

Vaccuperm VGA-117

Gas dosing regulator

GB Service instructions





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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-117 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-117 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-117.
- 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-117 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-117 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-117

Example: Dosing regulator Type key VGA-117-1000/5-M0, N

Code	Example	VGA-117	-1000	/5	-M	O	, N
	Vaccuperm Gas Advanced = VGA						
	Dosing flow						
500	25-500 g/h						
1000	50-1000 g/h						
2000	100-2000 g/h						
4000	200-4000 g/h						
6000	300-6000 g/h						
8000	400-8000 g/h						
10000	500-10000 g/h						
	Connection input and output						
1	PE hose 8/11						
2	PE hose 10/14						
3	PVC pipe DN15 (d 20)						
	Adjustment						
M	Manual						
A	Automatic, 230-240V/50-60Hz						
B	Automatic, 110-115V/50-60Hz						
	Control						
0	Without						
1	4-20 mA						
2	Direct						
	Differential pressure regulator						
Y	Yes, with vaccumeter						
N	No						

2.2 General Data

Permissible medium	Cl ₂
Accuracy	± 4% of upper limit
Control range	1:20
Flow meter	according to the floater principle, length of the measuring tube 190 mm
Vacuum connection (from the vac. reg.)	for hose 8/11
Vacuum connection (to the injector)	for hose 8/11
Weight	2.6 kg
Weight with servomotor	4.2 kg
Permissible vacuum regulator	VGA-111, VGA-146: up to 4000g/h

2.2.1 Vacuum connection (from the vacuum regulator / to the injector)

PE hose 8/11 or 10/14
PE hose 8/11 or 10/14
PVC pipe DN15 (d20)

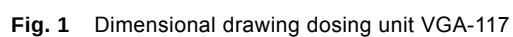
2.2.2 Dosing Flow

50 - 1000 g/h	2 - 50 lbs/day
100 - 2000 g/h	5 - 100 lbs/day
200 - 4000 g/h	10 - 210 lbs/day
300 - 6000 g/h	15 - 310 lbs/day
400 - 8000 g/h	20 - 420 lbs/day
500 - 10000 g/h	30 - 520 lbs/day

2.2.3 Accessories (not including)

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

2.3.1 Dosing regulator



Technical drawing of the TM04 0788 0908 device, showing front and side views with dimensions.

Front View Dimensions:

- Top hole diameter: $\varnothing 6$
- Top section height: 107
- Height from top section to first mounting bracket: 575
- Total height: 600
- Distance from left edge to first mounting bracket: 145
- Distance from left edge to second mounting bracket: 170
- Distance from bottom edge to first mounting bracket: 12.5
- Distance from bottom edge to second mounting bracket: 12.5

Side View Dimensions:

- Top section width: 107
- Distance from top section to first mounting bracket: 575
- Total height: 600
- Distance from left edge to first mounting bracket: 145
- Distance from left edge to second mounting bracket: 170
- Distance from bottom edge to first mounting bracket: 12.5
- Distance from bottom edge to second mounting bracket: 12.5

Fig. 2 Dimensional drawing dosing unit VGA-117 with servomotor

2.4 Electrical data

2.4.1 Servomotor with reversing potentiometer

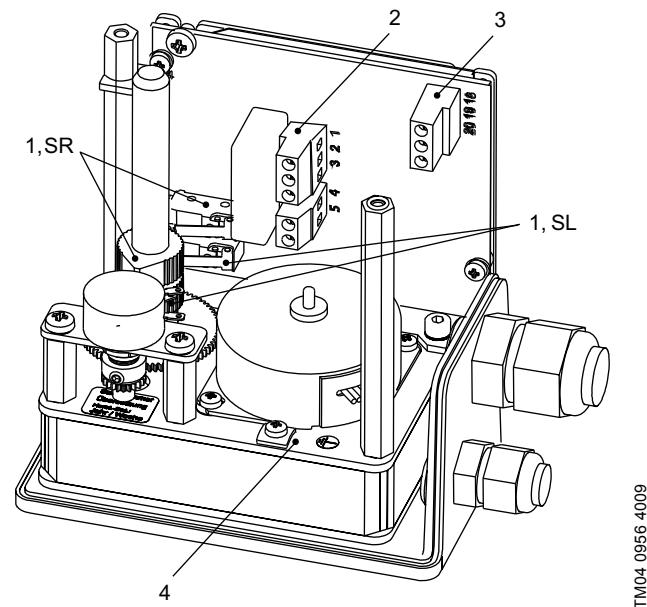
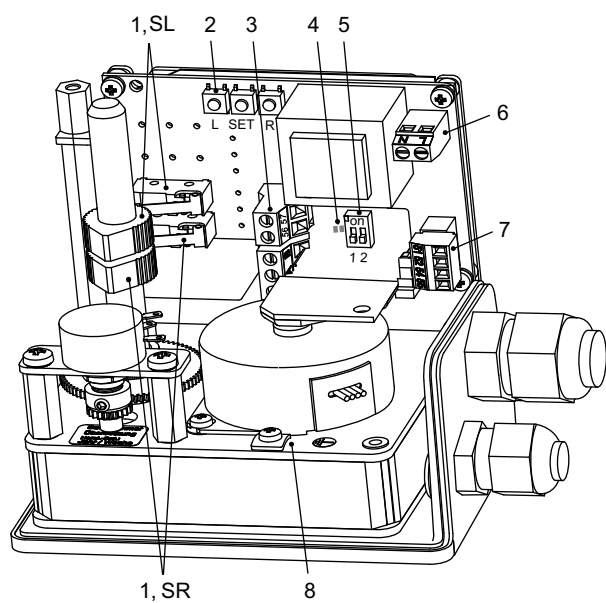


