Disinfection system with automatic pH control

EASYSALT

Operating instructions

Read the operating manual!

The user is responsible for installation and operation related mistakes!

Original operating instructions

BA-91410-02-V01

Dosing | *Liquids*
Conveying | *Gases*
Control | *Systems*

Table of Contents

1 Notes for the Reader

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

Observe the following principles:

- Read the entire operating manual prior to starting-up the system
- Read the operating manual of the individual components included in the documentation package of the EASYSALT.
- Ensure that everyone who works with or on the system has read the operating instructions and follows them.
- Keep the operating manual and the documentation package for the entire service life of the system.
- Pass on the operating instructions to any subsequent owner of the system.

1.1 General non-discrimination

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

1.2 Explanation of the signal words

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

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

Table 1: Explanation of the signal words

1.3 Explanation of the warning signs

Warning signs represent the type and source of a danger:

Warning sign	Type of danger
	Danger point
	Danger from electrical voltage
	Danger from potentially-explosive substances
	Danger from corrosive substances
	Danger of damage to machine or functional influences

Table 2: Explanation of the warning signs

1.4 Identification of warnings

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

This is how warnings are identified:

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

1.5 Instruction for action identification

This is how pre-conditions for action are identified:

✓ Pre-condition for action which must be met before taking action.

🛠 A resource such as a tool or auxiliary materials required to perform the operating instructions.

This is how instructions for action are identified:

➔ Separate step with no follow-up action.

1. First step in a series of steps.

2. Second step in a series of steps.

▸ Result of the above action.

✓ **Action completed, aim achieved.**

2 Safety

2.1 General warnings

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

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

DANGER!

Mortal danger from electric shock!

Wrongly connected or located cables or damaged ones can injure you.

- ⇨ Perform the electrical installations in accordance with the appropriate circuit diagram.
- ⇨ The system is only to be connected with a fused SCHUKO socket outlet (ground fault circuit interrupter).
- ⇨ Replace damaged cables without delay.
- ⇨ Do not use extension cables.
- ⇨ Do not bury cables.
- ⇨ Secure cables to avoid being damaged by other equipment.

DANGER!

Danger to life from corrosion.

Corroded electrical components can heat up and cause injury or fire.

- ⇨ Should you find corroded electrical lines, deactivate the system immediately.
- ⇨ Replace corroded components immediately.
- ⇨ Only use signal spare parts supplied by the manufacturer.

DANGER!

Danger to life through explosions!

The use of products without ATEX certification in a potentially explosive area can lead to explosions and fatal injuries.

- ⇨ Never use the system in potentially explosive areas.

DANGER!

Danger from chemical burns or poisoning.

If released, pH value reducers can cause irritation of the eyes and skin.

- ⇨ Read the appendant safety data sheets for your pH value reducer (e.g. hydrochloric acid, sulphuric acid etc.)
- ⇨ Always wear suitable personal protective equipment when working with chemicals.
- ⇨ Before working with chemicals, find out about the location of eye baths or other rinsing equipment

WARNING!!

Caustic burns or other burns through dosing media!

You may come into contact with dosing media when working on the system components.

- ⇨ Disconnect the system from the current supply and secure it against unintended activation.
- ⇨ Use sufficient personal protective equipment.
- ⇨ Rinse the system parts with sufficient water to remove any residual dosing media.
- ⇨ Never look into open ends of plugged pipelines and valves.
- ⇨ Dispose of dosing medium residue in the correct fashion.
- ⇨ Clean the affected system parts thoroughly.

WARNING!!

Danger from unsuitable materials.

The materials of the components and hydraulic parts of the system must be suitable for the dosing medium that is used. The use of unsuitable materials can result in damage and leaks.

- ⇨ Make sure that the materials, lubricants, adhesives and sealing materials that you use are suitable for the dosing medium.

CAUTION

Increased risk of accidents due to insufficient qualification of personnel!

The system and its accessories may only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents.

⇨ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.

⇨ Those performing system settings require an exact understanding of their effects on the production process and operating behaviour. Settings may only be performed by qualified service personnel.

⇨ Prevent access to the system for unauthorised persons.

Note

Damage to the system from hydrochloric acid steam

Hydrochloric acid steam has a corrosive impact and can damage to insufficiently protected components and parts.

⇨ The installation location of the system must have ventilation.

⇨ Paint the unprotected metal parts.

⇨ With a concentration of over 9% hydrochloric acid, equip packaging with an activated carbon filter.

2.2 Hazards due to non-compliance with the safety instructions

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

The specific consequences can be:

- Failure of major system functions,
- failure of required maintenance and repair methods,
- danger for individuals through dangerous dosing media,
- danger to the environment caused by substances leaking from the system.

2.3 Working in a safety-conscious manner

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

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

2.4 Personal protective equipment

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

You will require the minimum of the following personal protective equipment:

Personal protective equipment required	
	Protective goggles
	Protective clothing
	Safety shoes
	Protective gloves

Table 3: Personal protective equipment required

Wear the following personal protective equipment when performing the following tasks:

- Wall mounting,
- Installation,
- Commissioning,
- Work on the peristaltic pump and media-transporting lines,
- Shutdown,
- Maintenance and repair work,
- Cleaning the cell,
- Disposal.

2.5 Personnel qualification

Any personnel who work on the system must be in possession of the appropriate special knowledge and skills.

Anybody who works on the system must meet the following conditions:

- Attendance at all the training courses offered by the owner.
- Personal suitability for the respective activity.
- Sufficient qualification for the respective activity.
- Training in handling of the system.
- knowledge of safety equipment and the way this equipment functions.
- Knowledge of this operating manual, particularly of safety instructions

and sections relevant for the activity.
- Knowledge of fundamental regulations regarding health and safety and accident prevention.

All persons must generally have the following minimum qualification:

- Training as specialists to work unsupervised on the system,
- Sufficient training to enable them to work on the system under the supervision and guidance of a trained specialist.

These operating instructions differentiate between these user groups:

2.5.1 Specialist staff

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

2.5.2 Trained electricians

Due to their professional training, knowledge and experience as well as knowledge of specific standards and provisions, trained electricians are able to do the electrical work assigned to them and to recognise and avoid any potential dangers by themselves.

They are specially trained for their specific working environment and are familiar with relevant standards and provisions.

They must comply with the legally binding regulations on accident prevention.

2.5.3 European Adhesive Specialist

An adhesive specialist is someone whose professional training, knowledge, experience and knowledge of the relevant specifications enables him to perform the tasks with which he has been allocated. He is in possession of extensive knowledge pertaining to the selection of the correct adhesive, the connection of various materials and the durability of adhesives in connection with various dosing media.

