

## Operating instructions

- Translation of the original -

### Non-return valves



English **GBR**



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### Availability and Completeness

These operating instructions constitute part of the valve delivery and must be kept available so that they can be referred to by authorised personnel at any time. No sections may be removed from these instructions. Should the operating instructions or individual pages be missing, they must be replaced at once.

### Change Service

This documentation is subject to the Change Service of Guth Ventiltechnik GmbH. Changes may be made to this documentation without notice of such changes being given.

### Copyright

This documentation contains information that is protected by copyright. It may only be used in connection with the use of the valve.

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# 1. General informations



## NOTICE

Please read this handbook carefully before you begin with the assembly of, commissioning of or any other work connected with this valve.

### 1.1 Intended use

The valve is only approved for areas of use authorised by GUTH.

It was developed and manufactured for installation in piping systems to prevent backflows of fluids in commercial and industrial operation. As flow media water, hot water and mineral oil as well as foodstuffs, beverages or their pre-products as well as pasty media, which are subject to a special hygienic standard, are foreseen.

Transported highly viscous products or products with solid components may give rise to clogging of the area in which the medium is transported (outflow end).

When using these products, the cleaning cycles must be adapted as appropriate.

It has been developed and manufactured in accordance with currently applicable safety standards. Therefore there is no hazard risk under normal conditions if it is used according to the specifications.

### 1.2 Notes on the guarantee

All obligations arising in connection with guarantees are contained in the General Terms and Conditions of Guth Ventiltechnik GmbH.

### 1.3 Safety instructions

- **The valve may only be fitted and commissioned by qualified personnel.**

#### **Based on the definition laid down in EN 60204-1. Qualified personnel:**

A person who, on the basis of his or her specialist training, has acquired knowledge and experience as well as knowledge of the relevant standards and can evaluate the work entrusted to him or her and any possible hazards.



- The valve may only be used for approved purposes.
- The GUTH company shall accept no liability for damage and operational malfunctions resulting from failure to observe these instructions.
- Technical modifications resulting in deviations from the illustrations and information contained in these instructions may be made without prior notice being given.
- The valve may only be fitted and commissioned in accordance with these operating instructions.
- The manufacturing process did not take account of safety precautions in respect of external fire.
- Conversion or modification of the fitting may only be carried out in agreement with the GUTH company.
- The original replacement parts supplied by the GUTH company serve the purpose of ensuring safety. Should other parts be used, the GUTH company shall accept no responsibility whatsoever for any damage that may result.
- The fitting may only be disassembled when not connected to a voltage supply or under pressure.
- Prior to repair and maintenance operations the product line must be de-pressurised and free of the product. Product residues and cleaning agents must be removed as well.
- Fittings that come into contact with hazardous media must be decontaminated.
- Never touch the fitting or piping when hot liquids are being processed or the sterilization process is running.
- If hot or cold fitting parts represent hazards, then these parts must be shielded against the possibility of persons coming into contact with them by the plant operator.

The valve may only be operated when it is in perfect working order. In addition to the documentation, instructions on the following also apply:






- Internal plant working and safety instructions
- National regulations in the country of implementation
- Generally accepted safety regulations
- Accident prevention regulations

Failure to observe the specified hazard warnings may pose a risk to persons as well as the environment, fitting and plant. Specifically, failure to observe the warnings may cause the following hazards to arise:

- the failure of important functions of the fitting and plant
- the failure of prescribed methods for maintenance and repairs
- hazards to persons caused by electrical, mechanical or chemical agents
- environmental hazards on account of leakage of hazardous substances