Fig. 3 Servomotor with reversing potentiometer

Item	Description
1	SR, limit switch cam min. SL, limit switch cam max.
2	Mains voltage input
3	Potentiometer input/output
4	Earth terminal

Mains voltage	220 - 240 V $\pm 10\%$, 50/60 Hz $\pm 5\%$, 100% on time (standard) 110 - 120 V $\pm 10\%$, 50/60 Hz $\pm 5\%$ 24 V AC $\pm 10\%$, 50/60 Hz $\pm 5\%$
Rated current	30 mA (at 230 V), 60 mA (at 115 V), 240 mA (at 24 V)
Limit switch - load capacity	2 A at 250 V
Power consumption	Approx. 2 VA
Control variant	Reversingpotentiometer 1 k Ω Open/close signal
Actuating time	90 s for 270° at 50 Hz 75 s for 270° at 60 Hz
Adjustment angle	Max. 270°
Degree of protection	IP 65
Permissible ambient temperature	-15 to 60

2.4.2 Servomotor with analogue control



TM04 0956 4009

Fig. 4 Servomotor with analogue control

Item	Description
1	SR, limit switch cam min. SL, limit switch cam max.
2	Programming buttons
3	Alarm output
4	LEDs
5	DIP switch
6	Mains connection terminals
7	Analogue signal connection terminals
8	Earth terminal

Mains voltage	220 - 240 V $\pm 10\%$, 50/60 Hz $\pm 5\%$, 100% on time (standard) 110 - 120 V $\pm 10\%$, 50/60 Hz $\pm 5\%$ 24 V AC $\pm 10\%$, 50/60 Hz $\pm 5\%$
Rated current	30 mA (at 230 V), 60 mA (at 115 V), 240 mA (at 24 V)
Limit switch - load capacity	2 A at 250 V
Power consumption	Approx. 2 VA
Control variant	Analogue control Input/Output
Signal input/output	4 - 20 mA (standard setting) 0 - 20 mA (switchable)
Setpoint input	4 (0) - 20 mA (DC) Load 250 Ω Overload protection 25 mA Protection against reverse polarity to -25 mA ESD protection, input filter Resolution: 10 bits
Actual value output	4 (0) - 20 mA Max. load 500 Ω Resolution: 10 bits
Carrying capacity of signal output	Output current: 4 -20 mA Minimum voltage for open circuit 10 V
Potentiometer	1000 Ω
Actuating time	90 s for 270° at 50 Hz 75 s for 270° at 60 Hz
Adjustment angle	Max. 270°
Degree of protection	IP 65
Permitted ambient temperature	0 to 60

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 installation

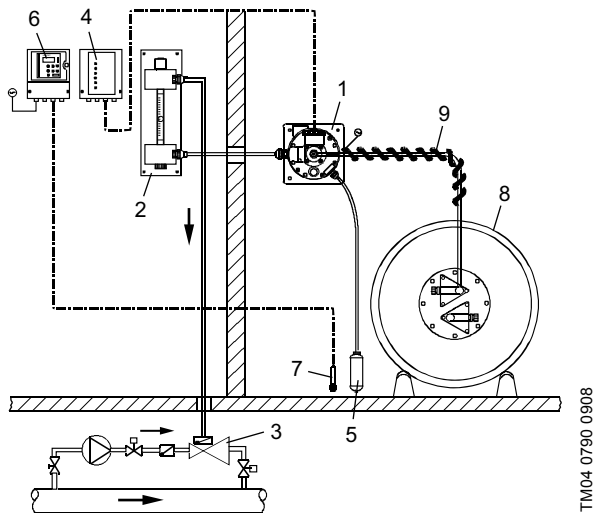


Fig. 5 Dosing and vacuum regulator

Item	Description
1	Vacuum regulator for wall mounting
2	Dosing regulator
3	Injector
4	Remote display for container empty indication
5	Adsorption device
6	Gas warning device
7	Gas sensor
8	Gas drum
9	Heater strip

3.4 Mounting



Warning

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

3.4.1 Dosing regulator

- Mount the dosing regulator to the wall.

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!**

Standard

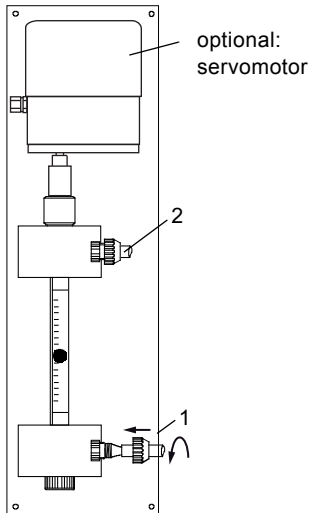


Fig. 6 Vacuum connections, standard

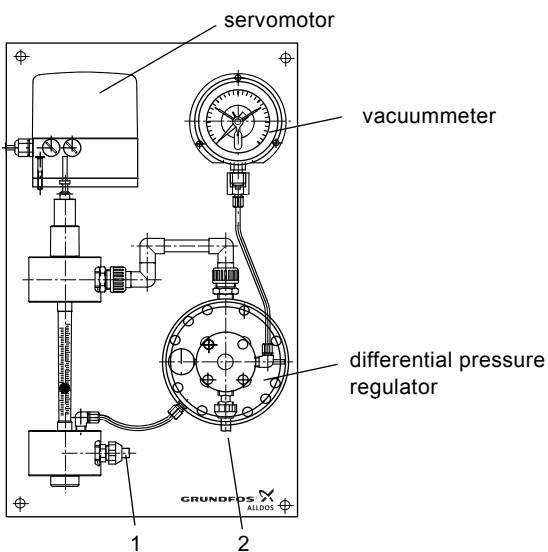


Fig. 7 Vacuum connections, none standard, with optional accessories

Item	Description
1	Vacuum line from the vacuum regulator
2	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.

