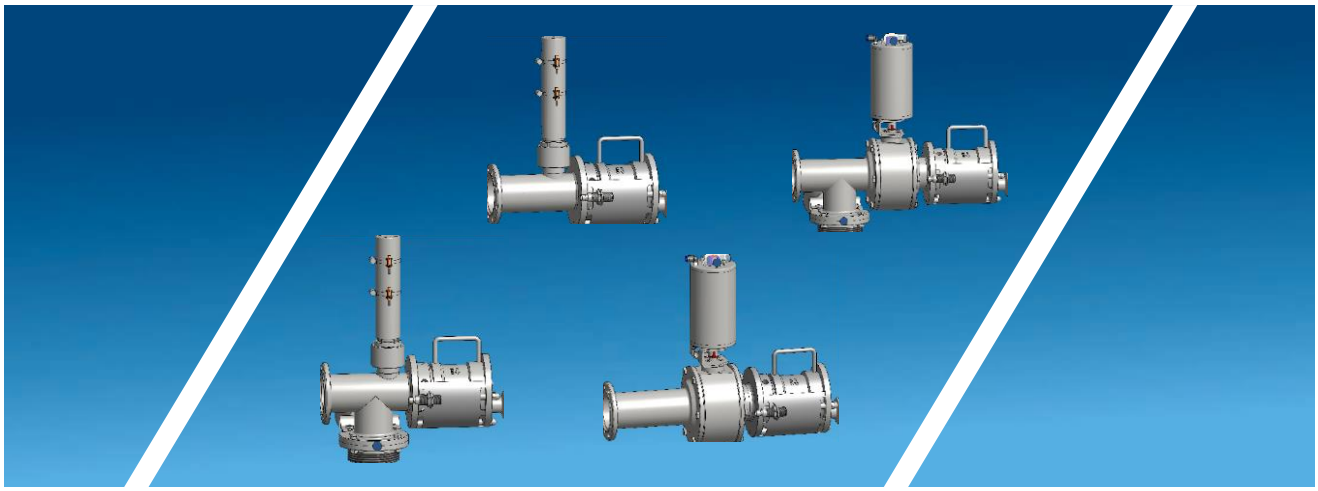
OPERATING/INSTALLATION INSTRUCTIONS

(Translation)



Plug-in Chamber with Stopper

Plug-in Chamber with Stopper and Butterfly Valve

Plug-in Chamber with Ball Valve

Plug-in Chamber with Ball Valve and Butterfly Valve

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Ball Valve Operating/Installation Instructions for Plug-in Chamber

Type	Pipe standard	Size
with stopper	DIN Standard	DN25, DN40, DN50, DN65, DN80, DN100 /Series A
	Inch Standard	1", 1 ½", 2", 2 ½", 3, 4" /Series D
	ISO Standard	DN33,7, DN48,3, DN60,3, DN76,1, DN88,9, DN114,3 /Series C
	SMS Standard	DN25, DN38, DN51, DN63,5, DN76,1 /Series D
with Stopper and Butterfly Valve	DIN Standard	DN25, DN40, DN50, DN65, DN80, DN100 /Series A
	Inch Standard	1", 1 ½", 2", 2 ½", 3, 4" /Series D
	ISO Standard	DN33,7, DN48,3, DN60,3, DN76,1, DN88,9, DN114,3 /Series C
	SMS Standard	DN25, DN38, DN51, DN63,5, DN76,1 /Series D
with ball valve	DIN Standard	DN40, DN50, DN65, DN80, DN100 /Series A
	Inch Standard	1 ½", 2", 2 ½", 3", 4" /Series D
	SMS Standard	DN38, DN51, DN63,5, DN76,1 /Series D
with Ball Valve and Butterfly Valve	DIN Standard	DN40, DN50, DN65, DN80, DN100 /Series A
	Inch Standard	1 ½", 2", 2 ½", 3", 4" /Series D
	SMS Standard	SMS 38, SMS 51, SMS 63,5, SMS 76,1 /Series D

NOTE

These operating/installation instructions are part of the plug-in chamber and must be available to operating and maintenance personnel at all times. The safety precautions contained therein must be observed.

If the plug-in chamber is sold on, the operating/installation instructions must be included in the delivery or downloaded from the following Internet page:
http://www.awh.eu/de/downloads.

Translation

The operating instructions must be written in an official European Community language acceptable to the manufacturer of the machinery in which the partly completed machinery will be installed, or to his authorized representative. If any discrepancies arise in the translated text, the original operating instructions (German) must be consulted for clarification, or the manufacturer must be contacted.

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1 Introduction

These operating/installation instructions (hereinafter referred to as the “manual”) provide you with all the information you need to operate the plug-in chamber smoothly (hereinafter also referred to as the “fitting”).

The manual applies to the following variants

- Plug-in Chamber with Stopper
- Plug-in Chamber with Stopper and Butterfly Valve
- Plug-in Chamber with Ball Valve
- Plug-in Chamber with Ball Valve and Butterfly Valve

In principle, this manual applies to all designs. In the event of differences between the designs, this will be pointed out clearly.

The manual must be read, understood, and applied by all persons assigned with the assembly, maintenance, cleaning and troubleshooting of the fitting. This applies in particular to the listed safety instructions.

After studying the manual, you will be able to:

- Assemble and operate the fitting safely
- Clean and service the fitting correctly
- Take the correct measures if a fault occurs.

In addition to this manual, generally valid, statutory and other binding regulations in regard of accident prevention and in regard of environmental protection in the country of use must also be observed.

The manual must always be kept or made available at the place of use of the fitting. If necessary, download the manual from the http://www.awh.eu/de/downloads Internet page.

1.1 Means of Presentation

As an instruction and for directly warning against danger, statements where special attention needs to be paid are identified as follows in this manual:

Section-related Warnings

Section-related warnings apply not only to one particular action, but rather to all actions within a section.

DANGER

This warning warns of a hazard with a high level of risk.

Failure to observe it can lead to death or severe physical injury.

– *Measure(s) to prevent the danger*

WARNING

This warning warns of a hazard with a medium level of risk.

Failure to observe it can lead to death or severe physical injury.

– *Measure(s) to prevent the danger*

CAUTION

This warning warns of a hazard with a low level of risk.

Failure to observe it can lead to minor or moderate injury.

– *Measure(s) to prevent the danger*

NOTE

This warning warns of a hazard with a minor level of risk.

Failure to observe it can lead to material damage.

– *Measure(s) to prevent the danger*

The “Info” symbol provides useful information, additional tips and recommendations.

Embedded Warnings

The embedded warnings apply to specific actions and are integrated directly into the action before the specific action step.

– ⚠ DANGER / WARNING / CAUTION

– *NOTE*

Further Means of Presentation

– Texts which follow this mark are bulleted lists.

• Texts following this mark describe activities that need to be carried out in the specified order.

" " Texts in quotation marks are references to other chapters or sections.

Symbols Used

Crushing hazard is indicated by this symbol.

Burn hazard is indicated by this symbol.

Observe manual is indicated by this symbol.

Environmental measures are indicated by this symbol.

This symbol warns against dangers to individuals with medical implants (such as cardiac pacemakers) and with implanted devices.

Warning about substances which are a water hazard

1.2 Abbreviations

AWH	Armaturenwerk Hötensleben GmbH
WO	Design
CIP	Cleaning in place
D	Diameter
DN	Nominal width
EN	European Standard
EPDM	Ethylene propylene diene monomer rubber (sealing material)
EEC	European Economic Community
H	Height
L	Length
PMS	Process Management System
PN	Pressure Nominal in bar for a room temperature of 20 °C

PSI	Pound-force per square inch (measurement unit for pressure)
PTFE	Polytetrafluoroethylene (sealing material)
Ra	Average roughness value (dimension for the surface roughness)
Rd	Round male
R_{min}	Minimum radius of curvature
C	Radius
Q_F	Flow rate/standard flow rate
V_M	Pig speed
TIG	Welding process with tungsten electrode and inert gas

1.3 Guarantee, Warranty and Liability

Guarantee

If the fitting is used as intended, a guarantee is provided according to the statutory warranty obligation. This does not apply to wear parts.

Increased wear due to abrasive media is not a product defect. Any claims resulting from this cannot be taken into account as part of the warranty.

Warranty and Liability

The commitments agreed in the contract of supply and delivery, the general terms and conditions and the terms of delivery of Armaturenwerk Hötensleben GmbH (referred to hereinafter as AWH) and the statutory regulations valid at the time the contract was concluded shall apply.

Warranty and liability claims in case of personal injury and damage to property shall be excluded, in particular if these can be attributed to one or more of the following causes:

- Improper or incorrect use of the fitting,
- Incorrect assembly, commissioning, operation and maintenance of the fitting,
- Failure to observe the instructions in the manual in terms of assembly, commissioning, operation and maintenance of the fitting,
- Structural modifications to the fitting
  (Conversions or other modifications to the fitting must not be carried out without previous written approval from Armaturenwerk Hötensleben GmbH.
  In case of infringement, the fitting will lose its EC conformity and the operating license.),
- Use of spare parts that do not comply with the specified technical requirements,
- Improperly performed repairs,
- Disasters, the effects of foreign objects and force majeure.

Disclaimer

AWH reserves the right to make alterations to this document at any time and without prior notice. AWH provides no guarantee (neither expressed nor implied) with regard to all information in this document, including but not limited to the implied warranty of merchantability and suitability for a particular purpose. Furthermore, AWH does not guarantee the correctness or completeness of information, text, graphics or other parts in this document.

2 Safety

The fitting has been built in accordance with state-of-the-art technology and the recognized rules of safety. Nevertheless, use of the fitting may represent a danger to the life and limb of the user and third parties, or a risk of impairments to the device and other objects of material value as a result of its function.

The following basic safety instructions are intended to prevent injury to personnel and material damage. The operating company must ensure that the basic safety instructions are observed and adhered to.

This manual contains basic notes on installation, operation and servicing of the fitting which must be complied with.

Anyone involved in assembly, installation, operation, maintenance and servicing must have read and understood this manual.

The safety systems and safety instructions described in these instructions must be adhered to.

WARNING

Failure to comply with this manual, incorrectly performed installation and repair work or incorrect operation could lead to malfunctions on the device and to dangerous situations!

There is a risk of death or severe physical injury.

- *Have all work performed on the fitting carried out only by an* ***expert*** *and in compliance with*
  - *the corresponding detailed operating and installation instruction(s),*
  - *the warning and safety signs on the device,*
  - *the regulations and requirements specific to the plant and*
  - *the national/regional regulations for safety and the prevention of accidents.*
- *Never install damaged fittings or components.*

The figures in this manual are intended to provide basic understanding, and are primarily representations of the principles involved. They may differ from the actual design of the fitting.

2.1 Intended Use

WARNING

Improper use presents a risk of serious injury.

This fitting was designed exclusively for the purposes described above. Any other use beyond that described here or alteration of the fitting without written approval from AWH is considered contrary to the intended use. AWH accepts no liability for damages arising from such use. The operating company is solely responsible for the risk. The fitting may only be commissioned once it is certain that all the safety systems are fully functioning, and the facility in which the fitting is installed meets the safety requirements of all relevant EC directives.

NOTE

*The fitting may be installed only by an **expert**.*

*The work described in this manual is described in a way intended to be understood and carried out by experts **only** (see section "2.6 Qualification Requirements for Personnel").*

The plug-in chamber variants are intended for installation in pipes. They can be used in commercial and industrial operations (food, chemical and pharmaceutical industries and low-germ processes). Suitable flow media include water, steam, mineral oil, food, and liquids from the chemical and pharmaceutical industry, as well as pasty media, which are subject to a hygienic standard.

The fitting is used for transmitting, driving and receiving AWH tangent pigs or AWH lip pigs (depending on the design) in piggable plant sections. The product recovery system enables the ejection of products, pre-cleaning and product separation. Suitable drive media for the pig include water, air or nitrogen, as well as a subsequent product.

Any use that goes beyond the intended use and/or any utilization of the fitting for purposes other than intended use can lead to dangerous situations and/or to injury to humans and property damage.

Use the fitting only as intended.

- Use the fitting only in accordance with the information contained in this manual!
- All the specifications in this manual must be adhered to at all times.
- Keep all signs on the fitting in legible condition.
- Modifications or conversions to the fitting are not permitted.

The intended use also includes compliance with this manual, including the maintenance conditions.

Please contact AWH directly for professional design information and advice.

2.2 Labeling the Fitting

The information in this manual applies only to the plug-in chambers of the type and design specified on the title page.

The following details are important for all questions:

- Nominal width
- Connection type (threaded connection in accordance with DIN 11851, flange connection in accordance with DIN 11864, welding, etc.)
- Actuation
- Design
- Accessories (feedback, etc.)

This is the only way to ensure quick and efficient processing.

2.3 Danger Warnings

The safety systems and safety instructions described in these instructions must be adhered to.

2.3.1 Dangers

WARNING

Risk of burns due to hot media!

There is a risk of burning during operation or maintenance if flow media have temperatures over +60 °C / +140 °F.

- *Let the flow medium cool down prior to cleaning work.*
- *Empty the pipelines prior to assembly or disassembly work.*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out work on the fitting (see section “2.7 Personal Protective Equipment”).*

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

WARNING

Danger of injuries caused by ejected components!

The danger of crushing, blows or impacts caused by ejected components exists when work is performed on the plug-in chamber.

- *Carry out the switch-off procedure without fail before all cleaning, maintenance and repair work (see section 2.3.4 Switch-off* Procedure*).*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out work on the fitting (see section "2.7 Personal Protective* Equipment*").*

NOTE

Risk of damage to the fitting!

- *The fitting, length and quality of the lines must meet the requirements.*
- *Assembly is to be carried out by specialist personnel.*
- *Make sure that only the media specified in the manual are used.*
- *The parameters listed in the manual must always be complied with (see chapter "4 Technical Data").*

2.3.2 Hazardous Area of the Fitting

The area around the plug-in chamber shall be kept accessible to the operator.

The hazardous area during setup, maintenance and repair work extends to 1 m around the fitting. In addition to this, pay attention to the swing range of control cabinet doors when opened. The operating company must ensure that persons are prevented from entering the hazard area during motion sequences.

2.3.3 Installation of Replacement Parts and Wearing Parts

Replacement and accessory parts not supplied by AWH have not been checked or approved by AWH. Installing and/or using this type of product can therefore negatively alter the prescribed structural properties of your higher-level plant, under certain circumstances. AWH accepts no liability for any damage arising from the use of non-original parts or non-original accessory parts. Standard parts can be obtained from specialist dealers.

2.3.4 Switch-off Procedure

Before any cleaning, maintenance or repair work can begin, the specialist personnel must adhere without fail to the following switch-off procedure in order to prevent accidents.

WARNING

Risk due to moving parts and escaping compressed air or media at high pressure!

There is a risk of fingers and hands being crushed when the valves are being shut off.

Escaping compressed air or flow media at high pressure poses a risk of serious eye or skin injuries.

It is imperative that the following ***switch-off procedure*** *is observed before cleaning, maintenance or repair work is carried out (by specialist personnel only).*

- Disconnect the higher-level facility/machine from the power supply.
- Shut off the pneumatic system:
  - *Close the shut-off valve.*
  - *Check that the facility is depressurized.*
  - *Secure the shut-off valve against reopening.*
- Shut off the media supply:
  - *Relieve the pressure in the pipelines.*
  - *Afterwards, drain the pipelines (take particular care with hazardous materials).*
  - *Check that a supply of media is securely prevented (insert dummy discs if necessary).*
- Observe a cooling-down phase for media temperatures over +60 °C/+140 °F.

2.4 Duties of the Operating Company

The fitting is used in the commercial sector. The operating company is thus subject to the legal obligations regarding occupational safety.

In the EEA (European Economic Area), the national implementations of the framework directive (89/391/EEC) on carrying out measures for improving safety and protecting the health of employees during work, as well as the associated individual directives on the minimum specifications for safety and health protection of employees using work equipment, shall be observed and complied with in their currently valid versions.

As a basic rule, the operating company in Germany must observe the Industrial Safety Ordinance (BetrSichV).

In other countries, the respective national guidelines, statutes and country-specific regulations regarding occupational safety and accident prevention must be complied with. At the same time, the following, non-exhaustive instructions apply in particular:

– The owner/operating company must ensure that the fitting is used only as intended (see section "2.1 Intended Use").

– The owner/operating company must find out about the locally applicable industrial safety regulations, and - in addition - use a risk assessment to determine the hazards resulting from the specific working conditions at the place of use of the fitting. This must then be implemented in the form of operating instructions for the operation of the fitting.

- When using hazardous materials, protective measures must be specified in accordance with the safety data sheets and operating instructions shall be compiled for hazardous materials. Personnel must be briefed in the handling of hazardous substances.
  This also applies to hazardous substances that may arise during work processes.
- A continuous risk assessment must be carried out for workplaces, including temperature conditions for the medium and the place of use (falling). The measures must be recorded in operating instructions, and personnel must be instructed accordingly.
- Supervisors must monitor compliance with the measures specified in the operating instructions.
- Throughout the entire operating period of the fitting, the owner/operating company must keep checking whether the operating instructions that they have compiled actually correspond to the current status of the regulations, and adjust the instructions if necessary.
- The operating company must clearly regulate and specify the responsibilities of personnel (e.g. for operation, maintenance and cleaning).
- The owner/operating company must only allow sufficiently qualified and authorized personnel to work on the fitting.
- The owner/operating company must ensure that all employees handling the fitting have read and understood the manual.
  Furthermore, it must provide personnel with training at regular intervals with certification and inform them of the hazards.
- The owner/operating company must provide sufficient workplace lighting at the higher-level facility in accordance with the locally applicable regulations for occupational health and safety in order to prevent hazards occurring as a result of poor lighting.
- The owner/operating company must provide personnel with personal protective equipment and make sure that this is used (see section “2.7 Personal Protective Equipment”).
- The owner/operating company must make sure that no person works on the fitting whose ability to respond is impaired through drugs, alcohol, medication or similar.
- The owner/operating company must use appropriate measures to inform groups of persons who are not planned for direct contact with the fitting (e.g. visitor groups) about the potential dangers involved.
- The owner/operating company is obliged to operate the fitting in perfect condition at all times.
- Wherever high pneumatic pressures occur, there is a possibility of sudden failure of or damage to the lines and connections. This poses a hazard. The operating company must instruct operating and maintenance personnel at least once a year on the possible hazards.
- The constructor of the higher-level facility must install the switching and safety devices required for setting up, inspection, shutting down (including emergency shutdown), operating, maintenance, cleaning and repair, and provide proof of their installation.
- The operating company must provide fire safety devices, e.g. the appropriate quantity of suitable hand-held fire extinguishers of the appropriate size, in easily accessible places and provide employees with training in fire safety.
- Warnings in the documentation for externally supplied assembly groups must be adhered to and incorporated into the risk assessments for the specific workplace.
- Before operating the machine with the fitting, the owner/operating company shall ensure that the local specifications were followed during assembly and commissioning, if these were carried out by the owner/operating company.

NOTE

Due to deviating operating conditions at the operating company's site, additional safety measures may be required. In such cases, these measures must be added to the original safety measures by the operating company.

