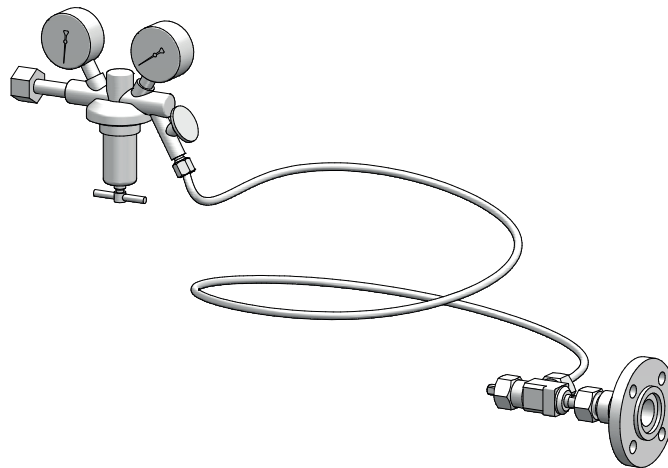


Nitrogen flushing device for chlorine lines

Operating instructions



Read the operating manual!

The user is responsible for installation and operation related mistakes!

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1 Notes for the Reader

This operating manual contains information and behaviour rules for the safe and designated operation of the device.

Observe the following principles:

- read the entire operating instructions prior to inaugurating the device.
- Ensure that everyone who works with or on the device has read the operating manual and follows it.
- Maintain the operating manual throughout the service life of the device.
- Pass the operating manual on to any subsequent owner of the device.

1.1 General non-discrimination

In this operating manual, only the male gender is used where grammar allows gender allocation. The purpose of this is to make the text easy to read. Men and women are always referred to equally. We would like to ask female readers for understanding of this text simplification.

1.2 Explanation of the signal words

Different signal words in combination with warning signs are used in this operating manual. Signal words illustrate the gravity of possible injuries if the risk is ignored:

Signal word	Meaning
DANGER!	Refers to imminent danger. Ignoring this sign may lead to death or the most serious injuries.
WARNING!	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to death or severe injuries.
CAUTION!	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to minor injury or damage to property.
PLEASE NOTE	Refers to a danger which, if ignored, may lead to risk to the machine and its function.

Tab. 1: Explanation of the signal words

1.3 Explanation of the warning signs

Warning signs represent the type and source of a danger:

Warning sign	Type of danger
	Danger to life from chlorine poisoning
	General danger zone
	Danger of damage to machine or functional influences

Tab. 2: Explanation of the warning signs

1.4 Identification of warnings

Warnings are intended to help you recognise risks and avoid negative consequences.

This is how warnings are identified:

Warning sign	SIGNAL WORD
Description of danger. Consequences if ignored. ⇨ The arrow signals a safety precaution to be taken to eliminate the danger.	

1.5 Identification of action instructions

This is how pre-conditions for action are identified:

- ✓ Pre-condition for action which must be met before taking action.
- ✗ A resource such as a tool or auxiliary materials required to perform the operating instructions.

This is how instructions for action are identified:

- ➔ Separate step with no follow-up action.
- 1. First step in a series of steps.
- 2. Second step in a series of steps.
 - ▶ Result of the above action.
- ✓ **Action completed, aim achieved.**

2 Safety

2.1 General warnings

The following warnings are intended to help you eliminate the dangers that can arise while handling the device. Risk prevention measures always apply regardless of any specific action.

Safety instructions warning against risks arising from specific activities or situations can be found in the respective sub-chapters.

	DANGER!
Danger to life from chlorine poisoning! Chlorine is poisonous. In severe cases, breathing in chlorine may lead to death. It irritates the eyes, the respiratory system and the skin. ⇒ Use sufficient personal protective equipment. ⇒ When carrying out any work on the system, use a respirator mask with a Type B gas filter that complies with EN 14387. ⇒ Always comply with the accident prevention regulations that apply at the place of use. ⇒ Get rid of leaks without delay. You must get rid of even very minor leaks without delay. Together with the humidity, chlorine forms hydrochloric acid and corrosion results in rapidly increasing leakage. ⇒ Use only chlorine-resistant seals. ⇒ Only use seals once. Reusing them leads to leaks.	