- Connect the vacuum line from the vacuum regulator (1).
- Connect the vacuum line to the injector (2).

4.1.2 Electrical connections dosing regulator - with servomotor



Warning

Disconnect from mains before removing the cover!

Observe local safety precautions!

Protect cable connections and plugs against corrosion and moisture.

Close unused screwings with suitable caps!

Before connecting the mains cable:

Caution

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!

To ensure electromagnetic compatibility (EMC):

Caution

Signal lines must be shielded.

The shield must be connected to PE or ground on the side of the counterpart.

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

- Establish the electrical connections according to the following terminal diagrams.

Note

Depends on the optional components selected: Direct mains connection (by customer) or via the terminal box.

Servomotor with analogue control (optional)

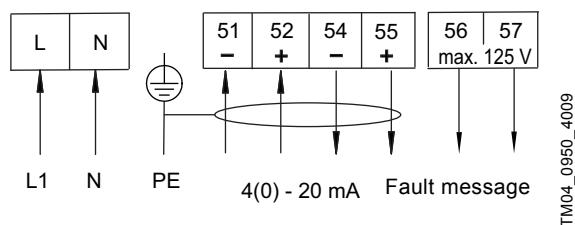


Fig. 8 Circuit diagram for a servomotor with analogue control

Servomotor with analogue control (optional), connected, for example, to a Conex® DIA-2Q

- Connect the terminals to the corresponding terminals on the external control device as shown in the connection diagram.

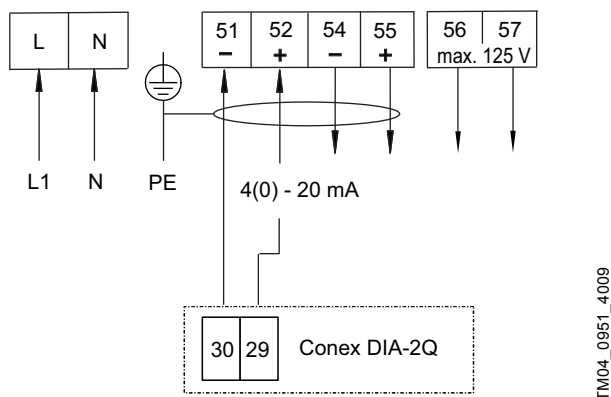
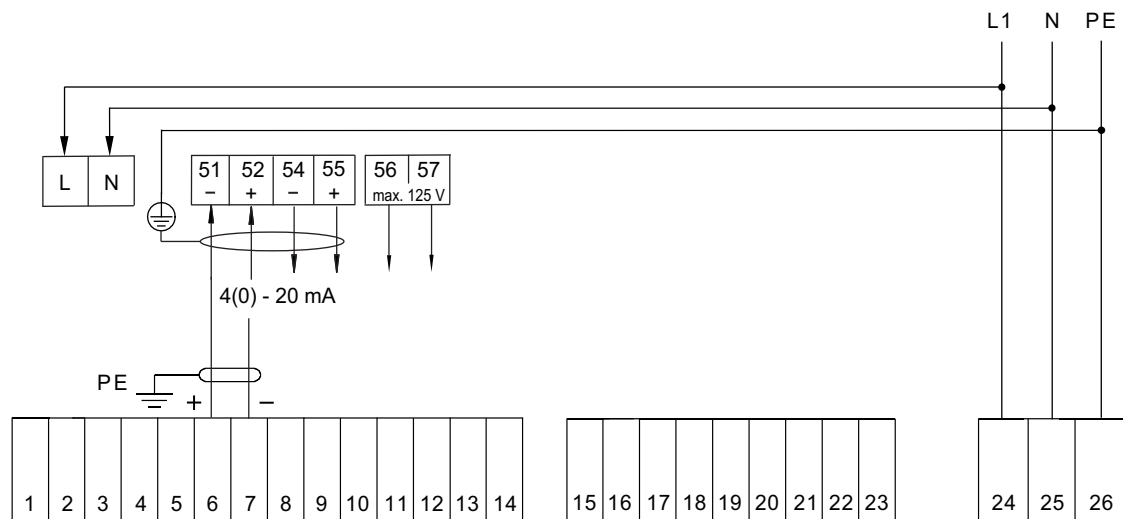


Fig. 9 Terminal connection diagram for Conex® DIA-2Q

Servomotor with analogue control (optional), connected, for example, to a Conex® DIS-2Q (microprocessor-based control device)

- Connect the terminals to the corresponding terminals on the external control device as shown in the connection diagram.



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Fig. 10 Terminal connection diagram for Conex® DIS-2Q on a servomotor with analogue control

Item	Description
L	Phase
N	Neutral
PE	PE (earth)
51	Signal input (-)
52	Signal input (+)
54	Signal output (-)
55	Signal output (+)
56	Collective error message
57	

Note See Section 4.1.2 for warnings and notes relating to electrical connection!

