OPERATING/INSTALLATION INSTRUCTIONS

(Translation)

Hygiene-Inline-Station

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Pipe standard	Size
DIN Standard	DN25, DN40, DN50, DN65, DN80, DN100 /Series A
Inch Standard	DN1", DN1 1/2", DN2", DN2 1/2", DN3", DN4" / Series D
ISO Standard	DN33,7, DN48,3, DN60,3, DN76,1, DN88,9 / Series C
SMS Standard	DN25, DN38, DN51. DN63,5, DN76,1 / Series D

NOTE

These operating/installation instructions are part of the higher-level facility and must be available to operating and maintenance personnel at all times. The safety precautions contained therein must be observed. If the higher-level facility is resold, the installation instructions must also be supplied to the new owner.

If the Hygiene Inline Station is sold on, the manual must be included in the delivery or downloaded from the following Internet page: http://www.awh.eu/de/downloads.

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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 Hygiene Inline Station smoothly (hereinafter also referred to as the “fitting”).

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 and
- Take the correct measures if a fault occurs.

In addition to these instructions, generally applicable, statutory and other binding regulations in regard of the prevention of accidents 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 notice describes a hazard with a high level of risk that will result in death or serious injury if not avoided.

WARNING

This warning notice describes a hazard with a medium level of risk that could result in death or serious injury if not avoided.

CAUTION

This warning notice describes a hazard with a low level of risk that could result in minor or moderate injury if not avoided.

NOTE

This warning notice describes a hazard with a low level of risk that could result in damage to property if not avoided.

The “info” symbol provides useful information.

Embedded Warnings

Embedded warnings apply to specific actions and are integrated directly into the action.

– ⚠ **DANGER / WARNING / CAUTION**

– ***NOTE***

The following means of presentation are also used:

– 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.

1.2 Abbreviations

ATEX	“**At**mosphère **ex**plosible”; includes measures to be taken for explosive atmospheres / explosion protection
AWH	Armaturenwerk Hötensleben GmbH
DN	Nominal width
EPDM	Ethylene propylene diene monomer rubber (sealing material)
Ra	Average roughness value (dimension for the surface roughness)
R_{min}	Minimum radius of curvature

1.3 Guarantee, Warranty and Liability

Guarantee

If the fitting is used as intended, a guarantee of five years is given. Exceptions to this are wear parts (seals, bushings, etc.).

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 installation, operation and servicing must have read and understood this manual.

Anyone involved in assembly, operation, maintenance and servicing must have read and understood these instructions.

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

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 Hygiene Inline Station is designated for installation in pipelines for the purpose of channeling the flow of fluid 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. It is part of a product recovery system which enables the pushing out of products, the pre-cleaning of the pipeline system and product separation. Both liquid and gaseous media are suitable driving media for the pig.

WARNING

In the event of improper use, there is 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 must not be put in to operation until it has been assured that all the safety systems are fully functioning, and the facility in which the fitting is installed meets the safety requirements of all relevant European 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 intended use also includes compliance with this manual, including the maintenance conditions.

2.2 Labeling the Fitting

The information in this manual applies only to the Hygiene Inline Station of the type and version specified on the title page.

The following details are important for all questions:

- Nominal width
- Connection type (threaded connection, flange connection, welding joint, 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

NOTE

Risk of damage to the fitting!

The fitting, length and quality of the lines must meet the requirements. Installation is to be performed 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”).

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 the work on the fitting.*

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.*

2.3.2 Hazardous Area of the Fitting

The hazardous area during setup, maintenance and repair work extends to 1 m around the fitting. Take into consideration the swing range of any switch cabinet doors that can open. The operator shall 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

WARNING

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

When the components are moving, there is a risk of fingers and hands being crushed.

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 and then drain them (take particular care with hazardous materials). Check that there is no risk of media being supplied (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 only used as intended (see section “2.1 Intended Use”).
- The owner/operating company must keep itself informed of 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 check 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 (for example, for operation, maintenance and cleaning).
- The owner/operating company must allow only 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, for example, the appropriate quantity of suitable hand-held fire extinguishers of the appropriate size, in easily accessible places and provide employees with training on 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.

Connections

- 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.

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 tasks described in the manual are to be carried out by experts only.

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

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.

Instructed person

An instructed person has been briefed and, if necessary, trained by the operating company or by an expert in a briefing on the assigned tasks and possible hazards in the event of improper actions.

Only personnel with the following 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 apprenticeship, knowledge and experience, enabling them to identify and avoid the risks that may arise from working with electricity
- **Cleaning:** Instructed person

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 an increased noise pressure level (≥ 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

