

Vaccuperm VGA-111

Vacuum regulator

GB Service instructions





CONTENTS

1.	Of general interest	3
1.1	Structure of the documentation	3
1.2	About this manual	3
1.3	User/target groups	3
1.4	Responsibilities of the operator	4
1.5	Maintenance and service personnel	4
1.6	Correct usage	4
1.7	Inappropriate usage	4
2.	Technical Data	5
2.1	Type key VGA-111	5
2.2	General data VGA-111	6
2.3	Dimensioned drawing	7
3.	Installation	8
3.1	Transport and storage	8
3.2	Unpacking	8
3.3	Typical installations	8
3.4	Mounting	9
4.	Commissioning	10
4.1	Preparations for commissioning	10
4.2	Checks before commissioning	12
5.	Maintenance	14
5.1	Possible faults	14
5.2	Cleaning the inlet valve	15
5.3	Cleaning the vacuum regulator	16
6.	Spare Parts	18
6.1	Vacuum regulator VGA-111	18



Warning

These operating instructions are also available on www.Grundfosalldos.com.

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

1. Of general interest

1.1 Structure of the documentation

The Grundfos Alldos device VGA-111 is a state-of-the-art solution, which complies with recognised safety regulations. Conformity with applicable standards, directives and laws has been verified.

Nevertheless, certain risks which cannot be prevented by the manufacturer are associated with the use of the system.

Purpose of this manual:

- Inform users of optimum use.
- Warn users of possible residual risks when using correctly and identify measures that should be taken to avoid damage.
- Caution users against obvious misuse or inappropriate use and inform them of the necessary care that must be taken when operating the system.

1.2 About this manual

This manual contains the following standardised safety instructions about possible residual risks:



Warning

If these safety instructions are not observed, it may result in personal injury!

Caution

If these safety instructions are not observed, it may result in malfunction or damage to the equipment!

Note

Notes or instructions that make the job easier and ensure safe operation.

Information about possible residual risks is provided:

- On warning signs displayed in the installation location.
- At the start of each section in this manual.
- Directly before any operating procedures that could involve residual risks.

1.3 User/target groups

Users are persons who are responsible for operating and monitoring the device VGA-111 at the installation location.

The system may only be operated by trained and qualified personnel. Personnel must have appropriate technical knowledge and be familiar with the basic principles of measuring and control technology.

1.3.1 Responsibilities of the users

The users' responsibilities:

- Read this manual before operating the VGA-111.
- Be trained by qualified personnel from Grundfos Alldos in the operation of the system.
- Observe the recognised regulations governing safety in the workplace and accident prevention.
- Wear appropriate protective clothing in accordance with national regulations for the prevention of accidents when operating the system and handling chemicals (German GUV-V D05).

1.4 Responsibilities of the operator

The owner of the building or operator of the VGA-111 is responsible for the following:

- Consider this manual to be part of the product and ensure that it is kept clearly accessible in the immediate vicinity of the system for the entire service life of the system.
- Meet the installation requirements specified by the manufacturer (required water connections and fittings, environmental conditions, electrical connection, protective pipe for dosing line if necessary, audible or optical warning device for alarm messages if necessary).
- Ensure that water lines and fixings are regularly checked, serviced and maintained.
- Obtain official approval for storing chemicals, if necessary.
- Train users in the operation of the system.
- Ensure that the regulations for the prevention of accidents are observed in the installation location (German GUV-V D05 regulation for the prevention of accidents, "Chlorination of Water" dated January 1997).
- Provide all users and service personnel with protective clothing in accordance with GUV-V D05 (face mask, gloves, protective apron).

1.5 Maintenance and service personnel

The system may only be maintained and serviced by authorised service personnel from Grundfos Alldos.

1.6 Correct usage

The Grundfos Alldos VGA-111 may be used for dosing chlorine (Cl₂) as being described in this manual.

1.7 Inappropriate usage

Applications other than those listed in section 1.6 *Correct usage* are considered not to be in accordance with the intended use and are not permitted. The manufacturer, Grundfos Alldos, accepts no liability for any damage resulting from incorrect use.

The system comprises state-of-the-art components and has undergone safety-related testing.

Warning



Unauthorised structural modifications to the system may result in serious damage to equipment and personal injury.

It is forbidden to open, modify, change the structure of, bridge, remove, bypass or disable components, especially safety equipment.

