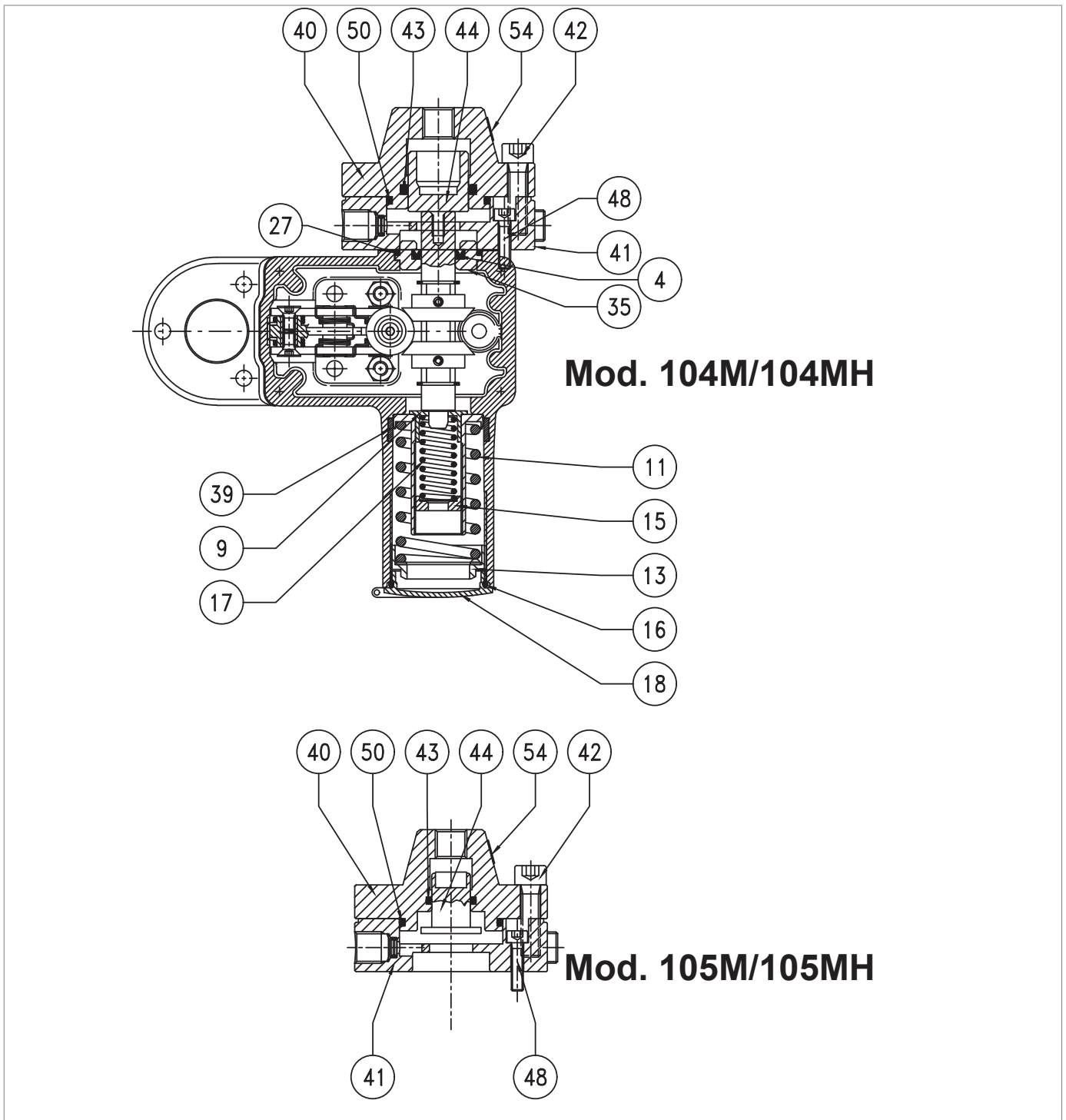
