

MINICHLORGEN T 3 / 6

In-situ-sodium hypochlorite system

Operating instructions



Read the operating instructions!

The user is liable for improper installation and operation.

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1 Notes for the Operator

1.1 Document guidance

These instructions assist in the safe and correct operation of the MINICHLORGEN T systems by providing guidance in the following areas:

- Installation and commissioning
- Operation
- Maintenance
- Shutdown procedures
- Transportation
- Potential risks due to matters outside of the manufacturer's control.

1.2 Personnel qualification

All personnel are obligated to read this manual and receive relevant training before operating or performing work on the equipment.

Operator:

- The company responsible for organizing the installation, commissioning, or servicing of the equipment.

Authorised service personnel:

- Only authorised service personnel trained by the operator or Lutz-Jesco can carry out installation, commissioning, and servicing of the equipment.
- Skilled people with relevant qualifications and experience for the task.

Users:

- Responsible for basic operation and upkeep of the equipment, they must be trained to carry out their tasks by authorised service personnel.
- Responsible for regularly completing the 'Operation Log'.
- Non-skilled persons.

1.3 Operators responsibility

Ensuring that:

- These instructions are easily accessible and in close proximity to the system at all times.
- The user is supplied with instructions on safe use of sodium hypochlorite and associated reagents.
- The installation room satisfies all local regulations including fire, safety, and accident prevention laws.
- No alterations to the system and installation that are not detailed in these instructions are made.
- Users are instructed in operation and basic maintenance of the system.
- The system is serviced at regular intervals by authorised personnel.
- Personal protective equipment is available for all users of the system.

1.4 Training course assistance

As an operator you are obligated to provide training to all personnel to prevent hazards and misuse of equipment from occurring.

1.5 Notes on warranty

The warranty period begins at the date of the invoice.

For a warranty claim to be valid the following requirements must be fulfilled:

- The system must be installed and operated in accordance with the information provided in this document.
- Maintenance and repairs must be carried out by authorised service personnel at the intervals stated.
- Spare parts and maintenance kits are only to be supplied by Lutz-Jesco GmbH or authorised distributors and operators.
- The water supply, environmental conditions and salt used must meet the specifications detailed in these instructions.
- Users must regularly fill in the 'Operation Log'.
- Alarm logs and history must be made available for Lutz-Jesco to view.

Item	Warranty Period (Years)
Wearing parts	1
Electrics	2
Electrodes	5 (pro-rata)

1.6 Software version

This document is relevant for software versions 010224 and later.

2 Safety

The following information is intended to help eliminate hazards. Risk prevention measures always apply regardless of any specific action.

Take note of the signal word and hazard symbols at the start of the sections in these instructions.

2.1 Safety conventions

2.1.1 Signal words

DANGER!

Imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

PLEASE NOTE

Potential risk of damage to the system.

2.1.2 Symbols



General warning



Electrical hazard



Mandatory action



Disconnect before performing work

2.1.3 Structure of warning messages

SIGNAL WORD



Potential hazard

Consequence of not avoiding hazard.

- How to avoid hazard.

2.2 Hazards due to misuse

The MINICHLORGEN T must only be used in the ways detailed in these instructions. Alterations and modifications of any kind that are not described in these instructions are forbidden.

Lutz-Jesco GmbH accepts no liability for any damage or harm caused by misuse of the equipment.

2.3 Working in a safety-conscious manner

Failure to follow the safety instructions leads to:

- Failure of important functions of the device and of the corresponding system.
- Failure of required maintenance and repair methods.
- Danger to personnel.
- Danger to the environment.

Safety rules and regulations not specified in this manual, which must be adhered to:

- Accident prevention regulations.
- Safety and operating provisions.
- Environmental protection provisions.
- Applicable standards and legislation.

2.4 Personal protective equipment

Personal protective equipment in accordance with national safety regulations should be used by all users and personnel when carrying out tasks described in this manual.

Recommended protective equipment:



Protective clothing:
Chemical safety overalls/PVC apron



Protective gloves:
PVC/Nitrile disposable gloves



Eye protection:
Protective goggles

2.5 Sodium hypochlorite safety note

WARNING

**Hazardous Substances**

Death or serious injury

- Read latest SDS sheet before handling substances.

It is the operator's responsibility to supply the user with instructions and training on safe use of sodium hypochlorite.

SDS available upon request.

Sodium Hypochlorite (NaClO, aq. solution):

- Max. concentration = 1.5 g/l Cl₂.
- Never mix sodium hypochlorite with acid or other products to prevent release of toxic gas(chlorine).

2.6 Hydrogen safety note

WARNING

**Potential for explosive atmosphere**

Death or serious injury

- Install equipment and vent line in accordance with local regulations and guidance from section 6 of this instruction manual.

The MINICHLORGEN T generates a small amount of hydrogen, which is safely discharged to the outside atmosphere by an independent vent line. See section 6 for installation guidance.

3 Transportation and storage

CAUTION

**Heavy object**

Strain or injury to personnel

- Use appropriate equipment to lift and move the MINICHLORGEN T.
- Wear appropriate PPE.



NOTICE

**Heavy object**

Risk of damage to the system

- Use appropriate equipment to lift and move the MINICHLORGEN T.
- Protect with suitable packaging during transport and installation.

Dimensions and weight of systems are described in section 5.

3.1 Delivery damage

If your package has been damaged due to improper transport and handling, inform your carrier and follow the returns procedure if necessary.

3.2 Transport and storage conditions

- Location must meet the environmental requirements described in section 5.
- The system should be protected via packaging where possible to reduce potential damage.
- The system must be empty of all residual chemical solutions.
- Suitable lifting and transport equipment must be used.
- If the system has been in use, it must be shut down in accordance with section 9.

4 Description

4.1 Models

This version of the MINICHLORGEN T is available in two different output capacities. The number in the model name represents the maximum mass, in grams, of available Cl_2 produced per hour.

Model	Power supply
MINICHLORGEN T 3	110–230 V~ 50–60 Hz
MINICHLORGEN T 6	110–230 V~ 50–60 Hz

4.2 Scope of delivery

Modular:

- MINICHLORGEN T
- Operating instructions
- Soft water sample valve
- Wall fixing kit
- Soft water connection kit
 - ½" BSPm x 15 mm-adapter
 - Adapter 15 mm x 12 mm
 - Adapter 12 mm x 8 mm
- Water inlet hose 8 mm OD, 3 m length
- Brine inlet hose 8 mm OD, 3 m length
- Product outlet
- Pressure reduction valve and pressure gauge
- 2x Product-outlet-hose connection-sets (DN4/6, DN6/9, DN6/12, DN9/12)

4.2.1 Available accessories

- Modbus RTU module (RS-485)
- Hydrogen detector
- Hydrogen detector cable
- Water softener cabinet
- Water softener double cabinet
- Salt solution tank and salt saturation kit L-tube

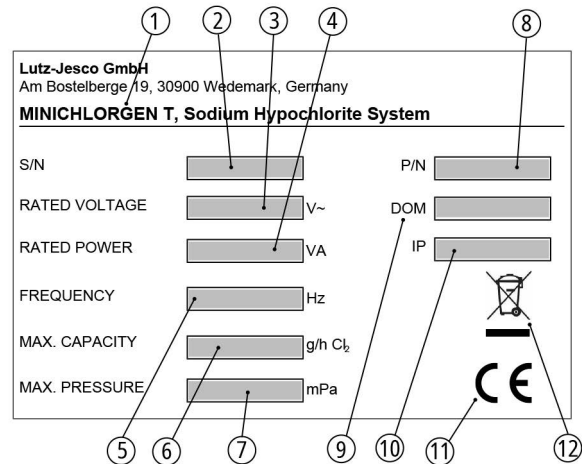
4.2.2 Required accessories

Accessories that are a requirement for the MINICHLORGEN T modular installation but not part of the standard scope of delivery:

- Dosing equipment and ancillaries
- Salt saturation tank
- Water softener
- Associated plumbing and pipework fittings

4.3 Rating plate

The rating plate clearly identifies the product and provides important information such as the manufacturer, product designation, year of manufacture and technical and safety-relevant data. The rating plate must be kept legible for the duration of the service life of the product.



Item	Description
1	Product name
2	Serial number
3	Nominal voltage
4	Rated output
5	Frequency
6	Max. capacity
7	Max. pressure
8	Part number
9	Production date
10	Protection class
11	Label showing conformity with applicable European directives
12	WEEE label

4.4 Intended use

The MINICHLORGEN T is intended for the following purpose: Automatic generation of a sodium hypochlorite solution containing 0.05-0.15%wt Cl_2 , using sodium chloride, electrical current, and softened water. The resulting solution can be used as a disinfection agent for a wide range of applications.