2.5.4 Trained persons

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

Trained persons have attended all trainings offered by the operator.

2.5.5 Personnel tasks

In the table below, you can check what personnel qualifications are required for the respective tasks. Only people with appropriate qualifications are allowed to perform these tasks!

Qualification	Activities
Specialist staff	■ Transportation ■ Assembly ■ Hydraulic installation ■ Commissioning ■ Taking out of operation ■ Rectifying faults ■ Maintenance ■ Repairs ■ Disposal
Trained electricians	■ Electric installation ■ Rectifying electrical faults ■ Repairing the electrics
Trained persons	■ Storage ■ Control

Table 4: Personnel qualification

3 Intended use

3.1 Notes on product warranty

Any non-designated use of the system can compromise its function or intended protection. This leads to invalidation of any warranty claims!

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

- The system is operated in a manner which is not consistent with these operating instructions, particularly safety instructions, handling instructions and the section "Intended Use".
- Operation of the system by those not adequately qualified to carry out the respective activities.
- Information on usage and environment (see section 5 „Technical data“ on page 13) is not adhered to.
- Operation of the system by those not adequately qualified to carry out the respective activities.
- No original spare parts or accessories of Lutz-Jesco GmbH are used.
- Unauthorised alterations are made to the system.
- The user uses different dosing media than those indicated in the order.
- Maintenance and inspection intervals are not adhered to as required or not adhered to at all.
- The system is commissioned before it or the corresponding system has been correctly and completely installed.
- Safety equipment has been bridged, removed or made inoperative in any other way.

3.2 Intended purpose

The EASYSALT pool disinfection system serves the generation of hypochlorous acid from salt dissolved in swimming pool water (NaCl solution) via flow-through chlorine electrolysis. The salt content of the pool water amounts to between 0.4% and 0.7% (corresponds to 4 – 7 g_{NaCl}/l_{Water}).

Using the pH control system included in the EASYSALT (TOPAX controller, pH measuring cell, peristaltic pump) set the wading pool water to a pH value between 6.5 and 7.2 so to achieve the optimal disinfectant capacity. We recommend hydrochloric acid as a pH value reducer.

3.3 Principles

- The EASYSALT pool disinfection system may only be used in private swimming baths and pools.
- The EASYSALT pool disinfection system, consisting of a “Technomat & electrolytic cell“ and pH control - TOPAX, peristaltic pump and mounting block was checked by the manufacturer under specific conditions before delivery. This included a load test of the Technomat control unit and a leak test of the hydraulic components.
- The system may only be commissioned in a technically faultless state under compliance with the specifications of the operating manual. Should the system not be in a technically faultless state, it is to be taken out of operation immediately.
- The operation and ambient conditions as described in the section Technical Data must be maintained.
- The salt concentration must amount to 0.4 – 0.6 %. Deviating concentrations require manufacturer authorisation.
- The maximum temperatures may not be exceeded.
- The system is not intended for outdoor use.
- Avoid the penetration of liquids and dust into electronic devices.

3.4 Salt & active agent

The EASYSALT is a system for the "in situ” production of the biocide active agent “active chlorine produced from sodium chloride via electrolysis“. In accordance with the biocide ordinance, as of 01/09/2015, the member states of the European Union may only use precursors for biocidal active agents produced "in situ" and which are used as disinfectants. These precursors must satisfy the quality requirements made of these substances by DIN EN and be sourced from a manufacturer or supplier listed in accordance with article 95 of the biocide ordinance. Please ask your supplier to confirm conformity with the biocide ordinance (certificate).

Biocidal active agent:
Active chlorine produced from sodium chloride via electrolysis

EC no. mix;
CAS no. not applicable

Precursors:
Sodium chloride

EC no. 231-598-3;
CAS no. 7647-14-5;
Special salt for electrolytic cells DIN EN 16401 and 14805

3.5 Water quality

Drinking water or water of a similar quality should be used. It should be free of solids and suspended matter. The temperature of the water entering the system must lie between 15 and 35 °C.

3.6 Foreseeable misuse

Information is outlined below regarding the system applications which are classified as non-intended use. This section is intended to allow you to detect possible misuse in advance and to avoid it.

- The TECHNOMAT “electrolytic cell” may not be used in a container or without throughflow. The device is not suitable for the production of chlorine bleach in standing water.
- The TECHNOMAT may only be used for the electrolysis of sodium chloride dissolved in water (solutions with 0.4 – 0.6% NaCl). No other medium or salt content may be used as has been intended.
- Never clean any of the soiled electrode plates of the TECHNOMAT “electrolytic cell” with hard metal objects. These could damage the electrode plates.
- Never operate the TECHNOMAT “electrolytic cell” with the socket in a standard motor vehicle. Always use the control unit intended.

4 Product description

4.1 Scope of delivery

Please compare the delivery note with the scope of delivery. The following items are part of the scope of delivery:

- EASYSALT basic device
- Electrolytic cell PS20
- pH single-rod measuring cell
- pH buffer solutions for calibration
- Suction Line SA
- Injection nozzle SKD
- Mounting set for mounting plate
- Hose 6/8 LD-PE 10 m
- Hose 4/6 LD-PE 2 m
- Electrolytic cell adapter Technomat PS

4.2 The design and components

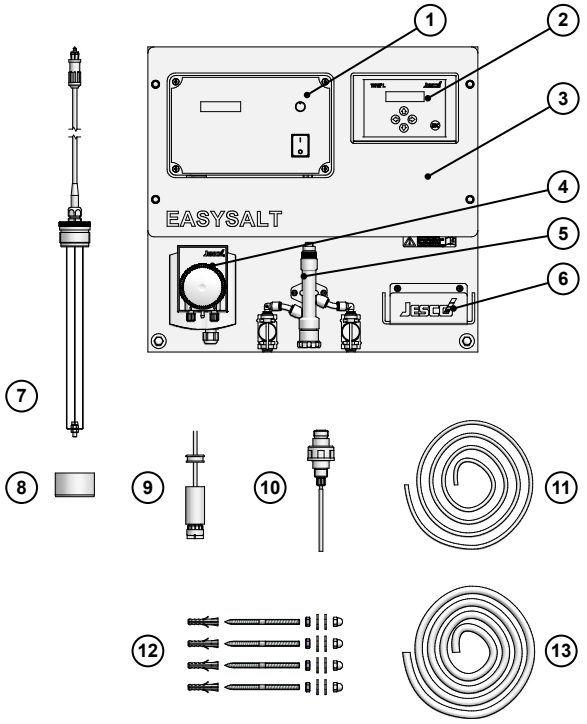

Fig. 1: The design and components

Item	Description
1	TECHNOMAT PS 20
2	TOPAX L2
3	Front plate
4	Peristaltic pump 2.8 l/h
5	Mounting block with pH single-rod measuring cell
6	buffer solutions
7	Electrolytic cell PS20
8	Electrolytic cell adapter Technomat PS
9	Flexible suction line SA
10	Injection nozzle SKD
11	Hose PE 4/6
12	Mounting set for mounting plate
13	Hose PE 6/8