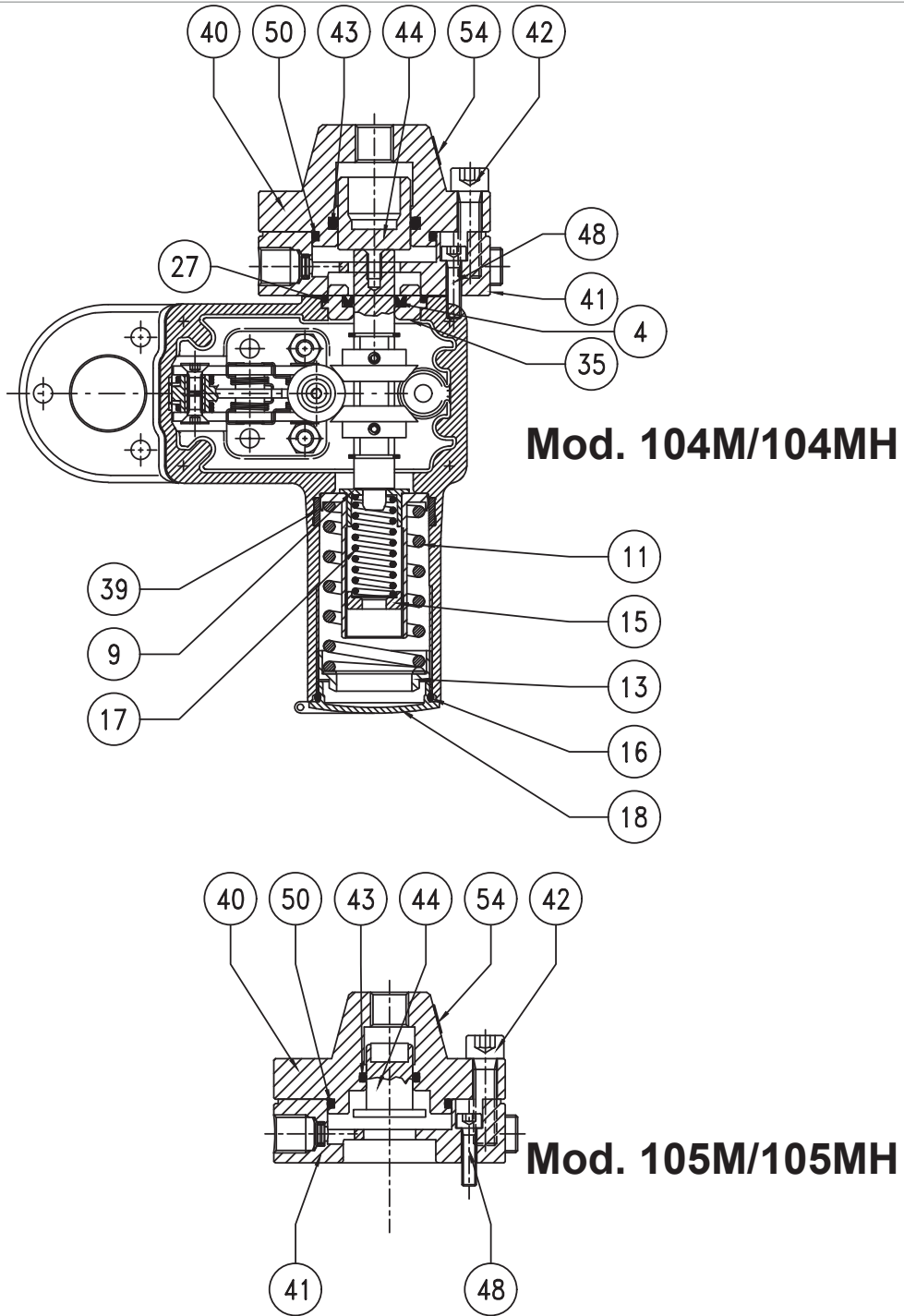