2.5 Safety Measures (to Be Implemented by Owner / Operating Company)

- The owner/operating company must ensure that unauthorized persons (not operating or maintenance personnel) are prevented from entering the hazardous area of the higher-level system (in which the fitting is installed).
- The owner/operating company must empty the pipelines prior to assembly and maintenance work on the fitting.
- The owner/operating company must design the disconnection of the energy sources on the higher-level facility technically in such a way that the switch-off procedure described in section 2.3.4 can be adhered to.
- This manual must be retained for future reference.
  It must be available in the vicinity of the higher-level facility in which the fitting is installed.
- The operating company must define and adhere to the intervals for inspections and control measures in accordance with the environment and media used.
- The work described in the chapters Transport, Installation, Assembly, Maintenance, Malfunctions and Disassembly/Disposal must be carried out only by experts.

2.6 Qualification Requirements for Personnel

The fitting must be operated, maintained and repaired only by persons who have the appropriate qualifications. These persons must be familiar with this manual and act in accordance with them. The respective authorizations for personnel must be clearly defined.

The following qualifications are designated in the manual for various fields of activity:

Expert/Specialist Personnel

A person with appropriate training, suitable apprenticeship and experience who is in a position to identify risks and avoid dangers.

An expert is a person whose professional training, knowledge and experience, and whose knowledge of the relevant standards and regulations, enables them to carry out work on the fitting, identify potential risks independently and to avoid them.

Only personnel with the following specific knowledge may be employed for work on the fitting:

- **Assembly/disassembly:** Industrial mechanic or similar training, practical experience in the assembly/disassembly of fittings
- **Welding work:** Welder qualification in pipeline engineering or similar apprenticeship.
- **Electrical work:** Electrician; person with appropriate specialized training, knowledge and experience, enabling them to identify and prevent risks which may be caused by electricity.

2.7 Personal Protective Equipment

In order to minimize health risks, personal protective equipment must be worn when working on the fitting.

Protective work clothing

Protective work clothing is tight-fitting work clothing with low resistance to tearing, with close-fitting sleeves and without protruding parts. It is mainly used for protection against becoming entangled in moving components.

Do not wear any rings, necklaces or other jewelry.

Safety shoes

Wear slip-resistant safety shoes for protection from heavy, falling objects and to prevent slipping on slippery surfaces.

Protective gloves

Wear protective gloves to protect your hands against friction, grazes, punctures or deeper injuries and against coming into contact with hot surfaces or chemical substances.

Protective goggles

Wear protective goggles for protection against media escaping at high pressure and against flying objects.

Hardhat

Wear a hardhat for protection against falling or flying objects.

Hearing protection

Wear hearing protection to protect yourself from increased sound pressure levels (≥ 85 dB(A)).

Welding hood

Wear a welding hood for protection from damage to the eyes or skin due to the welding arc, and from burns caused by flying particles during welding.

Personal protective equipment must be provided by the operating company in accordance with the valid requirements.
Furthermore, both the national regulations and, if necessary, the internal instructions from the operating company, must be observed.

3 Overview and Function

3.1 Plug-in Chamber with Stopper

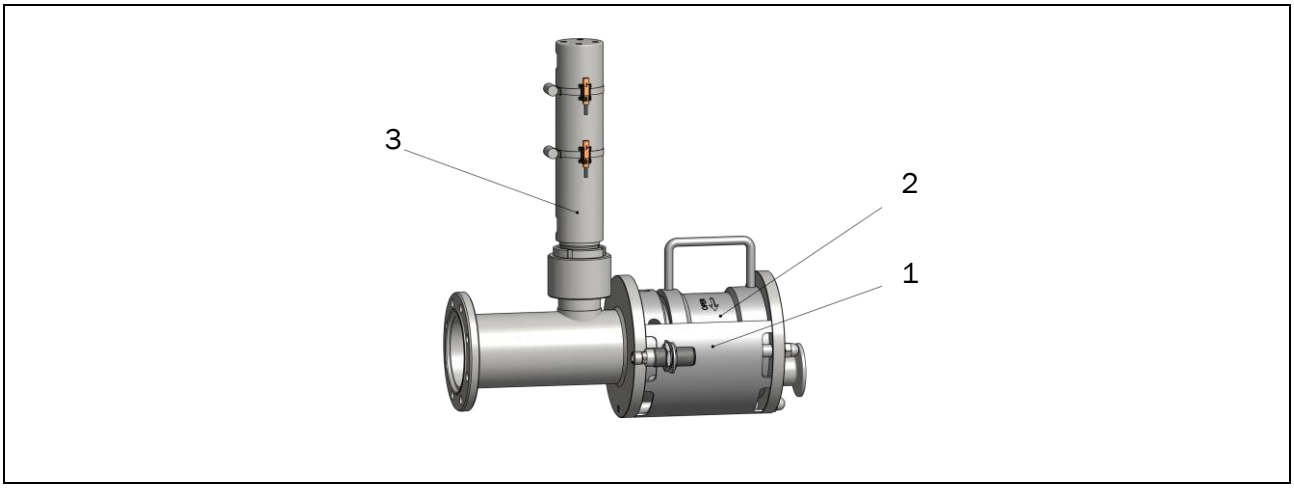

Fig. 3.1: Overview of Plug-in Chamber with Stopper

1 Housing
2 Valve chamber
3 Pig Stopper

3.2 Plug-in Chamber with Stopper and Butterfly Valve

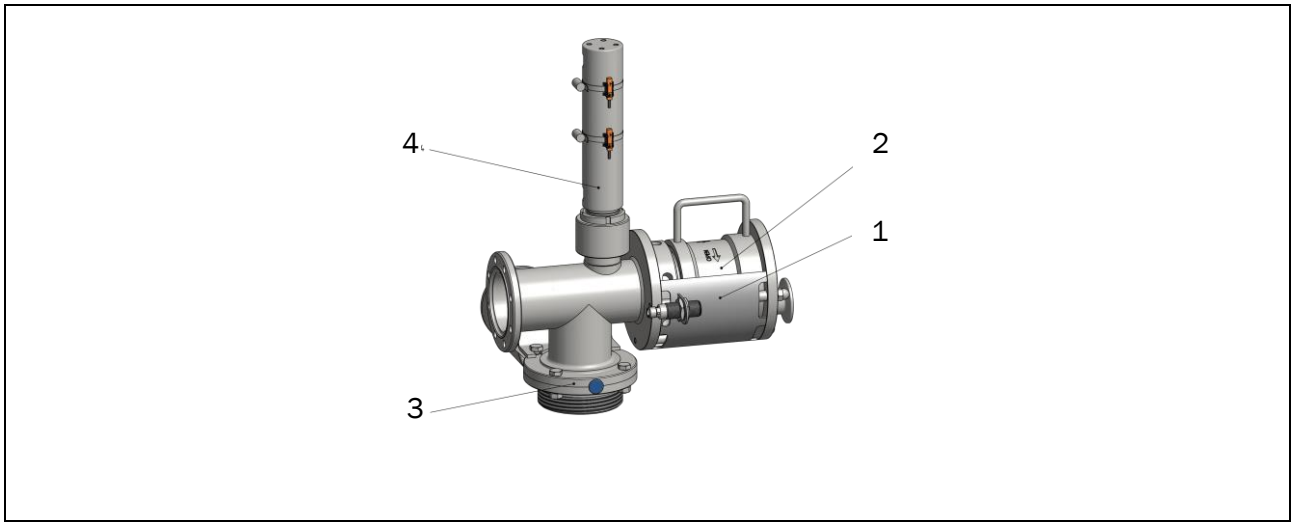

Fig. 3.2: Overview of Plug-in Chamber with Stopper and Butterfly Valve

1 Housing
2 Valve chamber
3 Product valve
4 Pig Stopper

3.3 Plug-in Chamber with Ball Valve

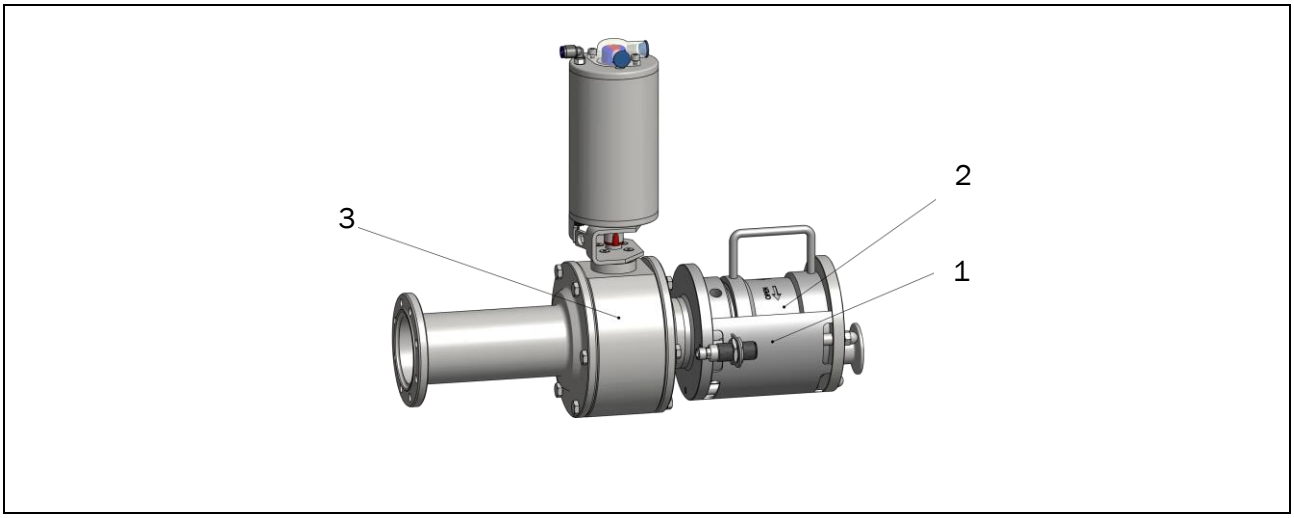

Fig. 3.3: Overview of Plug-in Chamber with Ball Valve

1 Housing
2 Valve chamber
3 Ball Valve

3.4 Plug-in Chamber with Ball Valve and Butterfly Valve

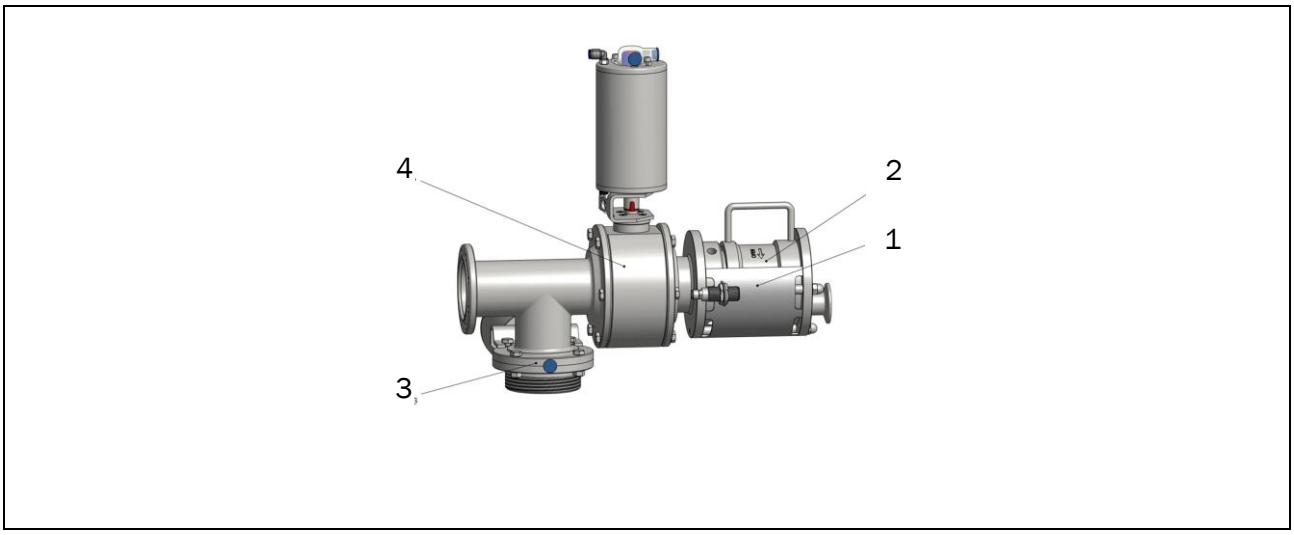

Fig. 3.4: Overview of Plug-in Chamber with Ball Valve and Butterfly Valve

1 Housing
2 Valve chamber
3 Product valve
4 Ball Valve

3.5 Pig dynamics

Principle

Pigging refers to a process by which a body is propelled through a pipe system by external energy. The pig in turn presses the content of the pipe system before it and thus out of the pipe.

The external energy is usually present in the form of pressure in front of the pig and exercises its effect directly on it. Fluids as well as gases can be used as the transmission medium.

In order to be able to use the driving energy, the pig must be reliably sealed against the interior surface of the pig and is slightly larger than the cross-section of the pipe. An elastomer provides the possibility of compensation.

In the pipeline, the pig is subjected to a strong friction stress. During operation, flow media reduce the friction between the pig and the pipe. They act as a lubricating film. If this flow medium is absent, the pig will be exposed to a greater amount of wear or will be destroyed by friction heat.

Physical Conditions

The pig is subject to Newton's Law.

The acceleration of a mass results in a force.

F = m x **a**

WARNING

Danger of Injury to Personnel!

The force for transporting the medium in the system represents a potential danger for personnel and plant components. In cases of undefined and excessively large force, parts of the higher-level plant may become destroyed. Personnel injury could occur.

- *Do not add any pressurized medium without proper controls.*
- *Add only limited amounts of driving energy.*

The maximum acceleration on the pig should not exceed 1 m/s^2. Analogously, the maximum speed of the pig should resemble the conveying speed of the medium and lie within a range of 0.3 - 1.5 m/s. The conveying speed is modified and limited by the regulation of the pressure (in cases of fluids) or of the volume flow rate (in cases of gases).

Liquid drive media

Liquids are not compressible. Their use as drive medium ensures a quiet, uniform running of the pig. The speed of the pig can be determined by the dosing of the pump pressure.

Gaseous drive media

Gases are compressible in their behavior and can form gas cushions.

Driving the pig at an insufficiently high standard flow rate causes its movement to alternate between abrupt forward movement and periods of non-movement. The consequence is the undesirable "slip/stick effect".

It is for this reason that the volume flow rate and not the pressure is to be kept constant with the aid of a driving pressure regulator. The propellant gas supply must proceed with a sufficiently high volumetric flow rate at the level of the required driving pressure.

3.5.1 Data Regarding Flow Rate and Standard Flow Rate

The conditions for passing through the pipelines are not constant but dynamic. Differences in height, different quantities of residual media in the pipe, pipe connections and bends necessitate continuous regulation of the energy to be applied.

Flow rate Q_F at Various Pig Speeds V_M

DN	Q_F in l/min at V_M = 0.3 m/s	Q_F in l/min at V_M = 0.5 m/s	Q_F in l/min at V_M = 1.0 m/s	Q_F in l/min at V_M = 1.5 m/s
25	9.56	15.93	31.86	47.78
32	14.48	24.13	48.25	72.38
40	20.41	34.02	68.05	102.07
50	35.34	58.09	117.81	176.71
65	61.58	102.64	205.27	307.91
80	92.75	154.59	309.18	463.77
100	141.37	235.62	471.24	706.86
125	220.89	368.16	736.31	1,104.47
150	318.09	530.14	1,060.29	1,590.43
200	565.49	942.48	1,884.96	2,827.43

Propellant gas standard flow rate Q_F at 3 bar driving pressure and different pig speeds V_M

DN	Q_F in l/min at V_M = 0.3 m/s	Q_F in l/min at V_M = 0.5 m/s	Q_F in l/min at V_M = 1.0 m/s	Q_F in l/min at V_M = 1.5 m/s
25	28.68	47.79	95.58	143.37
32	43.44	72.39	144.78	217.17
40	61.23	102.06	204.12	306.18
50	106.02	176.70	353.40	530.10
65	184.74	307.92	615.84	923.76
80	278.25	463.77	927.54	1,391.31
100	424.11	706.86	1,413.72	2,120.58
125	662.67	1,104.48	2,208.96	3,313.44
150	954.27	1,590.42	3,180.84	4,771.26
200	1,696.47	2,827.44	5,654.88	8,482.32

4 Technical Data

4.1 General Data

Ambient temperature range:

Lower limit temperature:	+5 °C /	+41 °F
Upper limit temperature:	+60 °C /	+140 °F

Max. permissible operating temperature: (depends on the sealing material and medium)	+100 °C /	+212 °F
Installation orientation:	horizontal, vertical	

The area of application for the fitting must always be adjusted to the corresponding operating conditions and the materials that come into contact with the product.

The maximum continuous temperature is dependent on the media.

4.2 Materials in Contact with the Product

Housing:	1.4404/1.4301
Valve chamber:	1.4404
Valve:	1.4404
T-piece:	1.4404
Gaskets:	EPDM

Surfaces

Exterior surface:	metal-bright
Inner surfaces in contact with the product:	Ra < 0.8 µm

4.3 Energy Supply

4.3.1 Compressed Air Connection

Nominal pressure:	PN	10 bar	/	145 psi	
Control air:	max.	10 bar	/	145 psi	(free of oil, grease and water)

4.3.2 Electrical Energy Supply

Refer to the external data sheets and manufacturer's instructions for the data on the energy supply for connection of proximity switches (< 50 V).

4.4 Connection Variants, Type Series, Dimensions

Examples of the various connection variants for the fitting are listed below. Installation should be either horizontal or vertical. See the table for the dimensions.

You can find additional technical information on the product pages of the current AWH catalog, at http://www.awh.eu or you can request it directly from AWH. The product identification numbers in the catalog and in the manual must be identical.

The dimensions in the table are in mm, except for the thread dimension, which is in inches, e.g. Rd 65 x 1/6".

