Oxiperm® Pro

OCD-162

Installation and operating instructions

Other languages

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GRUNDFOS

Original installation and operating instructions

CONTENTS

1. Limited warranty

Products manufactured by Grundfos Pumps Corporation (Grundfos) are warranted to the original user only to be free of defects in material and workmanship for a period of 24 months from date of installation, but not more than 30 months from date of manufacture .Grundfos' liability under this warranty shall be limited to repairing or replacing at Grundfos' option, without charge, F.O.B. Grundfos' factory or authorized service station, any product of Grundfos manufacture. Grundfos will not be liable for any costs of removal, installation, transportation, or any other charges that may arise in connection with a warranty claim.

Products which are sold, but not manufactured by Grundfos, are subject to the warranty provided by the manufacturer of said products and not by Grundfos' warranty.

Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions and accepted codes of good practice. The warranty does not cover normal wear and tear.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of Grundfos' products from which it was purchased together with proof of purchase and installation date, failure date and supporting installation data. Unless otherwise provided, the distributor or dealer will contact Grundfos or an authorized service station for instructions. Any defective product to be returned to Grundfos or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

Grundfos will not be liable for any incidental or consequential damages, losses, or expenses arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last. Therefore,the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

Products which are repaired or replaced by Grundfos or authorized service center under the provisions of these limited warranty terms will continue to be covered by Grundfos warranty only through the remainder of the original warranty period set forth by the original purchase date.

2. Directions for use

The Oxiperm Pro is a complex device used to create chlorine dioxide from HCl and $NaClO_2$ (provided by the user). The following sections within this manual contain the directions for use:

3. General information

3.1 Target group

These installation and operating instructions are intended for authorized and qualified operating and service staff.

3.2 Purpose of this manual

These installation and operating instructions describe how to install, commission, operate, maintain, repair, dismantle and store the system.

3.2.1 Software version

These installation and operating instructions refer to the software version v2.00.1.

3.3 Symbols used in this document

Warning

If these safety instructions are not observed, it may result in personal injury.

Warning

If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.

Caution — If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note — Notes or instructions that make the job easier and ensure safe operation.

Information about possible residual risks can be found:

- on warning signs located at the installation site
- at the beginning of each section in this manual
- immediately before steps associated with a residual risk.

3.4 Notations used in this document

Display text in this document is set in quotation marks.

4. Safety instructions

4.1 Obligations

4.1.1 Service staff

Only authorized service staff are permitted to undertake installation, commissioning, maintenance, repair, dismantling and storage of the system. Appropriate technical expertise and familiarity with the principles of measurement and control technology are assumed.

Service staff are required to do the following:

- Read this manual thoroughly before commencing installation, commissioning, maintenance, repair, dismantling or storage of the system.
- Observe the recognized regulations for health and safety and accident prevention.
- Wear protective clothing in accordance with the local safety regulations when working with the system and with chemicals. The protective clothing is supplied by the operating company and stored in a dry place in the installation room.

4.1.2 Operating company

Owners of the building and operators of the system are obliged to:

- Consider this manual to be part of the product and make sure that it is kept clearly accessible in the immediate vicinity of the system for the entire service life of the system.
- Provide the installation requirements specified by the manufacturer (necessary water connections and fittings, environmental conditions, electrical connections, protective pipe for dosing line, audible or visual warning system for alarms).
- The operating company has to elaborate a maintenance plan depending on the on-site conditions and the specific application of the system.
- Make sure that water lines and fittings are regularly checked, repaired and maintained.
- Obtain official approval for storing chemicals, if necessary.
- Instruct operators in the operation of the system.
- Attach the labels supplied by the manufacturer at the installation site so that they are clearly visible.
- Make sure the operator has received appropriate technical training.
- Make sure that the regulations for the prevention of accidents are observed in the installation location.
- Provide all operators and service staff with protective clothing in accordance with the regulations for the prevention of accidents: gloves, face mask, protective apron, breathing apparatus, if necessary.

4.2 Intended use

Oxiperm Pro OCD-162 is a system for the discontinuous preparation of a chlorine dioxide solution out of hydrochloric acid (HCl, 9 %) and sodium chlorite ($NaClO_2$, 7.5 %), and the continuous dosing of this solution for water disinfection.

4.3 Improper use

Applications other than those listed in section *4.2 Intended use* are not in accordance with the intended use and are not permitted. The manufacturer, Grundfos, accepts no liability for any damage resulting from incorrect use.

A chlorine dioxide solution with an uncritical concentration of approximately 2 g/l is generated in the reaction tank. Hence the Oxiperm Pro OCD-162 operates far out of the range of critical concentrations.

Gaseous chlorine dioxide is a chemically unstable compound. At concentrations over 300 g/m^3, it decomposes into chlorine and oxygen explosively without external impact.

Warning

Unauthorized structural modifications to the system may result in serious damage to equipment and personal injury.

It is forbidden to dismantle, modify, change the structure of the system, and to bridge, remove, bypass or disable components, including safety equipment.

Danger of explosion: at a concentration of more than 8 g/l at 68 °F (20 °C), the chlorine dioxide solution can explode.

4.4 Safety and monitoring equipment

The system is fitted with the following safety and monitoring equipment:

- two collecting trays for the two chemical containers (accessories)
- alarm functions of the control unit.

4.5 Chemicals

4.5.1 ClO_2 concentration

In the reaction tank of the system, diluted $NaClO_2$ and diluted HCl are mixed to create a chlorine dioxide solution with a concentration of approximately 2 g/l.

The following safety instructions must be observed:

Warning

Risk of explosion when using chemicals in too high concentrations.

Only use $NaClO_2$ in a diluted concentration of 7.5 % by weight, in accordance with EN 938.

Only use HCl only in a diluted concentration of 9.0 % by weight, in accordance with EN 939.

Observe the safety data sheets from the chemicals supplier.

Warning

Risk of poisoning from ClO_2 gas.

Risk of explosion when mixing $NaClO_2$, and HCl.

Do not put the suction lances into the same bucket.

Do not insert the suction lances in the wrong container.

Observe the labels on chemical containers, suction lances and pumps:

red = HCl

blue = $NaClO_2$

Warning

Risk of burns when skin and clothing come into contact with $NaClO_2$ or HCl.

Immediately wash affected skin and clothing with water.

Warning

Risk of irritation to eyes, respiratory system and skin, if chlorine dioxide is inhaled.

When changing the chemical containers, wear protective clothing in accordance with the regulations for the prevention of accidents.

Warning

The temperature of the chlorine dioxide solution stored in an external batch tank may not exceed 104 °F (40 °C).

Risk of outgassing at more than 104 °F (40 °C).

Note We recommend that you install a gas warning device.

4.5.2 Storing chemicals

- Chemicals must be stored in the appropriately marked original plastic containers.
- Chemicals must not be stored near grease, flammable substances, oils, oxidizing substances, acids or salts.
- Empty and full containers must be kept closed, especially in areas where local regulations for the prevention of accidents apply to storage.

4.5.3 Case of emergency

The general safety regulations and regulations for the procedure in case of an emergency, as specified in EN 12671 apply.
Actions in case of an emergency:

- Ventilate the installation location immediately.
- Wear protective clothing: gloves, face mask, protective apron, breathing apparatus if necessary
- Implement initial help measures
  - In case of contact with the eyes, rinse immediately with plenty of water for at least 15 minutes. Consult a doctor.
  - In case of contact with the skin, wash immediately with plenty of water. Remove all contaminated clothing.
  - In case gas is inhaled, move the casualty to a source of fresh air. Avoid taking deep breaths. Consult a doctor (look out for a racing pulse, as vasodilating treatment may be required).
- Spillages
  - In case of contact with clothing, remove the clothing immediately and wash with plenty of water.
  - Chemical spillages in buildings must be washed away with water.
  - Chlorine dioxide spillages can be doused with sodium thiosulphate, and washed away with water.
- Escaped gas
  - Escaped gas can be rinsed away with water from a sprinkling system.
- Firefighting
  - Aqueous solutions of ClO_2 are not directly flammable. Extinguish the surrounding fire with water, preferably using a fire sprinkler system to dilute the ambient gas. Inform the fire brigade of the installed production capacity and any harmful starting substances that are being stored (precursor substances), so that precautions can be taken regarding possible risks.

4.6 Accessories and external devices

For safety of accessories and external devices, see the respective instructions.

4.6.1 ClO_2 breakdown substance

To neutralize ClO_2 or to reduce the concentration of ClO_2 in water, you can use sodium thiosulfate ($Na_2S_2O_3$), the ClO_2 breakdown substance,

See also section *12.1 Flushing*.

5. Product description

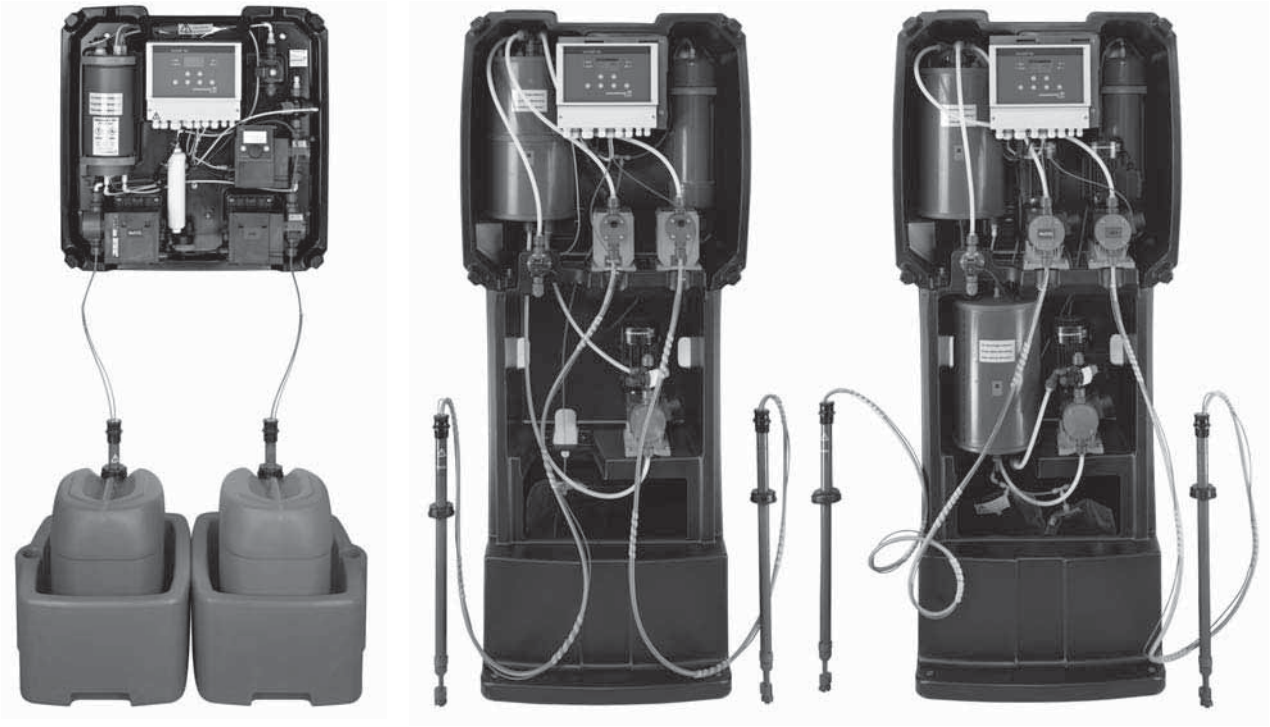

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Fig. 1 System without cover and without peripheral devices; OCD-162-5 (left), OCD-162-30 (middle), OCD-162-60 (right)

The system produces and doses ClO_2 for the disinfection of drinking water, process water, cooling water and wastewater.

The system has a plastic frame, where the internal components are mounted. The frame is prepared for wall mounting or floor mounting, and has a plastic cover.

The chemicals are supplied from two chemical containers, which are located in two collecting trays directly under the system (OCD-162-5, -10) or in a separate tray for each container next to the system (OCD-162-30, -60).

Each container has a suction lance, which is permanently connected to the corresponding dosing pump. The cable of each suction lance sends low-level and empty signals to the control unit.

The system is connected to two water lines:

- The drinking water line for supplying dilution water.
- The main water line to be disinfected, into which the final ClO_2 solution is dosed.

5.1 Applications

The system can be used for three different types of applications:

Disinfection of drinking water lines

- The flow rate of the water can fluctuate greatly (peak times when water is used for bathing and cooking).
- The type and level of contamination in the water (disturbance variables) can vary widely.
- Examples:
  – Hotels, multistory buildings
  – schools, hospitals, nursing homes
  – showers in sports facilities
  – food and beverage plants
  – waterworks.

Disinfection of industrial systems

- Dosing is controlled proportionally to the flow.
- Dosing is controlled by comparing setpoint and actual value.
- The water quantity in industrial systems is relatively constant.
- The type and level of contamination in the water (disturbance variables) are generally measured.
- Examples:
  – Bottle cleaning plants in breweries
  – industrial process water or wastewater systems
  – cooling water systems.

Shock disinfection

This application requires an external batch tank where the ClO_2 solution is stored temporarily.

- Applications requiring large quantities of disinfectant in a short time.
- Example: cleaning of whirlpool baths

5.2 Accessories

Note Accessories are not included in a standard delivery.

For the dilution water line

- Isolating valve
- Dilution water extraction device
- Tapping sleeve for dilution water extraction (if necessary with double nipple and connection piece for a hose)
- Hose with connection to solenoid valve

For the main water line

- Water meter
- Tapping sleeve for the injection unit
- Protective pipe for the dosing line, installed from the dosing pump to the injection unit
- Photometer: measures the ClO_2 concentration after dosing
- Sample-water filter (in case of insufficient water quality)

External batch tank

Warning

Risk of outgassing at more than 104 °F (40 °C).

The temperature of the ClO_2 solution stored in an external batch tank must not exceed 104 °F (40 °C).

The production of ClO_2 continues, until the external batch tank is full. If the maximum filling level of the external batch tank is attained, the dosing pump stops.

If the minimum filling level of the external batch tank is attained, the ClO_2 dosing pump starts running.

5.3 Identification

5.3.1 Type key

Example: OCD-162-30-D/G1

OCD-162	-30	-P	/G	1

Maximum capacity

5	5 g/h
10	10 g/h
30	30 g/h
60	60 g/h (230 V), 55 g/h (115 V)

ClO_2 dosing pump

P	Integrated digital dosing pump DDI (only for 30 g/h and 60 g/h)
D	Integrated mechanical dosing pump DMX (only for 30 g/h and 60 g/h)
S	Integrated SMART Digital dosing pump DDA (only for 5 g/h and 10 g/h)
N	without dosing pump

Supply voltage

G	220-240 V, 50/60 Hz
H	110-120 V, 50/60 Hz

Suction lance

No number	for 7.9 gal (30 liter) chemical container (length of suction lance plus suction hose 4.3 ft (1.3 m) (only for 5 g/h and 10 g/h)
1	for 15.6 gal (60 liter) chemical container (length of suction lance plus suction hose 9.8 ft (3.0 m) (only for 30 g/h and 60 g/h)
2	for 52.8/264.2 gal (200/1000 liter) chemical container (length of suction lance plus suction hose 14.10 ft (4.3 m) (only for 30 g/h and 60 g/h)
3	for 55 gal (208.19 liter) chemical container (length of suction lance plus suction hose 13.12 ft (4.0 m) (only for 30 g/h and 60 g/h)

5.3.2 Nameplate

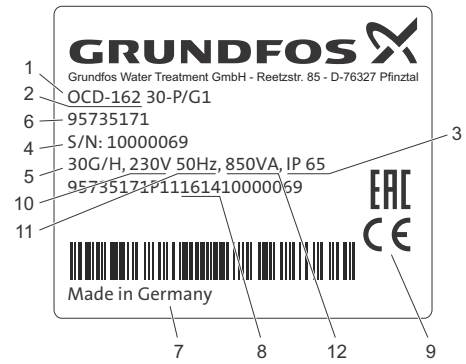

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Fig. 2 Nameplate

Pos.	Description
1	Type key
2	Product name
3	Enclosure class
4	Serial number
5	ClO_2 production capacity
6	Product number
7	Country of origin
8	Year and week of production
9	Marks of approval, CE mark, etc.
10	Voltage
11	Frequency
12	Power consumption

5.3.3 Product numbers

ClO_2 production capacity [g/h]	ClO_2 dosing pump	Voltage [V]	OCD-162-	Product No.
5	DDA	230 V, 50/60 Hz	5-S/G	95735153
	-		5-N/G	95735156
	DDA	115 V, 50/60 Hz	5-S/H	95735154
			5-S/H3	95735155
	-		5-N/H	95735157
			5-N/H3	95735158
10	DDA	230 V, 50/60 Hz	10-S/G	95735161
	-		10-N/G	95735164
	DDA	115 V, 50/60 Hz	10-S/H	95735162
			10-S/H3	95735163
	-		10-N/H	95735165
			10-N/H3	95735166
30	DMX	230 V, 50 Hz	30-D/G1	95735169
			30-D/G2	95735173
	DDI		30-P/G1	95735171
			30-P/G2	95735175
	-		30-N/G1	95735179
			30-N/G2	95735180
	DDI	115 V, 60 Hz	30-P/H1	95735172
			30-P/H2	95735176
			30-P/H3	95735178
	-		30-N/H3	95735181
60	DMX	230 V, 50 Hz	60-D/G1	95718452
			60-D/G2	95718456
	DDI		60-P/G1	95718454
			60-P/G2	95718458
	-		60-N/G1	95725956
			60-N/G2	95725957
55	DDI	115 V, 60 Hz	60-P/H1	95736300
			60-P/H2	95736302
			60-P/H3	95736304
	-		60-N/H3	95736305

6. Technical data

Letter symbols used in this section

A_{ClO2}	added quantity [mg/l]
Q_{DPmax}	max. dosing flow [l/h]
S_{DP}	stroke length [%]
C_{ClO2}	ClO_2 concentration in batch tank [g/l]
K_D	dosing coefficient [h/m^3]
Q_{WM}	flow rate at water meter [m^3/h]

6.1 Performance and consumption

6.1.1 Performance

	OCD-162			
	-5	**-10**	**-30**	**-60**
ClO_2 production capacity (min.) [g/h]	5	10	30	60
Concentration of ClO_2 solution [g/l]	2 +/- 10 %			
Maximum counterpressure of ClO_2 dosing pump [bar]	9			
Minimum process water pressure [bar]	3			
Maximum process water pressure [bar]	6			

6.1.2 Consumption of chemicals

	OCD-162			
	-5	**-10**	**-30**	**-60**
Consumption of HCl(1) [l/h]	0.17	0.30	0.92	1.85
Consumption of $NaClO_2$(1) [l/h]	0.16	0.28	0.86	1.63
Dilution water(1) [l/h]	2.7	4.3	15.2	30.4
ClO_2 solution(1) [l/h]	3.03	4.88	16.98	33.88

(1) +/- 10 %

6.1.3 Consumption of electricity

	OCD-162			
	-5	**-10**	**-30**	**-60**
Input power without external consumer load [VA]	100		180	320
Maximal allowed input power with external consumer load [VA]	850			
Maximum permissible load on the potential-free output contacts	500 VA (250 V / 2 A)			

6.2 Chemicals

Nominal concentration of $NaClO_2$ solution, quality according to EN 938	7.5 % by weight*
Nominal concentration of HCl solution, quality according to EN 939	9.0 % by weight*

* All technical data refer to the nominal concentrations. In operation, deviations up to ± 10 % of the chemical concentrations are permissible. Deviations can change the performance of the system.

6.3 Environmental conditions

Permissible relative air humidity (non-condensing)	Maximum 80 %
Permissible ambient temperature	41 to 104 °F (5 to 40 °C)
Permissible temperature of dilution water	50 to 85 °F (10 to 30 °C)
Permissible temperature of chemicals	50 to 95 °F (10 to 35 °C)
Storage temperature of the system	23 to 122 °F (-5 to 50 °C)
Storage temperature of chemicals	50 to 95 °F (10 to 35 °C)
Permissible height above sea level, where the system is allowed to be operated.	6561.68 ft (2000 m)
Enclosure class of control unit, dosing pumps, solenoid valve	IP65

6.4 Dimensions, weights and capacities

	OCD-162			
	-5	**-10**	**-30**	**-60**
System frame with cover W x H x D [in. (mm)]	2.50 x 2.50 x 1.07 (765 x 765 x 328)		2.51 x 5.90 x 1.86 (766 x 1800 x 568)	
Gross weight [lb. (kg)]	62 (28)	66 (30)	190-196 (86-89)	229-236 (104-107)
Net weight [lb. (kg)]	57.32 (26)	61.72 (28)	154.32 (70)	187.39 (85)
Volume compensation bag [l]	2 (1)	4 (2)	12 (1)	24 (2)
Total volume of reaction tank [l]	1.00	1.80	6.10	13.40
Total volume of internal batch tank [l]	1.00	1.80	7.00	13.90
Distance between bottom edge of frame and floor [ft (m)]	Approx. 3.28 (1)			
Length of suction lance plus suction hose [ft (m)]	4.26 (1.3)		9.84 (3.0) or 14.10 (4.3)	
Collecting tray W x H x D [in. (mm)]	19.09 x 10.62 x 21.65 (485 x 270 x 550)			
Weight of a collecting tray (3) [lb. (kg)]	12.12 (5.5)			
External batch tank, 50 l W x H x D(3) [in. (mm)]	33.07 (840) x 64.56 (1640) x 20.86 (530)			
External batch tank, 100 l W x H x D(3) [in. (mm)]	33.07 (840) x 78.74 (2000) x 20.86 (530)			
Connection for dilution water at the solenoid valve [mm]	1/4" ID x 3/8" OD, 6/9 mm, or 6/12 mm tubing or DN8 mm PVC pipe			

(1) One unit

(2) Two units

(3) Accessory

6.5 Materials

System frame	PP
Cover	EPP
Reaction tank and internal batch tank	PVC
Hoses	PTFE/PE
Seals	FPM/PTFE/FKM
Heads of dosing pumps	PVC

6.6 Dosing pumps

6.6.1 Dosing pumps for HCl or $NaClO_2$

	OCD-162			
	-5, -10	**-30**	**-60 (230 V)**	**-60 (115 V)**
Dosing pump	DDE 6-10	DDE 15-4	DMX 35-10	DDE 15-4
Connection, suction side [mm]	PE hose 4/6	PVC hose 6/12		
Connection, discharge side [mm]	PTFE hose 4/6	PTFE hose 9/12		

6.6.2 Dosing pump for ClO_2

	OCD-162				
	-5, -10	**-30-D/G**	**-30-P/G**	**-60-D/G**	**-60-P/G**
Dosing pump	DDA 7.5-16	DMX 16-10	DDI 60-10	DMX 35-10	DDI 60-10
Connection, suction side [mm]	PTFE hose 4/6	PTFE hose 9/12			
Connection, discharge side [mm]	PTFE hose 4/6	PTFE hose 9/12			

6.7 Measuring cell

Measuring cell	Measuring parameters	Sample water temperature	Pressure
AQC-D11	ClO_2, pH, ORP	41 to 104°F (5 to 40°C)	up to 43.51 psi (3 bar)
AQC-D6	ClO_2	up to 158 °F (70 °C)	up to 116.03 (8 bar)

6.8 Approvals

Electrical safety	Intertek 4007209 Conforms to ANSI/UL Std. 61010-1
NSF/ANSI 61	NSF/ANSI 61 Chlorine Dioxide Generator model numbers OCD-162-5, OCD-162-10, OCD-162-30 and OCD-162-60 are certified to NSF/ANSI 61 standards (b) (c). • (b) Certification of this product has been performed to the health effects requirements of NSF/ANSI 61, which assesses the acceptability of potential extractants from the chemical generator. No evaluation has been performed on the strength or efficacy of the chemical generated under this certification. The generated chemical has not been certified by UL to NSF/ANSI 60. The operation, maintenance, and the consistency of the source ingredients may affect the performance of the chemical generator and by-products in the chemical being generated. Consult the manufacturer's product literature for proper usage. • (c) Certification is based on a dose rate that yields a maximum chlorine dioxide concentration of 0.8 mg/L in potable water.