- Unscrew the hood screws and remove the hood.
- Establish the electrical connections in accordance with the circuit diagram; see Fig. 9.
 - Connect terminals 51 and 52 and, if required, terminals 54 and 55, in accordance with the circuit diagram.
 - Connect terminals 56 and 57 in accordance with requirements; voltage 125 V max.
 - Use separate, shielded lines with a minimum cross-section of 0.5 mm² and a maximum length of 1000 m for low voltages (setpoint/actual value signal lines).
 - The screen must be connected on one side to the housing earth (earth terminal).



Warning

The internal wiring of the drive must never be modified.

- Close the hood again and tighten the hood screws.

Servomotor - with reversing potentiometer (optional)

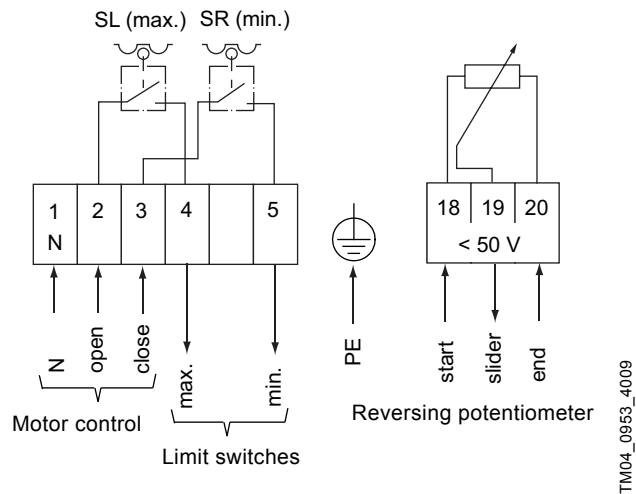


Fig. 11 Terminal connection diagram for servomotor with reversing potentiometer

Item	Description
1 N	Neutral
2	Phase Mains voltage input (for direction "open/max.")
3	Phase Mains voltage input (for direction "close/min.")
4	Mains voltage output (position "final position max.")
5	Mains voltage output (position "final position min.")
	PE (earth)
18	Start
19	Slider
20	End

- Connect the terminals to the corresponding terminals on the external control device (Conex® DIS-2Q in the example) as shown in the connection diagram.

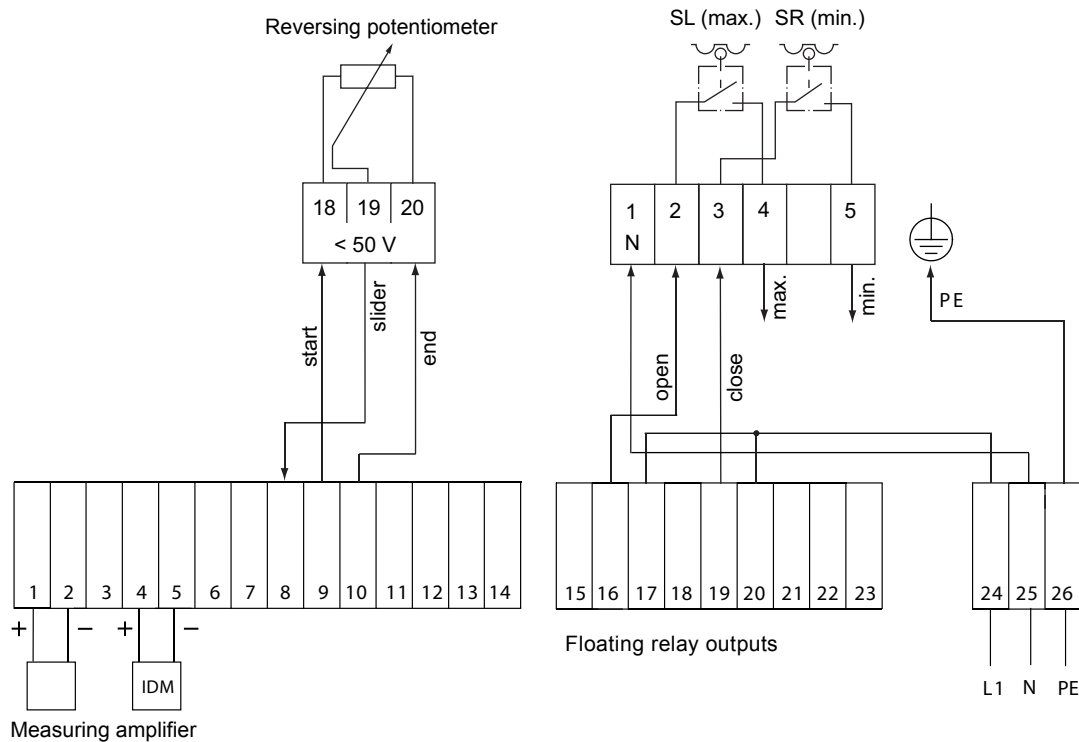


Fig. 12 Terminal connection diagram for Conex® DIS-2Q on a servomotor with reversing potentiometer

Electrical connection

Note See Section 4.1.2 for warnings and notes relating to electrical connection!

1. Unscrew the hood screws and remove the hood.
2. Establish the electrical connections in accordance with the circuit diagram; see Fig. 11.
 - Connect terminals 18, 19 and 20 in accordance with requirements; voltage < 50 V.
3. Determine the direction of rotation and, if necessary, correct it.