Fig. 9.31. Pressure switch Mod. 104M/104MH - 105M/105MH

Step	Action
1	Unscrew and remove the cap (18).
2	Remove the O-ring (16) from the cover (18) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
3	Completely release the spring (11) by adjusting the ring nut (13).
4	Completely release the minimum pressure spring (17) by adjusting the ring nut (15). <b>NOTICE!</b> <b>The minimum spring may not be installed.</b>
5	Remove the ring nut (13), the spring (11) and the spring support (17).
6	Remove the I/DWR ring (39) from the pressure switch sleeve and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before fitting the replacement I/DWR ring, clean the retaining slots using a cleaning solution.</b>
7	Undo and remove the screws (42).
8	Remove the upper cover (40) together with the piston (44).
9	Pull the piston (44) out of the upper cover (40).
10	Remove the O-rings (43, 50) from the upper cover (40) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.</b>
11	Refit the piston (44) into the upper lid (40).
12	Undo and remove the screws (48).
13	Remove the lower lid (41).
14	Remove the bush (35).
15	Remove the O-ring (27) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.</b>
16	Remove the U-shaped ring (4) from the bush (35) and replace it, taking care to lubricate it with synthetic grease. <b>NOTICE!</b> <b>Before inserting the replacement U-ring, clean the retaining slots with a cleaning solution.</b>
17	Position the bush (35) together with the O-ring (27). <b>NOTICE!</b> <b>Before inserting the bush (35), lubricate the internal surface with silicone grease.</b>
18	Fit the lower cover (41). <b>NOTICE!</b> <b>Make sure there is a gasket between the lower cover and the pressure switch body.</b>



Pressure switch Mod. 104M/104MH - 105M/105MH

Step	Action
19	Insert and fix the screws (48) according to the following tightening torques: <ul style="list-style-type: none"> <li>• Mod. 104-105: Tab. 9.59</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”.</b> </div>
20	Fit the upper cover (40).
21	Insert and fix the screws (42) according to the following tightening torques: <ul style="list-style-type: none"> <li>• Mod. 104-105: Tab. 9.59</li> </ul> <div style="border: 1px solid black; padding: 5px;">  <b>NOTICE!</b>  <b>Tighten the screws as shown in the diagram at “9.4.2.2 - Cross diagram for tightening screws”.</b> </div>

Tab. 9.66

 **WARNING!**

**Ensure that all parts have been fitted correctly.**

#### 9.4.5 - PROCEDURE FOR RECOMMISSIONING AFTER MAINTENANCE

 **NOTICE!**

For the re-commissioning procedure, please follow the instructions in section “8.5 - Slam-shut valve commissioning procedure”

## 10 - TROUBLESHOOTING

Listed below are the cases (causes and tripping) that could occur in the form of malfunctions of various kinds over time. These situations depend on the conditions of the gas as well as on the natural ageing and wear of the materials.

### 10.1 - GENERAL WARNINGS

#### **HAZARD!**

**Maintenance work must be carried out by qualified personnel:**

- trained on workplace safety also based on the regulations in force in the place of installation of the work equipment;
- qualified and authorised to carry out activities related to the equipment.

#### **WARNING!**







**PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people and property due to services:**

- other than those described;
- performed according to methods other than those specified;
- carried out by unsuitable personnel.

#### **NOTICE!**

**If an operating fault occurs and qualified personnel are not available for the specific service, call the PIETRO FIORENTINI S.p.A. Authorised Assistance Centre**

## 10.2 - OPERATOR QUALIFICATION SPECIFICATION

Commissioning	
<b>Operator qualification</b>	<ul style="list-style-type: none"> <li>• Mechanical maintenance technician;</li> <li>• Electrical maintenance technician;</li> <li>• Installer;</li> <li>• Name of the user.</li> </ul>
<b>PPE required</b>	<div style="display: flex; align-items: center; gap: 10px;">      </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>
<b>Equipment required</b>	Please refer to the chapter “7 - Commissioning/maintenance equipment”.

Tab. 10.67

## 10.3 - TROUBLESHOOTING PROCEDURES

For proper troubleshooting, proceed as follows:

- close the downstream shut-off valves;
- refer to the troubleshooting tables listed below.



## 10.4 - TROUBLESHOOTING TABLES

### NOTICE!

See chapter “9 - Maintenance and functional checks” for pictures of the regulator SBC 782 and its accessories.