6.9 System parameters

In this section all system parameters are listed with factory setting, range, resolution and unit.

Some of the parameter settings are protected by service code or super-user code.

Calibration	Factory setting	Range	Resolution
Type of ClO_2 calibration	1-point calibration	1-point calibration 2-point calibration	-
Manual zero point [µA]	0	-2000...2000	1
Cyclic ClO_2 calibration	off	on off	-
ClO_2 calibration interval [day]	100	1...100	1
Cyclic pH/ORP calibration	off	on off	-
pH/ORP calibration interval [day]	100	1...100	1
pH buffer temperature [°F (°C)]	77 (25.0)	23...248 (-5.0...120.0)	32.18 (0.1)

Batch tank	Factory setting	Range	Resolution
Batch tank	internal	internal external	-
Number of batches [batch]	0	0...20	1

Water meter	Factory setting	Range	Resolution
Water meter	off	on off	-
Type of water meter	pulse signal	pulse signal current signal	-
Volume per pulse [l]	1	1.0...999.0	0.1
Maximum flow [m^3/h]	10	1...1500	1
Input current (low) [mA]	0	0...20	1
Input current (high) [mA]	20	0...20	1

Measurement	Factory setting	Range	Resolution
Measurement	off	on off	-
Measuring cell	AQC-D11	AQC-D11 AQC-D6	-
Temperature measurement	on	on off	-
Upot [mV]	550	-800...1200	1
Temperature compensation	off	on off	-
Temperature correction [°F °C]	0.0	23...248 (-5.0...120)	32.18 (0.1)

Measurement	Factory setting	Range	Resolution
Type of measurement	ClO_2	ClO_2 ClO_2+pH ClO_2+ORP	-

Measuring range		Factory setting	Range	Resolution
ClO_2 [mg/l]	(low)	0.00	-	-
	(high)	1.00	0.00...20.00	0.01
pH [pH]	(low)	0.00	0.00...14.00	0.01
	(high)	14.00	0.00...14.00	0.01
ORP [mV]	(low)	-1500	-1500...1500	1
	(high)	1500	-1500...1500	1
Temperature unit		°C	°C °F	-
Temperature (low...high) [°F (°C)]		32...122 (0...50)	32...122 (0...50) 32...212 (0...100) 23...248 (-5...120)	-

Dosing control	Factory setting	Range	Resolution
ClO_2 control	off	on off	-
Control mode	proportional control	proportional control setpoint control combined control	-
Control characteristic	PI	P PI PID	-
Setpoint (setp) [mg/l]	0.20	0.00...ClO_2 range (high)	0.01
Proportional range (X_P) [%]	30.0	0.1...3000.0	0.1
Reset time (TN) [s]	60	1...3000	1
Derivative action time (deriv. time TV) [s]	0	0...1000	1
Added quantity (added) [mg/l]	0.20	0.00...20.00	0.01
Maximum dosing flow (Qmax) [%]	100	0...100	1

Alarms	Factory setting	Range	Resolution
ClO_2 alarm	off	on / off	-
Lower ClO_2 alarm limit [mg/l]	0.15	0.00...upper ClO_2 alarm limit	0.01
Upper ClO_2 alarm limit [mg/l]	0.7	Lower ClO_2 alarm limit...ClO_2 range (high)	0.01
Alarm hysteresis [mg/l]	0.01	0.00...0.5 x ClO_2 range (high)	0.01
Alarm delay [s]	1	1...1000	1

Monitoring	Factory setting	Range	Resolution
Dosing time monitoring	off	on / off	-
Time of dosing time monitoring [min]	600	0...600	1
Monitoring of cleaning motor	off	on / off	-

External inputs	Factory setting	Range	Resolution
Dosing stop input	N.O.	N.O. / N.C.	-
Failure input	N.O.	N.O. / N.C.	-

Relays	Factory setting	Range	Resolution
Warning relay	N.O.	N.O. / N.C.	-
Alarm relay	N.O.	N.O. / N.C.	-

Dosing pump	Factory setting	Range	Resolution
Pump type	digital pump	digital pump / mechanical pump	-
Minimum switch-on time (min. Ton) [s]	0.5	0.5...10.0	0.1
Maximum capacity [l/h]	2.75 (OCD-162-5) / 5.0 (OCD-162-10) / 16.0 (OCD-162-30) / 35.0 (OCD-162-60)	0.1...40.0	0.01
Stroke length [%]	100	1...100	1

Current output	Factory setting	Range	Resolution
Current output for dosing pump (low) [mA]	4	0...20	1
Current output for dosing pump (high) [mA]	20	0...20	1
Current output of ClO_2 concentration (low) [mA]	4	0...20	1
Current output of ClO_2 concentration (high) [mA]	20	0...20	1

Display contrast	Factory setting	Range	Resolution
Display contrast [%]	40	0...100	1

6.10 Minimum flow rate of dilution water

OCD-162	Minimum flow rate [l/min]
-5	0.95
-10	0.95
-30	4.0
-60	4.3

6.11 Electrical data

Supply voltage	110/120 V / 50-60 Hz or 230/240 V / 50-60 Hz		
Input power without external consumer load	OCD-162	-5	50 VA
		-10	50 VA
		-30	180 VA
		-60	320 VA
Analog inputs	• input for water meter 0(4) - 20 mA • input for measuring cell (ClO_2, pH or ORP, temperature)		
Digital inputs	• input for water meter with pulse signal (minimum 3 pulses/min., maximum 50 pulses/sec.) • input for dosing stop signal of a higher-level control system • input for gas warning device		
Analog outputs	• output for dosing control 0(4) - 20 mA • output for measured value ClO_2 0(4) - 20 mA		
Potential-free outputs	• output for alarm relay, 250 V / 6 A, max. 550 VA (See section *11.1 Fault overview*) • output for warning relay, 250 V / 6 A, max. 550 VA (See section *11.1 Fault overview*)		

7. Construction and functioning

This section includes detailed information on the production process, as well as dosing control, measurement and flushing. Several parameters and the settings at a mechanical ClO_2 pump are explained.

Letter symbols used in this section

A_{ClO2}	added quantity [mg/l]
Q_{DPmax}	max. dosing flow [l/h]
S_{DP}	stroke length [%]
C_{ClO2}	ClO_2 concentration in batch tank [g/l]
K_D	dosing coefficient [h/m^3]
Q_{WM}	water meter flow [m^3/h]

7.1 Installation schemes

7.1.1 System with measuring cell

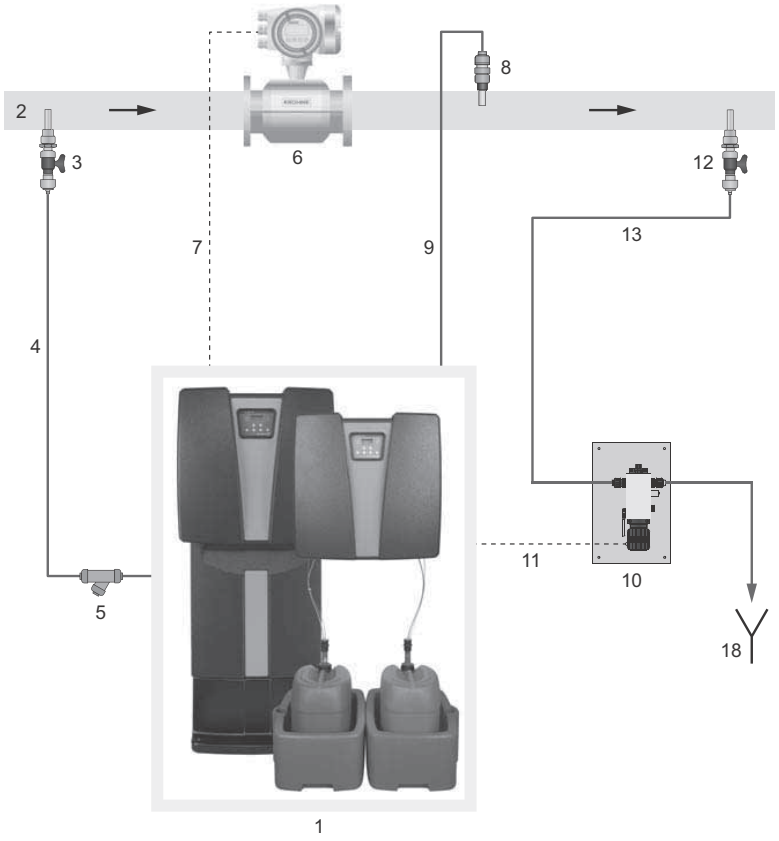

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Fig. 3 OCD-162 with measuring cell

1	OCD-162
2	Main water pipe to be disinfected
3	Dilution water extraction device with isolating valve
4	Dilution water line
5	Dirt trap
6	Flowmeter
7	Signal line of water meter
8	Injection unit
9	ClO_2 dosing line
10	ClO_2 measuring cell
11	Signal line of ClO_2 measurement
12	Measuring water extraction device
13	Measuring water line
18	Drain

7.1.2 System with measuring module

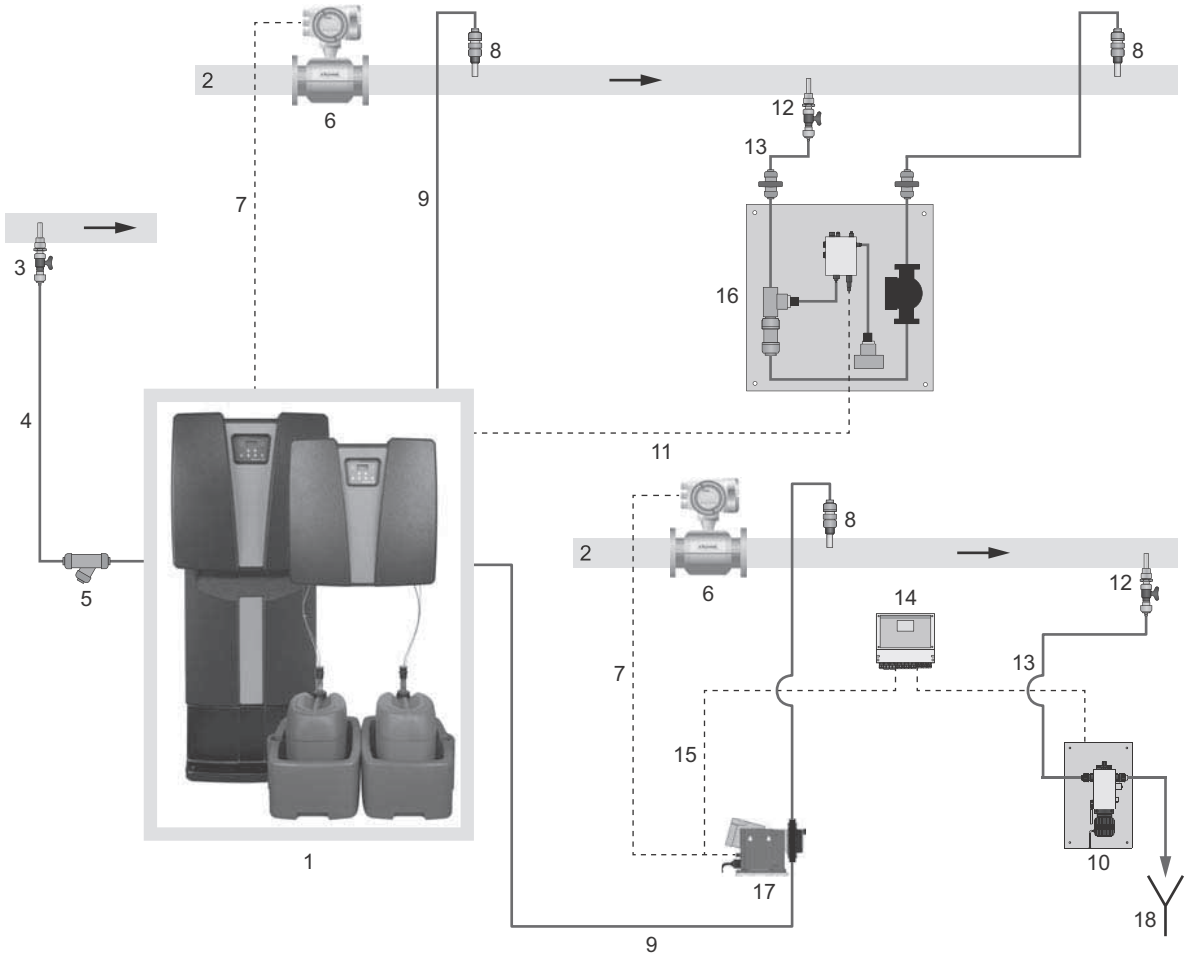

Fig. 4 OCD-162 with measuring module and two dosing pumps

1	OCD-162
2	Main water pipe to be disinfected
3	Dilution water extraction device with isolating valve
4	Dilution water line
5	Dirt trap
6	Flowmeter
7	Signal line of flowmeter
8	Injection unit
9	ClO_2 dosing line
10	ClO_2 measuring cell
11	Signal line of ClO_2 measurement
12	Measuring water extraction device
13	Measuring water line
14	Measuring amplifier
15	Signal line of ClO_2 dosing pump
16	Measuring module
17	Additional ClO_2 dosing pump
18	Drain

7.1.3 System with external batch tank

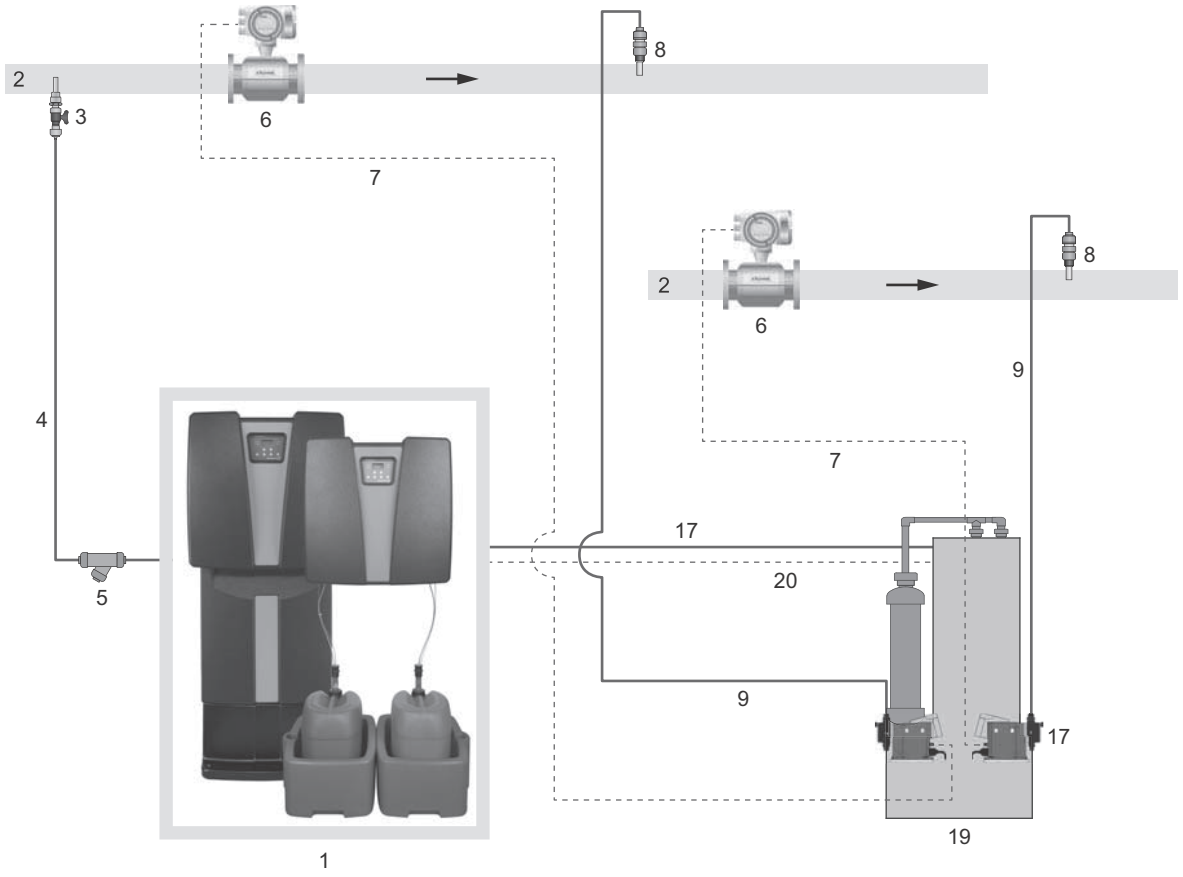

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Fig. 5 OCD-162 with external batch tank and two dosing points

1	OCD-162
2	Main water pipe to be disinfected
3	Dilution water extraction device with isolating valve
4	Dilution water line
5	Dirt trap
6	Flowmeter
7	Signal line of water meter
8	Injection unit
9	ClO_2 dosing line
17	Additional ClO_2 dosing pumps
19	External batch tank
20	Signal line of external batch tank

7.2 Components

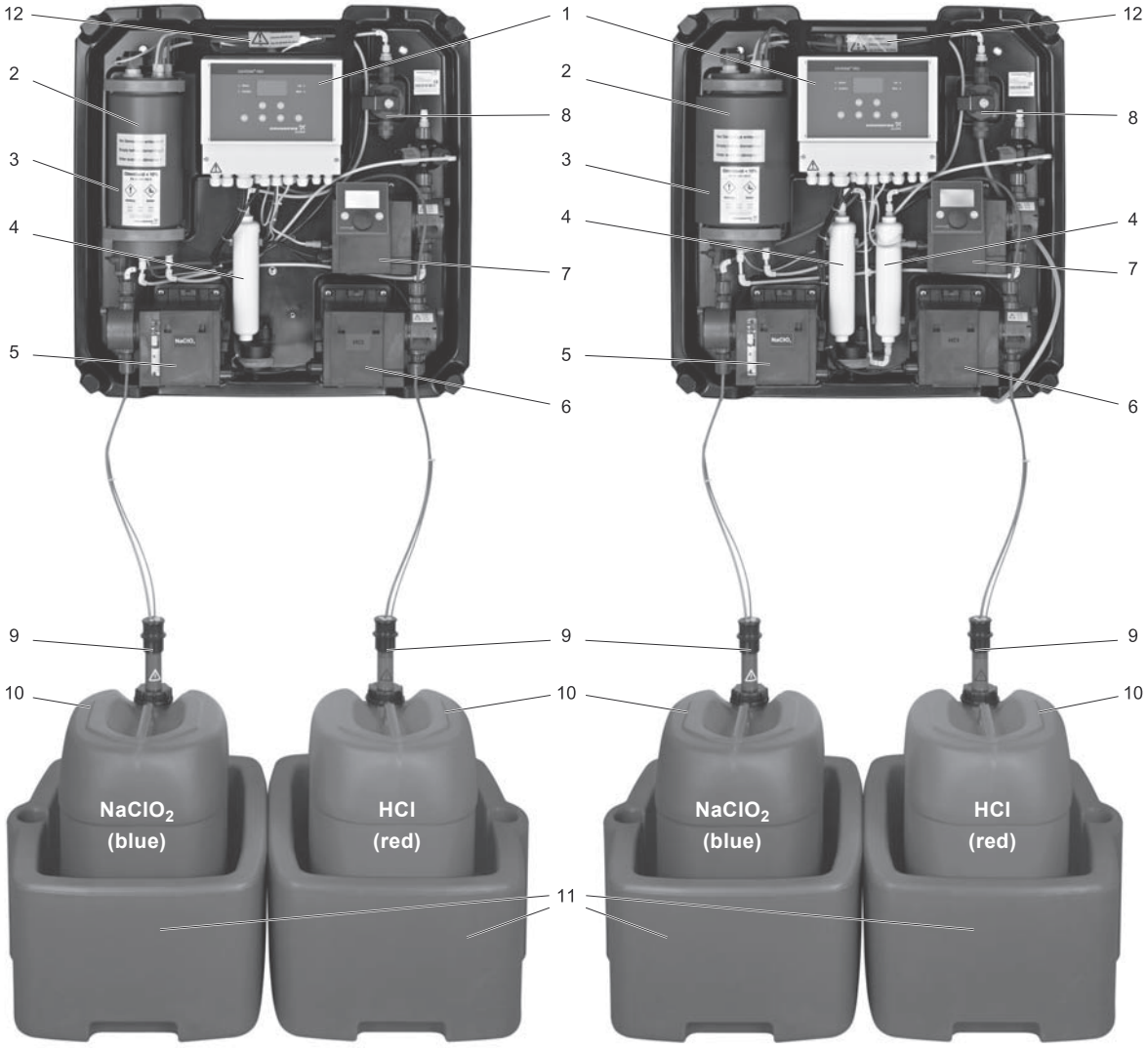

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Fig. 6 OCD-162-5 (left) and OCD-162-10 (right) without cover