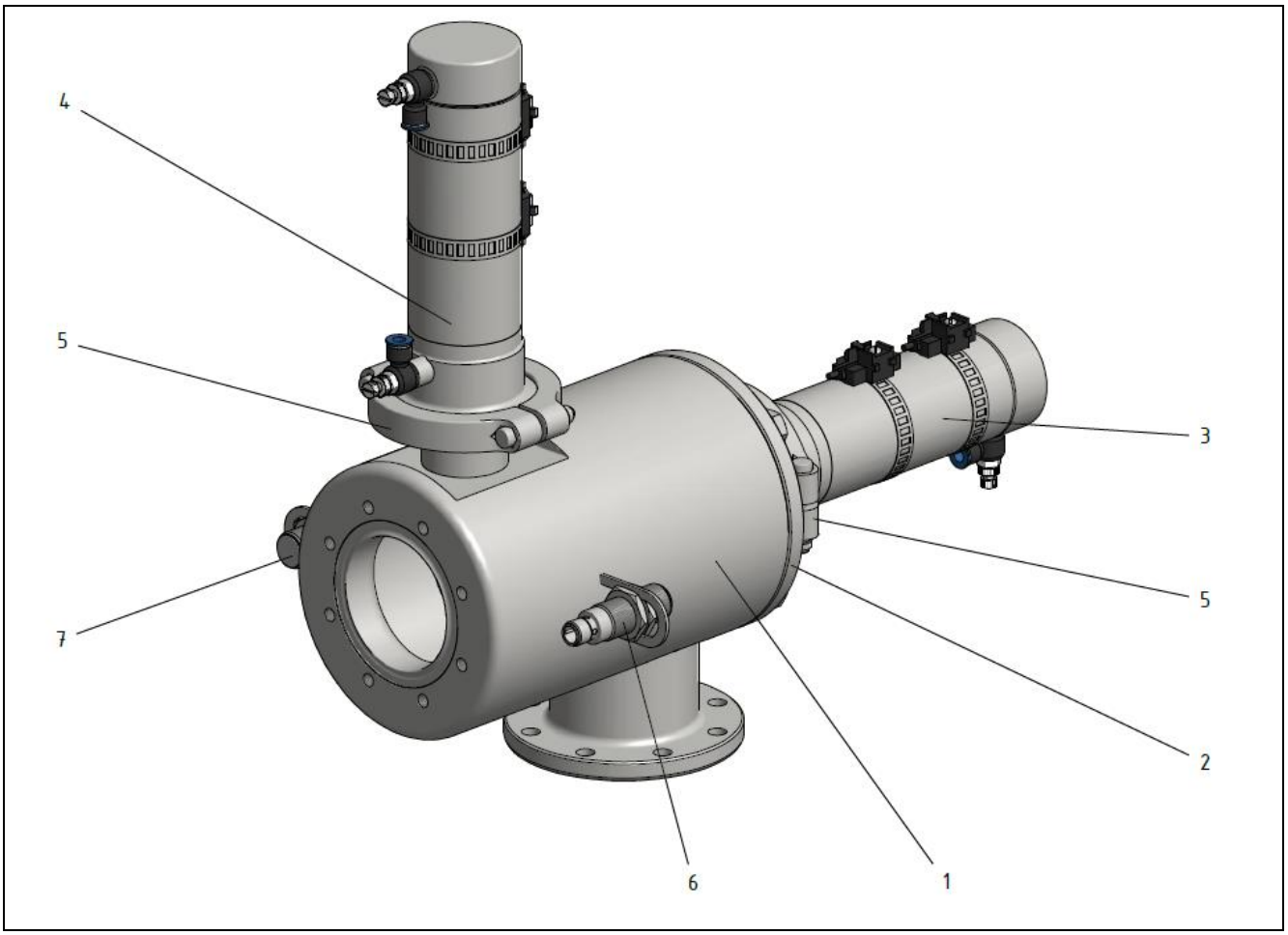

Fig. 3-1: Overview Hygiene Inline Station

1 Housing
2 Cover unit
3 Positioning cylinder
4 Support cylinder
5 Fastener
6 Initiator home position
7 Initiator start position

4 Technical data

4.1 General Data

Ambient temperature range:	
Lower limit temperature:	+5 °C / +41 °F
Upper limit temperature:	+45 °C / +113 °F
Max. permissible operating pressure: DIN 25 – 100; Inches 1” – 4”; ISO 33.7 – 88.9; SMS 25 – 76	10 bar/145 psi
Max. permissible operating temperature: (depends on the sealing material and medium)	+90 °C / +194 °F
Installation Position:	horizontal, vertical (self-draining)

4.2 Materials in Contact with the Product

See Fig. 3-1

Housing (item 1):	1.4404
Housing attachment parts:	1.4301 / 1.4307 / 1.4404
Gaskets:	EPDM

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.

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

Pneumatic cylinder (double-acting, A/A)	
Operating pressure:	6 – 8 bar
Working medium:	filtered compressed air (free of oil, grease and water)
Connection:	Throttle non-return valve 1/8”
	hose connection for hose D_A = 6 mm, D_I = 4 mm

The air/air (A/A) actuator requires compressed air for each switching procedure. This must be present at all times, otherwise the fitting will be able to be switched independently by the product flow. If the compressed air fails, it will not be possible to define the switching state precisely.

4.3.2 Electrical Energy Supply

Refer to the external data sheets and manufacturer's installation instructions for the data on the electrical energy supply for connecting initiators (< 50 V).

4.4 Connection Variants, Type Series, Dimensions

NOTE

Installation should be either horizontal or vertical (self-draining). See the table for the dimensions.

You can find 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.