### 10.4.1 - TROUBLESHOOTING SBC 782 REGULATOR

Failure	Device	Possible causes	Service
<b>Incorrect release pressure</b>	SB/82 BUILT-IN SLAM-SHUT VALVE	Max. and min. pressure spring incorrect calibration	Carry out the calibration again by adjusting the ring nuts
		Leverages with friction	Clean and lubricate the levers if needed replace the pressure switch
	PRESSURE SWITCHES MODELS 102 - 105	Springs (11.17) collapsed	Replace
		Springs (11.17) out of level	Refit
<b>Impossible to reset</b>	SB/82 BUILT-IN SLAM-SHUT VALVE	Max. and/or min. pressure spring incorrect calibration.	Carry out the calibration again by adjusting the ring nuts
		The downstream pressure is not consistent with the min and/or max setting of the slam-shut device	Adjust the downstream pressure
		Lever broken or chipped	Change the standard box containing the whole assembly
	PRESSURE SWITCHES MODELS 102 - 105	Membrane rupture (43) if min. spring is present.	Replace
		Manual release button locked	Clean and lubricate
<b>Failure to provide service</b>	SB/82 BUILT-IN SLAM-SHUT VALVE	Stem (6) locked in opening position	Clean and lubricate
		Locked levers	Clean and lubricate
	PRESSURE SWITCHES MODELS 102 - 105	Membrane rupture (43) if min. spring is missing.	Replace

Failure	Device	Possible causes	Service
<b>Downstream pressure increase with slam-shut device shutting off</b>	SB/82 BUILT-IN SLAM-SHUT VALVE ONLY VALID FOR 1" - 3"	O-ring (40) not sealing	Clean and replace if needed
		Plug pad (19) not sealing	Clean and replace if needed
		Conical seat (8) damaged	Replace
		O-ring (39) not sealing	Clean and replace if needed
	SB/82 BUILT-IN SLAM-SHUT VALVE ONLY VALID FOR 4" - 8"	O-ring (40) not sealing	Clean and replace if needed
		Plug pad (19) not sealing	Clean and replace if needed
		O-ring (44) not sealing	Clean and replace if needed
		Conical seat (8) damaged	Replace
	SB/82 BUILT-IN SLAM-SHUT VALVE ONLY VALID FOR 10"	O-ring (39) not sealing	Clean and replace if needed
		O-ring (42) not sealing	Clean and replace if needed
		Reinforced gasket (8) not sealing	Clean and replace if needed
		O-ring (39) not sealing	Clean and replace if needed
	BYPASS DEVICE HP2/2	Valve seat (2) damaged	Replace
		Pad O-ring (5) not sealing	Clean and replace if needed
		O-ring (15) not sealing	Clean and replace if needed
Valve seat (6) damaged		Replace	
		O-ring (20) not sealing	Clean and replace if needed

Tab. 10.68

## 11 - UNINSTALLATION AND DISPOSAL

### 11.1 - 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.

### 11.2 - QUALIFICATION OF THE OPERATORS IN CHARGE

#### Commissioning

Operator qualification	Installer
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>• any information provided by the Safety Manager at the installation facility.</li> </ul>
Equipment required	Please refer to the chapter “7 - Commissioning/maintenance equipment”.

Tab. 11.69

### 11.3 - UNINSTALLATION

#### ATTENTION!

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

#### NOTICE!

For equipment uninstallation procedures, please refer to the installation procedures (see chapter “6 - installation”), proceeding in reverse order.

### 11.4 - INFORMATION REQUIRED IN CASE OF RE-INSTALLATION

#### NOTICE!

Should the equipment be reused after uninstallation, refer to chapters:

- “6 - installation”;
- “8 - Commissioning”.

## 11.5 - DISPOSAL INFORMATION

### NOTICE!

**Bear in mind that the laws 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 legislation in force in the country of installation.**

### NOTICE!

**Proper disposal prevents damage to humans and the environment and promotes the reuse of precious raw materials.**

The equipment was manufactured with materials that can be recycled by specialised companies. For proper disposal of the equipment, proceed as specified in “Tab. 11.71”:

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. 11.70*

The equipment in any configuration consists of the following materials:

Material	Disposal/recycling indications
<b>Plastic</b>	It must be dismantled and disposed of separately.
<b>Lubricants/Oils</b>	They must be collected and delivered to the appropriate specialised and authorised collection and disposal centres.
<b>Steel/Cast Iron</b>	Disassemble and collect separately. It must be recycled through the specific collection centres.
<b>Stainless steel</b>	Disassemble and collect separately. It must be recycled through the specific collection centres.
<b>Aluminium</b>	Disassemble and collect separately. It must be recycled through the specific collection centres.
<b>Pneumatic/electric components</b>	They must be dismantled in order to be reused if they are still in good condition or, if possible, overhauled and recycled.

