



evoqua
WATER TECHNOLOGIES



WALLACE & TIERNAN[®]
CHLORINE DIOXIDE GENERATOR
DIOX-A 250

INSTRUCTION MANUAL



Note

Original manual!

Contents

1.	Introduction	7
1.1	Target groups	7
1.2	Conventions	8
2.	Safety	9
2.1	Intended use	9
2.2	General safety instructions	10
2.3	Safety instructions specifically for the chlorine dioxide generator	11
2.4	Standards and legal requirements	14
2.5	Data sheets	14
3.	Description	15
3.1	Versions	15
3.2	Required accessories	15
3.3	Optional Accessories	17
3.4	Operating principle	17
3.5	View	19
3.6	Technical data	20
3.7	DIOX-A with booster pump	21
3.8	DIOX-A without booster pump	22
3.9	Operating modes	23
4.	Installation	25
4.1	Scope of supply	25
4.2	Transport, storage, unpacking	26
4.3	Conditions for installation	26
4.4	Installation	27
4.5	Electrical installation	32

4.6	Commissioning	33
4.7	Setup	35
4.8	Settings list	38
5.	Interfaces	39
5.1	Selecting the interface	39
5.2	Connecting PROFINET IO-Device	40
5.3	Connecting PROFIBUS DP	44
5.4	Connecting MODBUS TCP	48
5.5	Changing the IP address of the CPU	52
5.6	Connecting Process Monitoring System (PMS)	56
5.7	Data formats	58
5.8	Reference list	60
6.	Operation	63
6.1	Control and display unit	63
6.2	Operating the control unit	64
6.3	Display scheme	67
6.4	Operation menus	68
6.5	Evacuation and Calibration	73
6.6	Activating ClO ₂ generation	79
6.7	Deactivating ClO ₂ generation	80
6.8	Emergency switch-off	80
6.9	AUTO mode, MANUAL mode	82
6.10	Flushing the system	84
6.11	Operation	86
6.12	Emptying the system	88
6.13	Messages and fault messages	89



7. Maintenance	93
7.1 Maintenance/inspection plan	94
7.2 Maintenance by the operator	94
7.3 Maintenance by qualified personnel	95
8. Maintenance and spare parts	97
8.1 Maintenance sets overview	97
8.2 Maintenance parts	99
9. Optional accessories	103
10. Wiring diagrams	105
10.1 Wiring diagrams WAE8885	105
10.2 Cable inlet	107
11. Index	109



1. Introduction

1.1 Target groups

This instruction manual provides information for installation, operating and maintenance personnel. It is required to operate and maintain the unit.

This instruction manual is intended for the operating personnel. It contains important information which will enable the operator to run the system in a safe, reliable, trouble-free, and economical way. Carefully observing these instructions will help to avoid dangers, reduce repair costs and down times, improve the system's reliability, and prolong its service life.





The chapters on installation and maintenance are solely provided for trained service personnel. These sections contain important information on assembling, configuring, and commissioning the system and on maintenance and repair work.

All persons working with the system must have read and understood the instruction manual, in particular the safety instructions it contains.

Please consult the table of contents and the index to quickly find the information you require.

1.2 Conventions

Notes The different weighting assigned to the various notes in this manual is indicated by means of pictogram symbols.

Picto-gram	Note	Meaning
	<i>Danger!</i>	Risk to life and limb
	<i>Warning!</i>	Risk involving electric current. Switch the system OFF at the emergency stop switch.
	<i>Attention!</i>	Failure to observe this instruction may result in damage to the system.
	<i>Note</i>	These notes facilitate work with the unit / system.

2. Safety

2.1 Intended use

The chlorine dioxide generator DIOX-A 250 is designed for the generation and dosing of a chlorine dioxide solution for disinfecting water.

The operational safety of the system can only be guaranteed so long as it is used strictly as intended. The system may only be used for the purpose defined in the order and under the operating conditions indicated in the technical specifications.

Compliance with the intended use also includes reading this instruction manual and observing all the instructions it contains. The system may only be installed and serviced by the personnel of the manufacturer or by personnel having been specially trained for this system by the manufacturer.

Furthermore, all inspection and maintenance work must be performed at the prescribed intervals. In particular, the annual maintenance by the manufacturer must be carried out on schedule.

The operator bears full and sole responsibility if this unit is put to any use which does not comply strictly and exclusively with this intended use.

Not intended use

Not intended and therefore not permitted is the following:

- Use or generation of other media or higher concentration.
- Transport with filled tanks
- mobile use

2.2 General safety instructions

The manufacturer attaches great importance to ensuring that work on its system is always perfectly safe. Safety is our guiding principle right from the design phase. The system is therefore equipped with safety features.

Safety instructions

The safety instructions in this documentation must be observed unconditionally at all times. Additional industry-wide or in-house safety regulations also continue to apply.

Safety instructions on the system

All safety instructions attached to the system itself must be observed. These instructions must always be clearly legible and complete.

State-of-the-art technology

The system has been constructed in accordance with state-of-the-art technology and the accepted safety regulations. However, in the event of the system being used by persons who have not been adequately instructed, risks to life and limb of such persons or third parties and damage to the system itself or to other property cannot be ruled out. Work not specifically described in this instruction manual may only be performed by authorized personnel.

Personnel

The operator running the system must ensure that only authorized and qualified specialist personnel work with and on the system and only within their assigned areas of responsibility. „Authorized specialist personnel” refers to trained technicians employed by the operator, by the manufacturer, or, if applicable, the service partner. All work on electrical components must be performed by qualified electricians only.

Spare parts / components

Trouble-free operation of the system is only guaranteed if original spare parts and components are used in precisely the combination described in this instruction manual. Failure to observe this instruction may incur the risk of malfunction or damage to the system.

Extensions and conversions

The system must not, without the express, prior, written consent of the manufacturer, be modified, extended, or converted in any way that might adversely affect its safety.

Electrical power

During normal operation, the control unit must remain closed.

Before starting any assembly, inspection, maintenance, or repair work, the system / device must be switched OFF with the emergency stop switch and the switch must be secured against reactivation.

Connect all cables as per the terminal diagram.

Disposal

Ensure that auxiliary materials and replaced parts are disposed of in a manner that is safe and environmentally benign.

2.3 Safety instructions specifically for the chlorine dioxide generator



Note

The operator is obliged to provide the user with operating instructions on the safe use of the chlorine dioxide generator. These operating instructions must include the information listed below.

Hazardous substances

- Chlorine dioxide ClO₂, aqueous solution (2 - 4 g/l (2000 - 4000 ppm), for water disinfection

ClO₂ solution is yellowish-green to orange in colour

Description of the risks involved

- Hydrochloric acid (HCl) 9 %
- Sodium chlorite (NaClO₂), aqueous solution 7.5 %, for the production of chlorine dioxide
- Hydrochloric acid and sodium chlorite solution must never come into contact with each other outside of the reactor, otherwise hazardous chlorine dioxide will be released.
- Hazards of chlorine dioxide:
 - Toxic if swallowed.
 - Causes burns.
 - Highly toxic to aquatic organisms.
- Never use higher concentrations of the solutions. Danger of explosion!
- Dry sodium chlorite is an accelerant. Do not allow to dry on flammable materials. Risk of fire!

General safety precautions

- Access to the unit should be restricted to trained personnel. Prevent unauthorised access to the unit and storage areas.
- Smoking and open flames prohibited.
- Do not inhale chlorine or chlorine dioxide fumes.
- Always have a respiratory mask with filter ready to use.
- Provide ample ventilation.
- Wear suitable protective clothing, gloves and eye/face protection.
- Avoid release to the environment. Refer to special instructions/ safety data sheet.

Specific safety precautions

- The chlorine dioxide generator may only be used with the following substances:
 - Hydrochloric acid 9 % in accordance with DIN EN 939 type 1
 - Sodium chlorite 7.5 % in accordance with DIN EN 938 type 1

- All containers used for chemicals, suction lances and collecting basins must be clearly marked to avoid confusion.
- Display notices about water chlorination in the workplace and in the immediate vicinity in accordance with the requirements of the accident prevention regulation on the chlorination of water.
- Chlorine dioxide is produced as a diluted aqueous solution (max. 2g/l (2000 ppm)) for immediate use.
It may only be stored in sealed containers. Any gas which is allowed to escape from the container must, at the very least, pass through an absorption system before being released into the environment.
- Hydrochloric acid and sodium chlorite solution must only be transported and stored in the original, sealed, upright container. Install in separate, suitably sized collecting basins. Do not stack.
Do not transfer or dilute.
Keep away from heat and direct sunlight.
Avoid all contact with each other or other chemicals.

Personal protection and code of conduct

- Eye Protection: tightly fitting safety goggles, face mask, eye rinse or eye wash fountain.
- Gloves: chemical resistant gloves.
- Protective clothing: tightly fitting protective clothing or a rubber apron and rubber boots.
- Breathing protection: If fumes are released, wear a respiratory mask per current standards (e.g. OSHA).
- Hygiene: do not eat, drink or smoke. Do not store food or any other substances intended for human consumption in the plant area. Wash hands thoroughly after work and before taking breaks.
Keep the workplace clean and tidy.
- Do not dismantle any parts of the system or drain off any liquid while there is any ClO₂, HCl or NaClO₂ left in the system.

What to do in the event of a fault or emergency

- Use water spray to disperse gas released from solution.
- Neutralize chlorine dioxide solution with sodium thiosulphate solution then dilute with plenty of water and wash down the drain, observing any local regulations concerning release of chemical waste into the sewage system.
- Never mop up with flammable or oxidisable materials (such as cloths or sawdust).
- Do not neutralize sodium chlorite solution with sodium thiosulphate solution. Instead, dilute with plenty of water and wash down the drain, observing any local regulations concerning release of chemicals into the sewage system.

-
- Remove any clothing that has come into contact with the sodium chlorite solution immediately and wash thoroughly. Do not allow the solution to dry.
- What to do in the event of fire*
- Aqueous solutions of chlorine dioxide are not flammable.
 - Extinguish any fire in the vicinity with water, preferably using a sprinkler system to dilute the gas.
 - In the event of an electrical fire use conventional fire extinguishing methods.
- What to do in the event of an accident involving chlorine dioxide - First aid*
- In the event of an accident or if you feel unwell, seek medical advice immediately. Check the safety data sheet (refer to 2.5).
 - If splashed in the eyes, flush with running water for several minutes holding the eyelid open (remove contact lenses before flushing). Seek medical attention.
 - If skin contact occurs: Rinse with plenty of water. Remove contaminated clothing and wash skin again. Seek medical attention.
 - If swallowed, rinse mouth out and make the victim drink plenty of water (if the victim is conscious) induce vomiting and consult a doctor without delay.
 - If inhaled: The victim should leave, or be removed from, the contaminated area to fresh air as rapidly as possible and should rest. Seek medical attention.
- Observe the material safety data sheets for hydrochloric acid and sodium chlorite.
- Disposal instructions*
- Neutralize ClO_2 solution with sodium thiosulphate solution then dilute with plenty of water and wash down the drain, observing any local regulations concerning release of chemicals into the sewage system.
- ClO_2 solution is a yellowish-green to orange gas which is colourless following neutralization.
- To neutralize 100 g ClO_2 , 234 g of sodium thiosulphate (dry) is required. This means, 1 liter (0.26 US gal) of the diluted aqueous ClO_2 solution (at 2 g/l (2000 ppm)) must be neutralized with approx. 5 g sodium thiosulphate.
- Observe the material safety data sheets for chlorine dioxide, hydrochloric acid and sodium chlorite.

2.4 Standards and legal requirements

Applicable in Germany.

- „Chlorung von Trinkwasser“ (German accident prevention regulation on the chlorination of potable water), DGUV Information 203-086
- „Dosieranlagen für Chlordioxid“ (Chlorine dioxide feed systems) DVGW W 624,
- „Chlordioxid in der Wasseraufbereitung“ (Chlorine dioxide in water purification applications) DVGW W 224,
- TrinkwV 2001 (German Drinking Water Ordinance),
- Wasserhaushaltsgesetz (Federal Water Act, WHG) §19,
- Gefahrstoffverordnung (Hazardous Substances Ordinance, GefStoffV),
- DIN EN 12671

This list makes no claim to be complete, up-to-date or valid in the location where the unit is installed or used.

2.5 Data sheets

EU Safety Data Sheets

- Hydrochloric acid: to receive from supplier
- Sodium chlorite: to receive from supplier
- Chlorine dioxide:

The safety data sheet for chlorine dioxide can be downloaded from <http://sds-id.com/1000102-8>

3. Description

3.1 Versions

The chlorine dioxide generator (also referred to as „generator” in this manual) is available in four different capacities.

Article No.	Chlorine dioxide generator	Nominal capacity
W3T162362	DIOX-A 50	50 g/h ClO ₂
W3T162363	DIOX-A 100	100 g/h ClO ₂
W3T162364	DIOX-A 170	170 g/h ClO ₂
W3T169910	DIOX-A 250	250 g/h ClO ₂

3.2 Required accessories

- Starting chemicals:
 - Carboy or tank with hydrochloric acid (HCl), 9%
 - Carboy or tank with sodium chlorite solution (NaClO₂) 7.5%
- Sodium thiosulfate for neutralization of ClO₂ solution
- Suction lances

If carboys are used:

- Adaptor plugs for carboys
- Collecting basins for carboys

The individual components can be obtained separately or from Evoqua. The exact requirements pertaining to the accessories are described in chapter 4.

3.2.1 Suction lances

The design and length of the suction lances must match the chlorine dioxide generator and the used containers. Evoqua offers the following types of suction lances:

Article No.	Description
W3T168018	length 475 mm
W3T168019	length 725 mm
W3T168020	length 975 mm
W3T168021	length 1125 mm

3.2.2 Chemicals

Evoqua offers the required chemicals in containers in several sizes:

Article No.	Description	Capacity
W3T171801	Hydrochloric acid 9 %	20 kg
W3T171802	Hydrochloric acid 9 %	60 kg
W3T171799	Sodium chlorite 7.5 %	10 kg
W2T505789	Sodium chlorite 7.5 %	20 kg
W3T171800		60 kg
W3T163644	Sodium thiosulphate	300 g

3.2.3 Adaptor plugs for carboys

If carboys are used, adaptor plugs may be required in order to fit in the suction lances. We offer the following types of adaptor plugs:

Article No.	Description
W3T160418	Adaptor plug for 10 l carboys
W3T164389	Adaptor plug for 20 - 30 l carboys

3.2.4 Collecting basins

The carboys for hydrochloric acid and sodium chlorite solution must be placed in separate collecting basins. We offer the following types of basins (article comprises 2 pieces):

Article No.	Description
W2T505585	For 10 - 20 l carboys
W2T505586	For 30 l carboys
W2T505587	For 60 l carboys

3.3 Optional Accessories

Evoqua recommends the following accessory kit:

Article No.	Description
W3T169989	Accessory kit operating water supply incl. solenoid valve

3.4 Operating principle

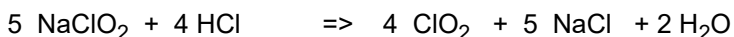
The chlorine dioxide generator works on the basis of the acid/chlorite process and generates chlorine dioxide as an aqueous solution.

Dilute hydrochloric acid (9%) and dilute sodium chlorite (7.5%) are used as starting components for the generation of chlorine dioxide.

Each reagent is fed from commercial carboys (or two external tanks) to the reaction tank with a metering pump.

The concentration of the both starting components is balanced so that an optimum yield is achieved at a ratio of 1:1. The exact addition of both starting components is monitored by electronic flow sensors. In the event of deviation the control unit automatically adjusts the values or activates an alarm.

The chemical equation for the reaction is:



Sodium chlorite + Hydrochloric acid => Chlorine dioxide + Sodium chloride + Water

A solution with 20 g/l (20 000 ppm) of chlorine dioxide is produced. This solution is diluted to 2 g/l (2000 ppm) directly after the reaction tank and flows to the point of application.

If there is insufficient operating water available for dilution, the system switches to STOP.

The system is controlled by a PLC type SIMATIC S7 in combination with an operating and observation panel type OP7 with a sealed keypad.

Operating conditions and faults are displayed in plain text. Operation and entry of the system settings is performed in guided menus in plain text.

Level monitoring (option):

- Two-level in the component containers (MIN, EMPTY)
- Leakage monitoring in the collecting basin of the generator

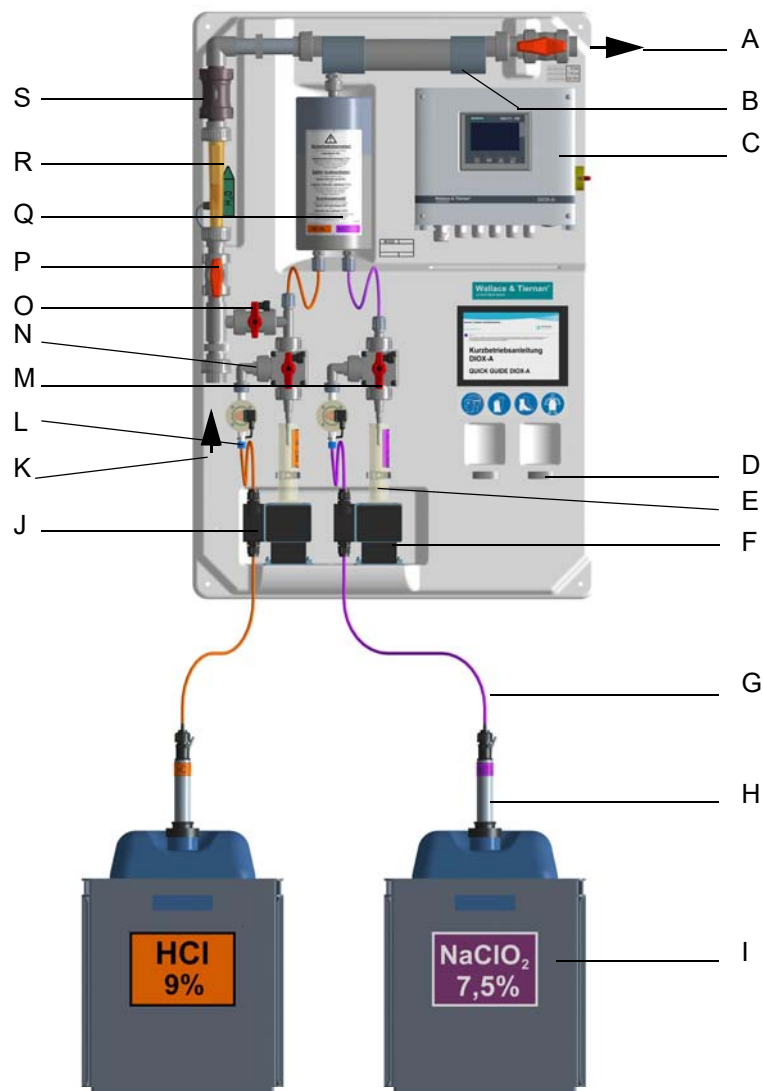
Main switch

- The EMERGENCY OFF main switch of the system is located on the control housing.

Gas detector:

- The system produces chlorine dioxide. Chlorine dioxide can escape in the event of leakage. It is therefore recommended to monitor the ambient air around the system with a chlorine dioxide gas detector.