2. Technical Data

2.1 Type key VGA-111

Example: Vacuum regulator Type key VGA-111-B/1-S-0R-0-U, NF

Code	Example	VGA-111	-B	/1	-S	-0	R	-0	-U	, N	F
	Vaccuperm Gas Advanced = VGA										
	Installation										
B	Directly on the cylinder										
W	Wall-mounting										
C	Header line										
BC	Direct installation drum / Header line										
	Connection										
1	G 1										
2	G 3/4										
3	US Joke										
4	Copper pipe 6/8										
	Inlet valve										
B	Basic										
S	Short										
L	Long, 230-240V/50-60Hz, short connection										
M	Long, 110-115V/50-60Hz, short connection										
N	Long, 230-240V/50-60Hz, long connection										
O	Long, 110-115V/50-60Hz, long connection										
	Pressure indication										
0	Without pressure gauge										
1	Pressure gauge without contacts										
2	Pressure gauge with MIN 'NO'										
3	Pressure gauge with MIN 'NC'										
	Connection pressure gauge										
X	Without										
T	Top										
R	Right-hand-side										
	Limiting nozzle full vacuum										
0	Without nozzle										
1	With nozzle										
	Filter										
O	Outside										
U	Inside										
	Residual pressure device										
Y	Yes										
N	No										
	Pressure input										
F	Frontal										
L	Left										

2.2 General data VGA-111

Permissible medium	Cl ₂
Maximum flow	4000 g/h
Empty indication	optical empty indication
Weight	ca. 2.4 kg (depending on the execution of the pressure connection)

2.2.1 Pressure connection (inlet)

Union nut G 1	
Union nut G 3/4	
Copper pipe 6/8 (G 1/2)	
Vacuum connection (for the dosing regulator)	for hose 8/11
Overpressure connection	for hose 8/11

2.2.2 Liquid trap

With liquid trap, long inlet valve
No liquid trap, short inlet valve

2.2.3 Pressure indication

Pressure gauge for Cl ₂ , 0-16 bar without contact
No pressure gauge

2.2.4 Accessories (not including)

Installation material: Hoses of different lengths
With holding plate for wall fixing at change of container
Test medium for leak search

