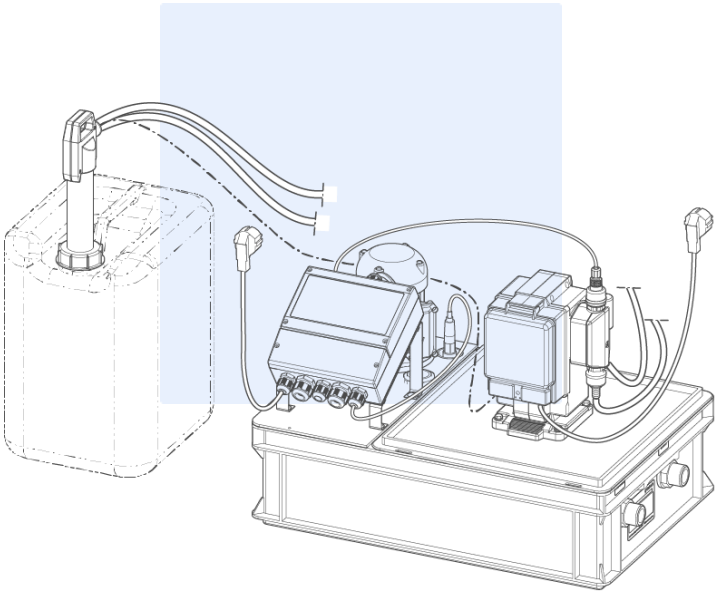
We understand water.



Neutralisation system | GENO-Neutra FNH-420-R

Operation manual

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Availability
Monday to Thursday
7:00 am - 6:00 pm

Friday
7:00 am - 4:00 pm

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Table of contents

1 Introduction

This manual is intended for owners/operating companies, operators/users as well as qualified specialists and ensures the safe and efficient handling of the product. The manual is an integral part of the product.

- Carefully read this manual and the included manuals on the components before you operate your product.
- Obey all safety and handling instructions.
- Keep this manual and all other applicable documents, so that they are available when needed.

Illustrations in this manual are for basic understanding and can differ from the actual design.

1.1 Validity of the manual

This manual applies to the product below:

- Neutralisation system GENO-Neutra FNH-420-R

1.2 Other applicable documents

- Instructions of optional accessories
- Safety data sheet of neutralising agent GENO-Neutrox

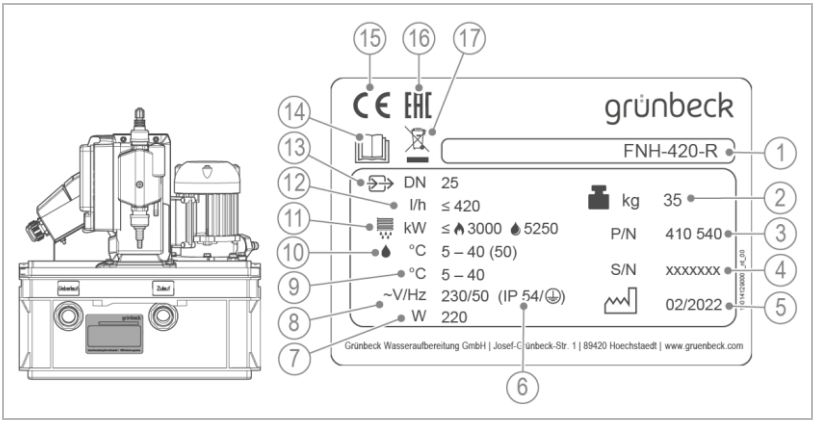
1.3 Product identification

You can identify your product based on the product designation and

the order no. indicated on the type plate.

► Check whether the products indicated in chapter 1.1 correspond to your product.

The type plate is located on the side of the neutralisation box.



	Designation
1	Product designation
2	Operating weight
1	Order no.
2	Serial no.
3	Date of manufacture
4	Protection/protection class
5	Power input
6	Power supply
7	Ambient temperature

	Designation
8	Condensate temperature
9	Boiler capacity
10	Neutralisation capacity
11	Nominal connection diameter
12	Obey the operation manual
13	CE mark
14	EAC test mark
15	Disposal information

1.4 Symbols used

Symbol	Meaning
	Danger and risk
	Important information or requirement
	Useful information or tip
	Written documentation required
	Reference to further documents
	Work that must be carried out by qualified specialists only
	Work that must be carried out by qualified electricians only
	Work that must be carried out by technical service personnel only

1.5 Depiction of warnings

This manual contains information and instructions that you must obey for your personal safety. The information and instructions are highlighted by a warning symbol and are structured as shown below:

SIGNAL WORD Type and source of hazard

- Possible consequences
- ► Preventive measures

The signal words below are defined subject to the degree of danger and might be used in the present document:

Warning symbol and signal word		Consequences if the information/ instructions are ignored	
	**DANGER**	Personal injury	Death or serious injuries
	**WARNING**		Possible death or serious injuries
	**CAUTION**		Possible moderate or minor injuries
	NOTE	Damage to property	Possible damage to components, the product and/or its functions, or an object in its vicinity

1.6 Requirements for personnel

During the individual life cycle phases of the product, different people carry out work on the product. This work requires different qualifications.

1.6.1 Qualification of personnel

Personnel	Requirements
Operator/user	• No special expertise required • Knowledge of the tasks assigned • Knowledge of possible dangers in case of incorrect behaviour • Knowledge of the required protective equipment and protective measures • Knowledge of residual risks
Owner/operating company	• Product-specific expertise • Knowledge of statutory regulations on work safety and accident prevention
Qualified specialist • Electrical engineering • Sanitary engineering (HVAC and plumbing) • Transport	• Professional training • Knowledge of relevant standards and regulations • Knowledge of detection and prevention of potential hazards • Knowledge of statutory regulations on accident prevention

Personnel	Requirements
Technical service (Grünbeck's technical service/authorised service company)	• Extended product-specific expertise • Trained by Grünbeck

1.6.2 Authorisations of personnel

The table below describes which tasks may be carried out by whom.

	Operator/ user	Owner/ operating company	Qualified specialist	Technical service
Transport and storage		X	X	X
Installation and mounting		X	X	X
Start-up/commissioning			X	X
Operation and handling	X	X	X	X
Cleaning	X	X	X	X
Inspection	X	X	X	X
Maintenance			X	X
Troubleshooting	X	X	X	X
Repair			X	X
Decommissioning and restart/recommissioning			X	X
Dismantling and disposal			X	X

1.6.3 Personal protective equipment

► As an owner/operating company, make sure that the required personal protective equipment is available.

The components below fall under the heading of personal protective equipment (PPE):

Protective gloves

Protective footwear

	Protective overall or protective apron
	Safety goggles (tightly fitting)

2 Safety

2.1 Safety measures

- Obey the local regulations on accident prevention and occupational safety.
- Obey the following regulations on the treatment and discharge of condensate originating from condensing boilers into the public sewer system:
  - Work sheet DWA-A 251:2011 "Condensates from condensing boilers"
  - DVGW VP 114 „Neutralisation systems for gas firing systems; requirements and testing“

2.1.1 Obligation to neutralise in accordance with DWA-A 251:2011

Excerpt from the standard

Nominal heat output	Neutralisation for firing systems and motors without catalytic converter is required for			
	GAS	Fuel oil DIN 51603-1 low in sulphur	Alternative fuels DIN 51603-6	Fuel oil DIN 51603-1
< 25 kW	no [1), 2)]	no [1), 2)]	no [1), 2)]	yes
25 kW up to 200 kW	no [1), 2), 3)]	no [1), 2), 3)]	no [1), 2)]	yes
> 200 kW	yes	yes	yes	yes

However, neutralisation is nevertheless required:

[1)] If the domestic waste water is discharged into small sewage treatment plants,

[2)] in case of buildings and lots whose drainpipes do not meet the material requirements stipulated in paragraph 5.3,

[3)] in case of buildings which do not meet the requirements for adequate mixing as per paragraph 4.1.1.

- Only operate your product if all components are installed

properly.

- Do not make any changes, alterations or extensions on your product.
- Only use genuine spare parts for maintenance or repair.
- Keep the premises locked against unauthorised access to protect imperilled or untrained persons from residual risks.
- Be aware of a possible risk of slipping due to leaking water on the floor.
- Comply with the maintenance intervals (refer to chapter 8.2).

2.1.2 Mechanical hazards

- You must never remove, bridge, or otherwise tamper with safety equipment.
- Make sure that the product is set up in a way that it cannot tip over and that its stability is guaranteed at all times.

2.1.3 Danger due to chemicals

- Chemicals can be hazardous to health and environment. They can cause skin and eye burns as well as irritation of the respiratory tract or allergic reactions.
- Avoid any skin/eye contact with chemicals.
- Use personal protective equipment.
- Read the safety data sheet before handling chemicals. Obey the instructions for different activities/situations.
- Current safety data sheets for chemicals are available for download at **www.gruenbeck.de/en/info-centre/safety-data-sheets**.

- Obey in-house instructions when handling chemicals. Make sure that protective and emergency equipment such as emergency showers and eyewash are available where required, and functional.

Mixing and residual amounts of chemicals

- Do not mix different chemicals. Unforeseeable chemical reactions posing a lethal danger can occur.
- Dispose of residual amounts of chemicals in accordance with local regulations and/or in-house instructions.
- Residual amounts from used containers should not be transferred into containers with fresh chemicals in order not to impair the effectiveness of the chemicals.

Labelling/Minimum shelf life/Storage of chemicals

- Check the labelling of the chemicals. Chemical labels must not be removed or made illegible.
- Do not use any unknown chemicals.
- Comply with the use-by date (minimum shelf life) stated on the label.
- If stored incorrectly, chemicals could change their state of matter, crystallize, outgas, or lose their effectiveness. Store and use the chemicals at the indicated temperatures only.

Cleaning/Disposal

- Immediately absorb leaked chemicals with suitable binding agents.
- Wipe up dripping chemicals with disposable cloths.
- Collect and dispose of chemicals in such a way that they cannot pose any risks to people, animals, or the environment.

2.1.4 Danger due to condensate

- Non-neutralised condensate is acidic and can cause chemical burns and irritation when coming into contact with the skin or the eyes.
- Avoid any skin/eye contact with the condensate.
- Use personal protective equipment when working with condensate.
- The condensate can damage surfaces when covering them.

Cleaning/Disposal

- Immediately absorb leaked and non-neutralised condensate with disposable towels.
- Dispose of the absorbed condensate with residual waste in an environmentally sound manner.

2.1.5 Groups of persons requiring protection

- This product is not designed to be used by persons (including children) with reduced capabilities, lack of experience or lack of knowledge.
- Children should be supervised to make sure that they do not play with the product.

2.2 Product-specific safety instructions

2.2.1 Neutralising agent (GENO-Neutrox)

- ► Brief/train the owner/operating company in handling the system and inform the owner/operating company about possible risks/sources of danger when handling chemicals.
- ► Always use personal protective equipment when handling chemicals (refer to chapter 1.6.3).
- ► Obey the safety data sheet of the neutralising agent GENO-Neutrox.

- The neutralising agent is a hazardous substance and is subject to the German Ordinance on Hazardous Substances.
- Keep the neutralising agent away from children.
- For neutralisation systems GENO-Neutra FNH-420-R, only the manufacturer's original GENO-Neutrox must be used.
- The neutralising agent is alkaline and can cause chemical burns and irritation when coming into contact with the skin or the eyes. Avoid any contact of eyes/skin with the neutralising agent.
- Use personal protective equipment when working on the product.
- The neutralising agent can damage surfaces when covering them.

2.2.2 Safety devices

- Delivery pump featuring a protective temperature limiter with automatic reset.
- The pump motor is switched off in the event of overheating

and restarts automatically after it has sufficiently cooled down.

- Level probe to monitor the filling level
- Overflow warning switch for switch-off
- pH electrode and pH measuring transducer to monitor the pH value

2.2.3 Safety-related components

Safety components must be replaced by genuine spare parts only.

- Dosing pump
- Dosing valve
- Delivery pump
- Level probe
- pH electrode
- pH measuring transducer (GENO-Neutra-matic$_2$)

2.2.4 Signals and warning signs

Labels on the product

	Risk of electric shock		Risk of chemical burns

The affixed information and pictograms must be clearly legible.
They must not be removed, soiled or painted over.

► Obey all warnings and safety instructions.

► Immediately replace illegible or damaged symbols and pictograms.

2.2.5 Line routing

- ► Always route lines such as suction and return hose, mains cables, electrical connecting cables away from traffic routes in order to prevent tripping and tearing off.
- ► Secure the lines of the neutralisation system at the installation site where public traffic can be expected.
- ► Mark possible tripping hazards, if necessary.

2.4 Conduct in emergencies

WARNING Pressurised media lines

- After the mains plug is unplugged, media lines on the pressure side are still under pressure.
- Dosing media splashing out

► Use personal protective equipment.

► Relieve the pressure on the pressure side of the dosing pump before working on the dosing pump, its equipment parts or the dosing lines.

2.4.1 In case of escaping dosing medium/condensate

1. De-energise the system – pull the mains plug.
2. Locate the leak.
3. Eliminate the cause of dosing medium or condensate escaping.
4. Contact the technical service.

WARNING Acidic condensate

- Chemical burns of eyes and body parts

► Thoroughly rinse your eyes with water if condensate or dosing medium gets into your eyes.

► Consult a physician, if needed.

2.4.2 In case of incorrect dosing/overdosing

1. De-energise the system – pull the mains plug.
2. Contact the technical service.

3 Product description

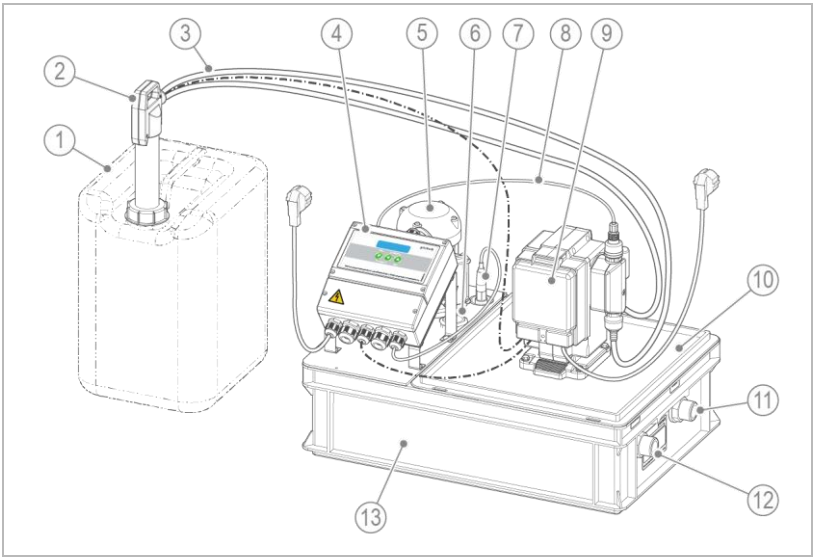
3.1 Intended use

- The neutralisation system GENO-Neutra FNH is suitable for the neutralisation (increase of the pH-value to > 6.5) of condensate originating from gas or oil-fired heat generators (condensing boilers) and/or exhaust systems made of stainless steel, plastic, glass, graphite and ceramics according to work sheets DWA A 251:2011 and DVGW VP 114 up to the specified capacity.

3.1.1 Possible applications

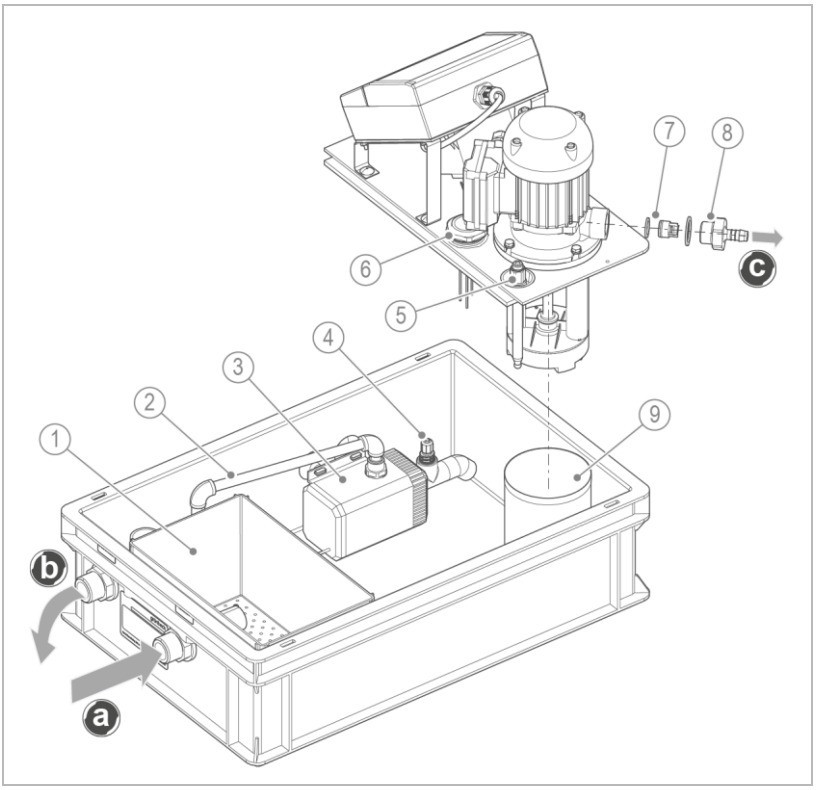
- The neutralisation system GENO-Neutra FNH-420-R is designed exclusively for use in industrial and commercial applications.
- The condensate can also contain impurities, combustion residues and, in case of oil operation, unburnt hydrocarbons or oil.
- In case of condensate containing an extremely high amount of impurities, we recommend installing condensate prefiltration box upstream. This increases the service life of the neutralisation system.

3.3 Product components



	Designation
1	Neutralising agent GENO-Neutrox (optional, not included in the scope of supply)
2	Suction lance with pre-alarm and empty signal
3	Suction and return pipe
4	Control unit GENO-Neutra-matic$_2$
5	Delivery pump
6	Level probe

	Designation
7	pH electrode
8	Dosing hose
9	Dosing pump GENODOS GP
10	Lid
11	Connection DN 25 (inlet)
12	Connection DN 25 (overflow)
13	Neutralisation box



	Designation
14	Condensate filter for activated carbon
15	Circulation distribution line
16	Circulation pump
17	Dosing valve
18	pH electrode

	Designation
19	Level probe
20	Non-return valve with flat seal
21	Hose nipple DN 12 with flat seal
22	Filter cage

Connections

	Designation
a	Inlet
b	Overflow
c	Outlet to the drain

3.4 Functional description

The condensate flows via the integrated condensate filter into the collection area of the neutralisation box where it is circulated, and the neutralising agent GENO-Neutrox is added.