## 1.4 Danger symbols

Safety instructions and warnings serve to avoid danger to the lives and health of users or maintenance personnel and damage to property. Attention is drawn to them by means of the symbols defined here. The hazards are also highlighted where they may arise by means of danger symbols (pictograms). The meaning of the pictograms is as follows:

| Symbol  | Signal word      | Meaning  |
|---|------------------|--|
|    | <b>DANGER</b>    | Indicates that death, serious injury and/or major damage <u>will</u> occur if the corresponding safety precautions are not observed and implemented.                     |
|   | <b>WARNING</b>   | Indicates that death, serious injury and/or major damage <u>can</u> occur if the corresponding safety precautions are not observed and implemented.                      |
|  | <b>CAUTION</b>   | Indicates that minor injury and/or damage can occur if the corresponding safety precautions are not observed and implemented.  |
|  | <b>ATTENTION</b> | Indicates that which may result in damages of the product itself or of adjacent vicinity occur if the corresponding safety precautions are not observed and implemented. |
|  | <b>NOTICE</b>    | This refers to important information about the product itself or its usage to which special attention is to be drawn.  |

## 2. Technical Data

### 2.1 Functional description

The Guth non-return valve is used in processing plants to prevent backflows of fluids in pipes. The seal chambers have been developed on the basis of the aseptic union standard DIN 11864, thus reducing the risk of the seal creeping backwards as a result of the product to a minimum. This hygienic seal chamber and the valve's internal geometry enables it to be cleaned very well and very effectively.

#### Method of functioning:

In its basic position, the valve disc is pressed against the seat seal by the spring pretensioning mechanism. However, where there is a flow occurring inside the valve, there are two possible and discrete situations:

➤ **Inflow to the valve disc counter to the direction of closure:**

The build-up of pressure from the flow on the valve disc opens the valve, thus enabling the medium to pass through the valve practically unhindered. The spring has been engineered in terms of dimensions to open the valve with only very minor differences in pressure.

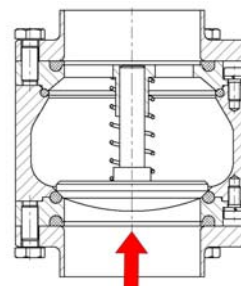
➤ **Inflow to the valve disc in the direction of closure:**

The flow approaches the valve disc in the direction of closure of the spring. The build-up of pressure from the flow on the valve disc thus causes a closing action. In this case, the valve disc is pressed against the seal, thereby hindering flow through the valve.



#### NOTICE

- The direction of flow of the valve must always take place "against the cone" in the direction of opening of the valve spindle so as to ensure opening.



### 2.2 Design of the valve

1. Welding neck flange
2. Seat flange
3. Guide part
4. Housing
5. Valve cone
6. Spring
7. Housing seal
8. Seat seal
9. Flange seal

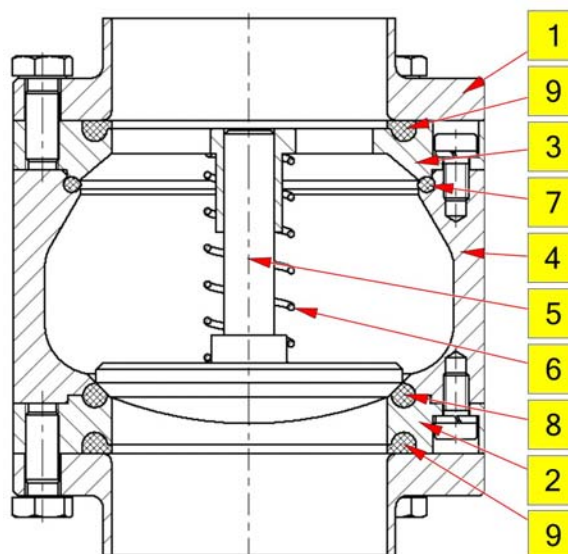


Fig. 1 Design of the valve

## 3. Installation of the non-return valve

### 3.1 Installation space

The installation space for the valve is to be dimensioned such that the fitting can easily be accessed from all sides. There must be enough working room to allow for the removal, addition or adjustment of components or built-in units.

### 3.2 Installation of the fitting

Vertical installation of the non-return valve is recommended to prevent increased wear in the guide. This method of installation also minimises the build-up of deposits.