3.5 View



- A *ClO₂ solution discharge to the storage tank*
- B *Static mixer*
- C *Control with emergency main switch*
- D *Support for suction lances*
- E *Beaker*
- F *Metering pump NaClO₂*
- G *Suction line*
- H *Suction lance with MIN and EMPTY contacts*
- I *HCl carboy and NaClO₂ carboy in separate collecting basins*
- J *Metering pump HCl*
- K *Operation water inlet*
- L *Flow meters for HCl and NaClO₂*

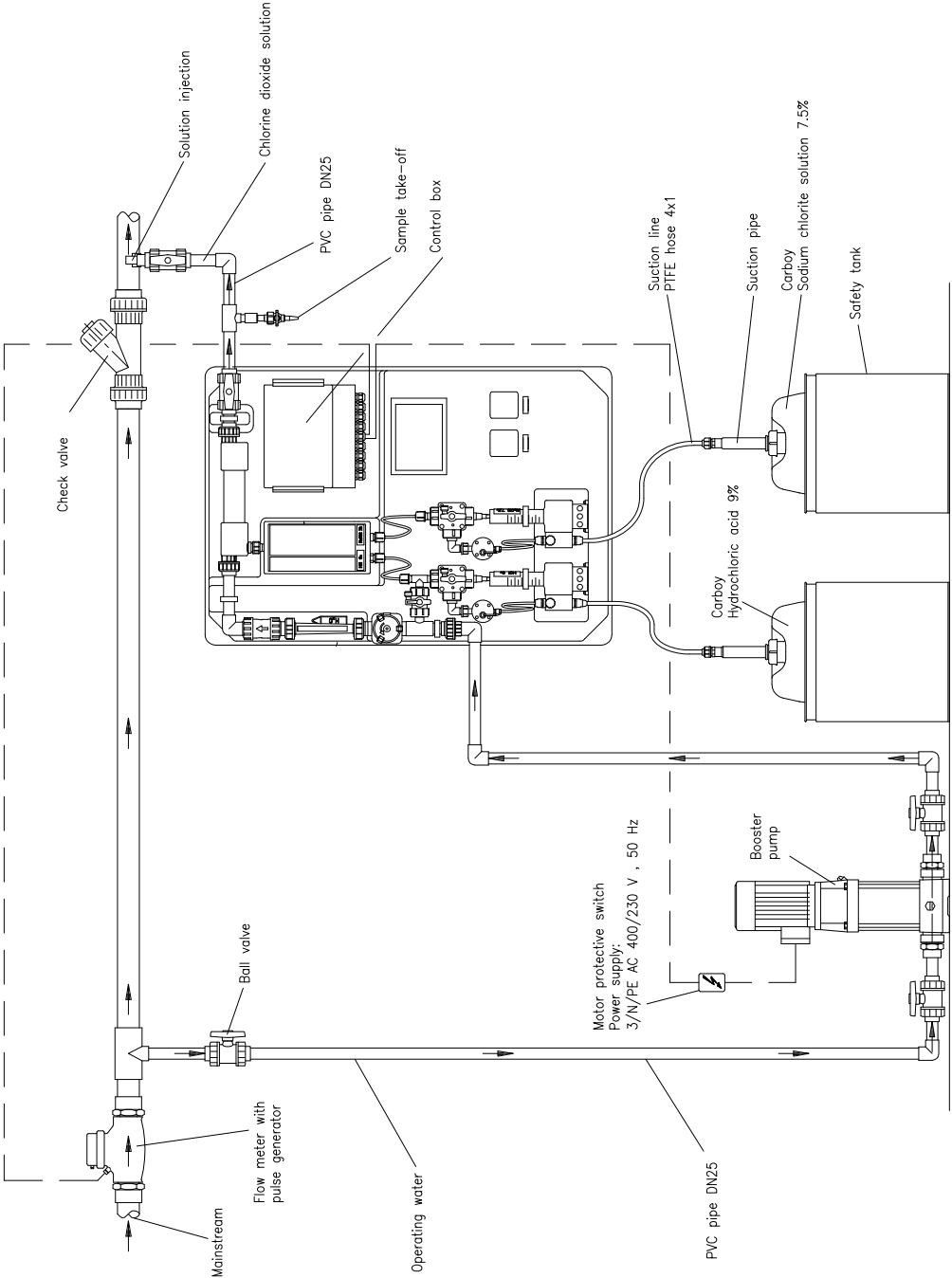
- M *Ball valve NaClO₂ with sample tap*
- N *Ball valve HCl with sample tap*
- O *Flushing ball valve*
- P *Membrane valve*
- Q *Reaction tank*
- R *Flow meter operation water*
- S *Check valve*

3.6 Technical data

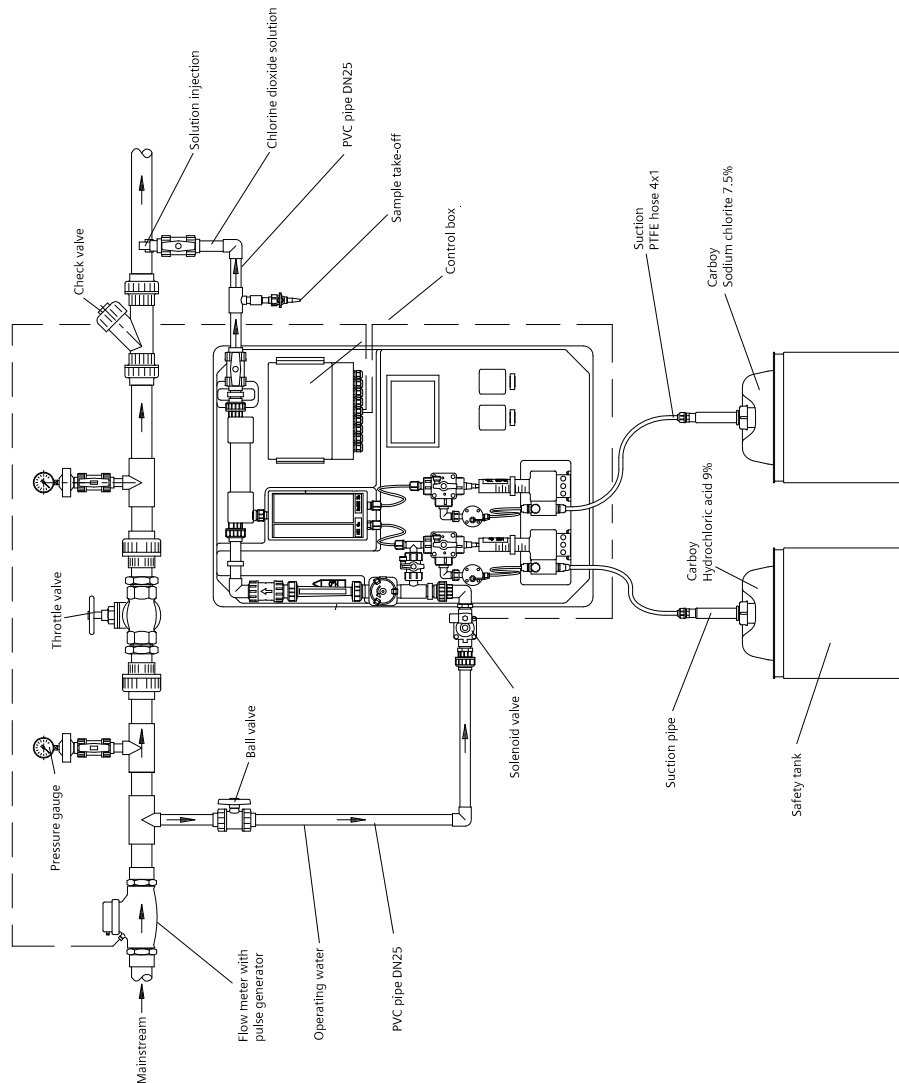
	DIOX-A 50	DIOX-A 100	DIOX-A 170	DIOX-A 250
Capacity ClO ₂ , approx.	50 g/h	100 g/h	170 g/h	250 g/h
Operating water approx.	400 l/h		800 l/h	
Operating water pressure	2-10 bar (g)			
Counter pressure	max. 8 bar (g)			
Pressure loss	approx. 1 bar			
Operating water temperature	5 - 45 °C (41 - 113 °F)			
Ambient temperature	5 - 50 °C (41 - 122 °F)			
Humidity	max. 90%, without condensation			
ClO ₂ concentration	20 g/l in the reaction tank			
Consumption of HCl and NaClO ₂	each 1.25 l/h	each 2.5 l/	each 4.25 l/h	each 6.25 l/h
Electric data				
Power	approx. 0.12 kVA (without booster pump)			
Voltage	230 V, 50 Hz (without booster pump)			
Pre-fuse	max. 10 A			
Dimensions and weight				
Generator on mounting plate (empty)	w 800 x h 1150 x d 300 mm (31.5 x 45.3 x 11.8 inch)			
	approx. 30 kg (66 lb)	approx. 32 kg (70 lb)	approx. 35 kg (77 lb)	approx. 37 kg (81 lb)

3.7 DIOX-A with booster pump

(Installation example using carboys)



3.8 DIOX-A without booster pump (Installation example using carboys)



This type of installation may be used only if the water pressure is high enough for the vent gas aspiration injector. Otherwise use a booster pump.

3.9 Operating modes

3.9.1 Systems with proportional volume generation

- The generated quantity of chlorine dioxide solution depends on the feed rate of the overall water volume which requires treatment.
- An external feed rate signal must be connected for proportional volume generation.
- This signal can, for example, be supplied by a magnetic-inductive flow meter (MIF) with a pulse output or a 4 - 20 mA output.
- The pulses must be within a range of up to 1,250 pulses per minute. Only then it is possible to adjust the control accordingly.

The 4 -20 mA signal should correspond to 0 -1 00% capacity.

3.9.2 Systems with measured-value controlled generation

The generated volume of chlorine dioxide solution depends on the measured chlorine dioxide concentration.

An external control signal must be connected for measured-value controlled generation.

This signal can be provided, for example, by a SFC unit. The pulses must be within a range of 0 - 120 pulses per minute, resp. 4 - 20 mA. Only then it is possible to adjust the control accordingly.

3.9.3 Systems with compound loop controlled dosing

The generation rate is calculated in proportion to a control parameter (e.g. feed rate signal from an external controller, e.g. SFC-PC). The dosage rate then results in a constant measurable variable during linear and fault-free operation. This measurable variable is also controlled on the basis of a setpoint value.

The pulses of the controller must be within a range of 0 - 120 pulses per minute, resp. 4 - 20 mA. Only then it is possible to adjust the control accordingly.

3.9.4 Manual adjustment

Systems without external control signals or setpoint only run in manual mode.

The dosage volume is set to a percentage of the maximum system capacity (refer to chapter 6.9.1).

4. Installation



Warning!

Risk of Explosion!

Risk of injuries due to dangerous chemicals!

The system produces chemicals in potentially hazardous quantities.

Solutions with low ClO_2 concentrations and the ClO_2 gas which occurs in the event of leakage constitute a health hazard and have an extremely corrosive effect on metals. This also applies to the hydrochloric acid and NaClO_2 solution used for ClO_2 generation.

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO_2 into contact with each other.
- Inspect the system for leaks before commissioning.
- Take special care if a chlorine-like odour is detectable in the room where the system is installed! This could indicate discharged chlorine dioxide solution or hydrochloric acid. Remedy the cause!
- To prevent health risks or damage to the system, follow the safety notes and warnings attached to the system and in the instruction manuals in any case.
- Only Evoqua customer service or personnel specifically trained by Evoqua may install the system.

4.1 Scope of supply

- Chlorine dioxide generator on mounting plate, capacity depending on version (see chapter 3.1)
- Fixture set, concise instructions
- Instruction manual

To connect the water supply pipe an optional accessory kit is available (see chapter 9.).

4.2 Transport, storage, unpacking

- During transport, protect the system against humidity, frost and damage.
- When unpacking check against the parts list to ensure that all listed items have indeed been delivered.
- Do not dispose of the packing materials until after the system has been successfully commissioned.

4.3 Conditions for installation

4.3.1 Location

The chlorine dioxide generator and the chemicals must be in a closed location that is not intended for the permanent stay of persons.

If it is necessary that the chlorine dioxide generator is installed in a working place, the following conditions must be met.

- The chlorine dioxide generator must be necessary for the process taking place in this location (e.g. plant for cleaning bottles).
- Only the quantity of chemicals necessary for the running process may be stored at the generator.
- The generator and the chemicals must be secured against unauthorized personnel.

The location itself must meet the following conditions:

- The room must meet the corresponding prescriptions for accident prevention.
- The room must be lockable, protected against access of unauthorized personnel.
- The necessary warning signs must be placed.
- Protected against frost and direct sun radiation, with sufficient ventilation
- Ambient temperature during operation at least 10 °C (50 °F).
- Sink and water supply for the safe removal of chemicals.
- Fire resistant towards the adjacent rooms (refer to the local prescriptions and regulations).
- Smoking and fire is prohibited in the rooms where sodium chlorite is stored and handled.
- Sufficient space is necessary for installation and maintenance.

4.3.2 Operation water

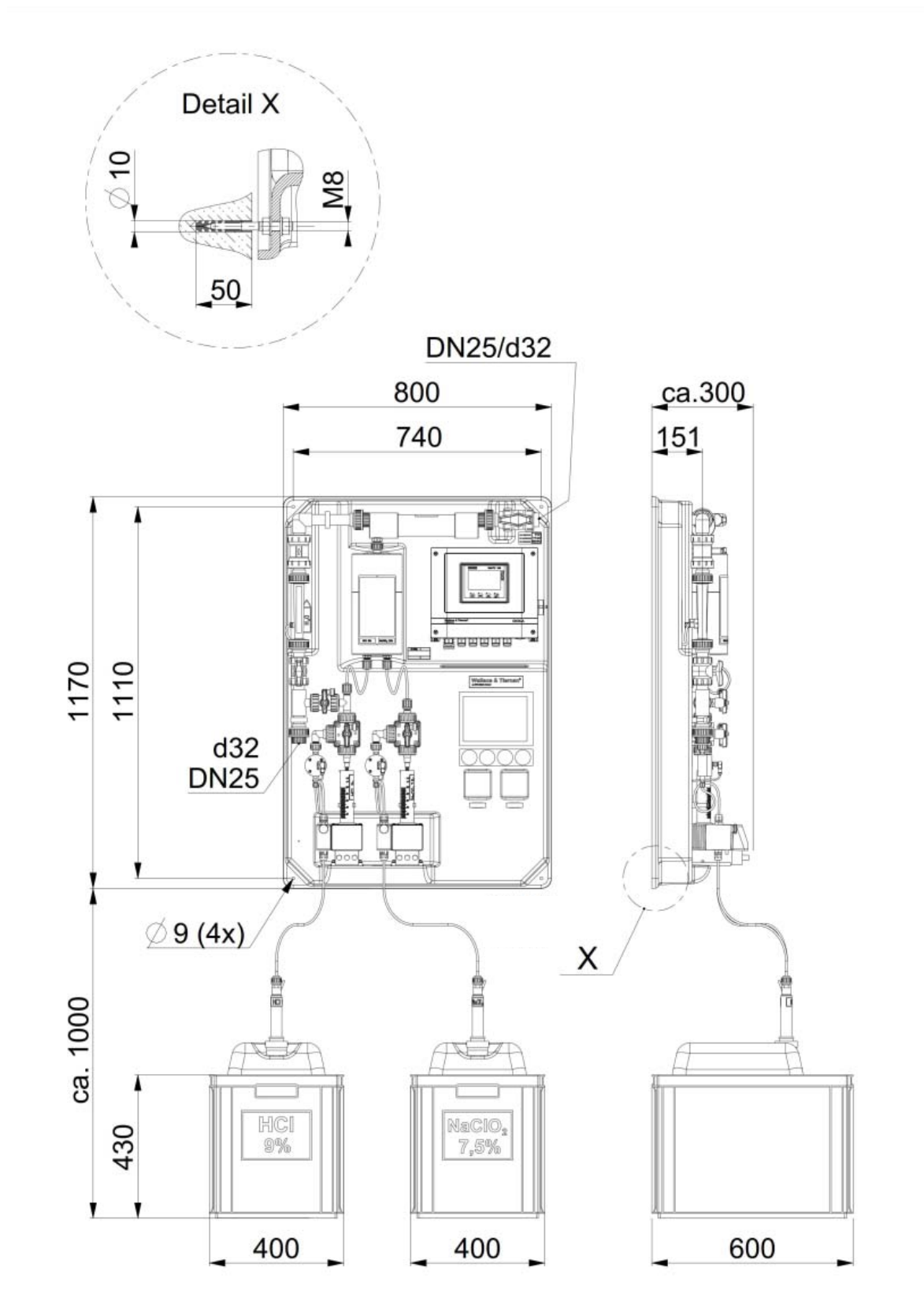
- The operating water must always be supplied in sufficient quantities and at a suitable admission pressure (see technical data)
- The operating water must not contain any particles (potable water quality)
- If the water pressure is too low, a booster pump is necessary
- Operating water temperature 5 - 45 °C (41-113 °F)
- Refer to the corresponding directions concerning potable water applications, install a pipe separator and a strainer.

4.4 Installation

4.4.1 Mounting the generation system

- The generator should be accessible for operation, maintenance and repair
- Mount the mounting plate vertically
- If carboys are used, leave sufficient space below the system for accommodation of both transport carboys for hydrochloric acid (HCl 9 %) and sodium chlorite solution (NaClO₂ 7.5 %) (lower edge approx. 1 m above the ground)
- The system is supplied with a securing fixture set containing M8 screws, nuts, washers and dowels
- The water supply pipe can be installed straight from below or from the side
- Install a pipe separator and a strainer upstream of the generator.
- Allow for unobstructed movement of the carboys to the generator.
- Place both carboys for the starting chemicals into sufficiently large separate collecting basins which permit simple and safe fitting and removal of the carboys. Each collecting basin must be able to accommodate the contents of one carboy
- The liquid level in the carboys should not be higher than the metering pumps on the generator

(Installation example using carboys)



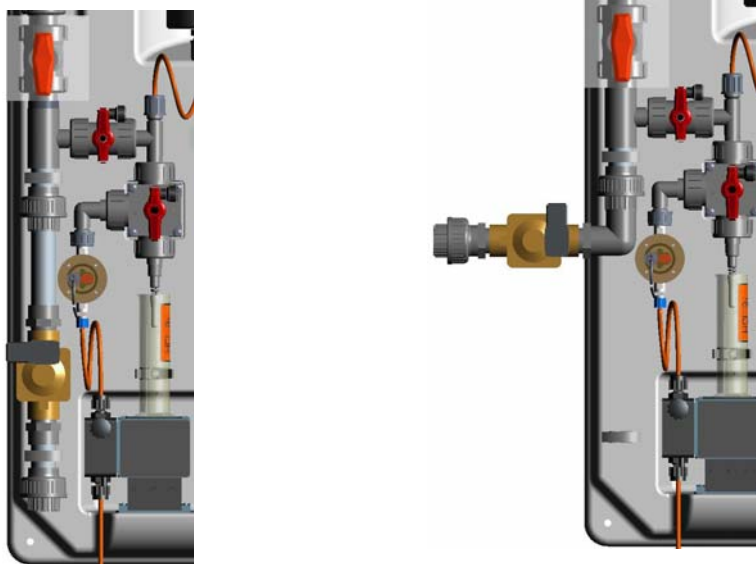
4.4.2 Connecting the operating water pipe



Note

The operating water must always be supplied in sufficient quantities and at a suitable admission pressure (2 - 10 bar (29 - 145 psi) and should not contain any particles.

The water supply pipe can be installed with the optional accessory kit W3T169989: straight from below or from the side (also refer to 3.7 and 3.8).



The accessory set W3T169989 contains parts for both options (incl. solenoid valve), refer to chapter 9.

- 1 Install the supply pipe for operating water including shut-off valve, pressure reducing valve and solenoid valve.
Ensure that the installation of the supply pipe is stress-free.
- 2 After installation and prior to commissioning check the supply pipe for leaks.

4.4.3 Install the solution line

- 1 Install the solution line without stress.
- 2 Between the chlorine dioxide generator and the point of application install a stop valve and a sample tap (refer to chapter 3.7).
- 3 The maximum pressure at the point of application must not exceed 8 bar (116 psi).
- 4 Check the solution line for leaks.

4.4.4 Installing carboys and suction lances



Warning!

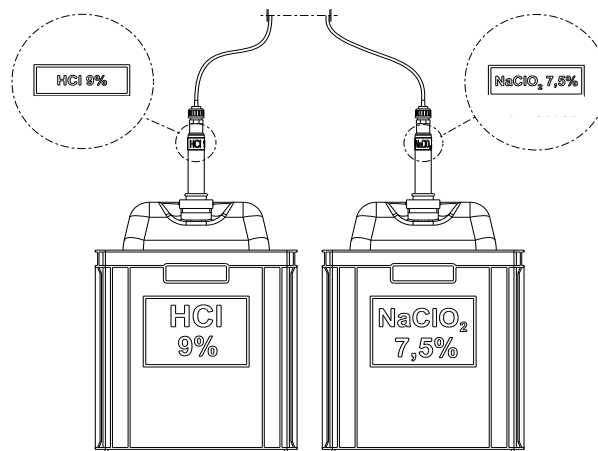
Risk of explosion!

Risk of injuries due to dangerous chlorine dioxide gas!

- Wear respiratory protective equipment and protective clothing.
 - Never bring HCl and NaClO₂ into contact with each other.
 - Only use containers in separate collecting trays.
 - Do not install both containers at the same time, but one after the other.
 - Do not swap containers or suction lances under any circumstances!
 - Only use diluted solutions: 9 % HCl, 7.5 % NaClO₂!
 - Carefully transport the containers and protect them from damage.
-

If you use chemical carboys and suction lances, install them as follows:

- 1 Place both transport carboys for the starting chemicals into sufficiently large separate collecting basins which permit simple and safe fitting and removal of the carboys. Each collecting basin must be able to accommodate the contents of one carboy at least.
- 2 Mark the collecting pans and suction lances with HCl 9 % respectively NaClO₂ 7.5 %.



- 3** Place the carboys for hydrochloric acid (HCl 9 %) and sodium chlorite solution (NaClO₂ 7.5 %) each into the appropriate collecting basin below the generator:
- diluted hydrochloric acid on the left
 - diluted sodium chlorite solution on the right

The solutions are available from the manufacturer: hydrochloric acid, HCl 9 % and sodium chlorite, NaClO₂ 7.5 %).

- 4** Open the carboy seals separately and keep the covers.
- 5** Place the suction lances into the carboys using the adaptor plugs (W3T164389, optional). Push the lance down to the bottom. Place the adaptor plugs to protect from smell.
- 6** Connect the suction lines and the return lines to the suction lance and the metering pump.
- 7** Cut the hoses to the necessary length.
HCl suction lance > orange hose > HCl metering pump.
NaClO₂ suction lance > violet hose > NaClO₂ metering pump.
- 8** Connect the cable of the suction lance to the left-hand socket of the corresponding metering pump.