2.3 Dimensioned drawing

2.3.1 Vacuum regulator VGA-111

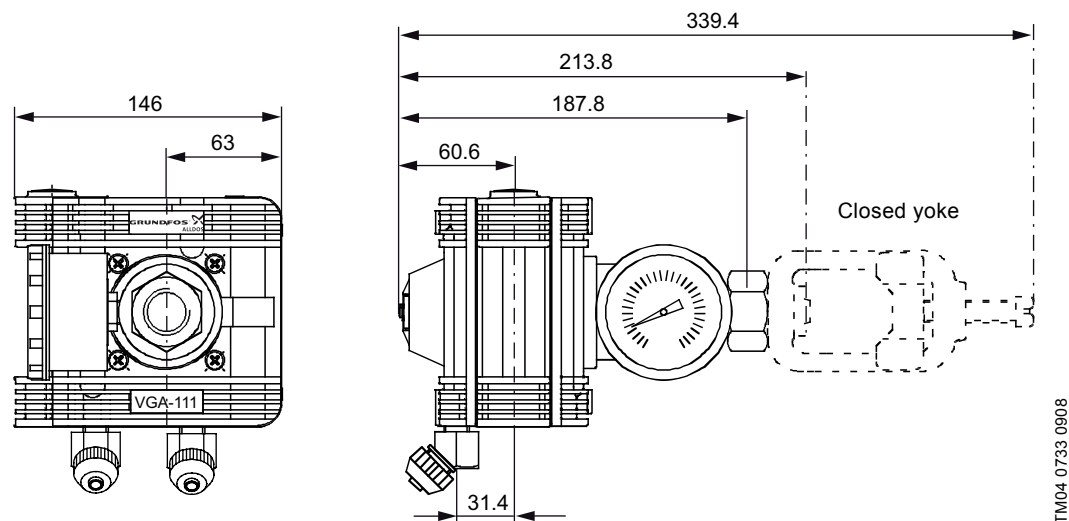


Fig. 1 Vacuum regulator VGA-111

2.3.2 Vacuum regulator VGA-111 with liquid trap

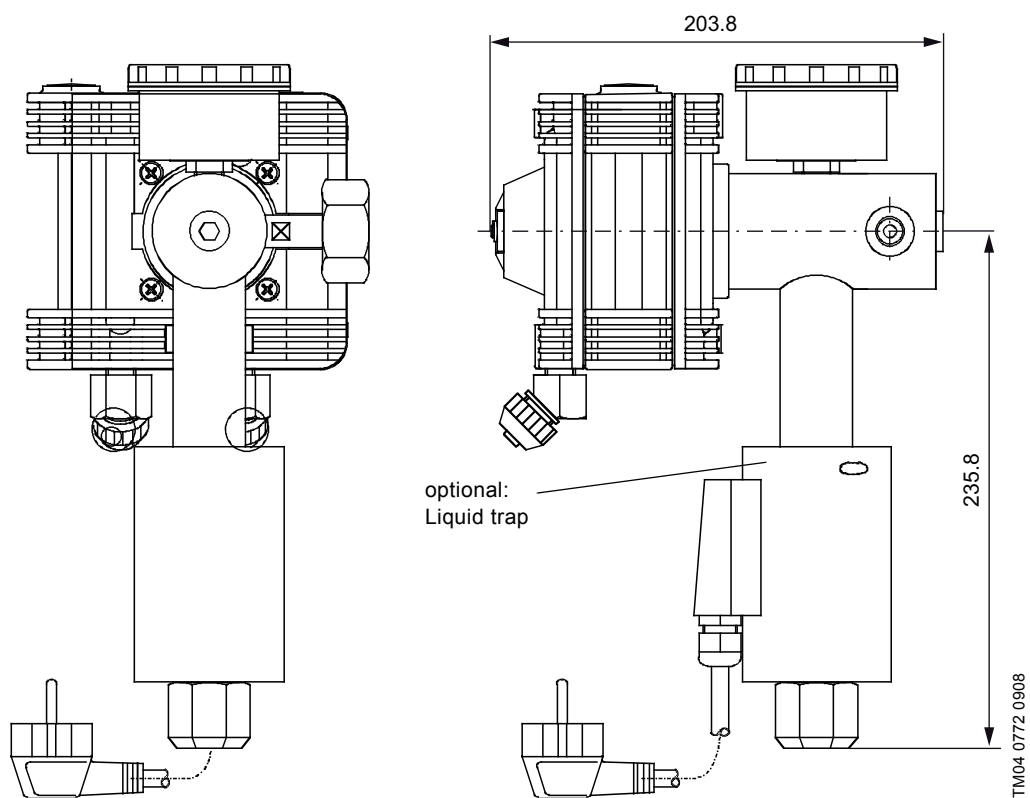


Fig. 2 Vacuum regulator VGA-111 with liquid trap

3. Installation

3.1 Transport and storage

- Handle with care, don't throw!
- Dry and cool storage place.

3.2 Unpacking

- Observe when unpacking
 - No humidity should get into gas-leading parts!
 - No foreign matter should get into gas-leading parts!
- Mount as soon as possible after unpacking.

3.3 Typical installations

Vacuum regulator and dosing regulator

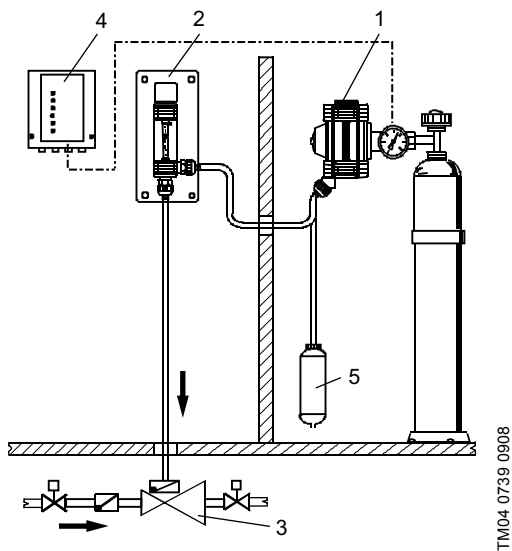


Fig. 3 Vacuum regulator and dosing regulator

Item	Description
1	Vacuum regulator VGA-111 (with contact pressure gauge)
2	Dosing regulator e.g. VGA 113
3	Injector
4	Remote display for container empty indication
5	Adsorption device

3.4 Mounting



Warning

Please read Installation and operating instruction, Chapter 2: Handling Chlorine.

3.4.1 Vacuum regulator

- The cylinder must be properly placed and fixed.
- All connections must be absolutely clean and dry.
- Remove the protective cap from the cylinder.



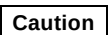
Warning

Never re-use used gaskets!

Replace the gaskets at any change of gas container!

Never use the device without the filter!

- Insert the gasket at the pressure connection of the vacuum regulator.
- If present for the actual connection version: Do not remove the filter at the pressure connection of the vacuum regulator!
- Screw the vacuum regulator onto the connection of the cylinder.



Do not align the device by turning the housing!

If necessary, hold up with a fork wrench size 13!

4. Commissioning

4.1 Preparations for commissioning

4.1.1 Vacuum connections



Warning

**Before connecting, ensure that the valves of all gas containers are closed.
Only use the intended line types!**

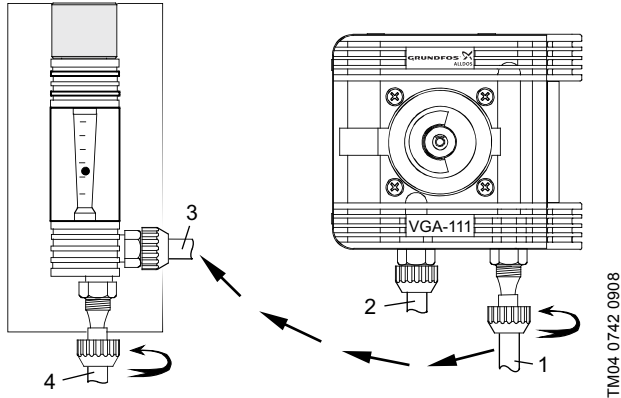


Fig. 4 Vacuum connections

Item	Description
1	Vacuum line from vacuum regulator
2	Overpressure line to adsorption device
3	Vacuum line from dosing regulator e
4	Vacuum line to the injector

Only tighten the union nuts of the vacuum connections by hand. Do not use any tools!

Caution

Danger of damages!