	DANGER!
Danger to life from chlorine poisoning! Chlorinators without gas warning devices are an increased safety risk, since it is not possible to detect escaping chlorine gas in good time or at all. ⇒ Install a gas warning device.	

	WARNING!
Increased risk of accidents due to insufficient qualification of personnel! Chlorinators and their accessories must only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents. ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons.	

	PLEASE NOTE
Damage to the plant due to the formation of hydrochloric acid Chlorine gas is highly hygroscopic. This means that humidity enters the system at any open connection on devices or pipes, which results in the formation of hydrochloric acid and contamination, thus inevitably causing damage to the units. ⇒ Keep all connections (including in the vacuum system and on all devices not currently in use) closed at all times.	

2.2 Information about chlorine

Chlorine is a hazardous substance. The chemical element chlorine is a greenish-yellow, toxic gas with a pungent odour, which can be detected in the air at concentrations below 1 ppm (= 1 ml/m³).

Chlorine is 2.5 times heavier than air and accumulates at ground level.

Chlorine is extremely toxic for water organisms. The reason for the toxicity of chlorine is its extraordinary reactivity. It reacts with animal and vegetable tissue and thus destroys it.

Air with a chlorine gas content of 0.5 - 1 % leads to a quick death in mammals and humans, as it attacks the respiratory tract and the pulmonary alveolus (formation of hydrogen chloride or hydrochloric acid).

	PLEASE NOTE
Faults due to insufficient chlorine quality Impurities in the chlorine gas form deposits in devices and valves and can attack the components chemically. This can lead to malfunctions. ⇒ Only use technically pure chlorine that meets the following requirements: - Mass content of chlorine at least 99.5% - Water content max. 20 mg/kg Chlorine that complies with EN 937 meets these requirements	

2.3 Hazards due to non-compliance with the safety instructions

Failure to follow the safety instructions may endanger not only persons, but also the environment and the device.

The specific consequences can be:

- failure of important functions of the device and of the corresponding system,
- Failure of required maintenance and repair methods,
- danger to persons,
- danger to the environment caused by substances leaking from the system.

2.4 Working in a safety-conscious manner

Besides the safety instructions specified in this operating manual, further safety rules apply and must be followed:

- accident prevention regulations
- Safety and operating provisions,
- safety regulations on handling hazardous substances,
- Environmental protection provisions,
- applicable standards and legislation.

2.5 Personal protective equipment

Based on the degree of risk posed by the dosing medium and the type of work you are carrying out, you must use corresponding protective equipment. Read the Accident Prevention Regulations and the Safety Data Sheets to the dosing media find out what protective equipment you need.

As a minimum, the following protective equipment is recommended:



Protective mask



protective clothing



Protective gloves



safety shoes

Corresponding protective equipment must be used during these tasks:

- Commissioning,
- all work on gas-bearing sections of the plant
- changing the chlorine gas containers,
- Shut-down,
- Maintenance work,
- Disposal.

DANGER!

Danger to life from chlorine poisoning!

If chlorine gas escapes, a filter mask is ineffective, since it is not a self-contained breathing apparatus.

⇒ If chlorine gas escapes, wear a Type 2 self-contained breathing apparatus that complies with EN 137.

2.6 Personnel qualification

Any personnel who work on the device must have appropriate special knowledge and skills.

Anybody who works on the device must meet the conditions below:

- Attendance at all the training courses offered by the owner,

- Personal suitability for the respective activity,
- sufficient qualification for the respective activity,
- training in how to handle the device,
- knowledge of safety equipment and the way this equipment functions,
- knowledge of this operating manual, particularly of safety instructions and sections relevant for the activity,
- Knowledge of fundamental regulations regarding health and safety and accident prevention.

All persons must generally have the following minimum qualification:

- Training as specialists to carry out work on the device unsupervised,
- sufficient training that they can work on the device under the supervision and guidance of a trained specialist.