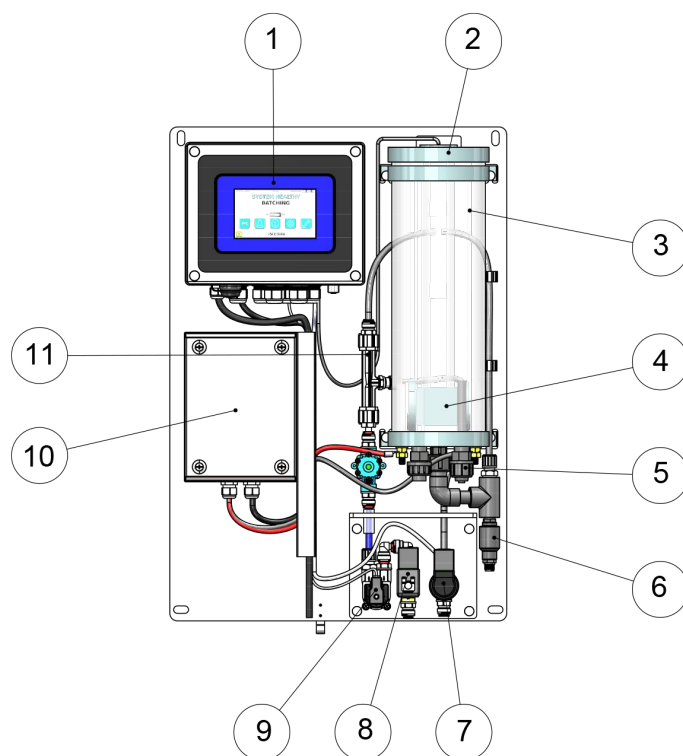
4.5 MINICHLORGEN T Design and function

In normal operation a batch process sequence commences: the water [8] and brine [7] solenoid valves are energised simultaneously, allowing softened water to flow through the DC power supply heat exchanger before passing through brine eductor [11] to create a vacuum, which draws in a set amount of brine from a salt saturator.

Once the predetermined quantity of brine is drawn, the brine solenoid valve closes. The water valve stays open until the correct volume of water determined by the water flow meter [9] is delivered to the electrolytic cell [4]. The resultant diluted brine solution passes through the electrolytic cell where a DC current is applied to generate a sodium hypochlorite solution.

The batch process continues until the upper-level switch of the integrated product tank is reached. When the product is removed from the integrated product tank via outlet [5] to meet process requirements, the batch cycle restarts automatically as soon as the lower-level switch is reached. Generation can be started and stopped manually at any time using the on/off switch on the HMI home screen [1].

Item	Description
1	Touchscreen HMI
2	Triple float level switch
3	Combined electrolyser & product storage vessel
4	Electrolyser
5	Product discharge connection
6	Drain / Sample valve
7	Solenoid valve for brine
8	Solenoid valve for softened water
9	Water meter
10	DC Power supply enclosure (for the electrolysis)
11	Brine eductor



4.6 Adaptive response technology

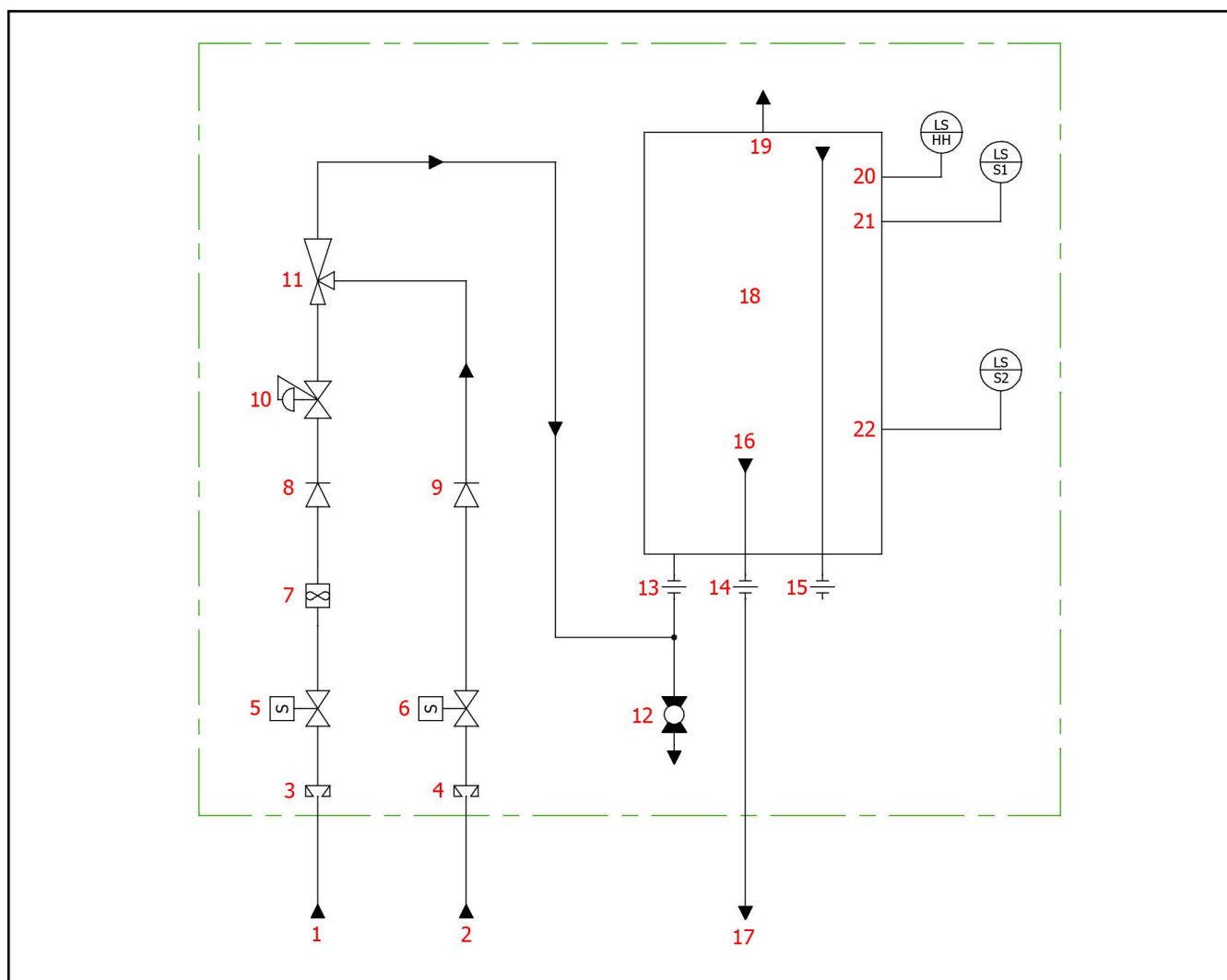
The MINICHLORGEN T utilises ART (Adaptive Response Technology) which allows the system to adapt to environmental and site conditions, and poor maintenance.

Rather than entering an alarm state and stopping generation completely, the MINICHLORGEN T reduces output capacity proportionally and displays a warning when:

- Ambient temperature is high.
- Inlet water temperature is high.
- Electrolytic cell temperature is high.
- Electrolytic cell scaling has occurred.
- Water pressure is unstable/low.
- Brine inlet pressure changes.
- Brine salinity changes.

If the parameters exceed alarm limits and the capacity cannot be reduced further the MINICHLORGEN T enters an alarm state and stops generation.

4.7 System process flow



Item	Description	Item	Description
1	Inlet for softened water	12	Drain / Sample valve
2	Inlet for brine	13	Inlet for electrolyser vessel
3	Connector 8 mm OD	14	Product outlet connection
4	Connector 8 mm OD	15	Vessel overflow connection
5	Water solenoid valve	16	Product outlet pipe
6	Brine solenoid valve	17	Product outlet to dosing device
7	Dilution water flow meter	18	Electrolyser / Product storage vessel
8	Non-return valve (Inside beige compression fitting)	19	Vent outlet
9	Non-return valve (Inside beige compression fitting)	20	Float level switch, High-high
10	Pressure regulator (1.8 bar)	21	Float level switch, Stop generation
11	Brine eductor	22	Float level switch, Low-level (Starts generation)

5 Technical data

5.1 Data table

Power output		MINICHLORGEN T	
		3	6
Cl ₂ capacity	g/h	3	6
Cl ₂ concentration	mg/l	500	1500
NaClO solution	l/h	6	4
Inlet water specification			
Discharge	mPa	0.2 – 0.3	
Temperature	°C	8 – 23*	
Hardness (CaCO ₃)	mg/l	< 20	
Hardness	°dH	< 1	
Turbidity	NTU	<5	
pH	-	6.5 – 8	
Particle size	µm	< 100	
Iron	µg/l	< 200	
Manganese	µg/l	< 10	
Fluoride	mg/l	< 2	
Free chlorine	mg/l	< 1	
Environmental conditions			
Protection classification	IP	54	
Ambient temperature	°C	5 – 40	
Air humidity	% RH	95	
Electrical specifications			
Supply voltage	V~	110–230 V~	
Frequency	Hz	50 – 60	
Max. rated power	VA	75	90
Usage			
Salt consumption	kg/h	0.01	0.02
Efficiency of salt use	kg/kg Cl ₂	3.0	
Energy consumption	kWh	0.015	0.03
Energy efficiency	kWh/kg Cl ₂	5.0	
Water consumption	l/h	6	4
Usage			
Water inlet	-	Connector 8 mm OD	
Brine inlet	-	Connector 8 mm OD	
Product outlet	-	12mm PVC solvent weld socket / Hose connection kit (DN4/6, DN6/9, DN6/12, DN9/12)	
Product outlet/ vent connection	-		
Soft water sample valve	-	Connector 15 mm OD	
PRV (Pressure-reducing valve)	-	R1/2 or G3/4	
Mains electrical power		M16 strain relief gland – Screw terminals (max. 1.5 mm²)	
Ethernet connection		M12, D-code, 4-pin, female	
Usage			
Weight	kg	17	
Dimensions	mm	670 x 460 x 153 (H x W x D)	

* Output automatically de-rated above 23°C

5.2 Salt specification

Use salt with a minimum of 99.9% sodium chloride purity.