4.4.5 Mounting identification and warning signs

- 1** Mount the prescribed warning signs at the entrance to the system (refer to the accident prevention regulation for the chlorination of water).

4.5 Electrical installation



Warning!

Risk of injuries due to electric current!

- Only qualified electricians are allowed to perform electrical works on the system.

When performing any work on the electrical system always observe the following:

- this instruction manual and the included wiring diagrams.
- all applicable electrical directives and the regulations of the local power utility.
- Safety requirements on site:
Ask the operator to familiarize you with the system!
Coordinate your work with colleagues in the immediate environment!
- Use only approved and properly functioning tools, measuring devices, and personal safety equipment.
- The system must be properly grounded. No freely accessible system component should be under mains voltage or any other dangerous voltage.
- Once the system is electrically connected, before starting any work on the system, always withdraw the main fuse or set the system's main switch to OFF and lock in this position.
- If it is necessary to carry out work on the system while it is switched on, do not under any circumstances touch any electrical contact.

Power supply

- The system is designed for 230 V 50 Hz
- Current consumption: 0.12 kVA max.
- Fuse: 10 A max.

Booster pump (optional)

The booster pump is designed for 230 or 400 V depending on type.

- 1 Connect the system in accordance with the wiring diagrams.
- 2 If necessary connect the enabling signal and general alarm line.
- 3 Connect the gas monitoring system (optional) to the external release or leakage monitoring input.

4.6 Commissioning



Warning!

Risk of explosion!


Risk of injuries due to dangerous chlorine dioxide gas!

- Wear respiratory protective equipment and protective clothing.
- Check system for leaks before commissioning.
- Never bring HCl and NaClO₂ into contact with each other.
- Only use containers in separate collecting trays.
- Do not swap containers or suction lances under any circumstances!
- Only use diluted solutions: 9 % HCl, 7.5 % NaClO₂!
- Carefully transport the containers and protect them from damage.

- 1 Check the operating water supply and solution line for leaks.
- 2 If applicable, start the gas detector (optional).
- 3 If carboys and suction lances are not yet installed, install them now (see chap. 4.4.4).
- 4 Open the external stop valve(s) for the operating water.
- 5 Open ball valve at the ClO₂ solution discharge (A) and the other ball valves in the ClO₂ solution discharge line.
- 6 Install the power supply, the emergency main switch remains OFF.
- 7 Check the safety installations.
- 8 Check for leaks.
- 9 Switch the emergency main switch ON.



Notes

- In the event of a fault the message indicator  is displayed.
- A signal is output via alarm relay (refer to chapter 6.13.2).
- Remedy the fault and acknowledge the fault by touching ACK.



10 Select the language

DE: German

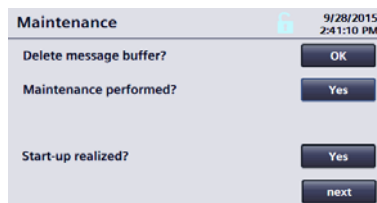
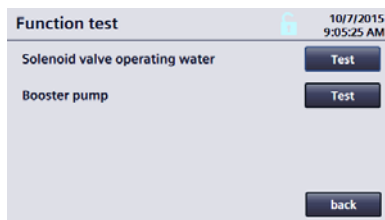
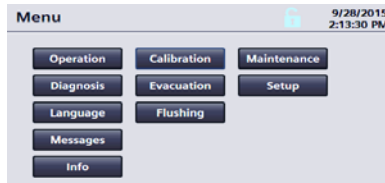
EN: English

FR: French

PL: Polish

The main screen is displayed (refer to 6.2.1).

A message „Calibrate unit!“ is displayed (calibrating the system before use is required, refer to chapter 6.5.2).



11 Set the parameters in the setup menu (refer to chapter 4.7)

12 Press F4 „Menu”.

13 Touch „Maintenance”.

14 Touch „next” to go to the menu „Function test”.

15 Touch „Solenoid valve operating water: Test” and simultaneously adjust the water flow at the dosing ball valve (P) to the following flow:

- for DIOX-A50 and 100: 400 l/h
- for DIOX-A170 and 250: 800 l/h

16 Open the flushing ball valve (O).

17 Touch „Solenoid valve operating water: Test” again and make sure that the reaction tank is filled with water.

18 Close the flushing ball valve (O).

19 Evacuate the suction lines and metering pumps (refer to chapter 6.5.1)

20 Calibrate the HCl and NaClO₂ flow (refer to chapter 6.5.2).

21 Start ClO₂ generation (refer to chapter 6.6).

22 Confirm that commissioning has been completed:

- Press F4 „Menu”.
- Touch „Maintenance”.
- Touch „Start-up realized? Yes”.
- Press F4 „Menu”.

After commissioning:

1 Train the operation personnel.

2 Complete the settings list.

3 Complete the Installation protocol, have it signed and send a copy to the manufacturer.


4.7 Setup

The Setup menus provide settings for:

- Type and name of the system
- AutoSTART and maintenance interval
- Lead signal (e.g. contact water meter for operating water)
Note: Oval gear meter cannot be used with bypass installation.

See also the settings list in chapter 4.8.

1 Press F4 „Menu”.

2 Touch the lock symbol .

3 Touch the password input box.

A keyboard is displayed.

4 Enter the service password.

(To switch between alpha keyboard and numeric keyboard press the „ABC” resp. the „123” key).

5 Confirm with „OK”.

6 Touch „Setup”.

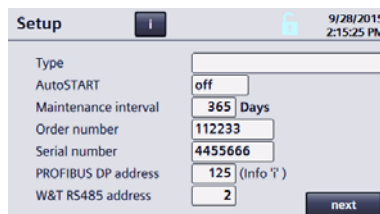
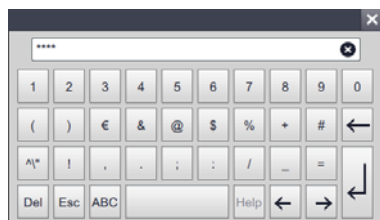
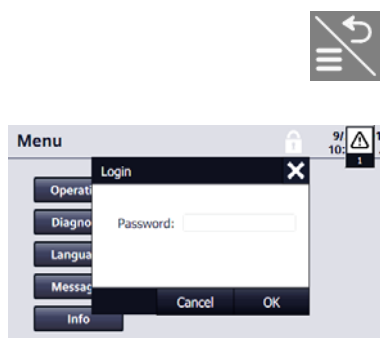
7 Set AutoSTART:

- AutoSTART = on: After switching ON at the main switch or after a power failure the generation of ClO₂ starts automatically.
- AutoSTART = off: Generation of ClO₂ must be started with the key F1 after switching ON or after a power failure.

8 Set the maintenance interval (max. 365 days)

Do not change the order and serial number.

9 If you use the PROFIBUS DP or RS 485 interface, set the interface address.



For information touch the „i” box and refer to chapter 5.

10 Touch „next”.

Menu „Setup: Lead signal” is displayed.

11 Select the type of the lead signal.

Note: The setting „simulation” cannot be used.

Setup: Lead signal 9/28/2015 2:17:25 PM

Type: Controller (contact)

Pulses/min at 100%: Controller (contact)

next

Setup: Lead signal 9/28/2015 2:23:05 PM

Type: Controller (contact)

Pulses/min at 100%: 120 pulses/min

next

Setup: Lead signal 10/5/2015 12:38:35 PM

Type: Contact water meter

Flow max: 500 m³/h

Number of pulses: 100 l/pulses

next

Setup: Lead signal 10/5/2015 12:37:30 PM

Type: IMF (contact)

Measuring range max: 160 l/s

Number of pulses: 1 l/pulses

next

Setup: Lead signal 10/20/2015 3:59:45 PM

Type: Analog input

Signal 4-20mA: 0..100% Capacity

next

Setup: PROFINET interface 9/28/2015 2:03:50 PM

IP address: 192 . 168 . 178 . 100

Subnet mask: 255 . 255 . 255 . 0

MAC address: 1C-3F-7B-7F-3B-0E

Device name:

change... next

- When „Controller (contact)” is used:
Enter the number of pulses as set in the controller.
- When „Contact water meter” is used:
Enter the maximum flow and the number of pulses as given on the contact water meter.
- When „IMF (contact)” is used:
Enter the range and the liters per pulse as given on the inductive magnetic flow meter (IMF).
- when „Analog input” is used:
The 4-20 mA signal should correspond to 0-100 % capacity.
If not, refer to the generation factor in 6.9.2

12 Touch „next”.

„Setup: PROFINET interface” is displayed

To change the IP address (only if the PROFINET interface is used, refer to chapter 5.2.



13 Touch „next”.

„Setup: Factory settings” is displayed

Attention:

If you touch the OK box in the menu „Factory settings” more than 3 seconds, all settings will be reset to factory settings and must be set again.

14 To leave the menu touch „back”.

-
-
-
-

Commissioning is complete.

4.8 Settings list

Display	Factory setting	Commissioning	Change
Capacity depending on the size of the unit	50/100/170/250 g/h		
AutoSTART	on		
Maintenance interval	365 days = 1 year		
PROFIBUS address	125		
RS 485 address	2		
Mode • AUTO • MANUAL	Generation factor 1.0 Capacity: 100 %		
Lead signal			
Controller	120 pulses/min		
Contact water flow meter	max. flow: 500 m ³ /h volume per pulse: 100 l		
IFM	max. range: 16 l/s volume per pulse: 1 l		
Mode	AUTO		
Alarm function	off		
Signal relay 1	Failure active		
Signal relay 2	Carboy MIN		

5. Interfaces

The controller provides interfaces for PROFINET IO-Device, PROFIBUS DP or MODBUS TCP. The corresponding hardware can be installed during commissioning or retrofitted later.



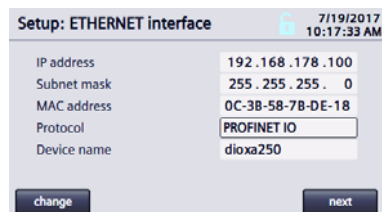
Note

Both status LEDs „ERROR” and „DIAG” on the SIMATIC S7 illuminate if the chlorine dioxide generator is not connected to a master PROFIBUS DP network. In such case, the communication partner (IO-controller) is not available. This does not affect or interrupt the operation of the system.

5.1 Selecting the interface



- 1 Press F4 „Menu”.
- 2 Touch the lock symbol.
- 3 Touch the password input box.
A keyboard is displayed.
- 4 Touch „123” to switch to the numeric keyboard.
- 5 Enter the service password and confirm with RETURN.
- 6 Touch OK.
- 7 Touch „Setup”.
- 8 Touch „next” until „Setup: ETHERNET interface” is displayed.
- 9 Touch the Protocol input box and select the desired interface.
- 10 Press F4 to finish.



5.2 Connecting PROFINET IO-Device

(Optional)

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a PROFINET system.

The control of the chlorine dioxide generator, the Siemens SIMATIC S7-1200, is geared for data exchange over PROFINET IO-Device on a superordinate PROFINET network. In this process, the control operates as a PROFINET IO-device and provides output data. (See chapter 5.8 Reference list). The superordinate automation system works as a PROFINET IO-controller.

Data transfer over PROFINET offers a standardized interface (EN 50170) for the transfer of process data.

If the default IP address can be used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default IP address refer to chapter 5.2.3.

5.2.1 Technical data PROFINET IO-Device

Hardware	SIMATIC S7-1200 CPU1214 C V4.2
Siemens article no.	6ES7214-1AG40-0XB0
Transmission technology	Industrial Ethernet
Baud rate	Duplex automatic
IP address (default)	192.168.178.100 255.255.255.0
Physical interface	RJ45 integrated Ethernet switch (optional)
Communication	Cyclic I/O data exchange between IO-controller and IO-device(s)
Configuration	6 x 32 Byte,

Article number:

W3T351974 Retrofit kit ETHERNET
incl. Industrial Ethernet Switch with accessories

5.2.2 Wiring PROFINET



Note

Follow the setup guidelines for PROFINET networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the PROFINET User Organization, the manufacturer or the manufacturer of the automation system you are using.

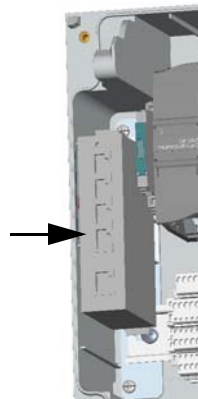
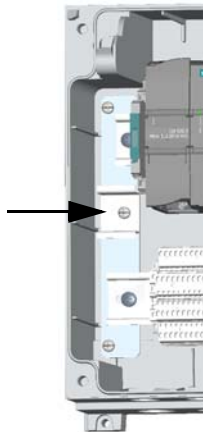


Warning!

Risk of injury or due to electric current!

- Electrical work on the system may only be performed by qualified electricians.

Installing the Ethernet switch



- 1 Switch off the system (press F1) and open the control housing.
- 2 Fix the 35 mm rail to the center hole (M5 thread) of the left mounting plate.
- 3 Snap the Ethernet switch onto the rail and connect to the power supply:

Prepare the three strands (2x black, 1x green/yellow) and connect them to the Ethernet switch. Connect the other strands to the potential terminal Plus (+), Minus (-) and PE.

- 4 Disconnect the RJ45 cable from the PLC and connect to the socket X1 of the Ethernet switch. Connect the socket X2 and the PLC using the supplied RJ45 cable.
- 5 For communication to the superordinate automation system use the sockets X3 to X5.

PROFINET IO-Device

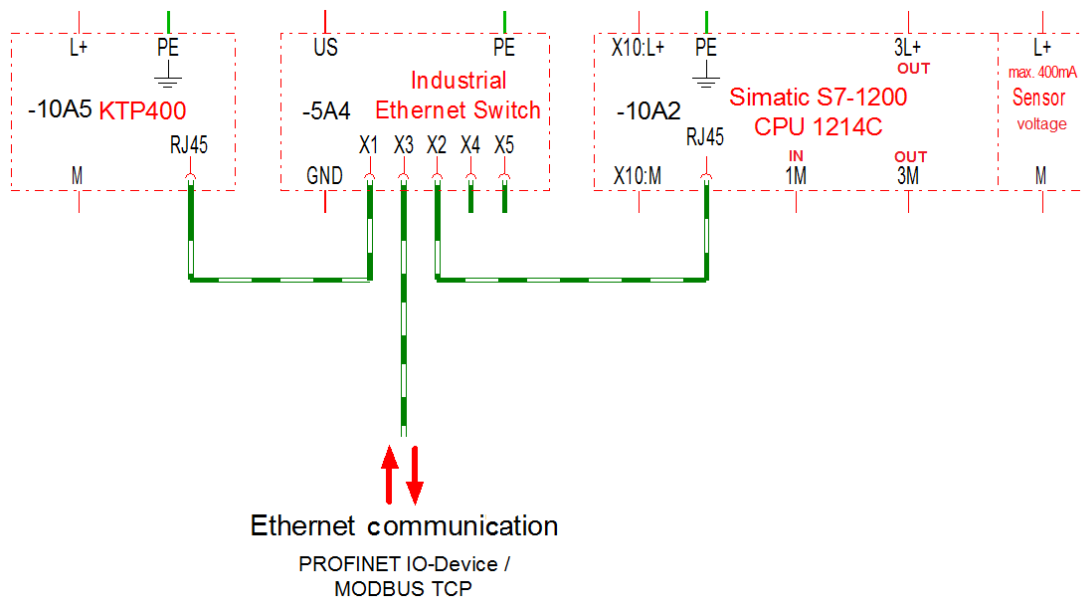


- A Display
- B CPU
- C Communication with IO-Master
- D -
- E -



Note

Both status LEDs „ERROR” and „DIAG” on the SIMATIC S7 illuminate if the chlorine dioxide generator is not connected to a master PROFIBUS DP network. In such case, the communication partner (IO-controller) is not available. This does not affect or interrupt the operation of the system.



5.2.3 Configuring PROFINET-IO-Controller

In order for the data on a automation system to be read, it must know the configuration for the data transfer.

Data exchange configuration:

The PROFINET IO-Controller is configured with the aid of the device master data file (GSDML file):

GSDML-V2.32-#Siemens-PreConf_Basic8880-V1-20180720-085016.xml

The GSDML file can be downloaded from the web site:
http://www.evoqua.com/en/brands/Wallace_and_Tiernan/Pages/Firmware-Updates.aspx

192 (6 x 32) bytes of user data are transferred over the PROFINET to the IO-controller.

Transfer areas

...	Transfer area	Type	Address in IO contr...	↔ Address in I-device	Length
1	Sd1	CD		← Q 384...415	32 Byte
2	Sd2	CD		← Q 416...447	32 Byte
3	Sd3	CD		← Q 448...479	32 Byte
4	Sd4	CD		← Q 480...511	32 Byte
5	Sd5	CD		← Q 576...607	32 Byte
6	Sd6	CD		← Q 608...639	32 Byte
7	<Add new>				

5.3 Connecting PROFIBUS DP

(Optional)

The control of the chlorine dioxide generator, the Siemens SIMATIC S7-1200, is geared for data exchange over PROFIBUS DP on a superordinate PROFIBUS DP network. In this process, the control operates as a PROFIBUS DP slave and provides output data (see chapter 5.8 Reference list). The superordinate automation system works as a PROFIBUS DP master.

Data transfer over PROFIBUS DP offers a standardized interface (EN 50170) for the transfer of process data. The process data is available on the PROFIBUS DP page as output data.

If the default bus address is used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default bus address refer to chapter 5.3.2.

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a PROFIBUS DP system.

5.3.1 Technical data

Hardware	SIMATIC S7-1200 CPU1242-5 PROFIBUS DP Slave V1.0
Siemens part no	6GK7242-5DX30-0XE0
Transmission technology	RS-485 in accordance with the PROFIBUS specifications
Baud rate	up to 12 MBit/s, autom. recognition
Bus address	default 125
Bus connection	9 pin D-Sub socket on site: 9-pole PROFIBUS DP plug
Communication	Cyclic I/O data exchange between the DP master and the DP slave(s)
Configuration	6 x 32 Byte, data consistency over the unit

Article numbers:

W3T351973 Extension PROFIBUS DP Slave incl. communication module with accessories

5.3.2 Wiring PROFIBUS DP



Note

Follow the setup guidelines for PROFINET networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the PROFINET User Organization, the manufacturer or the manufacturer of the automation system you are using.



Warning!

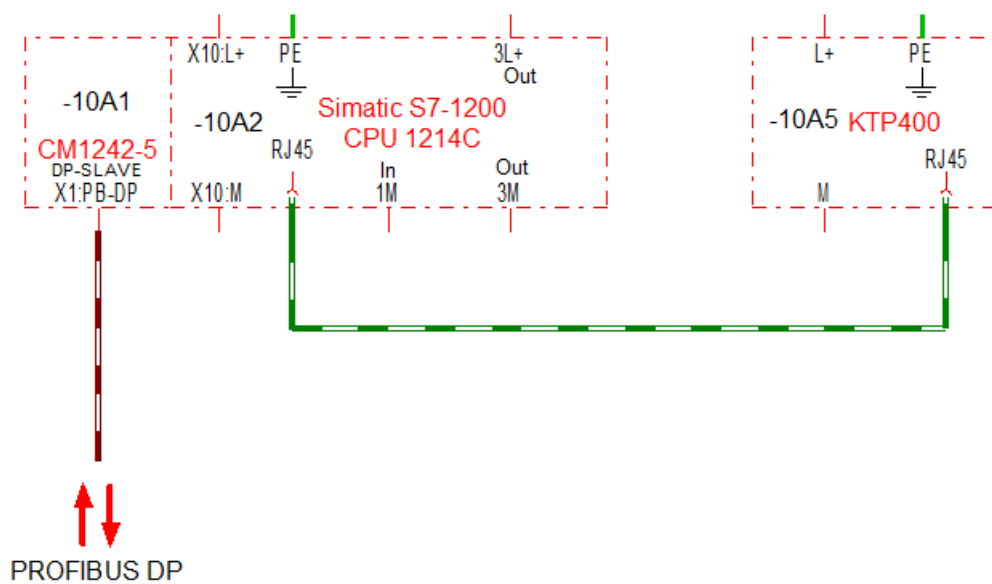
Risk of injury due to electric current!

- Electrical work on the system may only be performed by qualified electricians.