These operating instructions differentiate between these user groups:

2.6.1 Specialist staff

Thanks to their professional training, knowledge, experience and knowledge of the relevant specifications, specialist staff are able to perform the job allocated to them and recognise and/or eliminate any possible dangers by themselves.

2.6.2 Trained persons

Trained persons have received training from the operator about the tasks they are to perform and about the dangers stemming from improper behaviour.

Trained persons have attended all trainings offered by the operator.

2.7 Personnel tasks

In the table below you can check what qualifications are the pre-condition for the respective tasks. Only people with appropriate qualifications are allowed to perform these tasks!

Qualification	Activities
Specialist staff	■ Transportation ■ Assembly ■ Commissioning ■ Control ■ Changing the nitrogen flushing device ■ Taking out of operation ■ Fault rectification ■ Maintenance ■ Repairs ■ Disposal
Trained persons	■ Storage

Tab. 3: Personnel qualification

3 Intended use

3.1 Notes on product warranty

Any non-designated use of the device can impair its function and the protection provided. This leads to invalidation of any warranty claims!

Please note that liability is on the side of the user in the following cases:

- the device is operated in a manner which is not consistent with these operating instructions, particularly safety instructions, handling instructions and the section "Intended Use".
- Information on usage and environment (see section 5 „Technical data“ on page 9) is not adhered to.
- If people operate the device who are not adequately qualified to carry out their respective activities.
- No original spare parts or accessories of Lutz-Jesco GmbH are used.
- Unauthorised changes are made to the device.
- The user uses different dosing media than those indicated in the order.
- Maintenance and inspection intervals are not adhered to as required or not adhered to at all.
- The device is commissioned before it or the corresponding system has been correctly and completely installed.
- Safety equipment has been bridged, removed or made inoperative in any other way.

3.2 Intended purpose

The device is intended for the following purpose only:

- Leak test of the pressure system of a chlorine plant from the pressure manifold to the vacuum regulator.
- Flushing the chlorine lines before starting maintenance or long-term shutdown of a chlorine gas system.
- Flushing devices of the chlorine gas system before their disposal.

3.3 Prohibited dosing media

The device must not be used for the following media and substances:

- Any gases except nitrogen,
- not technically pure nitrogen with a mass content of less than 99.8 %

4 Product description

4.1 Scope of delivery

Carefully check the delivery prior to installation and refer to the delivery note to ensure the delivery is complete and to check for any transport damage. Contact the supplier and/or carrier regarding any questions concerning the delivery and/or transport damage. Do not operate defective devices.

The scope of delivery includes:

- Connection flange
- Auxiliary chlorine valve
- Flexible connection line
- Pressure reducer for nitrogen
- Mounting material for connection to a pressure manifold
- Operating instructions

4.2 Design and function

4.2.1 Structure of the device

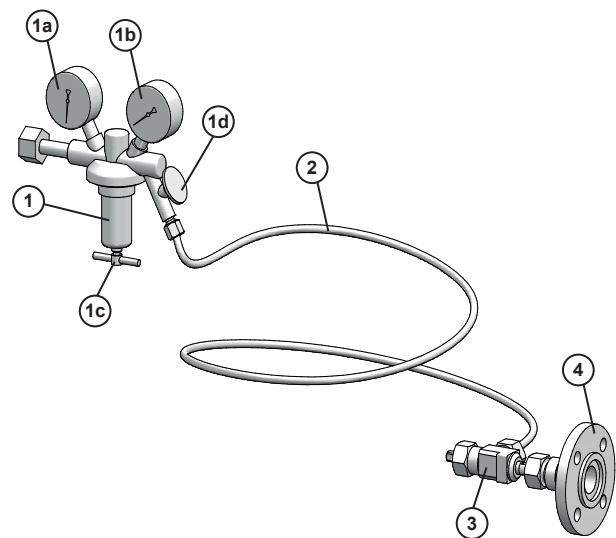


Fig. 1: Structure of the device

Position	Description
1	Pressure reducer for nitrogen
1a	High pressure gauge
1b	Low pressure gauge
1c	Adjustment screw
1d	Shut-off valve
2	Flexible connection line
3	Auxiliary chlorine valve
4	Connection flange

Tab. 4: Description of components

4.2.2 Function description

The pressure system of a chlorine system must be checked for leaks before commissioning. In order to detect possible leaks in the pressure system without risking the release of chlorine, the system is first checked for leaks with the nitrogen flushing device. Only then does a leak test with chlorine take place. Before maintenance or decommissioning of the chlorine system, the chlorine is removed from the chlorine system with the nitrogen flushing device.