Item	Component
1	Control unit
2	Reaction tank
3	Internal batch tank
4	Adsorption filter
5	$NaClO_2$ dosing pump
6	HCl dosing pump
7	ClO_2 dosing pump
8	Solenoid valve for dilution water
9	Suction lances
10	Chemical container
11	Collecting tray
12	Compensation bag (behind the control unit)

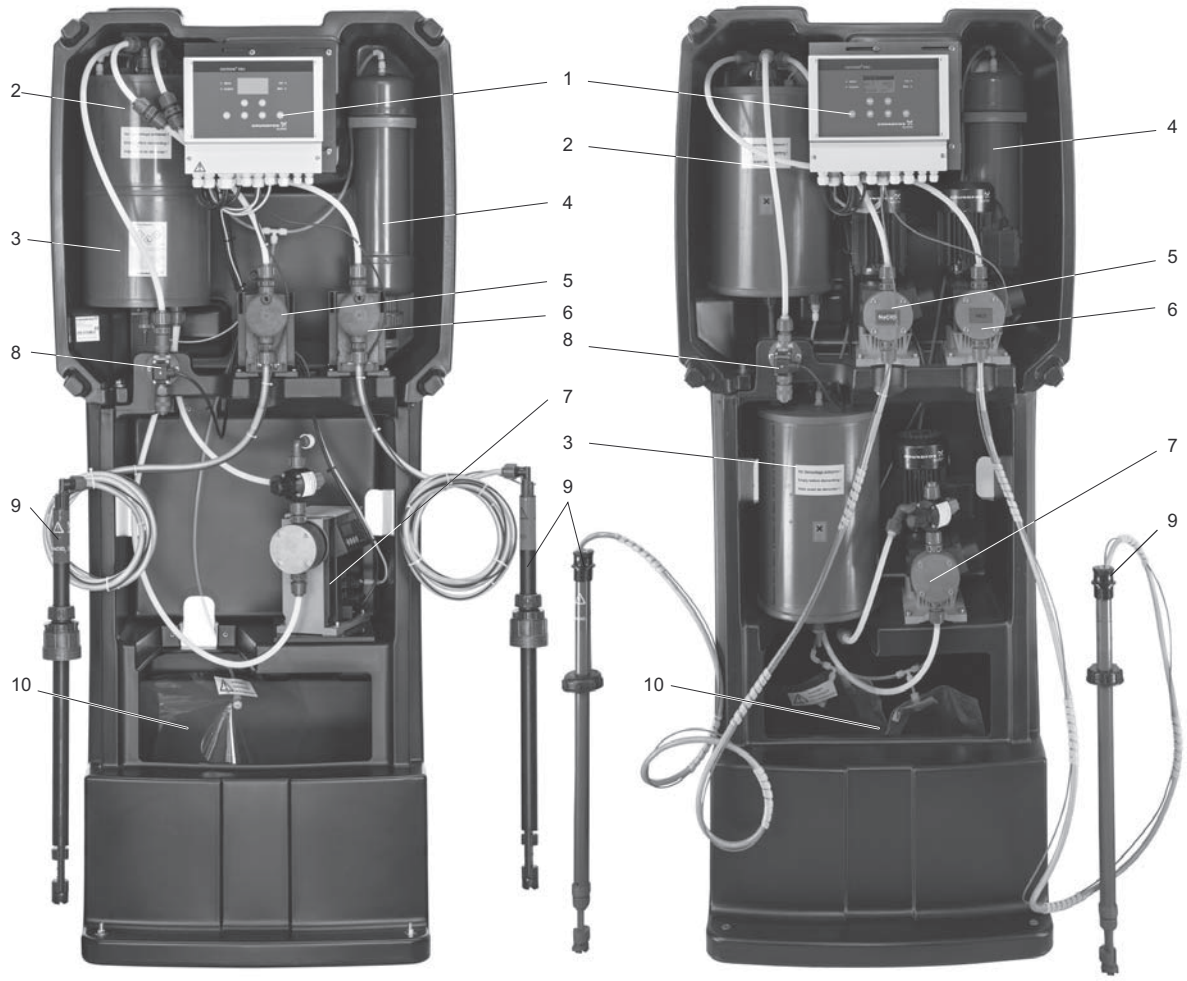

Fig. 7 OCD-162-30 (left) and OCD-162-60 (right) without cover

Item	Component
1	Control unit
2	Reaction tank
3	Internal batch tank
4	Adsorption filter
5	$NaClO_2$ dosing pump
6	HCl dosing pump
7	ClO_2 dosing pump
8	Solenoid valve for dilution water
9	Suction lances
10	Compensation bag

7.3 Tank levels

Reaction tank and internal batch tank

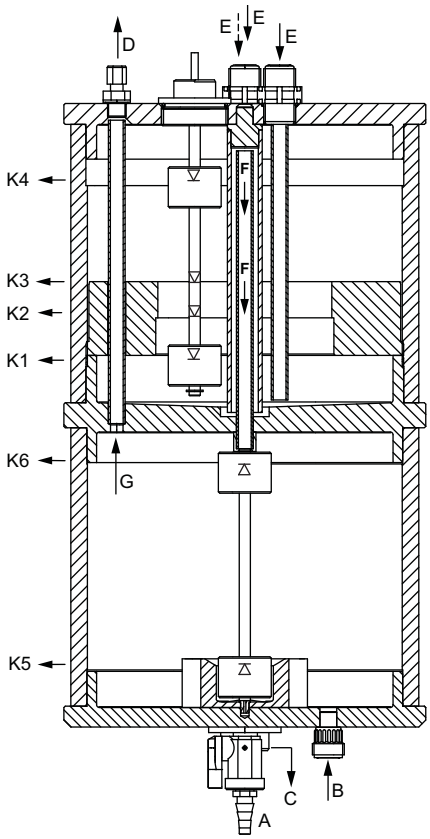

Fig. 8 Reaction tank and internal batch tank (OCD-162-5/-10/-30)

Level	Description
K1	Level of first water supply
K2	HCl supply level
K3	$NaClO_2$ supply level
K4	Level of second water supply
K5	Level for empty signal
K6	Maximum level

Pos.	Description
A	Drain valve
B	From the overflow line of the multi-function valve
C	To the ClO_2 dosing pump
D	To the volume compensation bag
E	HCl pump, $NaClO_2$ pump, dilution water
F	ClO_2 solution
G	Deaeration of internal batch tank

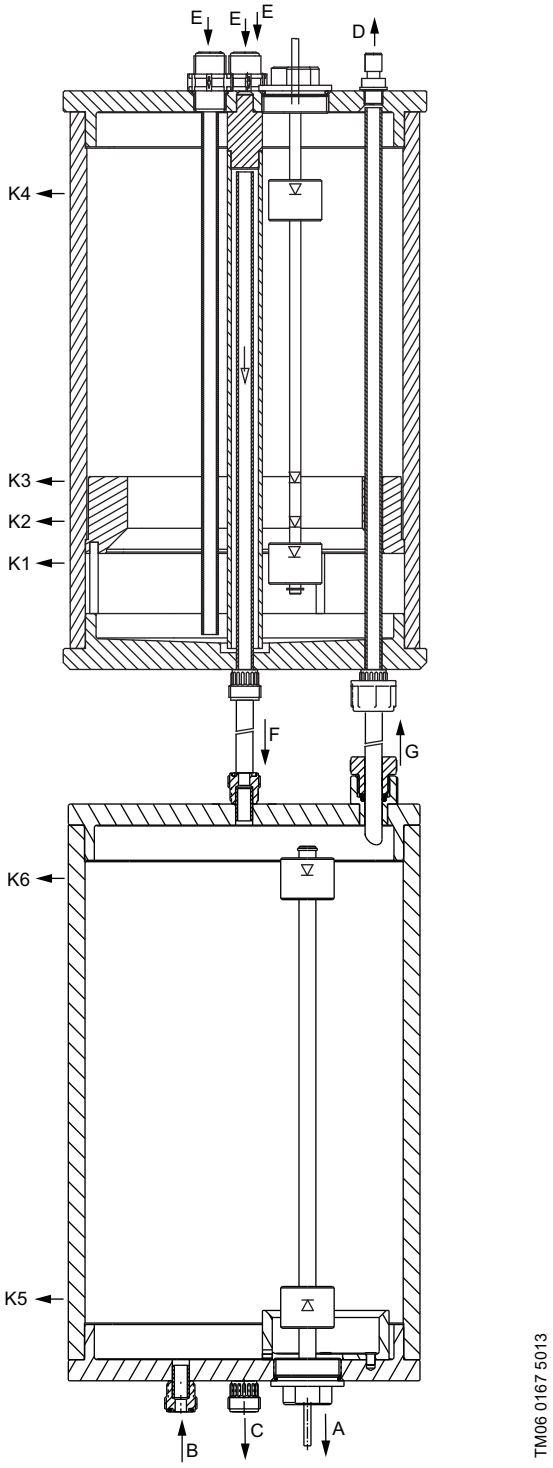

Fig. 9 Reaction tank and internal batch tank (OCD-162-60)

Suction lances

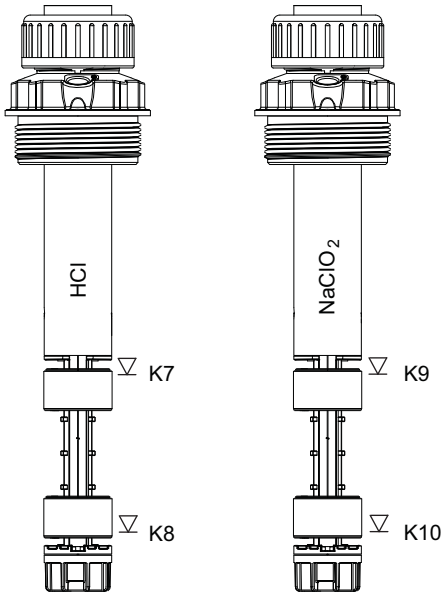

Fig. 10 Level indicators of the suction lances

Level	Description	Factory setting
K7	Contact open: low-level signal HCl	N.O.
K8	Contact open: empty signal HCl	N.O.
K9	Contact open: low-level signal $NaClO_2$	N.O.
K10	Contact open: empty signal $NaClO_2$	N.O.

External batch tank

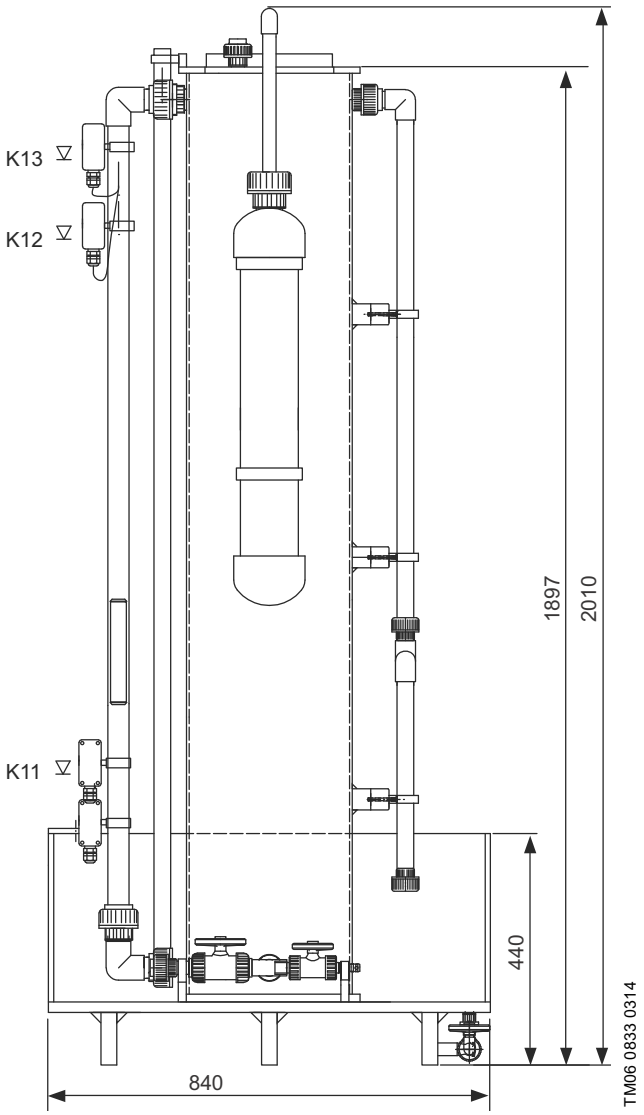

Fig. 11 External batch tank

Level	Description	Factory setting
K13	Maximum-maximum level	N.C.
K12	Maximum level	N.O.
K11	Minimum level	N.O.
-	Minimum-minimum level	not connected

7.4 Production of ClO_2

7.4.1 Operation modes

The system has to be set up according to the application. After starting up the production, the system runs automatically. Two operation modes are available.

Operation with internal batch tank

ClO_2 solution is generated in the reaction tank and stored temporarily in the internal batch tank. While the ClO_2 solution is dosed into the line system, a new batch is produced in the reaction tank. The system can produce 1 to 20 batches or produce continuously.

Operation with external batch tank

ClO_2 solution is continuously generated in the reaction tank and temporarily stored in the internal batch tank. The ClO_2 dosing pump is not used for dosing into the line system, but to fill an external batch tank.

7.4.2 Production process

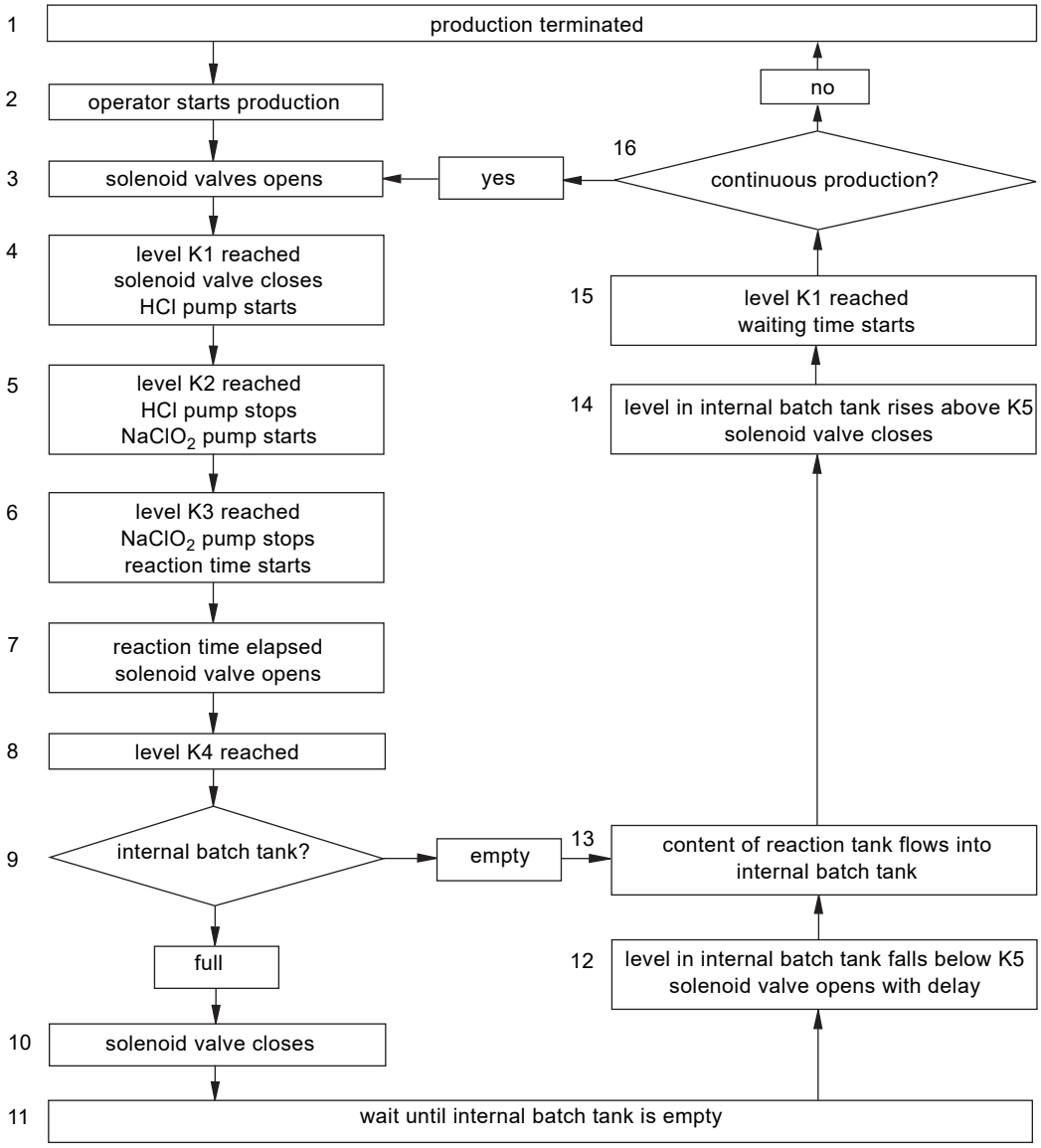

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Fig. 12 ClO_2 production process

1. Initially, the production process is terminated.
2. The operator starts the production in the menu.
3. The solenoid valve opens and water flows into the reaction tank.
4. The floater in the reaction tank reaches level K1. The solenoid valve closes. The HCl dosing pump starts and HCl flows into the reaction tank.
5. The floater in the reaction tank reaches level K2. The HCl dosing pump stops. The $NaClO_2$ dosing pump starts and $NaClO_2$ flows into the reaction tank.
6. The floater in the reaction tank reaches level K3. The $NaClO_2$ dosing pump stops. The chemical reaction begins. Reaction time: 15 minutes.
7. The reaction time has elapsed. The solenoid valve opens and water flows into the reaction tank.
8. The floater in the reaction tank reaches level K4. The reaction tank now contains the ready-to-use ClO_2 solution.
9. The position of the floater in the internal batch tank is checked.
   – If the internal batch tank is full (floater is above level K5), the process continues with step 10.
   – If the internal batch tank is empty (floater is below level K5), the solenoid valve stays open. The process continues with step 13.
10. The solenoid valve closes.
11. The ready-to-use ClO_2 solution remains in the reaction tank. The process waits for the content of the internal batch tank to be discharged by the ClO_2 dosing pump.
12. The floater in the internal batch tank falls below level K5. The solenoid valve opens with delay and water flows into the reaction tank.
13. The level in the reaction tank rises until the reaction tank overflows. Due to the siphon effect, the batch starts to flow through a pipe in the middle of the reaction tank into the internal batch tank.
14. The floater in the internal batch tank rises above level K5. The solenoid valve closes. The content of the reaction tank is discharged into the internal batch tank.
15. The floater in the reaction tank reaches level K1. The waiting time starts.
16. The waiting time has elapsed. The production mode is checked:
   – If the production runs continuously, the process starts again at step 3.
   – If the number of batches to be produced is reached, the process terminates (step 1).

7.4.3 Production status

The initial display shows a brief production status message, see section *9.2 Initial display*. A more detailed status message is given in the production status menu, see *10.6.1 Production*.

Initial display	Production status	Description
"production terminated"	"production terminated"	Production • not started • terminated by the operator • terminated by a failure
"prod. waiting"	"production waiting"	• Waiting for ClO_2 solution below K1 to be discharged into internal batch tank. • Waiting for a stable level in the reaction tank after production start. • Waiting for the internal batch tank to be discharged by ClO_2 dosing pump.
"prod. waiting"	"HCl empty, system waiting"	The HCl container is empty and the HCl pump has stopped.
"prod. waiting"	"NaClO2 empty, system waiting"	The $NaClO_2$ container is empty and the $NaClO_2$ pump has stopped.
"prod. running"	"1st dilution water"	First water supply is running (from empty reaction tank to level K1).
	"HCl pump running"	HCl pump is running (from level K1 to level K2).
	"NaClO2 pump running"	$NaClO_2$ pump is running (from level K2 to level K3).
"reaction time"	"reaction time"	Reaction time is running (at level K3).
"prod. running"	"2nd dilution water"	Second water supply is running (from level K3 to level K4).
	"3rd dilution water"	Third water supply is running (from K4 until K5 signals full).
	"filling int. batch tank"	Reaction tank is discharged into internal batch tank (from stop of third water supply until level K1).
"flushing"	"flushing is running"	Reaction tank is flushed due to an unknown level after production start.

7.5 Flushing

Note

The system has to be flushed with water to remove any traces of chemicals in the suction hoses, pumps and reaction tank in the following situations:

Prior to decommissioning

prior to maintenance and repair.