Dimensions

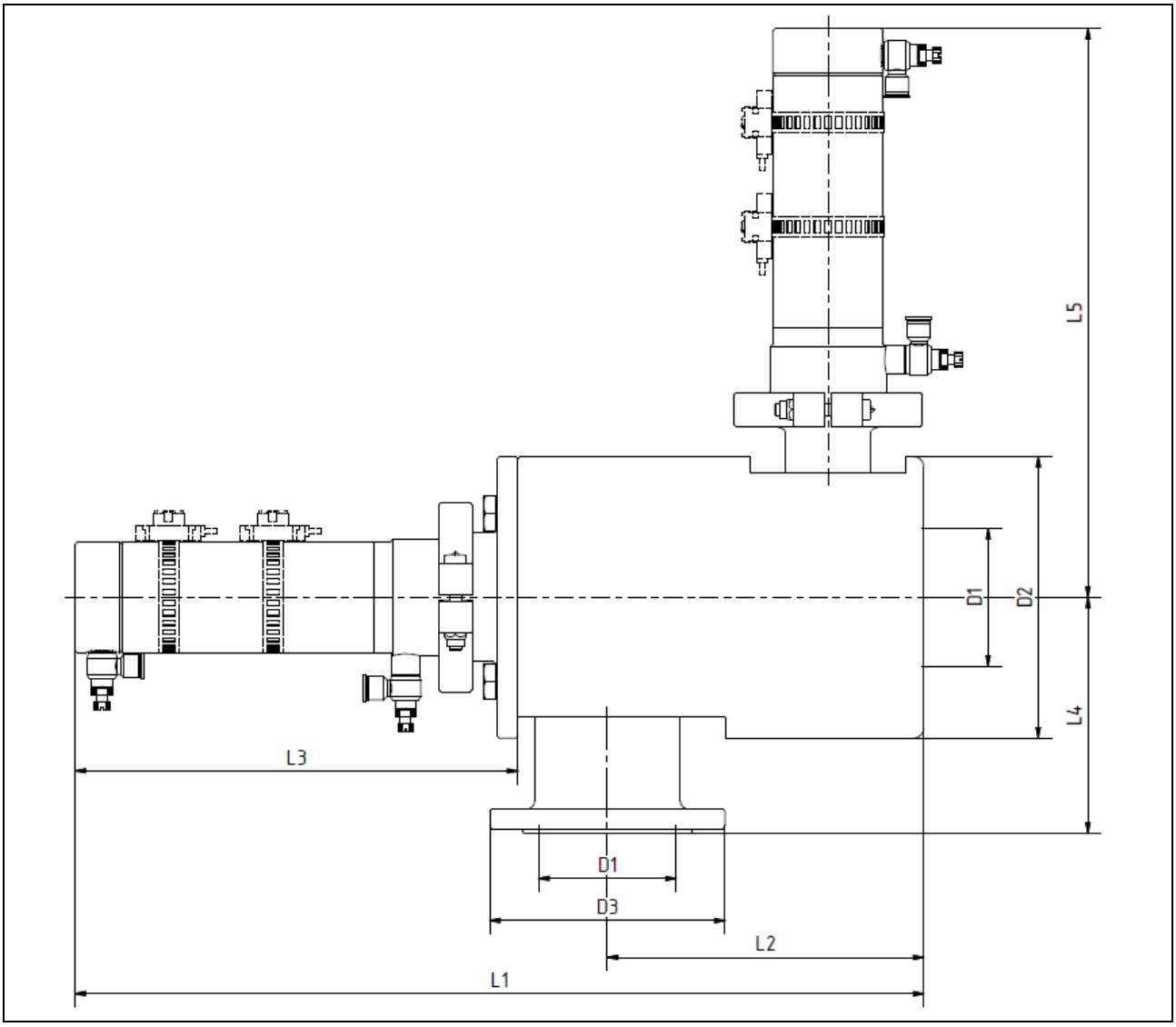

Fig. 4-1: Dimensions

Connection Variants DIN EN 10357, Series A

DN DIN	D1	D2	D3	L1	L2	L3	L4	L5
25	26	84	70	207	105	99	78	130
40	38	100	82	361	120	213	88	258
50	50	110	94	371	124	213	95	264
65	66	135	113	406	151	213	113	273
80	81	142	133	418	155	213	124	279
100	100	195	159	456	184	213	142	293

Connection Variants DIN EN 10357, Series D

DN Inch	D1	D2	D3	L1	L2	L3	L4	L5
1"	22.1	84	66	210	86	99	78	130
1 1/2"	34.8	100	79	361	121	213	88	258
2"	47.5	110	92	371	125	213	95	264
2 1/2"	60.2	135	107	406	153	213	113	273
3"	72.9	142	125	418	159	213	122	279
4"	97.38	195	157	456	185	213	142	293

Connection Variants DIN EN 10357, Series C

DN ISO	D1	D2	D3	L1	L2	L3	L4	L5
25	29.7	84	74	220	91	99	85	136
40	44.3	100	88	371	126	213	95	264
50	56.3	110	103	396	145	213	113	273
65	72.1	135	125	416	157	213	122	279
80	84.3	142	137	444	179	213	142	293
100	109.7	195	168	485	191	213	155	306

Connection Variants DIN EN 10357, Series D

DN SMS	D1	D2	D3	L1	L2	L3	L4	L5
25	22.5	84	66	210	86	99	78	130
38	35.5	100	79	361	121	213	88	258
51	48.5	110	93	371	124	213	95	264
63.5	60.5	135	107	406	153	213	113	273
76.1	72.9	142	125	418	159	213	122	279

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

When setting down the packaging, there is a risk of minor injury being caused by crushing.

– *When transporting the packaging, proceed with particular care.*

– *Wear safety shoes and protective gloves.*

5.2.1 Delivery (Including for Spare and Replacement Parts)

Unpacking

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

Incoming goods inspection

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

In the Event of Damage

- Check the delivery for damage (visual inspection).

In the Event of 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

Storage in a closed room

Storage conditions:

- Temperature: +10 °C – +45 °C/+50 °F – +113 °F
- Humidity: < 60%

5.3 General

5.3.1 Elements / Components

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 prevents the wear and the abrasion on the pig from being more than negligible.

Interior diameter tolerance: ± 0.5% nominal diameter

Roundness tolerance: ± 0.5% nominal diameter

Generally speaking, pipes in accordance with the Standards DIN 11850 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 x pipe diameter (BA2)

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

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

Outlets/T-pieces

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 pipe = nominal width of branch

AWH lip pig: Nominal width of pipe = branch, one nominal width increment smaller

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.*

Pipe connections

All pipe connections are to be centered and offset-free in their construction.

Centering / offset: ± 0.2 mm

Detachable pipe connections in accordance with DIN 11853/11864 meet 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.

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 DN100 and to a pressure level of PN16. According to the Pressure Equipment Directive, the assessment is independent of the length of the pipeline.

5.3.2 Pig dynamics

5.3.2.1 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.

This 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.

5.3.2.2 Physical Conditions

The pig is subject to Newton’s Law.