Salt used must meet local standards and regulations (e.g. BPR 528/2012, NSF 60, EN 973, EN 14805)

5.2.1 Minimum requirements:

Element/Compound	Upper Limit (mg/kg)
Arsenic (As)	13
Cadmium (Cd)	1.3
Chrome (Cr)	13
Iron (Fe)	0.5
Mercury (Hg)	0.26
Nickel (Ni)	13
Manganese (Mn)	10
Lead (Pb)	13
Antimony (Sb)	2.6
Selenium (Se)	2.6
Calcium (Ca)	100
Magnesium (Mg)	100
Bromide (Br-)	100

6 Installation

WARNING



Incorrect installation causes hazards.
Death, serious injury or failure of equipment

- Only authorised service personnel with relevant qualifications can perform installation work.
- All requirements should be met to ensure safe and optimal operation of the equipment.

Installation must also comply with local, national and site regulations and guidance. If in any doubt, consult the operator.

6.1 Location

Requirements:

- Natural high and low ventilation in the installation room.
- Mechanical ventilation must be used if there is insufficient natural ventilation.
- Sufficient space and adequate lighting for installation and maintenance work.
- Relevant warning signs in easily visible locations.
- A firm and level floor for any external tanks.
- A solid wall or rigid frame available for MINICHLORGEN T mounting.
- Access to a potable quality softened water supply for permanent connection.
- All environmental conditions are met (see section 5).
- All local regulations are met including fire safety and accident prevention laws.
- Protected from unauthorised access.
- Smoking and naked flames prohibited in installation room and signs to show this.

6.2 Supply with softened water

- Use the blue 2.5 m length of 8 mm OD tube and supplied adapters to connect from the softened water supply to the MINICHLORGEN T softened water inlet.
- Install the supplied slip tee valve downstream of the softening device for soft water sampling.

Requirements:

- Inlet water must meet the specifications stated in section 5.
- If hardness is above 20 mg/l CaCO₃ a water softener must be installed to prevent scaling/fouling of the electrodes.
- Suitable backflow prevention that meets local regulations or the requirements of IEC 61770 & EN 1717 must be installed if connected to a potable water source.
- A booster pump is required if pressure and flow rate in the supply line are low or irregular.

6.3 Softener regeneration switch

If a simplex softener is installed, a 'regen' switch must be used and connected to the 'Remote Inhibit' signal of the MINICHLORGEN T. This will stop the MINICHLORGEN T whilst the softener is regenerating to prevent scaling of the electrodes and low water faults.

6.4 Pressure reducing valve

- A PRV and pressure gauge is supplied with the MINICHLORGEN T to protect the system and improve operation.
- Install the PRV upstream of the electro-chlorination plant, take note of the direction of flow arrow embossed on the PRV body.
- Set the PRV to 200kPa (2 bar).

6.5 Saturated brine supply

- Use the black 2.5 m length of 8 mm OD tube to connect from the saturator brine inlet pipe (L-pipe) to the MINICHLORGEN T brine inlet.

6.5.1 Salt saturator tank

Requirements:

- Salt must meet the specification in section 5.2.
- The saturator must be supplied with softened water which meets the specification in section 5.1.
- Tank must be accessible for salt refilling and maintenance procedures.
- When using PDV or fine salt, saturator tanks must contain a bed of layered graded gravel to prevent blockages.
- The tank must be clearly labelled with:
 - Type of media inside

6.6 Product outlet

- Use the 12 mm screw connection or the dosing hose connection set supplied to connect a dosing pump directly to the tank outlet.
- The outlet pipes should be compatible with <1% w/w Cl₂.

6.7 Container overflow

- In the event of a failure of the level switch control or a solenoid valve, an overflow connection is provided at the bottom of the electrolyser vessel.
- Connect the overflow to a suitable container using a 12 mm connector or the metric hose connection set supplied.
- A pan switch can be installed in the container and wired to the control panel to trigger an alarm in the event of an overflow.
See section 6.10.3 for electrical connections.

6.8 Hydrogen ventilation

The electrolysis process of the 6 g/h MINICHLORGEN T system releases approximately 2 litres (0.17 g) of hydrogen per hour during operation.

The installation room must have natural ventilation at both the top and bottom to prevent accretion of hydrogen in the room. There must be no sources of ignition in the installation room.

6.8.1 Requirements for air exchange

To ensure that the installation room remains classified as safe, a minimum air change rate of 3 m³/h is required.

6.8.2 Safety signs

The following warning signs should be displayed next to the device and at the entrance to the installation room: Warning sign, No smoking, no naked flames.

DANGER!



Explosive atmosphere

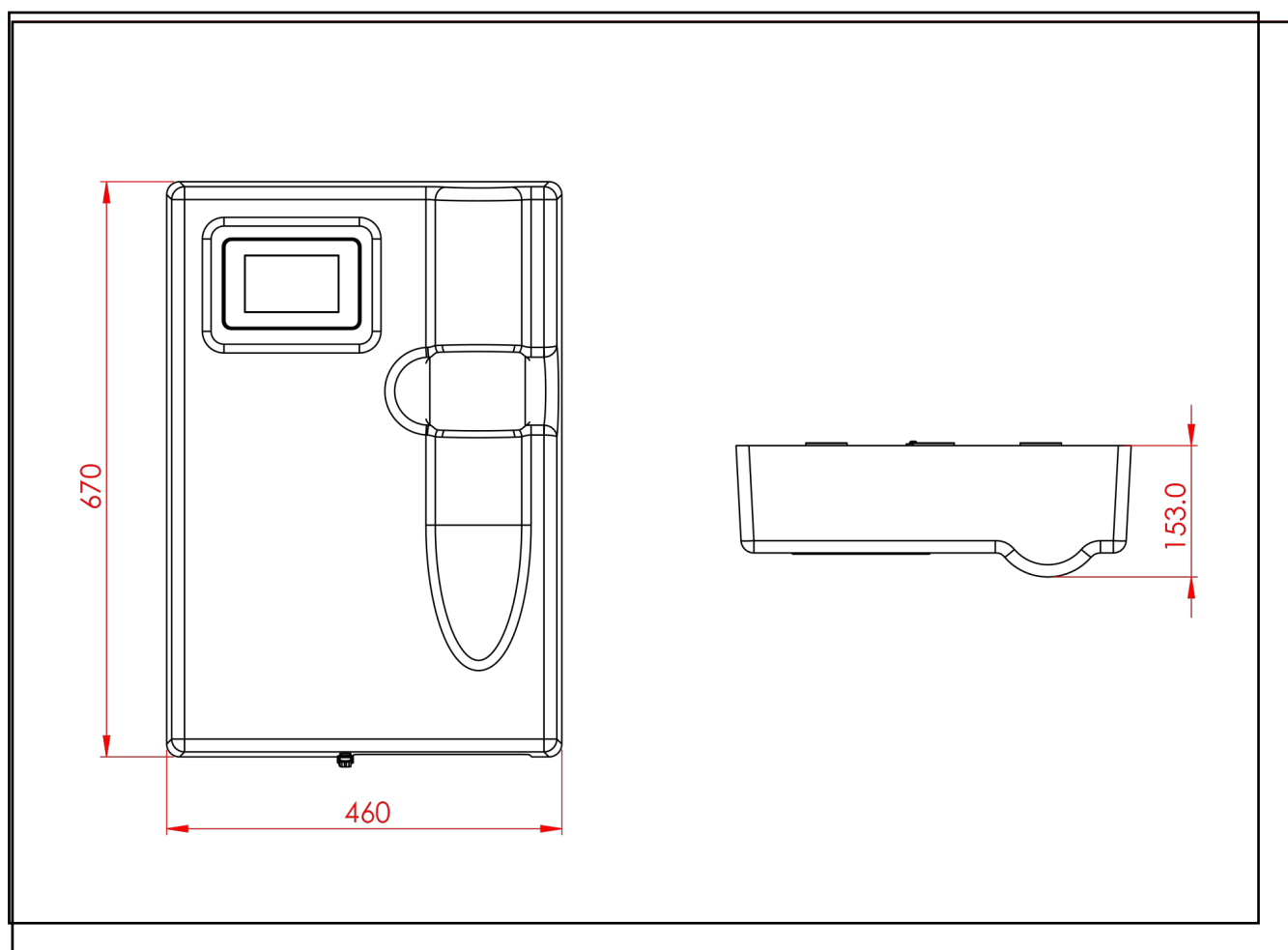
Death or serious injury

- Install in accordance with the instructions and local regulations.
- In no circumstances should the electrolytic cell be installed in an area without any ventilation.