By means of the neutralising agent GENO-Neutrox, the acid condensate is raised to an admissible pH level so that it can be discharged to the sewer system.

Upon reaching the admissible pH value (> 6.5), the condensate is pumped to the drain.

Control unit GENO-Neutra-matic$_2$ with pH monitoring

The control unit GENO-Neutra-matic$_2$ controls and monitors all important system functions.

In the GENO-Neutra-matic$_2$, various parameters can be changed in order to adapt the system to changing requirements on site such as the amount of condensate produced.

First and foremost, a pH setpoint of 7.5 should roughly be achieved. In practice, there will be a kind of oscillation around this value. This is due to the non-constant inflow of condensate, the circulation in the neutralisation box and the non-infinitely fast response of the pH electrode (system-related).

Circulation pump

The circulation pump is controlled via the control unit GENO-Neutra-matic$_2$. The condensate flows to the circulation pump via the circulation distribution line. The neutralising agent is added via the dosing valve.

Delivery pump

The delivery pump is a robust, seal-less centrifugal pump with the shaft being mounted in the motor, which is immerses into the medium with the corrosion-resistant pumping unit. The delivery pump

features a protective temperature limiter with automatic reset. The pump motor is switched off in the event of overheating and restarts automatically after it has sufficiently cooled down .

The integrated filter cage protects the delivery pump from coarse impurities.

The non-return valve prevents any backflow into the collection area of the neutralisation box when the delivery pump is off.

Dosing pump GENODOS GP

The dosing pump GENODOS GP is a self-priming diaphragm pump automatically deaerating against pressure. The eccentric wheel installed in the gear unit converts the rotary movement of the motor into a stroke movement of the dosing membrane.

Automatic venting is positively controlled and is realised via a second membrane. The venting process does not affect the dosing volume. Due to the automatic venting feature, suction and dosing against pressure are ensured even in case of outgassing media or when the dosing tank is replaced.

Level and overflow warning switch/voltage-free contacts

In addition, the level in the neutralisation box is monitored by a level probe and when the critical filling level is exceeded, a voltage-free fault signal contact is triggered as overflow warning.

A second voltage-free fault signal contact enables a safety switch-off of the condensing boiler either in parallel to the fault signal contact (overflow warning) or time-delayed.

A third voltage-free contact switches if the set maintenance interval has elapsed or the set limit value for the pH alarm has been exceeded or undershot during pumping out.

In addition, a voltage-free output for the actual pH value 4 – 20 mA (pH 0.0 – 14.0) is available as well as a voltage-free fault signal contact on the GENODOS dosing pump.

3.5 Accessories

You can retrofit your product with accessories. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechstaedt/Germany for details.

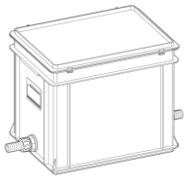
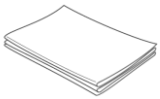
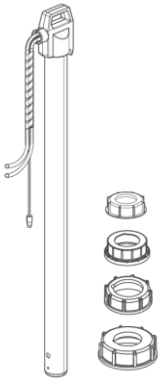
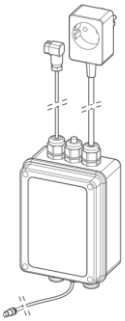
Illustration	Product	Order no.
	**Condensate prefiltration box DN 25** In case of gas/oil switchover operation of a condensing boiler or in case of an otherwise increased dirt content (e.g. impurities entering via the chimney), we recommend installing a condensate prefiltration box in the supply to the neutralisation system.	**410 135**
	**Safety package for caustic substances:** Consisting of the required PPE equipment and symbol signs necessary for the safe operation of dosing systems with caustic dosing agents.	**180 810**
	**Measuring beaker with 5-10-15-20 ml mark** To calibrate the pH electrodes; required 1x each per calibration solution	**88805080**
	**Hose DN 25 (5 m)** For covering distances of up to 5 m on the inlet and outlet side	**410 774e**
	**Oil binding mats, 20 pcs** Oil absorbing capacity of 100 ml/mat, water-repellent	**410 585**

Illustration	Product	Order no.
	**GENODOS suction lance B 10/20, 750 mm** For 75 kg canisters	**118 505**
	**Voltage-free level signal for GENODOS GP** For relaying the pre-alarm level of the suction lance	**163 870**

4 Transport, set-up and storage

4.1 Shipping/Delivery/Packaging

The product is packed in a cardboard box at the factory.

- ► Upon receipt, immediately check for completeness and transport damage.
- ► The activated carbon is not considered to be a hazardous substance in the sense of the German Ordinance on Hazardous Substances. Obey the current safety data sheet.

4.2 Transport/Set-up

- ► Transport the product in its original packaging only.
- ► Have two people transport the product to the installation site.
- ► Place the product on a level and stable surface. Take the weight of the product into account.

4.2.1 Transport/Storage/Handling of the canisters containing the neutralising agent GENO-Neutrox

- The neutralising agent GENO-Neutrox is a hazardous substance which is always subject to the German Ordinance on Hazardous Substances.
- ► Obey the safety data sheet of the neutralising agent GENO-Neutrox.
- Categorisation:
  UN 1824 SODIUM HYDROXIDE SOLUTION, 8, II

- Transport must be carried out in accordance with ADR. Simplified regulations for transport apply within the framework of the German “Craftsmen’s Regulation” or for “small quantities”.

Optimum conditions for transport and storage of the neutralising agent are given at the values below:

- Temperature: 10 °C – 25 °C

► Make sure that unauthorised persons, e.g. children, do not have direct access to the neutralising agent.

► When storing the 25 l canisters, do not stack more than 2 on top of each other.

► Secure the stacked canisters against falling over – place them against a solid wall or leave them secured on the pallet.

► Do not stack 75 l canisters on top of each other.

4.3 Storage

► Protect the product from the impacts below when storing it:

- Dampness, moisture
- Environmental impacts such as wind, rain, snow, etc.
- Frost, direct sunlight, severe heat exposure
- Chemicals, dyes, solvents and their vapours

4.3.1 Storage and handling the calibration solution

- ► Store the calibration solution at room temperature (15 °C – 25 °C) – do not expose it to frost.
- ► Tightly close the bottle containing the calibration solution after use.

4.3.2 Storage and handling the pH electrode

In order to prevent the sensor element from drying out, the pH electrode features a soaking cap or a transport container for storage and transport.

The pH electrode must not dry out during use or storage.

- ► Store the pH electrode in a 3 mol/l KCl solution. Do not use distilled water.

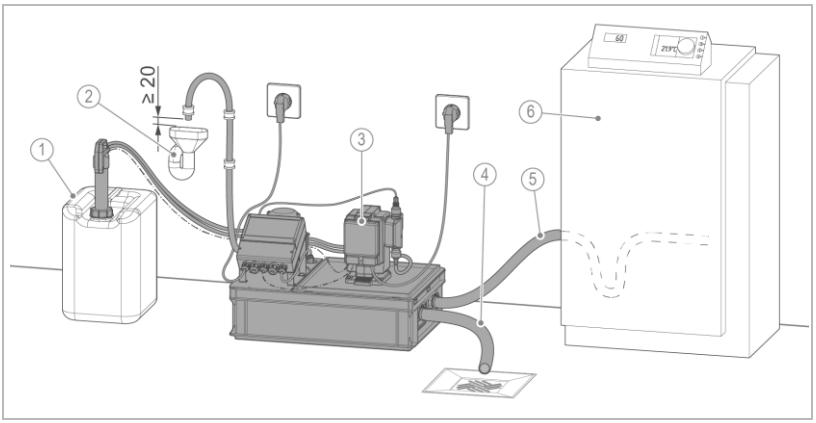
- ► Comply with the requirements below for storage and handling:

- Storage in dry rooms at -5 °C – +30 °C only
- Storage for longer than 6 months not recommended
- If the pH electrode has been stored dry for a longer period of time, conditioning is required before measuring – immerse it in a 3 mol/l KCl solution for about 24 hours
- Handle the pH-sensitive membrane glass with care – no skin contact, protected from damage
- Keep the electrical plug-in connections and cables clean and dry

5 Installation

The installation of the product must be carried out by a qualified specialist only.

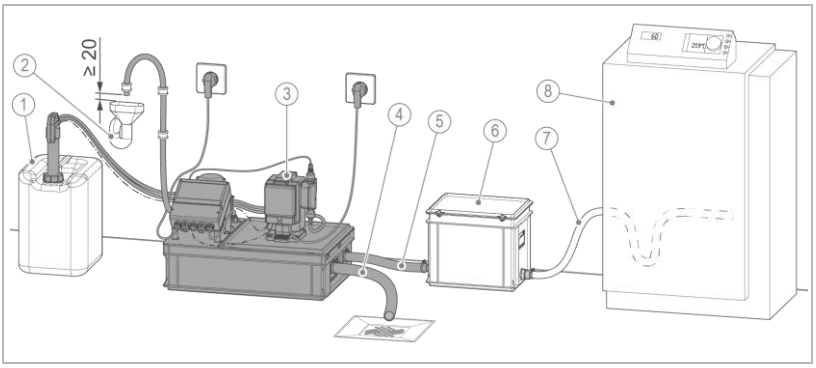
Installation example I



	Designation
1	Neutralising agent GENO-Neutrox
2	Drain connection
3	Neutralisation system GENO-Neutra FNH-420-R

	Designation
4	Overflow hose
5	Inlet hose
6	Heat generator with siphon

Installation example II (with condensate prefiltration box)



	Designation
1	Neutralising agent GENO-Neutrox
2	Drain connection
3	Neutralisation system GENO-Neutra FNH-420-R
4	Overflow hose

	Designation
5	Connecting hose
6	Condensate prefiltration box DN 25
7	Inlet hose
8	Heat generator

5.1 Requirements for the installation site

Obey the local installation directives, general guidelines and technical specifications.

- Protection from frost, severe heat exposure and direct sunlight
- Protection from high radiation temperatures in the immediate vicinity (≤ 40 °C)
- Protection from chemicals, dyes, solvents and their vapours
- Access for maintenance work (take required space into account)
- Sufficiently illuminated as well as aerated and ventilated

- Horizontal installation surface with sufficient load-bearing capacity to support the operating weight of the product

Space required

- There must be a clearance of at least 800 mm in front of the system for operation.
- Above the system, there must be a clearance of at least 600 mm for installation and maintenance work.
- Appropriate space must be reserved for placing the 25 kg or 75 kg canisters containing the neutralising agent GENO-Neutrox.
- In order to pull out the suction lance for the replacement of the canister, a clearance corresponding to the length of the suction lance is required.

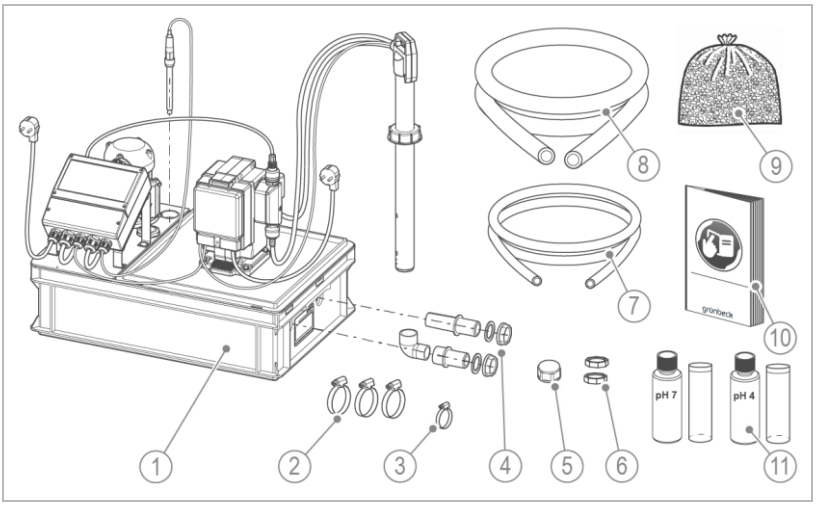
Water installation

- Inlet hose with a downward slope
- Floor drain or an alarm device which, in the event of a malfunction, visibly indicates the alarm and switches off the heat generator, if necessary
  - Note: In normal operation, the condensate is accumulated up to the switch-on point of the delivery pump.
- Drain connection ≥ DN 40 with possibility of backflow-free discharge of the condensate
- The drain connection must allow for resistance-free discharge ≥ 41.5 l/min

Electrical installation

- 2 separate Schuko sockets within a maximum distance of 1.5 m from the product
    - The power supply must carry continuous current or be connected in parallel to the burner of the condensing boiler

5.2 Checking the scope of supply



	Designation
1	Neutralisation system GENO-Neutra FNH-420-R as compact system (pre-assembled)
2	3 Hose clamps (20–32)
3	1 Hose clamp (12–20)
4	2 Hose connections DN 25 with union nut and seal
5	Closing cap R1" for overflow piece
6	2 Plastic nuts PG 13.5 for pH electrode
7	Outlet hose, 6 m in length (DN 12)
8	Hose, 5 m in length (DN 25) for inlet and overflow
9	Activated carbon filter filling, 3.5 l
10	Operation manual
11	1 Calibration solution pH 7 1 Calibration solution pH 4 2 Measuring beakers (20 ml)

► Check the scope of supply for completeness and damage.

The small parts are located in the neutralisation box.

► Remove the lid and take out the small parts.

The components below are pre-assembled at the factory:

- Dosing pump with console on the lid
  - Connection kit D 2-4 including dosing hose
  - Connection kit D6-12 for suction and return hose
  - Suction lance for 25 kg canister with empty signal and pre-alarm
- Delivery pump with filter cage and control unit with level probe on equipment console
  - pH electrode in the neutralisation box
- Circulation pump with circulation distribution line and dosing valve
- Condensate filter

5.3 Water installation

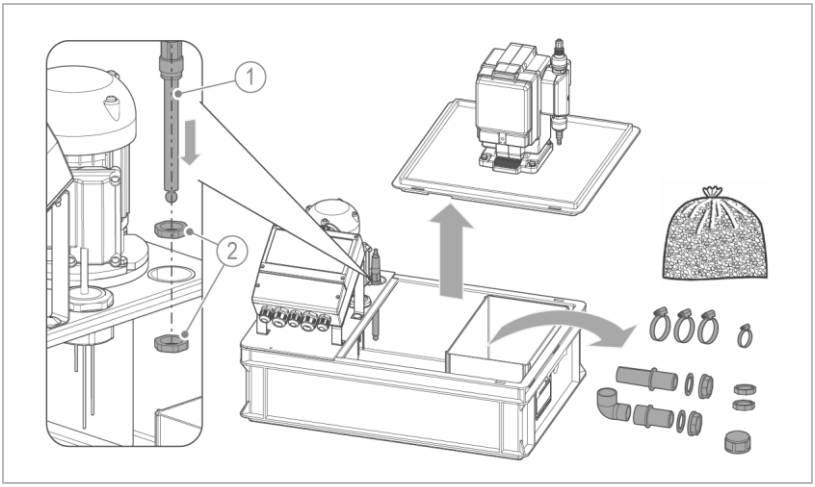
NOTE Pre-wired components

- Hoses, electric cables and connection points can be torn off or damaged.

► Carefully open the lid with the connected hoses to the dosing pump.

► After opening, put the lid down in a way that the lines are not squeezed, stretched or torn off.

5.3.1 Preparing the neutralisation system



	Designation		Designation
1	pH electrode	2	Plastic nuts PG 13.5

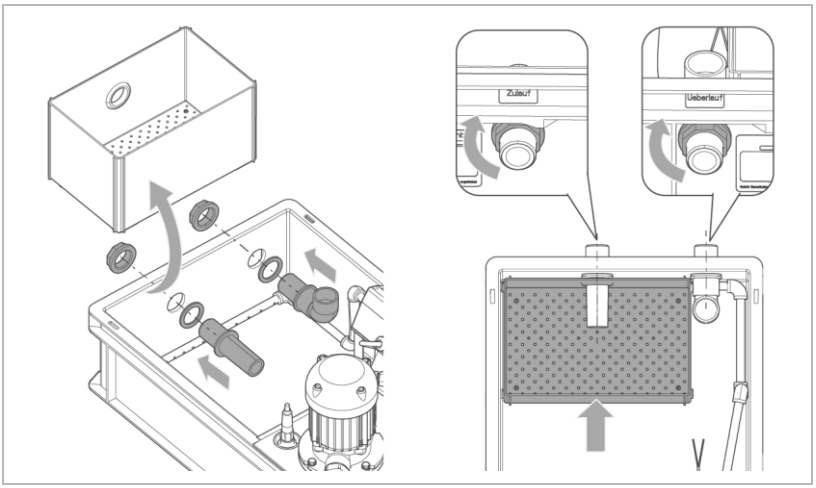
1. Open the lid of the neutralisation box.
2. Remove the transport locks from the neutralisation box.
3. Remove the bag containing the activated carbon as well as the components from the condensate filter.

Inserting the pH electrode

1. Remove the pH electrode.
2. Insert the pH electrode and fix it with the plastic nuts.

For calibration of the pH electrode, refer to chapter 6.2.

Installing the inlet and overflow hose connections

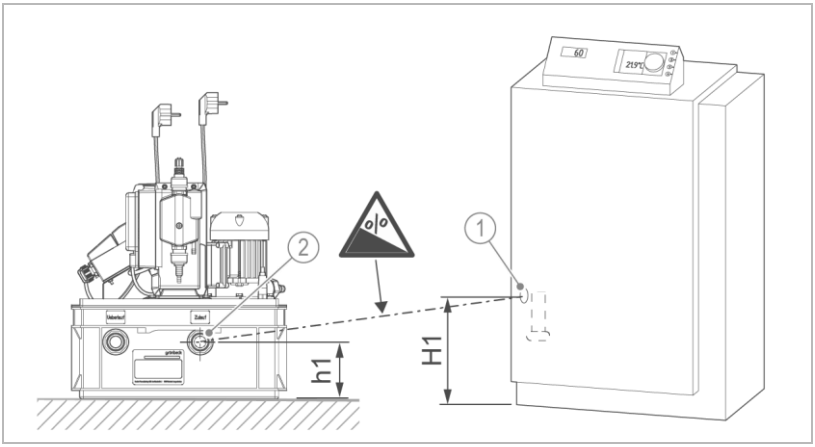


1. Remove the condensate filter from the neutralisation box.
2. Install the inlet and overflow connection.
   - **a** Place the seals on the connecting pieces from the inside.
   - **b** Insert the angled overflow connection facing upwards.
   - **c** Firmly tighten the locknuts from the outside.
3. Slide the condensate filter onto the inlet piece.
4. Check the installation situation of the circulation pump and the circulation distribution line.