4.4.1 Plug-in Chamber with Stopper

DIN, Series A connection variants

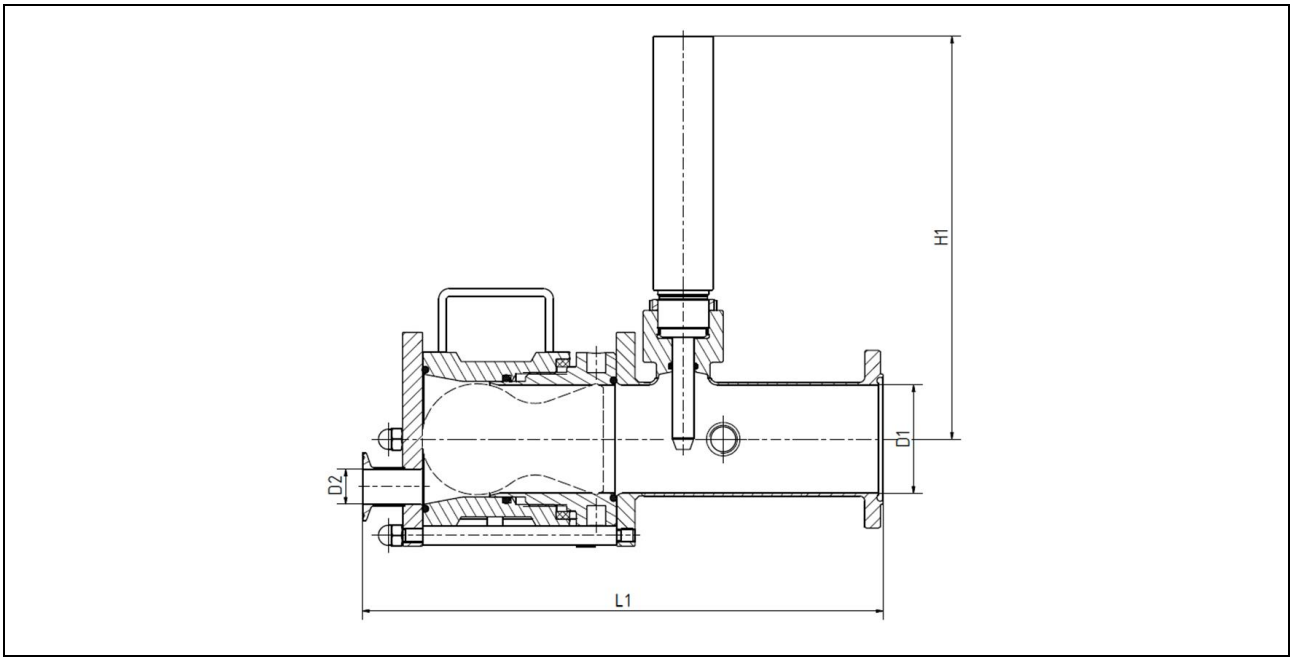

Fig. 4.1: Plug-in Chamber with Stopper, Connection Variant DIN, Series A

DN	D1	D2	L1	H1
25	26	16	250	278
40	38	16	280	281
50	50	26	305	288
65	66	26	340	290
80	81	26	390	293
100	100	26	460	295

Inch, Series D connection variants

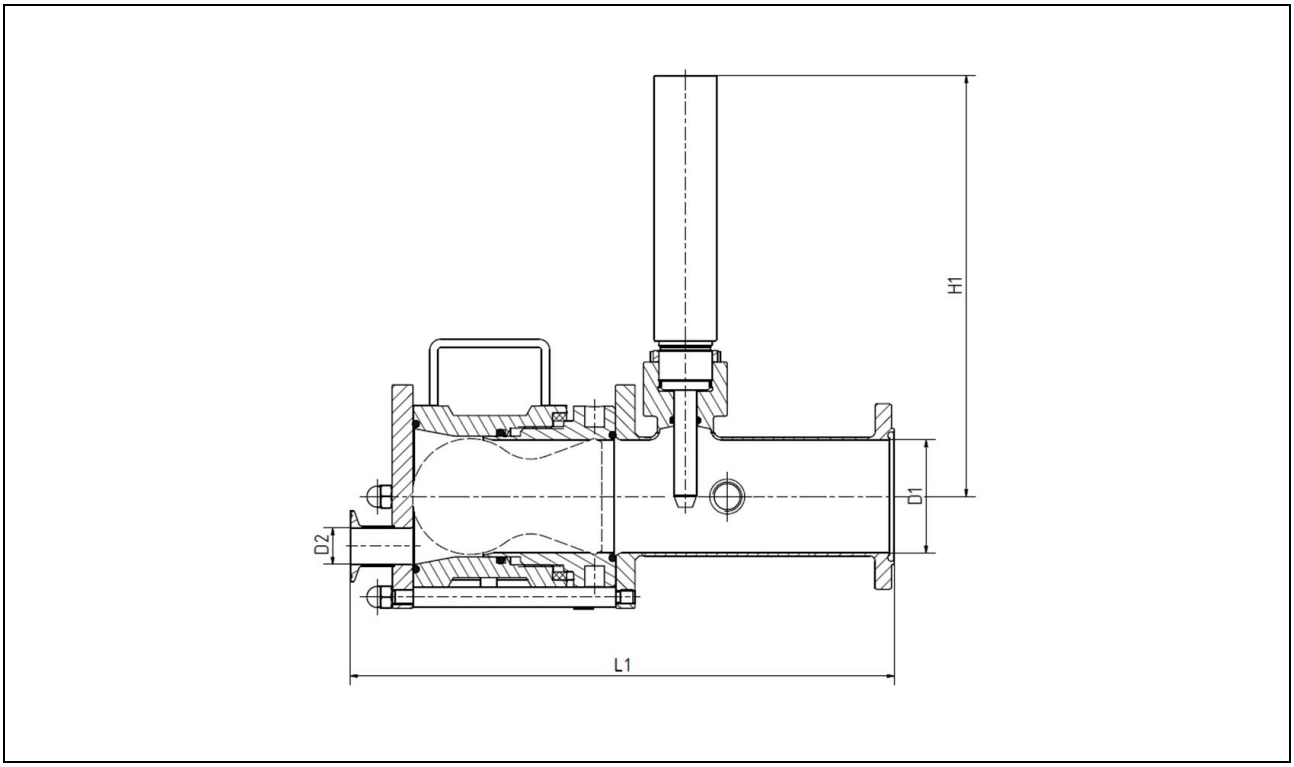

Fig. 4.2: Plug-in Chamber with Stopper, Connection Variant Inch, Series D

DN	D1	D2	L1	H1
1"	22.1	16	245	276
1 1/2"	34.8	16	275	280
2"	47.5	26	305	287
2 1/2"	60.2	26	330	288
3"	72.9	26	380	289
4"	97.38	26	460	294

ISO, Series C connection variants

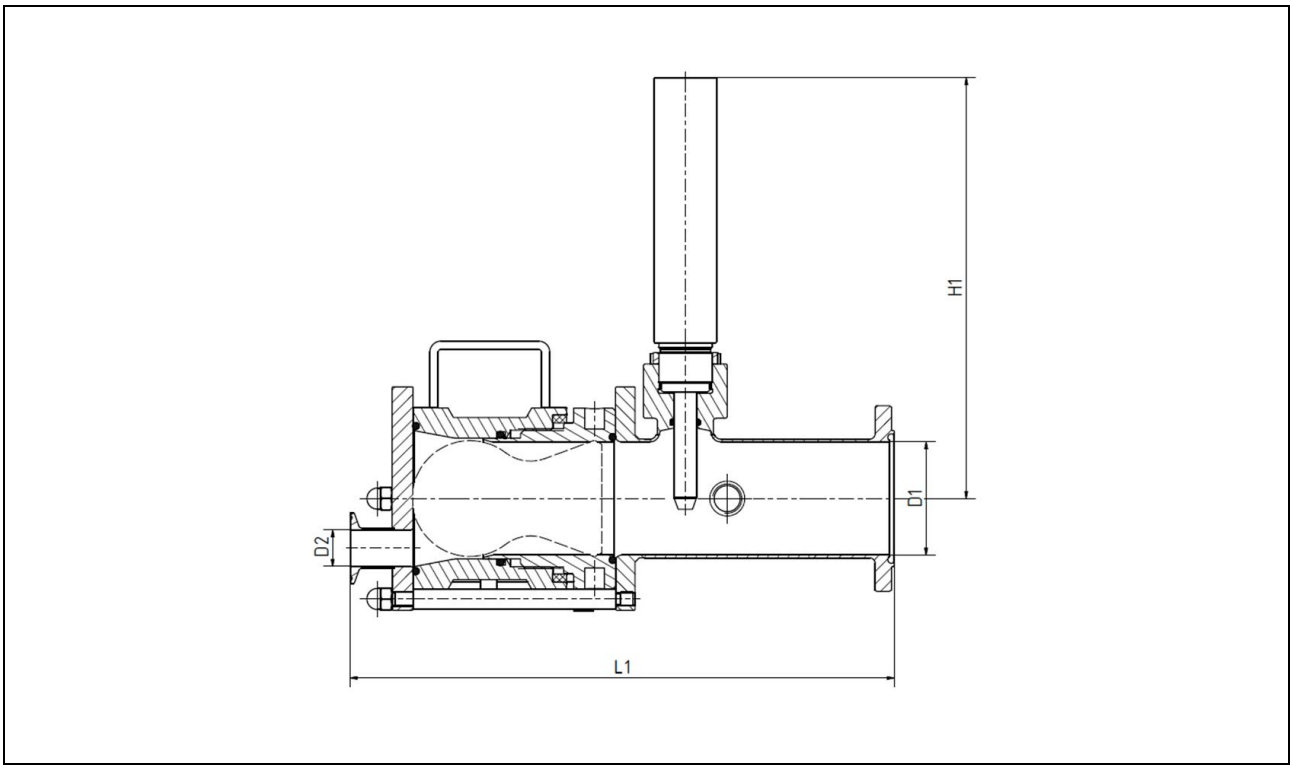

Fig. 4.3: Plug-in Chamber with Stopper, Connection Variant ISO, Series C

DN	D1	D2	L1	H1
33.7	29.7	16	260	280
48.3	44.3	26	300	285
60.3	56.3	26	325	292
76.1	72.1	26	385	294
88.9	84.3	26	400	295
114.3	109.7	26	420	300

SMS, Series D connection variants

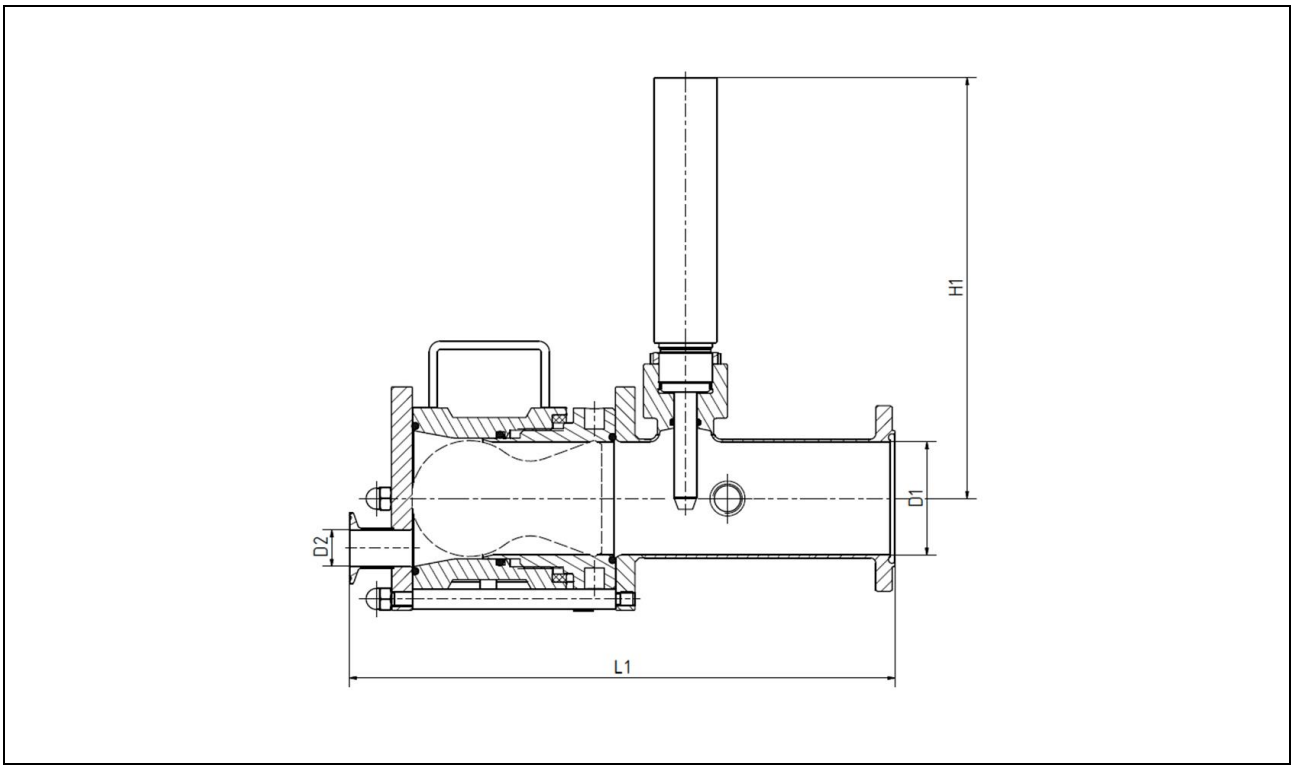

Fig. 4.4: Plug-in Chamber with Stopper, Connection Variant SMS, Series D

DN	D1	D2	L1	H1
25	22.5	16	243	276
38	35.5	16	274	280
51	48.5	26	303	287
63.5	60.5	26	328	288
76.1	72.9	26	378	289

4.4.2 Plug-in Chamber with Stopper and Butterfly Valve

DIN, Series A connection variants

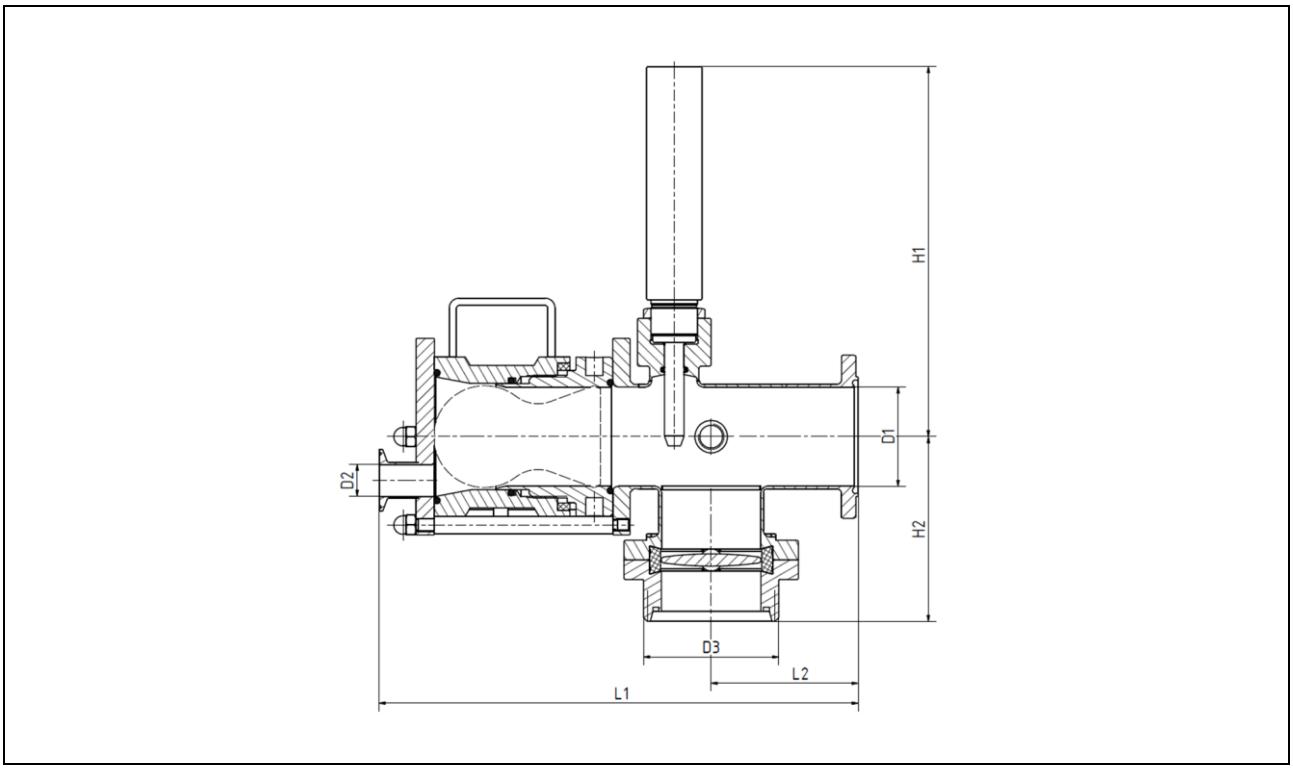

Fig. 4.5: Plug-in Chamber with Stopper and Butterfly Valve, Connection Variant DIN, Series A

DN	D1	D2	D3	L1	L2	H1	H2
25	26	16	Rd 52 x 1/6"	250	75	278	68
40	38	16	Rd 65 x 1/6"	280	85	281	83
50	50	26	Rd 78 x 1/6"	305	90	288	91
65	66	26	Rd 95 x 1/6"	340	100	290	126
80	81	26	Rd 110 x 1/4"	390	120	293	149
100	100	26	Rd 130 x 1/4"	460	155	295	165

Inch, Series D connection variants

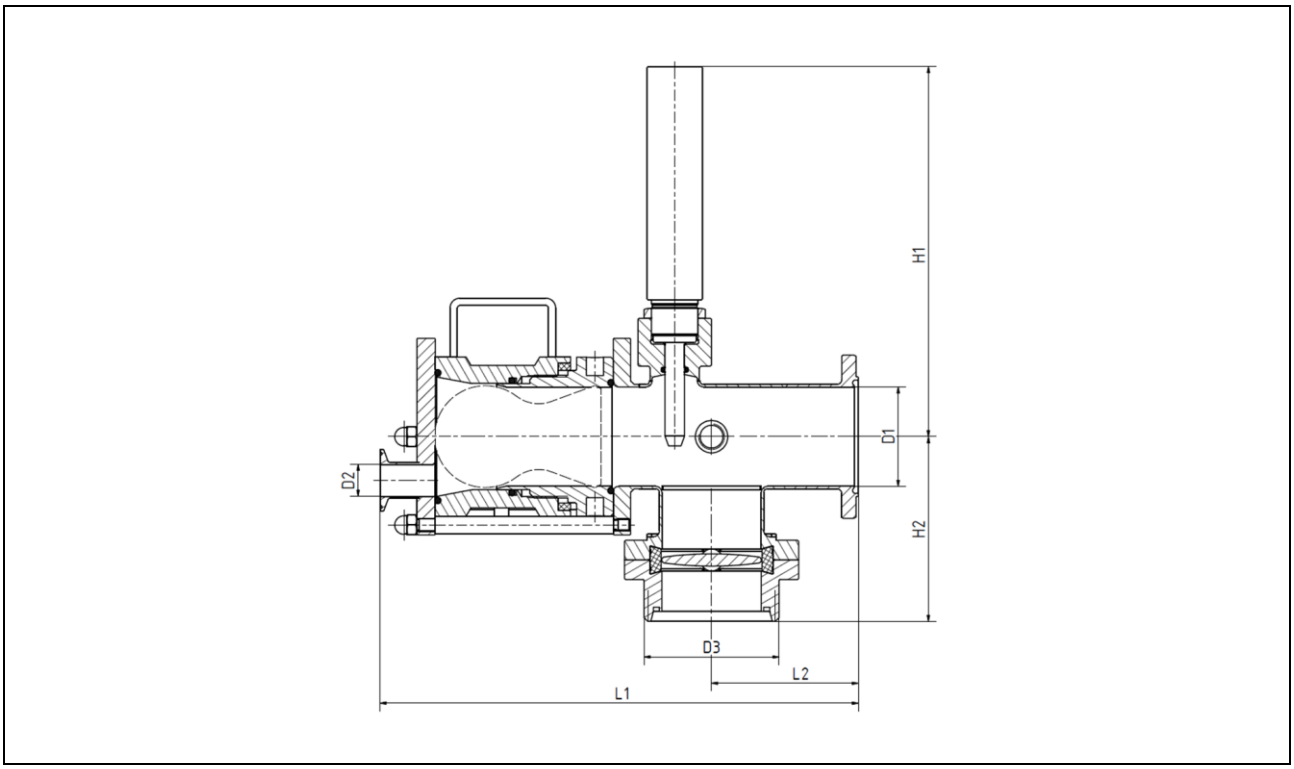

Fig. 4.6: Plug-in Chamber with Stopper and Butterfly Valve, Connection Variant Inch, Series D