#### NOTICE

- If the valve is installed horizontally, it will not be able to drain fully!

Exposure of the valve to tensile forces when installed in the pipe system gives rise to the risk of leaks.

It is especially important in this respect to take account of forces and torques arising in the pipe system on account of thermal expansion during operation that causes longitudinal stretching. Care must also be taken to ensure that vibrations resulting from plant operation or the flow behaviour of the medium are not transmitted to the valve. Prior to assembly, the pipe geometry and the connection dimensions must be defined according to the installation dimensions. On installing the valve, the components are to be inserted in the proper way.

### 3.3 Piping connections

All GUTH valves can be fitted with a very wide range of connectors for connection to piping systems. These include threaded connectors, clamped connectors, flanges as well as pipe connecting elements according to the SMS or BS/RJT standards. Also, models with ends for welding can be supplied. In the latter case it should be borne in mind that the entire seals must be removed so that welding can be performed without any risk to seals sensitive to heat. After welding and rework of the seam is complete, the parts are to be reassembled.

### 3.4 Preparation of welding seam

#### Welding seam preparation:

The plant pipe ends to be welded are to be sawn flush and at right angles and deburred. Align the housing welding ends to the pipe ends (radially and axially flush align).

#### Prior to welding in the fitting:

During the welding work no seals may be present next to or in the valve housing.

#### Welding-in instructions:

|                      |  |
|----------------------|--|
| Scope of usage:      | Welded connections of welded-in fittings with pipes according to DIN 11850. We recommend preparing the seam according to DIN 2559.   |
| Welding procedure:   | TIG (Tungsten Inert Gas welding), as appropriate using orbital welding technique — flood pipe internally with forming gas so as to displace the air from the welding area. |
| certified Personnel: | To prevent damage, welding should be undertaken by certified personnel (EN287).  |

➤ **Recommended welding filler materials**

| Plant part | Filler material |        |        |        |
|------------|-----------------|--------|--------|--------|
|            | 1.4316          | 1.4430 | 1.4404 | 1.4519 |
| 1.4301     | x               |        |        |        |
| 1.4306     | x               |        |        |        |
| 1.4401     |                 | x      |        |        |
| 1.4404     |                 | x      |        |        |
| 1.4435     |                 | x      | x      | x      |
| 1.4571     |                 | x      | x      |        |

Tab. 1 Examples for possible welding filler materials

**Welding seam treatment:**

As a rule, no reworking of the weld seam is needed inside the connecting pipe if the weld has been carried out properly. For the outside surface of the connecting pipe, we recommend passivating the weld seam (pickling using pickling paste).



**CAUTION**

- After welding, the valve housing must be thoroughly cleaned. Welding residue and dirt particles can cause damage to the seals.

## 4. Commissioning

Normally, the non-return valve is supplied fully assembled.  
Please see Chapter 3 for the installation as well as the connections.

### 4.1 General notes

- When installing the piping, pay attention to the direction of flow. > Flow against the cone!

## 5. Maintenance and repairs

### 5.1 Inspection

The valve needs very little maintenance. Nevertheless, as a rule, it should be inspected regularly i.e. after approx. 500 operating hours.

**During the inspection, the following should be checked:**

- Leak-tightness of all sealing points.
- Response characteristic of the valve.

➤ **Maintenance intervals:**



**NOTICE**

- Practical maintenance intervals can only be determined empirically by the user as they depend on the conditions of operation involving, for instance, hours of use per day, switching frequency, type and temperature of the product, type and temperature of the cleaning agent, surrounding conditions.


**NOTICE**

- Please pay attention to the lubricant manufacturer's safety data sheets!

**5.2 Valve designation**

Each valve carries a designation. This may be found on the housing.

Direction of flow: 

- 310125  valve number corresponding to order

**NOTICE**

- Please provide these two numbers whenever replacement parts are ordered!