» The circulation distribution line must lie flat on the bottom of the box.

5.3.2 Setting up the neutralisation system

- No flue gas from the condensing boiler must escape via the condensate inlet to the neutralisation system.
- If the condensing boiler does not feature a siphon, a siphon must be installed by the client on site.
- As an alternative, the inlet hose to the neutralisation system can be laid with a loop in the form of a siphon. Avoid a double siphon design.



	Designation		Designation
1	Outlet connection of boiler	2	Inlet connection of neutralisation system

► Set up the neutralisation system in a horizontal position close to the boiler – but away from traffic routes.

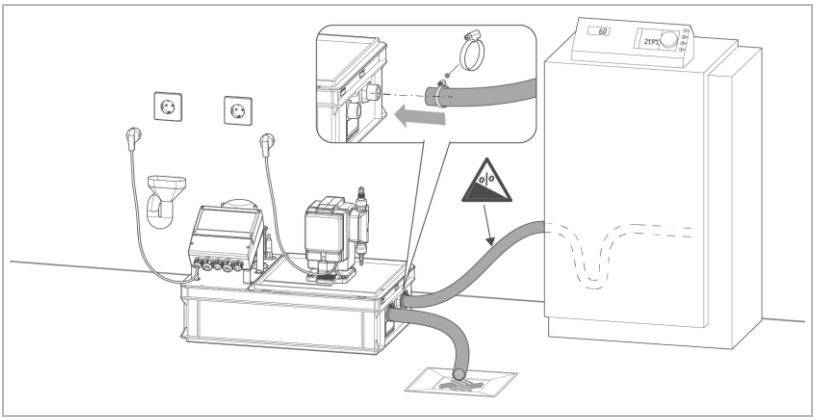
Select an installation site where the inlet hose can be as short as possible.

► Make sure that the outlet connection on the boiler has a downward slope of approximately 3 % to the inlet connection on the neutralisation system.

5.3.3 Connecting the neutralisation system

Use the hoses supplied with the system to connect the neutralisation system.

Installing the inlet and overflow hose



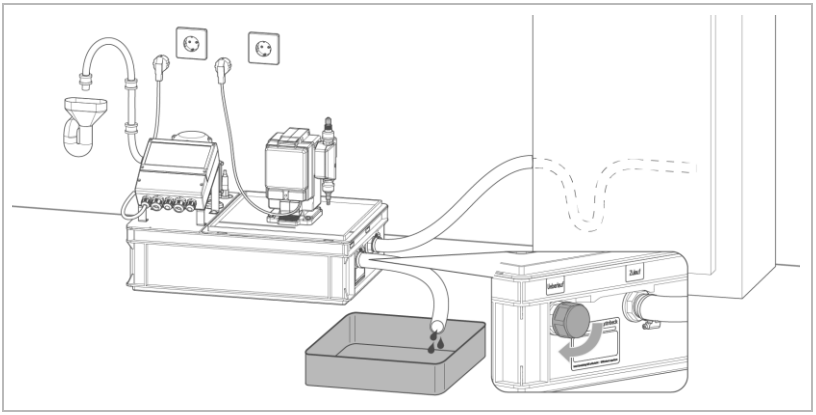
1. Shorten the inlet and overflow hose to the required length.
2. Connect the inlet hose to the neutralisation system.
3. Fix the inlet hose by means of the hose clamp.
4. Install the overflow hose on the overflow connection.
5. Fix the inlet hose by means of the hose clamp.
6. Route the overflow hose with a downward slope to the floor drain – do not kink the hose.

Should additional hoses and fittings be needed, only approved, corrosion-resistant materials according to worksheet DWA A251:2011 (e.g. made of PP, PE, PVC) must be used. Do not use brass, copper or steel components.

Incorporating additional condensing boilers or/and exhaust systems up to the max. capacity of the neutralisation system is possible by using corresponding T pieces.

Laying the overflow hose

The overflow hose is routed to a nearby floor drain, so that, in the event of a failure, the condensate temporarily can flow off in a controlled way until the failure has been remedied.



If no floor drain is available to discharge the condensate in the event of a failure, make sure of the following:

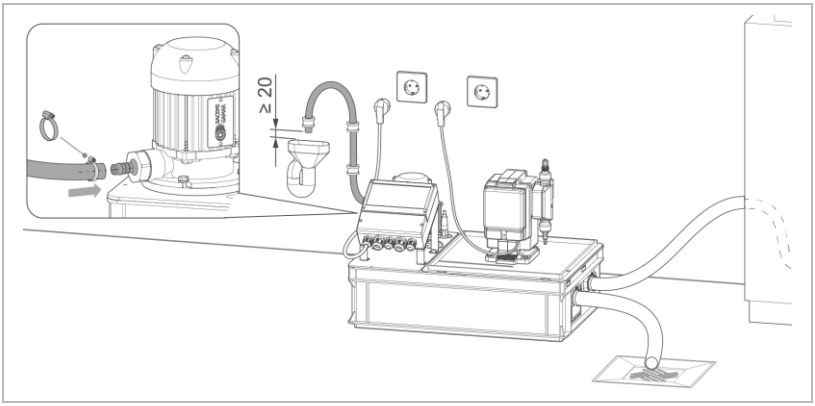
- ► Connect a suitable alarm device to terminals 11 and 12 (Brimful) of the GENO-Neutra-matic$_2$.
- ► Connect the condensing boiler to terminals 7 and 8 of the GENO-Neutra-matic$_2$, so that the condensing boiler is switched off without delay (refer to chapter 5.4.1).
- ► In this case, direct the overflow hose into a collection vessel provided by the client on site to collect the condensate.

Only close the overflow connection with the enclosed cap if it is ensured that no more condensate flows into the neutralisation system after the condensing boiler has been switched of – even from connected exhaust gas pipes.

Connecting the outlet hose to the drain connection

Comply with the following when connecting the outlet hose to the drain connection:

- The drain connection must at least have a nominal diameter of DN 40. The drain connection must allow for backflow-free discharge.
- The outlet hose must not be connected directly to the drain pipe in order to prevent a retroactive bacterial contamination from the drain to the system. Therefore, the outlet hose must end free above a drain connection.
- The outlet hose must end above the installation surface of the neutralisation unit in order to prevent syphoning.
- The outlet hose must not be constricted or kinked by hose connecting grommets, as this reduces the pump capacity. If a longer hose line is needed, the existing hose must be replaced by a hose of appropriate length (in one piece, without connecting parts).



1. Shorten the outlet hose to the required length.
2. Fix the outlet hose at the hose nipple by means of the hose clamp.
3. Fix the outlet hose at the drain connection with a distance of at least 20 mm.

If a longer hose line is used, the actual delivery rate must be checked by “gauging” the already laid outlet line.

The delivery rate must at least be equivalent to the max. amount of condensate produced + 10 %. The maximum amount of condensate produced by condensing boilers is determined as follows:

Max. boiler capacity [kW] x Specific condensate volume [l/kWh] = Max. amount of condensate produced [l/h]

For example:

Gas	1000 kW x (0.14 l/kWh for gas) = 140 l/h
Oil	1000 kW x (0.08 l/kWh for oil) = 80 l/h

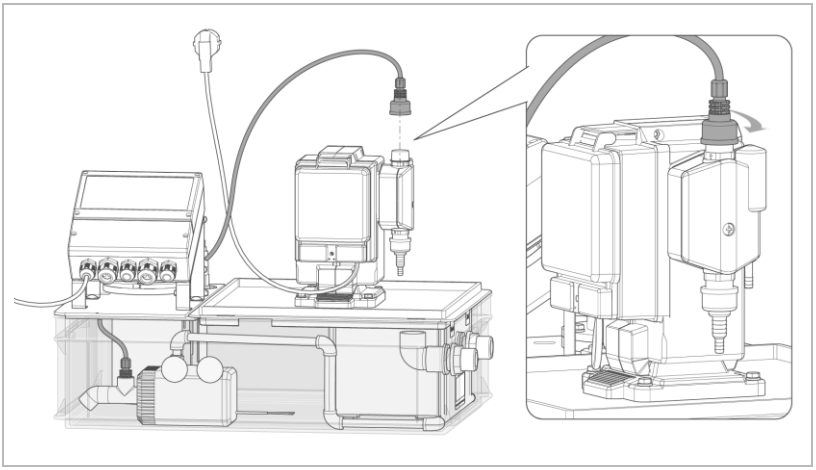
Other water, e.g. rain water entering via the chimney, must also be taken into account.

5.3.4 Connecting the dosing lines and the suction lance

Connecting the dosing hose

The dosing hose is connected to the dosing valve on the circulation pump at the factory.

The dosing hose is pre-assembled at connection kit D 2-4 of the dosing pump.



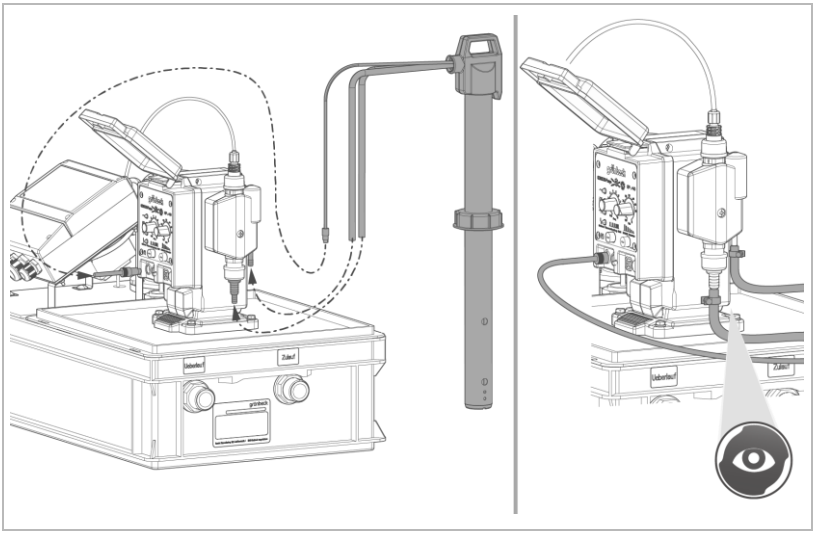
► Screw the connection kit D 2-4 with inserted flat seal onto the dosing outlet of the dosing pump.

Connecting the suction hose with suction and return hose

The suction lance for 25 kg canisters is connected to the dosing pump at the factory.

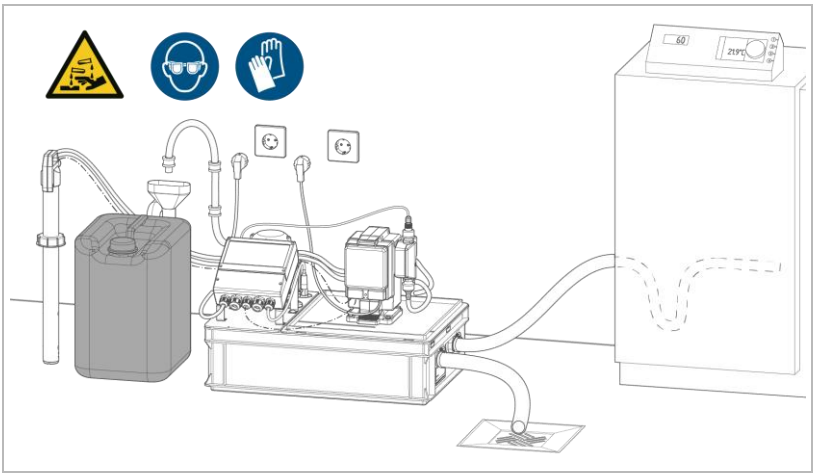
► Proceed as follows if you want to connect an optional suction lance for 75 kg canisters:

► Make sure to connect and lay the hoses without kinks.



1. Connect one hose to the connection nozzle on the suction side and fix it with the hose clamp.
2. Connect the second hose to the hose nozzle for the return (laterally offset at the back) and fix it with the hose clamp.
3. Plug the black level plug into the 3-pole coupling socket (refer to chapter 5.4.3).

5.3.5 Positioning the neutralising agent GENO-Neutrox



1. Position the canister containing the neutralising agent at the designated place.
   - **d** The canister must be easily accessible.
   - **e** Take the space required for pulling out the suction lance when replacing the canister into account.
2. Affix the safety symbols required for the neutralising agent in accordance with the applicable regulations (refer to chapter Accessories 3.5).
3. Obey the safety data sheet of the neutralising agent GENO-Neutrox.

NOTE Start-up/commissioning without water (dry run)

- Circulation pump, dosing pump and delivery pump can be damaged.

► Do not yet connect the system to the supply voltage – do not plug in the mains plug.

5.4 Electrical installation

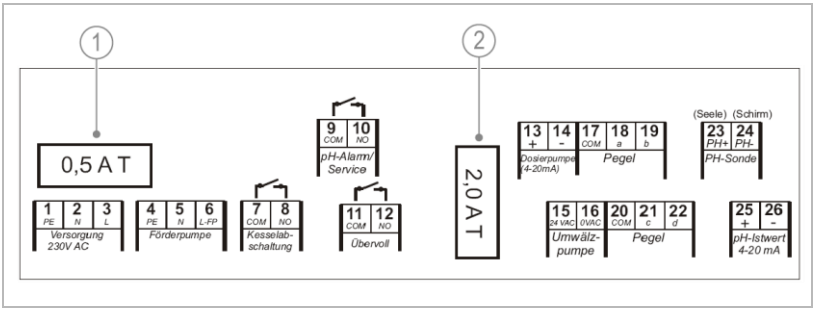
The electrical installation must be carried out by a qualified electrician only.

DANGER Life-threatening voltage on terminal connections

- Severe burns, cardiovascular failure, fatal electric shock
- ► Only have qualified electricians carry out electrical work on the product.
- ► Prior to opening the terminal box, make sure that the system is de-energised.

The mains cable and the delivery pump are pre-wired in the electrical connection box at the factory.

5.4.1 Terminal connections of GENO-Neutra-matic2



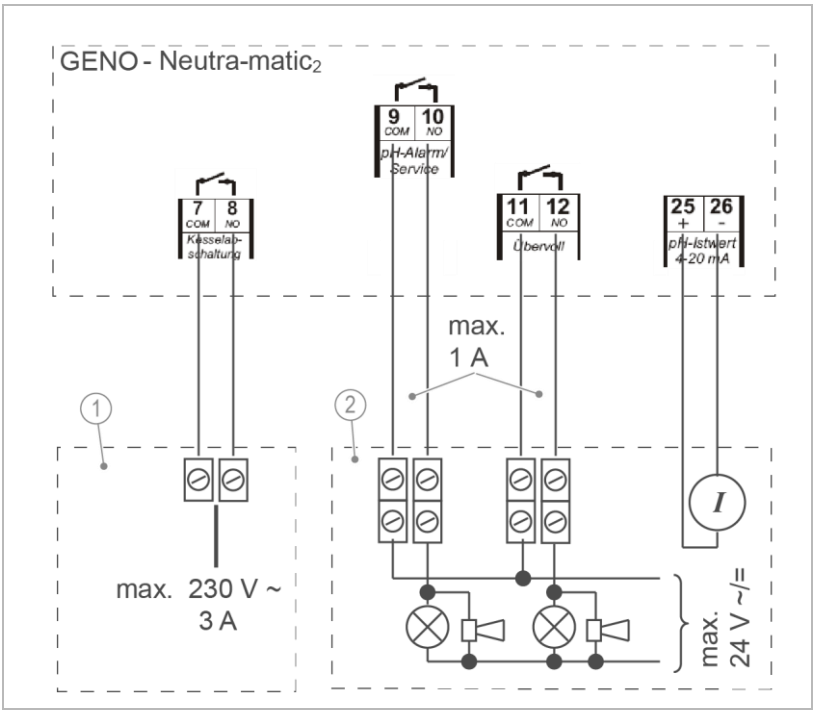
	Designation		Designation
1	Fuse F1 Electronics = Mains input of entire system (0.5 A slow-blow)	2	Fuse F2 Circulation pump and 24 V~ - outputs (1.25 A slow-blow)

Term.	Function	Colour	Remarks
1	Protective conductor	GN/YE	Mains cable 230 V~
2	Neutral conductor	BU	
3	Phase	BN	
4	Protective conductor	GN/YE	Delivery pump 230 V~
5	Neutral conductor	BU	
6	Phase	BN	
7	Com		Signal contact Boiler off Opens when level a is exceeded for longer than the programmed delay time (max. switching capacity 230 V~ / 3 A) of if there is a power failure
8	NOC		
9	Com		Signal contact pH alarm/Service Opens when the maintenance interval has elapsed or when a pH alarm occurs (max. switching capacity 24 V~ / 1 A) while the delivery pump is running or if there is a power failure
10	NOC		
11	Com		Signal contact Brimful Opens as long as level a is exceeded (max. switching capacity 24 V~ / 1 A) or if there is a power failure
12	NOC		
13	Analogue output (controller) 4-20 mA	YE	Connecting line to dosing pump GENODOS GP (red plug)
14	Ground	BN	
15	Phase	BN	Circulation pump 24 V~
16	Neutral conductor	BU	
17	Com	–	Level probe
18	Level a	BN	
19	Level b	GN	
20	Com	YE	
21	Level c	WH	
22	Level d	GY	
23	Core	WH	pH electrode
24	Shield	BK	
25	4 ... 20 mA		actual pH value – output Signal corresponds to pH 0.0 ... pH 14.0 voltage-free
26	Ground		

Connecting the condensing boiler and the voltage-free contacts to the GENO-Neutra-matic$_2$

If no floor drain is available, connect a suitable alarm device to terminals 11 and 12 (Brimful) of the GENO-Neutra-matic$_2$.

By connecting the condensing boiler to terminals 7 and 8 of the GENO-Neutra-matic$_2$, it must be switched off without delay.