Table 5: Position numbers

4.3 EASYSALT In the pool circulation

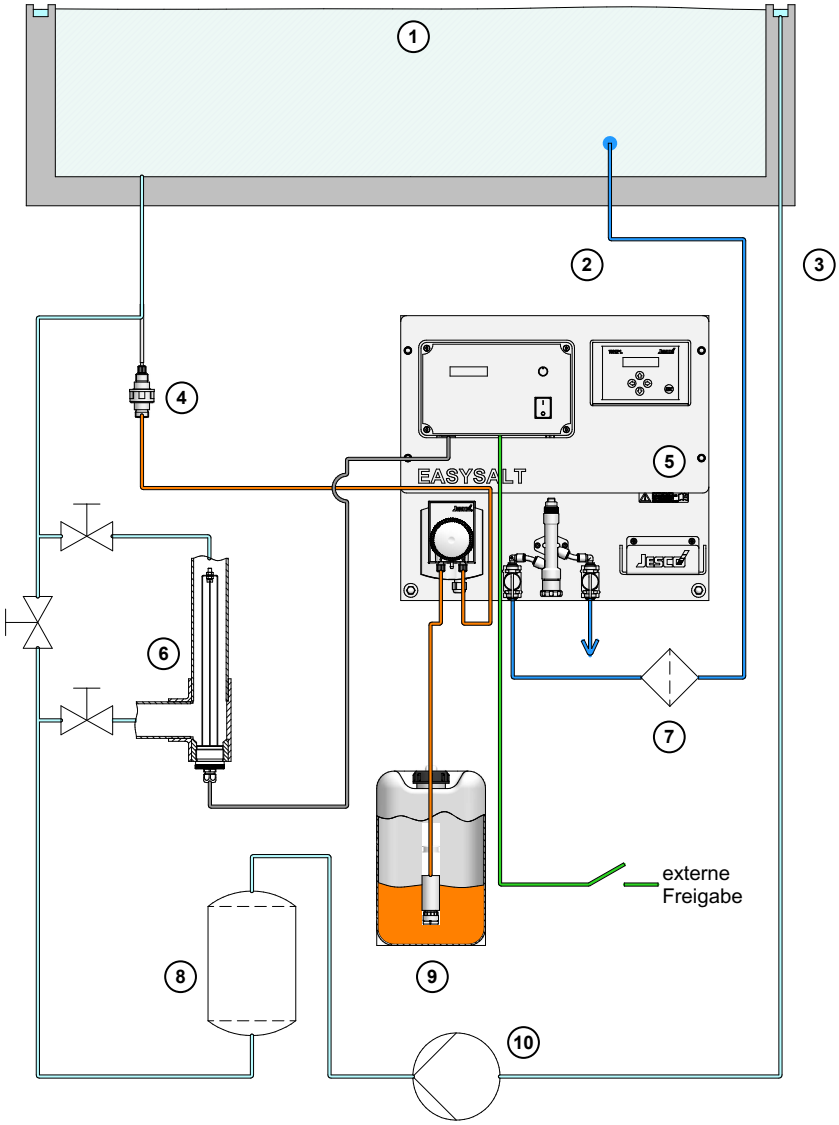

Fig. 2: EASYSALTIn the pool circulation

Item	Description	Item	Description
1	Pool with salty water	6	Electrolysis in the bypass
2	Sample water extraction	7	Sample water filter
3	Pool overflow / splash water	8	Pool filter
4	Injection nozzle for pH reducer	9	pH reducer
5	EASYSALT	10	Circulation pump

Table 6: Position numbers

4.4 Procedural overview

The EASYSALT pool disinfection system produces the chemical disinfectant hypochlorous acid (HClO) for the disinfection of the swimming pool water. It is the same hypochlorous acid which is produced by the mixture of the familiar chlorine products for the disinfection of swimming and wading pool water.

The electrolysis uses the salt solution (NaCl solution) to release elementary chlorine (Cl2) and hydrogen (H2). The chlorine reacts with the water immediately, producing hypochlorous acid (HClO). The hydrogen gas which develops during electrolysis escapes over the water surface.

Impurities in the water, bacteria, viruses, microbes and algae are destroyed oxidatively by the hypochlorous acid.

The effect of chlorine in water depends on the pH value of the water. The pH value is a measure of acid or an alkali reaction of a watery solution.

- pH < 7 acid watery solution
- pH = 7 neutral watery solution
- pH > 7 alkaline (base) watery solution

The optimum pH value for the effectiveness of chlorine in swimming and wading pool water is pH 6.5 – 7.2.

The electrolysis results in an increase in the pH value of the pool water. The EASYSALT is equipped with a pH control to keep this stable. The TOPAX controller and appendant pH single-rod measuring cell in the mounting block enables a pH value reducer to be dosed into the in the pool water via a peristaltic pump.

4.5 Areas of use

The EASYSALT pool disinfection system is designed for use in private pools.

You can use the system for:

- Wading pools, exercise pools up to 75 m³
- Whirlpools
- Sauna dip tanks

4.6 Rating plate

The rating plate contains information on the safety and functional method of the product. The rating plate must be kept legible for the duration of the service life of the product.