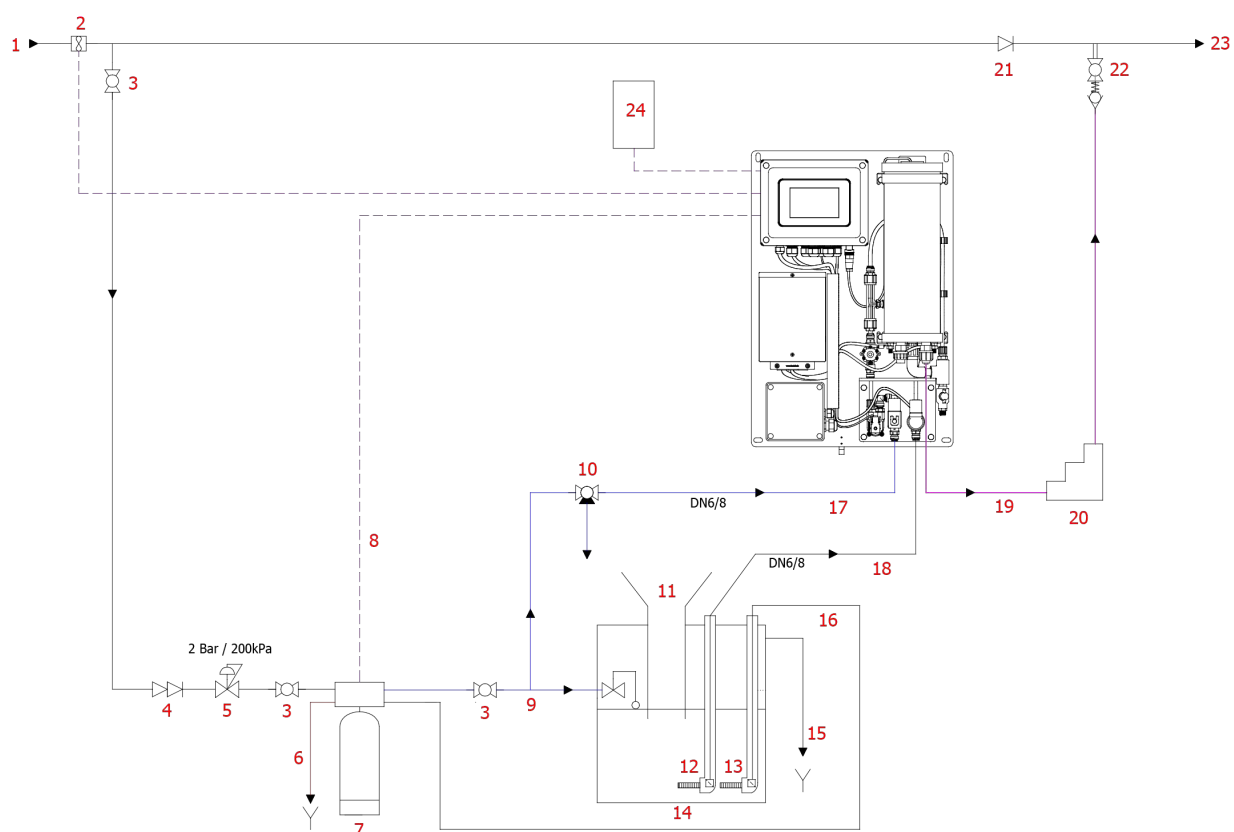
6.9 Dimensions

(All dimensions in millimetres)

6.9.1 MINICHLORGEN T Modular

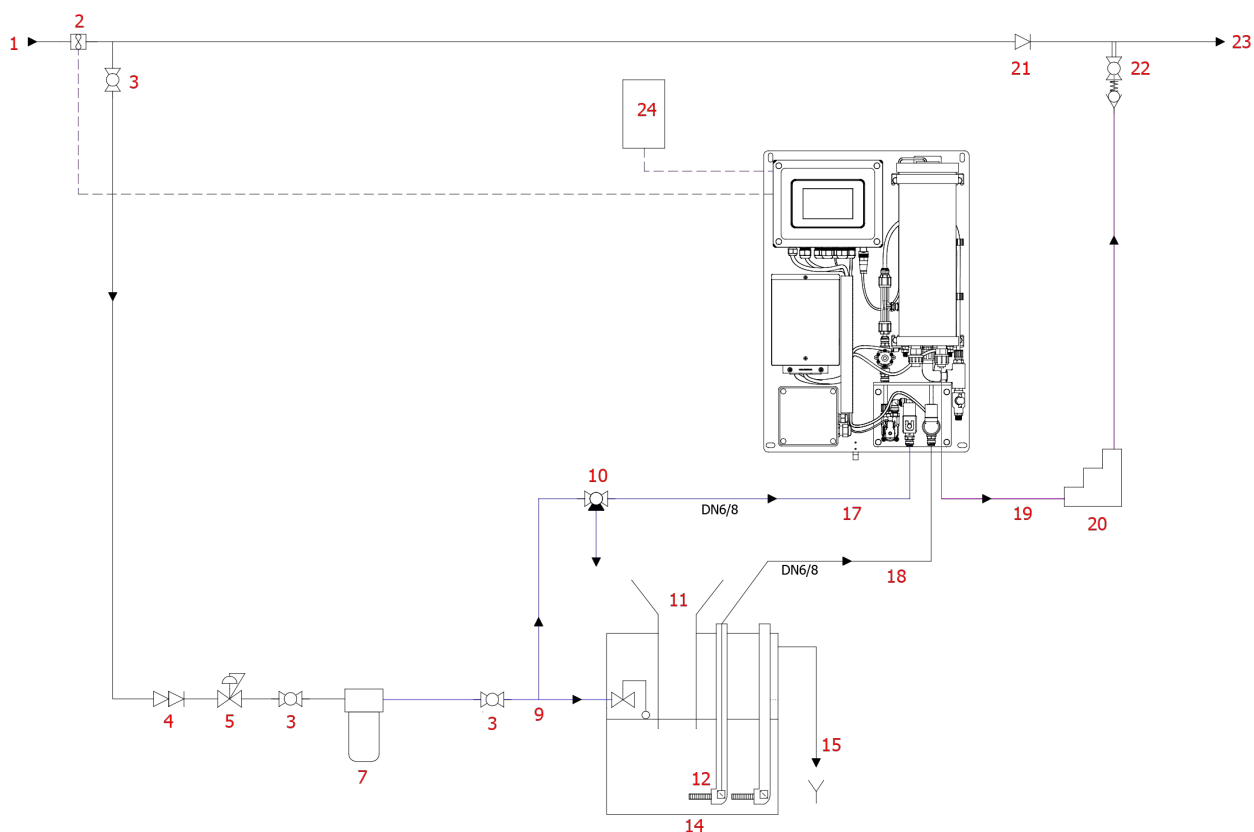


6.9.2 Install layout example 1



Item	Description	Process connection	Standard scope of delivery
1	Water supply line		-
2	Site flow meter	½" / 20 mm, PVC-U	-
3	Shut-off valve	-	-
4	Non-return valve (Category 3)	-	-
5	Pressure reducing valve	R1/2 or G3/4	Yes
6	Softener drain line	-	-
7	Water Softener	-	-
8	Softener regen switch wire	-	-
9	Softened water feed	15mm minimum	-
10	Sampling of softened water	Connector 15 mm	Yes
11	Filling funnel	-	-
12	Salt saturation kit (MINICHLORGEN T)	-	-
13	Salt saturation kit (to the softener)	-	-
14	Brine tank	½"BSPm Water inlet	-
15	Overflow	-	-
16	Brine removal water softener	-	-
17	Water supply	Connector 6mmID x 8mmOD	Yes - 3m length
18	Brine draw feed	Connector 6mmID x 8mmOD	Yes – 3m length
19	Product outlet line	-	-
20	Dosing pump	-	-
21	Non-return valve	-	-
22	Injection nozzle	-	-
23	Treated water supply line	-	-
24	-	-	-

6.9.3 Install layout example 2



Item	Description	Process connection	Standard scope of delivery
1	Water supply line		-
2	Site flow meter	1/2" / 20 mm, PVC-U	-
3	Shut-off valve	-	-
4	Non-return valve (Category 3)	-	-
5	Pressure reducing valve	R1/2 or G3/4	Yes
6	-	-	-
7	Water Softener	-	-
8	-	-	-
9	Softened water feed	15mm minimum	-
10	Sampling of softened water	Connector 15 mm	Yes
11	Filling funnel	-	-
12	Salt saturation kit (MINICHLORGEN T)	-	-
13	-	-	-
14	Brine tank	1/2" BSPm Water inlet	-
15	Overflow	-	-
16	-	-	-
17	Water supply	Connector 6mmID x 8mmOD	Yes - 3m length
18	Brine draw feed	Connector 6mmID x 8mmOD	Yes – 3m length
19	Product outlet line	-	-
20	Dosing pump	-	-
21	Non-return valve	-	-
22	Injection nozzle	-	-
23	Treated water supply line	-	-
24	-	-	-

6.10 Electrical Installation



Danger of electric shock

Death or serious injury

- Disconnect from electricity supply before working on equipment.
- Only authorised service personnel with relevant qualification can perform electrical work.