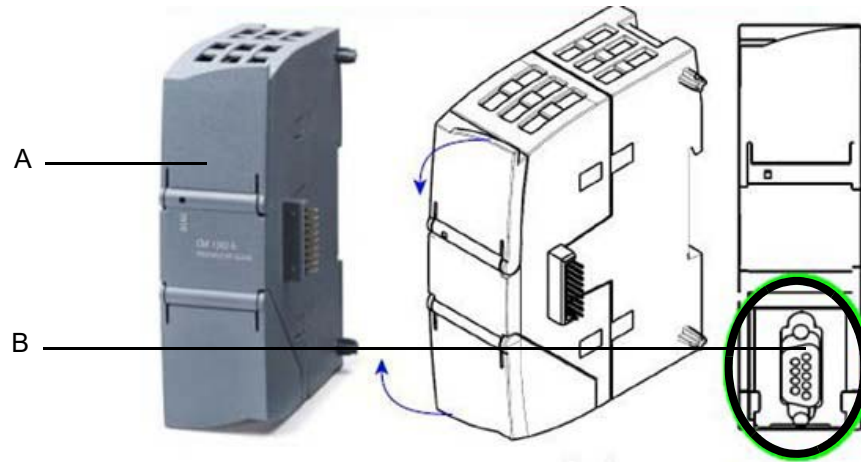
Proceed as follows:

- 1 Shut-down the system.
- 2 Open control cabinet.
- 3 Remove the interface cover at the left side of the PLC using a screwdriver.
- 4 Snap the communication module CM1242-5 Slave onto the rail.
- 5 Connect the communication module by carefully moving it towards the PLC. A separate power supply is not necessary.

Installing the communication module



- 6 Connect the PROFIBUS DP bus cable to interface X1: PB DP on the CM 1242-5 using the bus system's 9-pin PROFIBUS DP plug connector.



- A Interface
B Interface socket

- 7 Restart the chlorine dioxide generator.

Setting the PROFIBUS DP address

Setup		9/28/2015 2:15:25 PM
Type	DIOX-A 250	
AutoSTART	off	
Maintenance interval	365 Days	
Order number	112233	
Serial number	4455666	
PROFIBUS DP address	125 (Info ?)	
W&T RS485 address	2	
next		

- 1 Enter the Service password.
- 2 Press F4, then touch „Setup” and „next”.

The present PROFIBUS DP address is displayed.

- 3 Enter the new PROFIBUS address.

The new address is active after a reboot of the system. To reboot, switch the main switch off and on (or separate the system from the mains).



Note

Both status LEDs „ERROR” and „DIAG” on the SIMATIC S7 illuminate if the chlorine dioxide generator is not connected to a master PROFIBUS DP network. In such case, the communication partner (IO-Controller) is not available. This does not affect or interrupt the operation of the system.

5.3.3 Configuring PROFIBUS DP-Master

In order for the data on a automation system to be read, it must know the configuration for the data transfer.

Data exchange configuration:

The PROFIBUS DP master is configured with the aid of the device master data (GSD-file) of the SIMATIC CM1242-5 PROFIBUS DP slave V1.0.

For development in foreign systems, a GSD file is available for the CM 1242-5 (6GK7242-5DX30-0XE0, Version 1.0).

192 bytes of user data is transferred over the PROFIBUS DP to the master. (6 x 32 byte with data consistency across the entire length).

Transfer areas

...	Transfer area	Type	Master address	↔ Slave address	Length	Consistency
1	DP-Sd1	MS		← Q 256...287	32 byte	Total length
2	DP-Sd2	MS		← Q 288...319	32 byte	Total length
3	DP-Sd3	MS		← Q 320...351	32 byte	Total length
4	DP-Sd4	MS		← Q 352...383	32 byte	Total length
5	DP-Sd5	MS		← Q 512...543	32 byte	Total length
6	DP-Sd6	MS		← Q 544...575	32 byte	Total length
7	<Add new>					

5.4 Connecting MODBUS TCP

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a MODBUS system.

The control of the chlorine dioxide generator, the Siemens SIMATIC S7-1200, is geared for data exchange over MODBUS on a superordinate MODBUS network.

In this process, the control operates as a MODBUS server and provides output data (see chapter 5.8 Reference list). The superordinate automation system works as a MODBUS client.

If the default IP address can be used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default IP address refer to chapter 5.2.3.

5.4.1 Technical data MODBUS client

Hardware	SIMATIC S7-1200 CPU1214 C V4.2
Siemens part no.	6ES7214-1AG40-0XB0
Transmission technology	Industrial Ethernet
Baud rate	Duplex automatic
IP address (default)	192.168.178.100 255.255.255.0
Physical interface	RJ45 integrated Ethernet switch
Communication	Cyclic I/O data exchange between the server and client
Configuration	192 Byte output data
Port ID	502 (adjustable) 1

Order information:

W3T351974 Retrofit kit ETHERNET incl. Industrial Ethernet switch with accessories

5.4.2 Connecting MODBUS



Note

Follow the setup guidelines for MODBUS networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the MODBUS User Organization, the manufacturer or the manufacturer of the automation system you are using.

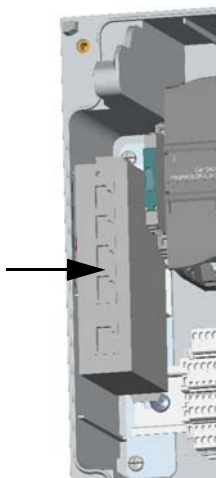
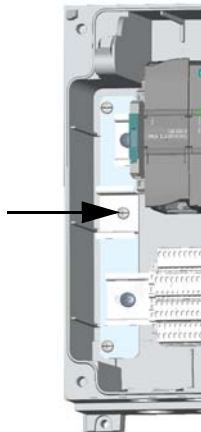


Warning!

Risk of injury due to electric current!

- Electrical work on the system may only be performed by qualified electricians.

Installing the Ethernet switch



- 1 Switch off the system (press F1) and open the control housing.
- 2 Fix the 35 mm rail to the center hole (M5 thread) of the left mounting plate.
- 3 Snap the Ethernet switch onto the rail and connect to the power supply:

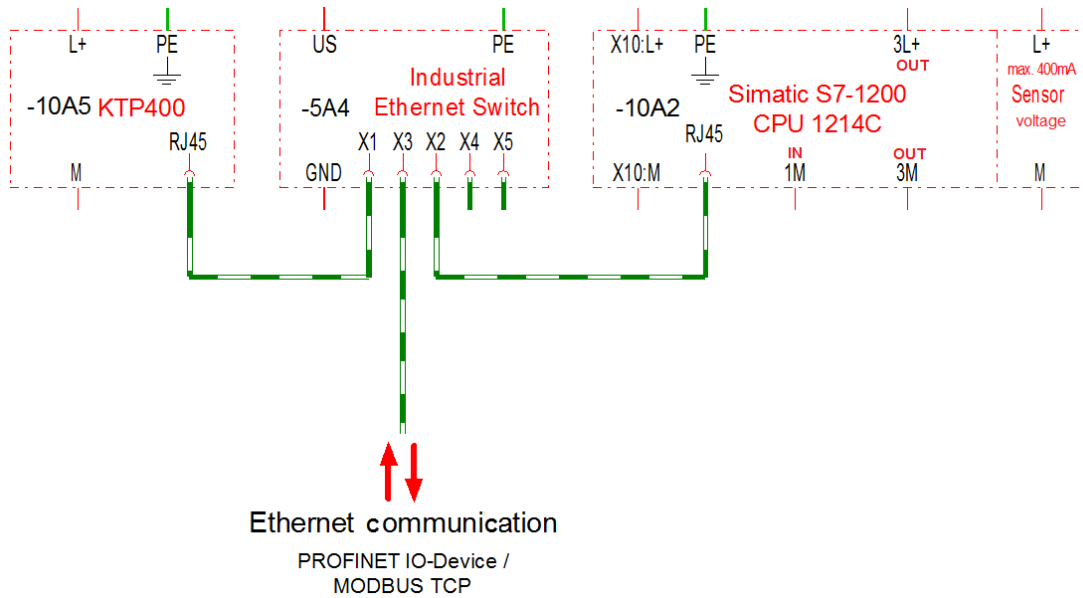
Prepare the three strands (2x black, 1x green/yellow) and connect them to the Ethernet switch. Connect the other strands to the potential terminal Plus (+), Minus (-) and PE.

- 4 Disconnect the RJ45 cable from the PLC and connect to the socket X1 of the Ethernet switch. Connect the socket X2 and the PLC using the supplied RJ45 cable.
- 5 For communication to the superordinate automation system use the sockets X3 to X5.

PROFINET IO-Device



- A Display
- B CPU
- C Communication with IO-Master
- D -
- E -



5.4.3 Configuring MODBUS client

In order for the data on a automation system to be read, it must know the configuration for the data transfer.

MODBUS functions for the data exchange:

MODBUS function	Data length (WORD)	Function and data type	Address register
03	1 to 125	read the holding register 1 to 125 WORD per call	40001 to 49999

Data exchange configuration:

Read: 192 bytes of user data are ready to be read by the MODBUS client (register 40001 to 40096).

5.5 Changing the IP address of the CPU

For PROFINET and MODBUS

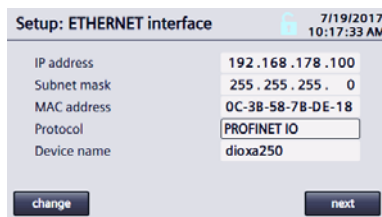


Notes

- The Ethernet interface of the CPU is used for the communication with an external automation system.
- This Ethernet interface of the CPU is also used for the communication with the HMI.
- When the IP address of the CPU is changed, the IP address of the HMI has to be matched as well. Subsequently the HMI is connected to the CPU again.
- Hence, for the connection of the system to an other IP address area two IP addresses are necessary.

- 1 Enter the Service password.
- 2 Press F4, then touch „Setup” and twice „next”.

The present ETHERNET interface setting with the IP address is displayed.

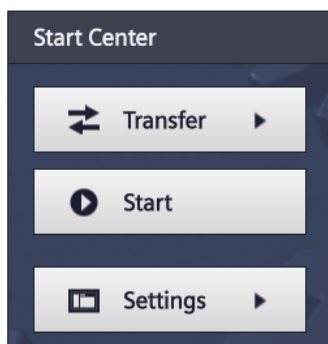


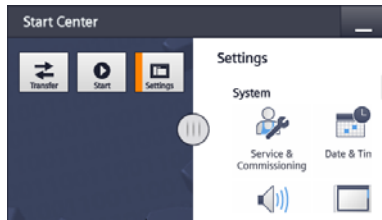
- 3 Touch „change”.



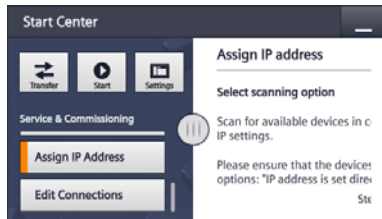
- 4 To change the IP address touch „Yes”.


Runtime is finished and Start Center is displayed.





- 5 Touch „Settings“.
- 6 Touch the symbol „Service and Commissioning“.



- 7 Swipe until „Assign IP Address“ is displayed.
- 8 Touch „Assign IP Address“ and then .
- 9 Swipe upward until „Accessible devices in target subnet“ is displayed.



- 10 Touch to activate.
- 11 Touch „>“ to go to the next step.

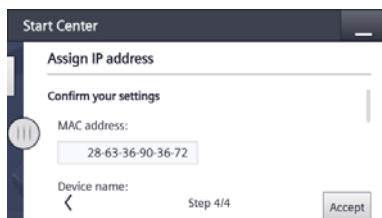
The search for the PLC starts automatically.

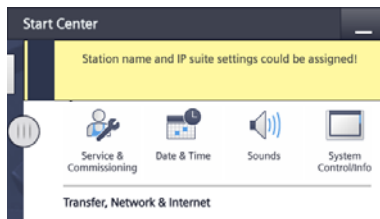


- 12 When the device is found touch „>“ to go to the next step.
- 13 Edit device name, IP address, subnet mask and default gateway according to your needs.

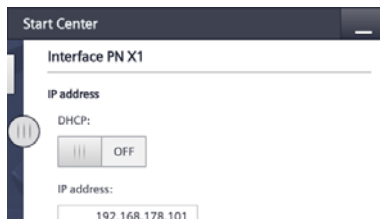


- 14 Touch „>“ to go to the next step.
- 15 Check your settings and touch „Accept“.

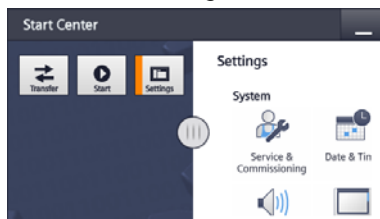




Changing the IP address of the HMI



Re-connecting HMI and PLC



If the change was successful, „Station name and IP suite settings could be assigned!” is displayed.

In case of a failure: „Station name and IP suite settings could not be assigned!” is displayed.

Touch „close” to close the message.

Touch  and  to close the window.

Enter the parameters again starting at step 7.

16 Swipe upward and select „Network Interface”.


17 Move the slide switch DHCP to „OFF”.

18 Set the IP address that it corresponds to the 1st, 2nd and 3rd octet of the setting as of step 12.

Set the 4th octet to a free address.

Set the subnet mask as of step 12.

19 If necessary adjust the Default gateway.

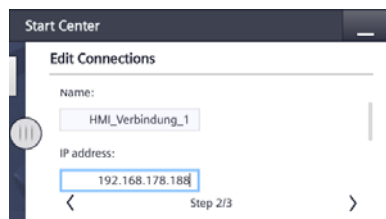
20 Touch , touch „Settings”.

21 Touch „Service & Commissioning”.

22 Swipe the list under „Service & Commissioning” upward until „Edit Connections” is displayed.

23 Touch „Edit Connections” and then .

Wait until the search for the PLC is finished.



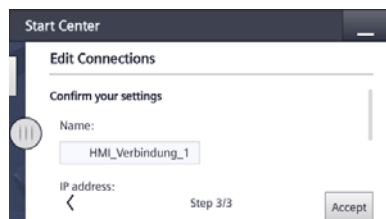
24 Touch „>” to go to the next step 2/3.

25 Enter the new IP address of the PLC as of step 12.




26 Swipe upward until the slide switch „Override” is displayed.

27 The slide switch must be set to „ON”, swipe if necessary.



28 Touch „>” to go to the next step 3/3.

29 Check the new settings and touch „Accept”.

30 Touch .

31 Touch „Start” to start runtime in the Start Center.

5.6 Connecting Process Monitoring System (PMS)

(Optional)

The serial RS 485 bus interface is used for data transfer to the visualisation system Process Monitoring System (PMS).

The visualisation system Process Monitoring System is used for archiving and monitoring of process data, for remote diagnosis and remote access using a standard browser with internet and E-mail capability.

Further units can be connected to the PMS via RS 485 bus interface.

For the PMS a separate instruction manual is available.

5.6.1 Technical data

Hardware	SIMATIC S7-1200 CB1241 RS 485
Siemens part no	6ES7241-1CH30-1XB0
Transmission technology	symmetrical two-wires bus line (semi-duplex operation)
Baud rate	19200 Baud (up to 1200 m)
Bus address	default 2
Bus connection	terminal block

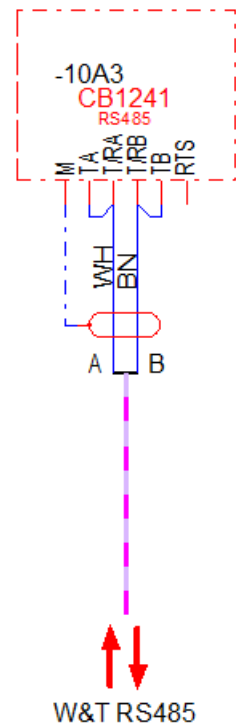
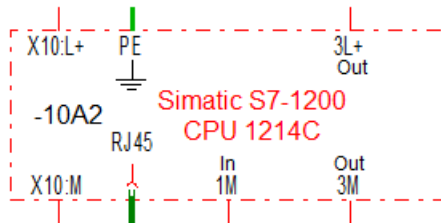
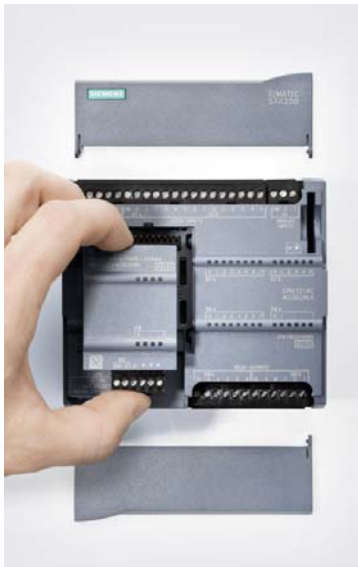
Article numbers:

W3T351975 Extension RS 485-PMS
incl. communication module with accessories

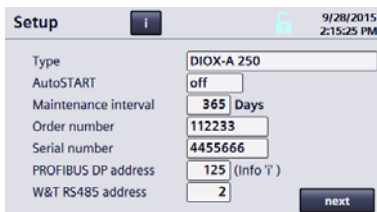
5.6.2 Connecting RS 485

Installing the communication board

- 1 Shut-down the chlorine dioxide generator.
- 2 Open control cabinet.
- 3 Carefully remove the two terminal covers of the PLC and lift the blind covers.
- 4 Connect the communication board CB1241 RS 485 from the top to the PLC and close the terminal covers. A separate power supply is not necessary.



Setting the RS 485 address



- 1 Enter the Service password.
- 2 Press F4, then touch „Setup” and „next”.
The present RS 485 address is displayed.
- 3 Enter the new RS 485 address and touch „next” to continue the setup process.
The new address is active immediately.

5.7 Data formats

The following table contains data formats used during the transfer of process data:

Data type	Size (Bit)	Typical names	Initials	Value range	
				min	max
BOOL	1	Bit, Bool	no	0	1
BYTE	8	unsigned Char, Byte	no	00 _{HEX}	FF _{HEX}
WORD	16	unsigned Integer, Word	no	00 _{HEX}	FFFF _{HEX}
STRING	(n*8) + 16	ASCII, String, Character string	no	---	---

n = number of characters

The byte sequence, in which the various data are saved into the memory or transmitted can be taken from the following chapters.

BYTE

Example: 7B_{hex} = 123_{dez}

BYTE 0							
7B _{hex}							
7	Bit						0
0	1	1	1	1	0	1	1

WORD

Example: 3039_{hex} = 12345_{dez}

BYTE 0								BYTE 1									
3039 _{hex}																	
15	Bit							8	7	Bit							0
0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	

STRING

Example: ,AB' STRING [2]

BYTE 0								BYTE 1								BYTE 2								BYTE 3											
Ab																																			
max. length of string								actual length of string								ASCII value A								ASCII value b											
31	Bit							24	23	Bit							16	15	Bit							8	7	Bit							0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	1	0				

5.8 Reference list

The following reference list contains the data that were made available by the chlorine dioxide generator.

„n” starting address of the master input area.

„R” read access right.

MODBUS Register	Byte addr.	Bit addr.	Length (byte)	Format	Access	Description	Value Value range
40001	n		10	STRING[8]	R	Version for RS485 Bus-Scan	'DIOXA001'
40006	n+10		6	STRING[4]	R	Typ for RS485 Bus-Scan	'A250'
40009	n+16		30	STRING[28]	R	Product type description mode	Diox-A***
40024	n+46		8	STRING[6]	R	Software version	V** **
40028	n+54		8	STRING[6]	R	Software date	MM/YY
40032	n+62		10	STRING[8]	R	Software article number	EAE****
40037	n+72		10	STRING[8]	R	Serial number	
40042	n+82		8	STRING[6]	R	Order number	
40046	n+90		26	STRING[24]	R	System name	
40059	n+116		26	STRING[24]	R	System location	
40072	n+142	0	1	BOOL	R	Generation OFF	Operating message
		1		BOOL	R	Unit external OFF	Operating message
		2		BOOL	R	Generation Manual	Operating message
		3		BOOL	R	Generation AUTO	Operating message
		4		BOOL	R	Bypass STOP	Operating message
		5		BOOL	R	Unit Failure	Operating message
		6		BOOL	R	Generation Run-out	Operating message
	n+143	0	1	BOOL	R	Generation STOP	Operating message
		1		BOOL	R	Unit rinse	Operating message
		2		BOOL	R	Evacuation HCl	Operating message
		3		BOOL	R	Evacuation NaClO2	Operating message
		4		BOOL	R	Calibration HCl	Operating message
		5		BOOL	R	Calibration NaClO2	Operating message
		6		BOOL	R	n.c.	
7	BOOL	R	n.c.				
40073	n+144	0	1	BOOL	R	Operating water	1 =Failure message active
		1		BOOL	R	Oval gear meter HCl	1 =Failure message active
		2		BOOL	R	Oval gear meter NaClO2	1 =Failure message active
		3		BOOL	R	Deviation pump feedrates	1 =Failure message active
		4		BOOL	R	Correction HCl pump	1 =Failure message active
		5		BOOL	R	Correction NaClO2 pump	1 =Failure message active
		6		BOOL	R	Calibration HCl number of pulses	1 =Failure message active
	n+145	7	1	BOOL	R	Calibration HCl monitoring time	1 =Failure message active
		0		BOOL	R	Calibration NaClO2 number of pulses	1 =Failure message active
		1		BOOL	R	Calibration NaClO2 monitoring time	1 =Failure message active
		2		BOOL	R	Leak monitoring	1 =Failure message active
		3		BOOL	R	Storage tank MAXMAX	1 =Failure message active
		4		BOOL	R	Level switch storage tank	1 =Failure message active
		5		BOOL	R	Carboy HCl empty	1 =Failure message active
6	BOOL	R	Carboy NaClO2 empty	1 =Failure message active			
7	BOOL	R	n.c.				
40074	n+146	0	1	BOOL	R	Power failure	1 =Failure message active
		1		BOOL	R	Unit OFF due to power failure	1 =Failure message active
		2		BOOL	R	Pulse failure: operating water	1 =Failure message active
		3		BOOL	R	Evacuation HCl monitoring time	1 =Failure message active
		4		BOOL	R	Evacuation NaClO2 monitoring time	1 =Failure message active
		5		BOOL	R	Flushing monitoring time	1 =Failure message active
		6		BOOL	R	n.c.	
	7	BOOL	R	n.c.			
n+147		1	BYTE	R	n.c.		