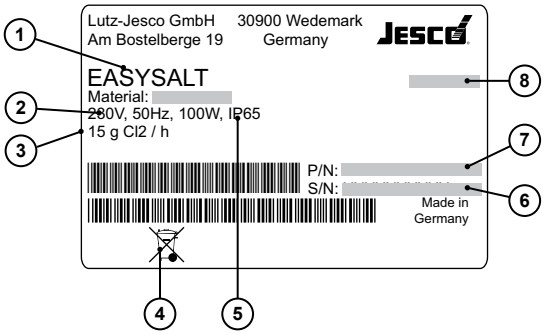

Fig. 3: Rating plate EASYSALT

No.	Description
1	Product name
2	Voltage supply, frequency, power consumption
3	Production capacity g_{Cl2}/h
4	WEEE label
5	Protection classification
6	Serial number
7	Part number
8	Month / year of manufacture

Table 7: Rating plate

5 Technical data

Description	Value
Dimensions	530 x 490 x 130 mm
Weight	approx. 14 kg
Ambient temperature	max. 30 °C
Relative humidity	Max. 90 %
Power supply	230 V AC 50 Hz
Protection class	IP 64
Connection Injection nozzle SKD	Hose 4/6, G 1/2 exterior
Maximum operating pressure mounting block	6 bar
Hose clamp connection mounting block	6/8
Hose clamp connection peristaltic pump	4/6
Delivery capacity peristaltic pump	2.8 l/h
Output electrolytic cell PS 20	15 g_{CL}/h
Electrolysis voltage	max. 12 V
Electrolysis current	max. 12 A
Hydraulic connection electrolytic cell	T-piece DN 50 / Ø 63 mm
Anode material	Coated titanium

Table 8: Technical data

6 Dimensions

All dimensions in millimetres (mm).

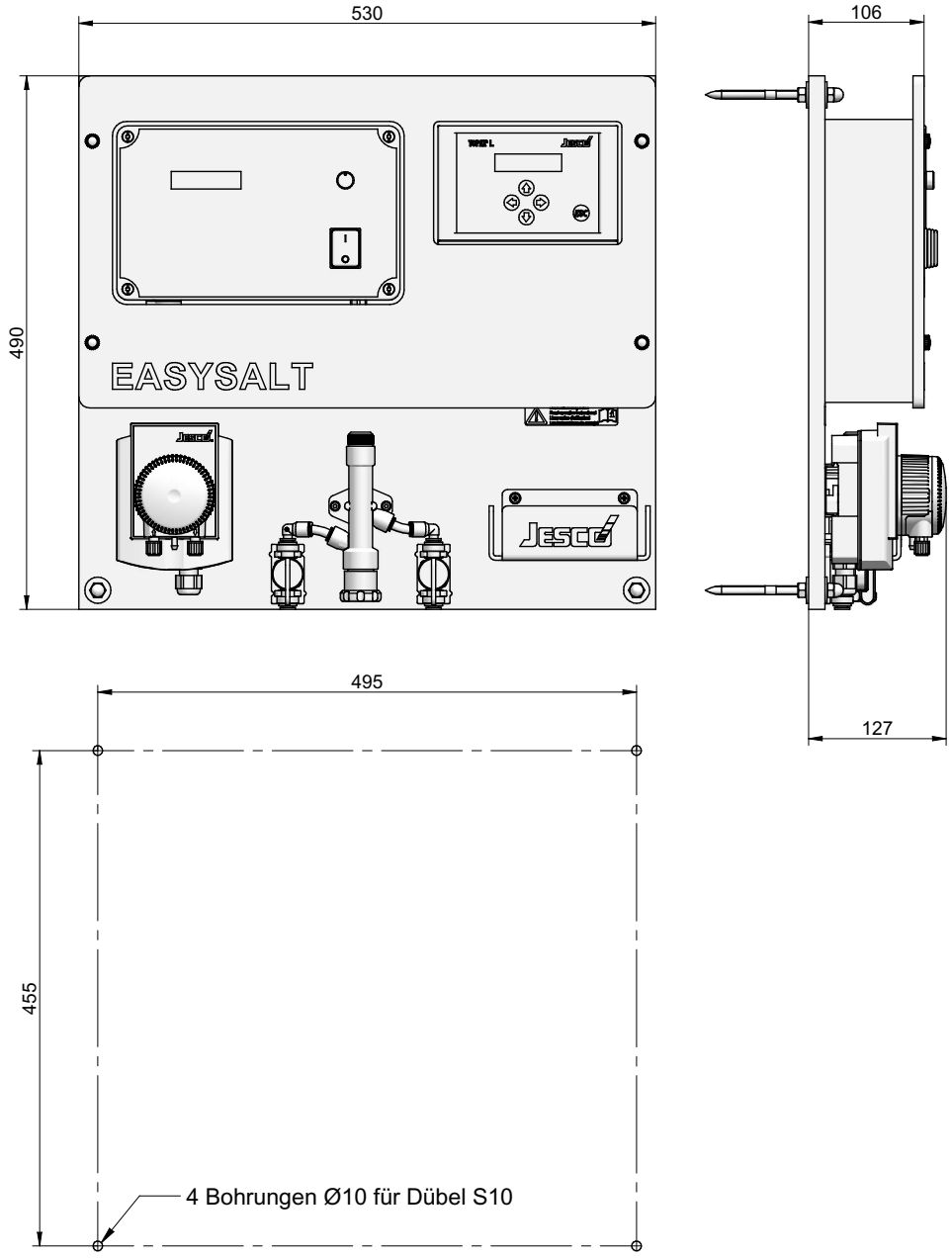

Fig. 4: Dimensional drawing EASYSALT

7 Installation

7.1 Installation location

The pool disinfection system is usually set-up in a separate technical room. It is not designed for outside use.

The room must fulfil the following requirements:

- secured against access by unauthorised persons,
- protected against weather conditions,
- frost-free,
- permissible ambient temperature adhered to (see section “Technical data” on page 13),
- The room is dimensioned to enable trouble-free assembly and inspection and maintenance of the system at all times.
- an electrical connection is given
- the room can be ventilated well,
- the room must comply with the locally valid prescriptions
- The room provides the scope in which to dispose of chemicals without danger. It is to be fitted with a water hose, a floor drain and a water hose.

Further information about the usage location:

- Relative humidity may not be permitted to exceed 90%.
- The atmosphere may not be condensing or corrosive.

7.2 Fitting the system

CAUTION

Danger of injury from falling.

The system weighs c. 15 kg and can fall down during unpacking and assembly. You can injure yourself or damage the system.

⇨ Wear safety boots when fitting the system.

⇨ Perform the fitting with the assistance of a second person (carrying and holding).