Damage to the system

Failure of main components.

- Study installation instructions and field wiring diagrams before commencing work.

6.10.1 Connection to the mains supply

The MINICHLORGEN T is intended for use as fixed equipment. The appliance is labelled as IEC class 1 and must be earthed in accordance with local regulations.

Connect the mains supply to the PCB 'MAINS IN' terminals.

Recommendations:

- Use a circuit breaker meeting the requirements of IEC 60947-2, type C or K to protect the final circuit. It must be clearly identified.
- Connect the cable cores in accordance with the local wiring regulations and the wiring diagram.

6.10.2 Field wiring

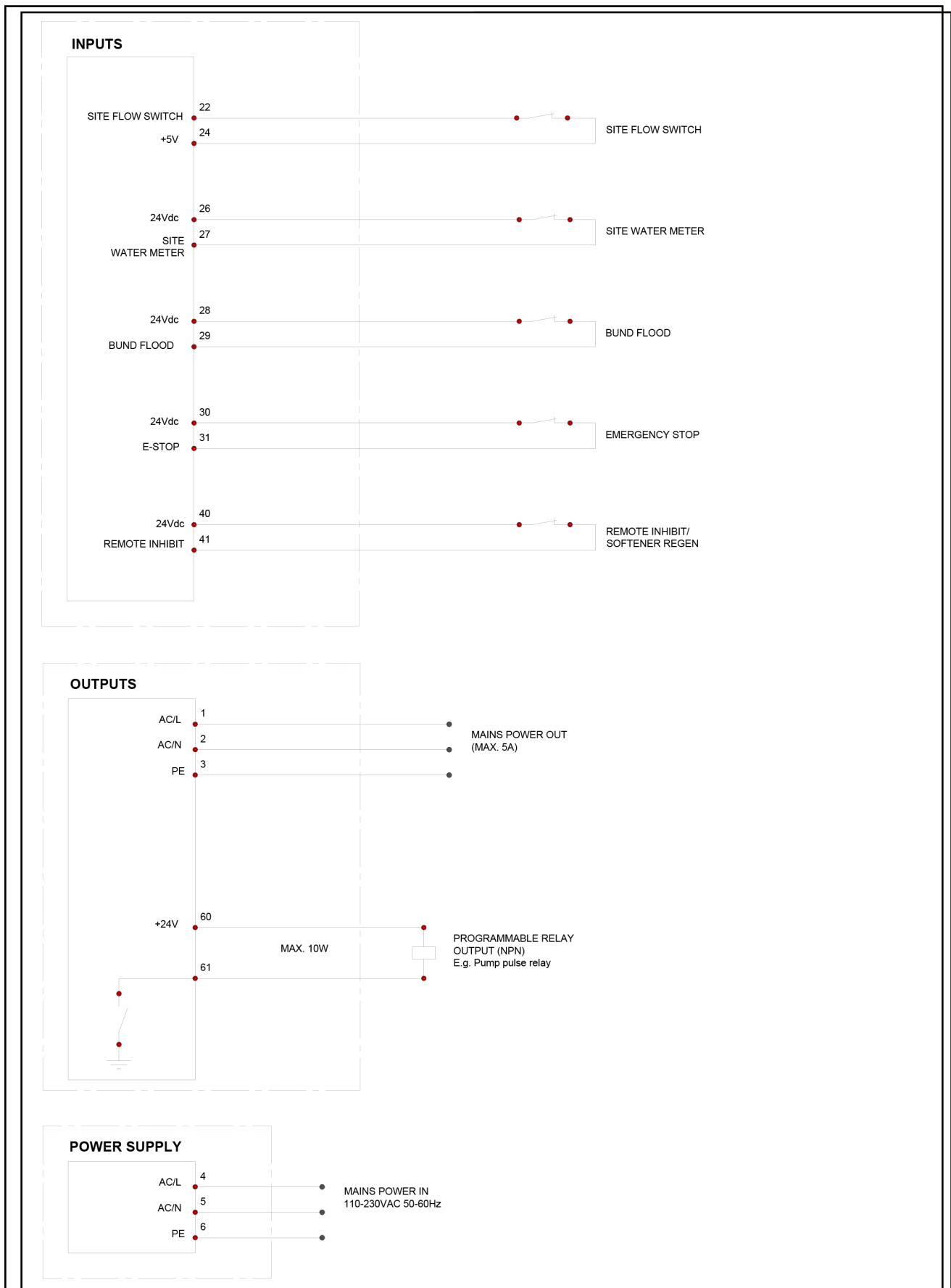
Use the field wiring diagrams to make any external connections to the MINICHLORGEN T controller.

Inputs may need to be activated via the 'Settings 1' screen on the controller HMI.

6.10.3 PCB Connection table

I.D	Description	I.D	Description
1	L Out (Power out)	41	Remote inhibit/ Softener regen
2	N Out (Power out)	42	24 V
3	PE Out (Power out)	43	Integrated level switch Start/Stop
4	L (Power in)	44	A FM
5	N (Power in)	45	Dilution A FM
6	PE (Feed in)	46	24 V
7	N.C alarm relay	47	24 V
8	C alarm relay	48	B FM
9	N.O alarm relay	49	Dilution B FM
10	C Power relay	50	0V
11	N.O. Power relay	51	0V
12	0V	52	24 V
13	Electrolyser volt signal	53	O1 Water valve
14	0V	54	24 V
15	Airflow signal	55	O2-Brine valve
16	0V	56	24 V
17	0V	57	O3
18	24 V	58	24 V
19	Water FM	59	O4
20	0V	60	24 V
21	0V	61	O5 Programmable relay
22	H ₂ 1	62	24 V
23	H ₂ 2	63	Blue LED
24	5V	64	Red LED
25	5V	65	24 V
26	24 V	66	0V
27	Reserve	67	AO0 DC amps
28	24 V	68	0V
29	Bund flood	69	AO1
30	24 V	70	PSU temp +
31	Emergency-Off	71	PSU temp -
32	24 V	72	-
33	Reserve	73	-
34	24 V	74	Electrolyser temp -
35	Reserve	75	Electrolyser temp+
36	24 V	76	Electrolyser temp -
37	Integrated level switch low	77	0V
38	24 V	78	0V
39	Integrated level switch overflow	79	+24 V SPS
40	24 V	-	

6.10.4 Field wiring diagram



7 Commissioning

WARNING



Damage to the system and risk of injury to personnel

- Commissioning must only be done by authorised service personnel.
- Wear effective PPE.

7.1 Checks before commissioning

		(✓)
1	Check equipment has been installed according to all requirements in section 6.	
2	Check environmental and location conditions meet the specifications listed in section 5.1 and 6.1.	
3	Check the saturator is filled with salt which meets specification listed in section 5.2.	
4	Check all connections and valves are tight both internal and external to the MINICHLORGEN T.	
5	Check there is natural/mechanical ventilation inside the installation room.	
6	Check that all electrical connections are correctly installed.	
7	Check that the tank outlet is connected to the dosing pump.	
8	Check water softener is installed according to manufacturer's instructions and working correctly.	
9	Check softener regen switch has been connected to the MINICHLORGEN T if a softener is in use.	
10	Check inlet water valve is closed.	

7.2 Commissioning checklist

Switch on		(✓)
1	Turn the main switch to the on position.	
2	Configure commissioning settings below (MINICHLORGEN T is delivered fully tested and pre-configured).	
Settings 1 Screen		
3	Set 'SYSTEM TAG' and 'SITE TAG'.	
4	Set status of installed field connections (LINKED OUT = Input not in use).	
5	Set 'MAX. OUTPUT'.	
6	Set batch mode (OFF if installed with product storage tank and level switches).	
Settings 2 Screen		
7	Set 'SOFT START'.	
8	Set 'RESTART DELAY' timer.	
9	Set 'BRINE' volume per batch.	
Maintenance screen		
10	Reset 'SERVICE' counters.	
11	Set IP settings and slave address if required.	
Start-Up		
12	Open water inlet valve to begin filling the electrolytic cell.	
13	Set pressure regulating valve to 2.0 bar (200 kPa) whilst solenoid valves are open.	
14	Check for leaks.	
15	Check tank start/stop switch operation.	
16	Check tank high level switch operation.	
17	Check any other field connections operate correctly.	
18	Allow the MINICHLORGEN T to generate for 60 minutes before filling in the commissioning log.	
On-site user training		
19	Explain the basic operation of the plant and sodium hypochlorite and hydrogen safety.	
20	Explain the maintenance tasks required (See section 11).	
21	Show the user how to complete the operation log (See section 12).	

7.3 Commissioning log

General	
System serial number	
System part number	

Maximum capacity (g/h)	
Salt saturator capacity (kg)	
Softener model	
Salt brand and type	
Dosing pump capacity	
Displayed values	
Volts (V)	
Amps (A)	
Hydrogen (% of LEL)	
Airflow (m ³ /hr)	
Pressure (bar)	
PSU-temp. (°C)	
Electrolytic cell temp (°C)	
Settings	
Soft start (mins.)	
Restart delay (HH:MM)	
Brine volume/batch (mls)	
Max. capacity (%)	
Site/Measured values	
Hardness (pre-softener)	
Hardness (post-softener)	
Inlet pressure	
DC Amps (A)	
AC Volts (V)	
Product strength (% / ppm)	
Product density	

8 Operation

8.1 HMI-Controller

The MINICHLORGEN T is operated by a touchscreen HMI, use your finger or a touch stylus on the surface of the screen.