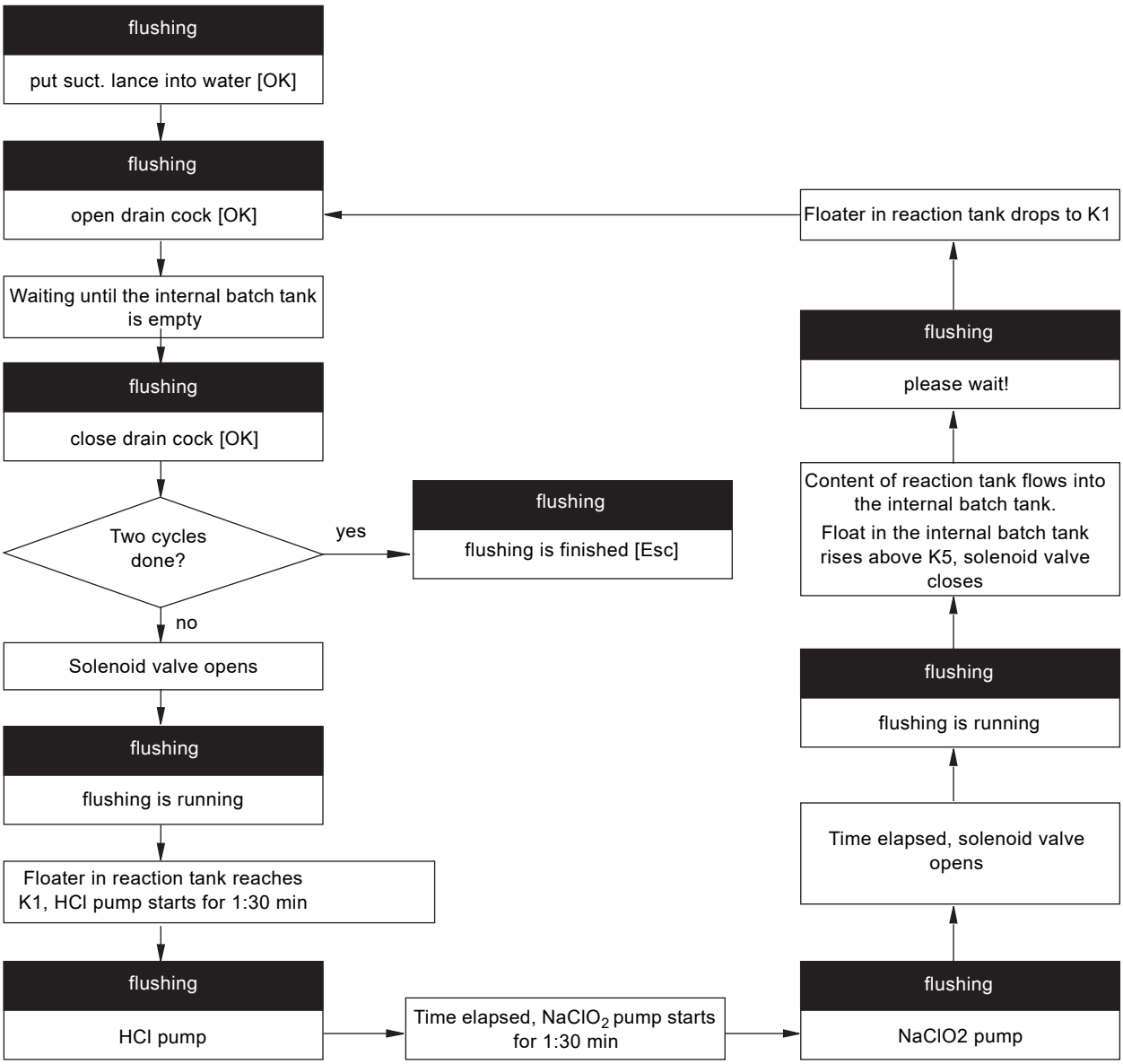

Fig. 13 Flushing process

7.6 Dosing control

The dosing control signal given to the dosing pump depends on the type of pump:

- A digital dosing pump needs a current signal 0(4) - 20 mA.
- A mechanical dosing pump needs the voltage (power-on/ power-off) from the dosing control.

7.6.1 Control mode

The selected control mode depends on the application.

control mode	measurement	water meter
proportional	-	●
combined	●	●
setpoint	●	-

Proportional control

The proportional control mode is particularly suitable for drinking water applications.

The dosing pump doses in proportion to the flow rate of the water meter:

- A water meter measures the flow rate in the main water line, and continuously sends the measured values to the control.
- The proportional control calculates the required ClO_2 dosing volume in proportion to the water flow rate in the main line.
- The proportional control sends an actuating variable to the dosing pump.
- The dosing pump doses the required quantity of ClO_2 solution from the internal batch tank into the main water line.
- An optional measuring cell monitors the ClO_2 concentration in the main line.

Setpoint control

The setpoint control mode is particularly suitable for industrial water applications:

- A setpoint for the target ClO_2 concentration in the main line has to be specified.
- The control unit measures the actual ClO_2 concentration with a measuring cell.
- The setpoint control mode compares the actual values with the setpoint. Based on the deviation, it calculates the quantity of ClO_2 solution required to achieve the setpoint.
- The setpoint control sends an actuating variable to the dosing pump.
- The dosing pump doses the corresponding quantity of ClO_2 solution from the internal batch tank into the main water line.

Combined control

This control mode combines setpoint control and proportional control. The actuating variable calculated by the setpoint control is scaled in proportion to the current water flow in the main line.

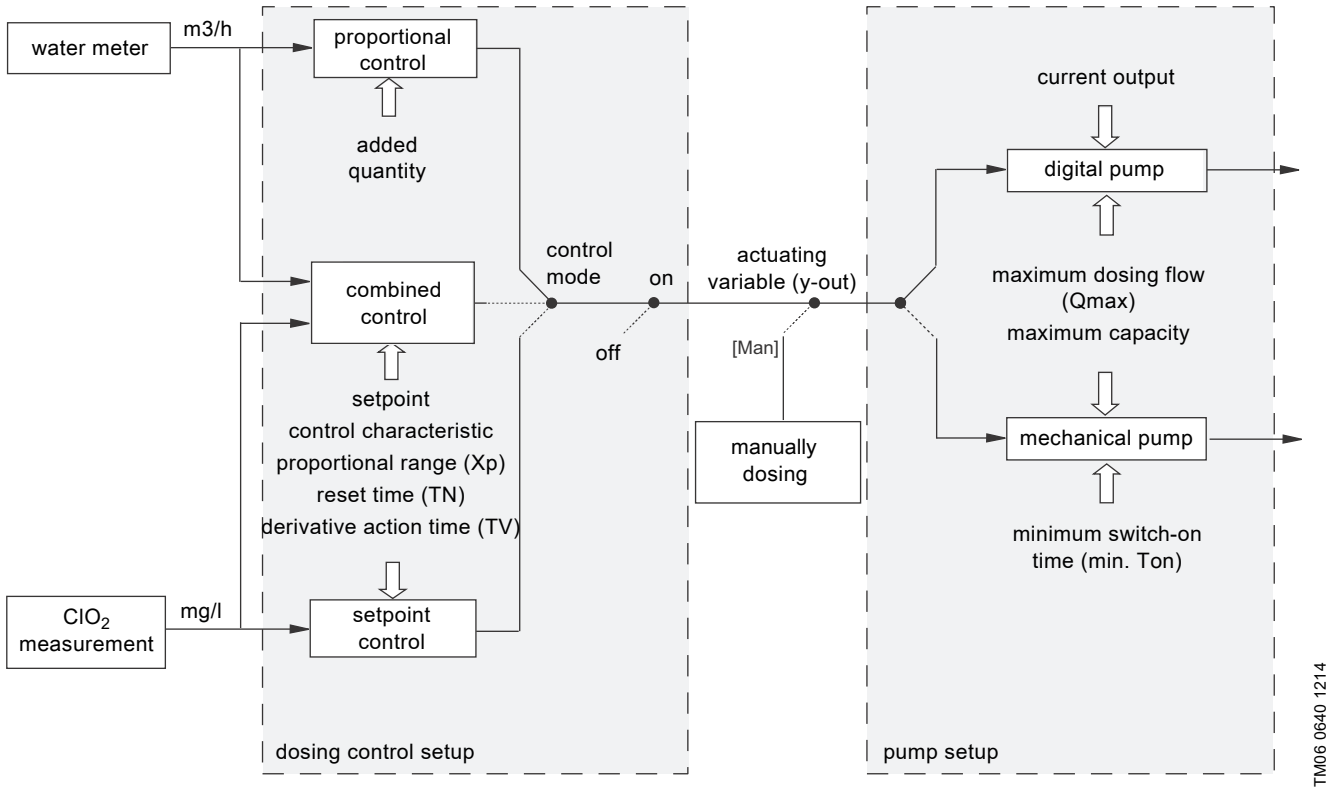

Fig. 14 Control mode scheme

7.6.2 Actuating variable (y-out)

The actuating variable is the control signal for the ClO_2 dosing pump (0-100 %). The actuating variable is calculated continuously by the dosing control.

7.6.3 Added quantity (added)

The added quantity is the quantity of ClO_2 in mg/l that is added to the water flow in the main line in proportional control mode.

7.6.4 Setpoint (setp)

The setpoint is the target ClO_2 concentration in the main line which the system tries to achieve continuously.

The setpoint is used for setpoint control or combined control.

7.6.5 Control characteristic

The setpoint control and combined control operate with the control characteristics P, PI or PID.

7.6.6 Proportional range (Xp)

Proportional range is a setting of the control characteristics P, PI or PID.

7.6.7 Reset time (TN)

Reset time is a setting of the control characteristics PI or PID.

The step-response from the PI control is composed of two parts: the actuating variable (corresponding to X_P) and the rate at which it increases. Reset time indicates the rate, at which the control signal increases. The higher the value of reset time, the slower the rate at which the control signal increases over time.

7.6.8 Derivative action time (TV)

Derivative action time is a setting of the control characteristic PID.

7.6.9 Maximum dosing flow (Qmax)

This setting is useful, if the maximum capacity can not be limited at the pump.

Example: The pump has a fixed dosing flow of 5 l/h at 20 mA. To limit the pump to a maximum flow of 2.5 l/h, set Q_{max} to 50 %.

7.6.10 Dosing stop input

The dosing stop input can be connected to a higher-level control system. A signal to this input stops the ClO_2 dosing pump.

7.6.11 Dosing time monitoring

The alarm is triggered, if the actuating variable exceeds the maximum dosing flow for the specified time, see section *7.6.9 Maximum dosing flow (Qmax)*.

7.6.12 Failure input

The failure input can be connected to a gas warning device. A signal to this input terminates the ClO_2 production and stops the ClO_2 dosing pump.

7.6.13 Dosing coefficient (KD)

Internal value used to calculate the actuating variable for proportional control:

$y_{out} = K_D \times Q_{WM}$

$$K_D = \frac{A_{ClO2}}{Q_{DPmax} \times S_{DP} \times C_{ClO2}}$$

A_{ClO2}	added quantity [mg/l]
Q_{DPmax}	max. dosing flow [l/h]
S_{DP}	stroke length [%]
C_{ClO2}	ClO_2 concentration in batch tank [g/l]
K_D	dosing coefficient [h/m^3]
Q_{WM}	flow rate at water meter [m^3/h]

7.7 Measurement

7.7.1 Measuring cell

Depending on the measuring cell, the ClO_2 concentration, temperature and pH or ORP value of the sample water can be measured. ClO_2 measurement is required for dosing with setpoint control or with combined control.

Measuring cell	ClO_2	Temperature	pH or ORP	cleaning motor monitoring
AQC-D11	●	●	●	●
AQC-D6	●	-	-	-

7.7.2 Calibrating the measuring cell

A constant ClO_2 value is necessary for the calibration.

ClO_2 value

To calibrate the measured ClO_2 value, a reference measurement must be taken (single-point calibration). This can be done with a photometer and the appropriate reagents. For details, please see the installation and operating instructions of the photometer.

The unit of the slope is µA/ppm.

pH value

Two different buffer solutions have to be used to calibrate the measured pH value (two-point calibration). For details, please see the installation and operating instructions of the measuring cell.

The unit of the slope is mV/pH. The unit of the offset is mV.

ORP value

The ORP value indicates the voltage of all ions in the water. ORP calibration is done with single buffer solution. For details, please see the installation and operating instructions of the measuring cell.

The unit of the offset is mV.

7.7.3 Calibration data

In the calibration logbook, the last 10 calibration data records are listed in chronological order. Example: pH calibration logbook.

number 1/10	
date	2008-09-23
time	09:01
slope	-54.2
asym.	11.31
buffer 1	4.01
buffer 2	7.00
cal. temp.	25.0

7.7.4 Monitoring the cleaning motor

The cleaning motor is monitored indirectly by regularly checking the current ClO_2 value.

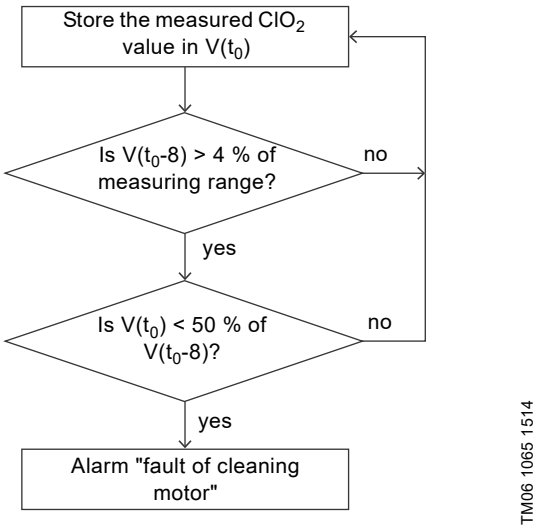

Fig. 15 Process of monitoring the cleaning motor

t_0	the current time
t_0-8	the time 8 seconds before the current time
V (t_0)	the current ClO_2 value
V (t_0-8)	the ClO_2 value 8 seconds before

If the ClO_2 value drops to less than 50 % within a period of 8 seconds, an alarm is triggered. This check is only performed, if the value which was 8 seconds ago was higher than 4 % of the measurement range.

7.7.5 Temperature compensation of the ClO_2 value

The influence of temperature on the measured ClO_2 value can be compensated by measuring the temperature separately with a Pt100 sensor.

7.7.6 ClO_2 alarm value

An alarm is triggered, if the measured ClO_2 value violates an upper or lower limit.

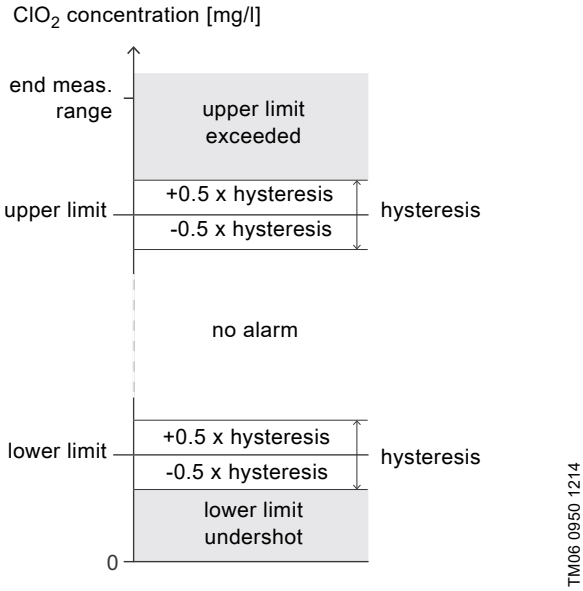

Fig. 16 Alarm limits

Upper limit

An alarm is triggered, if the measured ClO_2 value exceeds X mg/l (X = upper limit + 0.5 hysteresis).

The alarm message is removed, if the measured ClO_2 value undershoots X mg/l (X = upper limit - 0.5 hysteresis).

Lower limit

An alarm is triggered, if the measured ClO_2 value undershoots X mg/l (X = lower limit - 0.5 hysteresis).

The alarm message is removed, if the measured ClO_2 value exceeds X mg/l (X = lower limit + 0.5 hysteresis).

Hysteresis

The hysteresis indicates the tolerance for both alarm limits.

Alarm delay

The alarm trigger can be delayed.

7.8 Water meter

A water meter is required for dosing with proportional control and combined control. The system can operate with water meters that deliver a pulse signal or a current signal.

7.8.1 Water meter with pulse signal

The water meter must emit pulses with a frequency between 0.05 and 50 Hz. At least one pulse per 20 seconds must be emitted to keep the system running.

The maximum voltage has to be 13 V.

7.8.2 Water meter with current signal

The water meter must emit a signal between 0(4) and 20 mA. The load is 50 Ω.

7.9 ClO_2 pump type

The dosing pump for ClO_2 can be mechanical or digital.

A mechanical pump is controlled by power-on (T_{on}) and power-off (T_{off}). The dosing rate depends on the following ratio:

$$\frac{T_{on}}{T_{on} + T_{off}}$$

A digital pump is controlled by a current signal 0(4) - 20 mA.

7.9.1 Mechanical dosing pump

Stroke length (S_{DP})

If the dosing flow is low, reduce the stroke length at the pump. Set the stroke length parameter to the same value at the control unit. Consequently, the pump executes more strokes with a smaller stroke length. The resulting dosing rate remains the same. The ClO_2 is dispersed evenly and does not produce any clouds in the main line.

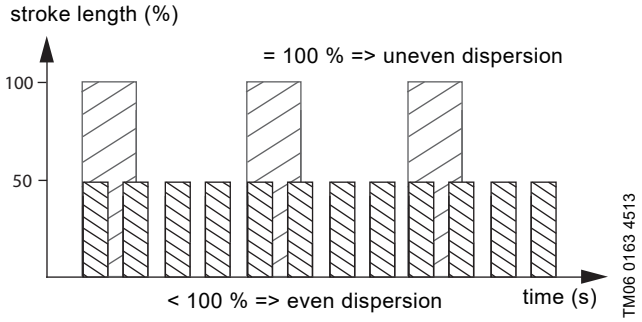

Fig. 17 Dispersion of dosing volume at different stroke lengths

Minimum switch-on time (min. Ton)

The minimum switch-on time can be adjusted and should be kept as short as possible.

Example: If the dosing pump executes 120 strokes per minute, the minimum switch-on time is 0.5 seconds, which equals 1 stroke.

7.9.2 Digital dosing pump

For digital dosing pumps, the stroke length parameter has to be set to 100 % at the control unit.

7.10 Relay polarity

The polarity of the alarm relay and warning relay can be changed from N.O. to N.C.

N.C. means normally closed. If a power failure occurs, the relay signals a fault. This is the fail safe setting.

8. Installation

This section includes information about the installation location and the environmental conditions. The hydraulic and electrical connections are described.

8.1 Transport

Warning

Risk of personal injury and damage to equipment as a result of operating faults due to transport damage.

Do not shake, crush or drop the package.

Do not use a sharp or pointed blade.

Open the packaging and carefully remove the device from the box.

Do not bend the hoses and cables.

Oxiperm Pro OCD-162-30 and -60 systems must be transported in an upright position.

Unpacking

1. Open the packaging.
2. Carefully remove the device from the box.
3. Retain the original packaging in order to return the device.
4. Check the device(s) for transport damage, especially hoses and cables.

Oxiperm Pro OCD-162-60:

Note Remove the transport protection of the $NaClO_2$ and HCl dosing pumps.

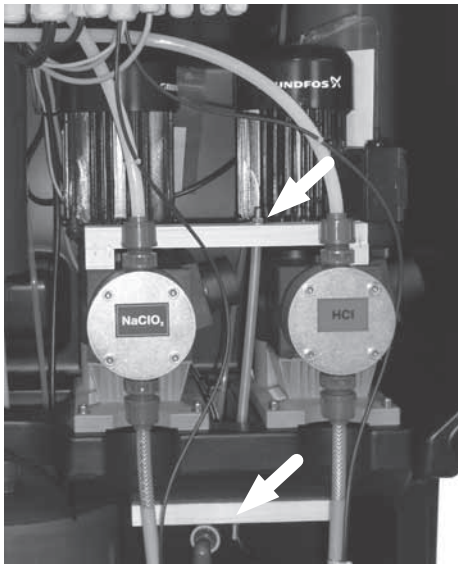

Fig. 18 Transport protection of OCD-162-60

Transport damages

1. Pack the device with its original packaging.
2. Inform the forwarder of the transport damage.
3. Return the device to the supplier.

8.2 Scope of delivery

One box for the system with cover, hoses and screws and one box per extension module.

8.3 Mounting

Installation location

Warning

Incorrect installation may result in serious personal injury and damage to property.

Only authorized service staff may install the system.

Note We recommend that you install a gas warning device.

For structural and technical safety and optimum operation of the system, all conditions listed below must be met. Prior to installation of the system, the operating company must make sure, that all conditions listed below are met.

The installation location must meet the following conditions:

- It is protected from the sun, frost-proof, well-ventilated and has sufficient lighting. The system must not be installed outdoors.
- It meets the conditions specified in section *6.3 Environmental conditions* regarding air temperature, humidity, permissible component temperature and dilution water quality.
- It has walls and floors, which enable the OCD-162-5, -10 system to be wall-mounted (minimum wall thickness for the mounting screws, 3.93 in. (0.10 m) or the OCD-162-30, -60 system to be floor-mounted.
- It has a power supply connection.
- It has access to the main water line.
- It has a connection for dilution water of drinking water quality, equipped with a manual isolating valve.
- It has a floor drain for washing away chemicals and a drain for sample water.
- It has a separate storage room for empty and full chemical containers.
- It is isolated from other areas with regard to fire protection.
- It is secured against unauthorized access, and meets the regulations for the prevention of accidents.
- It is not in permanent use by staff.
- Minimum wall thickness (brick/concrete): 3.93 in. (0.10 m)
- Minimum room height: 86.61 in. (2.20 m)
- Mounting height: display at eye level
- Minimum distance between injection unit and measuring point: 118.11 in. (3.00 m)
- Minimum distance between top edge and ceiling: 7.48 in. (0.19 m)
- Minimum allowance on either side: 7.48 in. (0.20 m)
- Maximum length of suction hoses: 169.29 in. (4.30 m)

Note

Correct installation:

The system must be installed vertically. The inclination should not exceed 5 °.

If the inclination is more than 5 °, the system does not function reliably.