Maximum length of the vacuum line, see Installation and operating instructions chapter 2, Handling chlorine.

- At the vacuum regulator, connect the vacuum line (1) and connect it to the dosing regulators (3).

Warning



Lead the overpressure line downwards, as chlorine is heavier than air.

Connect the overpressure line to a suitable adsorption device. If using a gas warning device.

Mount the sensor in a distance of about 10 cm from the outlet hole of the adsorption device.

- Connect the overpressure line (2).
- Connect the vacuum line to the injector (4).

4.1.2 Electrical connections

Before connecting the mains cable:

Check if the mains voltage indicated on the type plate corresponds to the local mains voltage. Wrong voltage can lead to damages of the product!

Caution

To ensure electromagnetic compatibility (EMC):

Signal lines must be shielded. The shield must be connected to PE or ground on the side of the counterpart, par exemple a controller.

Signal lines and mains lines must be guided in different cable channels.

Vacuum regulator VGA-111 with liquid trap and/or contact pressure gauge

- Connect the heating of the optional liquid trap.
 - Connect the mains line to the mains.
- Connect the optional contact pressure gauge.
 - Connect two cables with an external evaluation device.

Note

The polarity is arbitrary.



Warning

The terminals 3 and 5 of the limit switches are on mains potential when the switch closes after the limit position had been reached.

4.2 Checks before commissioning

Check tightness of the total plant before start-up



Warning

Check the tightness not until the total plant is ready for start-up.

Danger of gas leakage!

4.2.1 Checking the gas solution lines and the non-return diaphragm of the injector

- Observe the manual of the injector!

4.2.2 Checking the tightness



Warning

Liquid ammonia must not come in contact with parts of the plant!

Danger of leakages by corrosion!

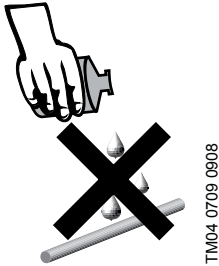


Fig. 5 No liquid ammonia

Checking the pressure connections (after changing gas cylinder)

- Open the cylinder valve and quickly close it again.
- Slowly pass the open ammonia bottle along gas-leading parts.
 - Slightly press the bottle in a pumping manner, allowing the ammonia mist to rise up.
 - Formation of white mist: Leakage at the pressure connection!
- Depressurize the plant!
- Eliminate leakage!
- Check tightness again

Formation of white mist --> pressure connection is not tight

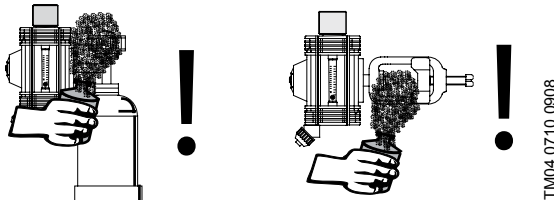


Fig. 6 Ammonia + chlorine gas --> formation of white mist

No formation of white mist --> pressure connection is tight

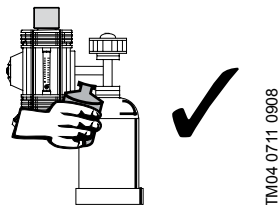


Fig. 7 No chlorine gas --> no formation of white mist

Checking the inlet valve

- Remove the union nut at the overpressure connection and take off the overpressure line.
- Close the rate valve.
- Open the cylinder valve.
- Slowly pass the open ammonia bottle along the overpressure connection.
 - Slightly press the bottle in a pumping manner, allowing the ammonia mist to rise up.
 - Formation of white mist: **The inlet valve is not tight!**
- **Depressurize the plant!**
- **Check the inlet valve and repair it!**
- **Check tightness again**

Formation of white mist --> the inlet valve is not tight!

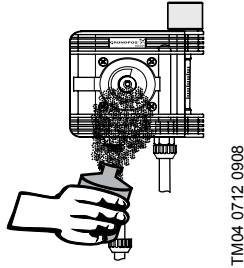


Fig. 8 Ammonia + chlorine gas --> formation of white mist

No formation of white mist --> the inlet valve is tight!

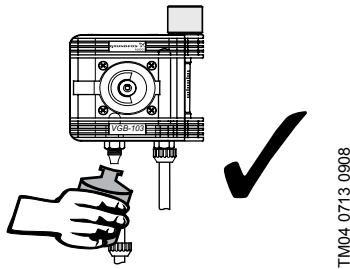


Fig. 9 No chlorine gas --> no formation of white mist

5. Maintenance

Rates for cleaning and maintenance

- at least every 12 months
- in case of malfunction



Warning

Switch off the whole plant before doing cleaning and maintenance work!

Danger of gas break-out!



Warning

Before re-starting, check the tightness!

Danger of gas break-out!