5 Technical data

Description		Value
Pressure reducer	High pressure gauge	0 – 200 bar
	Low pressure gauge	0 – 10 bar
	Materials	Brass, EPDM, PA, PTFE
	Inlet connection	W24, 32x1/14RH
	Outlet connection	G 1/4 RH a
Flexible connection line	Nominal width	DN6
	Material	Copper, galvanic coated
	Inlet connection	G 1/4i (DIN EN 560)
	Outlet connection	G 5/8i (BS 341–1)
Auxiliary chlorine valve	Materials	Bronze, Monel, PTFE
	Inlet connection	G 5/8 (BS 341–1)
	Outlet connection	G 5/8 (BS 341–1)
Connection flange	Version	DN25/PN 40 with spring acc. to EN 1092-1 with pin G 5/8
	Material	P235GH-TC (1.0345)

Tab. 5: Technical data

6 Installation



WARNING!

Increased risk of accidents due to insufficient qualification of personnel!

Chlorinators and their accessories must only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents.

- ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.
- ⇒ Prevent access to the system for unauthorised persons.



PLEASE NOTE

Damage to the system due to incorrect installation

The failure to observe installation instructions (e.g. use of unsuitable tools, incorrect torque) can damage the system parts.

- ⇒ Use the tool intended for this purpose.
- ⇒ Note the specified torque.

Pre-conditions for actions:

- ✓ The seals are clean and dry.
- ✓ All sealing surfaces are free of contamination and damage.
- ✓ The inside of the line is clean and dry.

Perform the following working steps:

1. Insert a new seal on the sealing surface on the connection of the auxiliary chlorine valve (1).
2. Screw the union nut (2) of the auxiliary chlorine valve to the connection of the flange (3). The tightening torque is approx. 40 Nm.
3. Insert a new seal on the sealing surface on the connection of the flexible connection line.
4. Screw the flexible connection line union nut (4) to the connection of the auxiliary chlorine valve. The tightening torque is approx. 40 Nm.
5. Screw the flexible connection line union nut (5) to the connection of the pressure-relief (6). The tightening torque is approx. 40 Nm.

- ✓ **Components of the nitrogen flushing device mounted.**

6.1.2 Installing the flange connection



Any bolts, nuts and washers that are removed during assembly work must be replaced with new ones if they are damaged. Used bolts, nuts and washers may only be installed if they are in new condition.

6.1 Installing the device

6.1.1 Mounting the nitrogen flushing device

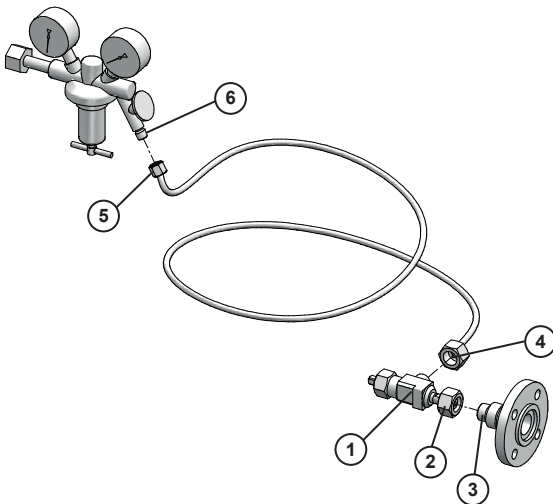


Fig. 2: Mounting the nitrogen flushing device

Resources required:

- ✂ Wrench for the operation of auxiliary valves
- ✂ Torque wrench AF19 20 – 50 Nm

Resources required:

- ✂ Torque wrench AF19 20 – 50 Nm

Pre-conditions for actions:

- ✓ The nitrogen flushing device has been mounted.
- ✓ The flange seals are clean and dry.
- ✓ All sealing surfaces are free of contamination and damage.