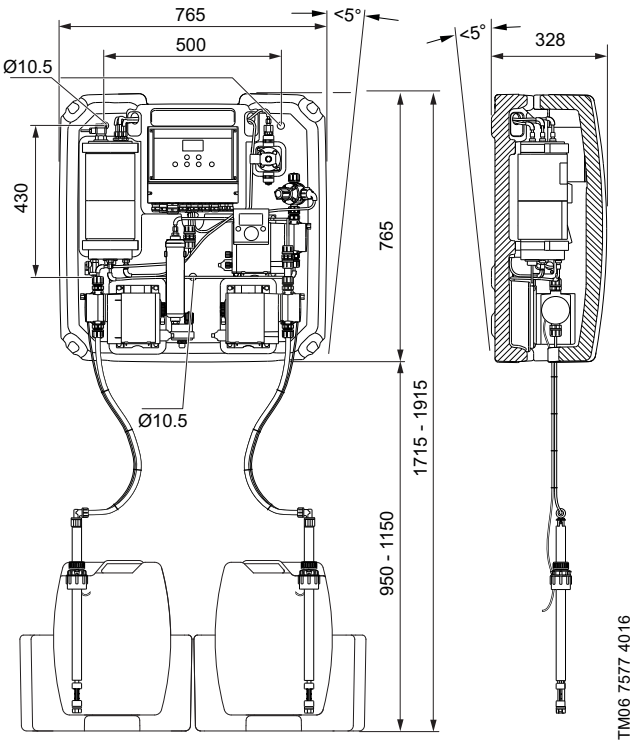

Fig. 19 Dimensions of OCD-162-5, -10

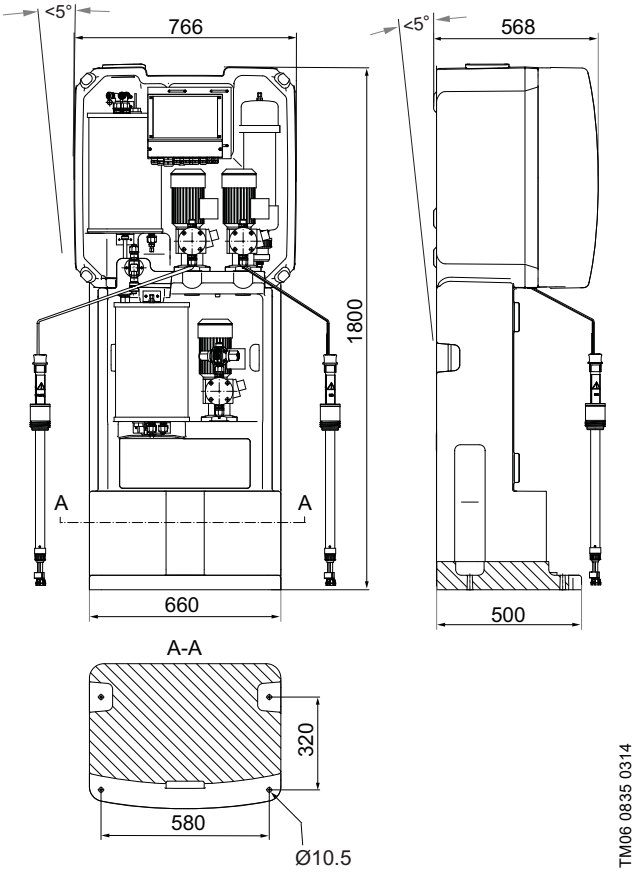

Fig. 20 Dimensions of OCD-162-30, -60

8.4 Additional modules

Additional modules, such as a measuring cell or a measuring module, must be fixed at a wall.

For details, see the installation and operating instructions of the respective additional module.

8.5 Deaerate HCl or $NaClO_2$ dosing pump

Use only water to deaerate the HCl or the $NaClO_2$ dosing pump.

8.5.1 For DDE 15-4 pump

Note

Before deaerating the HCl or the $NaClO_2$ dosing pump, make sure that there are no traces of chemicals in the suction lances, pumps and reaction tank. See also section *12.1 Flushing*

1. Put the HCl or the $NaClO_2$ suction lance into water.
2. Open the deaeration valve of the HCl or the $NaClO_2$ dosing pump by approximately half a turn.
3. Start the function test of the HCl or the $NaClO_2$ dosing pump: "main menu" > "function tests" > "relays"

relays
solen. valve
HCl pump
NaClO2 pump
warning relay
alarm relay
ClO2 pump

4. Let the pump run until water flows out of the deaeration hose of the HCl or the $NaClO_2$ dosing pump continuously and without air bubbles.
   The pump has been deaerated.
5. End the function test of the HCl or the $NaClO_2$ dosing pump.
6. Close the deaeration valve of the HCl or the $NaClO_2$ dosing pump.

8.5.2 For DMX 35-10 pump

Note

Before deaerating the HCl or the $NaClO_2$ dosing pump, make sure that there are no traces of chemicals in the suction lances, pumps and reaction tank. See also section *12.1 Flushing*

1. Put the HCl or the $NaClO_2$ suction lance into water.
2. Open the vent plug (2) in the pump housing.
   The vent plug must be open while the pump is running.
3. Unscrew the cap nut from the outlet valve (1) of the HCl or the $NaClO_2$ dosing pump.
4. Start the function test of the HCl or the $NaClO_2$ dosing pump: "main menu" > "function tests" > "relays"

relays
solen. valve
HCl pump
NaClO2 pump
warning relay
alarm relay
ClO2 pump

5. Let the pump run until water flows out of the outlet valves the HCl or the $NaClO_2$ dosing pump continuously and without air bubbles
   The pump has been deaerated.
6. End the function test of the HCl or the $NaClO_2$ dosing pump.
7. Screw the cap nut back on the outlet valve of the HCl or the $NaClO_2$ dosing pump.
8. Cross-tighten the dosing head screws with the correct torque. For the correct torque value, see the operation and installation instruction of the DMX 35-10 pump.

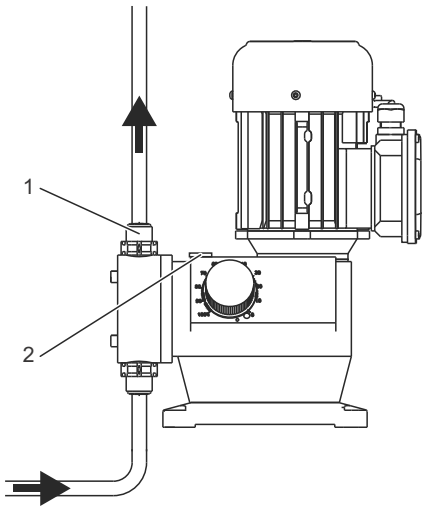

Fig. 21 DMX 35-10 pump

Pos.	Description
1	Outlet valve
2	Vent plug

8.6 Chemical containers and suction lances

Warning

Do not kink suction hoses and cables. Kinked hoses and cables may result in personal injury and damage to property.

Route the hoses directly down from the unit where possible.

Do not lay in loops.

Warning

Danger of chemicals leaking out of the suction hose.

Do not put tensile stress on the suction hose between the suction lance and the pump.

If the suction hose is too tense, it can slide off the connection.

Warning

Risk of poisoning from ClO_2 gas.

Risk of explosion when mixing $NaClO_2$, and HCl.

Do not put the suction lances into the same bucket.

Do not insert the suction lances in the wrong container.

OCD-162-5, -10: Make sure that the chemical containers are positioned under the system.

Observe the labels on chemical containers, suction lances and pumps:

red = HCl

blue = $NaClO_2$

Warning

Risk of fire and corrosion due to incorrect storage of chemicals.

Do not store HCl and $NaClO_2$ near grease, flammable or oxidizing substances, oils, acids or salts.

Obtain approval for storing chemicals.

1. Remove the cover of the system.
2. Screw the hose of the HCl suction lance (red label) onto the hose connection of the HCl pump (red label).

Note The N.C. symbol must be visible on top of the floater of the suction lances. Otherwise reverse the floater.

3. Position the HCl container in the red collecting tray on the right side under the system (OCD-162-5, -10) or next to the system (OCD-162-30, -60).
4. Unscrew the cover of the container. Immerse the suction lance (red label) in the container. Screw the cap of the suction lance onto the container.
5. Screw the hose of the $NaClO_2$ suction lance (blue label) onto the hose connection of the $NaClO_2$ pump (blue label).
6. Position the $NaClO_2$ container in the blue collecting tray on the left side under the system (OCD-162-5, -10) or next to the system (OCD-162-30, -60).
7. Unscrew the cover of the container. Immerse the suction lance (blue label) in the container. Screw the cap of the suction lance onto the container.

Changing the polarity of the suction lance

The polarity of the suction lance can be changed by reversing the floater of the suction lance.

Only reverse the floater if the N.O. symbol is visible on top of the floater of the suction lances.

1. Remove the floater sidewards
2. Turn the floater upside down (180 °) and attach it. Make sure that the N.C. symbol at the floater points upwards.

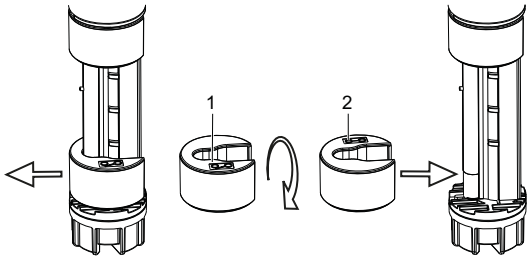

Fig. 22 Reversing the floater

8.7 Hydraulic installation

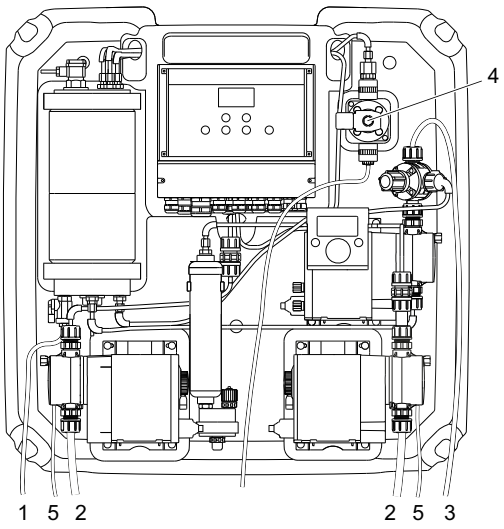

Fig. 23 OCD-162-5 (-10)

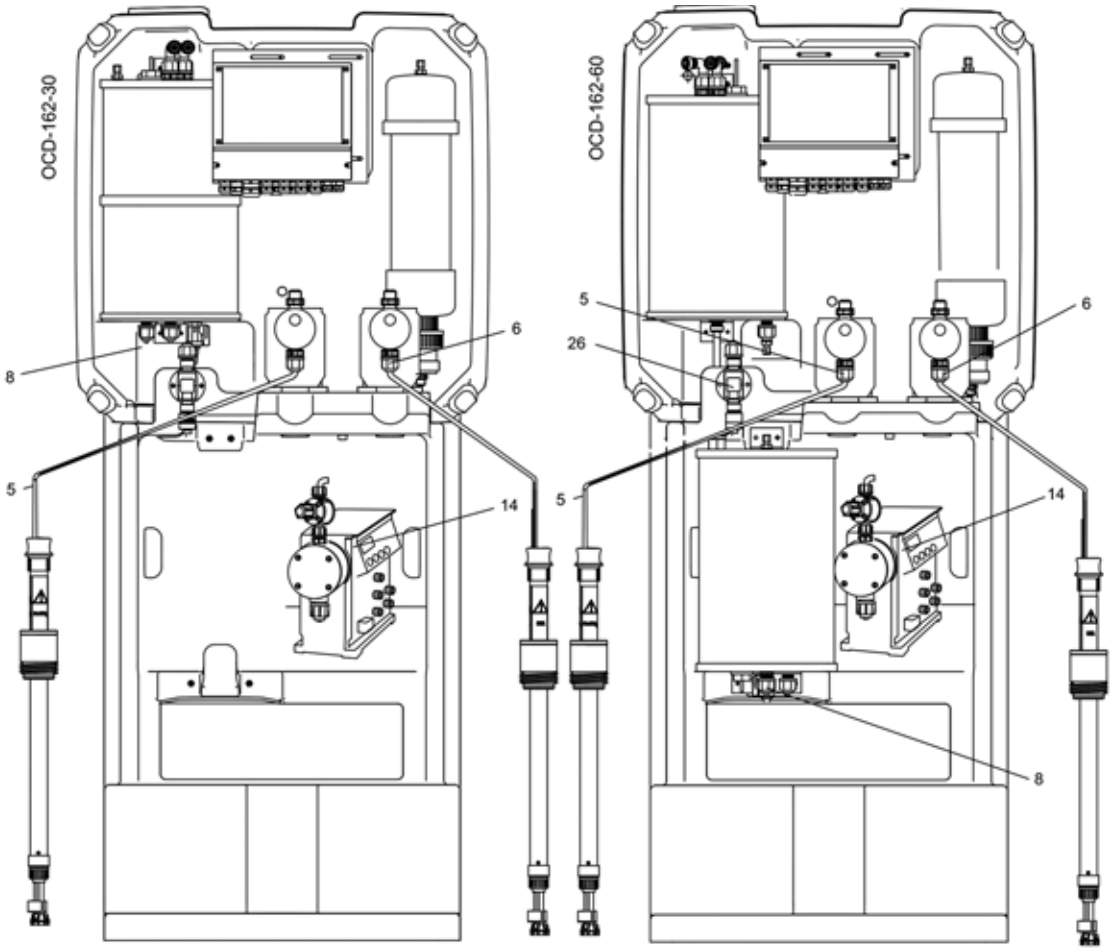

Fig. 24 OCD-162-30, -60

Pos.	Description
1	Hose from the internal batch tank to the drain valve
2	Hose of suction lance
3	Dosing line from the dosing pump to the injection unit
4	Solenoid valve with connection for dilution water
5	Deaeretion hose of the pump

8.7.1 System frame

1. Close the dilution water extraction device.
2. Connect the dilution water hose to the extraction device, see *7.1 Installation schemes*.
3. Route the dilution water hose to the system frame.

Note

Keep the hose as short as possible and avoid kinks!

Make sure that the pressure of the dilution water is > 43.5 psi (3 bar) when the solenoid valve is open.

4. Connect the dilution water hose to the solenoid valve.
5. Route the ClO_2 hose from the multi-function valve on the dosing pump to the injection unit (in the protective pipe provided by the customer) and connect it.
6. Connect the hose from the internal batch tank to the drain valve for flushing.

Warning

If protective pipes for the dosing line are installed, these may not be longer than 9.84 ft (3 m).

Risk of concentrated collection and dangerous escape of ClO_2 gas.

8.7.2 External dosing pump

The external dosing pump is not a standard component.

Warning

Incorrect installation may result in personal injury and damage to property.

Only authorized service staff may connect an external dosing pump to the system.

1. Route the dosing line from the internal batch tank to the external dosing pump, and connect it to the suction valve on the external dosing pump.
2. Route the overflow line from the external dosing pump back to the internal batch tank, and connect it.
3. Route the dosing line from the external dosing pump to the injection unit, and connect it to the injection unit.

8.7.3 Measuring cell

1. Connect a hose to the extraction device in the main line, route it to the measuring cell inlet, and connect it.
2. Connect another sample-water hose to the measuring cell outlet, and route it into the drain.

For more detailed information, see the installation and operating instructions for the measuring cell.

8.7.4 Measuring module

1. Connect a hose to the extraction device in the main line, route it to the measuring module inlet, and connect it.
2. Connect another hose to the measuring module outlet, route it to the injection unit in the main line, and connect it.

For more detailed information, see the installation and operating instructions for the measuring module.

8.8 Electrical installation

Warning

Only authorized service staff may connect the electronic components.

Warning

Risk of shock from damaged electronic components (transport or installation damage).

Do not reach into the void behind the control unit. Do not kink cables.

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Fig. 25 Control unit with cable glands

The following components can be connected at commissioning:

- Warning lamp or audible warning system
- Water meter
- Measuring cell
- Sample-water sensor from bypass measuring module
- Failure input, for example to a gas warning device
- Dosing stop input, for example to a higher-level control system
- External batch tank

Passing a cable through a gland

1. Unfasten the two screws on the rectangular cover under the control unit. Remove the cover.
2. Loosen the cable gland, and push the cable through.
3. Connect the cable as shown in the terminal connection plan, see section *16. Terminal connections*.
4. Tighten the cable gland by hand.

8.8.1 Water meter

The connections depend on the type of water meter (pulse signal or current signal).

Connect the signal cable of the water meter to the control unit, see section *16. Terminal connections*.

8.8.2 Measuring cell

AQC-D1/ -D11 measuring cell

Connect the measuring electrode and counter-electrode as well as the sample-water sensor, Pt100 temperature sensor, pH/ORP electrode and cleaning motor to the control unit.

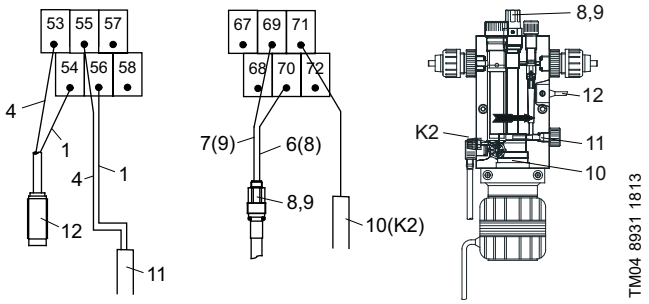

Fig. 26 Connection plan AQC-D1/ -D11

Pos.	Component	Pos.	Component
1	Brown	8	Reference electrode
2	White	9	Measuring electrode with reference electrode
3	Black	10	Counter-electrode
4	Blue	11	Pt100 temperature sensor
6	Outer conductor (screen)	12	Water sensor
7	Inner conductor	K2	Plug of counter-electrode

AQC-D6 measuring cell

Connect measuring electrode and counter-electrode for ClO_2 as shown in the connection plan.

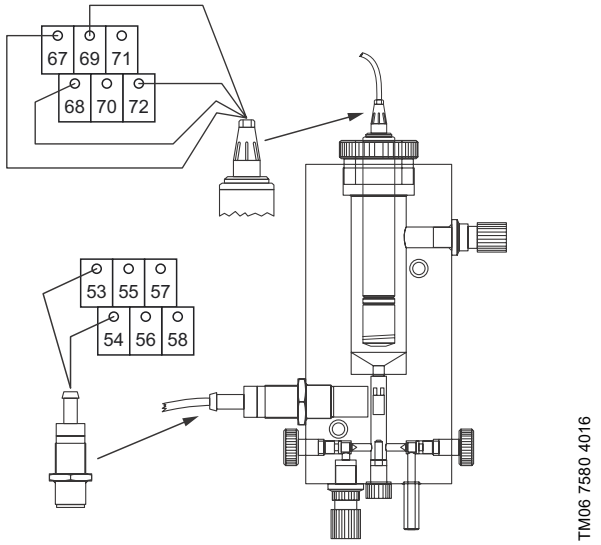

Fig. 27 Connection plan AQC-D6

Pos.	Connection	Description
67	- 12 V	Brown
68	⊥	White
69	M	Yellow
72	⊥	Green

Water sensor

Pos.	Connection	Description
54	+	Black
53	-	White

8.8.3 Dosing stop input

Connect the cable from a higher-level control system to terminals 49/50, see section *16. Terminal connections*.

8.8.4 Warning lamp or audible warning system

Connect the cable of the warning lamp or audible warning system to the alarm relay or warning relay.

1. Connect the alarm relay
   – Terminals 25 and 29 N.C.
   – Terminals 25 and 27 N.O.
2. Connect the warning relay
   – Terminals 26 and 30 N.C.
   – Terminals 26 and 28 N.O.

8.8.5 Failure input

Connect the cable from a gas warning device to the terminals 51/52, see section *16. Terminal connections*.

8.8.6 Power for external devices

Two external devices can be supplied with 230 V / 115 V power supply voltage.

Select free cable glands, and connect to the terminals 14/16/18 and 20/22/24, see section *16. Terminal connections*.

8.8.7 External batch tank

The external batch tank is delivered with a level indicator with 3 bistable changeover switches, see figure 28 and section *7.3 Tank levels*.

Make sure that the status indicator field of each changeover switch is black when the floater is at the bottom.

Fig. 28 Bistable changeover switch

If a status indicator field is white, modify the respective changeover switch.

Modifying the changeover switch

1. Remove the housing cover.
2. Carefully turn the indicator wheel clockwise, until the status indicator field is black.
3. Mount the housing cover.

Connecting the external batch tank

Connect the terminals as described in the following table.

Terminals		Polarity	Switch	Level
BK-390	OCD			
2	48	N.C.	K13	Maximum-maximum (overflow)
3	47			
1	46	N.O.	K12	Maximum
2	48			
1	45	N.O.	K11	Minimum
2	48			
---	---	---	---	Minimum-minimum (dry run)
---	---	---	---	not connected

8.8.8 Power supply cable

Warning

Incorrect electrical connections may result in serious personal injury and damage to property.

Electrical connections may only be carried out by authorized service staff.

Switch off the power supply before starting work.

Carry out power supply connection according to the local regulations.

Provide for an all-pole separator.

Warning

Do not route the power supply cable through the void behind the control unit. Risk of gas poisoning due to escape of gas from a damaged volume compensation bag.

Route the power supply cable up at the side between the control unit and the reaction tank.

Requirements

- Operating voltage minimum 230 V / 115 V
- Operating current minimum 4 A
- 2-pole interruption

Connecting the power supply cable

1. Position the main switch as close as possible to the system.
2. Switch off the main switch.
3. Connect the protective earth. See section *16. Terminal connections*.
4. Check that the voltage corresponds to the value specified on the nameplate. See section *5.3 Identification*.
5. Route the power supply cable up at the side between the control unit and the reaction tank.
6. Connect the power supply cable to the main switch.

9. Commissioning

This section includes information on how to start the system after having installed all components.

The control elements are described. The navigation between the menus is explained.

Section *9.5 Menu structure* gives an overview of the menu architecture.

Warning

Only authorized service staff is allowed to commission the system.

Before commissioning, check the hoses, connections and pumps for leakages.
Check the system for installation faults.

Risk of burns due to the escape of chemicals from faulty seals, valves, hose connections and lines.

Risk of corrosion damage to the main water line and damage to property due to malfunctions resulting from insufficient quality of the dilution water.

Caution Pressure, temperature and drinking water quality must comply with the system specifications.

Check the dilution water before and during commissioning.

Note We recommend that you install a gas warning device.

9.1 Control elements

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Fig. 29 Control elements

Button	Function
[Esc]	Cancel command, exit menu, confirm alarm message, return to previous menu
[Up]	Select previous menu item, set higher numerical value
[Down]	Select next menu item, set lower numerical value
[OK]	Confirm menu selection
[Cal]	Open calibration menu
[Man]	Open manual dosing menu

Indicator LED	Function	Color
[Alarm]	Alarm	Red
[Caution]	Warning	Yellow
[Cal]	Calibration	Yellow
[Man]	Manual dosing	Yellow

9.2 Initial display

The initial display is the first screen that appears after turning on the system.