The acceleration of a mass results in a force $\mathbf{F = m \cdot a}$

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 10 m/s². Analogously, the maximum speed of the pig should resemble the conveying speed of the medium and lie within the range of between 0.3 - 1.5 m/s. The conveying speed is modified and limited by the regulation of the volume flow rate.

The conditions for passing through are not constant but dynamic. The energy to be applied must be continuously regulated by differences in height, different quantities of residual media in the pipe, pipe connections and bends.

Flow rate V_F at various pig speeds W_M

DN	25	32	40	50	65	80	100
V_F in l/min at W_M = 0.3 m/s	8.80	14.47	20.40	35.33	61.55	90.43	141.30
V_F in l/min at W_M = 0.5 m/s	14.72	24.11	34.01	58.88	102.58	150.72	235.50
V_F in l/min at W_M = 1.0 m/s	29.44	48.28	68.01	117.75	205.17	301.44	471.00
V_F in l/min at W_M = 1.5 m/s	44.16	72.42	102.02	176.63	307.76	452.16	706.50

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.

5.3.3 Welding Guidelines

The welding into pipes is carried out according to DIN EN 11850 or DIN 11866.

Welding method: TIG or orbital welding

Seam type: Butt weld joint according to DIN EN 29692

Installed Condition

Fittings may need to be dismantled in order to avoid damage to seals.

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.
- Format the welded seam area while welding and during 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.

5.4 Installation

The fitting is installed in accordance with the structural layout of the pipe system and the technical data for the connection variants (see section 4.4). There are no restrictions on the choice of installation position.

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!

– *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.
- Connect the pneumatic cylinder with the compressed air supply.
- Fasten the initiators for position detection.
- Connect the initiators with the higher-level control.

5.4.1 Adjusting the Position Detection of the Pig

Prior to the pigging process, the pig is moved out of its home position and into the start position by the positioning cylinder. The support cylinder must unblock the path for this beforehand. The two positions must be detected separately from one another via the initiators in order exploit the possibility of automation.

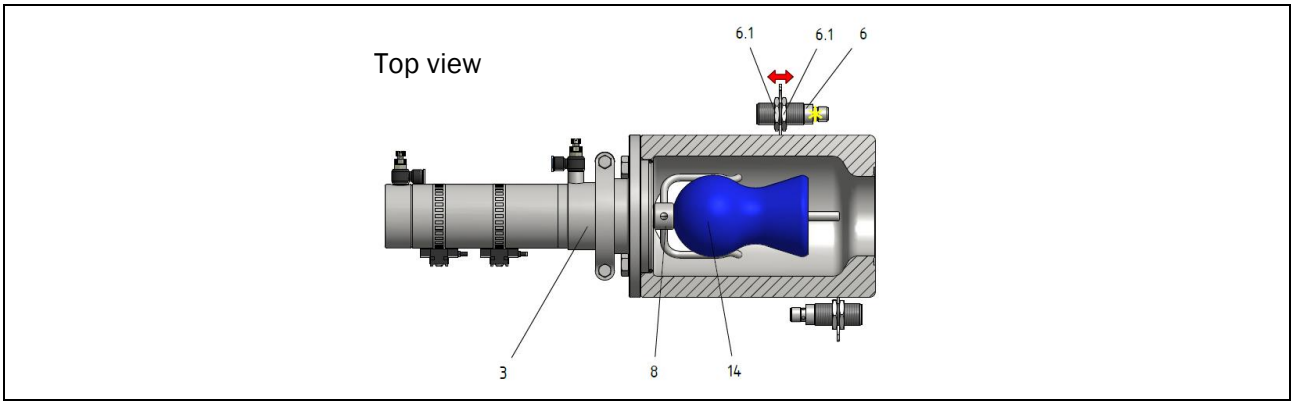

Fig. 5-1: Assembly of initiator home position

1. Pig (14) is in home position, positioning cylinder (3) and pig gripper (8) have moved completely into end position
2. Initiator (6) is to be shifted axially in its position so that a largest possible area is detected and a reliable signal message ensues. An LED on the sensor facilitates handling. The LED is illuminated when a signal is pending.
3. The initiator is to be fastened into position with fastening nuts (6.1).

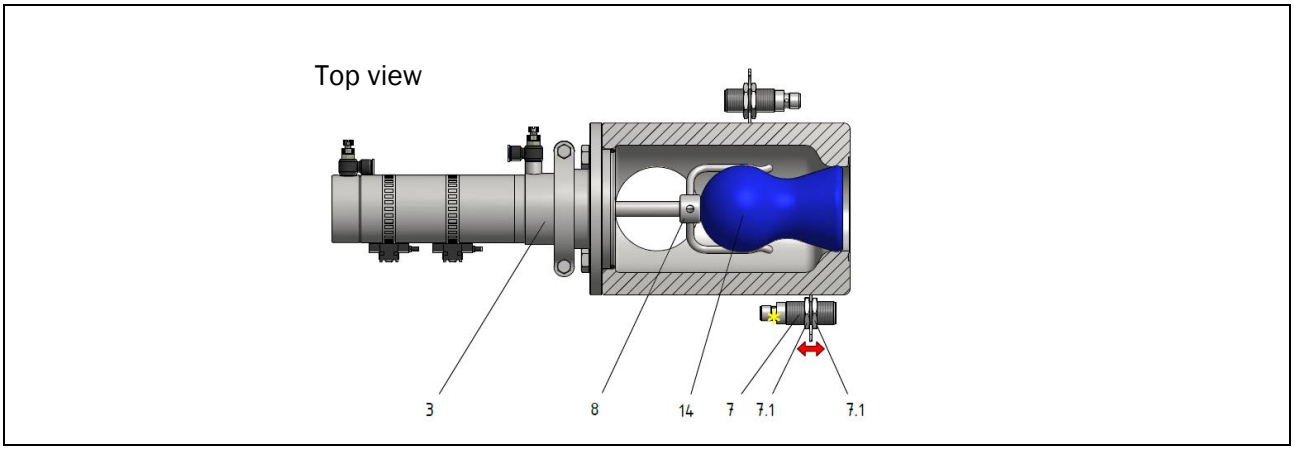

Fig. 5-2: Assembly of initiator start position

1. Pig (14) is in start position, positioning cylinder (3) and pig gripper (8) have extended completely into end position
2. Support cylinder (4) unblocks the path and is retracted completely.
3. Initiator (7) is to be shifted axially in its position so that a largest possible area is detected and a reliable signal message ensues. An LED on the sensor facilitates handling. The LED is illuminated when a signal is pending.
4. The initiator is to be fastened into position with fastening nuts (7.1).