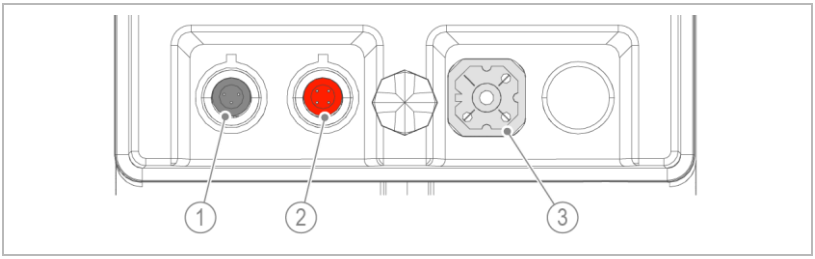
	Designation		Designation
1	Condensing boiler (external boiler switch-off)	2	Terminal box on site

1. Connect the signal contact Boiler off to terminals 7 and 8
2. Connect the signal contact pH alarm/Service to terminals 9

and 10.

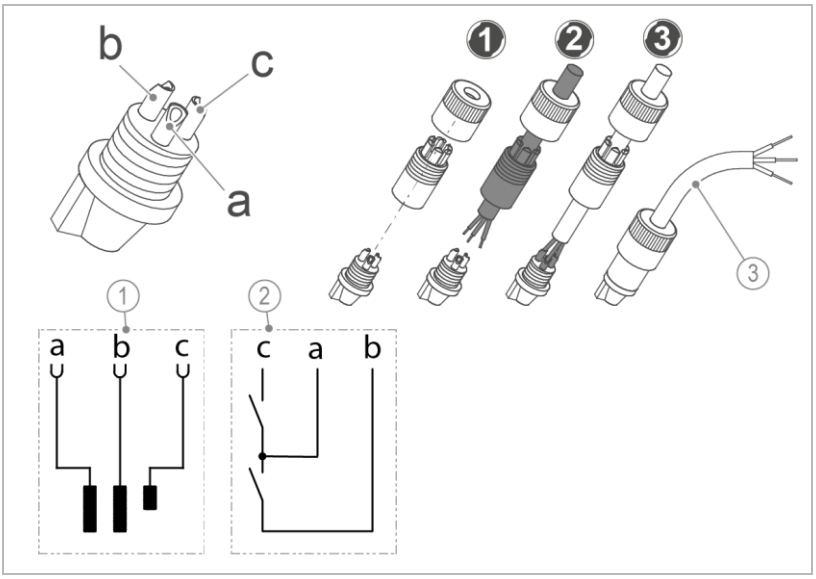
3. Connect the signal contact Brimful to terminals 11 and 12.
4. Connect the contact output for actual pH value to terminals 25 and 26.

5.4.2 Contact connections Dosing pump GENODOS GP



	Designation	Function
1	Input Empty signal	• Coupling socket, 3-pole • Level plug in black A level probe can be connected to this connection. For GENODOS pumps GP-../41, only and exclusively suction lances and empty signals with pre-alarm must be used.
2	Input External control	• Coupling socket, 4-pole • External plug in red · Connection for external pulse transmitters (e.g. contact water meter (Reed, Hall), control units, etc.) · Connection for control units with analogue signal output (0–5 V / 1–6 V / 0–20 mA / 4–20 mA) · Connection for external operational release (e.g. timer, relay, etc.) For external operational release (release of internal control), the selector switch for internal or external control must be set in the scaling range "Int. – 10".
3	Output Fault signal	• Control plug The voltage-free fault signal output (changeover contact) contains a collective fault signal for power failure, empty signal (but not the pre-alarm for GP-../41) membrane break as well as dosing monitoring.

Input connection for empty signal (suction lance)



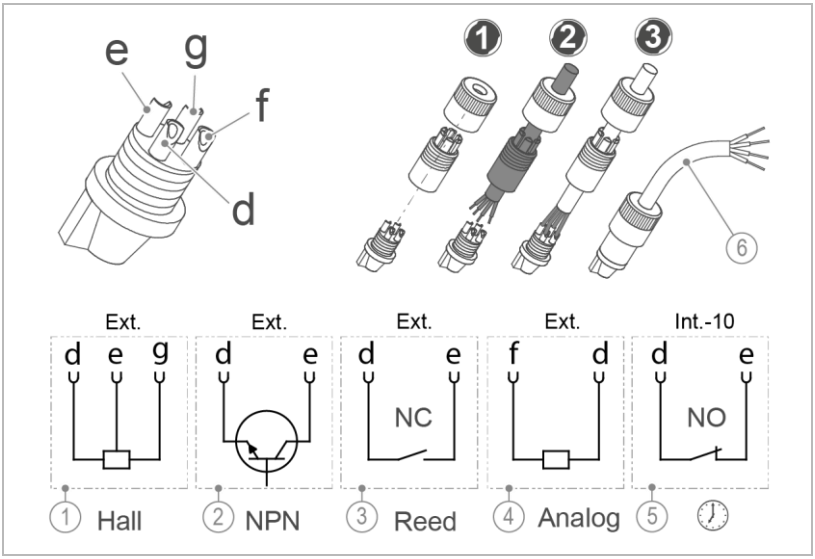
	Designation
1	Level probe (200 µs)
2	Level control with pre-alarm

	Designation
	(e.g. float switch)
3	Connection cable, 3-pole

	Designation	Colour
a	Ground (reference point)	BR (brown)
b	Level empty	WH (white)
c	Level pre-alarm	GN (green)

- The connector is pre-assembled with the connection cable at the factory.

Input connection for control (GENO-Neutra-matic$_2$)



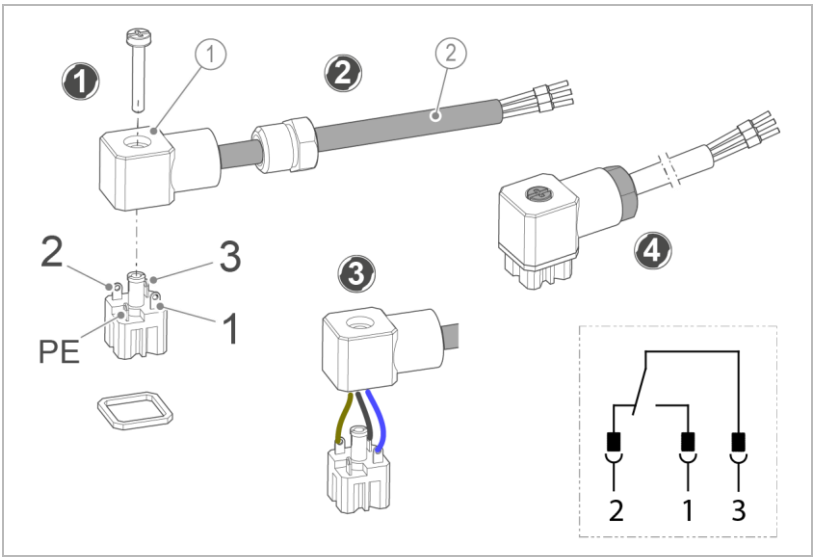
	Designation
1	Hall switch
2	Transistor control NPN
3	Relay contact (normally open contact NOC), contacts of water meter e.g. Reed switch

	Designation
4	Analogue control: 0–5 V, 1–6 V, 0–20 mA, 4–20 mA
5	Ext. operational release (e.g. timer, normally closed contact NCC)
6	Connection cable, 4-pole

	Designation	Colour
d	Ground	BR (brown)
e	Signal clocking	GN (green)
f	Signal analogue	YE (yellow)
g	+ 11.6 V	WH (white)

- The connector is pre-assembled with the connection cable at the factory.

Output connection for collective fault signal



	Components
1	Cable socket, 3-pole, with Pg 7 screw connection

	Components
2	Connection cable, ÖPVC-OZ 3x0.5 with wire end ferrules 0.50 mm², orange

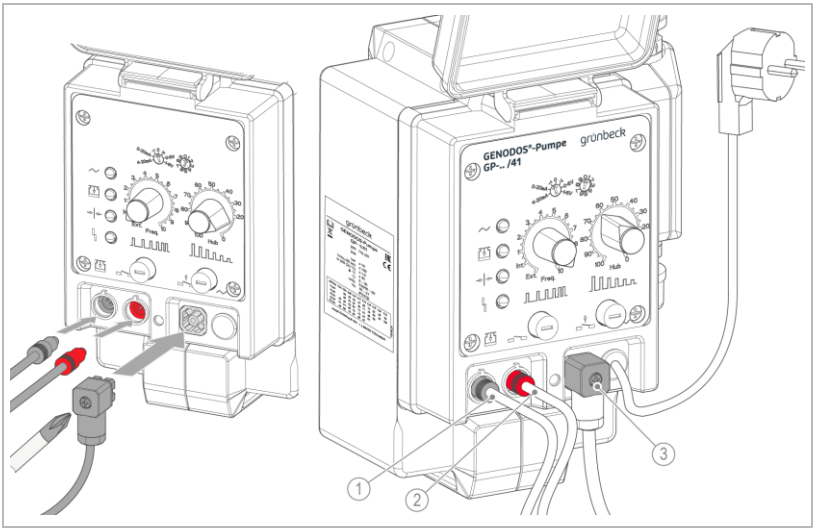
	Connections	Colour
1	1 + 3 = Operation	BU (blue)
2	2 + 3 = Fault	BR (brown)
3	Changeover contact (common)	BK (black)

Contact rating max. 230 V/60 VA

Possible collective fault signal in the event of power failure, membrane break, dosing monitoring, empty signal

- The connector is pre-assembled with the connection cable at the factory.

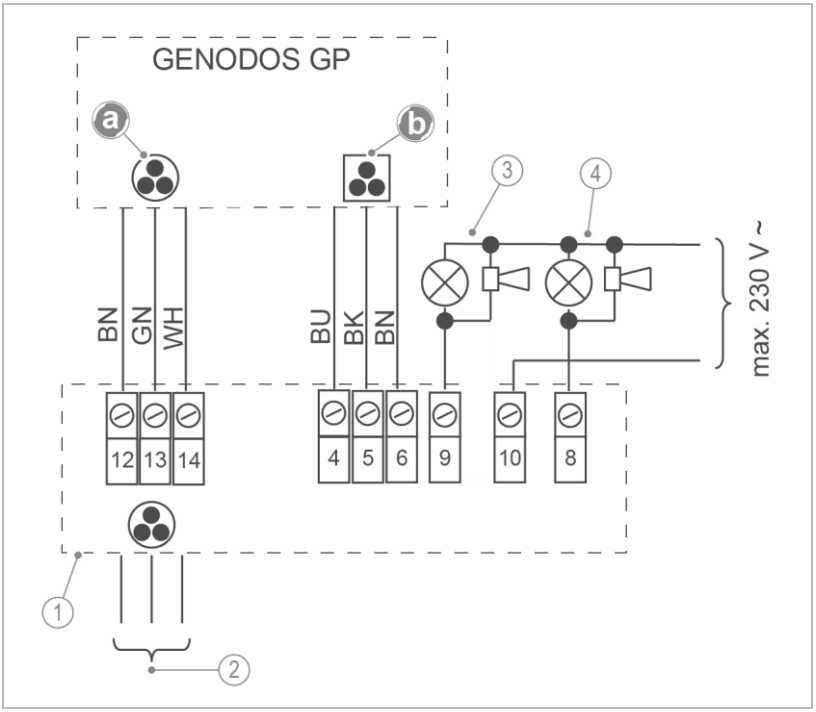
5.4.3 Dosing pump GENODOS GP



	Designation
1	Input Empty signal of suction lance
2	Input Control of GENO-Neutra-matic$_2$
3	Output Collective fault

1. Plug the black plug of the suction lance into the connection Input Empty signal Suction lance.
   a. Unscrew the blind plug and remove the existing contact sleeve.
2. Plug the red plug of the connecting line from the GENO-Neutra-matic$_2$ to the GENODOS pump into the connection Input Control GENO-Neutra-matic2.
   a. Unscrew the blind plug.
3. Plug the cable socket into the signal contact output Collective fault signal, if needed.

Terminal connections of dosing pump GENODOS GP for voltage-free level signal (optional, order no. 163 870)



	Designation
a	Connection Empty signal of suction lance
b	Connection Collective fault
1	Terminal box provided by the client on site
2	Suction lance
3	Pre-alarm
4	Empty signal/fault

Obey the mounting instructions of the accessory Voltage-free level signal (refer to chapter 3.5).

The optional alarm delay for connection to the overflow warning switch enables the heat generator to be switched off either in parallel with the fault signal, or with a time delay.

6 Start-up/commissioning

The initial start-up/commissioning of the product must be carried out by technical service personnel only.

WARNING Acidic condensate/alkaline neutralising agent

- Chemical burns of eyes and body parts

► Use personal protective equipment (refer to chapter 1.6.3).

► Avoid any skin and eye contact with the condensate or the neutralising agent.

► Thoroughly rinse your eyes with water if condensate or neutralising agent gets into your eyes.

6.1 Preliminary work

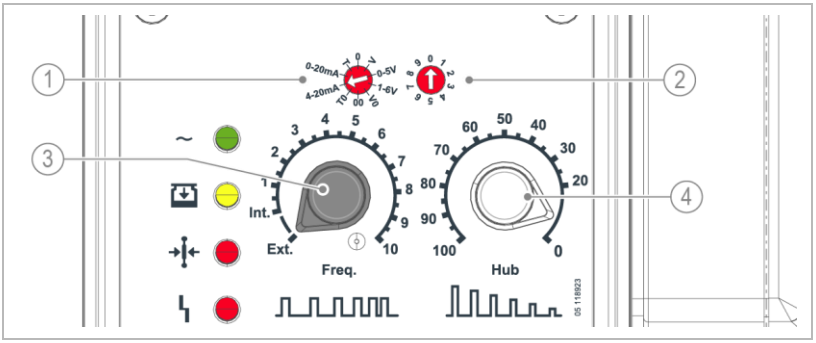
► Check the outlet, overflow and inlet hose for professional fastening.

► Check the dosing hose as well as the suction and return hose of the suction lance for professional fasting.

6.1.2 Pre-settings of GENODOS pump GP

For operation of GENODOS pump GP, refer to chapter 7.2.

The installation of the stroke length controller must only be changed during operation and during the pump stroke



	Designation
1	Operating mode switch
2	Pulse division or pulse multiplication factors

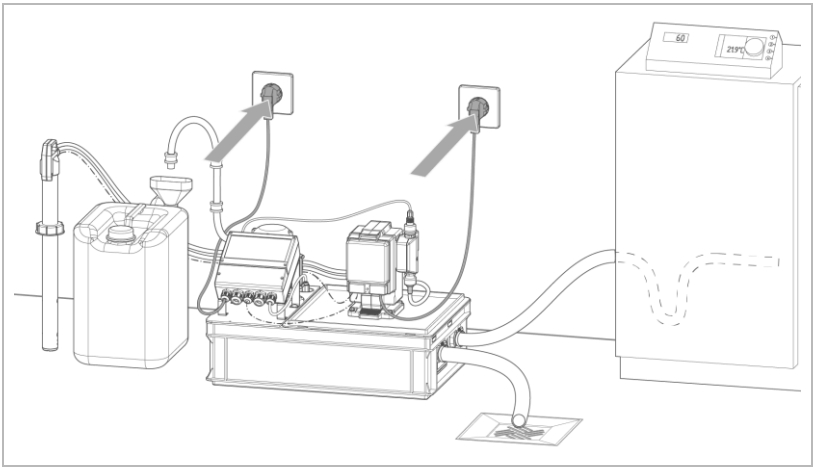
	Designation
3	Selector switch for internal and external control
4	Stroke length controller

1. Set the pulse division factor (item 2) to 0.
2. Set the operating mode switch (item 1) to 4 – 20 mA
3. Set the selector switch (item 3) for the stroke frequency to Ext. (control of GENO-Neutra-matic$_2$)

GENODOS pumps GP-../41 can store and process a maximum of **65517** incoming pulses in case of external control. With "Mains off" or when switching to another operating mode (operating mode switch), these stored pulses are deleted.

6.1.3 Establish supply voltage

The dosing pump GENODOS GP and the GENO-Neutra-matic$_2$ are switched on and off via the mains plug.



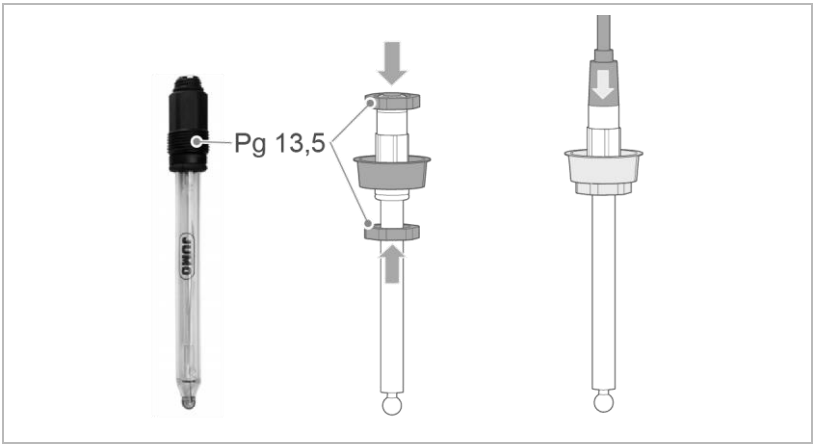
► Plug the two mains plugs of the GENO-Neutra-matic$_2$ and the dosing pump GENODOS GP into the sockets.

6.2 Calibrating the pH electrode

A prerequisite for operating the neutralisation system as intended is that the pH electrode has been calibrated with the pH measuring transducer GENO-Neutra-matic$_2$ during initial start-up/commissioning.

► Set the operating language on the GENO-Neutra-matic$_2$, if

needed (refer to chapter 7.1).



1. Connect the pH electrode to the electrode cable of the GENO-Neutra-matic$_2$.

6.2.1 Preparing calibration

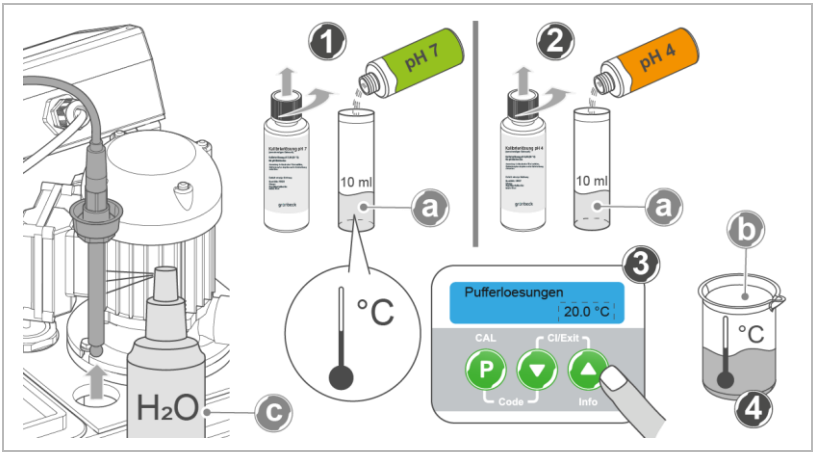
In order to check and calibrate the pH electrode, you need the utensils below:

- Deionised water in a spray bottle
- Buffer solution pH 7
- Buffer solution pH 4
- One measuring beaker each per buffer solution
- Thermometer to measure the room temperature and the temperature of the medium
- A soft cloth
- Spare pH electrode

The check and the calibration of the pH electrode is carried out as a two-point measurement with buffer solutions pH 7 and pH 4.