Determining the direction of rotation

The internal wiring means that the direction of rotation (looking through the drive towards the output shaft) and limit switches are assigned as follows:

- If the mains voltage is present at terminal 2, the output shaft rotates anticlockwise (in the direction "open/max.").
 - This direction of rotation is restricted by the upper switch (max.). If the switch is activated, the mains voltage is present at terminal 4.
- If the mains voltage is present at terminal 3, the output shaft rotates clockwise (in the direction "close/min.").
 - This direction of rotation is restricted by the lower switch (min.). If the switch is activated, the mains voltage is present at terminal 5.
- If the drive rotates in the opposite direction to the control commands, swap over the connections of terminals 2 and 3.



Warning

The internal wiring of the drive must never be modified.

Close the hood again and tighten the hood screws.

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 with ammonia



Warning

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

Danger of leakages by corrosion!

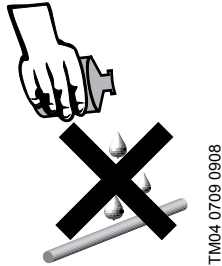


Fig. 13 No liquid ammonia

4.2.3 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

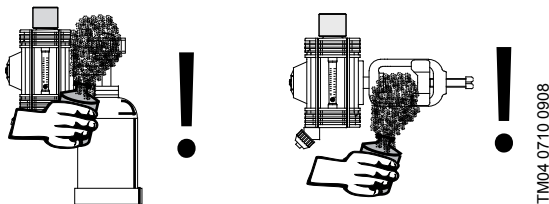


Fig. 14 Ammonia + chlorine gas --> formation of white mist

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

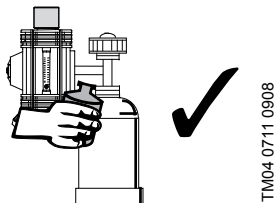


Fig. 15 No chlorine gas --> no formation of white mist

4.2.4 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!**

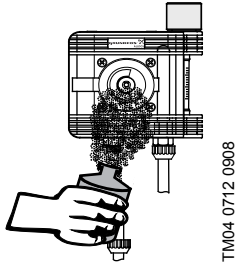


Fig. 16 Ammonia + chlorine gas --> formation of white mist

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

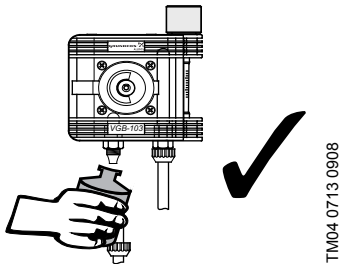


Fig. 17 No chlorine gas --> no formation of white mist

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
Desired dosing flow is not reached.	Insufficient injector vacuum.	Check the motive water pump, 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 with suggested line lengths and diameters in the I/O.
	Vacuum line is dirty.	Replace the vacuum line.
	Servomotor does not reach the 100 %-position.	Adjust the servomotor or check the settings of the control device.
	Filter at the pressure connection of the dosing unit is soiled.	Replace the filter.
	The valve of the gas container is closed.	Open the valve of the gas container.
	The gas container is empty.	Replace the empty gas container by a new one.
	Wrong adjusting spindle (diameter too low)	Mount the correct adjusting spindle
Despite correctly displayed gas flow the desired gas solution concentration cannot be reached.	Leakage in vacuum line between vacuum regulator and dosing unit.	Eliminate the leakage.
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 run.	Servomotor is switched to manual operation.	Switch servomotor to automatic operation.
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.		
Despite constant operating conditions the vacuum varies	Spring in differential pressure regulator is soiled	Clean the spring
	Spring in differential pressure regulator is damaged	Replace the spring
Despite constant operating conditions the dosing flow varies	Diaphragm in differential regulator is soiled	Clean the diaphragm
	Diaphragm in differential regulator is damaged	Replace the diaphragm

5.2 Cleaning the measuring tube

5.2.1 Required tools and accessories

- Hot water (ca. 40°C)
- Soft brush

5.2.2 Procedure

- Unscrew the lower support (knurled screw = A).
- Take the measuring tube out downwards.
- Take off the plugs of the measuring tube and take out the ball.
- Clean all parts with hot water, use brush if necessary.
- Replace damaged parts, if necessary.
- Dry all parts well.

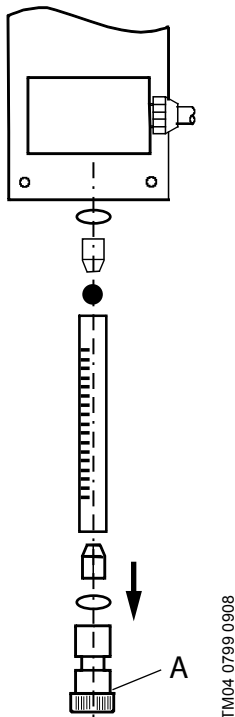


Fig. 18 Demount of the measuring tube

Caution *Danger of corrosion when mounting moist parts!*

- Remount all parts in reverse sequence.