Care must be taken to ensure that both initiators show only the respective pig position.

5.4.2 Adjusting the Response of the Pneumatic Cylinders

Compressed air is used to move positioning cylinder and support cylinder into two switching positions. Each of the two positions can be queried for automation. The mode of end position response is identical at the two cylinders.

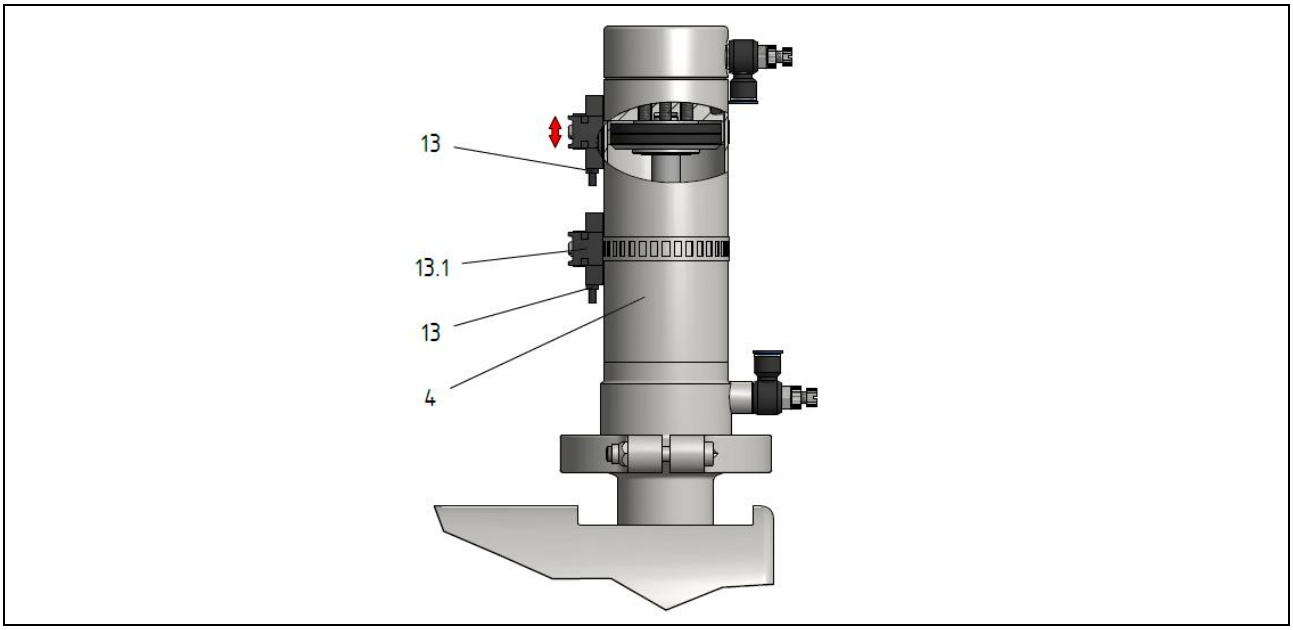

Fig. 5-3: End position sensor assembly

1. Move pneumatic cylinder (4) completely into one end position.
2. Initiator (13) is to be shifted axially in its position so that a largest possible area is detected and a reliable signal message ensues. An LED on the sensor facilitates handling. The LED is illuminated when a signal is pending.
3. The initiator is to be fastened into position using a clamping strap with a fastening screw (13.1).
4. Move pneumatic cylinder (4) completely into the opposite end position.
5. Mount the second initiator (13) the same way.

6 Disassembly/assembly

WARNING

Risk of serious injury due to incorrect disassembly/assembly!

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

- *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 2.3.4).*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*
- *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 has temperatures over +60 °C/+140 °F.