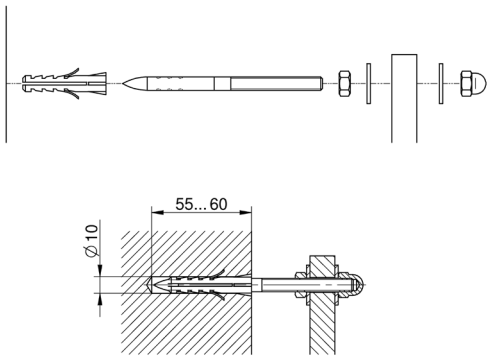

Fig. 5: Wall mounting

Precondition for action:

- Mounting set for a mounting plate (pos. 12)
- Hammer drill with 10 mm masonry drill bit
- Open-end spanner AF 6 and AF 13

Perform the following working steps:

1. Prepare the drillholes for wall mounting of the system. Comply with the specifications of fig “Dimensional drawing EASYSALT” on page 14 and drill 55 - 60 mm into the wall.
2. Press the rawlplugs included in the scope of delivery in the drillholes.
3. Screw in the four stair bolts into the rawlplugs using the AF 6 open-end spanner until their threads are no longer visible.
4. Use the AF13 open-end spanner to screw the nuts onto the four stair bolts and place a spacer washer on the bolts.
5. Position the system on the stair bolts.
6. Place a further spacer washer on the stair bolts and fix the system with the cap nuts. Tighten the cap nuts by hand.

✓ **You have successfully mounted the system on the wall.**

8 Hydraulic installation

Note

Hydraulic distortion of the measurement results

Incorrect installation of the hydraulic lines can distort the measurement results. As a result, the controlling of connected systems and control points may be faulty.

- ⇨ Comply with all the guideline instructions for installing the EASYSALT and connected devices.
- ⇨ Only use hose connections made from polyethylene (PE) with a diameter of 6/8 mm for the sample water.
- ⇨ Prevent misrepresentations of the sample water en route to the EASYSALT by taking the sample water 30 cm above the bottom of the tank or in the centre of the water pipe. The extracted sample water must reach the EASYSALT within a short space of time, arriving with a pressure of 0.2 bar.
- ⇨ If the extraction or supply of the sample water does not satisfy these requirements, an external sample water pump must be installed in front of the EASYSALT.
- ⇨ If you expect heavy soiling (e.g. leaves, coarse, small floating materials, etc.) in the sample water, use an external pre-filter. It helps you prevent blockages in the EASYSALT.

8.1 Hose connections

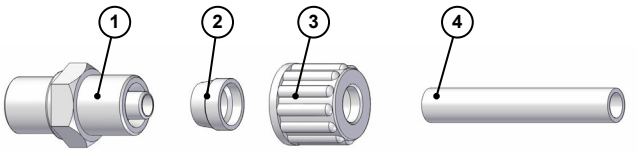

Fig. 6: Hose clamp connector

Perform the following working steps:

1. Cut the hose (4) to the appropriate length neatly and at an exact right angle.
2. Push the union nut (3) and the clamping ring (2) onto the hose end. In doing so, maintain the order and alignment of clamping ring and union nut.
3. Push the hose (4) to the end of the hose taps.
4. Push the clamping ring (2) on the hose taps.
5. Tighten the union nut (3).

✓ **Hose clamp connection installed.**

8.2 Hose coupling devices

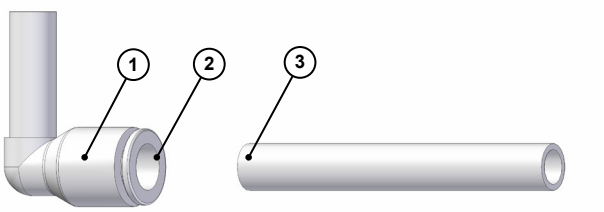

Fig. 7: Hose coupling device

Perform the following working steps:

1. Cut the hose (3) to the appropriate length neatly and at an exact right angle.
2. Slide the hose onto the connector (1) to its fullest extent.

✓ **The hose coupling device has been installed.**

Removing the connector.

To remove the hose coupling device, press the ring (2) flush onto the coupling whilst simultaneously pulling out the hose. Ensure that the line is free of pressure and media before doing so.

8.3 Installing the suction line

CAUTION

Danger from pH value reducer!

It is possible that you come into contact with the pH value reducer when preparing the installation and during the installation itself. The pH value reducer is an acid which can cause chemical burns upon contact with skin or eyes.

- ⇨ Always wear safety goggles, safety gloves and safety clothing when performing the work steps outlined in this section.

Pre-conditions for actions:

- ✓ The system was fitted in accordance with section 7.2 “Fitting the system”.
- ✓ A packaging canister of the pH value reducer in a collecting pan was placed in close proximity.
- 🛠 25 mm drill bit

Perform the following working steps:

1. Remove the cover from the packaging.
2. Drill a hole in the packaging cover using the 25 mm drill bit. Re-use this cover after replacing the packaging.
3. Guide the suction line through the hole and place its rubber sleeve in the hole using the contour intended for this purpose.
4. Screw the cover onto the packaging. Lower the suction line so far down until the screen is standing on the floor of the cannister bottom.

5. Unscrew the hose clamp connection union nut from the entry of the hose pump. Make sure not to lose the clamping ring. Slide the union nut and clamping ring onto the hose. Place the hose on the hose connection to its fullest extent and fix it with the clamping ring and the union nut.

✓ **The suction line has been installed.**

8.4 Installing the injection nozzle

Note

Correct installation by a specialist

The installation of the injection nozzle requires the services of an authorised fitter or an adhesive specialist. A saddle clamp or welded sleeve must be inserted in the section of the pipeline in which the injection nozzle is to be installed. Inappropriate installation can result in damage or leakage.

⇨ The injection nozzle should only be installed by an authorised fitter or an adhesive specialist.

⇨ Ensure that the max. back pressure in the pipe line does not exceed 1 bar. Should it exceed 1 bar, dose the pH value reducer at another location with less back pressure (e.g. splash water tank)

⇨ Comply with the specifications of the documentation for the injection nozzle.

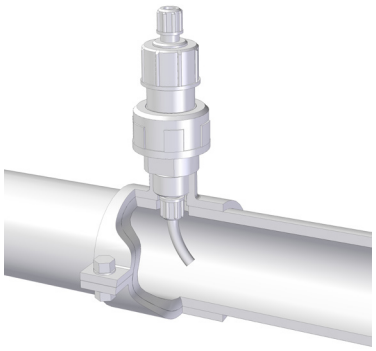

Fig. 8: Example installation of the injection nozzles

Precondition for action:

✓ A suitable location for the installation of the injection nozzles which provides the following properties:
- No back pressure over 1 bar
- Behind the pool filter (pos. 8)
- Behind the electrolytic cell

Perform the following working steps:

1. Isolate the pipe line intended for installation from the water flow.
2. Drill a hole to fit the injection nozzle. The thread diameter of the injection nozzle is G1/2 on the outside.
3. Turn the injection nozzle in the hole and install a saddle clamp or a welded sleeve for security.
4. Install the injection nozzle hose in such a way that it ends in the centre of the pipe line. Comply with the specifications of the documentation for the injection nozzle.
5. Fix the hose with the rest of the parts of the injection nozzle. Tighten the screw connections by hand.