- In order to prevent measuring errors during checking and calibration, the pH electrode must be cleaned and rinsed with deionised water before every check.
- A damaged or slow pH electrode must be replaced.

► Proceed as follows to prepare for the calibration of the pH electrode:



Designation	
1	Buffer solution pH 7
2	Buffer solution pH 4
a	Temperate buffer solution in measuring beaker, 1x each per calibration

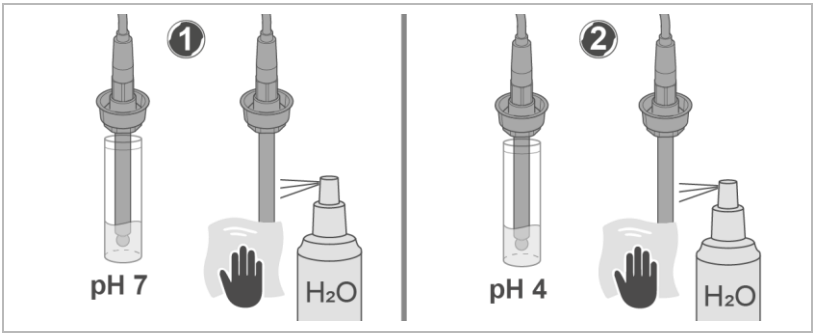
Designation	
	solution
b	Condensate
c	Deionised water to rinse the pH electrode

1. Temper the buffer solution to room temperature.
2. Clean the pH electrode.
3. Measure the temperature of the buffer solutions and enter the temperatures at the measuring transducer.

4. Measure the temperature of the condensate.

6.2.2 Calibrating

► For operation of the GENO-Neutra-matic$_2$, refer to chapter 7.1.3.



First step (with pH 7)

1. Rinse the pH electrode with deionised water.
2. Dry the pH electrode with a soft cloth.
3. Immerse the electrode into the first buffer solution pH 7.
   - **a** Wait until the display value for the pH value has stabilised.
   - **b** Enter the pH value of the first buffer solution at the measuring transducer.

Second step (with pH 4)

1. Rinse the pH electrode with deionised water.
2. Dry the pH electrode with a soft cloth.
3. Immerse the electrode into the second buffer solution pH 4.

a Wait until the display value for the pH value has stabilised.

b Enter the pH value of the second buffer solution at the measuring transducer.

» The measuring device determines the zero point and the slope of the electrode.

4. Rinse the pH electrode with deionised water.
5. Dry the pH electrode with a soft cloth.

Concluding work

As long as no valid calibration has been carried out, the error message pH Cal is shown in the first line of the GENO-Neutra-matic$_2$ display, and proper operation is not possible.

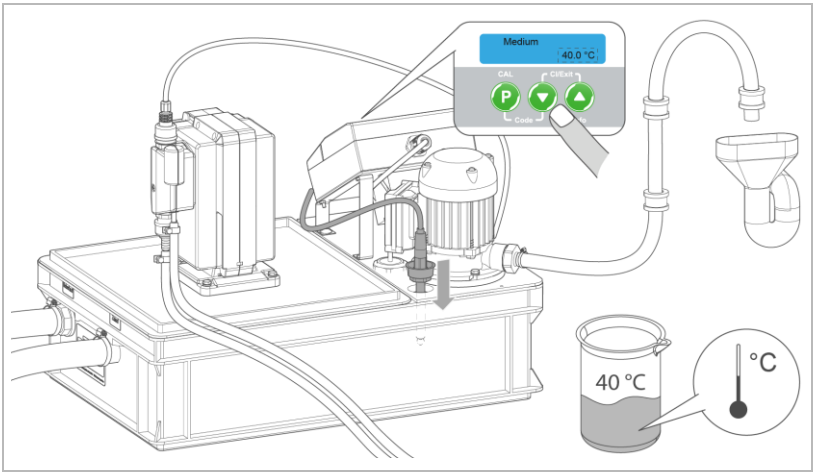
Possible calibration errors.

- Slope error: Is indicated by the GENO-Neutra-matic$_2$ if the difference of buffer solution pH 7 and buffer solution pH 4 is < 150 mV during the measurement.

► Abort the calibration and restart it.

- Time error: If, from the moment of immersion into the buffer solution, it takes longer than 3 minutes until the value no longer changes.

► Replace the unusable pH electrode.



► After the calibration, re-insert the pH electrode into the opening on the neutralisation box.

► Enter the temperature of the condensate at the measuring transducer.

► Clean the measuring beaker after calibration.

NOTE Store buffer solutions properly

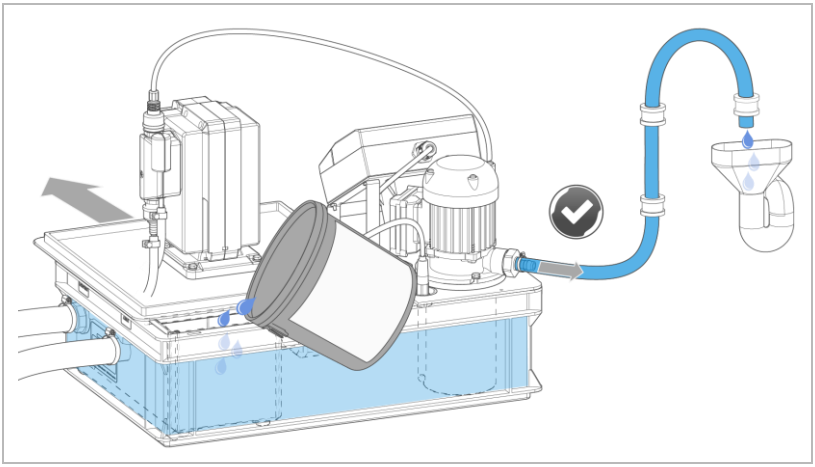
- Contaminations render buffer solutions useless.

► After calibration, store the buffer solutions as prescribed again (refer to chapter 4.3.1).

► Replace the buffer solution after the use-by-date has expired.

► Discharge the buffer solution in the measuring beaker after calibration has been completed.

6.2.3 Filling the neutralisation box with water



- ► Open the lid of the neutralisation box.
- ► Slowly fill water into the neutralisation box – into the condensate filter until the delivery pump delivers the water to the drain.
- ► Check the pumping function while doing so.
- ► Close the lid of the neutralisation box again.

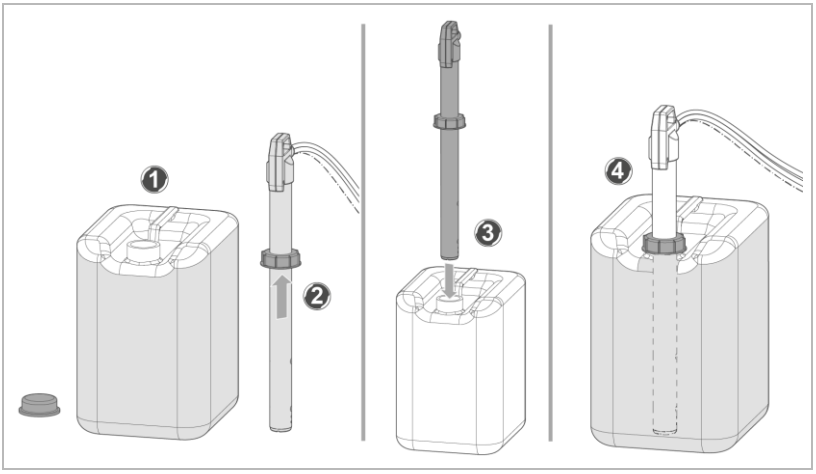
6.2.4 Connecting the suction lance to the canister

WARNING Skin and eye contact with dosing agent

- Chemical burns to the eyes, irritation of the skin and respiratory tract when in contact with the dosing agent

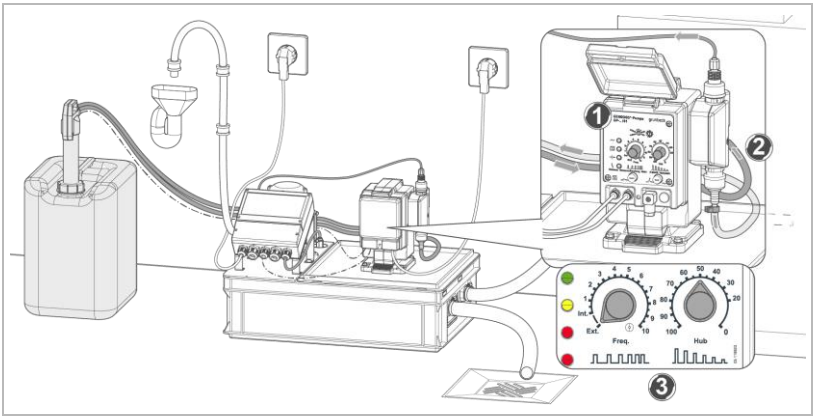
► Use personal protective equipment.

► Look out for leaks and puddles on the floor and immediately wipe up leaking/dripping dosing agent with disposable towels.



1. Remove the screw cap of the canister and keep it for closing the canister after the dosing agent has been used up.
2. Select the sliding cap suitable for the canister and slide it onto the suction lance.
3. Vertically insert the suction lance into the canister from above.
4. Fix the suction lance with the sliding cap – screw the sliding cap onto the canister opening.

6.2.5 Filling the dosing pump and the dosing line

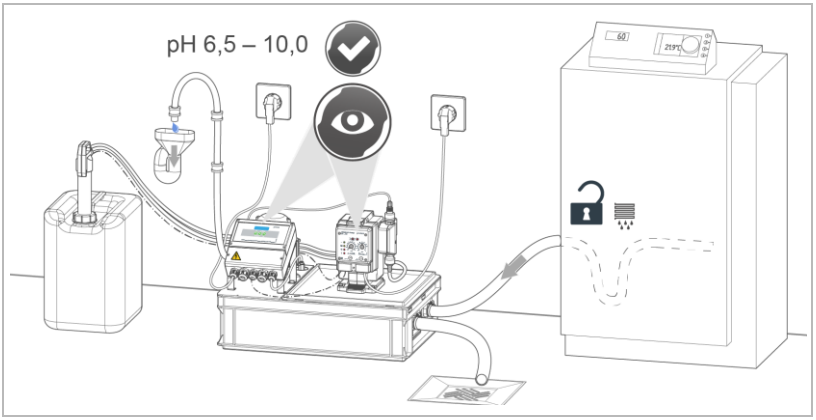


1. Proceed as follows to set the dosing pump to max. dosing capacity:
   a. Set the frequency selector switch to Int 10 (the dosing pump works at maximum frequency).
   b. Set the stroke length controller to 100 (the dosing pump works at maximum stroke length).
2. Wait until the return line to the suction lance is filled with neutralising agent.
3. Proceed as follows to set the dosing pump to operating capacity:
   a. Set the stroke length controller to the required stroke length.

For initial start-up/commissioning, we commend the setting 50 for gas condensate and 70 for oil condensate.

   b. Set the frequency selector switch to Ext. again.

6.3 Checking the product



4. Put the condensing boiler into operation.
5. Check the entire installation for leaks.
6. Check the neutralisation system for function.
7. Make sure that the condensate flows to the drain freely.
8. Check the pump capacity in case of line extensions or reductions in the cross sections of the outlet hose (e.g. due to hose connectors).
9. Record the start-up/commissioning in the operation log (refer to chapter 13).

The factory settings of the GENO-Neutra-matic$_2$ and the pre-settings of the dosing pump meet the requirements for “Normal condensate” as specified in the DVGW testing principles.

In practice, fault-free operation is achieved with this setting in many cases without the need for making changes. Due to the fluctuating condensate volumes and condensate composition in practice while the condensing boiler is in operation, fluctuations in the pH value within the permissible limit values of pH 6.5 – pH 10 are normal.

► Only readjust the dosing pump, if a sufficient amount of condensate is produced (refer to chapter 5.4.3).

6.4 Handing over the product to the owner/ operating company

- ► Explain to the owner/operating company how the product works.
- ► Use the manual to brief the owner/operating company and answer any questions.
- ► Inform the owner/operating company about the need for inspections and maintenance.
- ► Hand over all documents to the owner/operating company for keeping.

6.4.1 Disposal of packaging

- ► Dispose of packaging material as soon as it is no longer needed (refer to chapter 11.2).

6.4.2 Storage of accessories/consumables

- ► Store accessories and consumables properly (refer to chapter 4.3).

7 Operation

WARNING Acidic condensate/alkaline neutralising agent

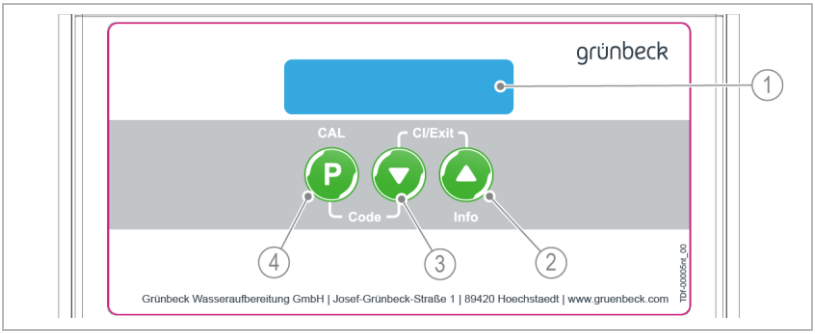
- Chemical burns of eyes and body parts
- ► Use personal protective equipment (refer to chapter 1.6.3).
- ► Avoid any skin and eye contact with the condensate or the neutralising agent.
- ► Thoroughly rinse your eyes with water if condensate or neutralising agent gets into your eyes.

► Inspect the product at regular intervals (refer to chapter 8.3).

► Replace the dosing agent in good time and have consumables at hand (refer to chapter 8.5).

► Have maintenance work carried out in good time (refer to chapter 8.4).

7.1 Control unit GENO-Neutra-matic$_2$

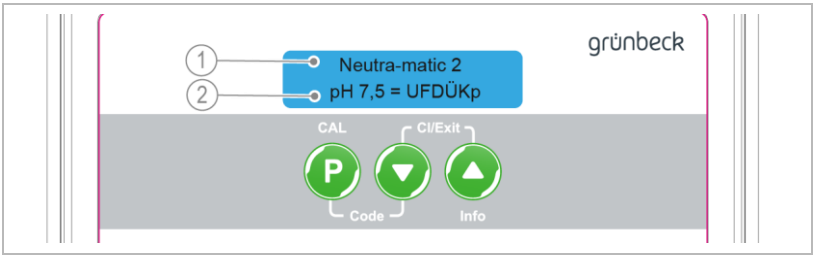


	Designation	Meaning/Function
1	Display	• Info level · Basic display to read off the current values
2	Operating key 	• In the basic display: · Switching on the system (press and hold key > 5 sec) • In the Info level: · Display of the parameters • In the programming level: · Switching to the next parameter · Increasing the numerical value of a parameter (display value flashes)
3	Operating key 	• In the basic display: · Switching off the system (press and hold key > 5 sec) • In the programming level: · Returning to the previous parameter · Decreasing the numerical value of a parameter (display value flashes)
4	Operating key 	• In the basic display: · Acknowledging a malfunction. · Calibrating the pH electrode (press and hold key > 2.5 s) • In the programming level: · Opening parameter for editing (display value flashes) · Saving parameter (display value stops flashing)

Key combination	Meaning/Function
	• Access to the programming level (press and hold key > 1 s): · Code request `C 000`
	• In the programming level: · Closing open parameter without saving (previous display value is retained) • Returning to the basic display

7.1.1 Basic display

By pressing any key, the switched-off display backlighting is switched on again.



From any open menu, the display automatically returns to the basic display if no key has been pressed for more than 5 minutes.

Previous parameters are retained.

	Designation
1	Line for status, controller name or fault signal
2	Line for states of input/output signals, in the sequence: **pH 7.5** measured pH value **=** The number of bars indicates the filling level of an optionally connected neutralisation box: · 1 Bar: Level d has been reached (lowest level) · 2 Bars: Level c has been reached (next higher level) · 3 Bars: Level b has been reached (next higher level) · 4 Bars: Level a has been reached (highest level, shown flashing) **U** Circulation pump is switched on **F** Delivery pump is pumping **D** Dosing pump is working **Ü** Signal contact “Brimful” is open **K** Delayed signal contact **p** Signal contact pH Alarm/Service is open

7.1.2 Reading off the Info level (basic display)

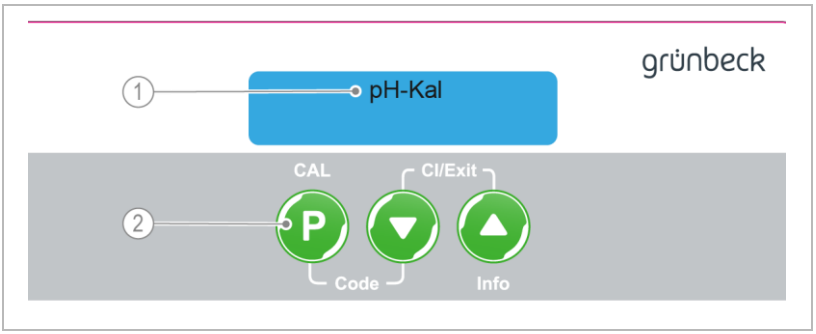
In the info level, the current setting values of the parameters below can be read:

- Actual pH value (is continuously shown in the display)
- pH Min. Alarm
- pH Max. Alarm
- Setpoint pH value
- Delay time of signal contact Boiler off
- Time until service is due

7.1.3 Calibrating

As long as no valid calibration has been carried out, the error message pH Cal is shown in the first line of the display, and proper operation is not possible.