5.3 Cleaning the rate valve

5.3.1 Required tools and accessories

- Allen key 5 mm
- Hot water (ca. 40°C)
- Soft brush
- Special tool 91835362 (48.541)
- Cylindrical pin (Ø ca. 6 mm)
- PTFE grease

5.3.2 Preparations for executions with servomotor

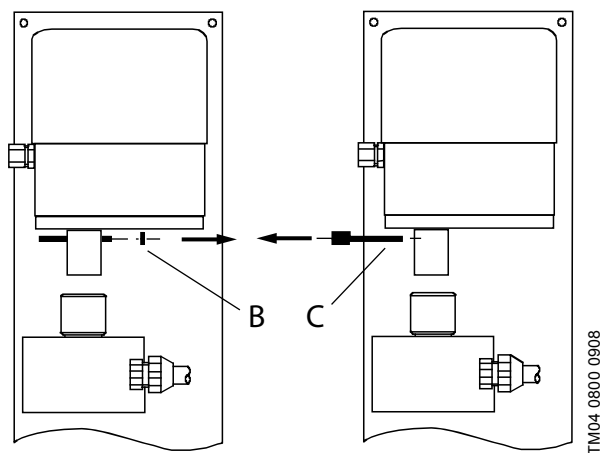


Fig. 19 Cleaning the measuring tube

- Take off the locking ring (B, red) of the retention pin (C).
- Pull the retention pin out of the coupling. Cleaning the measuring tube



Warning

Switch off mains power before opening the cover!

- Take off the cover of the servomotor.
- Unscrew the servomotor with the allen key (D) and take it off.

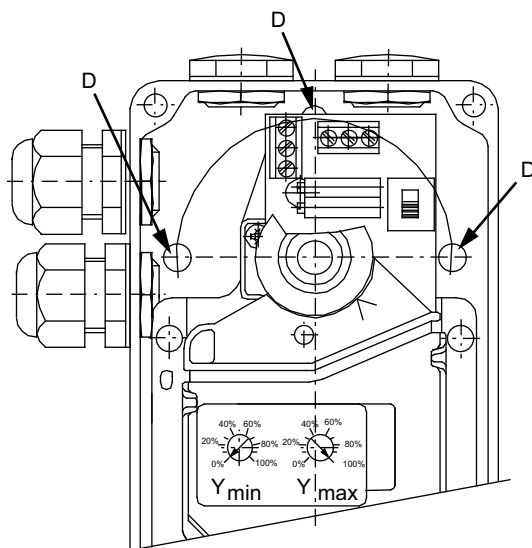


Fig. 20 Attachment points of the servomotor

- Take off loose coupling parts.

5.3.3 Procedure

- Unscrew the adjustment knob (C).
- Unscrew the rate valve cartridge (F).
- Remove the O-rings (G) of the rate valve cartridge.

Caution *Do not damage the sealing edge of the valve seat!*

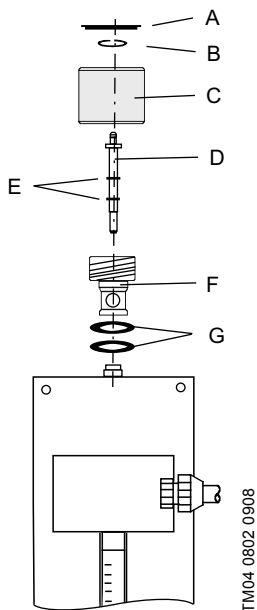


Fig. 21 Schema rate valve

- Press out the seat (position 2.4 in fig. 28) with the cylindrical pin.
- Take off the cap (A) of the adjustment knob.
- Remove the locking ring and take out the dosing spindle (D).
- Remove the O-rings (E) of the spindle.
- 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!*
No grease must get into the longitudinal groove of the spindle!

- Replace the O-rings of the spindle by new ones, slightly apply Teflon grease to them.
- Replace the O-ring of the rate valve cartridge.
- Remount all parts in reverse sequence.
 - Observe fitting position of the valve seat

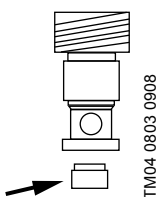


Fig. 22 Observe fitting position of the valve seat

5.4 Adjusting the servomotor (option)

Note The servomotor is already adjusted by works.

In case of repairs or exchange, it may be necessary to readjust the servomotor.

Warning

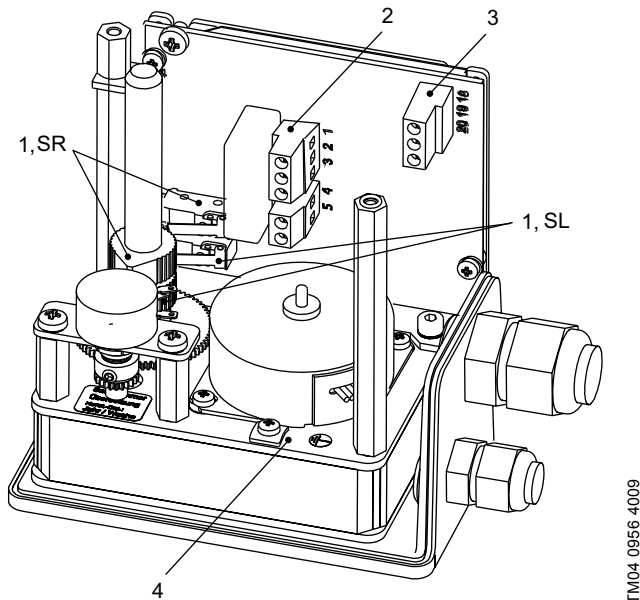


The servomotor may only be adjusted by qualified personnel, as the mains power has to be switched on.

Danger!

Do not touch bare wires or clamp screws!