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*

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

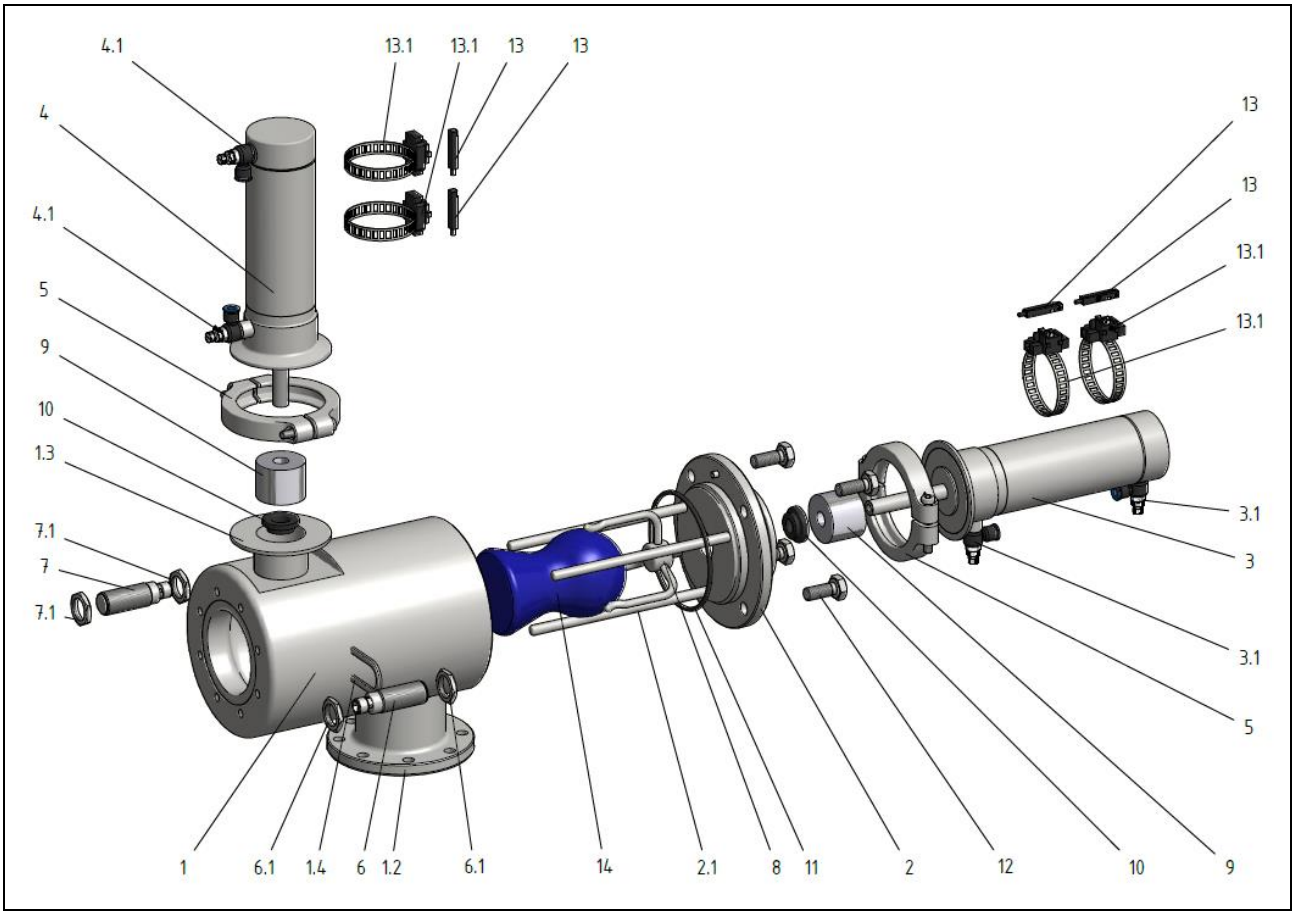

Fig. 6-1: Hygiene Inline Station setup

1	Housing	4	Support cylinder	9	Warehouse
1.2	Nut flange	4.1	Throttle non-return valve	10	Profile seal
1.3	Clamp connection	5	Fastener	11	O-ring
1.4	Holding plate	6	Initiator home position	12	Hexagonal bolt
2	Cover unit	6.1	Hexagonal nut	13	End position sensor
2.1	Guide bar	7	Initiator start position	13.1	Clamping strap
3	Positioning cylinder	7.1	Hexagonal nut	14	Tangent pig
3.1	Throttle non-return valve	8	Pig gripper		