DN	D1	D2	D3	L1	L2	H1	H2
1"	22.1	16	Rd 52 x 1/6"	245	70	276	66
1 1/2"	34.8	16	Rd 65 x 1/6"	275	85	280	82
2"	47.5	26	Rd 78 x 1/6"	305	90	287	94
2 1/2"	60.2	26	Rd 95 x 1/6"	335	105	288	123
3"	72.9	26	Rd 104 x 1/6"	380	115	289	146
4"	97.36	26	Rd 130 x 1/4"	460	155	294	164

ISO, Series C connection variants

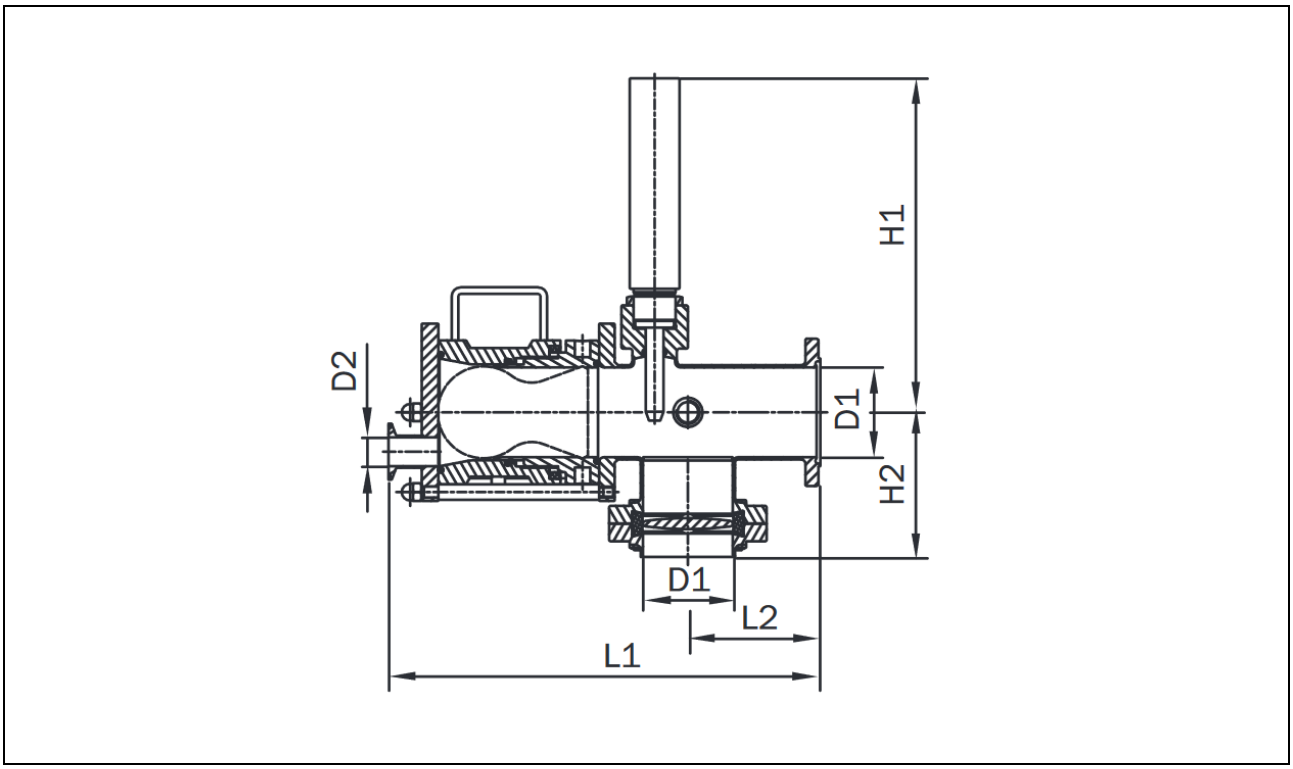

Fig. 4.7: Plug-in Chamber with Stopper and Butterfly Valve, Connection Variant ISO, Series C

DN	D1	D2	L1	L2	H1	H2
33.7	29.7	16	260	70	280	70
48.3	44.3	26	300	75	285	86
60.3	56.3	26	325	85	292	95
76.1	72.1	26	385	95	294	129
88.9	84.3	26	400	120	295	150
114.3	109.7	26	405	125	300	170

SMS, Series D connection variants

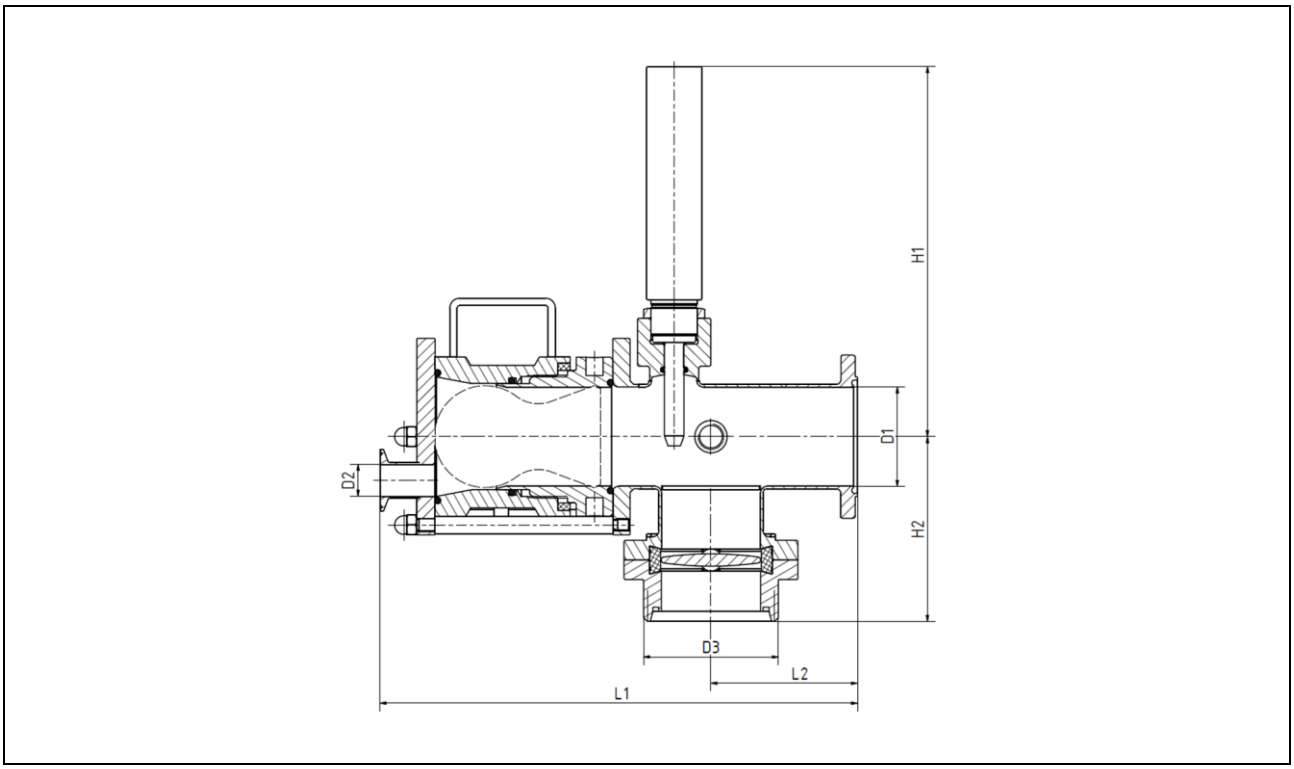

Fig. 4.8: Plug-in Chamber with Stopper and Butterfly Valve, Connection Variant SMS, Series D

DN	D1	D2	D3	L1	L2	H1	H2
25	22.5	16	Rd 40 x 1/6"	245	70	276	66
38	35.5	16	Rd 60 x 1/6"	275	85	280	82
51	48.5	26	Rd 70 x 1/6"	305	90	287	94
63.5	60.5	26	Rd 85 x 1/6"	330	105	288	123
76.1	72.9	26	Rd 98 x 1/6"	380	115	289	146