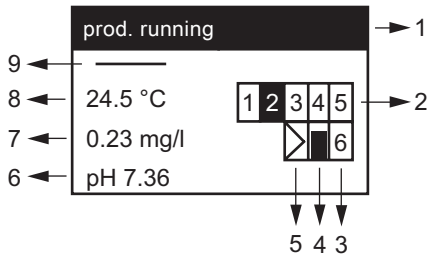

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Fig. 30 Initial display

Pos.	Message	Description	
1	example: "prod. running"	Production status, see section *7.4.3 Production status*	
2	1	Solenoid valve relay	White background when inactive. Black background when active.
	2	HCl pump relay	
	3	$NaClO_2$ pump relay	
	4	Warning relay	
	5	Alarm relay	
3	6	Relay of mechanical ClO_2 dosing pump.	
	6 (struck through)	Mechanical pump stopped. The symbol is struck through.	
4	■	Output for digital pump. The height of the bar is proportional to the actuating variable (0-100 %)	
	/	Digital pump stopped The symbol is struck through.	
5	◪	Water meter The height of the bar is proportional to the flow (0-100 %).	
6	example: 7.36 pH	pH value of the sample water	Display value is only available with connected measuring cell.
7	example: 0.23 mg/l	ClO_2 concentration	
8	example: 24.5 °C	Sample water temperature	
9	—	Progress bar if production is running	

9.3 Navigation

Use the [OK] and [Esc] keys to navigate between the main menu and the initial display.

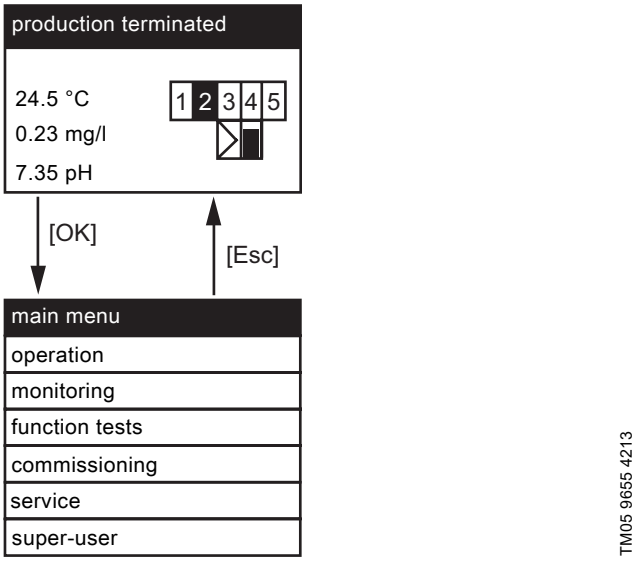


Fig. 31 Display and control elements

Use the [Up], [Down], [OK], [Esc] keys to navigate in the main menu and submenus.

The notation "main menu > commissioning > language" means:

1. Select "commissioning" in the "main menu" and press [OK].
2. Select "language" in the "commissioning" menu and press [OK].

The notation "Enter the value XYZ" means:

1. Enter the value XYZ via the buttons [Up], [Down].
2. Confirm with [OK].

The menu dialogues shown are examples. The dialogues depend on the settings made and the components connected.

9.4 Access codes

Three different access codes are assigned to all submenus. Each code gives access to a defined area.

Operator code

By default, all operator menus are unprotected. The operator has the possibility to define his own operator code.

Access is enabled for 60 minutes after entry of the code.

Service-user code

Some settings are reserved for trained service engineers (light grey fields in the menu structure table, see section *9.5 Menu structure*). These settings are protected by the service-user code 2633. The service-user code is necessary for commissioning.

Access is enabled for 30 minutes after entry of the code.

Super-user code

Some settings are preset in the factory (dark grey fields in the menu structure table, see section *9.5 Menu structure*). These settings are only accessible with the super-user code. The super-user menus are not described in these operating and installation instructions.

Factory-set reset code

The factory-set reset code 6742 is used to reset the system to the factory settings.

9.5 Menu structure

	Service-user code required
	Super-user code required

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4
operation	production	start		
		terminate		
	ClO2 dosing	start		
		stop		
	change container	HCl		
		NaClO2		

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4
monitoring	production	status		
		statistics	batch counter	
			dilution water	
			chem.consumption	
			age of ClO2	
	list of events			
	measurement	ClO2	measured value	
			cal. logbook	
		temperature		
		pH	measured value	
			cal. logbook	
		ORP	measured value	
			cal. logbook	
	dosing control			
	water meter			
	maintenance date			
	software version			

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4
function tests	level indicators	reaction tank		
		int. batch tank		
		ext. batch tank		
		suction lances	HCl	
			NaClO2	
	current output	digital pump	0 %	
			50 %	
			100 %	
		ClO2 value	0 %	
			50 %	
			100 %	
	relays	solen. valve		
		HCl pump		
		NaClO2 pump		
		warning relay		
		alarm relay		
		ClO2 pump		
	display			

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4	Submenu 5	Submenu 6	Submenu 7
commissioning	language	Deutsch					
		English					
		. . . .					
	date/time	date					
		time					
	batch tank	external					
		internal					
	display contrast						
	measurement	on	measuring cell	AQC-D1 /-D11	temp. comp.	cleaning motor	ClO2
							ClO2 + pH
							ClO2 + ORP
				AQC-D6			
			measuring range	ClO2	0.0... 0.50 mg/l		
					0.0... 1.00 mg/l		
					....		
					others	end meas. range	
				temperature	°C Celsius	0.0... 50.0 °C	
						0.0...100.0 °C	
						-5.0...120.0 °C	
					°F Fahrenheit	32.0...122.0 °F	
						32.0...212.0 °F	
						23.0...248.0 °F	
				pH	0.00...14.00 pH		
					2.00...12.00 pH		
					5.00... 9.00 pH		
					others	start meas range	end meas. range
				ORP	-1500...1500 mV		
					0...1000 mV		
					others	start meas range	end meas. range
			current output	0...20 mA			
				4...20 mA			
				others	start meas range	end meas. range	
			ClO2 alarm	on	lower limit		
					upper limit		
					hysteresis		
					alarm delay		
				off			
		off					
	water meter	on	pulse signal	volume per pulse			max. flow
			current signal	0...20 mA			
				4...20 mA			
				others	start meas range	end meas. range	
		off					

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4	Submenu 5	Submenu 6
commissioning	dosing control	on	control mode	proport. ctrl.		
				setpoint ctrl.	P	
					PI	
					PID	
				combined ctrl.	P	
					PI	
					PID	
			ctrl. parameters	setpoint		
				added quantity		
				prop. range XP		
				reset time TN		
				deriv. time TV		
			dos. time monit.	on	max. dosing time	
				off		
		off				
	dosing pump	int./ext. pump	yes			
			no			
		pump type	digital pump	0...20 mA		
				4...20 mA		
				others		
			mechanical pump	min. Ton		
		max. capacity				
		stroke length				
		max. dosing flow				
		dos. stop input	N.C.			
			N.O.			
	relays	warning relay	N.C.			
			N.O.			
		alarm relay	N.C.			
			N.O.			
	failure input	N.C.				
		N.O.				
	operator code	change				
		delete				
	settings	save				
		restore				
		factory reset				

Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4
service	maint. release			
	flushing			

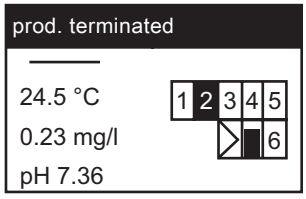
Main menu	Submenu 1	Submenu 2	Submenu 3	Submenu 4
super-user	system type	ClO2		
		NH2Cl		
	capacity	5 g/h		
		10 g/h		
		30 g/h		
		60 g/h		
	reaction time			
	cal. setup	calibration	one-point cal.	
			two-point cal.	
		manual zero pt.		
		Upot		
		electrode type	gold	
			platinum	
		display		
	temp. correction			
	sump			

Key	Menu	Submenu 1	Submenu 2	Submenu 3
[Cal]	calibration	ClO2	cal. meas. value	
			cal. result	
			cal. cycle	on
				off
		pH	cal. meas. value	
			cal. result	
			cal. cycle	on
				off
		ORP	cal. meas. value	
			cal. result	
			cal. cycle	on
				off
[Man]	manually dosing			

9.6 Initial startup

For description of control elements, navigation and initial display, see section *9.1 Control elements*, *9.3 Navigation* and *9.2 Initial display*.

1. Open the dilution water supply.
2. Switch on the power supply.
3. Select the language.
4. Enter the service code (see section *9.4 Access codes*).



TM03 6905 4506

Fig. 32 Initial display

9.7 Language

1. "main menu > commissioning > language"
2. Select the "language".

9.8 Date/time

Setting the date

1. "main menu > commissioning > date/time > date"
2. Set the date.

Setting the time

1. "main menu > commissioning > date/time > time"
2. Set the time.

9.9 Batch tank

This menu also affects the production mode, see section *7.4.1 Operation modes*.

1. "main menu > commissioning > batch tank"

batch tank
internal
external

Internal batch tank

1. "internal"

no. of batches
X
0 = continuous

X = 1...20: The number of batches to produce.

X = 0: Continuous production of batches

External batch tank

1. "external"

The production is running until the external batch tank is filled.

9.10 Display contrast

Adjust the display contrast in "main menu > commissioning > display contrast"

9.11 Measuring setup

9.11.1 Measuring cell

"main menu > commissioning > measurement > on > measuring cell"

The parameters in the display depend on the selected measuring cell.

AQC-D1/ -D11

Temperature measurement

temperature
on
off

1. Select your setting.

Temperature compensation

temp. comp.
on
off

2. Select your setting.

Monitoring the cleaning motor

cleaning motor
monitoring on
monitoring off

3. Select your setting.

Parameters

measurement
ClO2
ClO2 + pH
ClO2 + ORP

4. Select the measuring parameter(s).

AQC-D6

When selecting measuring cell AQC-D6, the measuring parameter is automatically set to ClO_2.

9.11.2 Measuring range

1. "main menu > commissioning > measurement > on > measuring range"

The parameters in the display depend on the selected measuring cell.

measuring range
ClO2
temperature
pH/ORP

2. Select and set all measuring ranges in succession.

ClO_2 measuring range

1. "main menu > commissioning > measurement > on > measuring range > ClO2".

Predefined ranges

ClO2
0.0... 0.50 mg/l
0.0... 1.00 mg/l
0.0... 2.00 mg/l
0.0... 5.00 mg/l
0.0...10.00 mg/l
0.0...20.00 mg/l
others

others

Enter the end of the measuring range.

ClO2
1.00 mg/l
end meas. range

Temperature measuring range

1. "main menu > commissioning > measurement > on > measuring range > temperature"

temperature
°C Celsius
°F Fahrenheit

2. Select the temperature unit.

temperature
32...122 °F (0.0... 50.0 °C)
32...212 °F (0.0...100.0 °C)
23...248 °F (-5.0...120.0 °C)

3. Select the temperature measuring range.

pH measuring range

1. "main menu > commissioning > measurement > on > measuring range > pH"

Predefined ranges

pH
0.00...14.00 pH
2.00...12.00 pH
5.00... 9.00 pH
others

others

Enter the start and the end of the measuring range.

pH
0.00 pH
start meas range

pH
14.00 pH
end meas. range

ORP measuring range

Make the settings as described before.

9.11.3 Current output

1. "main menu > commissioning > measurement > on > current output".

Predefined ranges

current output
0...20 mA
4...20 mA
others

2. Select the range.

others

Set the start and the end of the measuring range.

current output
0.00 mg/l = 0 mA
start meas range

1. Enter current value for "start meas range".

current output
1.00 mg/l= 20 mA
end meas. range

2. Enter current value for "end meas. range".

The specified range for the current output is assigned to the corresponding ClO_2 concentration.

9.11.4 ClO_2 alarm value

"main menu > commissioning > measurement > on > ClO2 alarm > on"

ClO2 alarm
upper limit
lower limit
hysteresis
alarm delay

1. Select the submenu.
2. Enter the value.

9.12 Calibration

Calibration can only be done, if the sample water contains ClO_2.

For details on calibration of the measuring cell, see section *10.3 Calibration*.

9.13 Water meter

"main menu > commissioning > water meter > on"

water meter
pulse signal
current signal

Water meter with pulse signal

volume per pulse
1.0 l

1. Enter volume per pulse.

max. flow
10 m3/h

2. Enter the maximum flow.

Water meter with current signal

1. "main menu > commissioning > water meter > on > current signal"

Predefined ranges

current signal
0...20 mA
4...20 mA
others

2. Select the range.

max. flow
10 m3/h

3. Enter the maximum flow.

others

Enter the current value for the start and the end of the measuring range.

water meter
5 mA
start meas range

1. Set "start meas range"

water meter
15 mA
end meas. range

2. Set "end meas. range"

max. flow
10 m3/h

3. Enter the maximum flow.

9.14 Dosing control setup

9.14.1 Dosing control mode

"main menu > commissioning > dosing control > on > control mode"

control mode
setpoint ctrl.
proport. ctrl.
combined ctrl.

1. Select the control mode.

Dosing control characteristic

Select the control characteristic for the setpoint or combined control mode.

ctrl. charact.
P
PI
PID

1. Select the control characteristic.

9.14.2 Dosing control parameters

The control parameters depend on the selected control mode.

"main menu > commissioning > dosing control > on > ctrl. parameters"

ctrl. parameters
setpoint
added quantity
prop. range XP
reset time TN
deriv. time TV

1. Select the control parameter and enter the value, see section *7.6 Dosing control*.

9.14.3 Dosing time monitoring

"main menu > commissioning > dosing control > dos. time monit. > on "

max. dosing time
600 min

1. Enter the maximum dosing time.

9.15 Dosing pump setup

"main menu > commissioning > dosing pump"

dosing pump
int./ext. pump
pump type
max. capacity
stroke length
max. dosing flow
dos. stop input

9.15.1 Internal or external dosing pump

"main menu > commissioning > dosing pump > int./ext. pump"

int. pump only?
yes
no

Select "yes", if only an internal pump is installed or select "no", if external pumps are installed.

9.15.2 Pump type

"main menu > commissioning > dosing pump > pump type"

digital pump
mechanical pump

Select the pump type.

Digital dosing pump

current output
0...20 mA
4...20 mA
others

Select a predefined range, or select "others" and set the current output corresponding to 0 % and 100 % capacity:

current output
0 % = mA
dosing flow

1. Enter the current value for 0 % dosing flow.

current output
100 % = mA
dosing flow

2. Enter the current value for 100 % dosing flow.

The specified current output is assigned to the corresponding capacity (0-100 %).

Mechanical dosing pump

min. Ton
0.5 s

Enter the minimum switch-on time.

9.15.3 Maximum capacity

"main menu > commissioning > dosing pump > max. capacity"

max. capacity
2.75 l/h

Enter the maximum capacity of the pump.

Note — Make sure that the maximum capacity setting corresponds with the setting of the ClO_2 dosing pump.

9.15.4 Stroke length

"main menu > commissioning > dosing pump > stroke length"

stroke length
100 %

Enter the stroke length. For a digital pump set 100 %. See also section *7.9 ClO_2 pump type*.

Note — Make sure that the stroke length setting corresponds with the setting of the ClO_2 dosing pump.

9.15.5 Maximum dosing flow

"main menu > commissioning > dosing pump > max. dosing flow"

max. dosing flow
100 %

Enter the maximum dosing flow, see section *7.6.9 Maximum dosing flow (Qmax)*.

9.15.6 Dosing stop input

"main menu > commissioning > dosing pump > dos. stop input"

dos. stop input
N.O.
N.C.

Set the polarity of the dosing stop input.

9.16 Relays

9.16.1 Warning relay

1. "main menu > commissioning > relays > warning relay"

warning relay
N.O.
N.C.

2. Set the polarity of the warning relay.

9.16.2 Alarm relay

1. "main menu > commissioning > relays > alarm relay"

alarm relay
N.O.
N.C.

2. Set the polarity of the alarm relay.

9.17 Failure input

1. "main menu > commissioning > failure input"

failure input
N.O.
N.C.

2. Set the polarity of the failure input.

9.18 Operator code

9.18.1 Change

By default, all operator menus are unprotected.

1. "main menu > commissioning > operator code"

operator code
change
delete

2. "change"
3. Enter the current operator code.
4. Enter the new operator code.

9.18.2 Delete

1. "main menu > commissioning > operator code > delete"
2. Enter the operator code.

9.19 Settings

All settings made during the commissioning can be saved.

Note — Use the function "restore" only, if the settings have been saved before. Otherwise the factory settings are loaded.

9.19.1 Save

To save all settings:

1. "main menu > commissioning > settings > save"

9.19.2 Restore

To restore the settings saved previously:

1. "main menu > commissioning > settings > restore"

9.19.3 Factory reset

All settings will be restored to the factory settings.

1. "main menu > commissioning > settings > factory reset"
2. Enter the factory-reset code, see section *9.4 Access codes*

10. Operation

This section includes information on starting, stopping and monitoring the production and dosing of ClO_2.

Calibration of the measurement, changing the chemical containers and manual deaeration of the pump are also described.

10.1 Production

10.1.1 Starting the production

"main menu > operation > production > start"

Note — After a power failure the production restarts automatically.

10.1.2 Terminating the production

"main menu > operation > production > terminate"

Note — The chemical reaction in the reaction tank continues. The ClO_2 dosing pump continues running, until the internal batch tank is empty.

10.2 Dosing

10.2.1 Starting ClO_2 dosing

"main menu > operation > ClO2 dosing > start"

ClO2 dosing
start
stop

10.2.2 Stopping ClO_2 dosing

"main menu > operation > ClO2 dosing > stop"

10.3 Calibration

To enter the calibration menu press the [Cal] button on the control unit, see section *9.1 Control elements*.

10.3.1 ClO_2 value

Note — Constant values of the measuring water are required for calibrating the measuring cell.
The values are viewed in "main menu > monitoring > measurement".

1. If the measured value remains constant, determine the ClO_2 value by means of a reference measurement
2. Take a note of this value.
3. Press [Cal] > "ClO2 > cal. meas. value".

cal. meas. value
0.05 mg/l
5.2 µA

4. Set the reference value in mg/l.

ClO_2 calibration is finished and the result is displayed.

cal. result
slope
22.0 µA/ppm
asym.
0.0 µA

10.3.2 pH value

Two different buffer solutions must be used to calibrate the measured pH value.

1. Prepare two glass jars with the buffer solutions, e.g. buffer 1 = 4.01 pH and buffer 2 = 9.18 pH
2. Prepare an empty 2.64 gal (10 liter) plastic bucket.
3. Measure the temperature of the buffer solution.
4. Press [Cal] > "pH > cal. meas. value".

cal. meas. value
Grundfos
DIN/NIST
others

5. Select one of the buffer types.

Buffer type	Buffer values
Grundfos	4.01, 7.00, 9.18
DIN/NIST	4.01, 6.86, 9.18
others	The lower and upper buffer values can be freely adjusted within the set pH measuring range (difference of at least 1 pH).

6. Select "Grundfos", for example.

buffer temp.
77 °F (25 °C)

7. Enter the measured temperature of the buffer solution.
8. Shut off the water supply of the measuring cell.
9. Remove the pH electrode from the measuring cell. Use the bucket to catch any water that flows out.
10. Immerse the pH electrode in the first glass jar.

buffer 1
4.01 pH
7.00 pH
9.18 pH

11. Select the value of the first buffer solution. The voltage is measured and displayed. Wait until the waiting message disappears.
12. Remove the pH electrode from the first buffer solution. Rinse the pH electrode with water.
13. Immerse the pH electrode in the second glass jar.

buffer 2
4.01 pH
7.00 pH
9.18 pH

14. Select the value of the second buffer solution. The voltage is measured and displayed. Wait until the waiting message disappears.
15. Remove the pH electrode from the second buffer solution. Rinse the pH electrode with water.

The pH calibration is finished and the result is displayed.

cal. result
slope -57.88 mV/pH
asym. -0.6 mV

Finishing pH calibration

1. Put the pH electrode back into the measuring cell.
2. Open the water supply of the measuring cell.
3. Dispose of the buffer solutions.

10.3.3 ORP value

1. Prepare a glass jar with ORP buffer solution.
2. Prepare an empty 2.64 gal (10 liter) bucket.
3. Press [Cal] > "ORP > cal. meas. value".

cal. meas. value
225 mV

4. Shut off the water supply of the measuring cell.
5. Remove the ORP electrode from the measuring cell. Use the bucket to catch any water that flows out.
6. Immerse the ORP electrode in the glass jar.
7. Enter the mV value of the ORP buffer solution.

The ORP calibration is finished and the result is displayed:

cal. result
ORP offset
-2 mV

Finishing ORP calibration

1. Remove the ORP electrode from the buffer solution. Rinse the ORP electrode with water.
2. Put the ORP electrode back into the measuring cell.
3. Open the water supply of the measuring cell.
4. Dispose of the buffer solution.

10.3.4 Logbook

The last ten calibration results are saved in the calibration logbook. Example: View the last ClO_2 calibration results:

"main menu > monitoring > measurement > ClO2 > cal. logbook"

number 1/10
date.....2014-07-31
time.....12:34:41
slope..... 22.0 µA/ppm

10.3.5 Interval

A calibration interval between 1 and 100 days can be set. Example: calibration interval for the ClO_2 value.

1. Press [Cal] > "ClO2 > cal. cycle > on".
2. Enter the interval in days.

10.4 Changing the chemical containers

The chemical containers should be replaced in the following situations:

- As soon as possible after the low-level signal is displayed.
- Immediately after the empty signal is displayed.

Warning

Risk of serious personal injury and damage to equipment due to incorrect handling of chemicals.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Warning

Risk of poisoning from ClO_2 gas.

Risk of explosion when mixing $NaClO_2$, and HCl.

Do not put the suction lances into the same bucket.

Do not insert the suction lances in the wrong container.

OCD-162-5, -10: Make make sure that the chemical containers are positioned under the system.

Observe the labels on chemical containers, suction lances and pumps:

red = HCl

blue = $NaClO_2$

Warning

Risk of burns from drips when removing the suction lance from the chemical container.

Do not allow drips to fall on the skin, clothing, shoes or ground.

Rinse away any drips on the container or in the collecting tray with water immediately.