**5.3 Cleaning and care**

The valve is suitable for CIP (Cleaning in Place). The following should be borne in mind:

- Pay attention to the cleaning agent manufacturer's safety data sheets!
- The valve interior must be cleaned regularly.
- Use only cleaning agents that do not damage the valve materials.
- Use clean, chlorine-free water as a thinning agent.
- Dose the cleaning agent step-by-step and avoid using concentrations that are too high.
- After cleaning, flush with plenty of clean water.
- Ensure that the flow of cleaning agent is compatible with the process.

**Recommended cleaning agents:**

- NaOH = sodium hydroxide
- HNO<sub>3</sub> = nitric acid

**NOTICE**

- The cleaning agents must be stored and disposed of in accordance with currently valid safety regulations.

**➤ Example for cleaning****Example for cleaning in the food industry for process valves in version EPDM:**

| Cleaning step                | Description   | Exposure time |
|------------------------------|---|---------------|
| Pre-rinsing                  | Process water at ambient temperature                  | 15 minutes    |
| Main cleaning I (lye step)   | Lye in aqueous solution 0,5-2% by 70°C                | 20-30 minutes |
| Inter-rinsing                | Process water at ambient temperature                  | 15 minutes    |
| Main cleaning II (acid step) | Acid in aqueous solution 1-1,5% by 55°C               | 20-30 minutes |
| After-rinsing                | Water (drinking water quality) at ambient temperature | 15 minutes    |



## 6. Malfunctions

### 6.1 Valve defects

The valve is extremely robust, so mechanical malfunctions are generally not to be expected. Nevertheless, damage to the guides, metallic surfaces and the sealing elements as well as deformation of components on account of extreme operating conditions can never be completely excluded.

#### 1. Valve is no longer leak-tight

##### ➤ Causes:

- From time to time, leakage may occur through the influence of flow forces or (fluctuating) pressure and temperature influences on the static elastomer sealing elements (O-rings) of the housing, or through ageing of the same. Please also check the compatibility of the sealing material used with the media you use.
- The cone guide is deformed, so that precise guidance is no longer possible.
- The closing pressure is no longer sufficient, e.g. because of a broken spring or stuck valve cone.
- Deposits on the sealing surface.

##### ➤ Rectification of fault:

- If the cone guide is damaged or stiff, the assembly must be replaced.
- If deposits have built up in the seat area, careful cleaning may help.
- Replace the sealing elements. Please check whether the seal chambers are still in perfect condition. The housing modules (aseptic separation principle) are highly sensitive by the nature of their construction and must exhibit no notches or damage of any other kind.

##### ➤ Rectification of fault:

- Replace the sealing elements. Please check whether the seal chambers are still in perfect condition. Especially the seal chamber between two housing modules (aseptic sealing principle) is a very sensitive component on account of the way it is constructed. It must be free of notches and other damage.

## 7. Transport, Packaging and Disposal

### 7.1 Transport and Packaging

Prior to transport, the valves are carefully checked and packed. However, the possibility of damage during transport cannot be excluded.

➤ **Unpacking:**

Remove the protective caps from the pipe connections (if present) and any remaining packaging.

➤ **Receiving inspection:**

Check the received goods against the delivery note to ensure that no parts are missing!

➤ **If damage is discovered:**

Check the delivery for damage (visual inspection)!

➤ **In case of complaint:**

If the delivery has been damaged in transit:

- Get in touch immediately with the last shipper!
- Keep the packaging (in case the shipper wishes to inspect it or for returning the goods).

➤ **Packaging for returning goods:**

If possible, use the original packaging material.

- If queries arise in connection with packaging and transport safety please contact Guth Ventilttechnik GmbH.

➤ **Storage in open air:**

Storage in the open air is not permitted.

➤ **Storage in closed spaces:**

Storage conditions:

- Temperature: 0°C bis 30 °C
- Humidity (air): < 60 %

### 7.2 Disposal

The valves are made mainly of steel (with the exception of electrical components and seals). They are to be disposed of according to locally valid environmental protection regulations.