5.1 Possible faults

Fault	Cause	Correction
Gas leakage at the pressure connection.	The gasket at the pressure connection is damaged.	Replace the gasket.
	Sealing surfaces are dirty, there are rests of old gaskets on the sealing surfaces.	Clean the sealing surfaces.
	The sealing surface at the connection of the gas cylinder is damaged.	Use a different gas cylinder.
	The pressure connection is loose.	Tighten the pressure connection.
	The sealing surface at the pressure connection of the device is damaged.	If necessary, replace the inlet valve.
Gas escapes at the overpressure line.	Re-liquefacted gas enters the inlet valve.	Reduce the extraction amount, ensure correct course of temperature.
	The inlet valve is soiled or damaged.	Clean the inlet valve, replace damaged parts.
Formation of ice on the gas cylinder.	The extraction amount per hours is higher than 1% of the contents of the gas cylinder, the system is too small.	Use a dosing system with more than one gas cylinders.
Desired dosing flow is not reached.	Insufficient injector vacuum.	Check the injector, repair it if necessary. Observe the manual of the injector.
		Check the motive water pump, repair it if necessary.
		Check the dirt trap before the injector, clean it if necessary.
	Leakage in vacuum line between dosing unit and injector.	Eliminate the leakage.
	Vacuum line between dosing unit and injector is too long.	Observe table "Suggested line lengths and diameters".
	Vacuum line is dirty.	Replace the vacuum line.
	The valve of the gas cylinder is closed.	Open the valve of the gas cylinder.
	The gas cylinder is empty.	Replace the empty gas cylinder by a new one.
	Filter at the pressure connection of the dosing unit is soiled.	Replace the filter.
Despite correctly displayed gas flow the desired gas solution concentration cannot be reached.	Wrong adjusting spindle (diameter too low).	Mount the correct adjusting spindle.
	Leakage in vacuum line between vacuum regulator and dosing unit.	Eliminate the leakage.
Servomotor does not run.	Servomotor is switched to manual operation.	Switch servomotor to automatic operation.
The ball in the measuring tube is caught.	Measuring tube and/or ball are soiled.	Clean the measuring tube and the ball.
Water in the measuring tube.	Non-return diaphragm of the injector is defective.	Repair the injector. Completely disassemble the dosing unit, clean it and dry it perfectly! Dry the vacuum line to the injector or replace it.
Servomotor does not reach the whole desired range.	The servomotor or the control device is adjusted wrongly.	Adjust the servomotor or check the settings of the control device.
Servomotor runs in wrong direction.		

5.2 Cleaning the inlet valve

5.2.1 Required tools and accessories

- Hot water (ca. 40°C)
- Soft brush
- Crosstip screwdriver
- Screwdriver
- Fork wrench size 24
- Cylindrical pin (Ø ca. 5 mm)

5.2.2 Procedure

- If present, unscrew the manometer.
- If present, open the liquid trap at the lower side and take out the filter.
- Unscrew the cover at the inlet side and take it off.

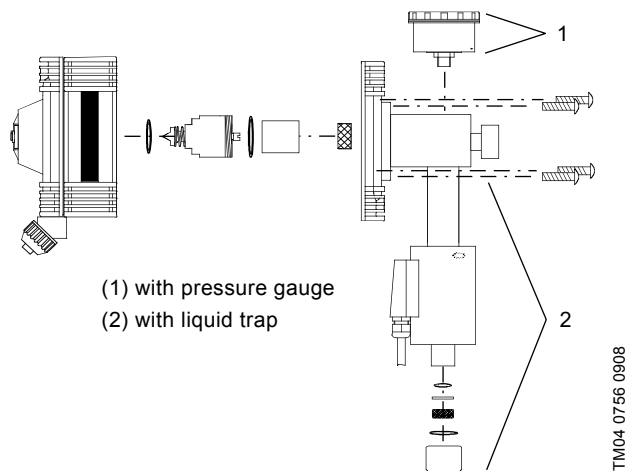


Fig. 10 Mounting of vacuum regulator

- Unscrew the inlet valve support with the fork wrench size 24.
- Take out the O-ring, the distance bushing and the filter.
- Unscrew the valve cone from the inlet valve support. Take out the screw part and the spring. Press out the valve seat with the cylindrical pin.

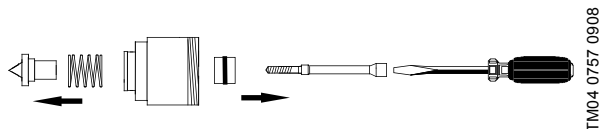


Fig. 11 Demount the valve

- Clean all parts with hot water, use brush if necessary.
 - If present, clean the manometer thread from remains of the bonding agent. Only dry-clean the bore hole at the inlet valve.
- Replace damaged parts, if necessary. Especially to be observed:
 - The sealing surface of the valve cone may not be damaged.
 - The inneredges of the valve seat may not be damaged.
 - The spring may not show any corrosion.
- Dry all parts well.