40075	n+148	0	1	BOOL	R	Perform maintenance!	1 = Warning message active
		1		BOOL	R	Carboy HCl MIN!	1 = Warning message active
		2		BOOL	R	Carboy NaClO2 MIN!	1 = Warning message active
		3		BOOL	R	Calibrate unit!	1 = Warning message active
		4		BOOL	R	Failure calibration HCl pump!	1 = Warning message active
		5		BOOL	R	Failure calibration NaClO2 pump!	1 = Warning message active
		6		BOOL	R	Correction HCl pump?	1 = Warning message active
		7	BOOL	R	Correction NaClO2 pump?	1 = Warning message active	
	n+149	0	1	BOOL	R	Operating water flow MAX!	1 = Warning message active
		1		BOOL	R	Storage tank MINMIN!	1 = Warning message active
		2		BOOL	R	Calibration operating water flow!	1 = Warning message active
		3		BOOL	R	Min-Stop active!	1 = Warning message active
		4		BOOL	R	Basic load dosing active!	1 = Warning message active
		5		BOOL	R	Attention! Set point < Alarm value!	1 = Warning message active
	6	BOOL		R	Analog signal!	1 = Warning message active	
	7	BOOL	R	n.c.			
40076	n+150	0	1	BOOL	R	n.c.	
		1		BOOL	R	n.c.	
		2		BOOL	R	n.c.	
		3		BOOL	R	n.c.	
		4		BOOL	R	n.c.	
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7	BOOL	R	n.c.		
	n+151		1	BYTE	R	n.c.	
40077	n+152		2	INT	R	Capacity [%]	0...100
40078	n+154		4	REAL	R	Flow HCl [l/h]	0,0...15,0 (one decimal)
40080	n+158		4	REAL	R	Flow NaClO2 [l/h]	0,0...15,0 (one decimal)
40082	n+162		4	REAL	R	Operating water flow [l/h]	0...150 (nur Batch)
40084	n+166		4	REAL	R	Operating hours unit [h]	0...999999
40086	n+170		4	REAL	R	Operating hours generation [h]	0...999999 (at Batch: oper.hours HCl p.)
40088	n+174		4	REAL	R	Operating hours NaClO2 pump [h]	0...999999 (only Batch)
40090	n+178		4	REAL	R	Generations	0...99999 (only Batch)
40092	n+182		2	INT	R	Next maintenance in [days]	0...999
40093	n+184		2	INT	R	Digital inputs IW0	
40094	n+186		2	INT	R	Digital outputs QW0	
40095	n+188		2	INT	R	Analog input IW64	0...27648 dez
40096	n+190		2	INT	R	Analog input IW66	0...27648 dez

6. Operation



Warning!

Risk of Explosion!

Risk of injuries due to dangerous chemicals!

Risk of system damage.

The system produces chemicals in potentially hazardous quantities.

Solutions with low ClO₂ concentrations and the ClO₂ gas which occurs in the event of leakage constitute a health hazard and have an extremely corrosive effect on metals. This also applies to the hydrochloric acid and NaClO₂ solution used for ClO₂ generation.

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
 - Never bring HCl and NaClO₂ into contact with each other.
 - Inspect the system for leaks before commissioning.
 - Take special care if a chlorine-like odour is detectable in the room where the system is installed! This could indicate discharged chlorine dioxide solution or hydrochloric acid. Remedy the cause!
 - To prevent health risks or damage to the system, follow the safety notes and warnings attached to the system and in the instruction manuals in any case.
 - Only authorized and trained personnel may use the system.
-

6.1 Control and display unit

The default input unit on the controller is the touchscreen. All of the control objects required for control after starting the controller are displayed on the touchscreen.



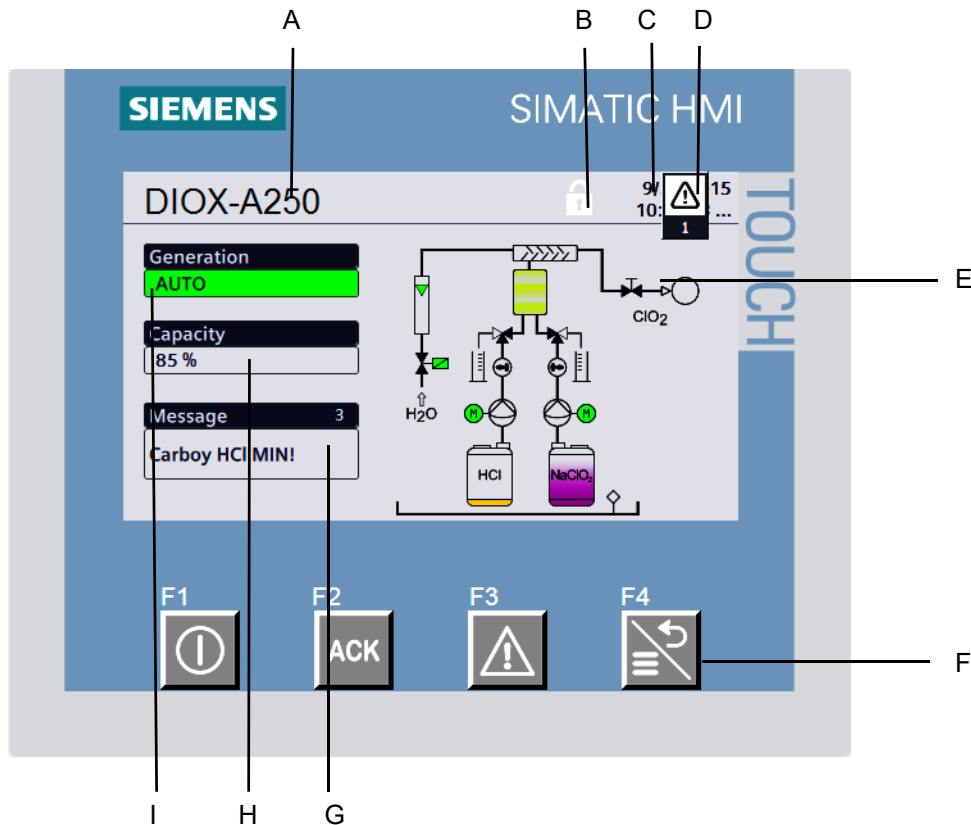
Attention!

System damage!

- Only touch the touchscreen with your finger or a touch stylus.
 - Never use pointed or sharp instruments to operate the touchscreen or press it abruptly with hard objects, as this can severely shorten its operational life or damage it completely.
 - Only touch one control object at a time. Touching several objects at a time can trigger unintentional operations.
-

6.2 Operating the control unit

6.2.1 Control operating panel



- A Type of system
- B Login-Symbol
- C Date and time
- D Message indicator
- E Scheme
- F Function keys F1-F4
- G Messages incl. number of messages
- H Present capacity
- I Status of the unit

Function keys



F1
Switch generation on and off (refer to “Activating ClO₂ generation” on page 79).



F2:
Acknowledge fault messages.



F3

Display the present fault message when the message indicator is displayed.



F4

Select the menu, leave a menu, return to the menu level above.

Message indicator



The message indicator is displayed in case of a fault.

The number in the lower part of the indicator shows the number of fault messages currently pending.

As long as the fault has not been acknowledged the indicator is flashing white/yellow.

6.2.2 Powering on

1 Switch on the main switch at the control box.

A „Power failure” message is displayed and must be acknowledged by touching ACK (delay time up to 30 seconds):

- When AutoSTART = ON is selected:
Generation starts automatically when generation was active.
- When AutoSTART = OFF is selected:
„Unit OFF due to power failure“ is displayed.
Generation must be started with F1.

The control operation panel is displayed.

6.2.3 Login, entering the password

The programme menus are protected against unauthorised operation by passwords.

- Operator password:
Protects all operating functions.
The operator password is 9040.
- Service password:
Protects the specific system settings and is only given to authorised specialised personnel.



Note

If no key is pressed for 5 minutes, the authorisation obtained with the password is cancelled. Then the password must be entered again.

The login status is displayed:



Locked, password has not been entered.



Open, password has been entered.

When the service password has been entered the lock symbol is displayed in blue.

To log out:

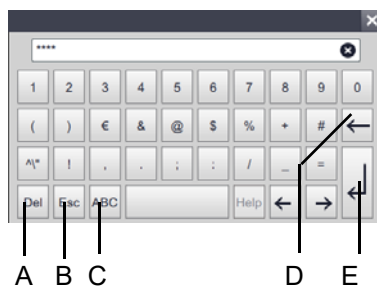
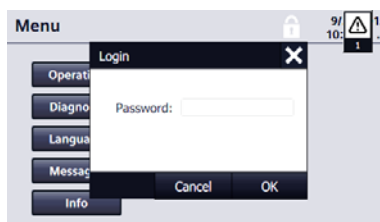
Touch the open lock symbol.

To log in:

Touch the closed lock and enter the password.

When the password is asked for:

- 1 Touch the password input box.
A keyboard is displayed.
- 2 Touch „123” to switch to the numeric keyboard.
- 3 Enter the password for the level you wish to log in to using the keyboard displayed on the screen and then touch Return (E).



A Del: Delete the character

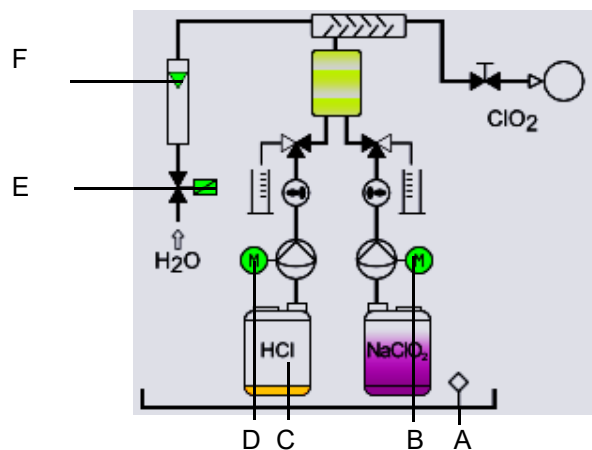
B Esc: Escape

C ABC or 123: Switch between alpha keyboard and numeric keyboard

D BACKSPACE

E RETURN

6.3 Display scheme



- A Leak sensor
- B Dosing pump NaClO_2
green = working
white = stopped
- C Level in carboy: Empty, above empty, above Min
- D Dosing pump HCl
green = working
white = stopped
- E Solenoid valve operating water
green = solenoid valve open
white = solenoid valve closed
- F Flow meter operating water:
green = flow sufficient
red = flow insufficient

Red symbols indicate failures.

6.4 Operation menus

For changes in the operation menu the operator password 9040 is required.

6.4.1 Menu „Operation“

The menu „Operation“ is used for unit setup.



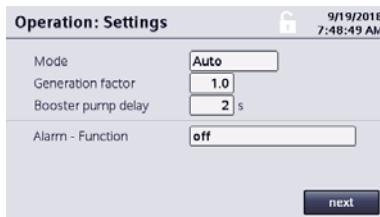
1 Press F4.

The main menu is displayed.



2 Touch „Operation“.

„Operation: Settings“ is displayed.



3 Enter the settings:

- Mode: Auto or Manual, refer to 6.9.
 - In Auto mode set the Generation factor (refer to 6.9.2)
 - In Manual mode set the Generation capacity (refer to 6.9.2).

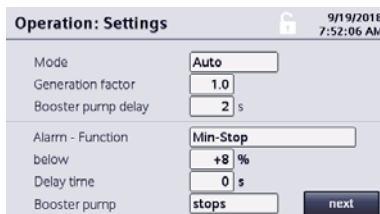
- Booster pump delay

Set a delay time for starting the booster pump.

This is necessary if the operating water solenoid valve or a shut-off valve installed in the operating water line does not open until the booster pump has started. In this case, the resulting overpressure can damage the system when the valve is opened. The overpressure can be avoided by delaying the start of the booster pump.

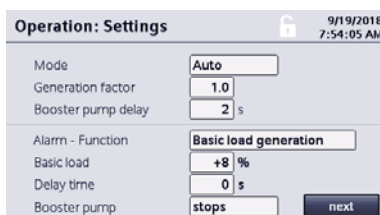
- Alarm function:

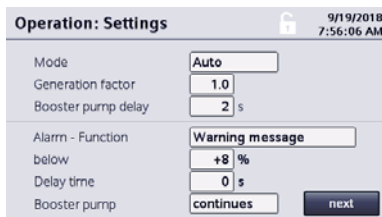
- off: When you select this option, the system continues generation according to the lead signal.
- MinStop: A field „below“ is displayed. Enter a minimum value for the lead signal here. If the signal falls below that value, the generation will stop. A warning message will be displayed.



- Basic load generation: A field „Basic Load“ is displayed. Enter a minimum value for the lead signal here. If the signal falls below that value, the generation will continue according to the value.

Pay attention for sufficient operating water flow!

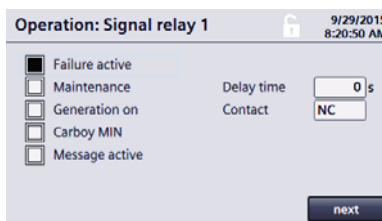




- Warning message: The system will continue generation, even when the lead signal falls below the value entered at „below“. A warning message will be displayed.
- Delay time: Enter the delay time until the alarm function becomes active.
- Lock booster pump:
 - on: Booster pump stops when the lead signal falls below the value entered at „below“.
 - off: Booster pump continues.

4 Touch „next“.

The operation menu „Signal relay 1“ is displayed.



5 Activate the function(s) of the signal relay 1.

Select the function by touching the symbol.

: Function is not active.

: Function is active.

One or more functions can be activated.

Set the delay time: Time before the relay switches.

Set the contact function NO or NC.

6 Touch „next“.

The operation menu „Signal relay 2“ is displayed.

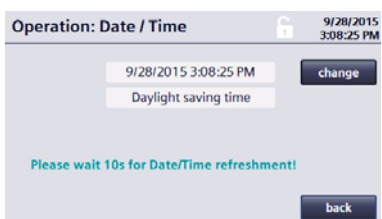
Activate the function(s) of the signal relay 2.

7 Touch „next“.

The operation menu „Date / Time“ is displayed.

Date is displayed as mm/dd/yyyy.

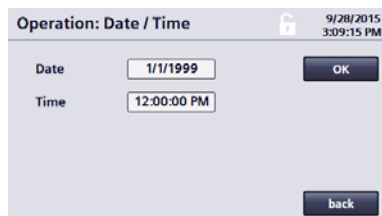
Correct date and time settings are recommended for the correct display and storage of fault messages.



8 To change the settings touch „change“.

9 Press the „Date“ or „Time“ box.

The keyboard is displayed.



10 Move the cursor to the number to change using the arrow keys.

To enter numbers touch „123“ to switch to the numeric keyboard. Use the DEL key and BACKSPACE to delete numbers.

11 Enter the correct numbers.

To store touch RETURN.

To cancel touch „ESC“.

12 To confirm the new settings touch „OK“.

13 To return to the main menu touch „back“.



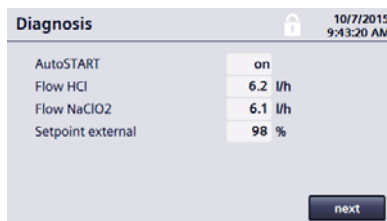
Note

„Daylight saving time” or „Wintertime” is set automatically.
Date and time are refreshed within 10 seconds.

6.4.2 Menu „Diagnosis“

The menu „Diagnosis“ shows the status of the system:

- present flows
- external setpoint
- calibration history
- present state of digital inputs and outputs



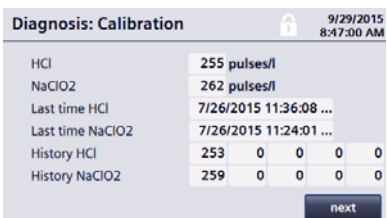
1 Press F4.

2 Touch „Diagnosis”.

„Diagnosis” is displayed.

The values in the diagnosis menu represent the present status of the system.

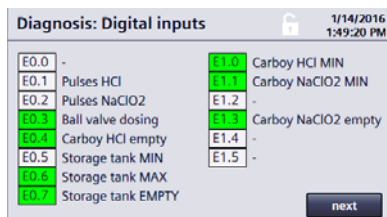
3 Touch „next” to go to the next menu.



„Diagnosis: Calibration” is displayed.

- Pulses per liter for HCl and NaClO₂
- Date and time of last calibration
- History: Pulses per liter at the last five calibrations

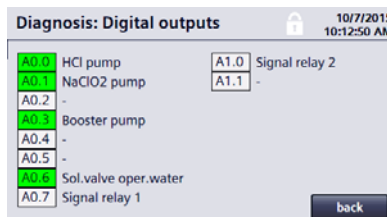
4 Touch „next” to go to the next menu.



„Diagnosis: Digital inputs” is displayed.

Active digital inputs are displayed in green.

5 Touch „next” to continue to the next menu.



„Diagnosis: Digital outputs” is displayed.

Active digital outputs are displayed in green.

6 To return to the main menu touch „back”.

6.4.3 Menu „Language“

The menu „Language“ is used to select the system language German, English or French.



1 Press F4.

2 Touch „Language“.

„Language“ is displayed.

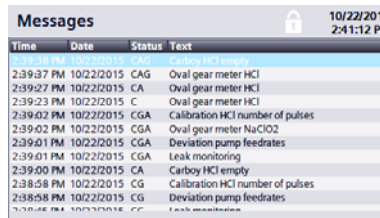
3 Select the language:

- for German: touch „DE“
- for English: touch „EN“
- for French: touch „FR“
- for Polish: touch „PL“

The new language is active immediately.

6.4.4 Menu „Message“

All messages are stored in the message buffer.



1 Press F4.

2 Touch „Messages“.

Display of the saved messages with date and time

- **C**: Message has come
- **A**: Message has been **ack**n~~o~~wledged
- **G**: Message has **g**one

3 Scroll in the message buffer by moving your finger on the screen.

System messages:

- Power failure: System switched off or power failure.
- System selected, Inhouse testing complete: Messages produced during factory testing without importance for the operator.

For other messages refer to 6.13

4 To leave the menu press F4.

6.4.5 Menu „Info“

The menu „Info“ shows the following data:

- system data
- maintenance data
- system name, order and serial number
- software version



Info: Operating data 10/23/2015
9:50:50 AM

Unit	236 h
Generation	169 h

next

„Info: Operating data“ is displayed.

- Unit: Total operating hours
- Generation: Generating hours

3 Touch „next“

Info: Maintenance 9/29/2015
9:14:00 AM

Next maintenance in	362 Days
last at	7/24/2015 3:36:00 PM
last but one	
last but two	
Start-up	2/21/2015 9:28:30 AM

next

„Info: Maintenance“ is displayed.

The following dates are displayed:

- Days until next maintenance
- Dates of the last three maintenances
- Unit startup date

4 Touch „next“

Info: Software 9/29/2015
9:18:45 AM

Type	-A 250
Name of unit	WW X
Location of unit	Tech X
Order number	112233
Serial number	4455666
Software	V1.0 08/15
	EAE1144

back

„Info: Software“ is displayed.

Name and location of the unit, order and serial number and the data of the software are displayed.

Name and location of the unit can be entered and changed.

5 To change touch the corresponding box.

These data are issued via the interface.

6 To return to the main menu touch „back“.

6.5 Evacuation and Calibration



Warning!

Risk of Explosion!

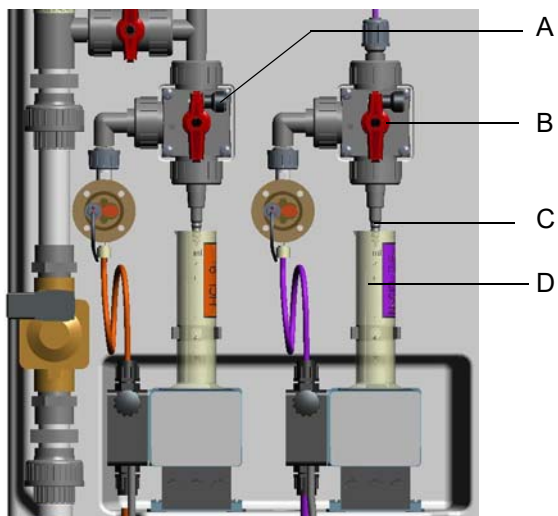
Risk of injuries due to dangerous chemicals!