4.4.3 Plug-in Chamber with Ball Valve

DIN, Series A connection variants

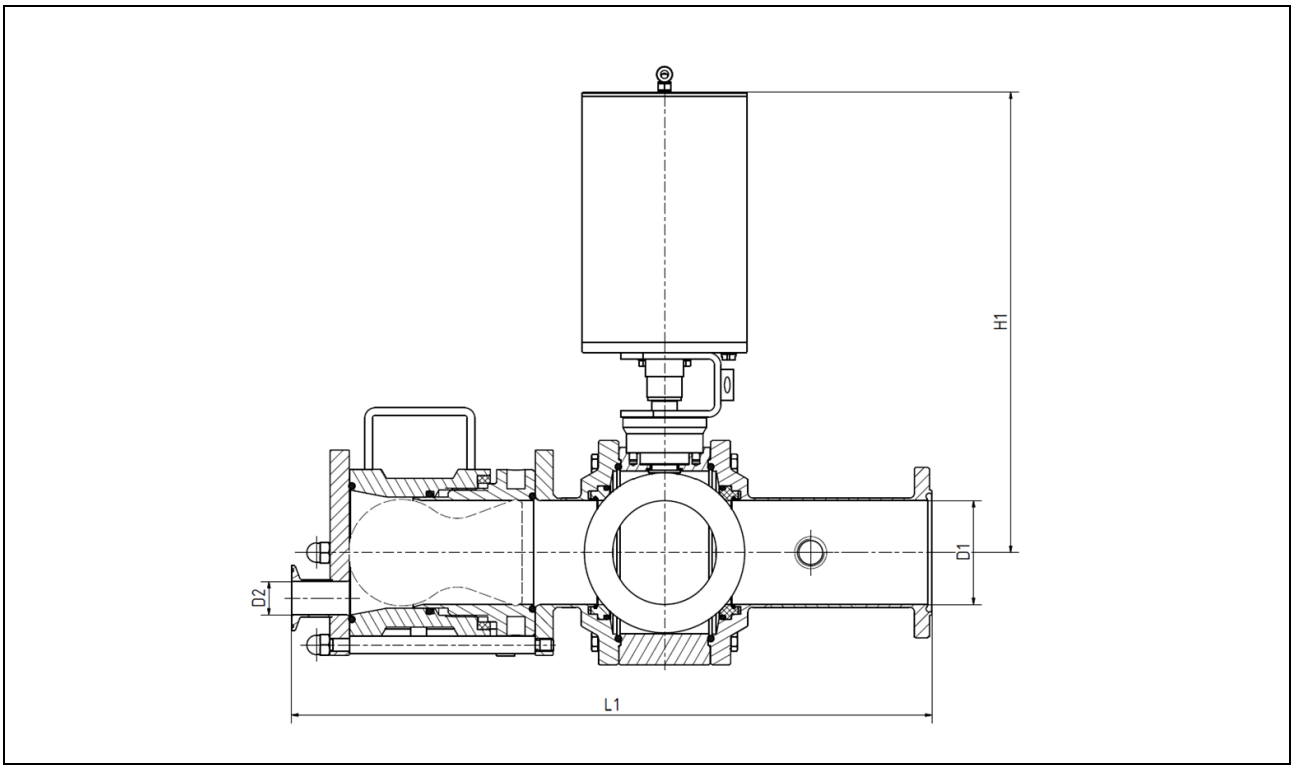

Fig. 4.9: Plug-in Chamber with Ball Valve, Connection Variant DIN, Series A

DN	D1	D2	L1	H1
40	38	16	330	263
50	50	26	365	271
65	66	26	420	281
80	81	26	500	359
100	100	26	610	377

Inch, Series D connection variants

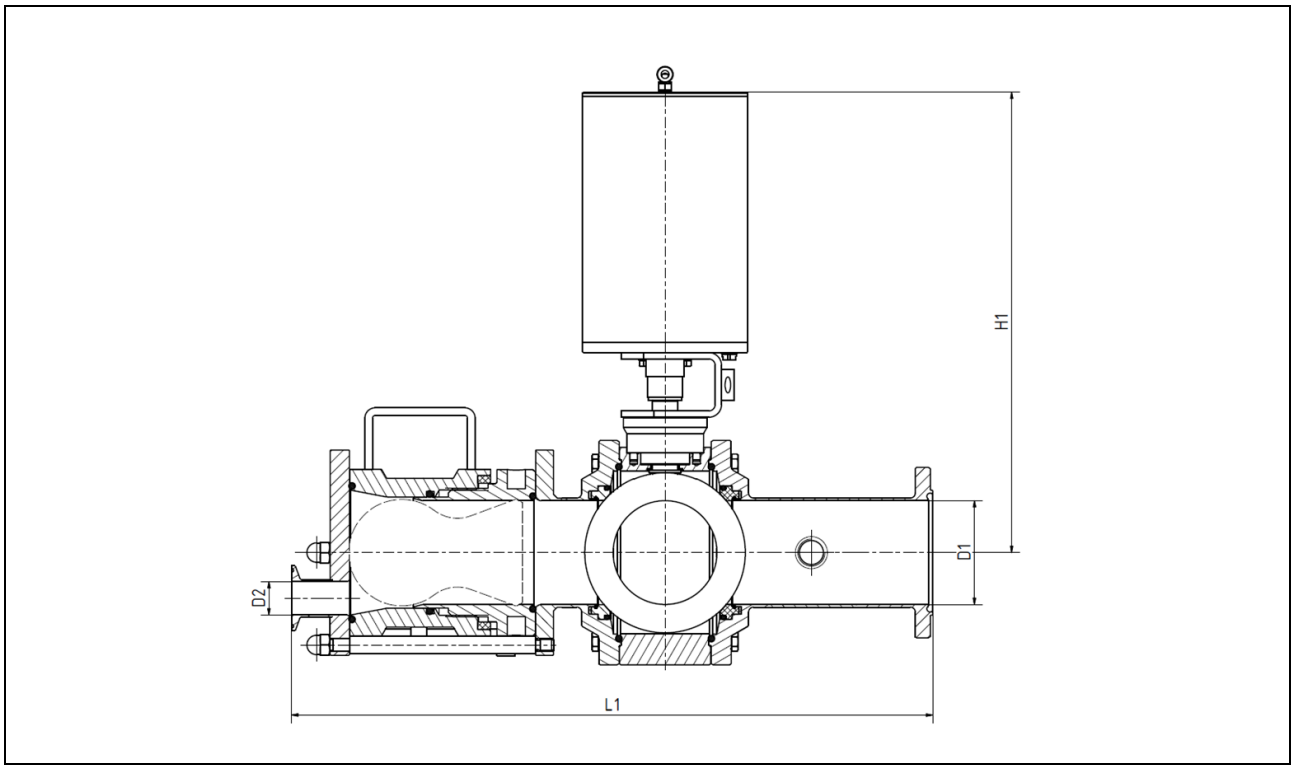

Fig. 4.10: Plug-in Chamber with Ball Valve, Connection Variant Inch, Series D

DN	D1	D2	L1	H1
1 1/2"	34.8	16	325	266
2"	47.5	26	365	268
2 1/2"	60.2	26	415	284
3"	72.9	26	510	359
4"	97.38	26	605	377

SMS, Series D connection variants

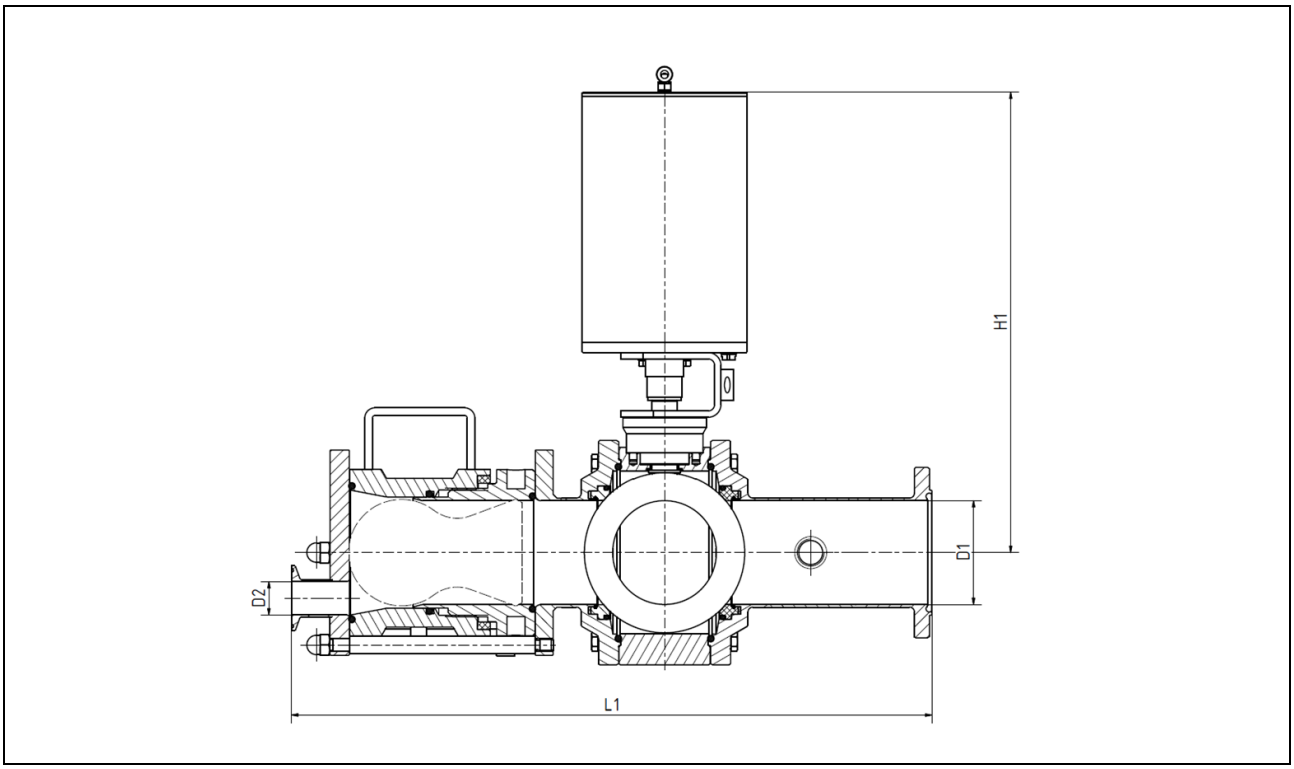

Fig. 4.11: Plug-in Chamber with Ball Valve, Connection Variant SMS, Series D

DN	D1	D2	L1	H1
38	35.5	16	325	263
51	48.5	26	365	268
63.5	60.5	26	415	284
76.1	72.9	26	510	359

4.4.4 Plug-in Chamber with Ball Valve and Butterfly Valve

DIN, Series A connection variants

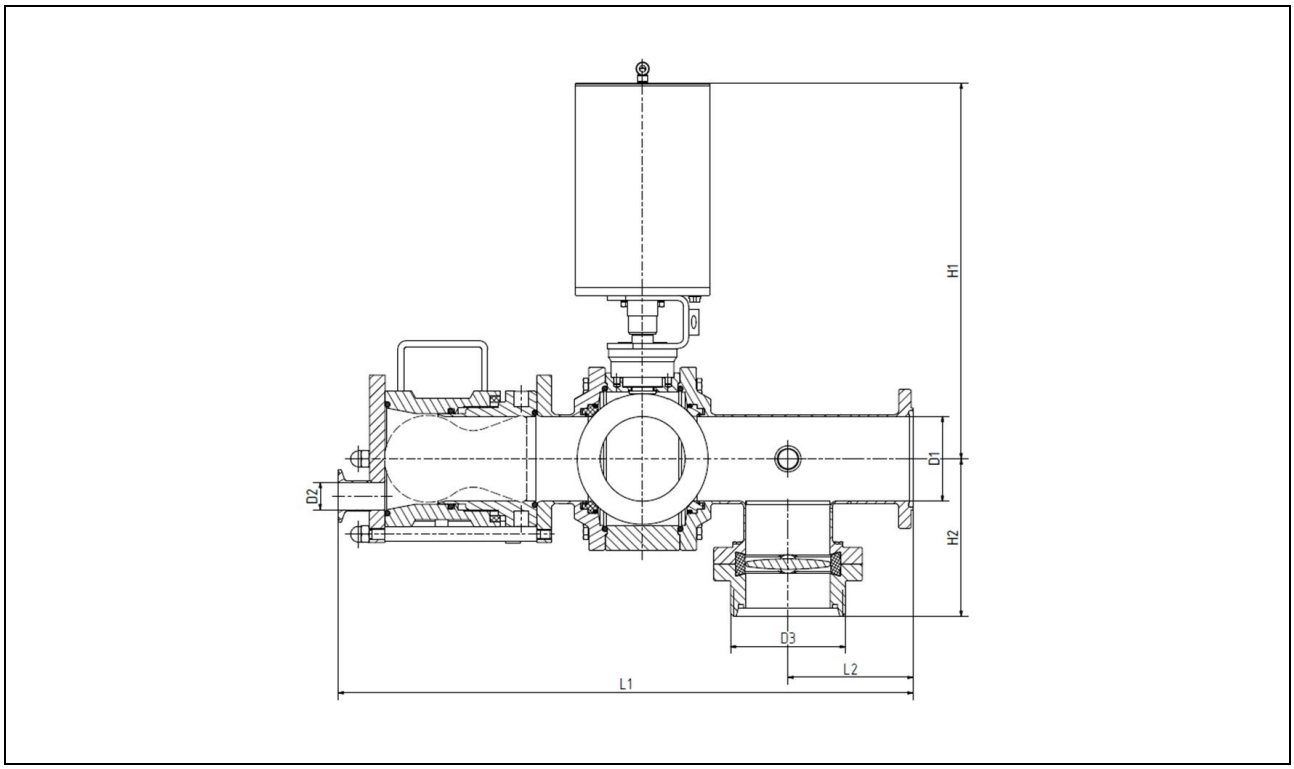

Fig. 4.12: Plug-in Chamber with Ball Valve and Butterfly Valve, Connection Variant DIN, Series A

DN	D1	D2	D3	L1	L2	H1	H2
40	38	16	Rd 65 x 1/6"	380	85	263	83
50	50	26	Rd 78 x 1/6"	420	90	271	91
65	66	26	Rd 95 x 1/6"	470	100	284	126
80	81	26	Rd 110 x 1/4"	550	120	359	149
100	100	26	Rd 130 x 1/4"	660	155	377	165

Inch, Series D connection variants

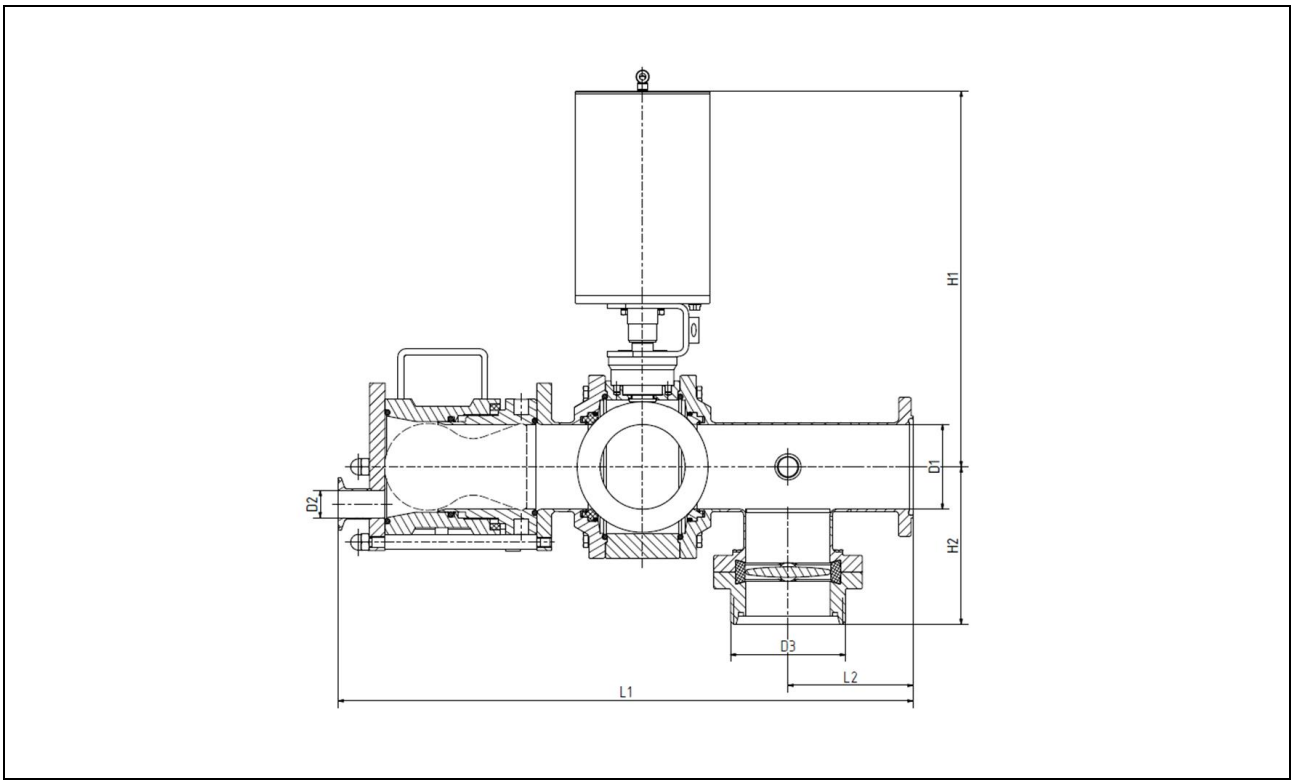

Fig. 4.13: Plug-in Chamber with Ball Valve and Butterfly Valve, Connection Variant Inch, Series D

DN	D1	D2	D3	L1	L2	H1	H2
1 1/2"	34.8	16	Rd 65 x 1/6"	385	85	266	82
2"	47.5	26	Rd 78 x 1/6"	425	90	268	94
2 1/2"	60.2	26	Rd 95 x 1/6"	475	105	284	123
3"	72.9	26	Rd 104 x 1/6"	570	115	359	146
4"	97.36	26	Rd 130 x 1/4"	675	155	377	164

SMS, Series D connection variants

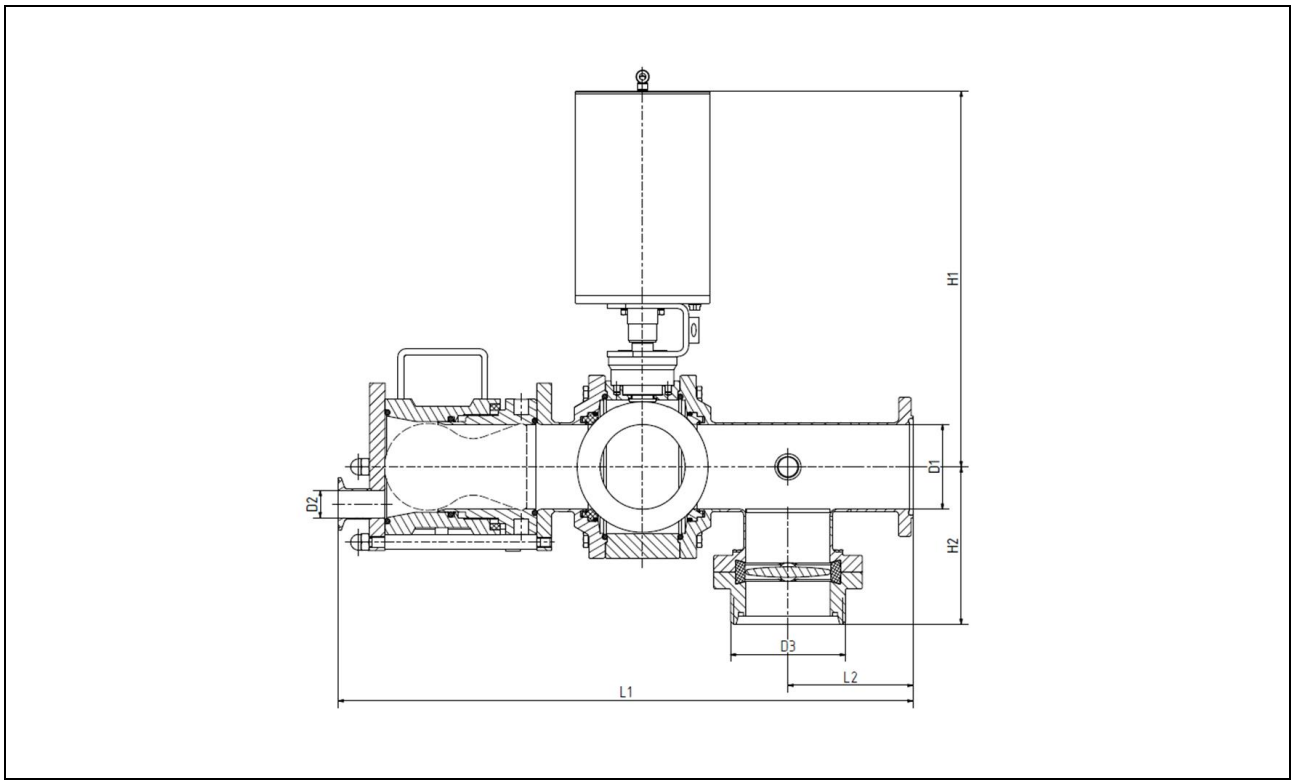

Fig. 4.14: Plug-in Chamber with Ball Valve and Butterfly Valve, Connection Variant SMS, Series D

DN	D1	D2	D3	L1	L2	H1	H2
38	35.5	16	Rd 60 x 1/6"	415	85	263	82
51	48.5	26	Rd 70 x 1/6"	425	90	268	94
63.5	60.5	26	Rd 85 x 1/6"	470	105	284	123
76.1	72.9	26	Rd 98 x 1/6"	565	115	359	146

5 Installation

5.1 Scope of Delivery

The detailed scope of delivery can also be found in the order confirmation.

5.2 Transport and Packaging

AWH products are carefully checked and packed before shipping. However, it is still possible for the product to become damaged during transport.

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

CAUTION

Danger from setting the packaging down!

A danger exists of minor injuries and crushing when the packaging is set down.

- *When transporting the packaging, proceed with particular care.*
- *Wear safety shoes and protective gloves (see section 2.7 Personal Protective Equipment).*

5.2.1 Delivery (including Spare and Replacement Parts)

Incoming Goods Inspection

- Check the product against the delivery note to ensure that it has been delivered in complete form.
- Check for visible damage to the packaging.

Unpacking

- Remove the protective caps from the pipe connections (where applicable).
- Remove the remaining packaging.

Damage

- Check the delivery for damage (visual inspection).

Complaints

If the delivery has been damaged during transport:
- Contact the last shipping agent immediately.
- Retain the packaging (for possible inspection by the shipping agent or for return delivery).

Packaging for return delivery

If possible, use the original packaging and the original packaging material. If neither is available any more, request a packaging company with specialist personnel. Consult AWH if you have any questions regarding packaging and transport safety.

5.2.2 Temporary Storage

The freight packaging for the fitting and spare/replacement parts is designed to be stored for 3 months following delivery.

Storage should be carried out in an enclosed, dry room.

Storage conditions:
- Temperature: +10 °C – +45 °C/+50 °F – +113 °F
- Humidity: < 60% (non-condensing)

5.3 Installation Components

Pig

The pig is an elastic, solid body that must provide reliable sealing in the pipe for functional purposes.

Pipe

Pipes must have the same diameter throughout. The roughness is subject to increased requirements in order to enable uninterrupted sealing and unimpaired running of the pig. An interior surface with a roughness of Ra ≤ 0.8 (Ra < 1.6 in the area of the weld seam) prevents the wear and the abrasion on the pig to be excessively high.

Interior diameter tolerance: ±0.5% nominal diameter

Roundness tolerance: ±0.5% nominal diameter

Generally speaking, pipes in accordance with the Standards DIN EN 10357, DIN 2430 and DIN 11866 fulfill the necessary requirements. The wall thicknesses are sufficient with adequately low pig speeds.

Pipe bends

A reliable sealing of the pig must be ensured in pipe bends. This sets limits to the radius of curvature.

AWH tangent pig: minimal radius of curvature R_{min} = 1.0 – 1.5 x pipe diameter (BA2/3, DIN 2605)

AWH lip pig: minimal radius of curvature R_{min} = 2.5 x pipe diameter (BA5, DIN 2605)

An offset-free installation offers bends with extended approaches (orbital weld-on ends).

Pipe connections

All detachable and non-detachable pipe connections must be implemented without offsets along the entire pigging section.

Tolerance offset: ±0.2 mm

Detachable pipe connections in accordance with DIN 11853/11864 or DIN 2430 meets these requirements. Non-detachable connections require orbital welding.

Maximum ridging (reinforcement): 0.5 mm

The length of the pipeline to be pigged is not restricted.

Branch/T-piece

The use of product recovery technology requires specially designed t-pieces. These are equipped with a guide on the branch. Only pigs with at least two sealing elements enable traversal of a branch. One of these sealing elements must be responsible for securing the sealing under any and all circumstances. Furthermore, the pig must be directed through the outflow in order to avoid falling in. The nominal width of the branch is dependent on the pig geometry.

AWH tangent pig: Nominal width of outflow = nominal width of pipe

AWH lip pig: Nominal width of outflow = one nominal width less than the nominal width of the pipe

Pig fittings

Pig fittings are used for the inserting, the transporting and the discharging of the pig. They ensure uniform and quiet running of the pig through the pipe system.

CAUTION

> ***Danger of injury from energy for pig transport!***
>
> *The energy applied for transporting the pig may represent a potential danger for personnel and plant components.*
>
> – *Use fittings for which there are no open ends present for an unimpeded pig exit and with which the pig can be removed only depressurized state.*

Pressure Equipment Directive

A pig pipe is not subject to acceptance when non-hazardous fluids are used. It is sufficient to have the pipeline designed and manufactured in accordance with “good engineering practice”. This applies up to a nominal width of DN 100 and to a pressure level of PN 16. According to the Pressure Equipment Directive, the assessment is independent of the length of the pipeline.

5.4 Welding Guidelines

The welding into pipes is carried out according to DIN EN 10357 or DIN 11866.

Welding method: TIG or orbital welding

Seam type: Butt weld joint according to DIN EN 29692

Installed Condition

– Avoid damage to gaskets.
– If necessary, dismantle the fittings before commencing welding work.

Welded Seam Preparation

- Cut the ends of the pipes level and right-angled.
- Remove burrs from the interfaces.
- Align the housing weld-on ends with the pipeline so they are level radially and axially.

The weld-on ends must fit flush and be welded without a gap.

Filler Materials

Base Material	Suitable Filler Material
1.4301	1.4302, 1.4316, 1.4551
1.4404	1.4430, 1.4455, 1.4576
1.4435	1.4430, 1.4440

Welding

- Flush the weld seam area prior to welding.
- Affix 3 to 4 tack weld-ons before welding.
- Form the weld seam area while welding and the cooling-down phase.

Welding Post-Treatment

No treatment is necessary on the interior after welding.

Accessible points can be improved by grinding.

The exterior can be treated afterwards by staining, brushing, grinding and polishing.

Cleaning

- Clean all welded parts before assembly.

5.5 Installing the plug-in chamber

The fitting is installed in accordance with the structural layout of the pipe system and the technical data for the connection variants (see section 4.4Connection Variants, Type Series, Dimensions). Installation is horizontal or vertical.

See the dimensional drawings for the installation dimensions. Make sure sufficient space is available for operation and maintenance (1 m around the fitting).

WARNING

Risk of serious injury due to leaking flange connections and pipe connections!

Escaping compressed air or flow media at high pressure poses a risk of serious eye or skin injuries.

- *The fitting may be installed only by an expert.*
- *Make sure that the flange connections and pipe connections do not have any leaks.*
- *After installation, tensile and compressive stress must be ruled out.*

- Check the gaskets for damage and replace them if necessary.
- Replace the gaskets when replacing components.
- Clean the installation space and check for any damage.
- Set the fitting at the flange connections of the product inlet and the product outlet.
- Tighten the screw connection cross-wise and in small increments until the metal stop is reached.
- Tighten the connections sufficiently securely that they will remain free of leaks.
- Connect the pneumatic cylinder with the compressed air supply.
- Fasten the initiators for position detection.
- Connect the initiators with the control.

5.6 Adjusting the end positions of the pig stopper

The pig is secured in the plug-in chamber. This positional security is ensured by the support cylinder (pig stopper). Compressed air can be used to move the support cylinder (Fig. 5.1, Item 1) into two switching positions. Each of the two positions can be queried for automation.