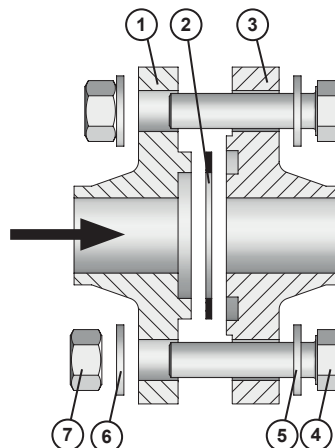


Fig. 3: Installing the flange connection

Nitrogen flushing device

Perform the following working steps:

1. Lubricate the sliding faces and thread of bolts, nuts and washers e.g. using fitting grease or PTFE grease.
2. Place the flat seal (2) into the groove of the flange (3) of the pressurized manifold. Assemble the seal in dry condition.
3. Fit the tongue flange (1) of the nitrogen flushing device. Make sure that the flat gasket (2) does not slip.
4. Fit the bolts (4), washers (5, 6) and nuts (7) by hand.
5. Tighten the bolts evenly alternately crosswise in three stages: 20 Nm, 35 Nm, 50 Nm.
6. Retighten all the bolts to the full target tightening torque (50 Nm).
7. Setting the seal (adapting to the flange seal surface) can make it necessary to retighten the bolts. For this reason, retighten the bolts to 50 Nm after a few hours.

✓ **Flange connection assembled**

6.2 Completing the installation

After completing installation, you must check that the nitrogen flushing device is leak-proof.

7 Commissioning



DANGER!

Chlorine gas can escape due to systems that are leaky or not installed correctly!

Chlorinators constitute an increased safety risk if they have not been properly installed, if an adequate leak test has not been performed or if the devices are not in good condition.

- ⇒ Before placing the system into operation, have it checked by technical personnel to ensure that it is in the proper condition and leaktight.
- ⇒ The condition of the installation must be checked for adequate tightness on a regular basis.
- ⇒ Get rid of leaks without delay. You must get rid of even very minor leaks without delay. Together with the humidity, chlorine forms hydrochloric acid and corrosion results in rapidly increasing leakage.

4. Open the shut-off valve of the pressure reducer (1 d).
5. Close the nitrogen cylinder's valve.
6. Apply soap solution to all the potential leaks.
 - ▶ Bubbles form at leak locations (with a possible time delay).
7. Repair the leak and repeat the leak test.

✓ **Leak test with nitrogen carried out.**

When commissioning the nitrogen flushing device, it is assumed that it will first be used to check the pressure system for leaks.

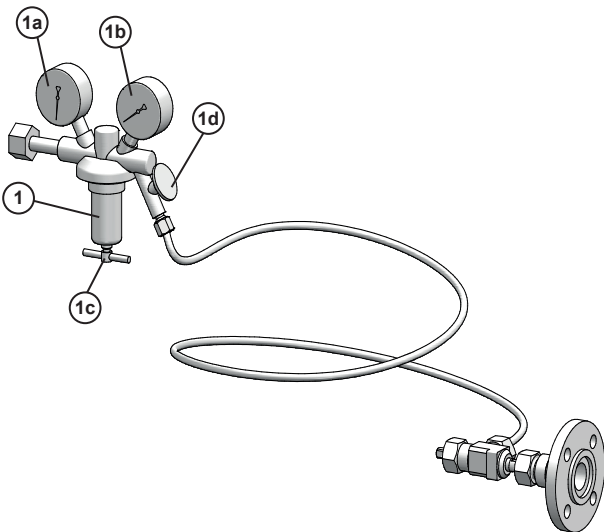


Fig. 4: Commissioning

Pre-conditions for actions:

- ✓ All chlorine container valves are closed.
- ✓ The auxiliary chlorine valve of the nitrogen flushing device is open.
- ✓ A nitrogen cylinder is available and has been secured against falling over.