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO₂ into contact with each other.
- Do not leave the system unattended during evacuation or calibration.



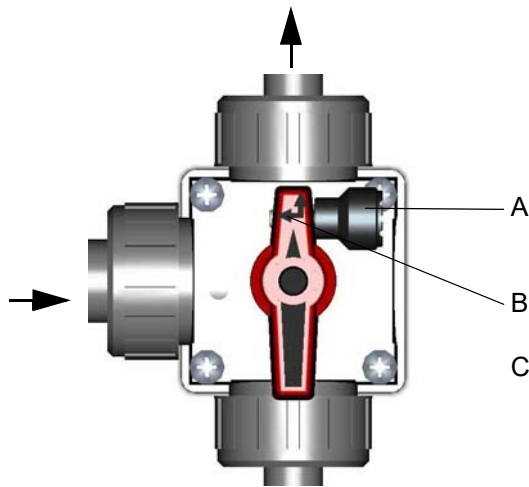
Note

To prevent serious damage due to leakage of chemicals, the metering pump automatically switches off during evacuation or calibration after 15 minutes.

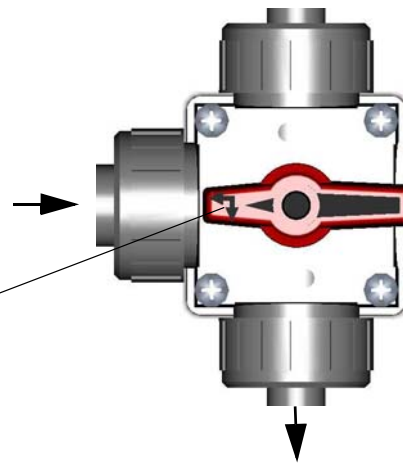


- A HCl ball valve
- B NaClO₂ ball valve
- C Sample tap with protection cap
- D Beaker with clip

Ball valve in position „Generation“



Ball valve in position „Evacuation and Calibration“



A Locking bolt

B mark on the handle:

C mark on the handle:



The handle is protected against accidental turning:

Prior to turning

- 1 Unscrew the locking bolt.
- 2 Pull the yellow locking catch on the handle, then turn the handle.
- 3 Secure the locking catch once more with the locking bolt.

6.5.1 Evacuating the metering pumps



Warning!

Risk of Explosion!

Risk of injuries due to dangerous chemicals!

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO₂ into contact with each other.
- Rinse beakers thoroughly after each use.
- Do not leave the system unattended during evacuation.

During evacuation the metering pump pumps air from the suction lines, the metering pump, the flow meter and the ball valve into a beaker until all air bubbles have been removed.

This section describes the evacuation of the HCl pump. The NaClO₂ pump is evacuated in the same way.



Note

The protection caps on the sample taps prevent the NaClO₂ solution from crystallising.



Generation must be switched off (if necessary press F1). „Generation Off” is displayed.

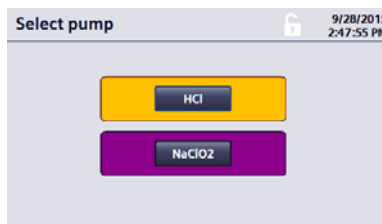
- 1 Press F4.
- 2 Touch „Evacuation”.

If necessary enter the operator password.

- 3 Touch „HCl”

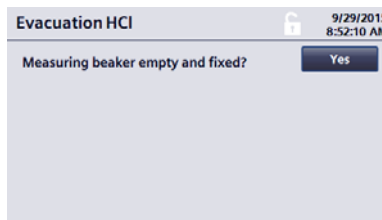
The evacuation process is started. The instructions on the display guide you through the process.

Note that the process cannot be interrupted.



- 4 Remove the protection cap from the sample tap HCl and clamp the empty graduated beaker into the bracket.

To confirm touch „Yes”.



- 5 Shift the HCl ball valve for evacuation (refer to the mark on the

handle):

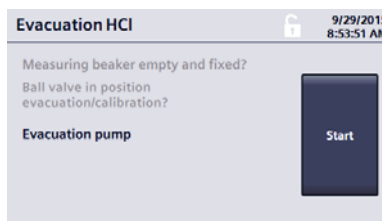


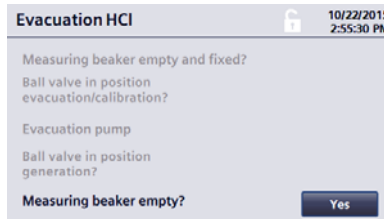
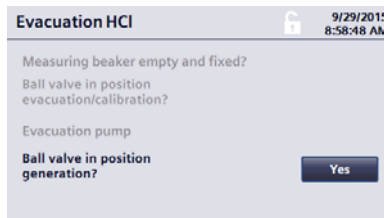
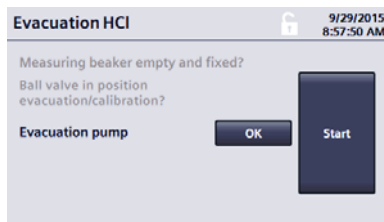
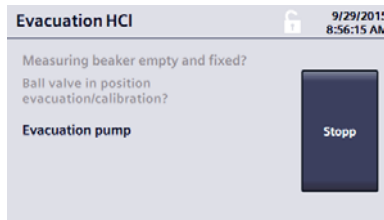
To confirm touch „Yes”.



- 6 To start evacuation touch „Start”.

The dosing pump is working.






7 When no more air bubbles appear, touch „Stopp”.

8 To restart evacuation (if necessary) touch „Start”.

9 To stop evacuation touch „Stopp”.

10 To finish evacuation touch „OK”.

11 Reset the HCl ball valve to the Generation position (refer to

the mark on the handle): 

To confirm touch „Yes”.

12 Empty the graduated beaker and rinse it. Place the protection cap back on the tap. Clamp the graduated beaker back into the bracket.

To confirm touch „Yes”.

To evacuate the NaClO₂ pump, press F4 for the main menu, touch „Evacuation” and follow the process accordingly.



Notes

- Always evacuate both metering pumps.
- To prevent serious damage, the metering pump automatically switches off during evacuation after 15 minutes.

6.5.2 Calibration of the HCl and NaClO₂ flow



Warning!

Risk of Explosion! Risk of injuries due to dangerous chemicals!

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO₂ into contact with each other.
- Rinse beakers thoroughly after each use.
- Do not leave the system unattended during calibration.

During calibration the control unit counts the number of pulses of the flow meter per 100 ml of liquid. The capacity of the metering pump is precisely controlled with this value.

This section describes the calibration of the HCl flow. The NaClO₂ flow is calibrated in the same way.


Generation must be switched off (if necessary touch F1). „Generation Off” is displayed.

- 1 Press F4.
- 2 Touch „Calibration”.
- 3 Touch „HCl”

The evacuation process is started. The instructions on the display guide you through the process.

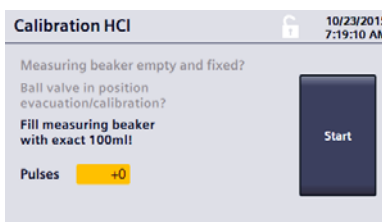
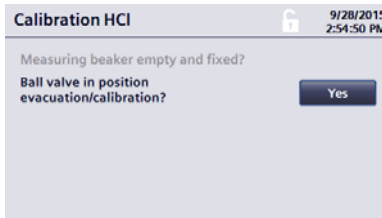
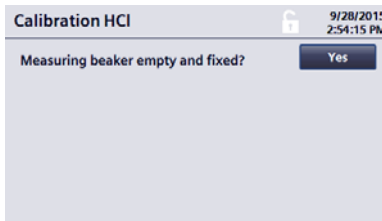
Note that the process cannot be interrupted.

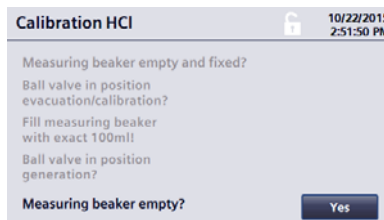
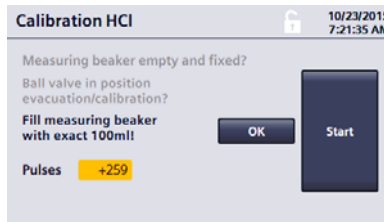
- 4 Remove the protection cap from the sample tap HCl and clamp the empty graduated beaker into the bracket.
To confirm touch „Yes”.

- 5 Shift the HCl ball valve for calibration (refer to the mark on the handle):

To confirm touch „Yes”.

- 6 To start calibration touch „Start”.
The beaker is filled.

- 7 When exactly 100 ml are reached touch „Stopp”






8 To continue calibration (if necessary) touch „Start” again.

The number of pulses counted is displayed (approx. 250 pulses/100 ml)

9 When calibration is correct (exactly 100 ml) touch „OK”.

If the calibration failed, continue until the process is completed and repeat calibration.

10 Reset the HCl ball valve to the Generation position (refer to

the mark on the handle): 

To confirm touch „Yes”.

Empty the graduated beaker and rinse it. Place the protection cap back on the tap. Clamp the graduated beaker back into the bracket.

To confirm touch „Yes”.

To calibrate the NaClO_2 flow touch „Calibration” and follow the process accordingly.



Notes

- Always calibrate both flows.
- To prevent serious damage, the metering pump automatically switches off during evacuation or calibration after 15 minutes.

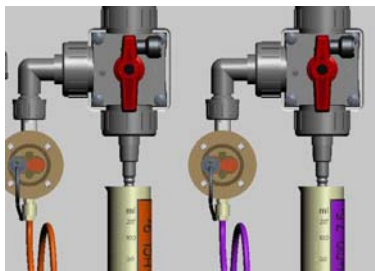
6.6 Activating ClO₂ generation



Attention!

Risk of system damage!

- The reaction tank must be filled with water or solution!
- For commissioning or re-starting, after dismantling the system or several days of non-operation it is essential to flush the system (refer to 6.10).



- 1 Check that both ball valves are in the „Generation“ position and secured with the locking bolt.
- 2 Check enable signal.
 - If the system is connected to an enable signal, enabling must be applied.
 - For the AUTO mode a lead signal must be connected (e.g. from an external controller or flow meter).
- 3 Open the operating water.
- 4 Press „F1: Generation ON/OFF“. „Generation ON“ is displayed.

The solenoid valve*) for the operating water opens, the booster pump runs (optional), the operating water flows. Additionally to the solenoid valve, a booster pump can be installed.

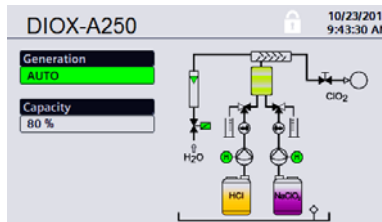
- 5 Adjust the operating water flow at the dosing ball valve (P):

Type	DIOX-A 50 and DIOX-A 100	DIOX-A 170 and DIOX-A 250
Operation water flow	approx. 400 l/h	approx. 800 l/h



Note

The type of the generator is given on the label on the right side of the generator.
Read the operation water flow at the upper edge of the flow meter float.



If sufficient operating water is flowing (MIN limit value is exceeded), the metering pumps start automatically. „Generation AUTO” is displayed.

6.7 Deactivating ClO₂ generation



Warning!

Risk of injury due to dangerous chemicals!

- Even after deactivating, the system still contains chlorine dioxide solution.
- If the system is out of operation for a prolonged period (several days), flush the system (refer to 6.10)

1 Press „F1: Generation ON/OFF“.

The dosing pumps HCl and NaClO₂ stop.

„Generation OFF” is displayed.

The solenoid valve operation water closes and the (optional) booster pump stops.

2 For longer standstill close off the operating water after flushing.



Notes

- Generation can also be switched on and off by the external enable signal (if the input is connected accordingly).
-

6.8 Emergency switch-off



Warning!

Risk of injury due to dangerous chemicals!

- Even after switching off, the system still contains chlorine dioxide solution.

- Before disconnecting system components it is essential to flush the system (refer to 6.10).
-

- 1 In case of an emergency switch off the main switch.
- 2 After reactivation observe the fault messages. Refer to 6.13.2

6.9 AUTO mode, MANUAL mode

Functions of the modes:

AUTO mode:

- ClO₂ generation dependent on external lead signal:
 - Flow signal from IMF (inductive magnetic flow meter), contact water meter) or
 - ClO₂ concentration (from external controller e.g. SFC unit)
- Generation factor can be set from 0.1 to 3.0
- Activation/deactivation with key „F1: Generation ON/OFF“
- Lock by the external enable signal

MANUAL mode:

- Continuous ClO₂ generation
- Capacity adjustable in % of the system capacity
- Start/stop with the key „F1: Generation ON/OFF“
- Lock by the external enable signal
- no external lead signal
- Pay attention for sufficient water flow.

6.9.1 Switching Auto-Manual



1 Press F4.

2 Touch „Operation“.

If necessary enter the operator password.

3 Touch the mode box.

Select the mode: „Auto“ or „Manual“.

- In mode „Auto“ set the generation factor (also refer to 6.9.2).

Enter the value with the numeric keys.

- In mode „Manual“ set the generation capacity in % of the maximum system capacity.

Enter the value with the numeric keys.

4 To return to the main menu touch „next“ or press F4.

Operation: Settings 9/19/2018 7:54:05 AM

Mode: Auto

Generation factor: 1.0

Booster pump delay: 2 s

Alarm - Function: Basic load generation

Basic load: +8 %

Delay time: 0 s

Booster pump: stops

Operation: Settings 9/19/2018 8:33:44 AM

Mode: Manual

Capacity: 100 %

Booster pump delay: 2 s

Alarm - Function: off

6.9.2 Setting the generation factor

With the generation factor GF the generation rate in the AUTO operating mode can be set exactly as required on the basis of the water flow and the required ClO₂ concentration.

The generation factor can be set within the range 0.1 - 3.0. Factory setting is GF = 1.

Calculation formula: Generation factor : GF = (ClO₂ quantity) : (max. capacity)

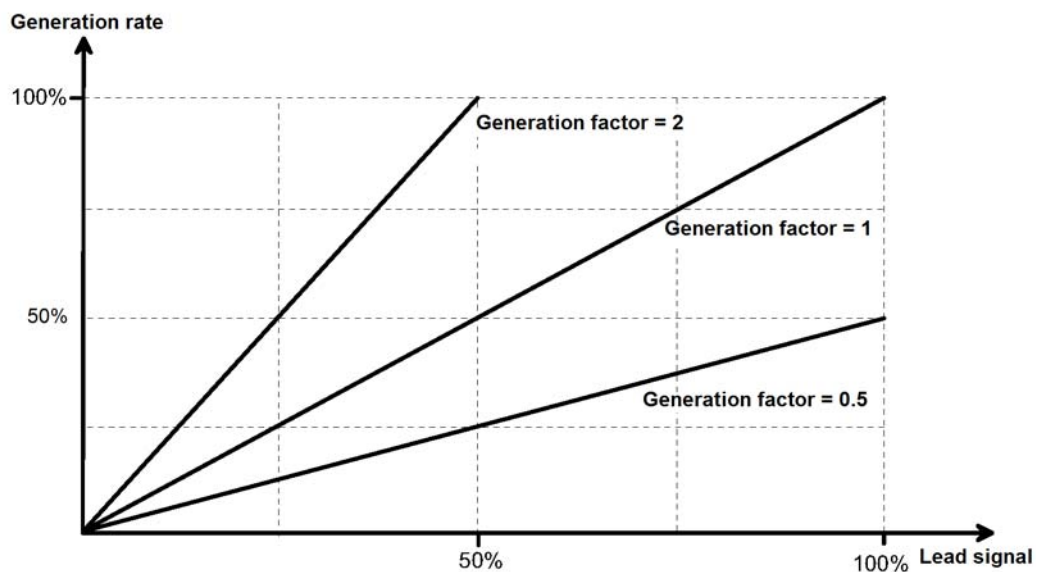
or

Generation factor = Generation rate [%] : Lead signal [%]

Example:

System type:	DIOX-A50
Maximum generation capacity ClO ₂	50 g/h (2.7 lb/d)
Feed rate in main flow:	150 m ³ /h (39.6 US gal/h)
Required ClO ₂ concentration:	0.2 mg/l = 0.2 g/m ³ (0.2 ppm)
Required quantity of ClO ₂ at 100 % flow signal	150 m ³ /h · 0.2 g/m ³ = 30 g/h (1.6 lb/d)
Generation factor	GF= 30 g/h : 50 g/h = 0.6

The following diagram shows the generation rate depending on the lead signal and the set generation factor. The generation rate cannot exceed 100 %.



6.10 Flushing the system

The system must be flushed before maintenance, repair or taking the system out of operation.

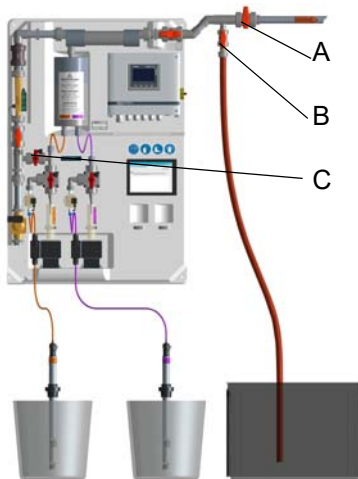


Warning!

Risk of injuries due to dangerous chemicals! System damage!

- Wear respiratory protective equipment and protective clothing.
- Never bring HCl and NaClO₂ into contact with each other.

The contents of the reaction tank must not flow into the water line during flushing.



A Shut off valve in solution line
B Ball valve at sample point
C Flushing ball valve



- 1 Switch of generation (press key F1).

„Generation Off“ is displayed.

- 2 In the solution drain line close the shut-off valve (A) downstream the ClO₂ sample point (B).

- 3 Connect a hose to the sample point (B) and place the hose into a 40 l (10 US gal) container with sodium thiosulphate solution 4 - 6 %.

(200 - 300 g sodium thiosulphate dissolved in approx. 5 l (1.3 US gal) water).

- 4 Open the ball valve at the sample point (B).

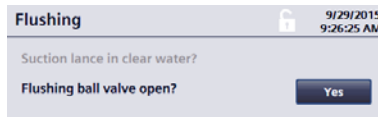
- 5 Press F4.

- 6 Touch „Flushing“.

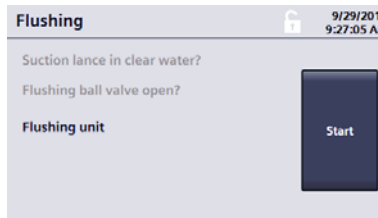
If necessary enter the operator password.

- 7 Place both suction lances separately into two tanks of clear water.

To confirm, touch „Yes“.

**8** Open the flushing ball valve (C).

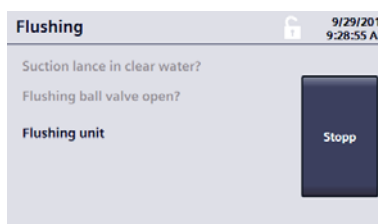
To confirm touch „Yes”.

**9** To start flushing touch „Start”.

The solenoid valve opens and the (optional) booster pump starts automatically.

Both metering pumps work.

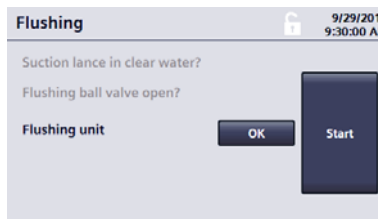
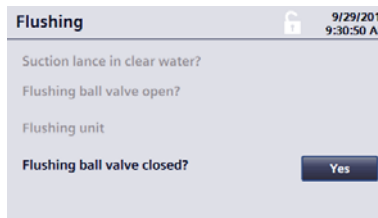
The metering pumps and the reaction tank are flushed.

**10** Stop flushing after approx. 5 min. by touching „Stopp”.

Otherwise the flushing is stopped automatically after 15 min.

The solenoid valve closes and booster pump stops automatically.

Both metering pumps stop.

**11** If necessary restart flushing with „Start”.**12** To finish flushing touch „OK”.**13** Close the flushing ball valve (C).

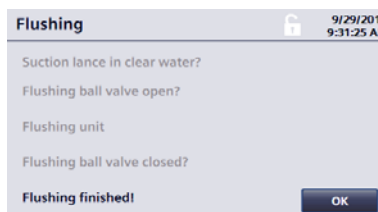
Close the ball valve at the sample point (B).

Open the shut off valve in the solution line (A) downstream the sample point.

Remove the hose.

Put the suction lances back into the carboys.

To confirm, touch „Yes.”

**14** To return to the main menu touch „OK”.**15** Strongly dilute and dispose the neutralised sodium thiosulfate solution.

6.11 Operation

A correctly installed and adjusted system requires the following measures for operation:

- Replacement of the hydrochloric acid and sodium chlorite carboys
- Daily inspection of the system for leaks
- Verification of the correct function of the gas detector (option) in accordance with national regulations and the system operating instructions
- Inspection and cleaning of the strainer in the operating water line

In case of a failure, touch ACK to acknowledge the failure. As soon as all failures have been remedied and acknowledged, the system will start again.