Cleaning agents must be disposed of in accordance with local regulations and the manufacturers' instructions on the safety data sheets.

## 8. Technical Information

### 8.1 Fields of application and materials

#### ➤ Basic version (other valve versions on request)

|  |  |
|--|--|
| <b>Opening pressure:</b><br>(other pressure settings optionally on request)                                | 0,15 bar (±0,1)  |
| <b>Working temperature:</b>  | min. +1°C to max. +120° C  |
| <b>Sterilisation temperature:</b>  | +140° C (briefly)  |
| <b>Working temperature for sealing material:</b>   | Operating temperature<br>(depends on the sealing material)   |
| <b>max. Operating pressure:</b><br>DN 10 - 65 / OD 0,5" - 2,5"<br>DN80 / OD 3"<br>DN100 - 150 / OD 4" - 6" | PN 16<br>PN 10<br>PN 6   |
| <b>Materials / Surface quality:</b><br>Parts in contact with product:<br><br>Other parts:                  | (other materials optionally on request)<br>1.4301(AISI 304)<br>1.4404 (AISI316L)<br>1.4301 (AISI 304L) |
| Surfaces in contact with product:  | Ra ≤0.8  |
| Gaskets in contact with product:   | EPDM, HNBR, FKM, FEP, FFKM, PTFE   |



#### NOTICE

- Test resistance to media, cleaning agents and temperature!

### 8.2 Tightening torques

The table contains non-binding guide values that apply to bolts and nuts according to DIN 912, 931, 933 and 934/ ISO 4762, 4014, 4017, 4032 of stainless steels A2 and A4.

They assume a coefficient of friction of  $\mu=0.12$  for standard bolts and nuts without lubrication.



#### NOTICE

- Additional lubrication of the thread substantially changes the friction coefficient and results in non-definable tightening ratios!

The tightening torques specified here may only be taken as very rough and non-binding, approximate values (see VDI 2230).

|        | Strength class 50<br>'e.g. rotating parts' | Strength class 70<br>'Standard A2-70, A4-70' | Strength class 80<br>'e.g. A4.80' |
|--------|--|--|-----------------------------------|
| Thread | Tightening torque<br>in Nm                 | Tightening torque<br>in Nm                   | Tightening torque<br>in Nm        |
| M 5    | 1.7  | 3.5  | 4.7                               |
| M 6    | 3.0  | 6.0  | 8.0                               |
| M 8    | 7.1  | 16.0   | 22.0                              |
| M 10   | 14.0                                       | 32.0   | 43.0                              |
| M 12   | 24.0                                       | 56.0   | 75.0                              |
| M 16   | 59.0                                       | 135.0  | 180.0                             |
| M 20   | 114.0                                      | 280.0  | 370.0                             |
| M 24   | 198.0                                      | 455.0  | 605.0                             |
| M 30   | 193.0                                      | 1050.0                                       | 1400.0                            |

Tab. 2 Tightening torque

## Konformitätserklärung *Declaration of Conformity*

Im Sinne der EG-Richtlinien 2006/42/EG Anhang II(1) und 2014/68/EU, Artikel 6 Abs.2.  
*In compliance with EC Machine Directive 2006/42/EC Annex II(1) B and 2014/68/EU, Article 6 Clause 2.*

Hersteller / *Manufacturer:*                   **Guth Ventiltechnik GmbH**  
**Horstring 16, D-76829 Landau**

Hiermit erklären wir für die unten aufgeführten Produkte:

Alle Ventile oder auch Druckgeräte mit einem Betriebsdruck über 0,5 bar fallen in den Anwendungsbereich der EG-Druckgeräterichtlinie 2014/68/EU. Neben den druckgerätespezifischen Anforderungen werden insbesondere die einschlägigen Anforderungen des Anhangs I der EG-Maschinenrichtlinie 2006/42/EG angewendet und erfüllt. Die technischen Unterlagen können der benannten Stelle auf Verlangen übermittelt werden.