Perform the following working steps:

1. Connect the pressure reducer (1) of the nitrogen flushing device to a nitrogen cylinder.
2. Open the nitrogen cylinder's valve. The high pressure gauge of the pressure reducer (1a) indicates the current cylinder pressure.
3. Set a test pressure of 10 bar using the adjustment screw (1c). The pressure is displayed on the low pressure gauge (1b).

8 Operation



DANGER!

Chlorine gas can escape due to systems that are leaky or not installed correctly!

Chlorinators constitute an increased safety risk if they have not been properly installed, if an adequate leak test has not been performed or if the devices are not in good condition.

- ⇒ Before placing the system into operation, have it checked by technical personnel to ensure that it is in the proper condition and leaktight.
- ⇒ The condition of the installation must be checked for adequate tightness on a regular basis.
- ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.



PLEASE NOTE

Damage to the system by chlorine

The pressure reducer of the nitrogen flushing device is not chlorine resistant.

- ⇒ After operating the nitrogen flushing device close the auxiliary chlorine valve.

The nitrogen flushing device is used to check the check a pressure system for leaks and to flush a chlorine system.

8.1 Checking the tightness of the pressure system with nitrogen

Pre-conditions for actions:

- ✓ All the open connections of the pressure system were closed correctly.
- ✓ All the shut-off valves in the pipe system were opened.
- ✓ A nitrogen cylinder with a pressure reducer (0 – 10 bar) has been connected.

Perform the following working steps:

1. Slowly raise the system pressure at the pressure reducer to 10 bar.
2. Close the nitrogen cylinder's valve.
3. Apply soap solution to all the potential leaks.
 - ▶ Bubbles form at leak locations (with a possible time delay).
4. Close the outlet on the nitrogen cylinder's pressure reducer and observe the pressure gauge in the installation.
 - ▶ The pressure must not drop within one hour.
5. Depressurise the system using the injector to evacuate the piping.

6. In case of leakage, repair the leak(s) and repeat the leak test.

✓ **Leak test with nitrogen carried out.**

8.2 Flushing the chlorination plant

Pre-conditions for actions:

- ✓ All chlorine tank valves were properly closed.
- ✓ The auxiliary chlorine valve of the nitrogen flushing device is closed.
- ✓ A nitrogen cylinder with a pressure reducer (0 – 10 bar) has been connected.

Perform the following working steps:

1. Use the injector to suck off the remaining chlorine.
2. Open the valve of the nitrogen cylinder and slowly raise the system pressure at the pressure reducer to 10 bar.
3. Slowly open the auxiliary chlorine valve and flush the remaining liquid chlorine into the evaporator.



DANGER!

Chlorine residues in the lines

As long as the chlorine lines have not reached room temperature, it can be assumed that chlorine is present in the chlorine lines.

- ⇒ Operate the injector until the chlorine lines have reached room temperature and the system is depressurised.

 It can take up to 2 hours at room temperature to evaporate and/or remove the remaining chlorine from the lines.

4. After flushing the system, close the auxiliary chlorine valve, the shut-off valve of the pressure reducer and the valve of the nitrogen cylinder one after the other.

✓ **Chlorinations plant flushed.**

8.3 Shutting down in an emergency

The valve of the nitrogen cylinder must be closed and the flushing device depressurised by opening the relief valve of the pressure reducer.

The further procedure depends on the type of accident and should be planned and executed by professional personnel.

8.4 Test intervals

You must check the components of the chlorinator for leaks on a daily basis and after maintenance or commissioning work.

9 Shutdown

9.1 Short-term shutdown

Perform the following working steps:

1. Close the auxiliary chlorine valve.
2. Close the nitrogen cylinder's valve.
3. Open the pressure reducer relief valve to depressurise the nitrogen purge device.

In case of bottle change:

4. Unscrew the pressure reducer from the nitrogen cylinder.



Nitrogen flushing device shut down for the short term.