Caution *Danger of corrosion when mounting moist parts!*

- Remount all parts in reverse sequence.
 - Screw the valve cone and the screw part fully together.
 - Observe fitting measurement:

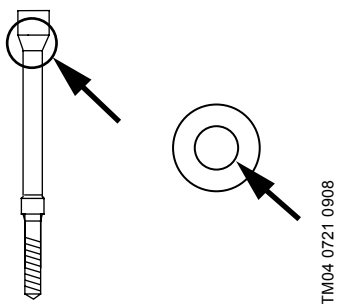


Fig. 12 Valve cone and valve seat

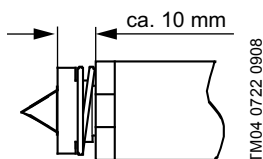


Fig. 13 Check the distance of mounting

- If present, apply Loctite 243 to the thread of the manometer and screw it in. If no Loctite 243 is present, tighten with hemp.

5.3 Cleaning the vacuum regulator

5.3.1 Required tools and accessories

- Hot water (ca. 40°C)
- Soft brush
- Crosstip screwdriver

5.3.2 Procedure

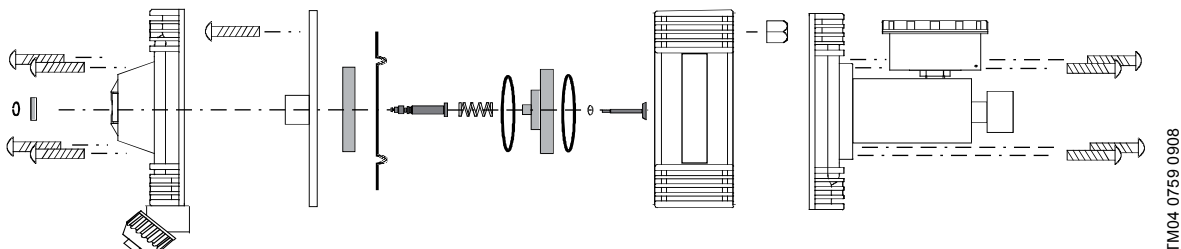


Fig. 14 Demount the vacuum regulator

- Unscrew both covers.
- Unscrew the inner cover.
- Take out the diaphragm disk and unscrew it.
- Clean all parts with hot water, use brush if necessary
- Replace damaged parts, if necessary.
- Dry all parts well.

Caution *Danger of corrosion when mounting moist parts!*

- Replace O-rings by new ones.
- Remount all parts in reverse sequence.
 - Check the function of the overpressure valve:

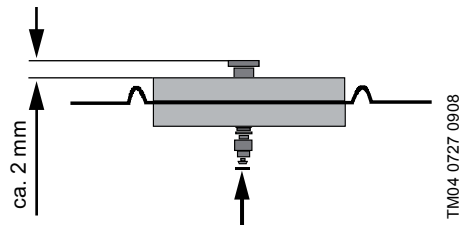


Fig. 15 Diaphragm disk

- Observe the fitting position of the diaphragm:

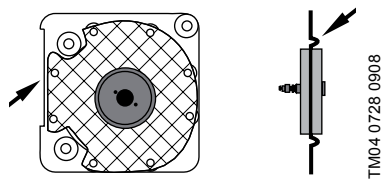


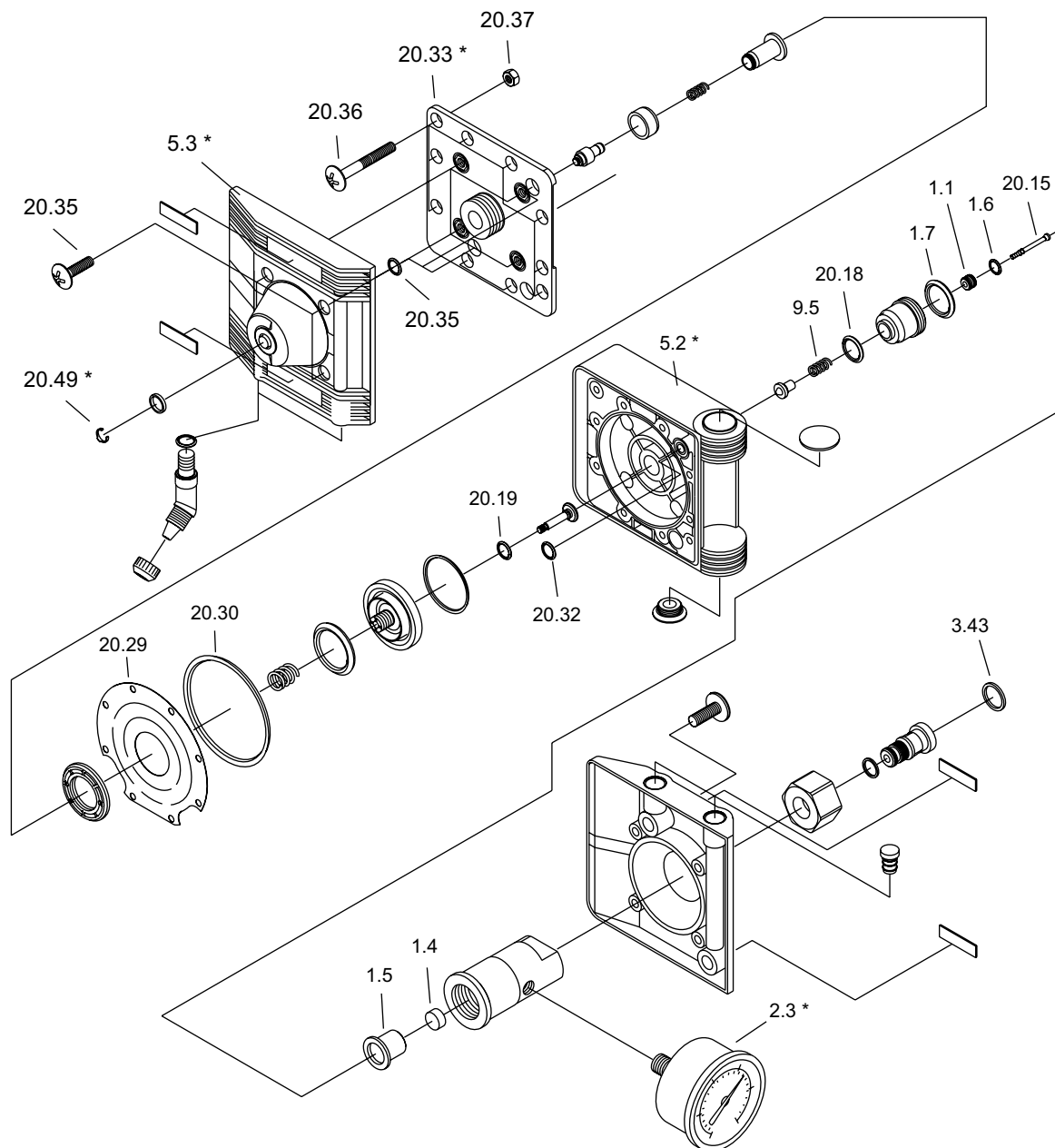
Fig. 16 Diaphragm

6. Spare Parts

6.1 Vacuum regulator VGA-111

Items without asterisk mentioned in the drawings fig. 17, 18 and 19 are parts of the spare part set. Items with an asterisk have a separate order number.

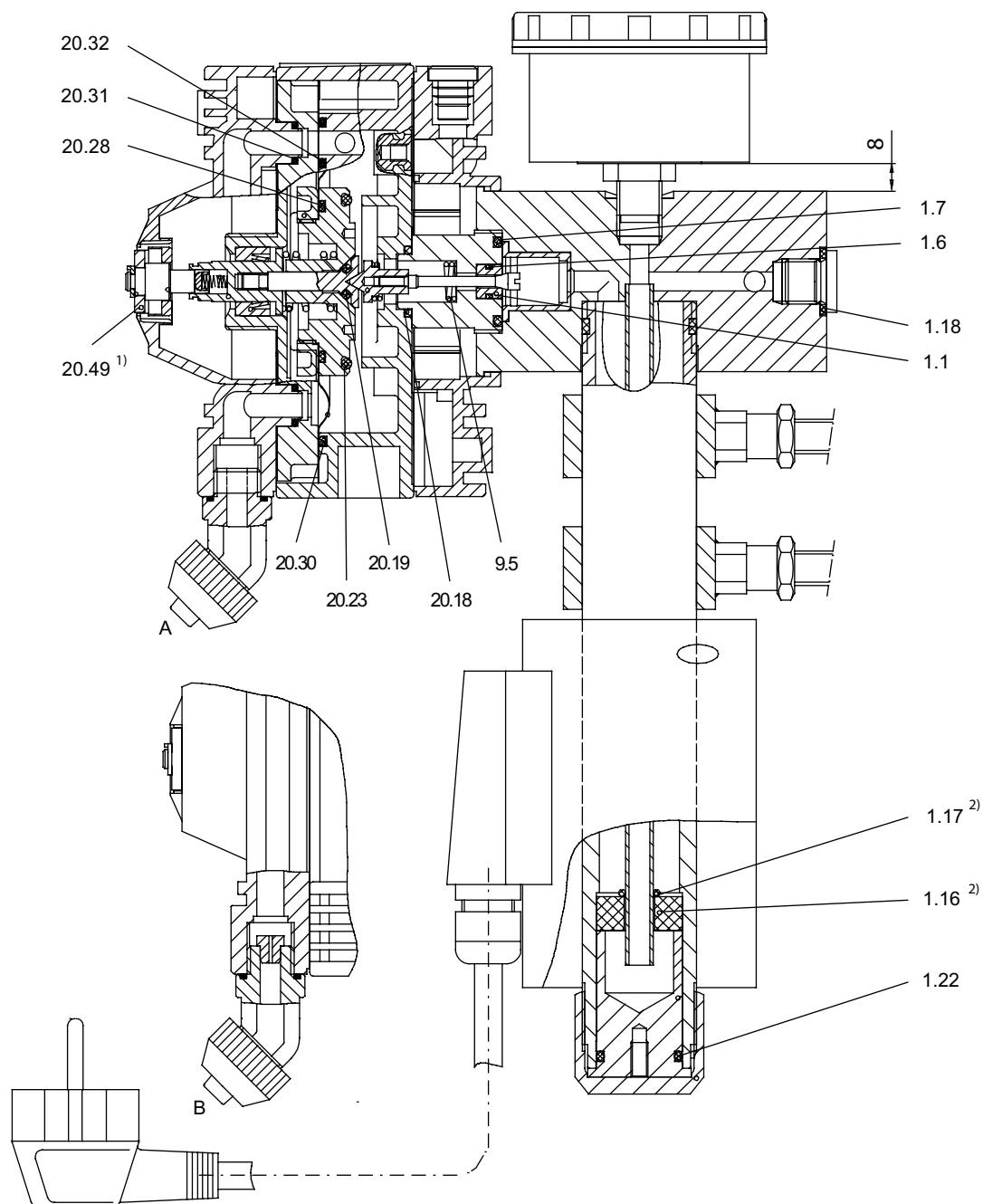
- We suggest to store some spare parts sets to ensure fast replacing of wearing parts, if necessary