✓ **The injection nozzle has been installed.**

8.5 Installing the pH measuring cell

The pH measuring cell must be installed in the pre-installed mounting block and the TOPAX controller must be connected to enable measuring of the pH value.

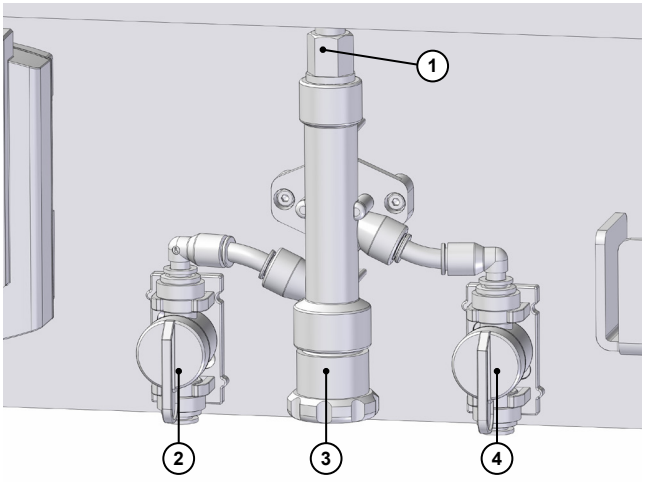

Fig. 9: Mounting block with pH measuring cell

Pre-conditions for actions:

✓ The wall mounting was performed successfully in accordance with section 7.2 „Fitting the system“ on page 15.

Perform the following working steps:

1. Screw both ball valves (2 and 4) on the mounting block tight. The grips must be horizontal.
2. Remove the front plate from the EASYSALT system by removing the four knurled nuts and lifting off the front plate.
   ▶ This reveals the measuring cable of the PH measuring cell.
3. Unscrew the sealing plug (1) from the mounting block. Carefully store the sealing plug for future shutdown.
4. Remove the cap from the tip of the single-rod measuring cell which prevents the electrodes from drying out and connect the single-rod measuring cell with the measuring cable (connect and screw hand tight).
5. Screw the single-rod measuring cell into the mounting block carefully. Make sure that you do not damage the single-rod measuring cell.
6. Open both ball valves on the mounting block and check whether all screw connections are tight.

✓ **pH measuring cell installed.**

8.5.1 Installing the electrolytic cell

Further information about the installation of the electrolytic cell is available in the operating manual of the TECHNOMAT. Follow all its specifications.

9 Electric installation

Pre-conditions for actions:

✓ Section 7 „Installation“ on page 15 was concluded.

✓ Section 8 „Hydraulic installation“ on page 16 was concluded.

The mains connection is performed via a Schuko plug connected to an external power supply.

Note

Operation in parallel to the circulation pump.

The electrolytic cell of the EASYSALT should not be operated without the circulation pump being active. Ensure that both system parts are operated simultaneously.

⇨ Plan the operating times of the electrolytic cell so that they coincide with those of the circulation pump.

⇨ Use time switches to ensure parallel operation of the system parts.

Connection plan

The following connection plan shows the electrical connections of the individual components.

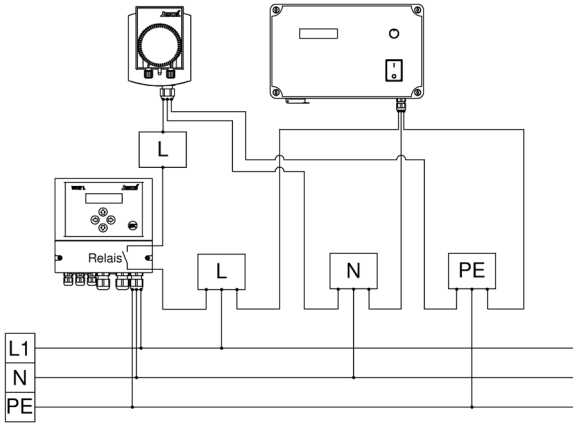

Fig. 10: Connection plan

10 Start-up

10.1 Calibrating the pH measuring cell

This section takes you through the steps for calibrating the pH measuring cell of the EASYSALT.

Precondition for action:

✓ The installation of the electrics, the hydraulics and the pH measuring cell has been performed successfully.

✓ The operating manual of the TOPAX controller is at hand.

Perform the following working steps:

1. Close both stop valves of the mounting block (pos. 5).
2. Unscrew the black screw caps from the underside of the mounting block and remove the sample water.
3. Calibrate the pH measuring cell in accordance with the operating manual of the TOPAX controller (pos. 2).
4. Screw the black screw caps back on to the underside of the mounting block.
5. Open the two stop valves on the EASYSALT.

✓ **The pH measuring cell has been calibrated successfully.**

10.2 Start-up of the peristaltic pump

Precondition for action:

✓ The installation of the electrics and the hydraulics has been performed successfully.

✓ The documentation of the peristaltic pump is within easy reach.

Perform the following working step:

1. Commission the peristaltic pump in accordance with the appendant operating manual.

✓ **The start-up of the peristaltic pump has been completed.**

10.3 Start-up of the TECHNOMAT

Precondition for action:

✓ The installation of the electrics and the hydraulics has been performed successfully.

✓ The TECHNOMAT documentation is within easy reach.

Perform the following working step:

1. Start up the TECHNOMAT in accordance with the appendant operating manual.

✓ **The start-up of the TECHNOMAT has been completed.**

11 Operation

DANGER!

Danger from hydrogen.

Hydrogen gas is produced during electrolysis; this escaped into the ambient air via the water surface. If the electrolytic cell is operated in a closed line system, gas emissions can result in pressure build-up and the piping can burst. Accretions of hydrogen gas from a concentration of c. 3.9 Vol. % are highly flammable and can result in explosions.

- ⇨ Never operate the system in a closed line system. Ensure that all the shut-off values are open during operation.
- ⇨ Never operate the system without a constant water flow.
- ⇨ Avoid the accretion of hydrogen gas. Ventilate the affected rooms immediately to reduce the concentration to a safe level.

Electrolytic cell

The start-up and operation are described in the TECHNOMAT operating manual.

pH value control

The operation and calibration for pH value control are described in the operating manual of the TOPAX controller.

12 Shutdown and storage

12.1 Short-term shutdown

No special measures are required for shutdown periods of up to a week.