6.2 Switching Conditions

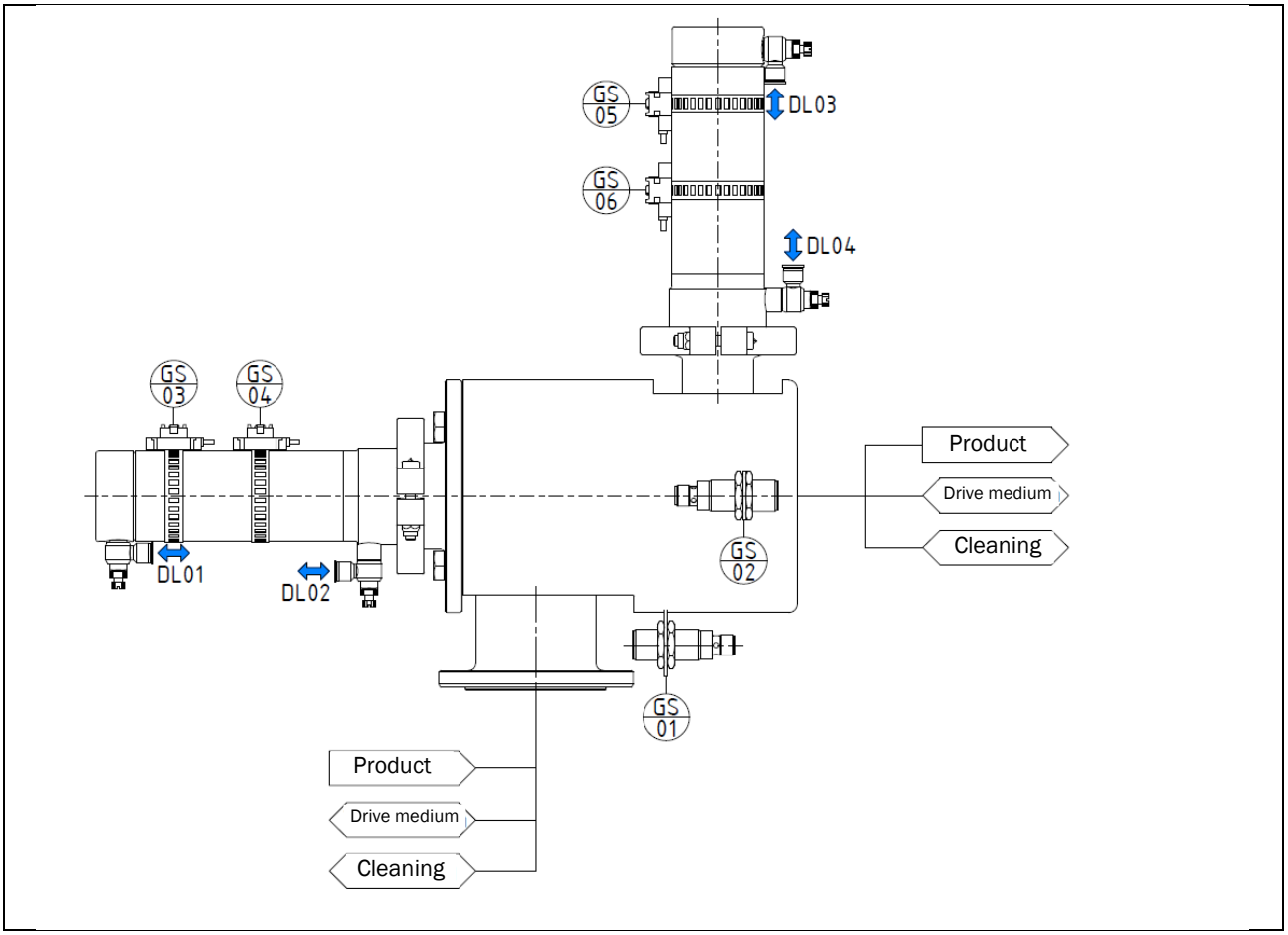

Fig. 6-2: Switching conditions

Switching condition	GS01	GS02	GS03	GS04	GS05	GS06	DL01	DL02	DL03	DL04
Product transfer	1	0	1	0	0	1	0	1	1	0
Unlocking	1	0	1	0	1	0	0	1	0	1
Positioning	0	1	0	1	1	0	1	0	0	1
Product ejection	0	0/1	0	1	1	0	1	0	0	1
Returning	0	0/1	0	1	1	0	1	0	0	1
Positioning	1	0	1	0	1	0	0	1	0	1
Locking	1	0	1	0	0	1	0	1	1	0
Cleaning	1	0	1	0	0	1	0	1	1	0

*Process example

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

6.3 Inserting and Replacing the Pig

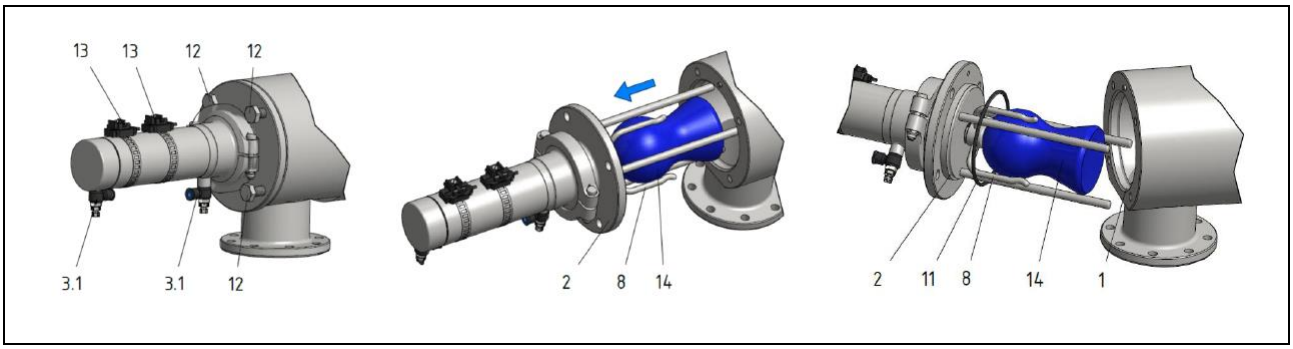

Fig. 6-3: Replacing the pig

- Depressurize the Hygiene Inline Station by shutting off all of the valves.
- Disconnect the connection cable to the end position switch (13).
- Disconnect the compressed air supply to the throttle non-return valves (3.1).
- Release and remove the hexagonal bolts (12).
- Carefully remove the cover unit (2).
- Replace/set the pig (14) in the displayed position into the pig gripper (8).
- Clean the sealing surfaces on the cover (2) and the housing (1) of contaminations.
- Check the O-ring (11) for damage.
- Insert the O-ring (11) into the seal recess on the cover (2).

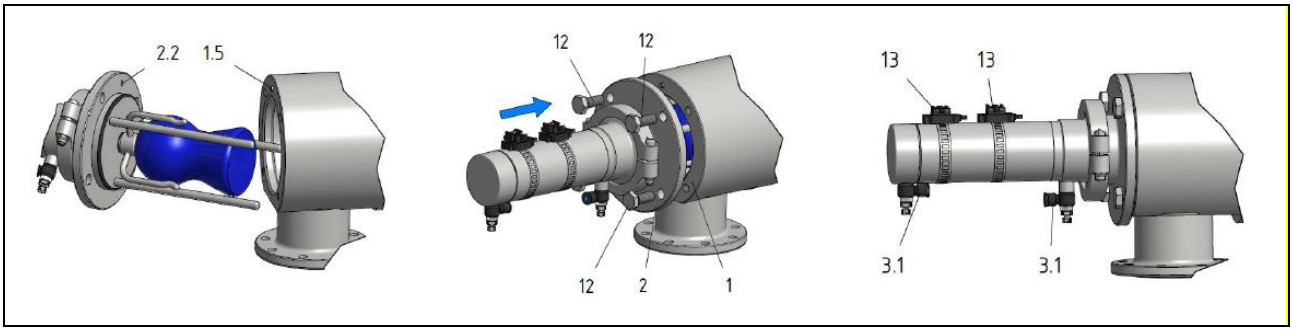

Fig. 6-4: Inserting the pig

- Position the cover (2). Note while doing so the position determination (2.2), (1.5).
- Guide the cover (2) up to the housing (1).
- Screw in the hexagon bolts (12) cross-wise and in small increments until the metal stop is reached.
- Connect the connection cable of the end position switch (13).
- Connect the compressed air supply to the throttle non-return valves (3.1).