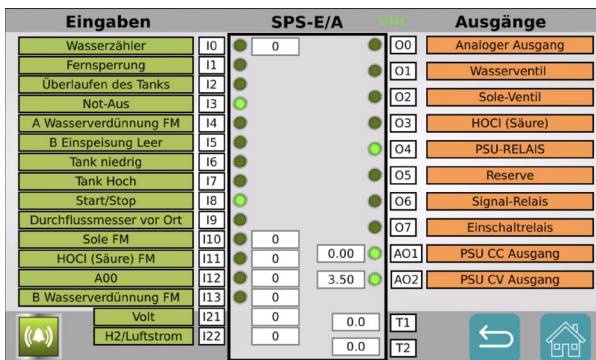
8.1.1 Home screen

Shows basic information, sub-menu icons, and allows manual operation via the ON/OFF button.



8.1.2 SPS E/A-screen

Shows the status of the digital and analogue inputs including live pulse counters from the water flow meter.



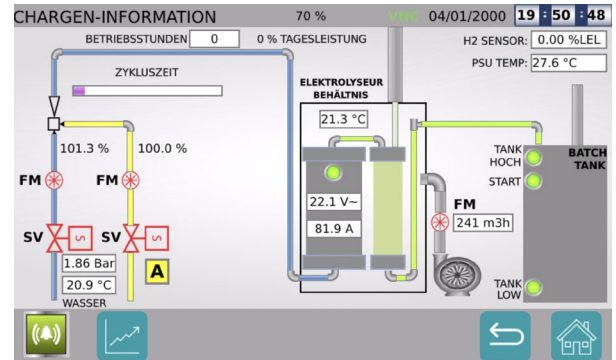
8.1.3 Alarm/System log

Shows history of alarms, acknowledgements, de-rating occurrences, system status changes and basic settings changes.



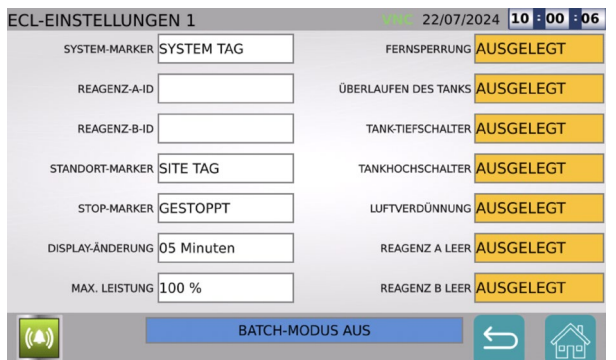
8.1.4 Process information

Shows a process mimic which includes current status or readings of flow meters, valves, sensors, cycle times, and product tank.



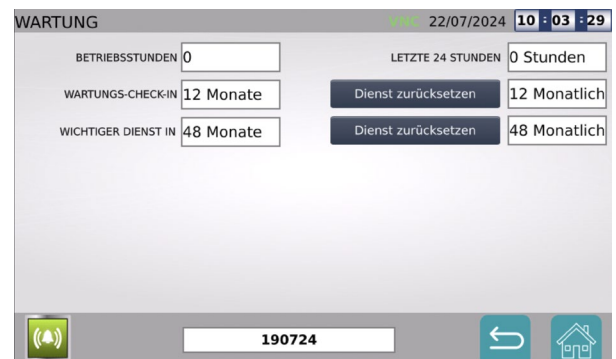
8.1.5 Settings 1

Allows adjustment of basic settings, tags and inputs.



8.1.6 Maintenance

Shows the operating hours, maintenance schedules, panel IP and language settings.



8.1.7 User rights

To change settings and access certain functions of the software, you must be logged in as a user.

'Operator' rights (Password = 002236):

- Access to the basic settings.

'Service' rights:

(Only for authorised service personnel)

- Access extended settings.
- Access to the maintenance functions.
- Access to the serial communication settings.

8.1.8 Log in procedure

1. Press and hold the area in the top right corner of the screen until the log in window appears.
2. Select the user type and enter the password.



8.2 Controller functions and settings

8.2.1 Manual inhibit

The operation of the MINICHLORGEN T can be manually inhibited to stop generation. Press the ON/OFF switch on the home screen.

8.2.2 Remote inhibit

- Operation can be remotely inhibited by an external volt free contact connected to the MINICHLORGEN T control panel.
- The screen will display 'Remote Inhibit' when active.
- The input has to be selected in 'Settings 1' if in use.

8.2.3 Programmable output

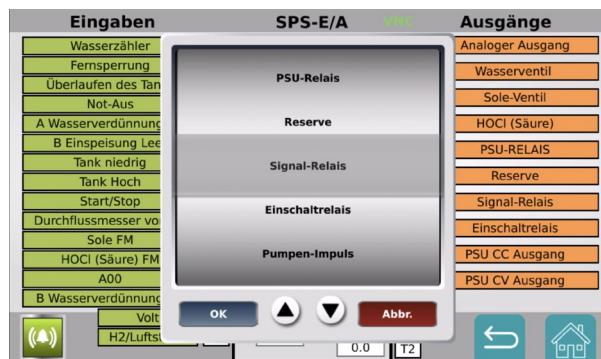
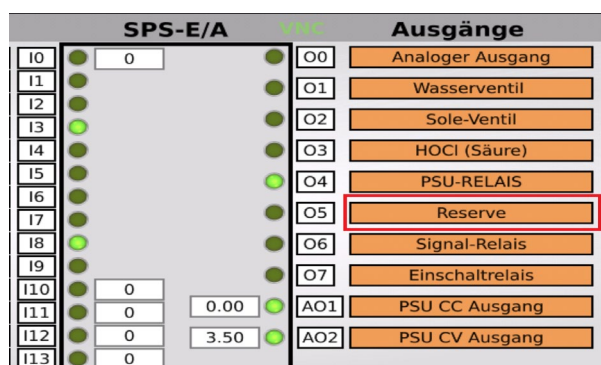
PLC

Output 5 of the PCB can be connected to an external relay, an NPN PLC input (See section 6.12.5 for field wiring connection).

The output can be selected as the following outputs:

- Run relay
- Alarm relay
- System-derating warning
- Water valve
- Brine valve
- Pump pulse output

When logged in under the 'Service' username, navigate to the 'SPS E/A' screen and press the spare output to configure its operation.



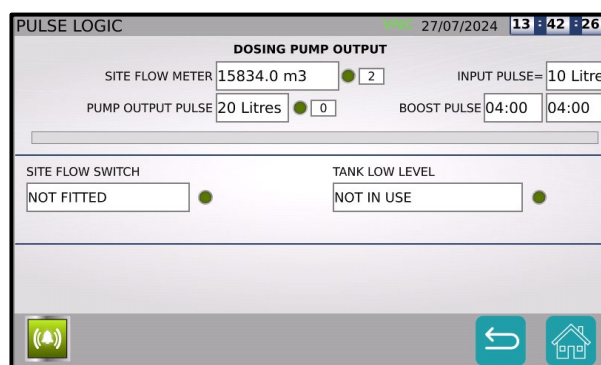
8.3 Pulse logic



A pulse water meter can be connected to the MINICHLOGEN T controller to monitor water consumption and control a dosing pump.

Configuration steps:

1. Connect a volt free site water meter to input 26 and 27 in the control panel.
2. Connect a 24Vdc control relay to outputs 60 (+) and 61 (-).
3. Connect a dosing pump pulse signal to the control relay contacts.
4. Configure the water meter pulse in and pulse out in the 'Pulse Logic' screen.
5. The 'Boost pulse' function can be used in recirculating systems to send a pulse to the dosing pump if no water meter signal has been received in the set time.



8.4 Controller communication

The controller supports the following communication protocols as standard:

- Modbus TCP (RTU with optional add-on module)
- VNC
- E-mail

8.5 Emergency shutdown

- In the event of an emergency the generating process can be immediately stopped by an emergency stop switch.
- All power to the outputs is removed when the switch is depressed, and a software alarm is activated.

9 Shutdown and emptying

WARNING



Chemical exposure hazard.

Death or serious injury

- Only authorised service personnel may drain the system.
- Chemicals may still remain in the system even after flushing.

The MINICHLORGEN T should be flushed with water before maintenance work and emptied during downtimes.

9.1 Flushing the system

1. Turn power off and on again using the switch disconnect on the MINICHLORGEN T.
2. A flush/filling cycle will commence when powered on.
3. Power off before generation happens, repeat the process two times to ensure the electrolytic cell has been flushed with water.

9.2 System drain

1. Follow the system flush procedure.
2. Isolate the power and the inlet water supply.
3. Unscrew the bottom electrolytic cell connection and place a container below it.
4. Remove the tube and allow the electrolytic cell contents to drain into the container.
5. Reconnect the tube.