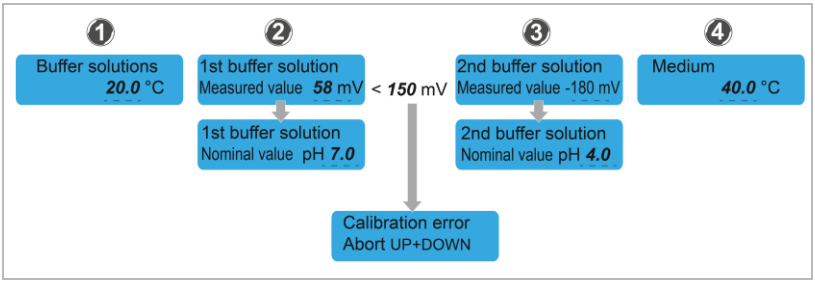
For calibration of the pH electrode, refer to chapter 6.2.2.



	Designation
1	Error message pH Cal (request to carry out calibration)

	Designation
2	CAL key to start the calibration

► Start the calibration by pressing and holding the P key for longer than 2.5 seconds.



1. Enter the measured temperature of the buffer solutions.
   a. Use ▼ or ▲ to enter the temperature.
   b. Confirm with P.
2. Calibrate with the first buffer solution (pH 7)
   a. Wait until the value displayed does not change any longer.
   b. Confirm with P.
   c. Use ▼ or ▲ to enter the pH value of the first buffer solution.
   d. Confirm with P.
3. Calibrate with the second buffer solution (pH 4)
   a. Wait until the value displayed does not change any longer.

As long as the difference (measured value for pH 7 – measured value for pH 4) is < 150 mV, Calibration error is displayed. The calibration can only be aborted by using the key combination ▼ and ▲.

b Confirm with P.

c Use ▼ or ▲ to enter the pH value of the second buffer solution.

d Confirm with P.

4. Enter the measured temperature of the medium/condensate.

a Use ▼ or ▲ to enter the temperature.

b Confirm with P.

» Calibration is completed.

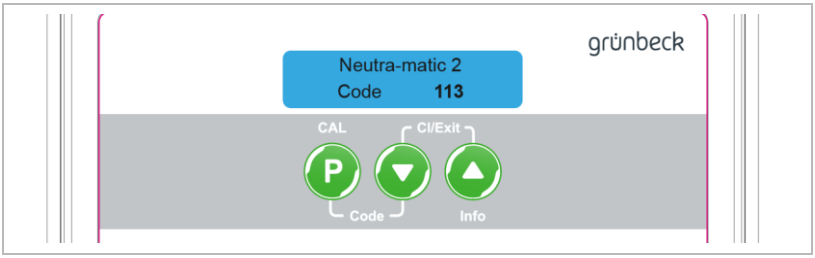
» The basic display will appear in the display.

Behaviour of the output signals during calibration

- Dosing (controller) is switched off.
- Analogue output (actual pH value) is frozen at 12.6 mA (= pH 7.5).
- The circulation pump is running when level d is exceeded.
- The delivery pump switches on when level b is reached and switches off again when level c is undershot.

7.1.4 User programming level (Code 113)

All parameters that can be changed by the owner/operating company, are stored in the user programming level.



► Reprogram the parameters in Code level 113, if needed.

1. Simultaneously press and hold the keys P and ▼ for more than 1 second.
   » The display changes to code request C 000.
2. Set Code C 113 using ▼ or ▲.
3. Confirm with P.
4. Select the desired parameter.
5. Set the desired value.
6. Save the value using P.

By simultaneously pressing ▼ and ▲, you close the setting without saving.

7. Return to the basic display – simultaneously press ▼ and ▲.

Parameters

Factory settings must only be changed by a qualified specialist and after consultation with Grünbeck's technical service.

In the tables below, the factory settings are greyed out.

Parameters		Setting range	Remarks
pH Min. Alarm	pH	0.0...5.0...12.0	Lowest pH value to trigger the alarm
pH Max. Alarm	pH	0.0...9.0...12.0	Highest pH value to trigger the alarm
pH Alarm delay	sec	0.0...1...999.9	Delay time • Time for which the set limit value must be exceeded/undershot before an alarm is triggered and a fault signal is output.
		If the medium in the neutralisation box falls below the pH Min. Alarm or exceeds the pH Max. Alarm for longer than the pH Alarm delay while the delivery pump is running, the pH Alarm signal is output. The parameters pH Min. Alarm and pH Max. Alarm represent the limits of a range around the pH setpoint that must not be reached within the scope of proper operation. Since the run time of the delivery pump only lasts a few seconds, in particular with low condensate inflow, the pH Alarm delay must be kept very short. Otherwise the pH Alarm is suppressed without being detected.	
Reaction pH Alarm		When delivery pump is running	• When delivery pump is running • Cont. pH ↑↑↑ • Switching off dosing
		Adjustable system behaviour if the pH value of the medium in the neutralisation box is > pH Max. Alarm. • Factory setting "When delivery pump is running": Relay contact of terminals 9/10 is changed over when the delivery pump is running (in this setting also applies for pH value < pH Min. Alarm). • Cont. pH ↑↑↑ If the pH value is > pH Max. Alarm three times in a row when the delivery pump is switched on, then the pH Alarm remains until it is acknowledged manually. • Switching off dosing: As for Cont. „pH ↑↑↑". In addition, the dosing of neutralising agent is interrupted until manual acknowledgement.	
Delay burner	min	0...0.0...9999	Delay time for the output of the signal contact "Boiler off"

Parameters		Setting range	Remarks
			The delay time for the output of the signal contact “Boiler off” runs down as long as the highest level a in the neutralisation box is continuously exceeded.
Setpoint pH value	pH	0.0...7.5...12.0	Setpoint as target for dosing (controller) • If the setpoint is too low or too hight, a pH Alarm might occur frequently.
			Setpoint for dosing (controller). Changing this parameter is only advisable after consultation with Grünbeck’s technical service and only in the smallest possible steps.
Maintenance interval	d	0...60...365	0 = Switched off 60 = Maintenance every 60 days • After the programmed time has elapsed, Service is displayed. ► Acknowledge the message by setting the new interval duration.
Actual pH value		continuous during pumping out	In the continuous setting, the signal for the actual pH value in the neutralisation box is output at terminals 25/26.
			In the “during pumping out” setting, this is only the case as long as the delivery pump is running. In the meantime, the signal is frozen at 12.6 mA (≙ pH 7.5).
Language		German	To choose from: English, French, Dutch, Italian, Spanish, Russian

7.1.5 Reading out the error memory (Code 245).

In Code level 245, the last 10 errors that have occurred are stored.

► Set Code C 245 via the programming level.

» The errors that have occurred are listed as follows:

- Memory #0 (most recent error)
- …
- Memory #9 (least recent error)

7.1.6 Indicating the software (Code 999)

The software version of the GENO-Neutra-matic$_2$ can be displayed via code level 999.

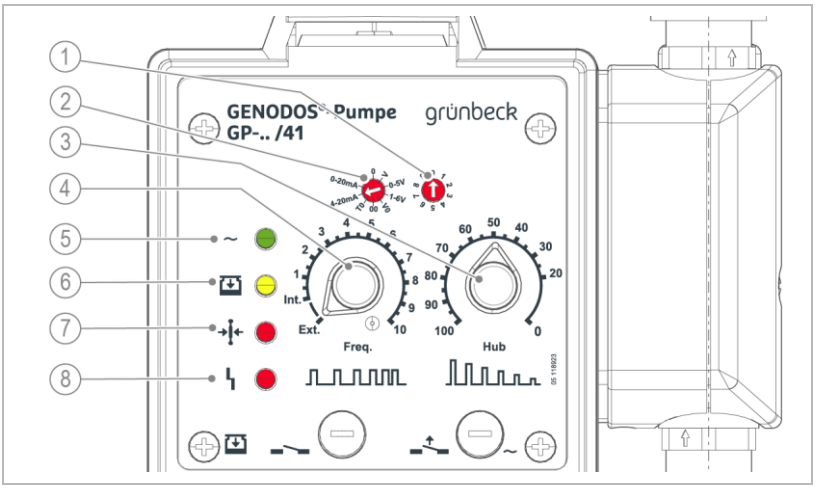
► Set Code C 999 via the programming level.

» The software version is displayed, e.g. V 2.06.

7.2 GENODOS pump GP

The functions of the operating panel of GENODOS pump GP-../**40** and GP-../**41** are identical.

7.2.1 Displays and settings



	Designation	Function
3	Pulse division or pulse multiplication factors	Setting the pulse division and the pulse multiplication
4	Operating mode switch	Setting different operating modes: 0, T, V and 00, T0, V0 or analogue 0 – 5 V, 1 – 6 V, 0.20 mA, 4 – 20 mA with external control (refer to chapter 7.2.2). The selector switch for the stroke frequency must be set to Ext.

	Designation	Function
5	Stroke length controller	Adjustment of the dosing capacity per stroke. The dosing volume is continuously adjustable in the scaling range from 0 – 100. The adjustment must only be made during operation and during the pump stroke.
6	Selector switch for internal and external control	• Internal control The internal control of the pump is set via the selector switch in the scaling range from Int – 10. The stroke frequency (number of dosing strokes per minute) is approx. 6 dosing strokes/minute in the Int setting and is continuously adjustable up to the setting "10" with max. 109 dosing strokes/minute (50 Hz). • External control When set to Ext., the pump only processes signals from external pulse generators.
7	Operation indicator	The operation LED indicates that the pump is supplied with mains voltage. With GENODOS pumps GP-../41, each dosing stroke is confirmed by a short flash.
8	Empty indicator	The yellow LED of the empty indicator illuminates to indicate that the liquid level in the dosing tank has fallen below a certain level. If an empty signal probe is connected, pump operation is stopped at the same time. The pump operation is automatically restarted when the dosing agent is refilled. A suction lance with a pre-alarm can also be connected with pump type GP-../41. The yellow LED of the empty indicator flashes on the control panel as a pre-alarm signal.
9	Membrane monitoring	The lighting up of the red LED on the membrane monitoring indicates a membrane leak. In the event of a membrane break, pump operation is stopped immediately.
10	Dosing monitoring	Dosing monitoring compares the requested strokes with the processed dosing strokes. If a difference is detected, this is indicated by means of the red LED and pump operation is stopped. If the max. number of strokes is exceeded, the pump operates with the max. stroke frequency (109 strokes/min at 50 Hz).

7.2.2 Setting the operating mode

► Set the operating mode switch to analogue control 4 – 20 mA

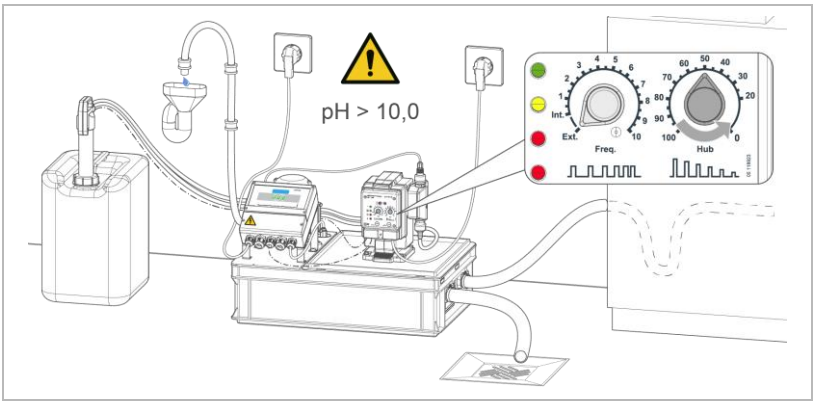
7.2.3 Setting the factors

Setting the factors Division T and Multiplication V is not required in case of analogue control via the GENO-Neutra-matic$_2$ controller.

7.2.4 Adjusting pre-settings

Readjusting the settings of the dosing pump is only necessary if, during pumping the condensate to the drain, the pH value is outside the pH Alarm limit values.

This is displayed on the GENO-Neutra-matic$_2$ and the voltage-free signal contact pH Alarm/Service is opened (refer to chapter - 31681.0.0).



► Correct the stroke length on the stroke length controller step by step in steps of 3 – 5 %.

8 Maintenance and repair

Maintenance and repair includes cleaning, inspection and maintenance of the product.

The responsibility for inspection and maintenance is subject to local and national requirements. The owner/operating company is responsible for compliance with the prescribed maintenance and repair work.

By concluding a maintenance contract you make sure that all maintenance work will be carried out on time.

► Only use genuine spare and wearing parts from Grünbeck.

8.1 Cleaning

Have the cleaning work only carried out by persons who have been instructed in the risks and dangers that can arise from the product.

WARNING Cleaning live components

- Risk of electric shock, sparking due to short-circuit

► Before starting the cleaning work, unplug the mains plugs and disconnect the supply line of the voltage-free contacts.

► Do not use any high-pressure equipment for cleaning and do not blast electrical/electronic devices with water.

NOTE

Do not clean the product with cleaning agents containing alcohol/solvents

- Plastic components are damaged.
- Varnished surfaces are affected.

► Use a mild/pH-neutral soap solution.

► Use personal protective equipment.

► Only clean the outside of the product.

► Do not use any strong or abrasive cleaning agents.

► Wipe the surfaces with a damp cloth.

8.1.1 Handling leaked dosing agent

WARNING

Skin and eye contact with dosing agent

- Chemical burns to the eyes and irritation of the skin and respiratory tract

► Use personal protective equipment.

► Obey the safety data sheet and strictly follow the instructions.

► Wipe up dripping dosing agent with disposable towels immediately.

► Absorb leaked dosing agent with suitable means – use a binding agent, if needed.

► Clean the areas until they are completely dry.

8.2 Intervals

By way of regular inspections and maintenance, malfunctions can be detected in time and product failures might be prevented.

► As owner/operating company determine which components must be inspected and maintained at which intervals (load-dependent). These intervals are subject to the actual conditions such as: degree of impurities, environmental impacts, consumption, etc.

The interval table below shows the minimum intervals for the activities to be carried out.

Task	Interval	Activities
Inspection	2 months	• Visual check of all components for damage and leaks • Replace activated carbon filling in condensate filter • Check the filter cage of the delivery pump and clean it, if necessary • Read the current pH value displayed on the pH measuring transducer • Check pH electrodes and clean and calibrate them, if needed • Check the filling level of the dosing agent in the canister • Check the dosing pump for function
Maintenance	semi-annually or annually (depending on the condensing boiler)	• Perform all activities listed under Inspection • Clean the delivery pump, the non-return valve and the filter cage • Clean the circulation pump, the distribution line and the dosing valve • Clean the dosing pump and the dosing lines • Clean the neutralisation box, the filter cage and the level probe
	load-dependent	• Refer to semi-annually/annually

8.3 Inspection

You as owner/operating company can carry out the regular inspections yourself. Initially, we recommend inspecting the product at shorter intervals and later on as required, but at least every 2 months.

► Carry out an inspection at least every 2 months.

Prerequisite

During start-up/commissioning, the owner/operating company must have been trained by Grünbeck's technical service personnel in handling the neutralisation system as well as in performing the activities to be carried out at regular intervals (in particular cleaning, checking and calibrating the pH electrode).

► Have at least the following components at hand to perform an inspection (refer to chapter 8.5):

- Activated carbon filling for condensate filter
- Calibration solutions pH 7 and pH 4
- pH electrode
- Oil binding mat (not required in case of gas operation)

Preliminary work

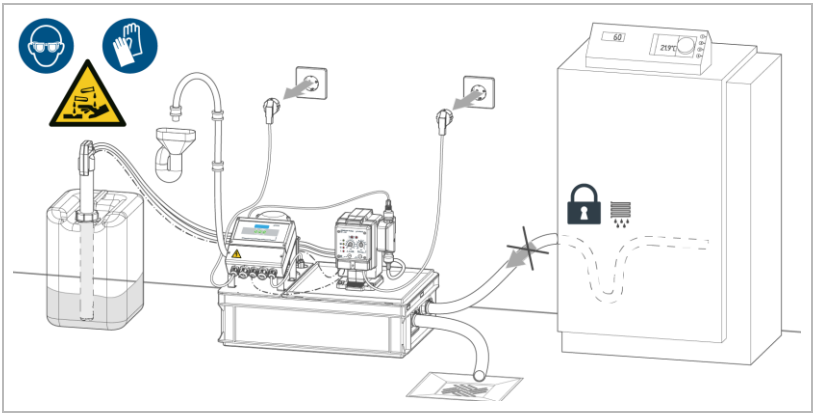
► Use personal protective equipment (refer to chapter 1.6.3).

DANGER Hazardous voltage

- Severe burns, cardiovascular failure, fatal electric shock.

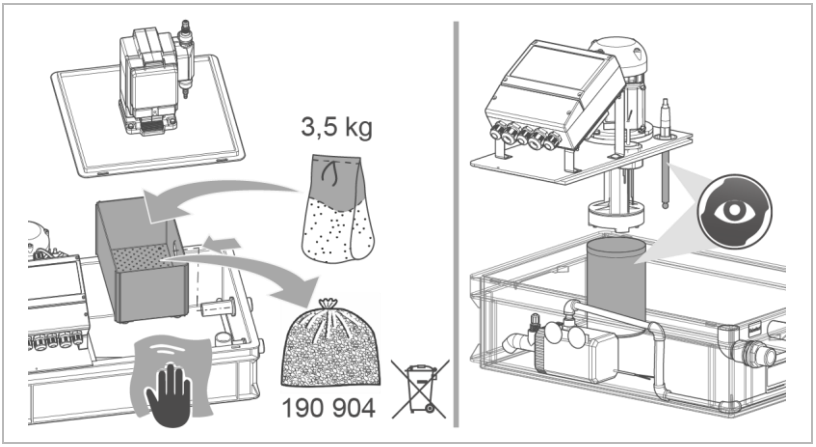
► Unplug the mains plugs prior to working on the system.

► Disconnect the supply line of the voltage-free contacts from mains.



1. Stop the inflow of condensate or divert it into a suitable collection vessel.
2. Unplug both of the mains plugs.
3. Make sure that the system is de-energised.

Performing an inspection



1. Open the lid of the system.
2. Check whether there is an oil film on the water surface in the neutralisation box.

a Remove the oil film with an oil binding mat.

b Do not use any loose oil binding agents. These might clog the circulation and the delivery pump.

Contact the service personnel for condensing boilers if the oil film can be traced back to a boiler malfunction.

3. Replace the activated carbon filling in the condensate filter.

   a Dispose of used activated carbon properly.

NOTE Activated carbon can block pumps

- Loose activated carbon which gets into the neutralisation box can result in the destruction of the pump's motor.

► When replacing the activated carbon filling, make sure that it does not get into the neutralisation box.