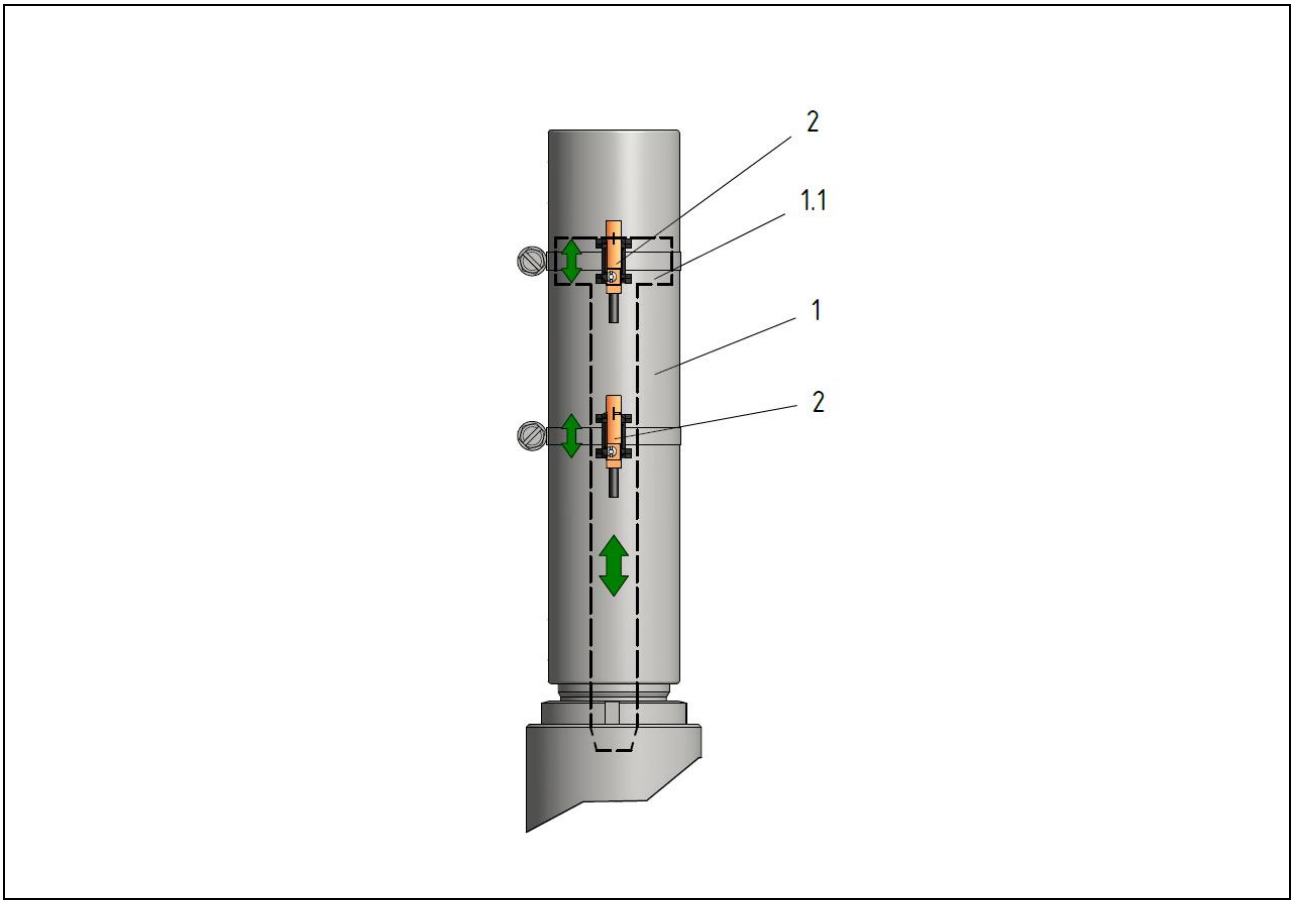

Fig. 5.1: Assembly Sensor positional security cylinder

Retracted Position

- Retract the piston rod (Fig. 5.1, Item 1.1) of the pneumatic cylinder all the way in, up to the end position.
- Assemble the initiator (Fig. 5.1, Item 2) in such a way that a reliable response on the part of the piston rod is ensured.

Extended Position

- Extend the piston rod (Fig. 5.1, Item 1.1) of the pneumatic cylinder all the way out into the end position.
- Assemble the second initiator (Fig. 5.1, Item 2) in such a way that a reliable response on the part of the piston rod is ensured.

5.7 Assembling and Adjusting the Pig Sensor

The pig (Fig. 5.2, Item 1) can be operated in both directions (bidirectional). A magnet is located in the pig (Item 1.1). With the aid of the magnet, the pig sensor (Item 2) enables a position determination and response regarding the pig position. This response is to the electronic control.

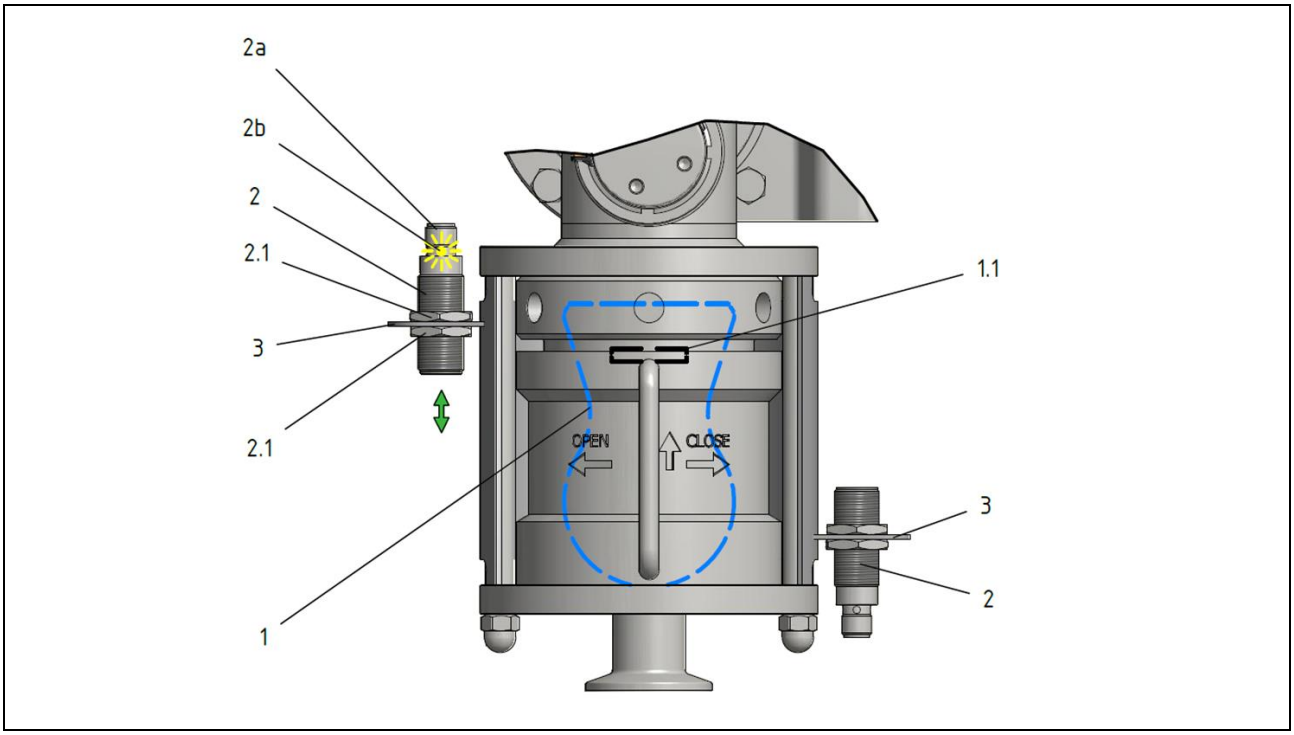

Fig. 5.2: Pig sensor assembly and adjustment

- Determine the operating direction.
- Assemble the pig sensor (Item 2) on the holding plate (Item 3).
- Adapt the pig sensor at the connection (Item 2a) with the Process Management System (PMS).
- Shift the pig sensor axially to shift it into the optimum position. Use the response of the LEDs (Item 2b) to accomplish this.
- Secure the pig sensor in its position with two retaining nuts (Item 2.1).

5.8 Switching States

Consult the two tables below (Fig. 5.3 and 5.4) to obtain the switching states of the sensors for the various work cycles.

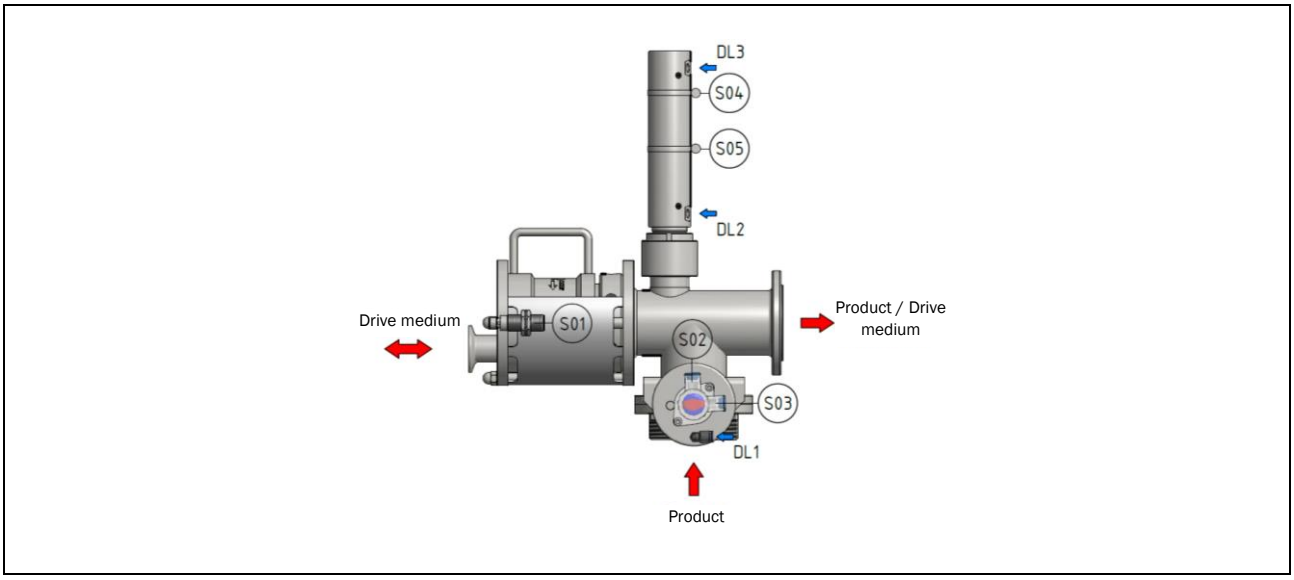

Fig. 5.3: Switching states of Plug-in Chamber with Stopper and Butterfly Valve

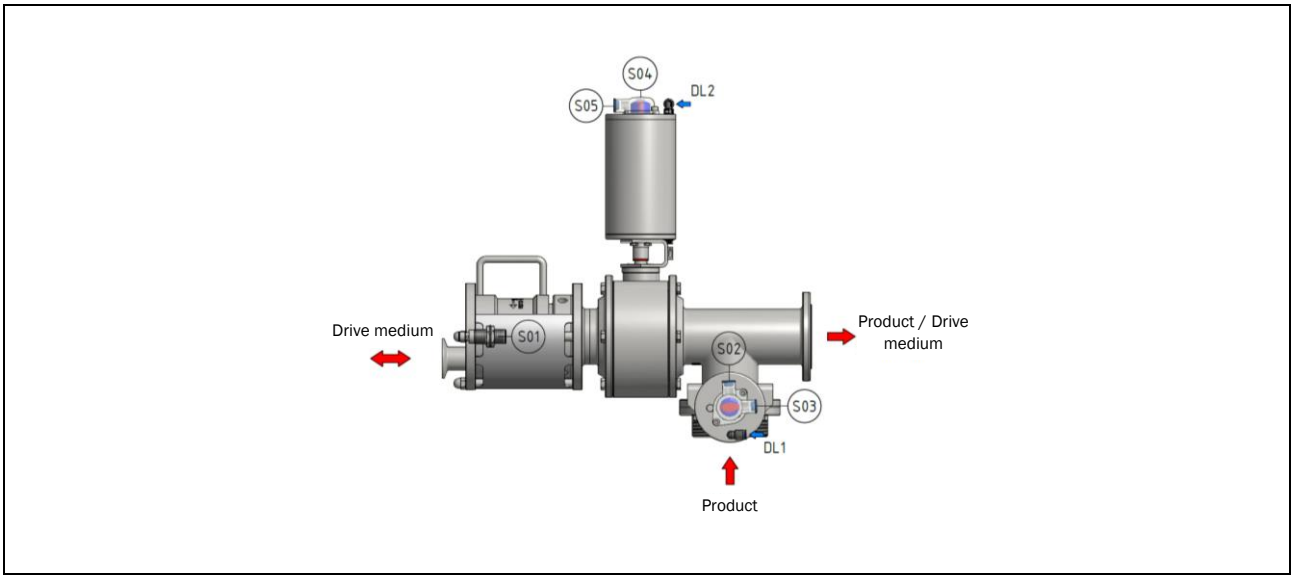

Fig. 5.4: Switching states of Plug-in Chamber with Ball Valve and Butterfly Valve

Switching Cycle	S01	S02	S03	S04	S05	DL1	DL2	DL3
Product cycle	1	1	0	0	1	1	0	1
Unlocking	1	1→0	0→1	0→1	1→0	0	1	0
Product ejection	1→0	0	1	1	0	0	1	0
Returning	0→1	0	1	1	0	0	1	0
Locking	1	0	1	1→0	0→1	0	0	1

6 Disassembly/Assembly

WARNING

Risk of serious injury due to incorrect disassembly/assembly!

When using harmful or toxic media, or media which are hazardous in any other way, there is a risk of intoxication or chemical burns!

- *The work may be performed only by an expert.*
- *Always adhere to the switch-off procedure without fail before all assembly, maintenance and repair work (see section 2.3.4Switch-off Procedure).*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*
- *If in doubt, contact a specialist company or AWH.*

WARNING

Risk of burns due to hot media!

There is a risk of burning if flow media have temperatures over +60 °C/+140 °F.

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

6.1 Structure of Plug-in Chamber

6.1.1 Plug-in Chamber with Stopper

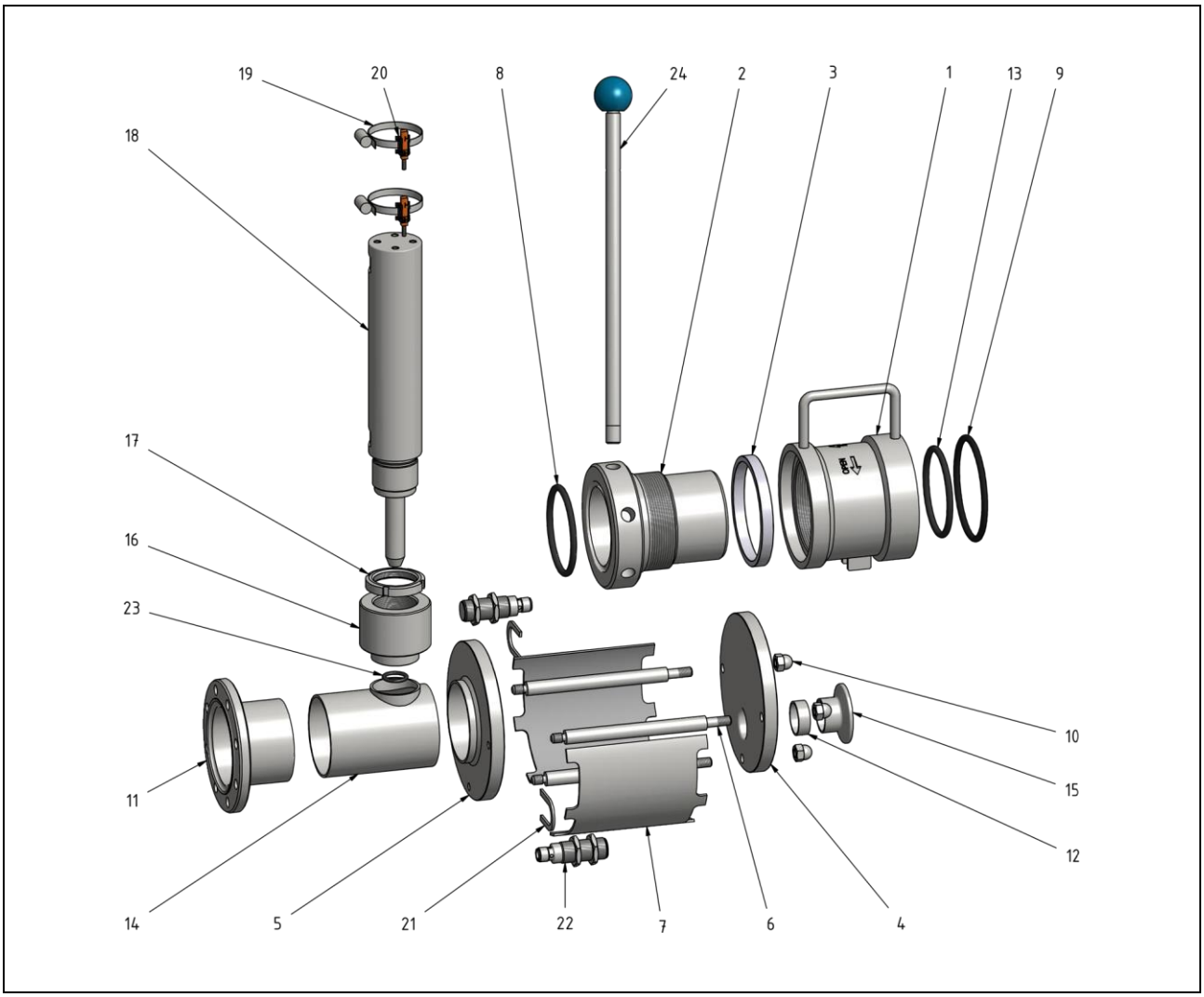

Fig. 6.1: Structure of Plug-in Chamber with Stopper

1	Valve chamber Part 1	13	O-ring
2	Valve chamber Part 2	14	T-piece
3	Support ring	15	Clamp connection DIN 32676
4	Housing lid 1	16	Pig stopper receptacle
5	Housing lid 2	17	Nut
6	Tension anchor	18	pneumatic cylinder
7	Shell plate	19	Clamping strap for round cylinder
8	O-ring	20	induct. Sensor
9	O-ring	21	Holding plate INI
10	Cap nut	22	Magnet sensor
11	Nut flange DIN 11864-2	23	O-ring
12	Pipe section	24	Handle bar