1. Untwist the screw cap from the suction lance in the chemical container.
2. Carefully pull the suction lance out of the container, and immediately insert it into the drip pipe in the collecting tray.
3. Screw the original cover onto the empty container.
4. Unscrew the cover of the new container. Retain the cover.
5. Insert the suction lance. Fasten the screw cap.
6. As soon as the suction lance is inserted, the production starts up. The alarm message confirms automatically.
7. Reset the chemical consumption counter ("operation > change container > HCl/NaClO2").

10.5 Deaerating the pump manually

Warning

Risk of serious personal injury and damage to equipment due to incorrect handling of chemicals.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Conditions for deaerating:

- The internal batch tank must contain chlorine dioxide solution.
- The dosing pump must be operated in "manually dosing" mode.
- The dosing pump is running:

1. To deaerate the pump, turn the green deaeration knob clockwise as far as it will go. Observe the direction of the arrow on the protective cap.
2. As long as the deaeration knob is turned, the dosing medium can flow through the relief line to the tank.
3. When released, the deaeration knob returns to its original position automatically.

10.6 Monitoring

10.6.1 Production

Status

"main menu > monitoring > production > status"

Example: further status message, see section *7.4.3 Production status*.

status
HCl pump running

Batch counter

"main menu > monitoring > production > statistics > batch counter"

batch counter
25 batches

After 65535 batches, the display is reset to 0.

Dilution water

"main menu > monitoring > production > statistics > dilution water"

The dilution water flow rate of the10 latest ClO_2 production cycle is displayed.

dilution water 1/10
1.4 l/min
2014-02-28

Chemical consumption counter

"main menu > monitoring > production > statistics > chem.consumption"

chem.consumption
1.456 l HCl
since 2014-04-29
1.123 l NaClO2
since 2014-04-23

Age of ClO_2

"main menu > monitoring > production > statistics > age of ClO2".

age of ClO2
reaction tank
03:16:25
int. batch tank
00:00:28

10.6.2 List of events

The history of up to 99 faults and messages can be viewed by scrolling through the list.

"main menu > monitoring > list of events"

event 1/99
lower limit undershot
2014-07-22.....11:45

10.6.3 Measurement

The measured values temperature and pH/ORP are only displayed, if the AQC-D1/D11 measuring cell is selected.

"main menu > monitoring > measurement"

Measured value ClO_2

"main menu > monitoring > measurement > ClO2 > measured value"

ClO2
0.2 mg/l
4.061 µA
0.0 - 1.0 mg/l

– ClO_2 value
– signal from measuring cell
– ClO_2 measuring range

Temperature of sample water

"main menu > monitoring > measurement > temperature"

temperature
73.4 °F (23 °C)
32 - 122 °F (0.0 - 50.0 °C)

– temperature value
– temperature measuring range

Measured value pH

"main menu > monitoring > measurement > pH > measured value"

pH
7.20 pH
-30 mV
0.00 - 14.00 pH

– pH value
– signal from pH sensor
– pH measuring range

Measured value ORP

"main menu > monitoring > measurement > ORP > measured value"

ORP
1350 mV
0 . . . 225 mV

– ORP value
– ORP measuring range

10.6.4 Dosing status

"main menu > monitoring > dosing control"

For control status description, see section *7.6 Dosing control*.

dosing control	
y-out:	75 %
setp:	0.2 mg/l
setpoint ctrl.	
Xp:	83 %
TN:	300 s
TV:	0 s
Qmax:	100 %
min. Ton:	1.0 s

10.6.5 Water meter status

1. "main menu > monitoring > water meter"

Water meter with pulse signal

water meter
5.0 m3/h
1.2 Hz

– Water flow
– pulse frequency corresponding to the water flow.

Water meter with current signal

water meter
5.0 m3/h
10 mA

– Water flow
– current signal corresponding to the water flow.

10.6.6 Maintenance date

1. "main menu > monitoring > maintenance date"

maintenance date
last
2014-07-25
next
2015-07-25

10.6.7 Software version

1. "main menu > monitoring > software version"

software version
OCD-162
v2.00.0 20140226
3184

11. Fault finding

This section includes an overview of alarm messages, a list of possible errors and remedies, and a description of how to test the functions of the system.

11.1 Fault overview

The alarm messages are shown in the initial display.

Alarm message	Reaction					
	Alarm LED	Warning LED	Alarm relay	Warning relay	Event list	Remark
lower limit undershot	●	-	●	-	-	
upper limit exceeded	●	-	●	-	-	
ClO2 dosing time exceeded	●	-	●	-	-	dosing stop
fault of cleaning motor	●	-	●	-	-	dosing stop (only setpoint or combined control)
water sensor fault	●	-	●	-	-	dosing stop (only setpoint or combined control)
calibrate ClO2 sensor	●	-	-	-	-	
calibrate pH sensor	●	-	-	-	-	
calibrate ORP sensor	●	-	-	-	-	
temperature error	●	-	-	-	●	
low level HCl	-	●	-	●	●	
empty HCl	●	-	●	-	●	HCl pump stops
low level NaClO2	-	●	-	●	●	
empty NaClO2	●	-	●	-	●	$NaClO_2$ pump stops
timeout HCl pump	●	-	●	-	●	production terminates
timeout NaClO2 pump	●	-	●	-	●	production terminates
timeout 1st dilution water	●	-	●	-	●	production terminates
timeout 2nd dilution water	●	-	●	-	●	production terminates
timeout 3rd dilution water	●	-	●	-	●	production terminates
timeout production	●	-	●	-	●	production terminates
timeout flushing	●	-	●	-	●	production terminates
level int. batch tank	●	-	●	-	●	dosing stop
level ext. batch tank	●	-	●	-	●	
annual maintenance due	-	●	-	-	-	
maintenance date exceeded	●	-	-	-	-	
fault current input	●	-	●	-	-	
wire breakage current output 1	●	-	●	-	-	
wire breakage current output 2	●	-	●	-	-	
external failure	●	-	●	-	-	dosing stop, production terminates
empty signal int. batch tank	-	●	-	●	●	dosing stop (20 s + time inverse proportional to current dosing rate) after empty signal
check ClO2 batch	-	●	-	●	●	
check water pressure	-	●	-	-	●	
fault reaction tank	●	-	●	-	●	production terminates
fault int. batch tank	●	-	●	-	●	production terminates
fault ext. batchtank	●	-	●	-	●	production terminates
external dosing stop	-	-	-	-	●	dosing stop

Activated relays can be deactivated with the [Esc] button. An exception is the warning relay, which is activated by the signal "empty signal int. batch tank". The warning relay is only deactivated, if the fault is removed. For trouble-free operation of the system eliminate the cause of the faults.

If an alarm occurs, which is written into the event list, the Oxiperm Pro system must not be switched off.

Note

If the system is switched off while writing an alarm into the event list, all settings are reset to factory settings.

11.2 Faults with error message

Service staff only

Error message	Cause	Remedy
"low level HCl" **"low level NaClO2"**	HCl or $NaClO_2$ container is almost empty.	Change the HCl or $NaClO_2$ container. OCD-162-05, -10: the chemical containers must be positioned under the system.
	The floater on the suction lance has a wrong orientation.	Turn the floater upside down.
"empty HCl " **"empty NaClO2"**	HCl or $NaClO_2$ container is empty.	Change the HCl or $NaClO_2$ container. OCD-162-05, -10: the chemical containers must be positioned under the system.
"check ClO2 batch"	Warning message, undefined contents in the internal batch tank after power supply failure.	Drain the internal batch tank manually, and dispose of the content.
"level int. batch tank"	Too much water is flowing into the internal batch tank, so the ClO_2 solution is too highly diluted. Water is in the volume compensation bag or the activated carbon filter or the adsorption filter.	Stop the system.
	• Solenoid valve is leaking.	Check the solenoid valve. Clean or replace the strainer in the solenoid valve.
	• Faulty level indicator in the reaction tank. Too much HCl and/or too much $NaClO_2$ is flowing into the internal batch tank.	Replace the level indicator in the reaction tank.
	• Dilution water pressure is too high.	Check the dilution water pressure and adjust it according to the requirements.
"level ext. batch tank"	Faulty changeover switch in the external batch tank, or external batch tank is overfull.	Replace the changeover switch in the external batch tank.
"timeout 1st dilution water"	During the first dilution water supply, the level in the reaction tank has increased too slowly. Level K1 was not reached in time.	Check the dilution water supply.
	• Strainer in solenoid valve is clogged, or solenoid valve is faulty.	Check the solenoid valve in the "relays" menu, see section *11.4.3 Relays*. Replace the filter, or replace the solenoid valve.
	• Dilution water supply is not sufficiently open.	Open the dilution water supply further.
	• Level indicator in the reaction tank is damaged.	Replace the level indicator in the reaction tank.
	• Dilution water pressure is too low. Dilution water pressure has to be at least 43.51 psi (3 bar).	Check if the hose for dilution water is not bent. Check if a further consumer is connected to the dilution water hose.

Error message	Cause	Remedy
"timeout HCl pump" **"timeout NaClO2 pump"**	During HCl or $NaClO_2$ supply, the level in the reaction tank has increased too slowly between the levels K1 and K2 or K2 and K3. Level K2 / K3 was not reached in time.	Check the hose from the pump to the reaction tank for assembly faults. Check the HCl or $NaClO_2$ pump in the "relays" menu, see section *11.4.3 Relays*.
	Insufficient performance of the HCl or $NaClO_2$ pump • Air in suction hose and/or dosing head. • Pump is not dosing. • Discharge hose is leaking, clogged, porous or bent.	Check the discharge hose. Replace, if necessary.
	HCl or $NaClO_2$ pump is not sucking in • Suction hose is leaking, clogged, porous or bent. • Deposits are at the foot valve. • Valve is not installed correctly or clogged. Crystalline deposits are in the valves. • Diaphragm is broken (leaking). • Diaphragm tappet is torn out. • HCl or $NaClO_2$ container is empty.	• Check the suction hose and suction lance. • Clean or replace the foot valve. • Clean the valves. • Replace the diaphragm. • Check the fill level of the HCl or $NaClO_2$ container. • If "empty HCl" or "empty NaClO2" is signalled, replace the HCl or $NaClO_2$ container.
	• Pump is not running at all.	Check the pump. Replace the pump, if necessary.
	• Cable breakage between HCl or $NaClO_2$ pump and control unit.	Check the cable from pump to control unit. Replace the cable.
	• Faulty control unit.	Check the control unit. Replace the control unit, if necessary.
	• Level indicator in the reaction tank is damaged.	Replace the level indicator in the reaction tank.
"timeout 2nd dilution water"	During the second dilution water supply, the level in the reaction tank has increased too slowly between the levels K3 and K4. Level K4 was not reached in time.	
	• See alarm message "timeout 1st dilution water".	Check the solenoid valve and dilution water supply in "relays", see section *11.4.3 Relays*. Check the water supply. See also alarm message "timeout 1st dilution water".
"timeout production"	After overflow, the level in the reaction tank has dropped back down to K1 too slowly.	
	• Insufficient dilution water supply.	See alarm message "timeout 1st dilution water".
	• If the screw connection of the ClO_2 drain at the reaction tank or the screw connection to the internal batch tank is loose, or an O-ring is missing in one of the screw connections, the ClO_2 solution can not drain.	Fasten the screw connections or fit in a new O-ring.
"timeout 3rd dilution water"	During the third dilution water supply, no overflow from the reaction tank into the internal batch tank was determined.	
	• Dilution water supply and solenoid valve.	Check the solenoid valve and water supply in the "relays" menu, see section *11.4.3 Relays*.
"timeout flushing"	• For example temporary power failure.	Confirm the alarm message with [Esc] and restart the ClO_2 production process.

Error message	Cause	Remedy
"temperature error"	The temperature at the measuring cell has exceeded the set measuring range.	
	• Faulty temperature sensor.	Check the temperature sensor. Replace, if necessary.
	• Faulty cable of temperature sensor.	Check the cable of the temperature sensor. Replace, if necessary.
	• Water temperature higher or lower than measuring range.	Check the water temperature.
	• Temperature measuring range set incorrectly.	Correct the measuring range.
"slope error"	Fault during pH or ClO_2 calibration. Invalid calibration result detected by plausibility check.	Repeat the calibration, clean the cell, or replace the electrodes.
"fault of electrode/buffer"	Fault during pH calibration. Auto reading of buffer data.	
"error asym. pot."	Fault during pH calibration. Invalid asymmetry potential detected by plausibility check.	
"fault of electrode/buffer"	Fault during pH calibration. Two buffers with a pH difference of less than 1 pH were selected.	Check the buffer solutions. Repeat the calibration, and replace the electrode.
"calibration time exceeded"	Fault during ClO_2, pH and ORP calibration. This alarm is activated, if the calibration process does not have a stable measured value within a certain period.	Check the pH electrode and replace, if necessary.
"offset"	Fault during ORP calibration. Invalid calibration result detected by plausibility check.	Repeat the ORP calibration, or replace the electrode.
"calibrate ClO2 sensor" "calibrate pH sensor" "calibrate ORP sensor"	The set monitoring time is reached for the next calibration interval.	Calibrate or replace the electrode or the sensor.
"water sensor fault"	The floater of the measuring cell is above the water sensor. The flow is too big.	Reduce the flow with the adjustment spindle of the measuring cell.
	The floater of the measuring cell is below the water sensor. The flow is too small.	Increase the flow with the adjustment spindle of the measuring cell.
	The sample-water extraction device or the hose to the measuring cell is clogged or leaking.	Check the sample-water extraction device and the hose to the measuring cell.
	No sample-water flow in the measuring cell. Filter is clogged.	Clean the filter of the measuring cell.
	Lack of water at the sample-water extraction device.	Check the flow in the main line at the sample-water extraction device.
	Faulty water sensor.	Replace the water sensor.
	Faulty cable between the measuring cell and the control unit.	Replace the cable.
	Faulty control unit.	Check the control unit. Replace the control unit, if necessary.
"fault of cleaning motor"	Cleaning motor monitoring in the measuring cell indicates a fault.	Stop the system.
	• Faulty cleaning motor.	Check the power supply of the cleaning motor. Replace the cleaning motor.
	• No power supply to the cleaning motor. Cable breakage.	Check the cable. Replace the cable.
	• Gas bubbles in the measuring cell.	Vent the measuring cell.

Error message	Cause	Remedy
"ClO2 dosing time exceeded"	The dosing control predefines the maximum capacity for a longer period than the set time.	
	• After a power supply failure, the solution in the internal batch tank has been diluted too much after flushing (setpoint control and combined control).	Continue ClO_2 production and dosing after flushing.
	• Poor water quality (setpoint control and combined control).	Measure the water quality and the ClO_2 concentration in the main line.
	• Faulty water meter, or wrong setting of water meter (proportional control and combined control).	Check the water meter. Replace water meter, if necessary.
	• Faulty measuring cell cable or measuring cell.	Check the cable of the measuring cell. Replace, if necessary.
	• HCl or $NaClO_2$ container contains only water.	Replace the HCl or $NaClO_2$ container.
	• Dosing control is set incorrectly.	Check the dosing control settings.
"wire breakage current output 1" **"wire breakage current output 2"**	Cable breakage between the control unit and an external recording device.	Check the current output control unit with the "current output" menu, see section *11.4.2 Current outputs*. Replace the cable, if necessary.
	Faulty control unit.	Check the control unit. Replace the control unit, if necessary.
"external failure"	An external device, which is connected to the failure input (terminal 51/52), indicates a fault.	
	• Faulty external device.	Check the external device.
	• Cable breakage between the control unit and the external device.	Replace the cable.
	• Faulty control unit.	Replace the control unit, if necessary.
"annual maintenance due"	Maintenance overdue for less than 30 days.	Stop the system and perform maintenance. Acknowledge maintenance: "main menu > service > maint. release".
"maintenance date exceeded"	Maintenance overdue for more than 30 days.	Stop the system and perform maintenance. Acknowledge maintenance: "main menu > service > maint. release".
"empty signal int. batch tank"	This error message appears in "int. batch tank" mode, if the set number of batches (1-20 batches) are produced.	Check the operation mode. If the production does not run continuously, this is not a fault. See section *7.4.2 Production process*.
	The dosing pump has emptied the internal batch tank, before the next batch is available in the reaction tank.	Check the settings for maximum capacity and stroke length in the "main menu > commissioning > dosing pump" menu.
	Faulty water meter.	Check the water meter. Replace, if necessary.
	Drain valve of the internal batch tank is open.	Close the drain valve.
	Faulty measuring cell (setpoint control and combined control).	Check the measuring cell. Replace the measuring cell.
"fault reaction tank"	Faulty level indicator in the reaction tank detected by plausibility check.	Check the level indicator in the reaction tank in the "level indicators" menu. Replace the level indicator, if necessary.
	Faulty control unit.	Replace the control unit, if necessary.
"fault int. batch tank"	Faulty level indicator in the internal batch tank detected by plausibility check.	Check the level indicator in the internal batch tank in the "level indicators" menu. Replace the level indicator, if necessary.
	Faulty control unit.	Replace the control unit, if necessary.

Error message	Cause	Remedy
"fault current input"	Faulty water meter.	Check the water meter. Replace, if necessary.
	Faulty control unit.	Check the current input of the control unit: Supply the current input with a defined current between 0 and 20 mA, and compare with display in the "monitoring > water meter" menu. Replace control unit, if necessary.
	Cable breakage between water meter and control unit.	Replace the cable.
	A water meter with 0-20 mA output signal is connected, but the setting of the control unit is 4-20 mA.	Check the settings at the control unit.
"lower limit undershot" **"upper limit exceeded"**	The set lower alarm limit is undershot, or the set upper alarm limit is exceeded.	Check the set alarm limits. Check the dosing control and measurement settings. Check the external components.
"check water pressure"	The flow rate of the dilution water is to low. Minimum flow rate see section *6.10 Minimum flow rate of dilution water*.	Increase water pressure to ≥ 43.51 psi (3.0 bar). Use the correct type of hose for the dilution water. See section *17. Overview spare parts, maintenance kits and accessories*.

11.3 Faults without error message

Fault	Cause	Remedy
The ClO_2 dosing pump stops.	The isolating valve of the dosing line is closed.	Open the isolating valve. If the system operates in 60 Hz mode, check if the multi-function valve is set to 87.02 psi (6 bars) at the overflow side. See also the installation and operating instructions of the multi-function valve.
Overdosing of ClO_2 solution due to a free discharge.	The ClO_2 dosing pump has a free discharge into a container. Even if the pump stops, the ClO_2 solution continues running into the container due to a siphon effect. The consequence is overdosing. The conditions are: • disconnected injection unit • dosing pump without multi-function valve.	Connect the multi-function valve at the pump. This will prevent uncontrolled flow of the dosing liquid through the dosing lines.
Perceptible smell of ClO_2	The activated carbon filter or adsorption filter is saturated.	Replace the activated carbon filter or adsorption filter.
Measured values of connected pH-probe fluctuate on the display.	• Cable to control unit is connected incorrectly.	Check cable connections.
	• Temperature sensor is not connected with temperature compensation.	Connect temperature sensor.

11.4 Function tests

11.4.1 Hydraulic and electric connections

1. Remove the cover from the system.
2. Check for leaks in hydraulic connection and hoses.
3. Check all cables, fuses and electrical connections.

11.4.2 Current outputs

1. "main menu > function tests > current output"

current output
digital pump
ClO2 value

2. Select the current output to test.
3. Select a value (0 %, 50 % or 100 %).
4. Measure the output current and compare.

11.4.3 Relays

Stop the production before testing the relays. The display shows, which relay is activated.

Display	Status of relay
"X"	activated
"-"	inactivated

1. "main menu > function tests > relays"

relays	
solen. valve.....	-
HCl pump.....	-
NaClO2 pump.....	-
ClO2 pump.....	-
alarm relay.....	-
warning relay.....	-

2. Press [OK] to activate ("X") or to inactivate ("-").
3. Check the relay and compare.

11.4.4 Display

1. "main menu > function tests > display"

The display gets completely dark and all LEDs light up.

11.4.5 Manually dosing

In this menu, the dosing capacity is adjusted manually.

1. Press [Man].
2. Enter the actuating value (%).
3. Confirm with [OK].

The ClO_2 dosing pump is running with the adjusted dosing capacity. The "Man" LED is activated.

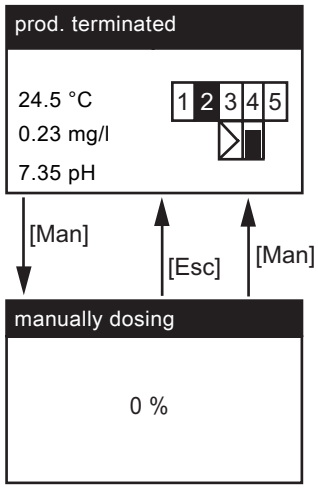


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Fig. 33 Display and control elements

Exit manually dosing with [Man].

Manually dosing is quitted. The ClO_2 dosing pump is controlled by the currently selected control mode. The "Man" LED is deactivated.

Note

Exit manually dosing with [Esc].

Manually dosing is still active, the pump continues dosing the adjusted capacity while the control menus are accessible. The "Man" LED stays activated.

11.4.6 Level indicators

For illustrations and description of the tank level indicators, please see section *7.3 Tank levels*.

Status of level indicators

The display indicates the status of the level indicators.

Display	Status of level indicators
"X"	Level at switch
"-"	Level above or below switch
"?"	Invalid level indicator

Reaction tank

"main menu > function tests >level indicators > reaction tank"

reaction tank	
K4:.....	-
K3:.....	x
K2:.....	-
K1:.....	-

While the production process is running, the levels K1 to K4 must be marked in succession.

Internal batch tank

"main menu > function tests >level indicators > int. batch tank"

int. batch tank	
K6:.....	-
K5:.....	-

If the internal batch tank is empty, the filling level K5 is marked. If the batch tank is filled, the level is between K5 and K6, and no filling level is marked. If the tank is overfull, the filling level K6 is marked (alarm).

External batch tank

"main menu > function tests >level indicators > ext. batch tank"

ext. batch tank	
K13:.....	-
K12:.....	x
K11:.....	x

Display	Status of level indicators
"X"	Level above switch
"-"	Level below switch
"?"	Invalid level indicator

Suction lances

Warning

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Risk of burns from drips when removing the suction lance from the chemical container.