9.3 Neutralising

Sodium hypochlorite may still be present in the solution emptied from the electrolytic cell, neutralise with sodium sulphite, and dilute with water before releasing into a drain.

Disposal should be done in accordance with local and site regulations and rules.

9.4 Shutdown

It is always recommended to keep the MINICHLORGEN T in standby to prevent corrosion of electrical components.

Shutdown notes:

- Follow the system flush and system drain procedure.
- Drain the product storage tank and dispose of sodium hypochlorite in accordance with local and site regulations and rules.
- Check the steel power pack enclosure is sealed shut.
- Ensure the installation room will meet environmental specifications in section 5.1
- Ensure there is sufficient heating and ventilation to prevent condensation and corrosion.
- Remove any corrosive liquids and gases from the installation room.

9.5 Disposal of old equipment

- The system 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 differ from country to country, please consult the operator for advice.

10 Troubleshooting

10.1 System warning

- System warnings are displayed on a yellow banner at the bottom of the screen.
- After a defined “alarm delay time”, some warnings cause a system fault.
- Warnings are logged in the alarm history.



10.2 System fault

- System faults are displayed on an orange banner at the bottom of the screen.
- Once a fault condition is rectified the reset button can be pressed to change the status to 'Healthy' and resume generation.
- Press the  button to access the alarm summary.



- Click on the “Info” symbol in the alarm summary to display the cause and possible remedies for the error status.



10.3 Error messages

Message	Possible cause	Remedy
Overflow of tank	Liquid leak inside skid spill bunds.	Find source of leak, repair and empty the bunds.
	The bund float switch is stuck in an upwards position or has an open circuit.	Repair or replace the bund switch.
Emergency-Off	The emergency-off switch has been pressed.	Reset the emergency-off switch if it is safe to do so.
	There is a fault with the emergency stop wiring or switch.	Check and repair the switch wiring.
Tank low	The product tank is leaking.	Find source of leak and repair.
	Level sensor is in open circuit position.	Repair or replace level switch.
	The demand of the application is too high for the output of the generator.	Reduce the demand of the application or increase the size of the generator.
	Output setting is too low.	Increase output % in settings.
Tank high	Water solenoid valves are leaking.	Find source of valve leak and repair or replace.
	Start/Stop or high-level sensor is lifted or in open circuit position.	Repair or replace level switch.
	There is back-flow from the application into the product storage tank.	Eliminate the back-flow from the application.
Water Flow Fault	Low water inlet pressure.	Adjust PRV, increase water pressure, install a water boost system.
	The strainer of the pressure reducing valve is blocked.	Cleaning the strainer of the pressure reducing valve.
	The water solenoid valve or connection is defective.	Repair or replace water solenoid valve.
	The water flow meter or wiring connection is defective.	Repair or replace the water flow meter.
	There is a blockage in the system.	Remove all blockages.
Water Valve Fault	Water solenoid valve is stuck in open position.	Remove impurities from solenoid valve. Repair or replace water solenoid valve.
	Water solenoid valve is installed in the wrong orientation.	Check the arrow on the body of the valve matches the direction of flow and change if necessary.
	Inlet water pressure is too high.	Adjust water inlet pressure is set to 1.5 bar on the PRV. Repair or replace PRV.
	Water solenoid valve is being energised when it shouldn't be.	Check PLC and PCB wiring and output statuses and repair/replace.
High volts	Low volume of brine per batch.	Adjust brine volume setting to 50-75mls. Check for and remove blockages in the brine line. Adjust water pressure to 1.5 bar at the PRV.
	Low brine concentration.	Refill saturator with salt. Check salt saturator fill valve isn't passing and repair/replace if necessary.
	Scaling/fouling of electrodes.	Acid wash electrolytic cell and find the source of the scaling/fouling. Repair/replace water softener. Check salt quality meets the specification in section 5.2.
	DC power supply output is on whilst the MINICHLORGEN T generation is stopped.	Check the PSU run signal wiring. Check the run relay status. Repair or replace PSU/PLC/PCB.

Message	Possible cause	Remedy
Low volts	High volume of brine per batch.	Check brine volume setting is 50-75mls.
	Brine solenoid valve is stuck in open position.	Remove impurities from solenoid valve. Repair or replace the solenoid valve. Check PLC and PCB wiring and output statuses and repair/replace.
	DC power supply has no output voltage.	Check PLC and PCB wiring and output statuses and repair/replace. Replace PSU relay. Replace PSU fuses. Replace PSU.
High current	DC amp adjustment setting is incorrect.	Contact the operator.
Low current	DC amp adjustment setting is incorrect.	Contact the operator.
	System has de-rated its output to its minimum level.	Ensure site and environmental conditions meet the parameters in section 5. See the MINICHLORGEN T alarm log for de-rating warning history.
PSU temp high	The inlet water temperature is too high.	Install a water cooler.
	PSU enclosure separation baffle has been removed.	Fit new separation baffle.
	Enclosure axial fans have failed (2000 only)	Replace axial fans.
Electrolytic cell temp high	The inlet water temperature is too high.	Install a water cooler.
	Negative electrolytic cell connection is loose	Tighten the M8 nuts, replace cable if necessary.

10.4 System messages

Message	Reason
Remote inhibit	Remote inhibit connection is open circuit. External control has called for the system to be remotely stopped.
Manual inhibit active	The system has been manually stopped using the ON/OFF button on the display.
Stopped/Tank full	External tank level has reached the start/stop tank full switch. External control has stopped the system. Start/stop input (Terminal 42/43) is disconnected. Level switch is faulty.
Service check	System service check counter has reached 0 months, service check is now due. Authorised service personnel can reset this warning once maintenance has been completed.
Major Service due	The major maintenance counter has reached 0 months; maintenance is now due. Authorised service personnel can reset this warning once maintenance has been completed.
„XXXXXX“ linked out	The digital input has been deactivated and will not trigger any warnings or alarms. This is recorded.

11 Maintenance

The MINICHLORGEN T is designed to have a long service life, however some parts are subject to operational wear. It is therefore necessary to regularly perform visual inspections and maintenance work.

DANGER!



Danger of electric shock

Death or serious injury

- Disconnect from electricity supply before working on equipment.
- Only authorised service personnel with relevant qualifications can perform electrical work.



NOTICE



Damage to the system

Failure of main components

- Study maintenance instructions before commencing work.
- Only authorised service personnel may carry out maintenance work.



WARNING



Chemical exposure hazard.

Death or serious injury

- Only authorised service personnel may carry out scheduled maintenance work.
- Wear effective PPE.

11.1 Maintenance checks for users

Maintenance checks which are to be performed regularly by users after being trained by the operator / authorised service personnel.

11.1.1 Supply with softened water

- Water hardness tests should be completed and recorded regularly with a maximum interval of 7 days between tests.
- Calcium hardness should read below 20mg/l CaCO_3 .
- Contact the operator immediately if hardness readings are high.

11.1.2 Salt saturator refill

- Ensure the saturator is refilled regularly with the correct specification salt to avoid high voltage alarms and electrode scaling/fouling.

11.1.3 General

- Complete the operation log (See section 12).
- Check for leaks.
- Check the state of the piping and components.
- Contact the operator immediately if there are any leaks or damage to the equipment.