4. Check the filter cage of the delivery pump for impurities – clean it, if needed.
5. Check the pH electrode for impurities – clean and calibrate it, if needed.
6. Check the dosing tank for residual amounts of the dosing agent and its shelf life.
7. Complete the system:
8. Plug the mains plugs into the sockets.
9. Visually check all components for damage and leaks.
10. Reprogram the maintenance interval.
11. Put the system back into operation.
12. Record the maintenance carried out in the operation log (refer to chapter 13).

8.4 Maintenance

Regular work is required in order to ensure the proper functioning of the product in the long term.

Maintenance must be carried out at regular intervals – depending on the amount, contamination and pH value of the condensate as well as on the fuel and boiler type – but at least at the following intervals:

Every 6 months	Every 12 months
Gas condensing boiler aluminium components	Gas condensing boiler
Oil condensing boiler	
Gas/oil condensing boiler (switchover operation)	

8.4.1 Semi-annual and annual maintenance

Maintenance work requires expert knowledge. The maintenance work must be carried out by technical service personnel only.

► Have at least the following components at hand to perform maintenance:

- Suction and pressure valve for dosing pump
- Dosing valve
- Non-return valve
- Filter cage for delivery pump
- Condensate filter
- Activated carbon filling for condensate filter
- Calibration solutions pH 7 and pH 4
- pH electrode
- Oil binding mat (not required in case of gas operation)

► Carry out all activities listed under Inspection.

► Check all electrical connections for damage and a tight fit.

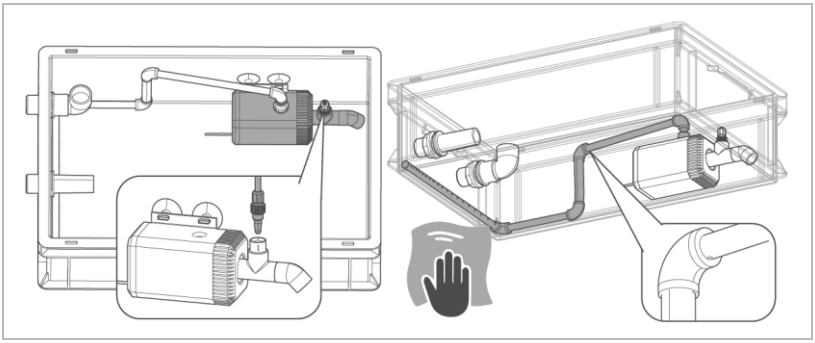
► In addition, carry out cleaning on the components below:

Cleaning the circulation pump and the distribution line

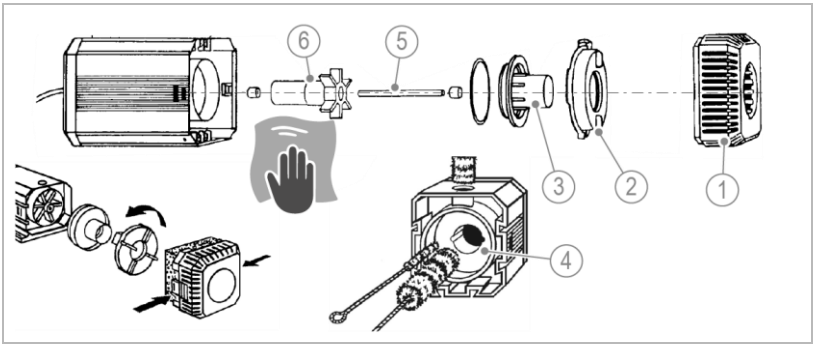
NOTE Circulation pump running dry

- Dry-running causes the circulation pump to become defective.

► Do not remove the circulation pump from the condensate while it is running.



1. Clean the distribution line and the vent hole.
2. Completely clean the inside of the neutralisation box.
3. Remove the dosing valve and check it for impurities – clean or replace it, if needed.
4. Loosen the suction feet of the circulation pump and remove the circulation pump.
5. Dismantle and clean the circulation pump as follows:



	Designation		Designation
1	Pump grate, grey	4	Motor body
2	Pump lid	5	Ceramic axis
3	Retaining ring	6	Pump impeller

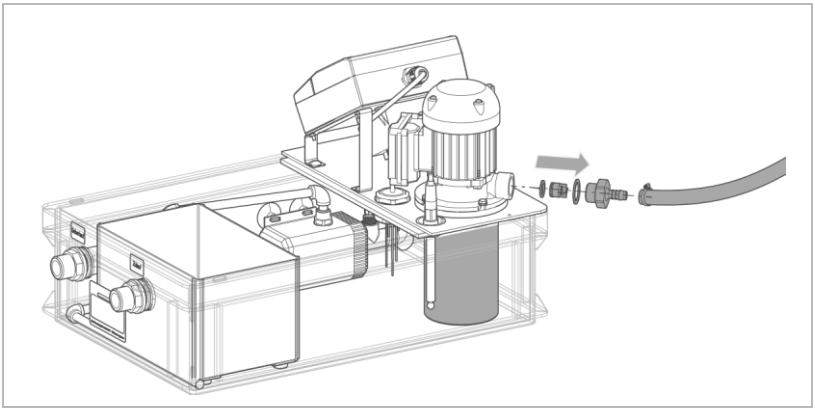
6. Gently squeeze the pump grate at the side and pull it out of the locking device.
7. Open the pump lid by turning it to the left and remove it.
8. Carefully pull off the retaining ring in a straight motion.
9. Carefully remove the pump impeller and the ceramic axis.
10. Thoroughly rinse all pump parts under running water.
11. Clean the motor body with a cleaning brush.
12. Reassemble the circulation pump in reverse order.
13. Install the circulation pump in the neutralisation box.

Cleaning the delivery pump

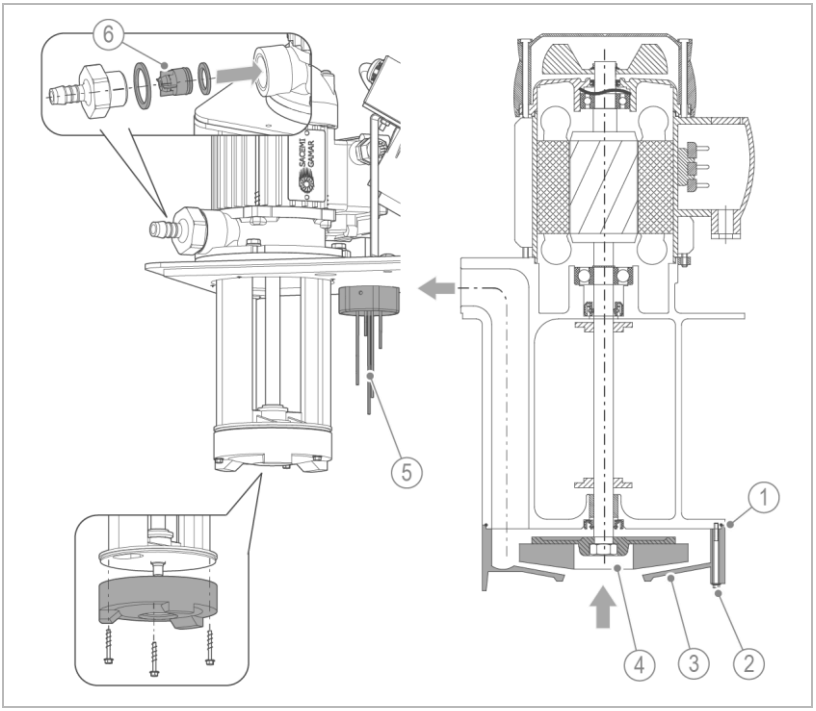
The delivery pump is maintenance-free when used as intended. Maintenance is limited to cleaning work and functional checks.

Any contamination inside the delivery pump can result in a reduction in the delivery rate and in a functional failure of the delivery pump.

► Have any necessary repair work, which is required due to normal wear and tear or overloading of the delivery pump, carried out by authorised, qualified specialists.



1. Detach the outlet hose.
2. Remove the non-return valve and clean it - replace it, if needed.
3. Open the equipment console featuring the delivery pump.
4. Clean the filter cage – replace it, if needed.



	Designation		Designation
1	Seal (O-ring)	4	Impeller
2	Screws	5	Level probe
3	Lid	6	Non-return valve

1. Rinse the delivery pump with clear water to remove loose sludge.
2. Visually check the delivery pump for damage.
3. In the event of malfunctions or obstructions to the free running of the delivery pump, carry out the cleaning work below:
   - **a** Remove the lid of the impeller.
   - **b** Clean the inside of the impeller and the lid.
   - **c** Carefully clean the sealing surfaces.

d Properly put on the lid again with the seal in place – pressure chamber above pressure socket.

NOTE Lid must be mounted tightly

- Leaks at the lid of the impeller result in a reduction of the delivery pump's capacity.
- Large amounts of leakage directed into the neutralisation box overload the pump's motor and result in a pump failure.

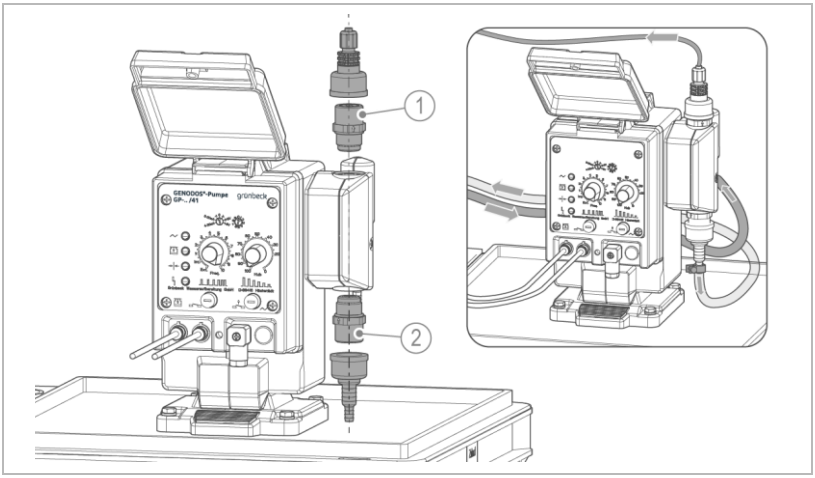
► Proceed as follows to screw on the lid:

e First, screw in the two screws near the pressure socket and tighten them, then the opposite ones and afterwards all the others.

- Make sure that the lid is mounted tightly.

» Drip formation is permitted.

Cleaning the dosing pump GENODOS GP



	Designation		Designation
1	Pressure valve	2	Suction valve

1. Clean all parts of the GENODOS dosing pump that come into contact with chemicals.
2. Replace the suction and pressure valve every year.
3. Check the suction lance and the dosing lines for deposits, incrustations and damage.
4. Replace the dosing tank containing the dosing agent, if needed.
5. Check the empty signal for function by removing the suction lance from the dosing tank.

Completing the system and checking it for function

1. Complete the assemblies:
2. Fill the neutralisation box with water.
3. Close the lid of the system.
4. Plug the mains plugs into the sockets.
5. Check the neutralisation box and the hoses for leaks.
6. Carry out a functional check.
7. Put the system into operation.
8. Record the maintenance carried out in the operation log (refer to chapter 13).

8.5 Consumables

The pH electrode and the activated carbon filling are considered to be consumables as their service life directly depends on the system load.

Product	Quantity	Order no.
GENO-Neutrox, 25 kg canister (dosing agent)	1x	**180 350**
GENO-Neutrox, 75 kg canister (dosing agent)	1x	**180 355**
ecoLine pH electrode	1x	**211 502**
Calibration solution pH 4	50 ml	**203 627**
Calibration solution pH 7	50 ml	**203 628**
Activated carbon filling, 3.5 litres	1x	**410 590**

8.6 Spare parts

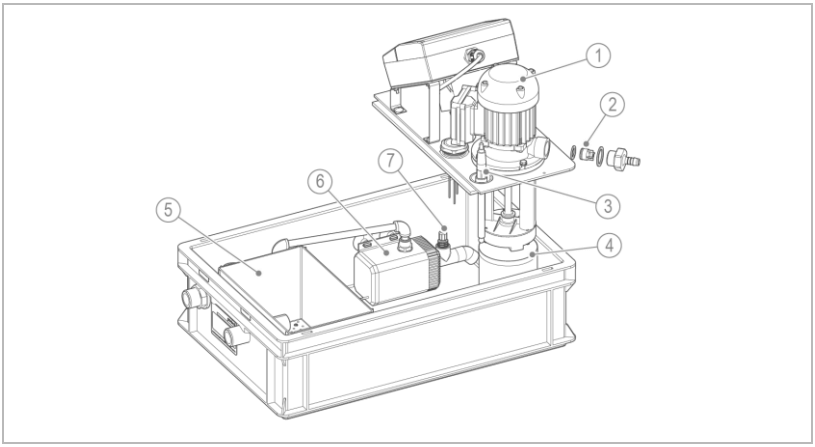
For an overview of the spare parts, refer to our spare parts catalogue at www.gruenbeck.com. You can order the spare parts from your local Grünbeck representative.

8.8 Wearing parts

Wearing parts must be replaced by qualified specialists only.

Wearing parts are listed below:

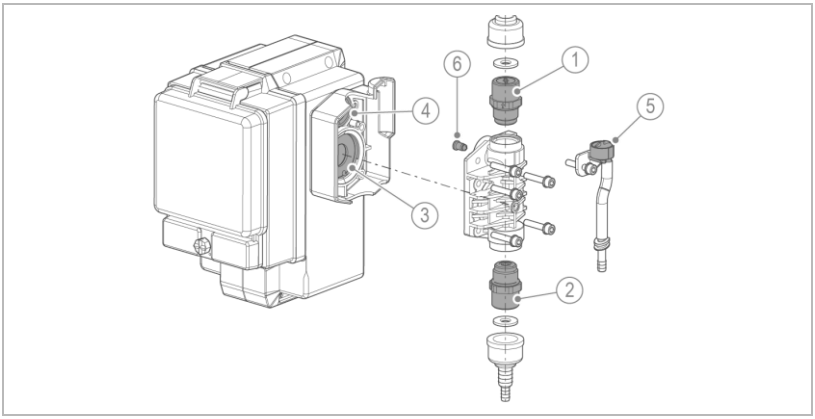
- Seals



	Designation
1	Delivery pump (centrifugal immersion pump SPV 18-170)
2	Non-return valve
3	pH electrode with cable

	Designation
4	Filter cage
5	Condensate filter
6	Circulation pump
7	Dosing valve

Wearing parts on GENODOS GP



	Designation		Designation
1	Pressure valve	**4**	Venting membrane
2	Suction valve	**5**	Valve pin
3	Dosing membrane		Seals

9 Troubleshooting

9.1 GENO-Neutra-matic$_2$ messages

By reading out the error memory of the GENO-Neutra-matic$_2$, a possible malfunction can be detected (refer to chapter 0).

Display	Explanation	Remedy
Alarm Brimful	The highest level a is reached in the neutralisation box	► Check the outlet hose ► Clean the level probes ► Check the delivery pump and replace it, if needed
Alarm Boiler off	Alarm Brimful is pending for longer than the delay time “Delay burner”.	► Check condensate inflow – if permanently too high, connect a second system hydraulically in parallel
pH Min. Alarm ↓↓↓	The pH value has fallen below the lower alarm value	► Carry out a calibration ► Record and check the amount of condensate inflow ► Modify the stroke length setting of the dosing pump in small steps of 3 - 5 % each ► Adjust the parameter setting and the pH setpoint, if needed.
pH Max. Alarm ↑↑↑	The pH value has exceeded the upper alarm value	
Service	Maintenance interval has elapsed	► Have maintenance performed by technical service ► Restart maintenance interval
pH Cal	No valid calibration has been carried out yet	► Carry out a calibration
Level	Invalid level setting detected, e.g. higher level pending, no lower level	► Check wiring of level probe and replace level probe, if needed
Int-Err	Internal electronic fault	► Contact technical service and have the control unit replaced.

9.1.1 Other observations

Observation	Explanation	Remedy
The pH measurement is very slow during calibration	Frost damage to pH electrode (admissible storage temperature -5 °C – +30°C)	► Replace pH electrode
pH measurement cannot be calibrated (always indicates roughly pH 7 and hardly changes)	Moisture has penetrated pH cable or plug-in connection	► Replace electrode cable and use a new pH electrode

Do not connect old and new components – risk of moisture transfer.

9.2 Malfunctions of delivery and circulation pump

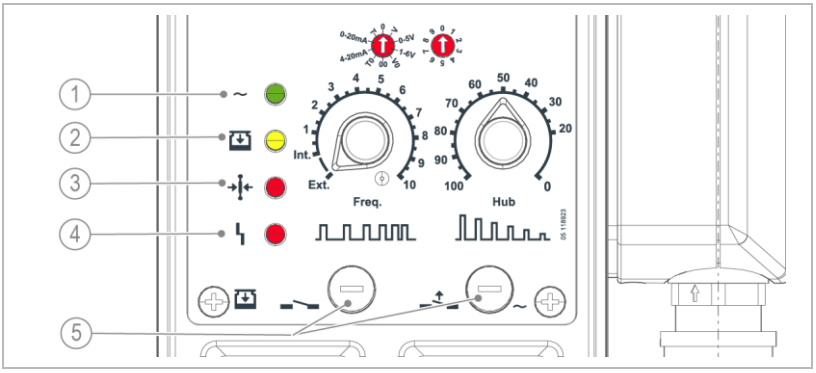
WARNING Delivery pump overloaded

- Risk of burns on hot surfaces
- Overheating of the pump motor and failure of delivery pump
- If the protective temperature limiter responds, this means that there is an irregularity that overloads and overheats the pump motor.
- Continued operation without eliminating the cause will destroy the protective temperature limiter and damage the pump motor.

► Eliminate the cause for overheating the pump motor.