9.2 Long-term shutdown

Perform the following working steps:

1. Close the chlorine tank valves.
2. Use the injector to suck off the remaining chlorine.
3. Open the valve of the nitrogen cylinder and slowly raise the system pressure at the pressure reducer to 10 bar.
4. Slowly open the auxiliary chlorine valve and flush the remaining chlorine from the lines.
5. Close the nitrogen cylinder's valve.
6. Switch off the injector when the system is depressurised.
7. Dismantle the nitrogen flushing device from the pressure manifold.
8. Unscrew the nitrogen flushing device from the nitrogen cylinder.
9. Close all the open connections to protect the lines and devices from humidity and dirt.



Nitrogen flushing device shut down for the long term.

9.3 Storage

Storing the device correctly will extend its service life. You should avoid negative influences such as extreme temperatures, high humidity, dust, chemicals, etc.

9.4 Disposal of old equipment

- Before disposing of the old equipment, you must clean off the remaining chlorine by rinsing it with nitrogen or air.
- The device must be disposed of in accordance with applicable local laws and regulations. It should not be disposed of as domestic waste!
- As the disposal regulations may differ from country to country, please consult your supplier if necessary.
- In Germany, the manufacturer must provide free-of-charge disposal provided the device has been safely returned along with a declaration of no objection (see page 17).

10 Maintenance

If used correctly, no maintenance of the nitrogen flushing device is necessary.

11 Notes to EC conformity

The device falls under the purview of the pressure equipment directive 2014/68/EU.

The values stated below do not exceed the limit values in according to article 3, paragraph 1. Therefore, it is designed and manufactured in accordance with valid good engineering practice This pressure device may not carry a CE marking and an EC declaration of conformity will not be issued.

Device designation:	Nitrogen flushing device
Type:	-
Pressure stage:	PN40
Nominal diameter:	DN6
max. temperature:	50 °C
Medium:	Nitrogen, fluid group 2

12 Declaration of no objection

Please copy the declaration, stick it to the outside of the packaging and return it with the device.

Declaration of no objection

Please fill out a separate form for each appliance!

We forward the following device for repairs:

Device and device type:

Part-no.:

Order No.:

Date of delivery:

Reason for repair:

.....

.....

Dosing medium

Description:

Irritating: ☐ Yes ☐ No

Properties:

Corrosive: ☐ Yes ☐ No

We hereby certify, that the product has been cleaned thoroughly inside and outside before returning, that it is free from hazardous material (i.e. chemical, biological, toxic, flammable, and radioactive material) and that the lubricant has been drained.

If the manufacturer finds it necessary to carry out further cleaning work, we accept the charge will be made to us.

We assure that the aforementioned information is correct and complete and that the unit is dispatched according to the legal requirements.

Company / address:

Phone:

.....

Fax:

.....

Email:

Customer No.:

Contact person:

Date, Signature:

13 Warranty claim

Warranty claim

Please copy and send it back with the unit!

If the device breaks down within the period of warranty, please return it in a cleaned condition with the complete warranty claim.

Sender

Company: Phone: Date:

Address:

Contact person:

Manufacturer order no.: Date of delivery:

Device type: Serial number:

Nominal capacity / nominal pressure:

Description of fault:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Service conditions of the device

Point of use / system designation:

.....

Accessories used (suction line etc.):

.....
.....
.....
.....

Commissioning (date):

Duty period (approx. operating hours):

Please describe the specific installation and enclose a simple drawing or picture of the chemical feed system, showing materials of construction, diameters, lengths and heights of suction and discharge lines.

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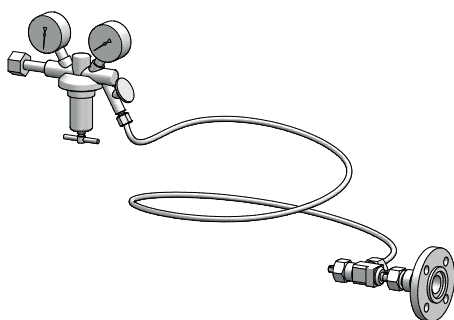
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Operating instructions
Nitrogen flushing device