6.1.2 Plug-in Chamber with Stopper and Butterfly Valve

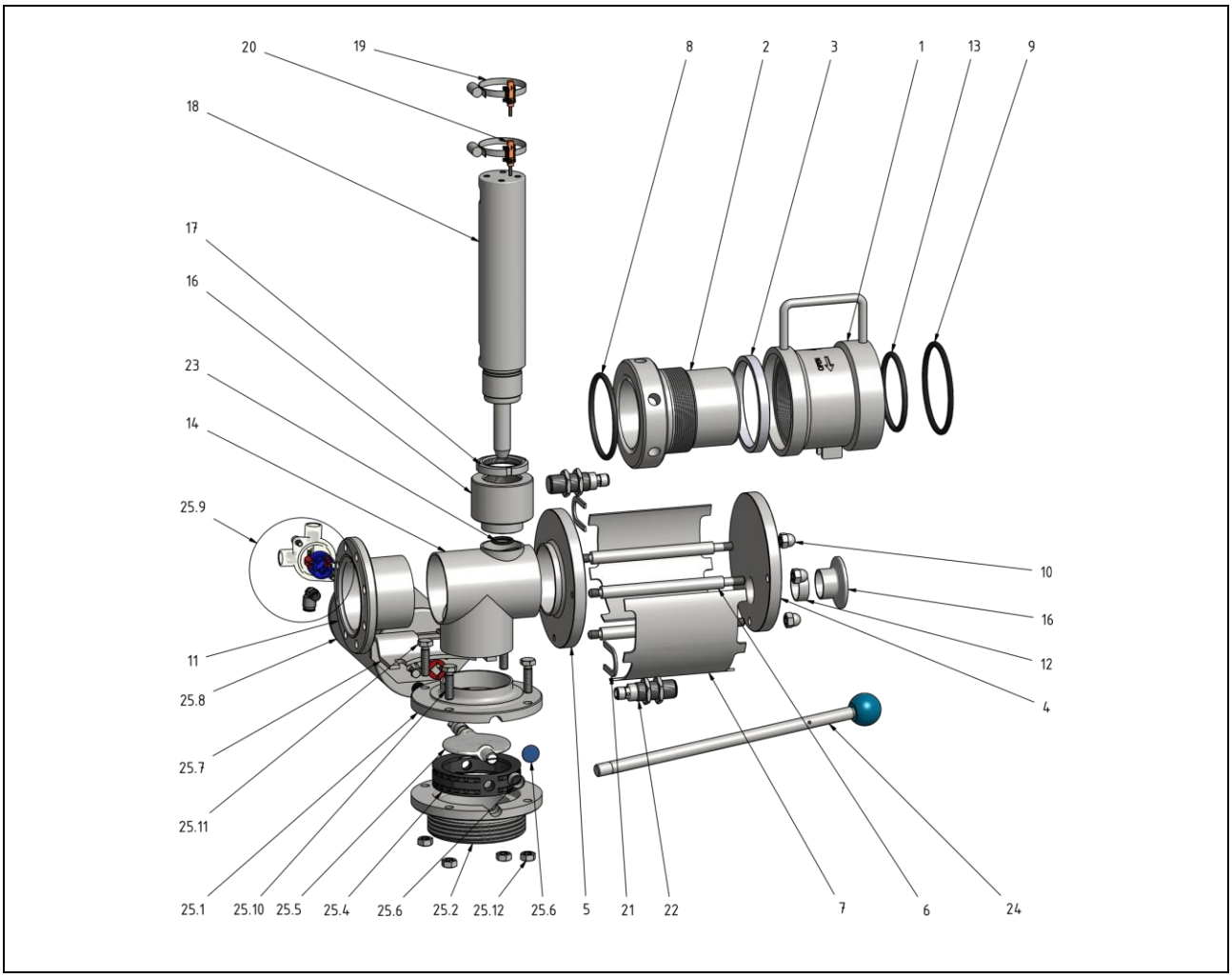

Fig. 6.2: Structure of Plug-in Chamber with Stopper and Butterfly Valve

1	Valve chamber Part 1
2	Valve chamber Part 2
3	Support ring
4	Housing lid 1
5	Housing lid 2
6	Tension anchor
7	Shell plate
8	O-ring
9	O-ring
10	Cap nut
11	Nut flange DIN 11864-2
12	Pipe section
13	O-ring
14	T-piece
15	Clamp connection DIN 32676
16	Pig stopper receptacle
17	Nut
18	pneumatic cylinder
19	Clamping strap for round cylinder
20	induct. Sensor
21	Holding plate INI
22	Magnet sensor
23	O-ring
24	Handle bar
25.1	Welded flange
25.2	Threaded flange
25.3	Butterfly valve bearing bushing
25.4	Butterfly valve gasket
25.5	Valve disc
25.6	Plugs
25.7	Holding bracket
25.8	Butterfly valve - Actuator
25.9	Service Kit for Butterfly valve - Actuator
25.10	Hex nut screw
25.11	Hex nut screw
25.12	Hex nut

6.1.3 Plug-in Chamber with Ball Valve

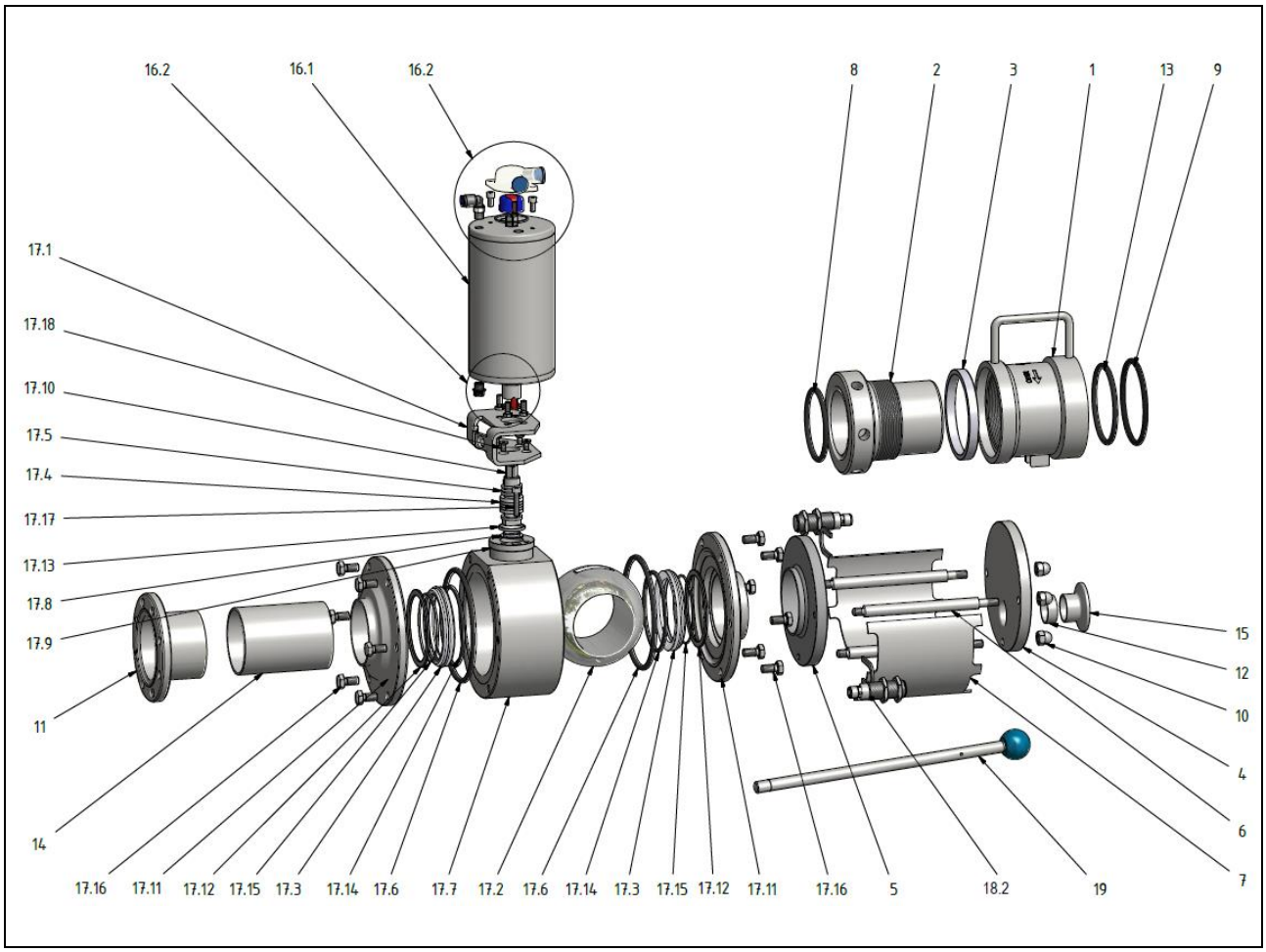

Fig. 6.3: Structure of Plug-in Chamber with Ball Valve

1	Valve chamber Part 1
2	Valve chamber Part 2
3	Support ring
4	Housing lid 1
5	Housing lid 2
6	Tension anchor
7	Shell plate
8	O-ring
9	O-ring
10	Cap nut
11	Nut flange DIN 11864-2
12	Pipe section
13	O-ring FDA
14	Pipe section
15	Clamp connection DIN 32676
16.1	Butterfly valve - Actuator
16.2	Service Kit for Butterfly valve - Actuator
17.1	Holding bracket
17.2	Ball
17.3	Seal ring
17.4	Chevron-type packing set
17.5	Spring
17.6	O-ring
17.7	Housing
17.8	Plain bearing
17.9	Spindle dome KH
17.10	Spindle
17.11	Connection flange
17.12	Square ring
17.13	Seal ring
17.14	O-ring
17.15	O-ring
17.16	Hex nut screw
17.17	Cylinder screw
17.18	Countersunk screw
18.1	Holding plate INI
18.2	Magnet sensor
19	Handle bar

6.1.4 Plug-in Chamber with Ball Valve and Butterfly Valve

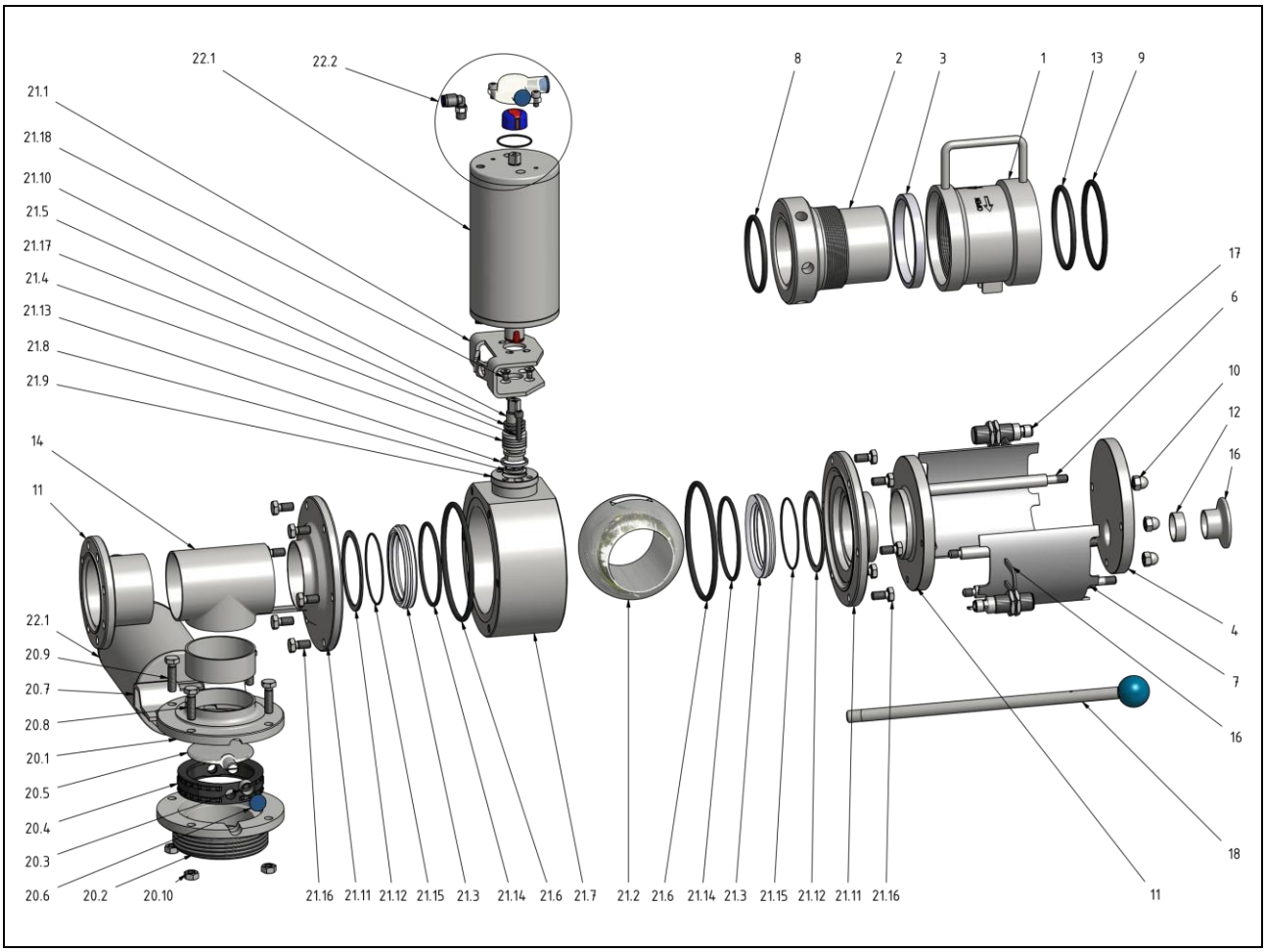

Fig. 6.4: Structure of Plug-in Chamber with Ball Valve and Butterfly Valve

1	Valve chamber Part 1	18	Handle bar	21.7	Housing
2	Valve chamber Part 2	20.1	Welded flange	21.8	Plain bearing
3	Support ring	20.2	Threaded flange	21.9	Spindle dome KH
4	Housing lid 1	20.3	Butterfly valve bearing bushing	21.10	Spindle
5	Housing lid 2	20.4	Butterfly valve gasket	21.11	Connection flange
6	Tension anchor	20.5	Valve disc	21.12	Square ring
7	Shell plate	20.6	Plugs	21.13	Seal ring
8	O-ring	20.7	Holding bracket	21.14	O-ring
9	O-ring	20.8	Hex nut screw	21.15	O-ring
10	Cap nut	20.9	Hex nut screw	21.16	Hex nut screw
11	Nut flange DIN 11864-2	20.10	Hex nut	21.17	Cylinder screw
12	Pipe section	21.1	Holding bracket	21.18	Countersunk screw
13	O-ring	21.2	Ball	22.1	Butterfly valve - Actuator
14	T-piece	21.3	Seal ring	22.2	Service Kit for Butterfly valve - Actuator
15	Clamp connection DIN 32676	21.4	Chevron-type packing set		
16	Holding plate INI	21.5	Spring		
17	Magnet sensor	21.6	O-ring		

6.2 Inserting and Replacing the Pig

WARNING

Danger of injuries caused by ejected components and flow media!

The danger of injuries and burns from ejected components and flow media exists in the presence of an incorrectly closed reception side.

– *Check the operating readiness of the reception side before each pig procedure. No pig is permitted to be there and the reception side must be correctly closed.*

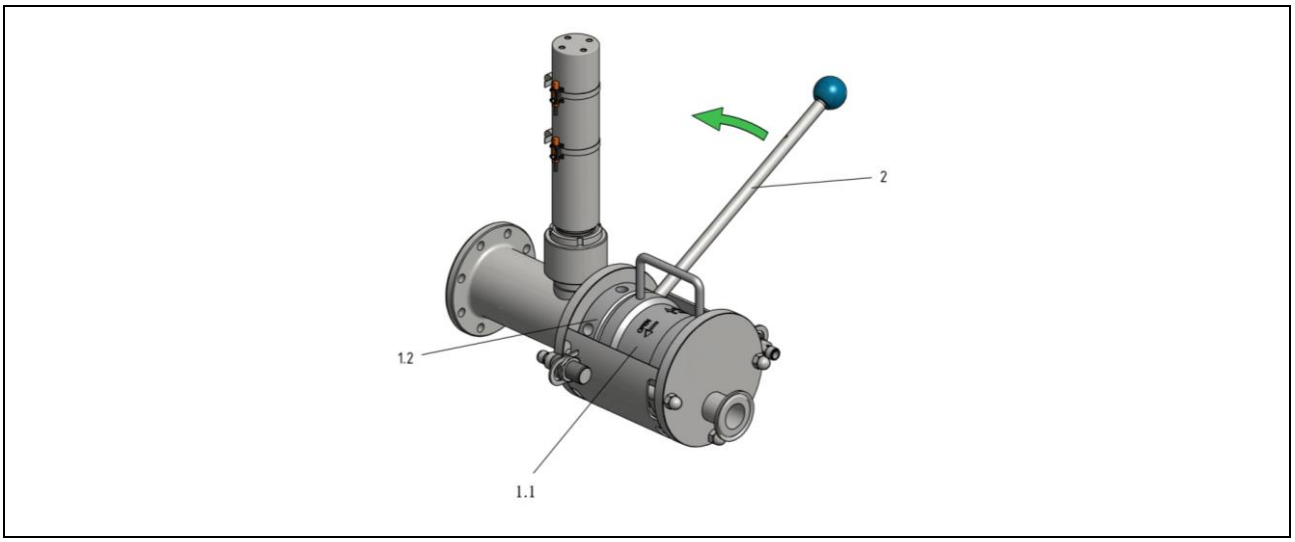

Fig. 6.5: Detach the valve chamber

- Carry out the shutdown procedure (see section 2.3.4 Switch-off Procedure). The plant must be empty.
- Depressurize the plug-in chamber by blocking all of the valves.
- Insert the handle bar (Item 2) into a bore hole on the valve chamber Part 2 (Item 1.2).
- Turn the handle bar by a ½ -1 rotation in the ‘open’ direction (direction of the arrow) against the valve chamber Part 1 (item 1.1).

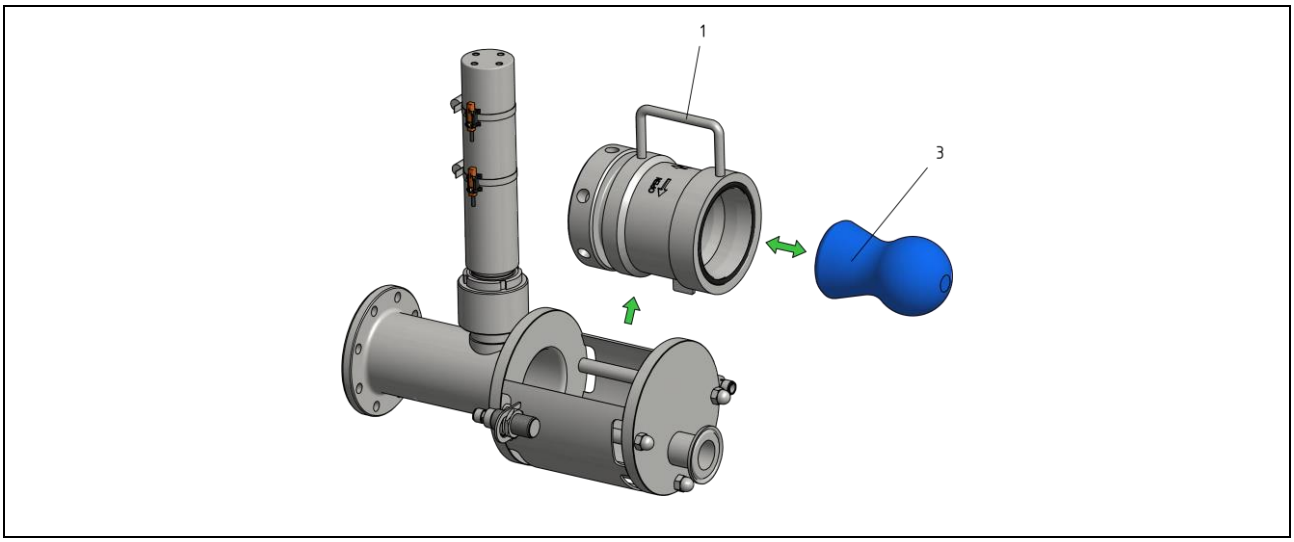

Fig. 6.6: Inserting/removing a pig

Inserting a Pig

- Pull the valve chamber (Item 1) out in an upwards direction.
- Press the pig (Item 3) in the direction of the arrow into the valve chamber. It must be completely inserted in the valve chamber.