TM04 0852 0908

Fig. 17 Exploded drawing, vacuum regulator

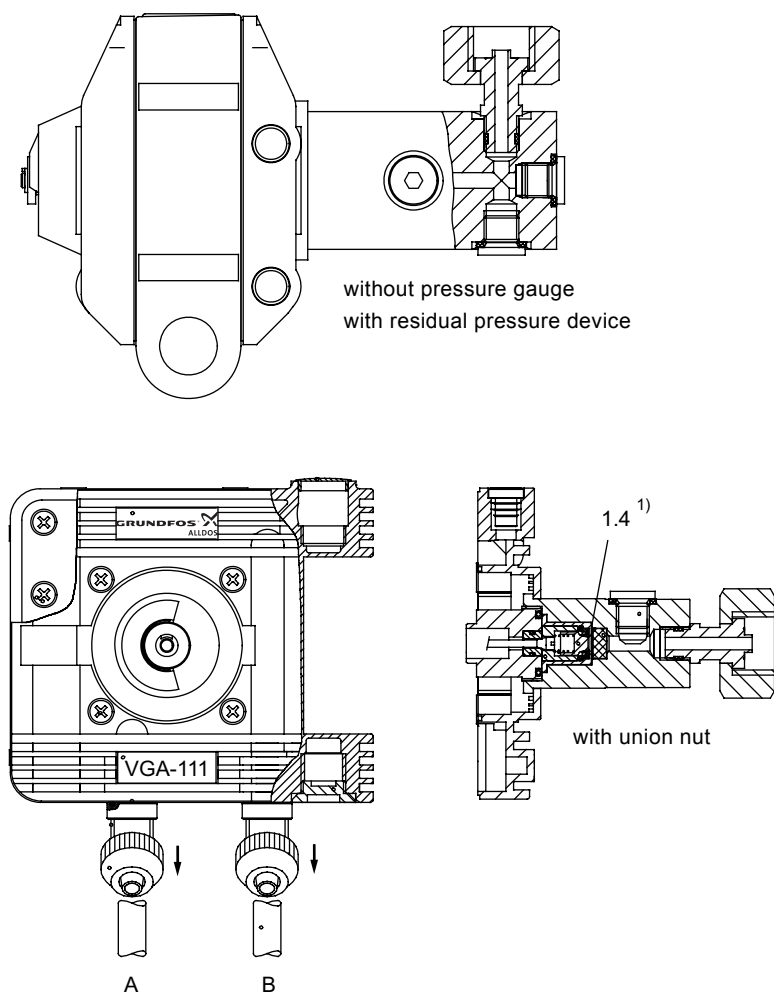
Item	Description	Oder no.
All No. without *	Spare part set VGA 111 without liquid trap	91835972 (553-594)
	Spare part set VGA 111 with liquid trap	91835977 (553-605)
2.3 *	Pressure gauge	91834683 (12.2519)
5.2 *	Body	96680982 (12.5270-200)
5.3 *	Hood	96680966 (12.5219-400)
20.33 *	Cover	91836366 (12.2366-205)
20.49 *	Lock washer	96681001 (12.5308)



TM04 0767 0908

Fig. 18 Vacuum regulator with liquid trap

Item	Description
A	Connections for the overpressure line
B	Connection for the vacuum line to the dosing regulator
1)	without liquid trap
2)	with liquid trap



TM04 0768 0908

Fig. 19 Versions of vacuum regulators

Item	Description
A	Connections for the overpressure line
B	Connection for the vacuum line to the dosing regulator
1	Without liquid trap

Argentina

Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana km. 37.500 Lote 34A
1619 - Garin
Pcia. de Buenos Aires
Phone: +54-3327 414 444
Telefax: +54-3327 411 111

Australia

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ALLDOS Oceania Pty. Ltd.
Unit 3 / 74 Murdoch Circuit
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15.710237 V1.0		95 714213 0209		GB
Repl.	15.710082 V. 1.0	Repl.	96 681342 1104	
	15.710001 V. 1.0		96 681297 1004	

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