11.2 Maintenance for authorised personnel

11.2.1 MINICHLORGEN T

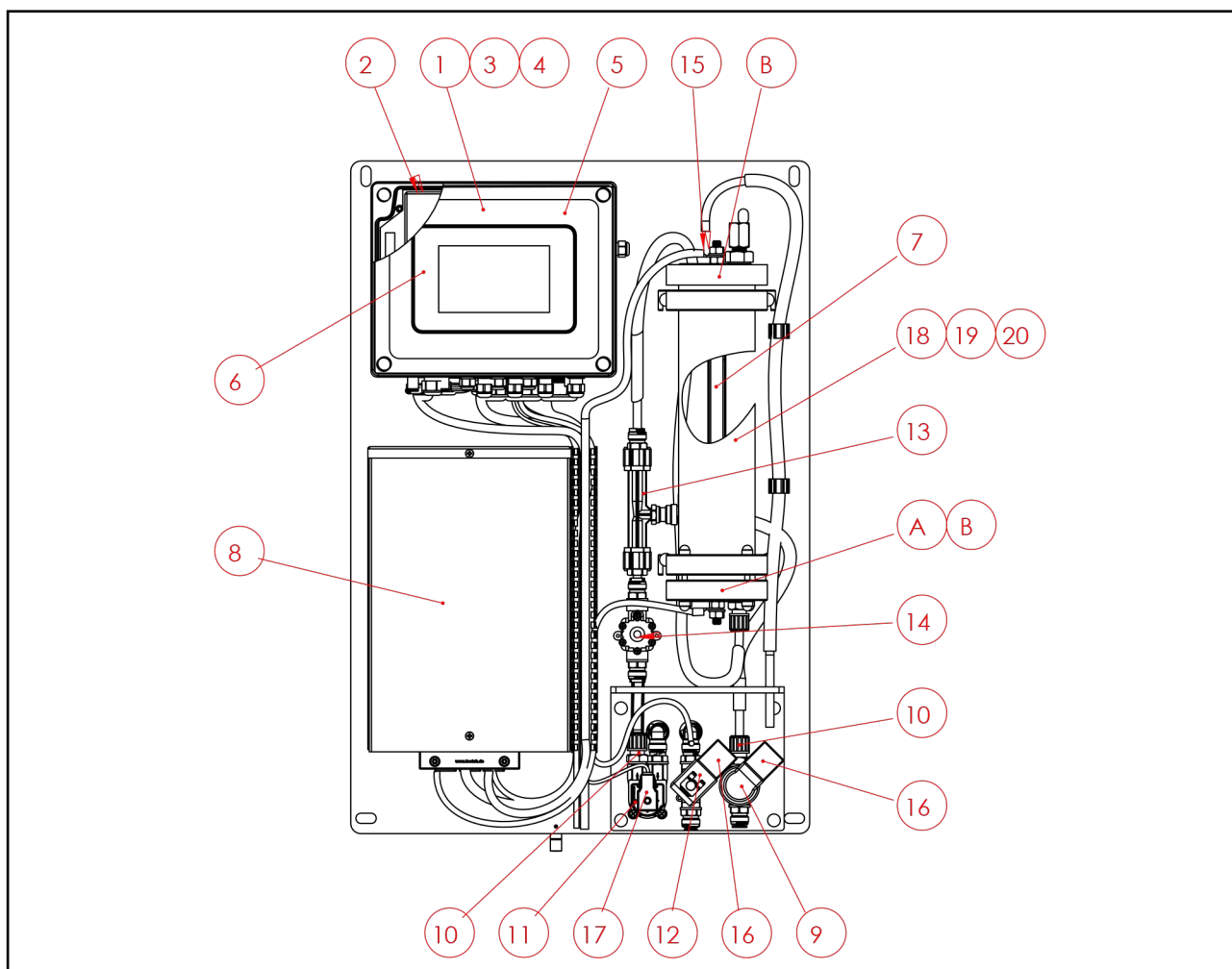
- The MINICHLORGEN T has a 4-year preventative maintenance schedule with two-year intervals. Once the 4th year is reached, the cycle repeats.
- Annual checks should be made to ensure the MINICHLORGEN T and associated equipment are working correctly.
- All seals in the MINICHLORGEN T are chemically resistant and do not need replacement as part of the 4-year maintenance cycle. Seals in contact with NaClO solution are recommended to be replaced 4-6 years from the date of installation.

11.2.2 Water softener

The water softener must be regularly maintained to prevent scaling/fouling of the electrodes. Refer to the softener manufacturer's instructions for maintenance procedures.

11.3 Maintenance and spare parts

Only authorised service personnel are permitted to replace the parts in this section.



11.3.1 Preventative maintenance schedule

Interval	No.	Description	Quantity	Available maintenance sets	
Year 2	12	Water solenoid valve	1	Maintenance set MINICHLORGEN T (2 years)	Maintenance set MINICHLORGEN T (2 years) complete
	9	Brine solenoid diaphragm	1		
	-	Pressure regulator valve (PRV) maintenance set	1	-	
Year 4	12	Water solenoid valve	1	Maintenance set MINICHLORGEN T (4 years)	Maintenance set MINICHLORGEN T (4 years) complete
	10	Water dilution NRV	1		
	9	Brine solenoid valve	1		
	4	PLC battery	1		
	-	Pressure regulator valve (PRV) maintenance set	1	-	

11.3.2 Maintenance schedule for seals

Interval	No.	Description	Quantity	Available maintenance set
Years 4 - 6	-	Electrolytic cell seals kit (Seals in contact with NaClO)	1	Sealing set MINICHLORGEN T (4 years)

11.3.3 Spare part list

No.	Description	Quantity
1	PLC	1
2	PCB	1
3	PLC-PCB connector board set (3x boards, 3x ribbon cables)	1
4	PLC battery	1
5	Fascia (Black)	1
6	Fascia (Navy)	1
7	LED status display	1
8	PSU Single module (30/60/90)	1
-	Electrolytic cell DC cable set	1
-	PSU signal cable	1
9	Brine solenoid valve	1
10	Non-return valve (Water/Brine)	1
11	Dilution water flow meter	1
12	Dilution water solenoid valve assembly	1
13	Brine eductor	1
-	Pressure reducing valve (1/2" brass)	1
14	Pressure reducing valve (1/2" blue)	1
15	Electrolytic cell temperature sensor	1
16	Dilution water/Brine solenoid plug/cable (Form A)	1
17	Dilution water flow meter cable (Form CI)	1
18	Electrolytic cell assembly	1

11.4 Electrolytic cell acid cleaning

WARNING



Chemical hazard

Mixing hydrochloric acid with sodium hypochlorite releases hazardous chlorine gas.

- Only authorised service personnel can perform acid cleaning.
- Check internal degassing column drain valve is open before starting CIP procedure to prevent acid being directed to the NaClO storage tank.
- Use effective PPE.



If the installed softening device fails or the wrong grade of salt is used the electrolytic cell will become scaled. Scale reduces efficiency of the process and will eventually cause the MINICHLORGEN T to enter a 'Voltage High' alarm state.

11.4.1 Acid cleaning notes

- Repeated acid cleaning will damage the electrolytic cell and reduce overall operating life, always seek to rectify the cause of scaling before putting the MINICHLORGEN T back into operation.
- Never remove the electrolytic cell from its casing, this will void warranty.
- Use a pump to circulate acid through the system, flow rate should be between 10-20L/min.
- Only use hydrochloric acid with a concentration between 5-10%.
- Do not leave the electrolytic cell in acidic solution for more than 10 minutes to prevent damage to the electrodes.

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13 EU declaration of conformity



(DE) EU-Konformitätserklärung

Hiermit erklären wir, dass das nachfolgend bezeichnete Gerät aufgrund seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der aufgeführten EG-Richtlinien entspricht. Bei einer nicht mit uns abgestimmten Änderung am Gerät verliert diese Erklärung ihre Gültigkeit.

(EN) EU Declaration of Conformity

We hereby certify that the device described in the following complies with the relevant fundamental safety and sanitary requirements and the listed EC regulations due to the concept and design of the version sold by us.

If the device is modified without our consent, this declaration loses its validity.

(FR) Déclaration de conformité UE

Nous déclarons sous notre propre responsabilité que le produit ci-dessous mentionné répond aux exigences essentielles de sécurité et de santé des directives CE énumérées aussi bien sur le plan de sa conception et de son type de construction que du modèle que nous avons mis en circulation.

Cette déclaration perdra sa validité en cas d'une modification effectuée sur le produit sans notre accord explicite.

(ES) Declaración de conformidad UE

Por la presente declaramos que, dados la concepción y los aspectos constructivos del modelo puesto por nosotros en circulación, el aparato mencionado a continuación cumple con los requisitos sanitarios y de seguridad vigentes de las directivas de la U.E. citadas a continuación.

Esta declaración será invalidada por cambios en el aparato realizados sin nuestro consentimiento.

(NL) EU-overeenstemmingsverklaring

Ondergetekende Lutz-Jesco GmbH, bevestigt, dat het volgende genoemde apparaat in de door ons in de handel gebrachte uitvoering voldoet aan de eisen van, en in overeenstemming is met de EU-richtlijnen, de EU-veiligheidsstandaard en de voor het product specifieke standaard. Bij een niet met ons afgestemde verandering aan het apparaat verliest deze verklaring haar geldigheid.

(PT) Declaração de conformidade UE

Declaramos pelo presente documento que o equipamento a seguir descrito, devido à sua concepção e ao tipo de construção daí resultante, bem como a versão por nós lançada no mercado, cumpre as exigências básicas aplicáveis de segurança e de saúde das directivas CE indicadas.

A presente declaração perde a sua validade em caso de alteração ao equipamento não autorizada por nós.

Bezeichnung des Gerätes:

Natriumhypochlorit-Generator vor Ort

Description of the unit:

On-site sodium hypochlorite generator

Désignation du matériel:

Générateur d'hypochlorite de sodium sur site

Descripción de la mercancía:

Generador de hipoclorito de sodio in situ

Omschrijving van het apparaat:

Natriumhypochlorietgenerator op locatie

Designação do aparelho:

Gerador de hipoclorito de sódio no local

Typ:

MINICHLORGEN T 3 / 6 / 30 / 60 / 90

Type:

EU-Richtlinien:

Niederspannungsrichtlinie / Low Voltage Directive (2014/35/EU)

EC directives:

RoHS-Richtlinie / RoHS Directive (2011/65/EU)

EMV-Richtlinie / EMC Directive (2014/30/EU)

Harmonisierte Normen:

NSR / LVD: EN 60335-1:2012+A2:2019

Harmonized standards:

RoHS: EN 63000:2018

EMV / EMC: EN 61000-6-2:2019

EN 61000-6-4:2019

EN 61000-4-2:2009

EN 61000-4-5:2014

EN 61000-4-6:2013

N 61000-4-11:2020

Dokumentationsbevollmächtigter:
Authorized person for documentation:

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Heinz Lutz
Geschäftsführer / Chief Executive Officer
Lutz-Jesco GmbH
Wedemark, 24.02.2026

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