Power failure

If the voltage fails, the system resumes normal operation when AutoSTART is activated and when there is no other fault.

If AutoStart is deactivated, the system must be restarted with F1. Refer to the Setup settings in chapter 4.7.

6.11.1 Replacing the HCl and NaClO₂ carboys



Warning!

Risk of explosion!

Risk of injuries due to dangerous chemicals!

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO₂ into contact with each other.
- Only use containers in separate collecting trays.
- Do not change both containers at the same time, but one after the other.
- Do not exchange containers or suction lances under any circumstances!
- Only use diluted solutions: 9 % HCl, 7.5 % NaClO₂!
- Carefully transport the containers and protect them from damage.

- Under no circumstances should residual solutions remaining in the containers be decanted, but should be disposed of in accordance with local regulations!
-



Attention!

System Damage!

Dirt in the HCl or NaClO₂ lines causes failure of the oval gear meters.

- Avoid soling of the suction lances.
 - Do not put the suction lances on the ground.
-

Shortly before a carboy runs empty, „... Carboy MIN“ is displayed. This signal can also be output via the signal relay.

In case of an empty carboy, the generation stops and the fault message „... Carboy empty“ is displayed.

It is recommended to replace carboys in time.

- 1 Switch off generation (press F1).
- 2 Wait until the HCl metering pump has stopped.
- 3 Remove the empty carboy.
- 4 Carefully place the full carboy into the collecting basin below the system.
- 5 Remove the cover.
- 6 Remove the suction lance from the empty carboy and place into the full carboy.
- 7 Replace the other carboy in the same way.
- 8 Evacuate the metering pumps, suction lances and suction hoses. (Refer to “Evacuating the metering pumps” on page 74)
- 9 Switch on generation.
- 10 Close the empty carboy, store in accordance with the supplier’s instructions and return to supplier.

The concentration of the starting chemicals is selected so that the carboys are empty at approximately the same time.

6.12 Emptying the system



Warning!

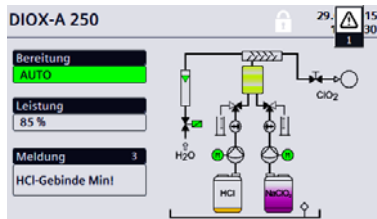
Risk of injuries due to dangerous chemicals!

- Even after flushing the system can contain dangerous chemicals in minor quantities.
 - Only authorized and qualified personnel may empty the system (refer to chapter 7.3.2.).
-

6.13 Messages and fault messages

6.13.1 Messages

Example:



Messages are displayed on the lower display line.

Several messages are displayed alternately. The number of active messages is indicated.

Message text	Reaction of the system	Cause	Remedy
Calibrate unit!	-	During commissioning	Calibrate the HCl and NaClO ₂ flow
Failure calibration HCl pump / NaClO ₂ pump!	Standard value is used (250 pulses/100 ml)	Calibration of HCl / NaClO ₂ flow is faulty	Calibrate the flow
Carboy HCl min	-	HCl carboy Min	Replace the HCl carboy
Carboy NaClO ₂ min	-	NaClO ₂ carboy Min	Replace the NaClO ₂ carboy
Correction HCl pump	-	Dosing rate too low	Calibrate the HCl flow
Correction NaClO ₂ pump	-	Dosing rate too low	Calibrate the NaClO ₂ flow
Ext. off	Generation is stopped	No external release signal	Check release signal
Setpoint < alarm value	Refer to alarm function setting (6.4)	Lead signal too small	Check the signal
Basic load generation active	Refer to alarm function setting (6.4)	Lead signal too small	Check the signal
Min stop active	Refer to alarm function setting (6.4)	Lead signal too small	Check the signal
Effect maintenance	The message is displayed until the maintenance has been executed and confirmed.	Maintenance interval reached	Inform the service of the manufacturer.
Analog signal	Generation is stopped	Analogue signal out of the valid range (<3.2 mA)	Check the analogue signal.
Set Date / Time	No restriction	Date and time are not set	Set date and time in the menu „Operation“

6.13.2 Fault messages



Warning!

Risk of injuries due to dangerous chemicals and electric current!

Observe before troubleshooting:

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
- Never bring HCl and NaClO₂ into contact with each other.
- All electrical work on the system may only be performed by qualified electricians!
- Before releasing parts of the system, flush the system and take it out of operation
- Commission the customer service for repairs and maintenance.

Fault messages are displayed in plain text, the message indicator



is displayed.

Example:

Time	Date	Status	Text
13:37 PM	10/22/2015	CAG	Carboy HCl empty
13:37 PM	10/22/2015	CA	Oval gear meter HCl
13:23 PM	10/22/2015	C	Oval gear meter HCl
13:02 PM	10/22/2015	CGA	Calibration HCl number of pulses
13:02 PM	10/22/2015	CGA	Oval gear meter NaClO ₂
13:01 PM	10/22/2015	CGA	Deviation pump feedrates
13:01 PM	10/22/2015	CGA	Leak monitoring
13:00 PM	10/22/2015	CA	Carboy HCl empty
13:58 PM	10/22/2015	CG	Calibration HCl number of pulses
13:58 PM	10/22/2015	CG	Deviation pump feedrates
13:46 PM	10/22/2015	CG	Leak monitoring

Display of the stored messages with date and time.

- **C:** Fault message has come
- **A:** Fault message acknowledged
- **G:** Fault message has gone

Scroll in the messages by moving the finger up/down on the touchscreen.




flashing white/yellow

- Fault is pending, but has not been acknowledged.
To acknowledge touch ACK.
The fault message is no longer displayed.
The message indicator is displayed until the cause of the fault has been remedied.



is permanently on

- The fault has been acknowledged, but not remedied.
To display the message again press F3 
Generation restarts as soon as all faults have been acknowledged and remedied.

Plain text display	Reaction	Cause	Remedy
HCl-carboy empty	Generation stops.	HCl carboy empty	Replace HCl carboy.
		Level probe defective, wire breakage	Check switch.
		Empty signal of the pump defective	Check pump.
NaClO ₂ - carboy empty	Generation stops.	NaClO ₂ carboy empty	Replace NaClO ₂ carboy.
		Level probe defective, wire breakage	Check switch.
		Empty signal of the pump defective	Check pump.
Oval gear meter HCl	Generation stops.	No pulses from oval gear meter HCl (e.g. because of air bubbles)	Evacuate the system. Check the HCl oval wheel meter (must turn with every pump stroke).
Oval gear meter NaClO ₂	Generation stops.	No pulses from oval gear meter NaClO ₂	Evacuate the system. Check the NaClO ₂ oval wheel meter (must turn with every pump stroke).
Deviation pump feedrates	Generation stops.	Correction factors of the pumps too far apart, measured feed rate variation too great	Evacuate and calibrate the metering pumps. Check both oval wheel meters (must turn with every pump stroke). Replace if necessary.
Correction HCl pump	Generation stops.	Correction factor outside the permissible range (50 - 150 %)	Evacuate metering pump.
		Feed rate measurement probably incorrect	Check the HCl oval gear meter (must turn with every pump stroke). Replace if necessary.
Correction NaClO ₂ pump	Generation stops.	Correction factor outside the permissible range (50 - 150 %)	Evacuate metering pump.
		Feed rate measurement probably incorrect	Check the NaClO ₂ oval wheel meter (must turn with every pump stroke). Replace if necessary.
Calibration HCl number of pulses	none	Calibration probably finished too late or too early (feed rate measurement outside the permissible range: 130 - 390 pulses)	Evacuate metering pump. check the NaClO ₂ oval wheel meter (must turn with every pump stroke). Replace if necessary.
Calibration NaClO ₂ number of pulses	none	Calibration probably finished too late or too early (feed rate measurement outside the permissible range: 130 - 390 pulses)	Evacuate HCl metering pump. Check the NaClO ₂ oval wheel meter (must turn with every pump stroke). Replace if necessary.

Plain text display	Reaction	Cause	Remedy
Calibration HCl monitoring time	Calibration stopped.	Calibration takes too long	Calibrate the HCl metering pump, stop in good time when 100 ml is reached.
Calibration NaClO ₂ monitoring time	Calibration stopped.	Calibration takes too long	Calibrate the NaClO ₂ metering pump, stop in good time when 100 ml is reached.
Evacuation HCl monitoring time	Evacuation stopped.	Evacuation takes too long	Stop evacuation in good time.
Evacuation NaClO ₂ monitoring time	Evacuation stopped.	Evacuation takes too long	Stop evacuation in good time.
Flushing monitoring time	Flushing stopped.	Flushing takes too long	Stop flushing in good time.
Leak monitoring	Generation stops.	Signal from leakage sensor	Seal the leak. If necessary check the leakage sensor.
Unit OFF due to power failure	Generation stops *)	Power failure	Switch ON generation when required.
Power failure	none *)	Power failure has occurred	Generation is switched back on automatically when required.

*) refer to the AutoSTART setting in chapter 4.7

7. Maintenance



Warning!

Risk of Explosion!

Risk of injuries due to dangerous chemicals!

System damage!

Solutions with low ClO_2 concentrations and the ClO_2 gas which occurs in the event of leakage constitute a health hazard and have an extremely corrosive effect on metals. This also applies to the hydrochloric acid and NaClO_2 solution used for ClO_2 generation.

- When working on the system wear protective clothing, protective gloves, goggles or face protection. Have a respiratory mask ready to use.
 - Never bring HCl and NaClO_2 into contact with each other.
 - Inspect the system for leaks before commissioning.
 - Take special care if a chlorine-like odour is detectable in the room where the system is installed! This could indicate discharged chlorine dioxide solution or hydrochloric acid. Remedy the cause!
 - To prevent health risks or damage to the system, follow the safety notes and warnings attached to the system and in the instruction manuals in any case.
 - Only Evoqua customer service or personnel specifically trained by Evoqua may maintain the system.
-

7.1 Maintenance/inspection plan

Period/ Interval	Maintenance level*)	Required work	Auxiliaries	O.K.	Not O.K.	Remedied
daily	1	Check the system visually: <ul style="list-style-type: none"> • function • leaks 				
monthly	1	<ul style="list-style-type: none"> • Check the strainer in the operation water line, clean if necessary • Calibrate HCl and NaClO₂ 				
every 3 months	1	<ul style="list-style-type: none"> • Check dosing pumps 				
yearly	2	Yearly maintenance	Corresponding to the maintenance sets			
<p>*) All work with maintenance level 2 must be done by customer service or personnel specifically trained by Evoqua.</p> <p>All further work can only be done after consulting the customer service.</p> <p>Document all implemented changes and performed work in the log.</p>						

7.2 Maintenance by the operator

The operator may only perform the works listed in this chapter. The regular maintenance („service maintenance), emptying and repairing the system must be performed by the customer service or by personnel especially trained by Evoqua.

The following maintenance work must be done by the operator:

- 1** Check the system daily for functionality and leaks.
In the event of leakage flush the system and tighten all connections by hand.
- 2** Clean the strainer in the operating water line monthly.
- 3** Every three months check the metering pumps (refer to the manual of the pumps).

The works and their frequency are also listed in the maintenance/inspection schedule.

7.3 Maintenance by qualified personnel

Service maintenance, emptying and repairing the system must be done by the customer service or by personnel especially trained by Evoqua.

7.3.1 Service maintenance

Regular system maintenance, at least annually by the Evoqua customer service, is part of the servicing contract and guarantee conditions.

Every 12 months the message „Effect maintenance“ is displayed until the maintenance has been executed and confirmed.

7.3.2 Emptying the system

- 1 Always flush the system beforehand (refer to chapter 6.10)
- 2 Close the shut-off valve in the operating water supply and at the point of application. Aerate the system with the flushing/ sampling tap (refer to chapter 3.).
- 3 To empty the reaction tank unscrew both non-return valves at the bottom of the reaction tank (size 22) so that the water can drain from the reaction tank.
- 4 Remove the static mixer.
- 5 Let the operation water line between oval gear meter (L) and check valve (S) run empty.
- 6 Loosen the unions at the HCl and NaClO₂ pumps and let the hoses run empty.
- 7 Before restarting tighten all unions.

7.3.3 Restarting an emptied system

- 1 Fit the suction lances into the respective carboys.
- 2 Evacuate the metering pumps and suction lines (refer to chapter 6.5.1).
As water and air is still contained in the hoses:
Let a sufficient quantity flow from each suction line, pour away separately and rinse afterwards with generous amounts of water.
- 3 Calibrate the HCl and NaClO₂ metering pumps (refer to chapter 6.5.2).

7.3.4 Maintenance menu

The maintenance menu is used

- to delete the message buffer
- to confirm startup and maintenance
- for function test of the booster pump and solenoid valve.



- 1 Touch the lock symbol
- 2 Enter the service password (required).

The lock symbol is displayed in blue.



- 3 Press F4

- 4 Touch „Maintenance”.

- 5 To delete the message buffer touch OK.

All fault messages will be deleted.

- 6 To confirm that maintenance has been executed touch „Yes”

The time to the next maintenance is displayed.

- 7 Touch „OK”.

To change the time to the next maintenance refer to chapter 4.7.

- 8 Touch „next”.

„Function test” is displayed.

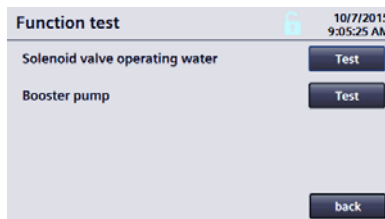
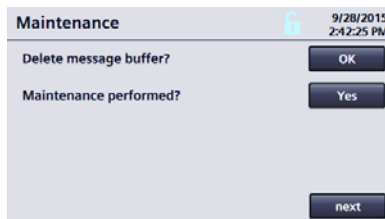
- 9 To open the operating water solenoid valve, touch „Test”

The valve is open as long as the key is touched.

- 10 To start the booster pump touch „Test”

The pump is running as long as the key is touched.

- 11 Touch „back” to return to the main menu.



Note

A function test of the metering pumps can be done via the function „Evacuation of metering pumps“, see chapter 6.5.1

8. Maintenance and spare parts



Warning!

Risk of injuries due to dangerous chemicals and electric current!

- All service maintenance and repair work must be performed by the customer service or personnel specifically trained by Evoqua.

Due to mechanical wear, the service life of the maintenance parts listed in the tables must be expected to be shorter than the system's service life. Maintenance parts are replaced at defined intervals during professional maintenance.

8.1 Maintenance sets overview

	Article No.	Type	Description, contents
1 Y	W3T169965	DIOX-A 50	Maintenance set for 1 year operation (item 1-16) incl. mounting drawing
	W3T169965	DIOX-A 100	
	W3T169966	DIOX-A 170	
	W3T169967	DIOX-A 250	
2 Y	W3T371573	DIOX-A 50	Maintenance set for 2 years operation, contains maintenance set for 1 year operation (item 1-16, 23-26) incl. mounting drawings
	W3T371573	DIOX-A 100	
	W3T371574	DIOX-A 170	
	W3T371575	DIOX-A 250	
4 Y	W3T371576	DIOX-A 50	Maintenance set for 4 years operation, contains maintenance set for 2-years operation (item 1-19, 23-26, 40-46) incl. mounting drawings
	W3T371576	DIOX-A 100	
	W3T371577	DIOX-A 170	
	W3T371578	DIOX-A 250	

In all maintenance sets are included:

- Pump head service set (2 x)
- Reactor seats (2 x)
- ClO₂ check valve (1 x)

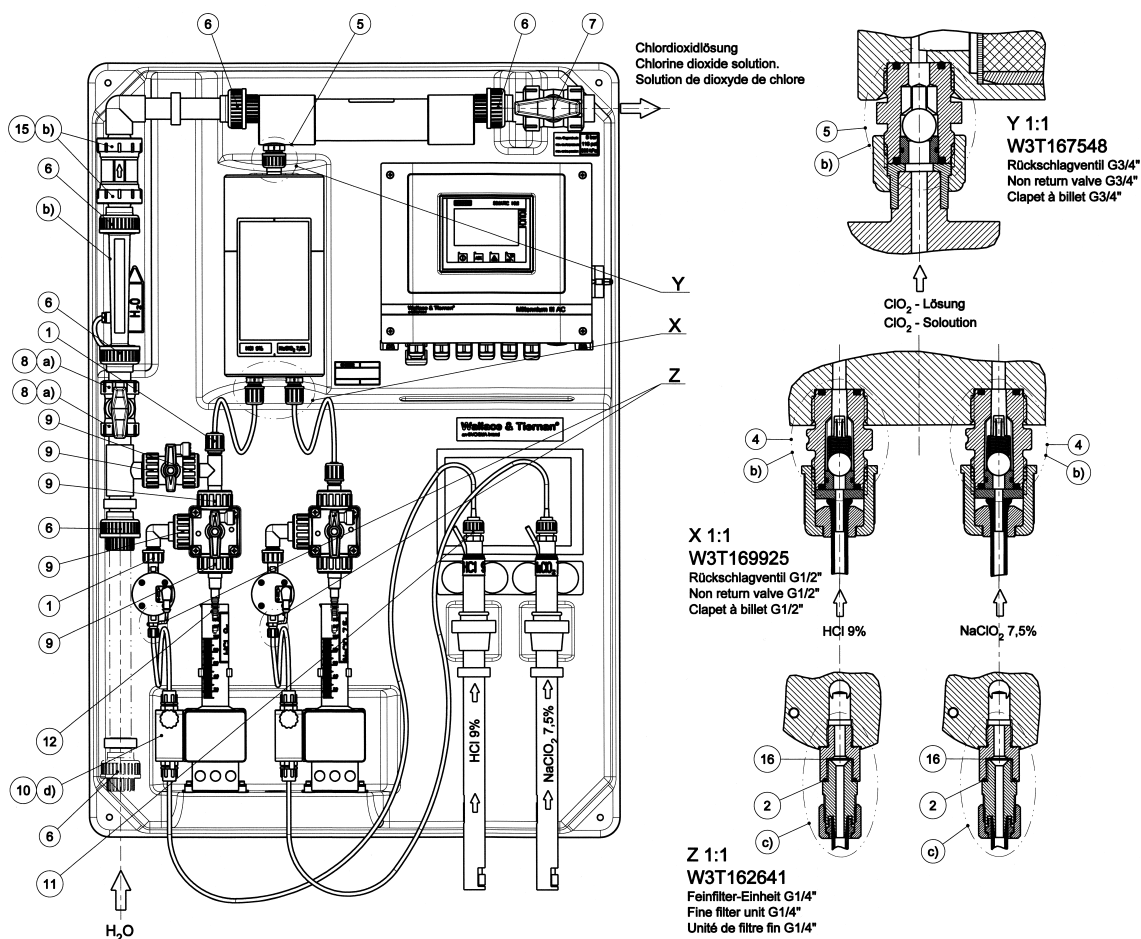
Usage of maintenance sets

After 1 year	After 2 years	After 3 years	After 4 years	After 5 years	After 6 years
1 Y	2 Y	1 Y	4 Y	1 Y	2 Y

8.2 Maintenance parts

8.2.1 Maintenance sets, annual

W3T169965, W3T169966, W3T169967

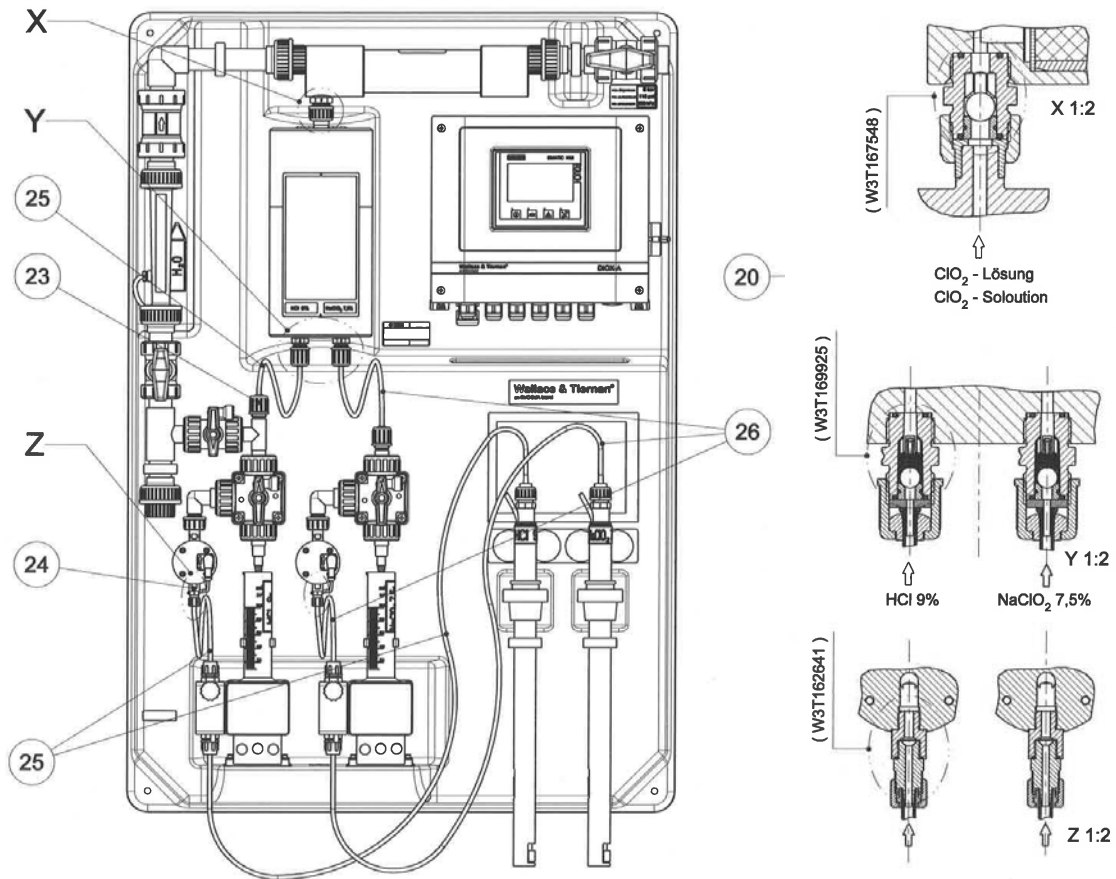


- a The ball valve DN20/d15 is used since version 10/2016. Retrofitting is possible with W3T384426
- b During assembly pay attention to the flow direction of the individual components.
- c The filter discs item 16 (including O-ring item 2) are required since version 12/2007. Not needed parts can be scrapped or built-in by retrofitting with two fine filter units W3T162640.
- d Pressure valve spring loaded