5.4.1 Servomotor with reversing potentiometer

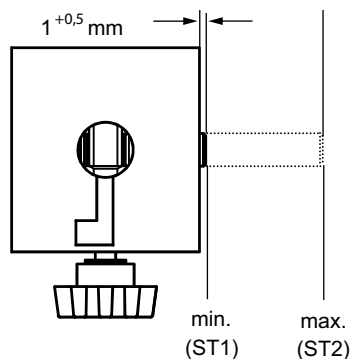


TM04 0956 4009

Fig. 23 Servomotor with reversing potentiometer

Item	Description
1	SR, limit switch cam min. SL, limit switch cam max.
2	Mains voltage input
3	Potentiometer input/output
4	Earth terminal

- Remove the cover from the servomotor.
- Use the connected control device to set the servomotor to 0% dosing flow (as indicated by the measuring tube). The toothed rack on the regulating valve must still protrude by at least 1 mm.



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Fig. 24 Setting the limit switches

Caution *If the set value is not reached, the regulating valve may become damaged!*

- Set this position on the control device as the zero point. Set the upper limit switch (SR, see Fig. 23) to the equivalent servomotor position.
- Set the control device to 10%.
- Check the dosing flow indicated by the measuring tube. If this is not 10%:
Reset the zero point. The floater may reach the end stop if the dosing flow exceeds 0%.
- Use the connected control device to set the servomotor to 100% dosing flow (as indicated by the measuring tube). The toothed rack on the regulating valve must not protrude by more than 31 mm.

Caution *If the set value is exceeded, the regulating valve may become damaged!*

- Set the lower limit switch (SL, see Fig. 23) to the equivalent servomotor position.
- Replace the cover on the servomotor.

5.4.2 Servomotor with analogue control

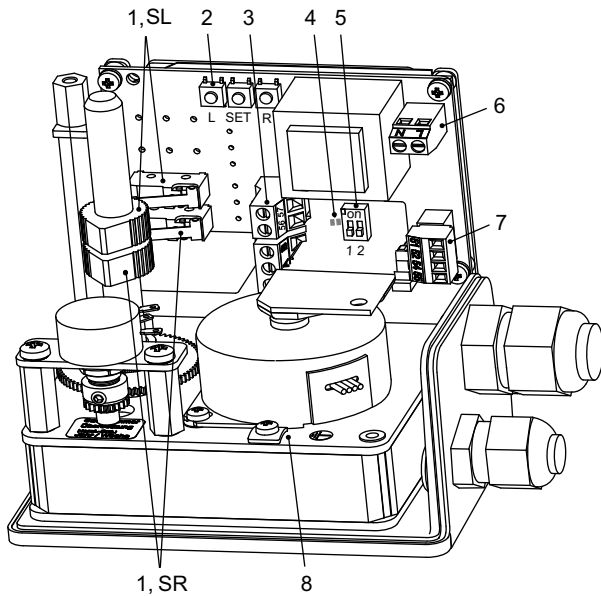


Fig. 25 Servomotor with analogue control

Item	Description
1	SR, limit switch cam min. SL, limit switch cam max.
2	Programming buttons
3	Alarm output
4	LEDs
5	DIP switch
6	Mains connection terminals
7	Analogue signal connection terminals
8	Earth terminal

Note *A 4-20 mA current sensor is required to ensure settings are exact.*

- Remove the cover from the servomotor.
- Connect the 4-20 mA current sensor to terminals 51 and 52 and set it to 4 mA.
- Use programming buttons R and SET to set the servomotor to 0% dosing flow (as indicated by the measuring tube). The toothed rack on the regulating valve must still protrude by at least 1 mm.

Caution *If the set value is not reached, the regulating valve may become damaged!*

- Set the lower limit switch (SR) to a value slightly below 0%.
- Set the current sensor to 5.6 mA (equates to 10%). For both this step and the next one you will need a current sensor.
- Check the dosing flow indicated by the measuring tube. If this is not 10%:
Reset the zero point. The floater may reach the end stop if the dosing flow exceeds 0%.
- Set the current sensor to 20 mA. Use programming buttons L and SET to set the servomotor to 100% dosing flow (as indicated by the measuring tube). The toothed rack on the regulating valve must not protrude by more than 31 mm.

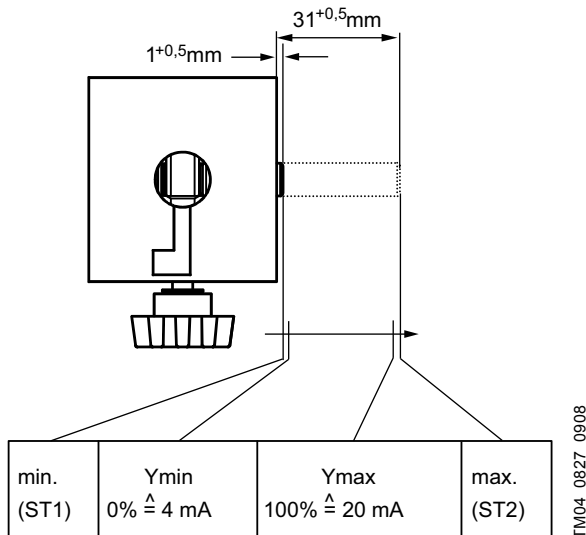


Fig. 26 Regulating valve with toothed rack

Caution *If the set value is exceeded, the regulating valve may become damaged!*

- Set the upper limit switch (SL) to a value slightly above 100%.
- Replace the cover on the servomotor.