7 Maintenance/Cleaning

WARNING

Risk of serious injury due to incorrect maintenance!

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

- *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).*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*
- *If in doubt, contact AWH.*

WARNING

Risk of burns due to hot media!

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

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*

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 interval depending on the operating environment and the type of flow medium used.
- Define the inspection intervals for gaskets and the pig 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.*
- *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/Customer Service

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.)

NOTE

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

Replacement and accessory parts not supplied by AWH have not been checked or approved by AWH. Under certain circumstances, the installation and/or use of such products could therefore result in changes with negative results to the properties of the fitting specified by its design and the higher-level plant. 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.

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

Customer Service

For technical questions or spare part requests, you can contact the Customer Service department as follows:

Phone	*+49 39405 92-422*
Fax	*+49 39405 92-111*
E-Mail	*info@awh.eu*
Internet	*http://www.awh.eu*

8 Faults

8.1 Safety Instructions

WARNING

Risk of serious injury due to incorrectly performed repair work!

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

- *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).*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*
- *If in doubt, contact AWH.*

WARNING

Risk of burns due to hot media!

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

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*

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	Remedy
Leaks on the pig sending station	Flange connections insufficiently bolted	Bolt the flange connections securely
	Clamps insufficiently bolted	Bolt the clamps securely
	Shaped packings, O-rings defective	Replace shaped packings, O-rings
Pig is either not secured in position or only inadequately	Compressed air supply at the pneumatic cylinder is either absent or too low	Secure sufficient compressed air supply
	Pneumatic cylinder leaking	Replace O-rings
	Pneumatic cylinder defective	Replace the pneumatic cylinder
	Locking cylinder extended	Check the locking cylinder Check the control
	Pig does not return to home position	Check the driving pressure. Check the pig gripper
Pig is either not locked or only inadequately	Compressed air supply at the pneumatic cylinder is either absent or too low	Secure sufficient compressed air supply
	Pneumatic cylinder leaking	Replace O-rings
	Pneumatic cylinder defective	Replace the pneumatic cylinder
	Positioning cylinder extended Pig not in home position	Check positioning cylinder Check the control Check pig position
No or unreliable detection of the pig position	Initiator settings insufficient	Secure correct settings
	Do not connect initiator with control	Secure correct connection
	Pig inserted in the wrong direction	Secure correct running direction
	Pig destroyed	Use functional pig
Pig destroyed	Process sequence incorrect (Positioning cylinder and locking cylinder extended simultaneously)	Secure correct process control
	Pig speed too high	Adjust the drive control

8.3 What to Do in Case of an Emergency

- Activate the emergency stop function on the higher-level facility (for example, by pressing the EMERGENCY STOP SWITCH 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!

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

- *The work may be performed only by an expert.*
- *Always adhere to the shutdown procedure prior to disassembly work.*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*
- *If in doubt, contact AWH.*

9.1 Decommissioning

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

9.2 Disassembly

WARNING

Risk of burns due to hot media!

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

- *Let the flow medium cool down prior to work.*
- *Drain the pipelines prior to disassembly work.*
- *Wear work protective clothing, protective gloves and protective goggles when carrying out the work.*

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.*

9.3 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 the appropriate personal protective equipment (for example, protective goggles, protective gloves).*

NOTE

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

After removal, the entire fitting must be properly:

– cleaned (see section 7.2) and

– broken down into its assembly groups and individual parts for correct disposal.

Unless other arrangements have been made for return or disposal, disassembled components should be recycled:

– Scrap any parts made of metal

– Recycle any parts made of plastic

If necessary, contact a specialist company to arrange for disposal.

Comply with locally applicable health, safety, disposal and environmental protection regulations.

NOTE

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

Oils and cleaning agents must be disposed of in accordance with local regulations and the information in the cleaning agent manufacturer's safety data sheets.

Contaminated cleaning tools (such as brushes, cloths etc.) must be disposed of in accordance with local regulations and specifications of the manufacturers.

Packaging material must be disposed of in accordance with the environmental regulations and recycled.

10 Declarations

On the following pages, declarations can be found for the fitting.

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 receive an EU Declaration of Conformity or a CE mark pursuant to said Directive.

Armaturenwerk Hötensleben GmbH
Schulstraße 5-6
39393 Hötensleben, Germany

Declaration

In accordance with the

EC Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Hygiene Inline Station**

Type: **DIN: DN25 – DN100 / PN10**

Inch: DN1 ½" – DN4" / PN10

ISO: DN25 – DN100 / PN10

SMS: DN38 – DN76.1 / PN10

is consistent with the following directives and standards in its delivered version:

Directive/Standard	Title	Version	Comments
2014/68/EU	EU Pressure Equipment Directive	2014	
DIN EN 12516-2	Industrial valves – Shell design strength – Part 2: Calculation method for pressurized shells of steel fittings	10/2004	
AD 2000 information sheets	Regulations for pressure equipment (national standards)		
The fittings are designed for fluids in fluid group 1 and for gases in fluid group 2. The specified nominal widths are classified in accordance with article 4, paragraph 3.			

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 16. May 2018

Thomas Erhorn (CEO)

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

Armaturenwerk Hötensleben GmbH
Schulstraße 5-6
39393 Hötensleben, Germany

EU Declaration of Conformity

In accordance with the

EC Pressure Equipment Directive 2014/68/EU

We hereby declare that the design of

Name: **Hygiene Inline Station**

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AD 2000 information sheets	Regulations for pressure equipment (national standards)		
The fittings are designed for fluids in fluid group 1 and for gases in fluid group 2. The specified nominal widths are classified in accordance with category 1.			

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 16. May 2018

Thomas Erhorn (CEO)

Person authorized to compile the technical documentation:
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