Die aufgeführten Ventile oder auch Druckgeräte sind als nichtselbständige Geräte zum Einbau in eine Maschine oder in eine Anlage bestimmt, wobei diese erst dann in Betrieb genommen werden darf, wenn sichergestellt ist, dass die Gesamtmaschine oder Anlage den einschlägigen EG-Richtlinien entspricht.

Ventile oder auch Druckgeräte ohne CE-Kennzeichen erfüllen die Anforderungen des Artikels 4 Abs.3 der Richtlinie 2014/68/EU.

*We herewith declare for the products mentioned below:*

*All valves or pressure equipment with an operating pressure above 0,5 bars are subject to the scope of Pressure Equipment Directive 2014/68/EU. The specific requirements for pressure equipment and particular the relevant requirements of Annex I of the Machine Directive 2006/42/EC are both applied and fulfilled. On request by a national authority the technical documents can be transmitted.*

*The valves or pressure equipment are designed to be assembled to another machine or installation as a partly completed unit. Its use it not allowed until the conformity with the provisions of all relevant directives has been ensured.*

*Valves or pressure equipment without CE-marking correspond to Article 4 Clause 3 of the Directive 2014/68/EU.*

| Bezeichnung/<br><i>Name of product</i>  | Nennweite/<br><i>Nominal size</i> | max. PN | Kategorie<br><i>category</i> |
|---|-----------------------------------|---------|------------------------------|
| Sitz- und Wechselventile / <i>Seat and Change over valves</i>                     | DN 32 – 150 / OD 1" – 6"          | 80      | Artikel 4, Absatz 3 / I-III  |
| Scheibenventile / <i>Butterfly valves</i>   | DN 32 – 150 / OD 1" – 6"          | 40      | Artikel 4, Absatz 3 / I-III  |
| Kugelhähne / <i>Ball valves</i>   | DN 32 – 100 / OD 1" – 4"          | 10      | Artikel 4, Absatz 3 / I-II   |
| Druckbehälter / <i>Pressure tank</i>  | V 0,5 - 1500L                     | 40      | Artikel 4, Absatz 3 / I-III  |
| Rohrleitungen / <i>Pipelines</i>  | DN 8 - 250                        | 80      | Artikel 4, Absatz 3 / I-III  |
| Baugruppen und Kundenspezifische Teile / <i>Assemblies &amp; customised parts</i> | DN 8 – 250 / V 0,5 – 1500L        | 32      | Artikel 4, Absatz 3 / I-III  |

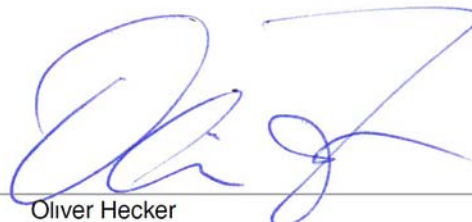
### Angewandte Richtlinien / *Applied guidelines:*

|            |   |
|------------|---|
| 2006/42/EG | Maschinenrichtlinie / <i>Machinery Directive</i>            |
| 2006/95/EG | Niederspannungsrichtlinie / <i>Low voltage Directive</i>    |
| 2014/68/EU | Druckgeräterichtlinie / <i>Pressure equipment directive</i> |

### Angewandte Normen, technische Spezifikationen / *Applied national Standards, technical specifications:*

|                       |   |
|-----------------------|---|
| DIN EN ISO 60204-1    | Sicherheit von Maschinen / <i>Safety of machinery</i>   |
| DIN EN 12266          | Industriearmaturen -Prüfung von Armaturen / <i>Industrial valves - Testing of metallic valves</i> |
| AD 2000, DIN EN 12516 | Armaturengehäuse -Auslegung / <i>Industrial valves - Shell design strength</i>                    |

Landau, 01.07.2016



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