Remove pig

- Pull the valve chamber (Item 1) out in an upwards direction.
- Press the pig (Item 3) in the direction of the arrow out of the valve chamber.

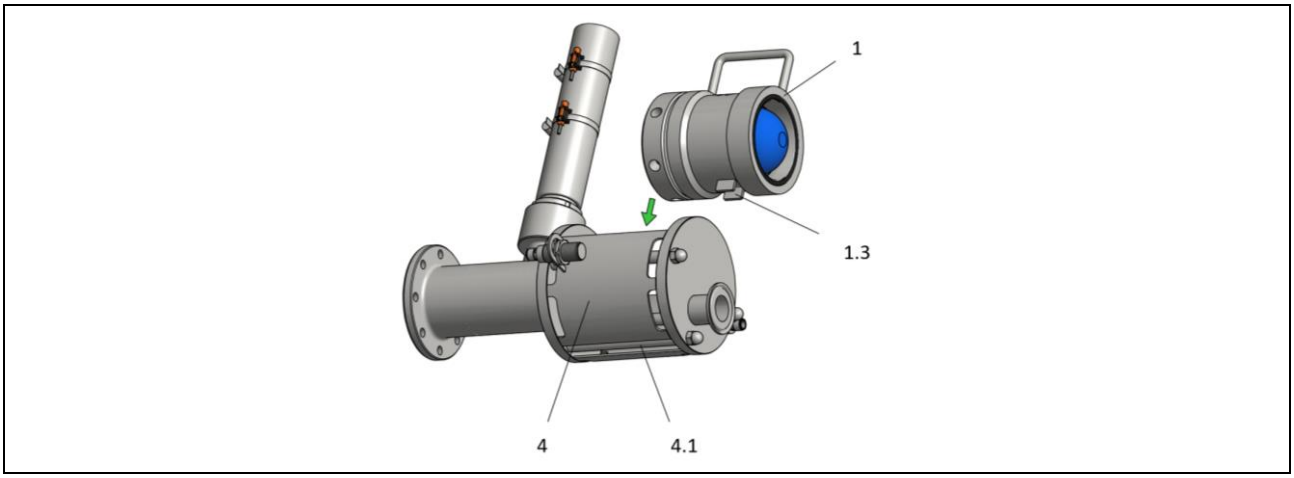

Fig. 6.7: Inserting a Valve Chamber

- Clean the sealing surfaces of the valve chamber (Item 1) of contaminations.
- Check the gaskets for damage.
- Place the valve chamber (Item 1) in the housing (Item 4).
- Take care to ensure that the guide plates (Item 1.3) on the left and right are placed next to the struts (Item 4.1). This will ensure that the valve chamber will not go out of alignment.

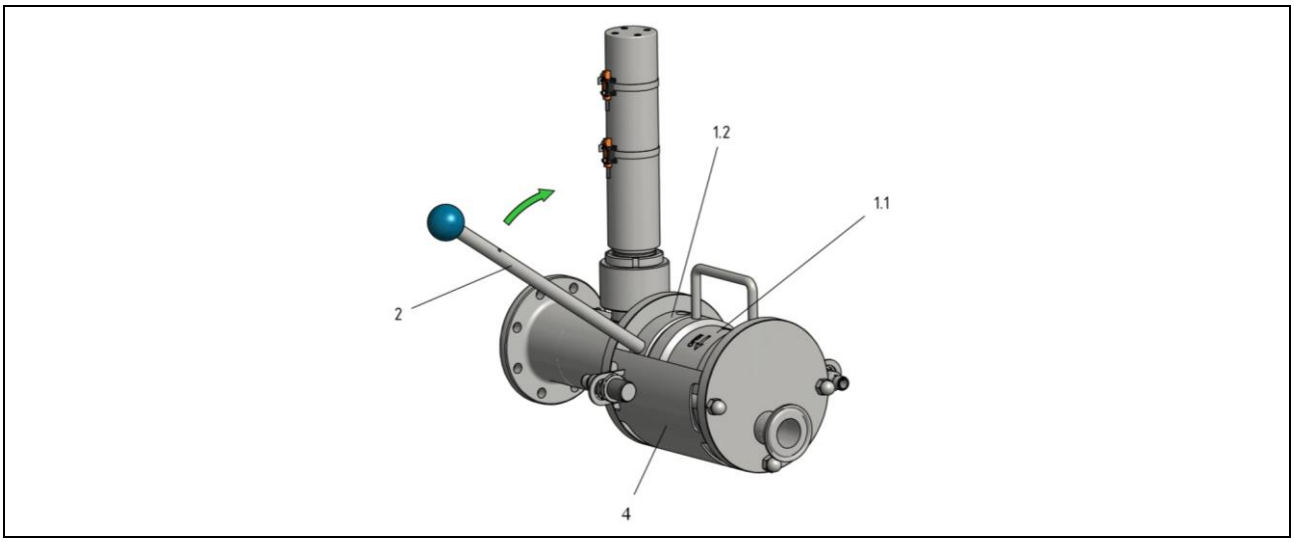

Fig. 6.8: Securing a Valve Chamber

- Insert the handle bar (Item 2) into a bore hole on the valve chamber Part 2 (Item 1.2).
- Turn the handle bar by a ½ -1 rotation in the ‘close’ direction (direction of the arrow) against the valve chamber Part 1 (item 1.1).
- Make sure that the sealing surfaces are mounted in parallel.

7 Maintenance/Cleaning

WARNING

Risk of serious injury due to incorrect maintenance!

When using harmful or toxic media, or media which are hazardous in any other way, there is a risk of intoxication or chemical burns!

- *The work may be performed only by an expert.*
- *Adhere to the switch-off procedure without fail before all cleaning, maintenance and repair work (see section 2.3.4 Switch-off Procedure).*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*
- *If in doubt, contact AWH.*

WARNING

Risk of burns due to hot media!

There is a risk of burning if flow media have temperatures over +60 °C/+140 °F.

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

CAUTION

Risk of minor injury due to crushing!

There is a risk of crushing between individual components during cleaning, maintenance or repair work.

- *Proceed with particular care with this type of work.*
- *Wear protective gloves when carrying out the work.*

7.1 Cleaning/Maintenance Intervals

To ensure proper operation of the fitting, it must be cleaned and maintained at regular intervals.

- Define the cleaning intervals depending on the operating environment and the type of flow medium used.
- Define the inspection intervals for gaskets depending on the operating environment and the type of flow medium used.

NOTE

Pneumatic actuators:

Equip the compressed air line with a maintenance unit (pressure regulator, filter, water separator) as this will prolong the service life of the O-rings.

The pneumatic actuator should generally be operated with dry, oil-free air.

- The fitting is subject to vibrations during operation, which can loosen the screwed and clamp connections. To prevent damage, check the fitting for loose connections at regular intervals (recommended interval for single-shift operation: 3 months).

Refer to the relevant manufacturer's instructions for details on cleaning and maintenance work for supplier components.

7.2 Notes on Cleaning

WARNING

Risk of injury due to incorrect handling of cleaning agents!

- *Store the cleaning agents in accordance with the relevant safety guidelines.*
- *When handling cleaning agents, follow the safety instructions on the cleaning agent manufacturer's data sheet.*
- *Always wear rubber gloves and protective goggles when cleaning (see section 2.7 Personal Protective Equipment).*
- *Take care not to touch the fitting or pipeline when processing hot media or during the sterilization process.*

To clean the product when installed, simply wash the surfaces that come into contact with the product (CIP cleaning).

Cleaning agents:	3% nitric acid	max. +60 °C/+140 °F
	3% caustic soda	max. +80 °C/+176 °F

Please observe the following:

- Use only clean and chlorine-free water.
- Measure the quantities carefully to avoid overly strong concentrations of cleaning agent.
- Rinse with plenty of clean water after cleaning.

7.3 Spare Parts Stock

When requesting spare parts, always specify the type of fitting.

The following details are important for all spare part requests or questions:

- Nominal width
- Sealing material
- Housing material
- Connection type (DIN 11851, DIN 11864, welding, etc.)
- Accessories (feedback, etc.)

Use only genuine spare parts, since only these will guarantee perfect functioning.

Spare parts and the associated spare part numbers can be found in the Valve technology catalog (available on Internet page http://www.awh.eu).

8 Faults

8.1 Safety Instructions

WARNING

Risk of serious injury due to incorrectly performed repair work!

When using harmful or toxic media, or media which are hazardous in any other way, there is a risk of intoxication or chemical burns!

- *Troubleshooting work must be performed only by an expert.*
- *Always adhere to the switch-off procedure prior to repair work (see section 2.3.4 Switch-off Procedure).*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*
- *If in doubt, contact AWH.*

WARNING

Risk of burns due to hot media!

There is a risk of burning if flow media have temperatures over +60 °C/+140 °F.

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

8.2 Faults and Remedial Action

Fault	Cause	Action for Elimination
Pig destroyed	Pig speed too high	Check drive media regulation
Pig either does not move or only insufficiently	Missing drive media pressure	Check drive media supply
	Pig worn	Replace pig
	Valve chamber leaking	Check valve chamber assembly
		Inspect gaskets
	Pig destroyed	Replace pig
Pig is either not detected or only insufficiently	Sensor not connected	Check connections
	Sensor defective	Replace sensor
	Sensor setting imprecise	Check sensor position
	Pig defective	Replace pig
	Pig not in end position	Check pig position
Leaks on the plug-in chamber	Valve chamber not sufficiently screwed in position.	Rotate the front part of the valve chamber further in the “close” direction.
	Gaskets, O-rings defective	Replace gaskets, O-rings
Pig is either not secured in position in production operations or only inadequately	Pneumatic cylinder sealing is defective	Replace gaskets, O-rings
	Pneumatic cylinder defective	Replace pneumatic cylinder
Leaks at the valves	Gaskets, O-rings defective or worn	Replace gaskets, O-rings

8.3 How to Act in Case of an Emergency

- Activate the emergency stop function on the higher-level plant (for example, by pressing the EMERGENCY STOP switch).
- Interrupt the electricity supply or switch off the higher-level main switch for the plant.
- Shut off the media supply (close the shut-off valve).

9 Decommissioning/Disposal

Once the fitting has reached the end of its service life, it must be removed from the plant, dismantled and disposed of in an environmentally friendly manner. Disposal must be performed in accordance with the respective valid local, national and international regulations.

WARNING

Risk of serious injury due to incorrect decommissioning/disposal!

When using harmful or toxic media, or media which are hazardous in any other way, there is a risk of intoxication or chemical burns!

- *The work may be performed only by an expert.*
- *Always adhere to the switch-off procedure prior to disassembly work (see section 2.3.4 Switch-off Procedure).*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*
- *If in doubt, contact AWH.*

9.1 Decommissioning and Removal

- Perform the switch-off procedure for the higher-level facility (see section 2.3.4).
- Remove the fitting correctly.

WARNING

Risk of burns due to hot media!

There is a risk of burning if flow media have temperatures over +60 °C/+140 °F.

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear protective work clothing, protective gloves and protective goggles when carrying out the work (see section 2.7 Personal Protective Equipment).*

WARNING

Danger for individuals with medical implants!

The pigs are equipped with strong permanent magnets for positioning which can also have an influence on sensitive electronic devices.

- *Individuals with medical implants (such as cardiac pacemakers) must maintain a minimum distance of 1 m from the plant.*

9.2 Disposal

CAUTION

Danger of injuries from harmful liquids which are a health hazard!

When performing disposal, there is a risk of injury from contact with harmful liquids.

– *Wear appropriate personal protective equipment (for example, protective goggles, protective gloves) (see section 2.7 Personal Protective Equipment).*

NOTE

The fitting is made of stainless steel and plastic. Stainless steel is a valuable raw material and can easily be recycled.

- Always clean the fitting correctly when it is removed (see section 7.2 Notes on Cleaning).
- Disassemble the fitting into assembly groups and individual parts

Unless other arrangements have been made for return or disposal, proceed as follows:

- Turn the disassembled parts in for recycling.
  - Metal parts should be junked,
  - Parts made of plastic should be turned in for recycling.
- If necessary, contact a specialist company to arrange for disposal.
- Comply with locally applicable occupational safety, disposal and environmental protection regulations.

NOTE

Risk of environmental damage as a result of improper disposal of the fitting!

– *Dispose of oils and cleaning agents in accordance with local regulations. The substances are NOT permitted to flow into ground water, bodies of waters or into the sewer system.*

– *In doing so, observe the instructions in the safety data sheets of the cleaning agent manufacturer.*

– *Dispose of contaminated cleaning tools (brushes, cloths, etc.) in accordance with local regulations and manufacturer's specifications.*

– *Dispose of the packaging materials in an environmentally sensitive manner and recycle them.*

10 Declarations

On the following pages, declarations can be found for the following variants:

- Plug-in Chamber with Stopper
- Plug-in Chamber with Stopper and Butterfly Valve
- Plug-in Chamber with Ball Valve
- Plug-in Chamber with Ball Valve and Butterfly Valve

Declarations for Fittings pursuant to the Pressure Equipment Directive 2014/68/EU

Fittings that fall within the scope of Directive 2014/68/EC receive an EU Declaration of Conformity and a CE mark pursuant to said Directive.

Fittings that fall under Article 4, Paragraph 3 do not necessarily receive a CE mark pursuant to this Directive. The operating instructions and safety information are enclosed with these fittings.

Declarations for Fittings pursuant to the Machinery Directive 2006/42/EC

Fittings that fall within the scope of Directive 2006/42/EC are items of incomplete machinery, and receive a declaration for incorporation but no CE mark, as per said Directive.

Armaturenwerk Hötensleben GmbH
Schulstraße 5-6
39393 Hötensleben, Germany

Declaration (Translation)

- Declaration for incorporation pursuant to the EC Machinery Directive 2006/42/EC
- EU Declaration of Conformity pursuant to the EU Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Plug-in Chamber with Stopper**

Type:
DIN: **DN 25 – DN 100 / PN10**
Inch: **DN 1" – DN 4" / PN10**
ISO: **DN 33.7 – DN 114.3 / PN10**
SMS: **DN 25 – DN 76.1 / PN10**

corresponds as delivered to the following fundamental health and safety requirements stipulated in the directives and standards listed below:

Directive/Standard	Title	Version	Comments
2014/68/EU	EU Pressure Equipment Directive	05/2014	
DIN EN 12516-2	Industrial valves – Shell design strength – Part 2: Calculation method for pressurized shells of steel fittings		
AD 2000 information sheets	Regulations for pressure vessels (national standards)		
The fittings are designed for fluids in fluid group 1 and for gases in fluid group 2. The standard designs are categorized as a rule in accordance with Article 4 Paragraph 3. Other media must be considered separately.			
2006/42/EC	EC Machinery Directive	05/2006	

The specific technical documents have been compiled in accordance with Directive 2006/42/EC, Annex VII, Part B.

If any modifications are made to the fitting without our agreement, this declaration shall become void.

Commissioning is prohibited until it is determined that the higher-level plant fulfills the provisions of the directives. For information about proper use of the fittings, see the operating/installation instructions.

Hötensleben, Germany, on 29. November 2017

Thomas Erhorn (CEO)

Person authorized to compile the technical documentation:
Armaturenwerk Hötensleben GmbH
Mr. Prost, Schulstr. 5/6, 39393 Hötensleben, Germany

Armaturenwerk Hötensleben GmbH
Schulstraße 5-6
39393 Hötensleben, Germany

Declaration (Translation)

- Declaration for incorporation pursuant to the EC Machinery Directive 2006/42/EC
- EU Declaration of Conformity pursuant to the EU Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Plug-in Chamber with Stopper and Butterfly Valve**

Type: **DIN:** DN 25 – DN 100 / PN10

Inch: DN 1" – DN 4" / PN10

ISO: DN 33.7 – DN 114.3 / PN10

SMS: DN 25 – DN 76.1 / PN10

corresponds as delivered to the following fundamental health and safety requirements stipulated in the directives and standards listed below:

Directive/Standard	Title	Version	Comments
2014/68/EU	EU Pressure Equipment Directive	05/2014	
DIN EN 12516-2	Industrial valves – Shell design strength – Part 2: Calculation method for pressurized shells of steel fittings		
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Armaturenwerk Hötensleben GmbH
Schulstraße 5-6
39393 Hötensleben, Germany

Declaration (Translation)

- Declaration for incorporation pursuant to the EC Machinery Directive 2006/42/EC
- EU Declaration of Conformity pursuant to the EU Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Plug-in Chamber with Ball Valve**

Type: **DIN:** **DN 40 – DN 100 / PN10**

Inch: **DN 1 ½" – DN 4" / PN10**

SMS: **DN 38 – DN 76.1 / PN10**

corresponds as delivered to the following fundamental health and safety requirements stipulated in the directives and standards listed below:

Directive/Standard	Title	Version	Comments
2014/68/EU	EU Pressure Equipment Directive	05/2014	
DIN EN 12516-2	Industrial valves – Shell design strength – Part 2: Calculation method for pressurized shells of steel fittings		
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39393 Hötensleben, Germany

Declaration (Translation)

- Declaration for incorporation pursuant to the EC Machinery Directive 2006/42/EC
- EU Declaration of Conformity pursuant to the EU Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Plug-in Chamber with Ball Valve and Butterfly Valve**

Type: **DIN: DN 40 – DN 100 / PN10**

Inch: DN 1 ½" – DN 4" / PN10

SMS: DN 38 – DN 76.1 / PN10

corresponds as delivered to the following fundamental health and safety requirements stipulated in the directives and standards listed below:

Directive/Standard	Title	Version	Comments
2014/68/EU	EU Pressure Equipment Directive	05/2014	
DIN EN 12516-2	Industrial valves – Shell design strength – Part 2: Calculation method for pressurized shells of steel fittings		
AD 2000 information sheets	Regulations for pressure vessels (national standards)		
The fittings are designed for fluids in fluid group 1 and for gases in fluid group 2. The standard designs are categorized as a rule in accordance with Article 4 Paragraph 3. Other media must be considered separately.			
2006/42/EC	EC Machinery Directive	05/2006	

The specific technical documents have been compiled in accordance with Directive 2006/42/EC, Annex VII, Part B.

If any modifications are made to the fitting without our agreement, this declaration shall become void.

Commissioning is prohibited until it is determined that the higher-level plant fulfills the provisions of the directives. For information about proper use of the fittings, see the operating/installation instructions.

Hötensleben, Germany, on 29. November 2017

Thomas Erhorn (CEO)

Person authorized to compile the technical documentation:
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