5.4.3 Manual operation of the servomotor

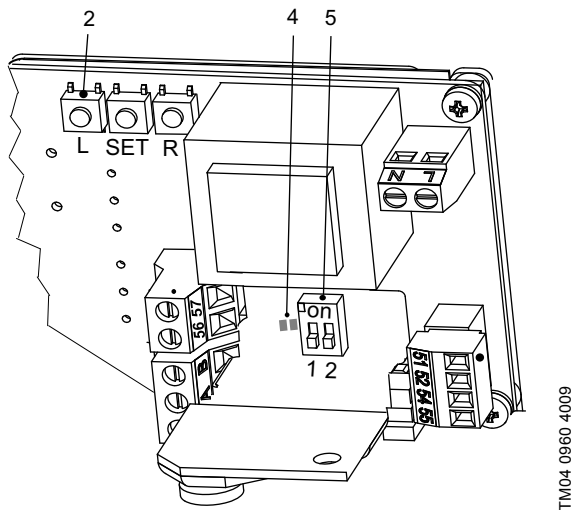


Fig. 27 Servomotor with analogue control

Item	Description
2	Programming buttons
4	LEDs
5	DIP switch

The servomotor can also be operated manually, if required.



Warning

Danger!

Do not touch exposed wires or clamping screws!

- Remove the cover from the servomotor.
- Move the switch, pos. 5, 2 to 'Man'.
- Use programming buttons L or R, pos. 2, to move the servomotor to the required position manually.
- Replace the cover on the servomotor.

Switch pos 5, 2 must be reset to 'Auto' for automatic mode.

6. Spare Parts

6.1 Dosing regulator VGA-117

Items mentioned in the drawing are parts of the spare part set. We suggest to store some spare parts sets to ensure fast replacing of wearing parts, if necessary.

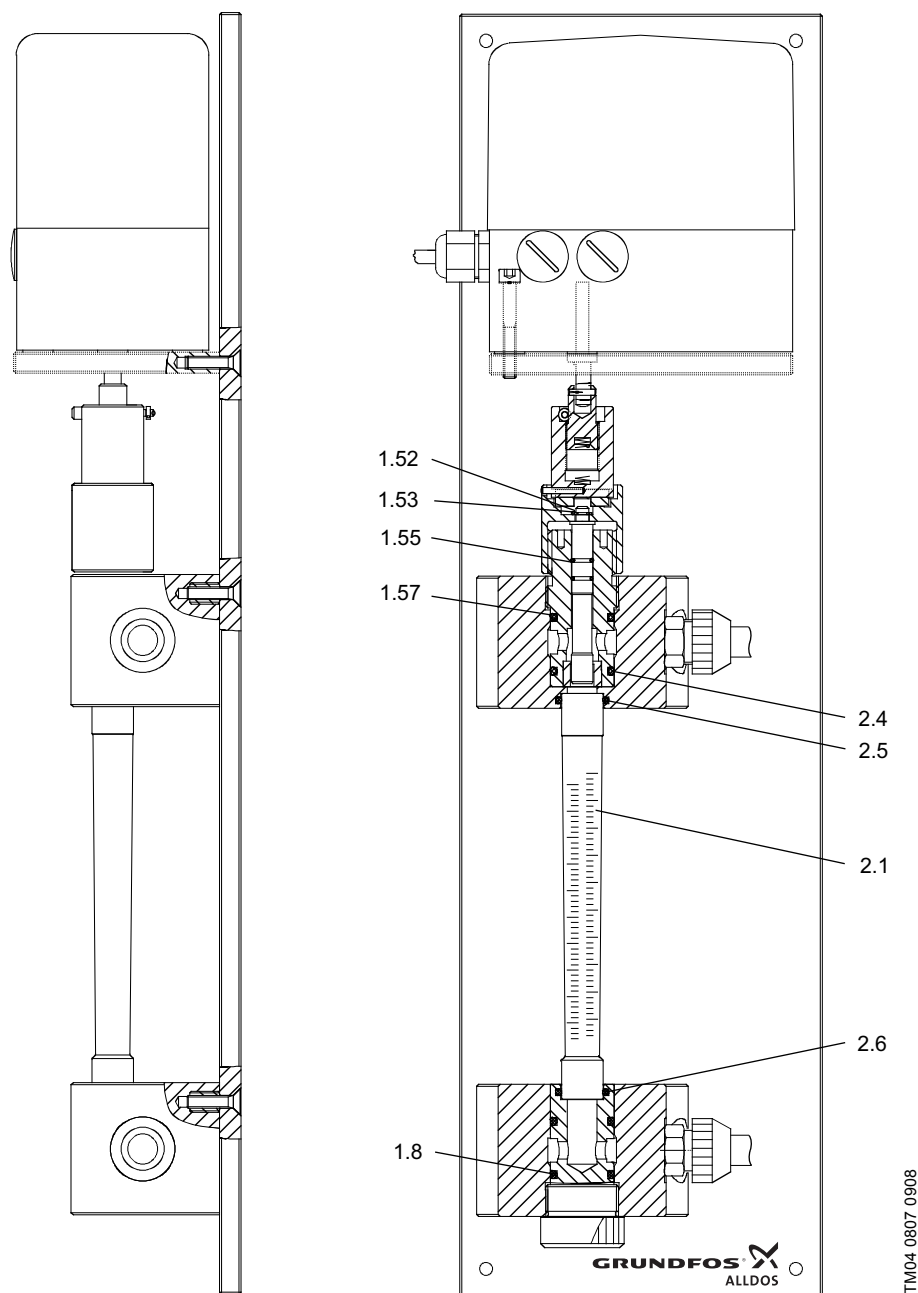


Fig. 28 Dosing regulator vaccuperm VGA-117 with servomotor

Item	Description	Oder no.
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