Observation	Explanation	Remedy
Delivery pump switches on repeatedly even though no condensate is flowing in	Non-return valve dirty or damaged, • causing the condensate to flow back into the neutralisation box	► Drain and unscrew the outlet hose ► Pull out the non-return valve using pointed pliers and clean it ► Replace non-return valve, if needed
Pump motor of delivery pump is turning but there is no water flow in the outlet hose (to the drain)	Level in the neutralisation box below the minimum limit	► Check the minimum level of liquid in the neutralisation box ► Check level probe for function
	Impeller damaged and/or clogged	► Clean or replace impeller
	Suction orifice clogged	► Clean suction orifice
	Pressure line clogged	► Clean suction and pump chamber ► Clean pressure line
Pump motor does not switch on – humming noise	Pump motor fault	► Request technical service
	Impeller/bearing blocked	
	Bushing/seal blocked	
Circulation not working although circulation pump is running (e.g. after previous draining and refilling of neutralisation box)	Air in the pipe and vent hole is clogged or distribution line is dirty	► Clean vent hole (with a toothpick or wire, d = 1.5 mm) ► Clean distribution line

9.3 Malfunctions of GENODOS GP



	Designation
1	LED Operation indicator (green)
2	LED Empty signal (yellow)
3	LED Membrane monitoring (red)

	Designation
4	LED Dosing monitoring (red)
5	Glass cartridge fuse 5x20 type MT, medium time lag, 0.125 A

1. Eliminate the malfunction.
2. Monitor the messages on the control unit.
3. Acknowledge the message/malfunction by unplugging the mains plug and plugging it in again.

GENODOS GP messages

Display	Explanation	Remedy
LED Operation indicator (green) does not light up Dosing pump does not clock	Power failure	► Check connection cable and mains voltage
	Defective fuses	► Check fuses and replace them, if necessary
LED Empty signal (yellow) for dosing	When lighting up: Liquid level undershot	► Refill dosing agent

Display	Explanation	Remedy
agent lights up or flashes	When flashing: Pre-alarm undershot	► Check level probe of suction lance
LED Membrane monitoring (red) lights up	Dosing membrane defective	► Replace dosing membrane
	Venting membrane defective	► Replace venting membrane
LED Dosing monitoring (red) lights up	Motor overload	► Unplug mains plug and plug it in again ► Check counter-pressure
	Mains voltage below 230 V	► Check mains voltage ► Unplug mains plug and plug it in again

Other observations

Observation	Explanation	Remedy
Pump does not prime despite full stroke movement (stroke controller at 100)	Liquid level undershot	► Refill the dosing agent
	Suction connection is leaking	► Seal suction connection
	Valves are dry (possibly crystalline deposits)	► Lift up suction hose briefly ► Thoroughly flush the pump ► Remove and clean suction and pressure valve as well as vent valve
	Suction line is kinked or dirty	► Replace or clean suction line
Liquid escaping from the pump head	Pump head has been tightened insufficiently or unevenly	► Tighten the screws on the pump head
	Dosing membrane defective	► Have dosing membrane replaced by technical service
	Venting membrane defective	► Have venting membrane replaced by technical service

Observation	Explanation	Remedy
Leak at the connection kits	Hose expanded too far	► Detach the hose on the connection kit in question and cut off approx. 1 cm ► Re-attach and secure the hose

9.4 Malfunctions of neutralisation system

Observation	Explanation	Remedy
Overflowing condensate filter	Activated carbon filling or outlet hole at the bottom highly contaminated	► Clean filter tank and replace, if needed ► Replace activated carbon filling
Overflowing neutralisation box	Filter cage of delivery pump dirty	► Clean the component ► Replace, if needed
	Defective fuse in control unit GENO-Neutra-matic$_2$ controller	► Replace the component
	Defective level probe	
	Defective delivery pump	

If a malfunction cannot be eliminated, the technical service personnel can take further measures.

► Contact technical service (refer to inner cover sheet for contact data).

10 Decommissioning

If a longer standstill is planned for the neutralisation system, the neutralisation system must be decommissioned.

10.1 Temporary standstill

If the heat generator and the neutralisation system are to be switched off temporarily (e.g. for 3 months in the summer), carry out the activities below:

1. Keep the neutralisation system connected to mains.
2. Open the lid and check whether deposits have formed on the surfaces inside the neutralisation box.
3. Remove deposits, if needed and clean the filter cage.
4. Refill the neutralisation box with water, if needed.
5. Close the neutralisation box with the lid.

10.2 Restart/recommissioning

1. Check the state of the neutralisation system.
2. Put the neutralisation system into operation again (refer to chapter 6).

11 Dismantling and disposal

11.1 Dismantling

► Have this work carried out by qualified specialists only.

1. Make sure that the heat generator is out of operation and no condensate is produced by the neutralisation system.
2. Pull the mains plugs.
3. Disconnect the supply line of the voltage-free contacts from mains.
4. Detach the inlet and outlet hoses.
5. Remove the condensate from the neutralisation box.
6. Remove the suction hose and the dosing tank.
7. Detach the individual components and disconnect the electrical, hydraulic and mechanical components for disposal.

11.2 Disposal

► Obey the applicable national regulations.

Packaging

► Dispose of the packaging in an environmentally sound manner.

NOTE

Danger to the environment due to incorrect disposal

- Packaging materials are valuable raw materials that can be reused in many cases.
- Incorrect disposal can cause hazards to the environment.

► Dispose of packaging materials in an environmentally sound manner.

► Obey the local disposal regulations.

► If necessary, commission a specialist company with the disposal.

Activated carbon

► Dispose of the used activated carbon via local waste disposal companies using waste code number 190904 – do not dispose of it with residual waste or household waste.

Oil binding mat

Used oil binding mats are categorised as oil-contaminated operating materials and must be disposed of as hazardous waste.

► Dispose of used oil binding mats properly – do not dispose of them with residual waste or household waste.

Neutralising agent GENO-Neutrox and canisters

The neutralising agent GENO-Neutrox is a base and must not enter the sewage system in concentrated form.

- ► Obey the safety data sheet of the neutralising agent GENO-Neutrox.
- ► Rinse the empty canister with a large amount of water.

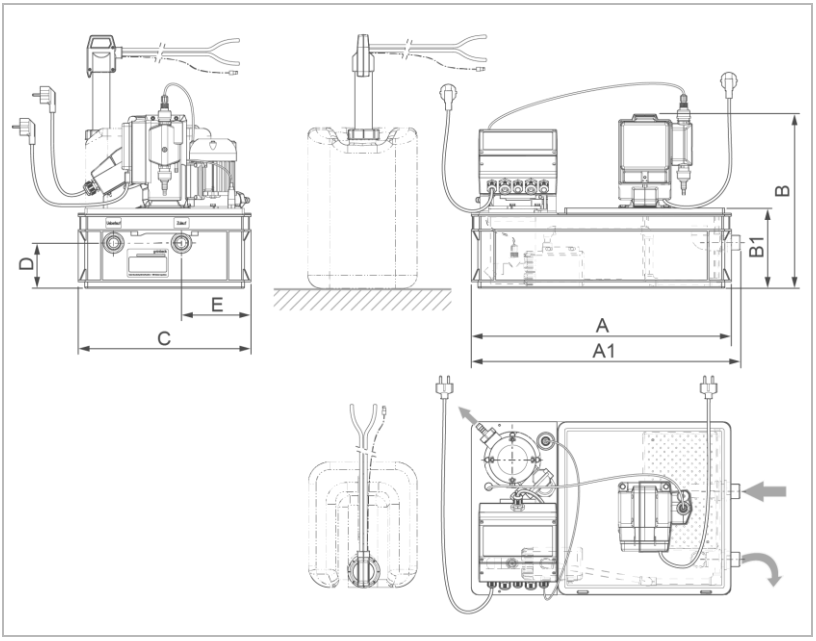
Product

If this symbol (crossed-out wheelie bin) is on the product, this product or its electrical and electronic components must not be disposed of as household waste.

- ► Find out about the local regulations on the separate collection of electrical and electronic products.
- ► Make use of the collection points available to you for the disposal of your product.
- ► If your product contains batteries or rechargeable batteries, dispose of them separately from your product.

For more information on take-back and disposal, go to www.gruenbeck.de.

12 Technical specifications



Dimensions and weights			FNH-420-R
A	Length	mm	600
A1	Total length with connections	mm	621
B	Total height	mm	400
B1	Height of neutralisation box	mm	185
C	Width	mm	400
D	Connection height of inlet and overflow	mm	105
E	Distance of inlet	mm	161
Height of switch-on level of delivery pump (condensate backwater height in standard operation)		mm	115
Operating weight (with condensate)		kg	~ 35.0
Empty weight		kg	~ 22.7

Connection data		FNH-420-R
Nominal connection diameter of inlet and overflow		DN 25
Nominal connection diameter of outlet hose to drain		DN 12
Drain connection provided by the client on site		≥ DN 40
with delivery rate	l/min	≥ 41.5
Mains connection, 2	V/Hz	230/50
Mains cable for GENO-Neutra-matic$_2$/GENODOS GP	m	1.8/1.8
Power input GENO-Neutra-matic$_2$/GENODOS GP	W	220/18
Protection/protection class		IP 54/⏚

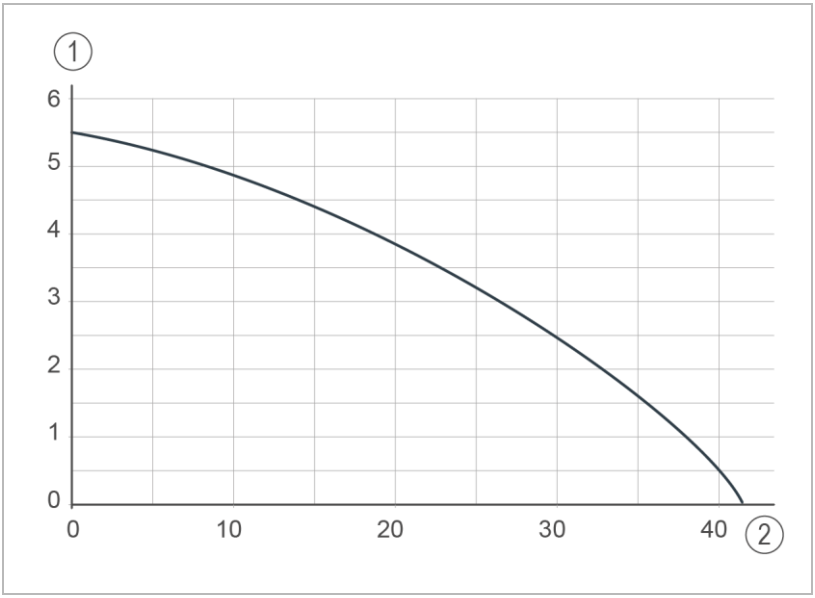
Performance data		FNH-420-R
Fuel/process (generation of condensate)		Gas or oil condensing technology
Neutralisation capacity	l/h	420
This corresponds,	l/min	7
at 0.14 l/kWh, to a gas boiler capacity of	kW	3000
at 0.08 l/kWh, to an oil boiler capacity of	kW	5250
Nominal delivery head (refer to characteristic curve of delivery pump)		3 m at 26.5 l/min = 1590 l/h
Delivery head	m	≤ 5.5
Delivery rate	l/min	≤ 41.5

Filling volumes and consumption data		FNH-420-R
Neutralising agent		GENO-Neutrox*
Consumption of neutralising agent		
for gas condensate	l/m³	0.32
for oil condensate	l/m³	1.82

General data		FNH-420-R
Condensate temperature	°C	5 – 40 (briefly 50)
Ambient temperature	°C	5 – 40
Order no.		**410 540**

* Not included in the scope of supply (refer to consumables)

Characteristic curve of delivery pump



	Designation		Designation
1	Delivery head in m	2	Delivery rate in l/min

Note:

Pump capacity at a hose length of 6 m (line extensions and reductions in the cross sections of the outlet hose cause a decrease in performance)

13 Operation log

► Document the initial start-up/commissioning and all maintenance activities.

Neutralisation system GENO-Neutra FNH-420-R

Serial no.: _____

13.1 Start-up/commissioning log

Customer			
Name			
Address			
Installation/Accessories			
Amount of condensate produced	l/h		
Manufacturer of condensing boiler			
Type of condensing boiler			
Fuel	☐ Gas	☐ Oil	☐ Oil/Gas
Capacity of condensing boiler	kW		
Accessories			
Condensate prefiltration box (optional)	☐ Yes	☐ No	
Voltage-free level signal	☐ Yes	☐ No	
Materials			
Are there aluminium parts in contact with the condensate in the condensing boiler and/or the exhaust system	☐ Yes	☐ No	
Material(s) of boiler			
Material(s) of heat exchanger			
Material(s) of exhaust system			
Maintenance and repair			

Maintenance and repair			
Aluminium parts in contact with the condensate	☐ No	☐ Yes	
Fuel	☐ Gas	☐ Oil	☐ Oil/Gas
Inspection	2 months	2 months	
Maintenance	12 months	6 months	

Remarks

Start-up/commissioning	
Company	
Service technician	
Work time certificate (no.)	
Date/signature	

Maintenance no.____

Work performed		
☐ Inspection	☐ Maintenance	☐ Repair

Work on the neutralisation unit		
Condensate filter	☐ cleaned	☐ replaced
Activated carbon filling of the condensate filter		☐ replaced
Circulation pump	☐ cleaned	☐ replaced
Dosing valve on the circulation pump	☐ cleaned	☐ replaced
Delivery pump	☐ cleaned	
Non-return valve	☐ cleaned	☐ replaced
Filter cage on the delivery pump	☐ cleaned	☐ replaced
Distribution line with vent hole	☐ cleaned	
Level probe	☐ cleaned	
Neutralisation box	☐ cleaned	

Work on the dosing pump GENODOS GP		
Wearing parts in contact with the medium	☐ cleaned	☐ replaced
Stroke setting in %		%
Supply of dosing agent GENO-Neutrox	kg	☐available
Suction lance	☐ cleaned	

Work on the control unit GENO-Neutra-matic$_2$		
pH electrode	☐ calibrated	☐ replaced
Condensate temperature measured and programmed during calibration		°C
Switch-off of condensing boiler (read off in the Info level)		min
Maintenance interval programmed in the user programming level		d
Visual check for damage, corrosion and leaks performed on all components		☐ done

Execution confirmed	
Company:	
Name:	
Date:	Signature:

Maintenance no.____

Work performed		
☐ Inspection	☐ Maintenance	☐ Repair

Work on the neutralisation unit		
Condensate filter	☐ cleaned	☐ replaced
Activated carbon filling of the condensate filter		☐ replaced
Circulation pump	☐ cleaned	☐ replaced
Dosing valve on the circulation pump	☐ cleaned	☐ replaced
Delivery pump	☐ cleaned	
Non-return valve	☐ cleaned	☐ replaced
Filter cage on the delivery pump	☐ cleaned	☐ replaced
Distribution section with vent hole	☐ cleaned	
Level probe	☐ cleaned	
Neutralisation box	☐ cleaned	

Work on the dosing pump GENODOS GP		
Wearing parts in contact with the medium	☐ cleaned	☐ replaced
Stroke setting in %		%
Supply of doing agent GENO-Neutrox	kg	☐available
Suction lance	☐ cleaned	

Work on the control unit GENO-Neutra-matic$_2$		
pH electrode	☐ calibrated	☐ replaced
Condensate temperature measured and programmed during calibration		°C
Switch-off of condensing boiler (read off in the Info level)		min
Service interval programmed in the user programming level		d
Visual check for damage, corrosion and leaks performed on all components		☐ done

Execution confirmed	
Company:	
Name:	
Date:	Signature:

Maintenance no.____

Work performed		
☐ Inspection	☐ Maintenance	☐ Repair

Work on the neutralisation unit		
Condensate filter	☐ cleaned	☐ replaced
Activated carbon filling of the condensate filter		☐ replaced
Circulation pump	☐ cleaned	☐ replaced
Dosing valve on the circulation pump	☐ cleaned	☐ replaced
Delivery pump	☐ cleaned	
Non-return valve	☐ cleaned	☐ replaced
Filter cage on the delivery pump	☐ cleaned	☐ replaced
Distribution line with vent hole	☐ cleaned	
Level probe	☐ cleaned	
Neutralisation box	☐ cleaned	

Work on the dosing pump GENODOS GP		
Wearing parts in contact with the medium	☐ cleaned	☐ replaced
Stroke setting in %		%
Supply of doing agent GENO-Neutrox	kg	☐available
Suction lance	☐ cleaned	

Work on the control unit GENO-Neutra-matic$_2$		
pH electrode	☐ calibrated	☐ replaced
Condensate temperature measured and programmed during calibration		°C
Switch-off of condensing boiler (read off in the Info level)		min
Maintenance interval programmed in the user programming level		d
Visual check for damage, corrosion and leaks performed on all components		☐ done

Execution confirmed	
Company:	
Name:	
Date:	Signature:

Maintenance no.____

Work performed		
☐ Inspection	☐ Maintenance	☐ Repair

Work on the neutralisation unit		
Condensate filter	☐ cleaned	☐ replaced
Activated carbon filling of the condensate filter		☐ replaced
Circulation pump	☐ cleaned	☐ replaced
Dosing valve on the circulation pump	☐ cleaned	☐ replaced
Delivery pump	☐ cleaned	
Non-return valve	☐ cleaned	☐ replaced
Filter cage on the delivery pump	☐ cleaned	☐ replaced
Distribution line with vent hole	☐ cleaned	
Level probe	☐ cleaned	
Neutralisation box	☐ cleaned	

Work on the dosing pump GENODOS GP		
Wearing parts in contact with the medium	☐ cleaned	☐ replaced
Stroke setting in %		%
Supply of dosing agent GENO-Neutrox	kg	☐available
Suction lance	☐ cleaned	

Work on the control unit GENO-Neutra-matic$_2$		
pH electrode	☐ calibrated	☐ replaced
Condensate temperature measured and programmed during calibration		°C
Switch-off of condensing boiler (read off in the Info level)		min
Maintenance interval programmed in the user programming level		d
Visual check for damage, corrosion and leaks performed on all components		☐ done

Execution confirmed	
Company:	
Name:	
Date:	Signature:

EU Declaration of Conformity

In accordance with the EC Machinery Directive 2006/42/EC

CE

This is to certify that the system designated below meets the safety and health protection requirements of the applicable EU guidelines in terms of its design, construction and execution.

This certificate becomes void if the system is modified in any way not approved by us.

Neutralisation system
GENO-Neutra FNH-420-R

Serial no.: Refer to type plate

The aforementioned system also complies with the following directives and provisions:

- EMC (2014/30/EU)
- Directive on the Restriction of Hazardous Substances RoHS (2011/65/EU)

The following harmonised standards have been applied:

- DIN EN 61000-6-2:2006-03
- DIN EN 61000-6-3:2011-09
- DIN EN ISO 12100:2011-03

The following national standards and regulations have been applied:

- DVGW VP 114:1996-07

Responsible for documentation: Markus Poepperl

Manufacturer: Grünbeck Wasseraufbereitung GmbH
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Hoechstaedt/Germany, 13.03.2019

By power of attorney Markus Pöpperl
Head of Technical Product Design
grünbeck

Publisher's information

Technical documentation
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