12.2 Long-term shutdown

When shutting down for a period over a week, carry out the instructions in the following section to prevent damage to the system or its individual components.

12.2.1 Peristaltic pump

CAUTION

Danger from pH value reducer!

It is possible that you come into contact with the pH value reducer when during shutdown of the peristaltic pump. The pH value reducer is an acid which can cause chemical burns upon contact with skin or eyes.

⇨ Always wear safety goggles, safety gloves and safety clothing when performing the work steps outlined in this section.

⇨ Secure the EASYSALT against reactivation after shutdown of the peristaltic pump.

Precondition for action:

✓ A bucket of clear water is ready.

Perform the following working steps:

1. Pull out the suction line from the packaging during operation with the pH value reducer and seal the packaging.
2. Place or hold the suction line in the bucket with clear water and wait until c. 500 ml water has been pumped through the peristaltic pump.

▶ The peristaltic pump has been rinsed with clear water and will not contain any further dangerous dosing media.

3. Remove the suction line from the bucket and let the pump run dry until there is no more liquid in the hose.
4. Disconnect the EASYSALT from the power supply.

✓ **Peristaltic pump shut down for the long term.**

12.2.2 pH measuring cell

Precondition for action:

✓ The EASYSALT has been disconnected from the power supply.

Perform the following working steps:

1. Ensure that the system has been disconnected from the power supply.
2. Remove the front plate from the EASYSALT system by removing the four knurled nuts and lifting off the front plate.

▶ This reveals the measuring cable of the PH measuring cell.

3. Connect the inflow and outflow tap of the mounting block.
4. Disconnect the measuring cable from the single rod measuring cell and unscrew the single rod measuring cell from the mounting block carefully.
5. Store the single rod measuring cell correctly in order to preserve its function. Comply with the specifications of the documentation for the single rod measuring cell.
6. Seal the mounting block with the sealing plug.

✓ **pH measuring cell shut down for the long term.**

12.2.3 Electrolytic cell

Precondition for action:

✓ The EASYSALT has been disconnected from the power supply.

✓ A large bucket is standing ready.

Perform the following working steps:

1. Remove the white flow limiter from the EASYSALT by loosening the 4 knurled nuts and removing the flow limiter.
2. Disconnect the plug of the electrolytic cell from the control unit.
3. The shut-off valves of the pool circulation next the electrolytic cell bypass are completely open, or the pool circulation has been switched off.
4. Close both shut-off valves in front and behind the electrolytic cell.
5. Place a large bucket under the area of the electrolytic cell.
6. Unscrew the electrolytic cell from the adapter counterclockwise and let the residual water flow into the bucket.
7. Dry the electrolytic cell with a soft cloth.
8. Store the electrolytic cell dry and frost-free.

✓ **Electrolytic cell shut down for the long term.**

12.3 Storage

Correct storage of the system increases its service life. Avoid negative influences such as extreme temperatures, high humidity, dust, chemicals, etc.

- the storage place must be cold, dry, dust-free and generously ventilated,
- temperatures between +5 °C and 35 °C (frost-free).
- Relative air humidity must not exceed 90 %.

13 Transport & Disposal

13.1 Transportation

Precondition for action:

- ✓ The system was shut down in accordance with section “Shutdown and storage” on page 21.
- ✓ The system was cleaned thoroughly. If any dosing media remains in the system, it must be neutralised and decontaminated.
  Confirm the non-objection with the form from section 16 „Declaration of no objection“ on page 27.
- ✓ All openings should be closed, so that no foreign objects can enter the device.
- ✓ The system must be suitably packed, preferably in the original packing, for transportation.

13.2 Disposal

- The device must be disposed of in accordance with applicable local laws and regulations. It should not be disposed of as domestic waste!
- As the disposal regulations may differ from country to country, please consult your supplier.
- In Germany, the manufacturer must provide free-of-charge disposal. provided the device has been safely returned along with a declaration of no objection (see page 27).

14 Maintenance

Products by Lutz-Jesco are manufactured to the highest quality standards and have a long service life. However, some parts are subject to operational wear. This means that regular visual inspections are necessary to ensure a long operating life. Regular maintenance will protect the dosing station from operation interruptions.

DANGER!

Mortal danger from electric shock!

Live parts can inflict fatal injuries.

⇨ Always disconnect the system from the power supply before carrying out any maintenance work.

⇨ Secure the system against unintended activation.

14.1 Maintenance intervals

Subject the system to regular maintenance, to prevent malfunctions. This table gives you an overview of maintenance work and the intervals at which you must carry it out. The next few sections provide instructions for carrying out this work.

Interval	Maintenance
daily	■ Check the chlorine value, the salt content and the pH value
Every 2 months	■ Calibrate the pH measuring cell ■ Clean the electrolytic cell (consult the operating manual of the TECHNOMAT)
Annually	■ Replace the hose of the peristaltic pump (consult the operating manual of the peristaltic pump) ■ Replace the pH measuring cell ■ Replace the pressure hose on the output side of the of the peristaltic pump (consult the operating manual of the peristaltic pump) ■ Clean the fittings

Table 9: Maintenance intervals

In some cases, regional regulations may require shorter maintenance intervals. Maintenance intervals depend only on how frequently the equipment is used. Chemical wear of rubber parts, for example, begins with the initial medium contact and continues irrespective of the usage.

14.2 Measuring cell

Note

Note the service life of the measuring cell.

The service life of the measuring cell is approx. 12 to 15 months, whereby the storage time must be taken into account at 50%. If the service life is exceeded, this may distort measurement results.

⇨ Note the printed date of manufacture and replace obsolete measuring cells in good time.

The service life of the measuring cell depends on the operating conditions and the water properties (e.g. corrosiveness, grease etc.). In normal conditions the service life will be 12 – 15 months, which includes 50 % storage time.

The following features indicated used pH measuring cells:

- The pH measuring cell takes an extraordinarily long time during the pH 6.8 adjustment process to reach the value of the buffer solution.
- The deviation of the pH measuring cell is too wide; the pH 6.8 adjustment is not possible.
- The white potassium chloride salt rings in the pH measuring cell are exhausted or discoloured.

Replacing the pH measuring cell

This section takes you through the replacement of the pH measuring cell of the EASYSALT.

Precondition for action:

✓ You have disconnected the device from the mains supply.

✓ The operating manual of the TOPAX controller is at hand.