*Tab. 11.71*

### NOTICE!

**Please refer to the chapter “9 - Maintenance and functional checks” to better identify the composition of the equipment and its parts.**

## 12 - RECOMMENDED SPARE PARTS

### 12.1 - GENERAL WARNINGS

 **NOTICE!**

If non-original spare parts are used, PIETRO FIORENTINI S.p.A. their declared performance cannot be guaranteed.

It is recommended to use original spare parts PIETRO FIORENTINI S.p.A.

PIETRO FIORENTINI S.p.A. shall not be held liable for any damage caused by using non-original parts.

### 12.2 - HOW TO REQUEST SPARE PARTS

 **NOTICE!**

For specific information, please refer to the sales network of PIETRO FIORENTINI S.p.A.



## 13 - CALIBRATION TABLES

### 13.1 - CALIBRATION TABLES FOR PRESSURE SWITCHES MOD. 100

Mod. 102M/102MH - Max pressure							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2701260	White	3.5	60	35	0.2	0.8
2	2701530	Yellow	4			0.801	1.6
3	2701790	Yellow/black	4.5			1.601	2.6
4	2702280	White/red	5.5			2.601	5.5

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.72

Mod. 102M - Min pressure							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700513	Red	2	40	15	0.05	0.199
2	2700713	Green	2.3			0.2	0.4
3	2700750	Black	2.5			0.401	0.8
4	2700985	Brown	3			0.801	2.8

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.73

Mod. 102MH - Min pressure							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700985	Brown	3	40	15	2.8	4.2
	2700980	Blue	3	35			
2	2700985	Brown	3	40		4.201	5.5
	2700985	Brown	3				

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.74

Mod. 103M/103MH - Max pressure							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2701530	Yellow	4	60	35	2	4
2	2701790	Yellow/black	4.5	60		4.001	7.5
3	2702280	White/red	5.5	60		7.501	15
4	2702450	Red	6	60		15.001	22

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.75

**Mod. 103M - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700464	Orange	1.7	40	15	0.2	0.5
2	2700513	Red	2			0.501	0.8
3	2700713	Green	2.3			0.801	1.7
4	2700750	Black	2.5			1.701	4
5	2700985	Brown	3			4.001	8

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

*Tab. 13.76*
**Mod. 103MH - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700985	Brown	3	40	15	8	13
	2700980	Blue	3	35			
2	2700985	Brown	3	40	15	13.001	19
	2700985	Brown	3				

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

**Mod. 104M/104MH - Max pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2702280	White/Red	5.5	60	35	15.001	30
2	2702450	Red	6	60		30.001	45

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

*Tab. 13.77*
**Mod. 104M - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700713	Green	2.3	40	15	1.6	3
2	2700750	Black	2.5			3.001	8
3	2700985	Brown	3			8.001	18

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

*Tab. 13.78*
**Mod. 104MH - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700985	Brown	3	40	15	18	30
	2700980	Blue	3	35			
2	2700985	Brown	3	40		30.001	41
	2700985	Brown	3				

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

*Tab. 13.79*



**Mod. 105M/105MH - Max pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2702280	White/Red	5.5	60	35	30	65
2	2702450	Red	6	60		65.001	90

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.80

**Mod. 105M - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max
1	2700713	Green	2.3	40	15	3	7
2	2700750	Black	2.5			7.001	16
3	2700985	Brown	3			16.001	44

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.81

**Mod. 105MH - Min pressure**

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max	
1	2700985	Brown	3	40	15	44	60	
	2700980	Blue	3	35				
2	2700985	Brown	3	40		15	60.001	90
	2700985	Brown	3					

**d** = Wire Diameter (mm)    **Lo** = Spring Length (mm)    **De** = External Diameter (mm)

Tab. 13.82

**TM0041EN**