Item	Article No.	Description	Quantity
1	W3T168401	O-Ring	4
2	W3T172835	O-Ring	2
4	W3T169925	Non return valve	2
5	W3T167548	Non-return valve	1
6	W3T172725	O-Ring	6
7	W2T504821	Sealing kit type 546	1
8	W3T169086	O-Ring	2
9	W3T171985	O-Ring	8
10	W3T185826	Service kit series B for DIOX-A 50/100 or	2
	W3T185828	Service kit series B for DIOX-A 170 or	2
	W3T161025	Service kit series B for DIOX-A 250	2
11	W3T168874	O-Ring	2
12	W3T164588	Protection cap	2
15	W2T552533	Set of gaskets type 561	1
16	W3T162640	Pack of filter discs (contains 6 pieces)	1

8.2.2 Maintenance sets, biennial

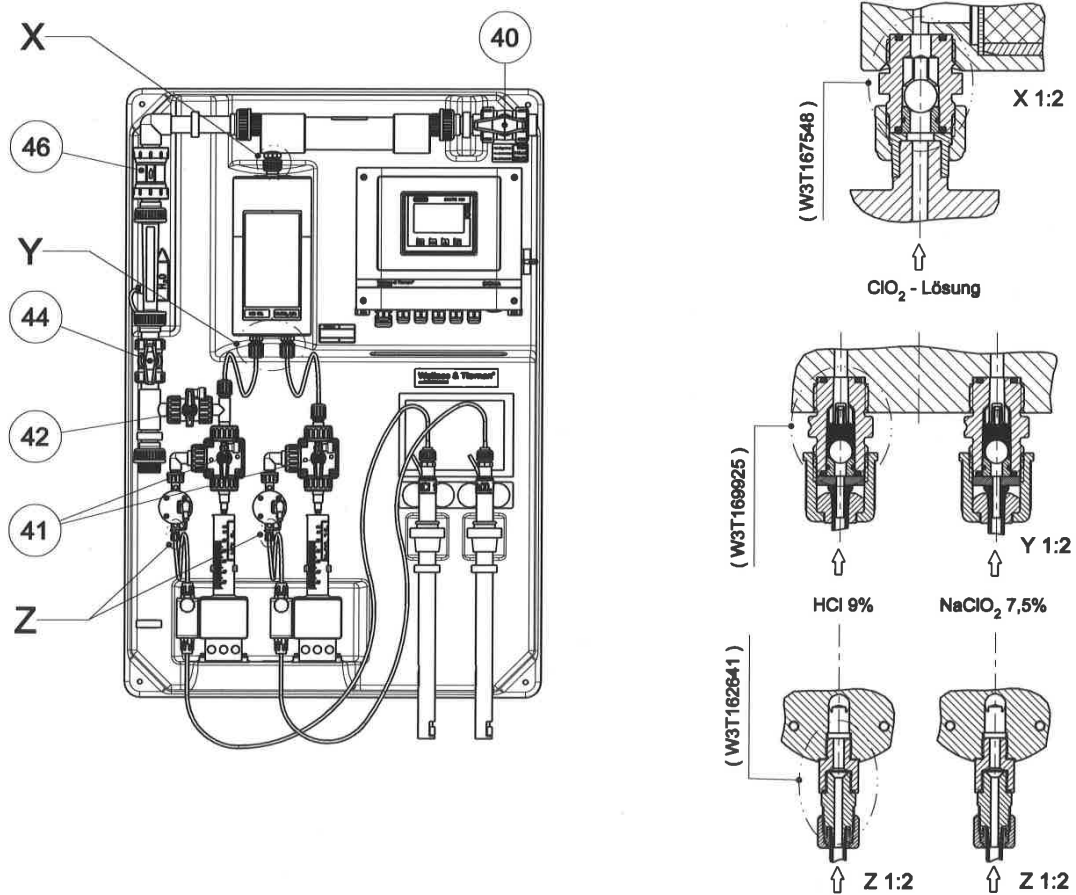
W3T371573, W3T371574, W3T371575



Item	Article No.	Description	Quantity
	W3T169965	Maintenance set, annual for DIOX-A 50/100 or	1
	W3T169966	Maintenance set, annual for DIOX-A 170 or	1
	W3T169967	Maintenance set, annual for DIOX-A 250	1
23	W3T163752	Hose connectors	4
24	W3T162641	Fine filter unit	2
25	W2T505795	Hose	3
26	W2T505596	Hose	3

8.2.3 Maintenance sets, every 4 years

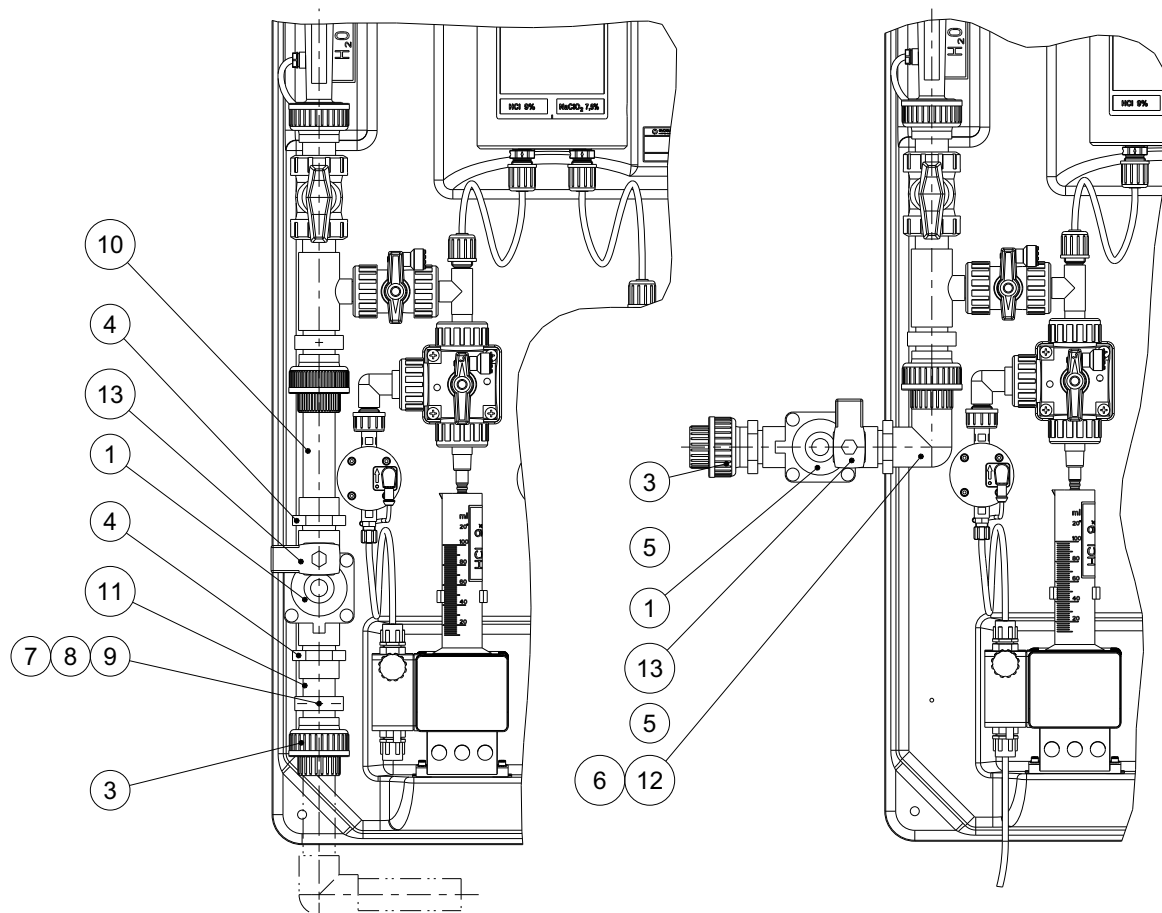
W3T371576, W3T371577, W3T371578



Item	Article No.	Description	Quantity
	W3T371573	Maintenance set, biennial for DIOX-A 50/100 or	1
	W3T371574	Maintenance set, biennial for DIOX-A 170 or	1
	W3T371575	Maintenance set, biennial for DIOX-A 250	1
40	W2T505983	Ball valve, type 546	1
41	W3T171902	3-way ball valve	2
42	W3T171901	2-way ball valve	1
44	W2T506149	Ball valve, type 546	1
45	W2T505946	Ball valve, type 355	1
46	W2T552517	Central part, type 561	1

9. Optional accessories

Accessories W3T169989

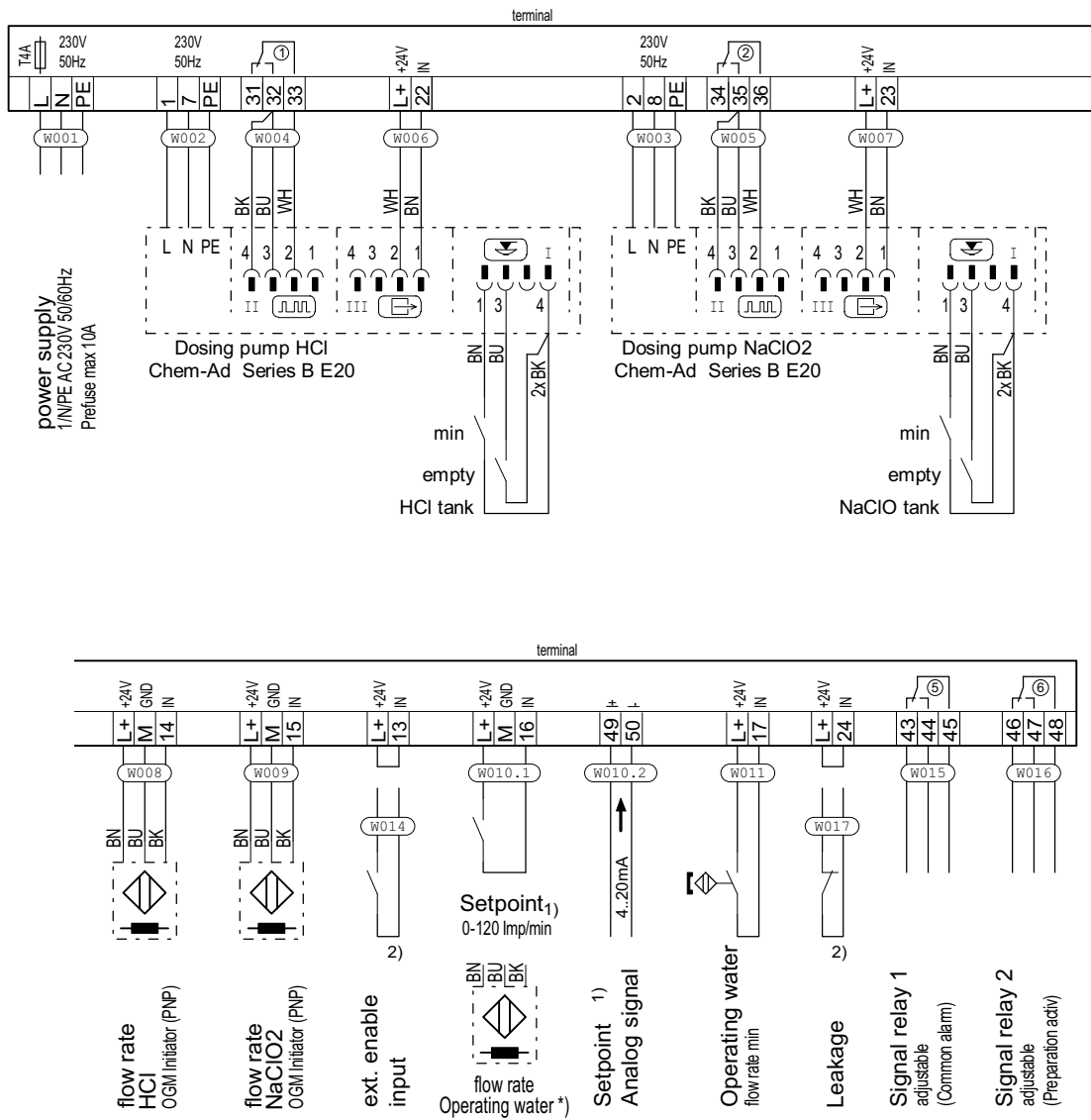


Item	Article No.	Description	Qty.
1	W3T172372	Solenoid valve	1
3	W3T165734	Union	1
4	W2T505692	Adaptor bush	2
5	W2T504863	Adaptor nipple	2
6	W2T507536	Elbow	1
7	W3T165668	Pipe clamp	1
8	W3T171871	Screw	1
9	W3T168162	Protective cap	1
10	W2T506629	Pipe	135 mm

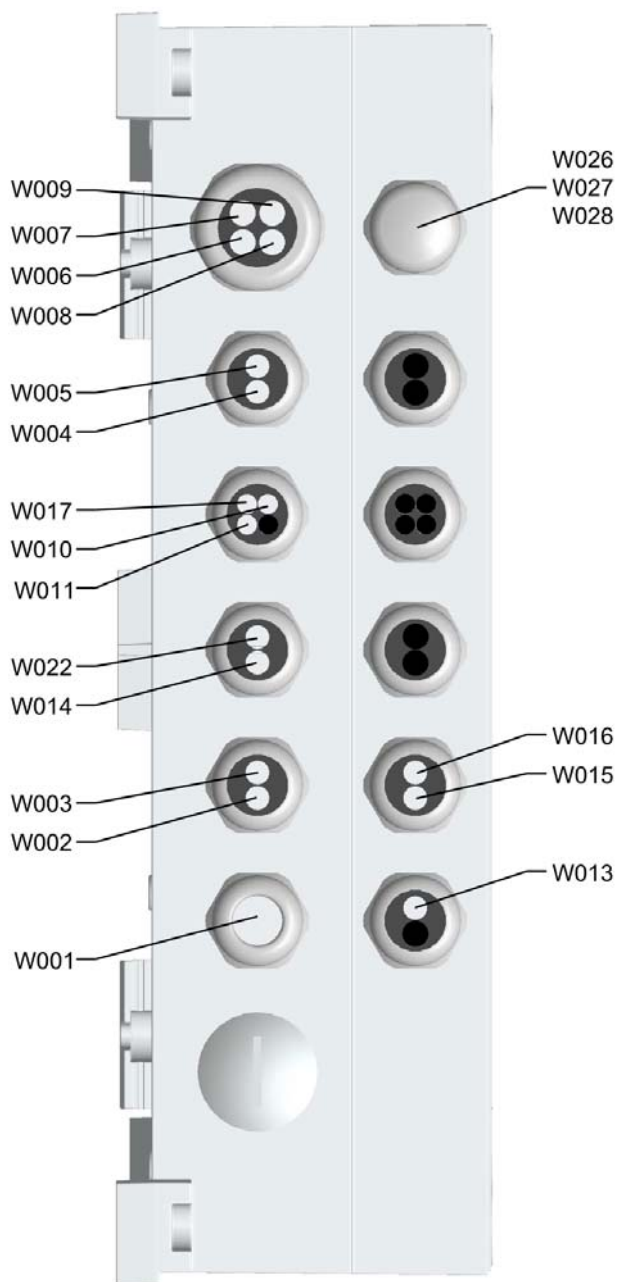
Item	Article No.	Description	Qty.
11	W2T506629	Pipe	100 mm
12	W2T506629	Pipe	50
13	W3T169363	Valve plug	1

10. Wiring diagrams

10.1 Wiring diagrams WAE8885



10.2 Cable inlet



- W009 NaClO₂ flow (OGM)
- W007 Status output NaClO₂ pump
- W006 Status output HCl pump
- W008 HCl flow
- W005 Pulses NaClO₂ pump
- W004 Pulses HCl pump
- W017 Leakage sensor
- W010 Operating water flow (OGM)
- W011 Operating water Min
- W022 E-Valve Operating water
- W014 Release generation
- W003 Supply NaClO₂ pump
- W002 Supply HCl pump
- W001 Supply
- W026 PROFIBUS DP
- W027 PROFIBUS IO-Device
- W028 RS 485 bus
- W016 Signal relays 2
- W015 Signal relays 1
- W013 motor starter booster pump

11.Index

A

Accessories 103
Accessory kit 17
AUTO mode 82

B

Beaker 75
Booster pump 27

C

Calibration 76
Capacity 20
Carboys 21
Chemical equation 17
Chemicals 16
ClO₂ concentration 20
Code 66
Collecting basin 30
Commissioning 33
Concentration 20
Consumption 20
Control operating panel 64
Conventions 8

D

Daylight saving time 70
Diagnosis menu 70
Disposal 13
Documentation 7

E

EMERGENCY OFF 18
Emptying 95
Evacuation 74

F

Factory settings 37
Fault messages 90
Fixture set 27
Flushing 84
Function keys 64

G

Generation factor 83

H

Hazardous substances 11

I

Info menu 72
Input unit 63
Installation 27
Interfaces 39

L

Language menu 71
Level monitoring 18
Log in 66
Log out 66

M

mA signal 23, 36
Main switch 18
Maintenance 93
Maintenance, confirmation 96
MANUAL mode 82
Message menu 71
Messages 89

N

Neutralization 13
Nominal capacity 15

O

Operating display 80
Operating modes 23
Operation 63
Operation modes 82
Operator password 66

P

Password 66
Pictogram 8
Plain text display 64
Precursors 17, 30
Process Monitoring System (PMS) 56
PROFIBUS DP 44
PROFINET 36, 40
Protective clothing 11

R

Replacing the carboys 86

S

Safety 10

Safety Data Sheets 14

Service password 66

Setup 35

Sodium thiosulphate 13

Spare parts 97

Starting chemicals 17

Storage 26

Suction lances 30

T

target groups 7

Technical data 20

Transport 26

Transport carboys 30

V

Versions 15

Voltage failure 86

W

Wintertime 70

Wiring diagrams 105



Wallace & Tiernan® Products worldwide

Australia

+61 1300 661 809
info.au@evoqua.com

Canada

+1 905 944 2800
wtoc.can@evoqua.com

China

+86 21 5118 3777
sales.cn@evoqua.com

France

+33 1 41 15 92 20
wtfra@evoqua.com

Germany

+49 8221 9040
wtger@evoqua.com

Singapore

+65 6559 2600
sales.sg@evoqua.com

UK

+44 300 124 0500
info.uk@evoqua.com

USA

+1 800 524 6324
wt.us@evoqua.com



Wallace & Tiernan®
an EVOQUA brand



Auf der Weide 10, 89312 Günzburg, Germany

+49 (8221) 904-0 www.evoqua.com

DEPOLOX, OSEC, Barrier, Chem-Ad and Wallace & Tiernan are trademarks of Evoqua, its subsidiaries or affiliates, in some countries.

All rights, especially those to duplication and distribution as well as translation, are reserved. No part of this document may be reproduced in any form (printing, photocopying, microfilm or any other method) or saved, processed, duplicated or distributed by the use of electronic systems without the express written consent of Evoqua Water Technologies GmbH.

All information presented herein is believed reliable and in accordance with accepted engineering practices. Evoqua makes no warranties as to the completeness of this information. Users are responsible for evaluating individual product suitability for specific applications. Evoqua assumes no liability whatsoever for any special, indirect or consequential damages arising from the sale, resale or misuse of its products.

© 2019 Evoqua Water Technologies GmbH Subject to change without notice WT.085.266.000.DE.IM.0919
W3T163136 Issue 21-0919