Perform the following steps:

1. Close both stop valves of the mounting block (pos. 5).
2. Unscrew the black screw caps from the underside of the mounting block and remove the sample water.
3. Remove the front plate (pos. 3) from the EASYSALT by loosening the 4 knurled nuts and removing the plate.
4. Unscrew the measuring cell plug from the pH measuring cell.
5. Unscrew the old pH measuring cell from the fitting.
6. Screw the new pH measuring cell into the fitting.
7. Screw the measuring cell plug onto the pH measuring cell.
8. Calibrate the pH measuring cell in accordance with the operating manual of the TOPAX controller (pos. 2).
9. Screw the black screw caps back on to the underside of the mounting block.
10. Open the two stop valves on the EASYSALT.

✓ **The pH measuring cell has been replaced successfully.**

15 Troubleshooting

All possible errors are listed in this table. Comply the specifications of the documentation of the individual components following a fault.

Problem	Possible cause	Measures for resolution
The TECHNOMAT switches itself off. The current and voltage display are at “0”.	The TECHNOMAT overload protection has tripped.	■ Reduce the salt content in the water by adding fresh water. ■ Set the power control dial to a lower value. ■ Check the connection line of the electrolytic cell for defects.
	The TECHNOMAT abnormal temperature protection has tripped.	Reduce the room temperature to under 30° C.
	The external release contact Is not connected.	■ Ensure that the brass strapping plug is sitting correctly on the underside of the TECHNOMAT. ■ Check the external clearance point (e.g. time switch, circulation pump, flow monitor, chlorine controller) ■ Wait until the external chlorine controller (if present) issues clearance for production automatically.
The current display on the TECHNOMAT remains at “0” with every voltage setting.	The cable for the electrolytic cell has not been connected correctly.	Check the cable connection to the electrolytic cell.
	The electrolytic cell is not in the water.	Check the correct installation of the electrolytic cell.
	The water does not yet contain the required salt content.	Set the correct salt content of 0.4 ... 0.6 %.

Table 10: Troubleshooting

15.1 Fault resolution for the pH value measurement

Error	Possible causes	Measures for resolution
Measured value fluctuates constantly	Loose measurement cable connections	Check measurement cable; re-attach if necessary
Measurement is very slow	Diaphragm blocked	Clean electrode
	Insufficient swelling layer on the glass membrane	Douse electrode in 3-molar KCl solution
	Electrode becoming obsolete	Replace electrode
	Buffer solution becoming obsolete	Check expiration date
The measurement deviates or is unstable	pH value measuring cell defective	Replace measuring cell
	Diaphragm is dry or soiled	Clean measuring cell
The display deviates by a constant value	pH value measuring cell not correctly installed	Check correct installation; check correct calibration
Display deviates by a constant value	External potential in the system	Remove external potential
TOPAX controller constantly displays pH value "7.00".	Short circuit	Check measuring cell for damage and replace if necessary

Table 11: Fault resolution for the pH value measurement

Error	Possible causes	Measures for resolution
No reaction to pH buffer solution	Measuring cell not correctly installed	Check correct installation; check correct calibration
	Measuring cell defective	Check measuring cell for damage and replace if necessary
pH rise slope error	The slope ascertained during calibration was greater than 65 mV/pH or smaller than 50 mV/pH.	The calibration may have been performed incorrectly. Check: ■ The connections ■ The calibration solution ■ Conformity with the calibration data ■ The temperature set Calibrate again If the rise slope error still persists, the electrodes either need to be regenerated or replaced.
pH zero point error	The zero point error of the electrode ascertained during calibration is greater than 55 mV/pH or smaller than -55 mV/pH.	Check the calibration solution, especially the internal buffer set. If this is OK, the electrodes or at least the reference electrodes must be regenerated or replaced.
Error input 1	Input 1 does not receive a correct signal.	Check the connection and the electrode cable.
Error input 2	Input 2 does not receive a correct signal.	Automatic temperature compensation has been set, although no suitable temperature sensor has been connected.
Water deficiency	The digital input has been opened.	Close the input as soon as you wish to continue with the control. If the water deficiency sensor is connected, it will indicate via error message, that the sample water supply has been interrupted.

Table 11: Fault resolution for the pH value measurement

15.2 Troubleshooting on the peristaltic pump

Error	Possible cause	Measures for resolution
The pump does not deliver or output too low.	Pump hose worn and hard.	Replace the pump hose.
	System backpressure too high.	Reduce the back pressure.
	Suction lift too great.	Fit the pump lower.
	Soiling in the pump hose.	Clean or replace the pump hose. Rectify the cause of the soiling.
	Injection nozzle blocked following carbonate precipitate.	Rectify the blockage; install a self-cleaning injection nozzle if necessary.
	Contact pressure of the rollers too low.	Springs are overloaded. Replace the rotor.

Table 12: Troubleshooting on the peristaltic pump

Pump hose is not centred on the flow track.	Hose is tangled.	Fit stress-free.
	The pressure rollers are not entirely straight, because the rotor is worn.	Replace the rotor.
	The ball bearing is missing, as it was forgotten during the hose change.	Fit the ball bearing.
The rotor does not turn.	The voltage supply has been interrupted.	Activate the voltage supply.
	Motor overload due to hardened hose.	Replace the pump hose.
	Motor is defective.	Replace the motor.
Pressure shocks in the hose line.	Gas bubbles expand in the pressure line and create flow fluctuations.	Install the line in such a way that gas bubbles are unable to collect.
		Install a non-return valve on the pressure connection of the pump.

Table 12: Troubleshooting on the peristaltic pump

16 Declaration of no objection

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

Declaration of no objection

Please fill out a separate form for each appliance!

We forward the following device for repairs:

Device and device type: ..... Part-no.: .....

Order No.: ..... Date of delivery: .....

Reason for repair: .....

.....

.....

Dosing medium

Description: ..... Irritating: ☐ Yes ☐ No

Properties: ..... Corrosive: ☐ Yes ☐ No

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

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

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

Company / address: ..... Phone: .....

..... Fax: .....

..... Email: .....

Customer No.: ..... Contact person: .....

Date, Signature: .....

17 Warranty Application

Warranty Application

Please copy and send it back with the unit!

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

Sender

Company: ..... Phone: ..... Date: .....

Address: .....

Contact person: .....

Manufacturer order no.: ..... Date of delivery: .....

Device type: ..... Serial number: .....

Nominal capacity / nominal pressure: .....

Description of fault: .....

.....

.....

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.....

.....

Service conditions of the device

Point of use / system designation: .....

.....

.....

Accessories used (suction line etc.): .....

.....

.....

.....

.....

Commissioning (date): .....

Duty period (approx. operating hours): .....

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

18 Index