Do not allow drips to fall on the skin, clothing, shoes or ground.

Rinse away any drips on the container or in the collecting tray with water immediately.

Risk of explosion when mixing $NaClO_2$, and HCl.

Risk of poisoning from ClO_2 gas.

HCl suction lance

"main menu > function tests >level indicators > suction lances > HCl"

HCl	
K7:.....	x
K8:.....	-

$NaClO_2$ suction lance

"main menu > function tests > level indicators > suction lances > NaClO2"

NaClO2	
K9:.....	x
K10:.....	-

Level status

K7 / K9	K8 / K10	Level status
"x"	"-"	Full
"-"	"-"	Low-level
"-"	"X"	Empty

To test the level indicator, move the suction lance up and down and observe the marks at the display.

11.5 Calibration faults

11.5.1 Slope or asymmetry error

If the slope or asymmetry is outside the norm, the following error messages are displayed: "slope error" or "error asym. pot.".

This is caused by an old electrode or an old buffer solution.

1. Press [Esc] to terminate calibration.
2. Check the expiry date.
3. Replace the electrode or replace the buffer solution.
4. Repeat the calibration.

11.5.2 Unstable measuring signal

If the electrode does not send a stable measuring signal to the control unit within 120 seconds, the following error message is displayed: "calibration time exceeded".

This is caused by an old electrode.

1. Press [Esc] to terminate the calibration.
2. Replace the electrode.
3. Repeat the calibration.

12. Maintenance

This section includes information on how to prepare and carry out the regular maintenance work. The order numbers of the relevant maintenance kits are mentioned at the beginning of each section.

Maintenance of the system must be carried out once a year. The maintenance dates are displayed in the menu "main menu > monitoring > maintenance date".

Warning

Incorrect maintenance may result in personal injury and damage to property.

Only authorised service staff may carry out maintenance work.

Switch off the system, and disconnect it from the power supply before carrying out maintenance work and repairs.

Warning

Do not reach into the void behind the control unit.

Risk of gas poisoning due to the escape of gas from a damaged volume compensation bag.

Warning

Risk of burns due to the escape of chemicals from faulty seals, valves, hose connections and lines.

Flush the system before starting maintenance work. Check the hoses for leaks.

Warning

Risk of faults due to failure to carry out maintenance work or due to delays in maintenance work may result in significant personal injury and damage to property.

Always abide by the specified maintenance intervals.

Warning

Risk of serious personal injury and damage to equipment due to incorrect handling of chemicals.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

The system is unpressurized.

Note

Only the dosing pump, dosing line and injection unit on the main water line are under pressure (maximum 145.03 psi (10 bar).

12.1 Flushing

Warning

Risk of serious personal injury and damage to equipment due to incorrect handling of chemicals.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Warning

Risk of poisoning from ClO_2 gas.

Risk of explosion when mixing $NaClO_2$ and HCl.

Do not put the suction lances into the same bucket.

Do not insert the suction lances in the wrong container.

Observe the labels on chemical containers, suction lances and pumps:

red = HCl

blue = $NaClO_2$

Warning

Risk of burns from drips when removing the suction lance from the chemical container.

Do not allow drips to fall on the skin, clothing, shoes or ground.

Rinse away any drips on the container or in the collecting tray with water immediately.

Note

The flushing process can be terminated at any time with [Esc].

Note

If automatic flushing fails, perform emergency flushing by filling the reaction tank through the opening of the level indicator.

Required items

- PVC hose, 11 x 8 mm, for the drain valve on the internal batch tank
- two 2.64 gal (10 liter) buckets filled with water for the suction lances
- the original screw caps for the chemical containers
- ClO_2 breakdown substance.

Oxiperm Pro OCD 162	Number of 2.64 gal (10 liter) buckets	ClO_2 breakdown substance: sodium thiosulfate
5 g/h	1	20 g
10 g/h	1	40 g
30 g/h	1	120 g
60 g/h	2	2 x 120 g

Preparation

1. Place the buckets filled with water next to the chemical containers.
2. Untwist the screw cap on the suction lance of the HCl container.
3. Remove the suction lance from the HCl container.
4. Place the suction lance in one of the buckets with water.
5. Screw the original cover onto the HCl container (red label).
6. Untwist the screw cap on the suction lance of the $NaClO_2$ container.
7. Remove the suction lance from the $NaClO_2$ container.
8. Place the suction lance in the other bucket with water.
9. Screw the original cover onto the $NaClO_2$ container (blue label).
10. Fill the bucket(s) for the ClO_2 breakdown substance with 1 liter of water.
11. Put the ClO_2 breakdown substance into the bucket(s).
12. Remove the cover from system.
13. Connect one end of the hose to the drain valve of the internal batch tank, and place the other end in the bucket with the breakdown substance.

Starting flushing

1. "main menu > service > flushing"

flushing
put suct. lance into water [OK]

2. Press [OK], if the suction lances are in the water.

flushing
open drain cock [OK]

3. Press [OK], if the internal batch tank is empty.

flushing
close drain cock [OK]

4. Press [OK], if the drain valve is closed.

Flushing starts. The flushing process takes about 7 minutes. The flushing process runs twice.

Working with the system after flushing

1. Remove the hose from the drain valve, and place it in the bucket.
2. Pour the contents of the bucket down the drain.
3. Rinse the hose and the bucket(s) with water thoroughly.
4. Unscrew the original cover of the $NaClO_2$ container. Retain the original cover.
5. Remove the $NaClO_2$ suction lance from the bucket of water, and insert it in the $NaClO_2$ container. Screw the suction lance cap onto the container.
6. Unscrew the original cover of the HCl container. Retain the original cover.
7. Remove the HCl suction lance from the bucket of water, and insert it in the HCl container. Screw the suction lance cap onto the container.
8. Fit the cover back on the system.

12.2 Dosing pumps

1. Flush the system, see section *12.1 Flushing*.
2. Have ready the suitable maintenance kit.

12.2.1 HCl and $NaClO_2$ dosing pumps

See the installation and operating instructions for the respective pump.

Maintenance kits

OCD-162-	Description	Order no.
5, 10	DDE 6-10 (230 V)	97751479
30	DDE 15-4 (230 V)	97751497
60	DMX 221 (230 V)	95715693
	DDE 15-4 (115 V)	97751497

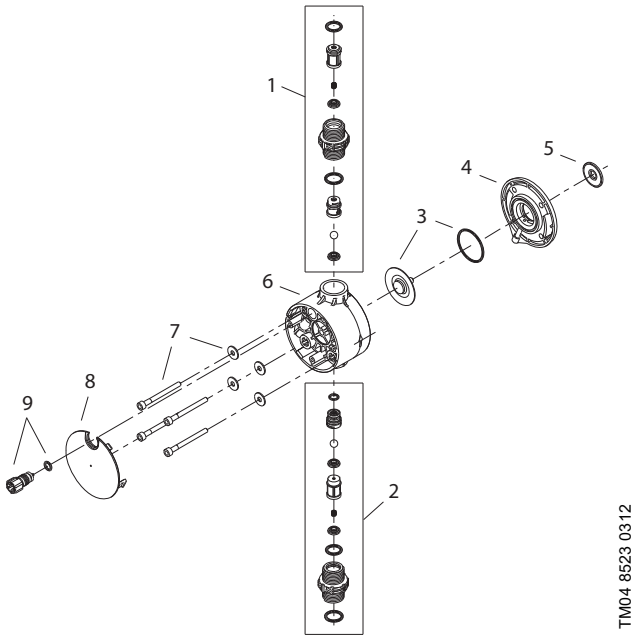

Fig. 34 Dosing head of DDE: exploded view

Pos.	Description
1	Discharge valve with compression spring
2	Suction valve
7	Screws
9	Deaeration valve

12.2.2 ClO_2 dosing pumps

See the installation and operating instructions for the respective pump.

Maintenance kits

OCD-162-	Pump type	Order no.
5-P/G, -P/H	DDA 7.5-16	98359993
10-P/G, -P/H		
30-D/G, -D/H	DMX 16-10	95715694
60-D/G, -D/H	DMX 35-10	95715693
30-P/G, -P/H	DDI 60-10	95715695
60-P/G, -P/H		

12.3 Solenoid valve

12.3.1 OCD-162-5 / -10

OCD-162-	Spare parts	Order no.
5, 10	3 O-rings, cap, strainer and valve	95702990

1. Flush the system, see section *12.1 Flushing*.
2. Close the dilution water extraction device.
3. Unscrew the hose connection at the bottom of the solenoid valve, and let the water flow into the bucket.
4. Unscrew the hose connection from the top of the solenoid valve.

Replacing O-rings, cap and strainer

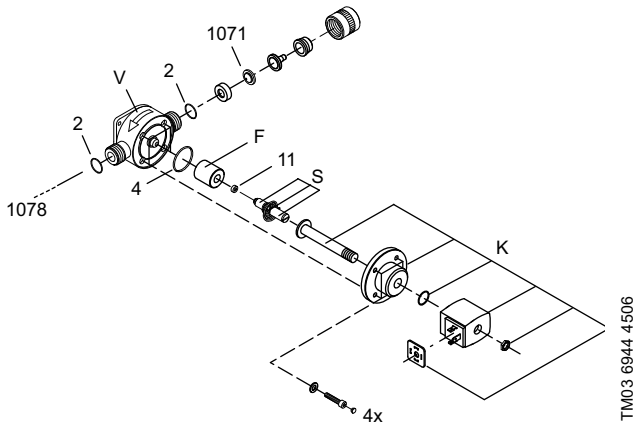

Fig. 35 Solenoid valve (OCD-162-5, -10): exploded view

Pos.	Description
2	2 O-rings
4	1 O-ring
11	Cap
1071	Strainer
1078	Valve
V	Enclosure with top and bottom hose connection
K	Upper section with cable connector
F	Guide
S	Tappet

1. Unfasten the screw nut and remove the cable connection socket (K) from the plug.
2. Unscrew the enclosure (V) from the system frame.
3. Unfasten the two screws on the enclosure (V).
4. Remove the four screws from the enclosure (V), and pull the upper section up and off.
5. Take out the tappet (S) and guide (F).
6. Remove the tightening cap (11) and fit a new cap.
7. Remove the O-ring (4), and fit a new O-ring.
8. Place the tappet (S) and guide.
9. Place the upper section of the enclosure.
10. Reassemble the enclosure and fasten the four screws on the enclosure.
11. Replace the O-rings (2) in the connector on the enclosure.
12. Screw the enclosure back onto the system frame.
13. Screw down the cable connection socket (K) again.
14. Fit a new strainer (1071).
15. Screw the screw connection with strainer into the lower connection (input).
16. Screw the screw connection with strainer into the upper connection (output).
17. Open the dilution water extraction device.
18. After two minutes, check the enclosure output for leaks.
19. If it is tight, screw down the top hose connection again.

Connection pieces

OCD-162	Connection pieces (A)	Order no.
-05, -10	G 5/8 female thread for hose 6/9: for input of solenoid valve	95727673
	G 5/8 female thread for hose 4/6: for output of solenoid valve	95727672

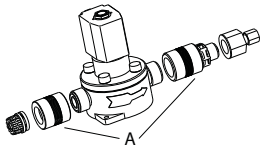

Fig. 36 Solenoid valve OCD-162-05, -10: exploded view

Caution Tighten the connection pieces manually!

12.3.2 OCD-162-30 / -60

OCD-162-	Spare parts	Order no.
30, 60	2 O-rings, cap, strainer and valve	95717912

1. Flush the system, see section *12.1 Flushing*.
2. Close the dilution water extraction device.
3. Unscrew the hose connection at the bottom of the solenoid valve, and let the water flow into the bucket.
4. Unscrew the hose connection from the top of the solenoid valve.

Replacing O-rings and strainer

1. Replace the O-rings from the top and bottom hose connection by new ones.
2. Replace the O-rings from both connectors by new ones.
3. Fit a new strainer.
4. Fit a new valve.
5. Attach and screw down the bottom hose connection.
6. Open the dilution water extraction device.
7. After two minutes, check the top end of the hose connection for leaks.
8. If it is tight, screw down the top hose connection again.
9. Pour the contents of the bucket down the drain.
10. Dispose of the old O-rings, cap and strainer.

Connection pieces

OCD-162-	Connection pieces (A)	Order no.
5, 10	G 5/8 male thread/G 1/4 male thread: for input of solenoid valve	95723464
	G 1/4 male thread/G 5/8 male thread: for output of solenoid valve	95723463

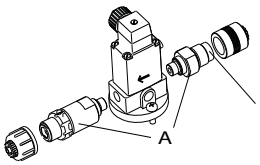

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Fig. 37 Solenoid valve OCD-162-30, -60: exploded view

Caution Tighten the connection pieces manually!

12.4 Reaction tank and internal batch tank

Warning

Risk of burns due to the escape of chemicals from hoses, reaction tank, internal batch tank and dismantled dosing line.

Risk of gas poisoning due to the escape of ClO_2 from the dismantled gas hose.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Make sure that the reaction tank and internal batch tank are empty before dismantling the reaction tank.

Flush the system before dismantling the reaction tank.

Maintenance kits

OCD-162-	Spare parts	Order no.
5, 10	3 O-rings	95702992
30, 60	4 O-rings	95717913

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Fig. 38 Reaction tank with internal batch tank of OCD-162-10

12.4.1 Replacing the O-rings on level indicator and drain valve

Warning

Risk of gas poisoning due to the escape of ClO_2 when dismantling the gas hose!

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Do not hold your face over the reaction tank.

1. Flush the system, see section *12.1 Flushing*.
2. Unfasten the level indicator connection on top of the reaction tank (A), see the following figures.

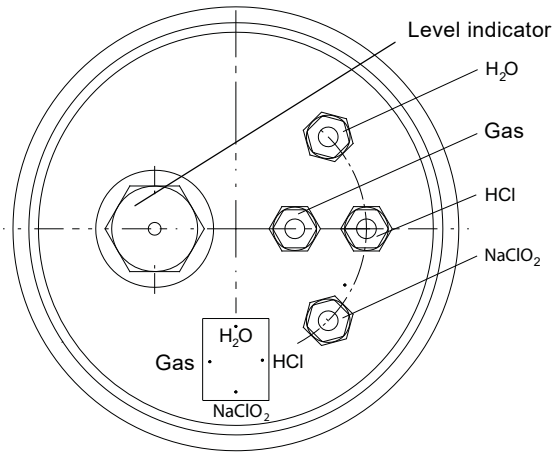

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Fig. 39 OCD-162-5, -10: connections on the reaction tank

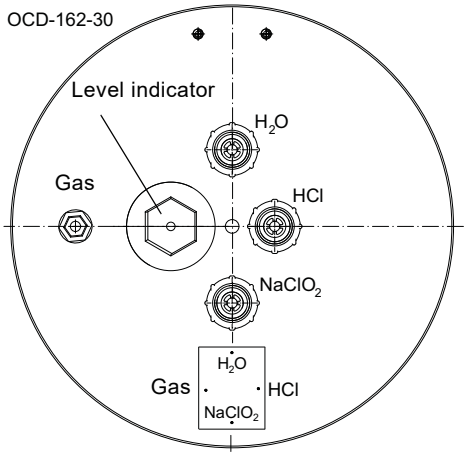

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Fig. 40 OCD-162-30: connections on the reaction tank

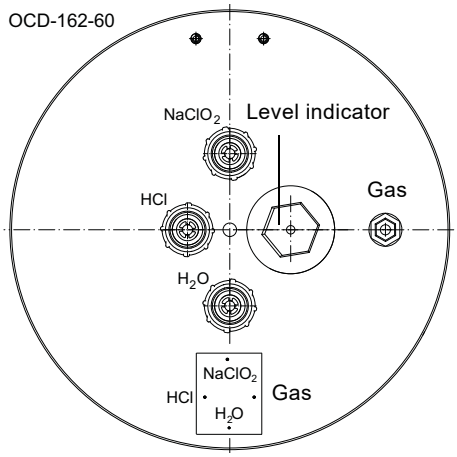

Fig. 41 OCD-162-60: connections on the reaction tank

3. Pull out the level indicator and drain valve (C).

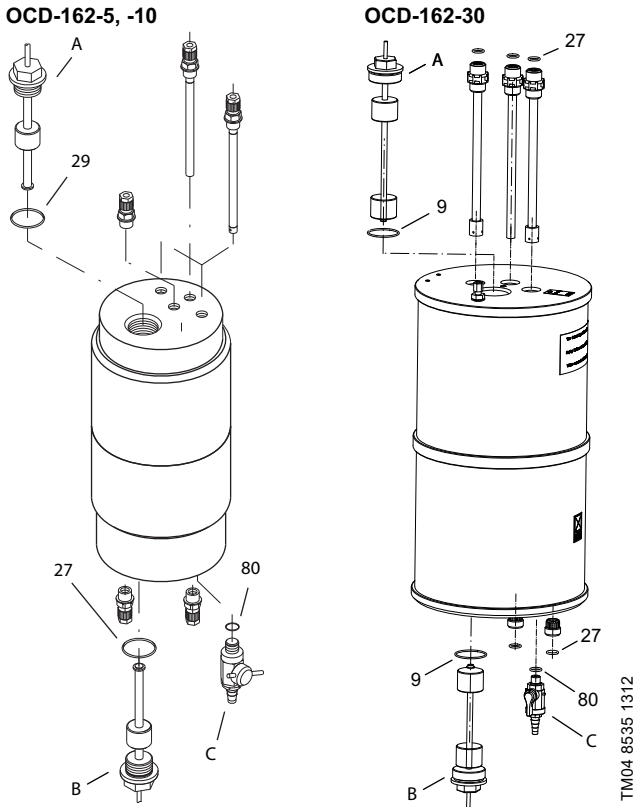

Fig. 42 OCD-162-5, -10, -30: reaction tank/internal batch tank

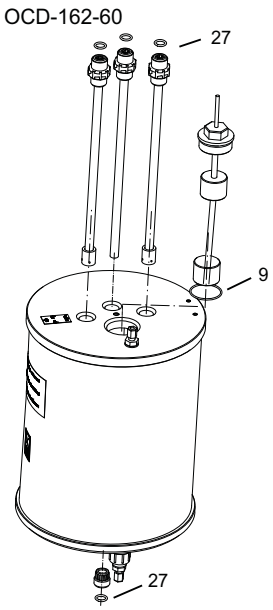

Fig. 43 OCD 162-60: reaction tank

Pos.	Spare parts
A	Level indicator connection on top of the reaction tank (see fig. 42)
B	Level indicator connection at bottom of the internal batch tank (see fig. 42)
C	Drain valve (see fig. 42)
9	O-ring on level indicator in reaction tank (OCD-162-60) O-ring on level indicator in internal batch tank (OCD-162-30)
27	O-ring on level indicator in internal batch tank
29	O-ring on level indicator in reaction tank (OCD-162-5, -10) (see fig. 42)
80	O-ring on drain valve (see fig. 42)

4. Remove the O-ring (29).
5. Screw the level indicator with the new O-ring back into position.
6. Unfasten the level indicator connection at the bottom of the internal batch tank (B) and pull out the level indicator.
7. Remove the O-ring (27 or 9).
8. Screw the level indicator with the new O-ring back into position.
9. Pull out the drain valve (27), and remove the O-ring (80).
10. Screw the drain valve with the new O-ring back into position.

12.5 OCD-162-5, -10: volume compensation bag and activated carbon filter

Warning

Risk of burns due to the escape of chemicals when the hoses are disconnected.

Risk of gas poisoning due to the escape of ClO_2 from the dismantled gas hose.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Do not hold your face over the volume compensation bag or activated carbon filter.

OCD-162-	Spare parts	Order no.
5	Volume compensation bag, activated carbon filter, O-ring, 2 valves	95702994
10	2 volume compensation bags, 2 activated carbon filters, O-ring, 2 valves	95705995

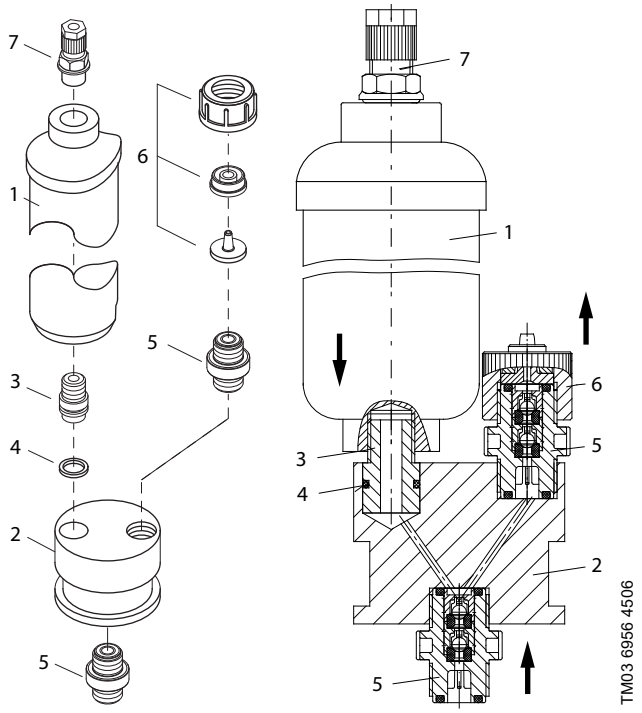

Fig. 44 Maintaining the activated carbon filter

Pos.	Description
1	Activated carbon filter
2	Valve support
3	Bottom screw connection
4	O-ring
5	Valve
6	Connection piece
7	Top screw connection

12.5.1 Replacing the volume compensation bag

The volume compensation bag is situated in the system frame, behind the control unit.

1. Unfasten the top screw connection on the activated carbon filter. The hose can now be moved.
2. Hold the volume compensation bag by the T-piece, and carefully pull it out from the void behind the control unit.
3. Loosen but do not remove the screwed joint on the volume compensation bag.
4. Pull the hose out of the screwed joint, and remove the volume compensation bag.
5. Unpack the new volume compensation bag, loosen but do not remove the screwed joint.
6. Push the hose into the screwed joint as far as the stop, and carefully tighten the screwed joint by hand.
7. Hold the volume compensation bag by the T-piece, and carefully push it into the void behind the control unit.
8. Replace the top screw connection on the activated carbon filter.

12.5.2 Replacing the activated carbon filter

1. Unscrew the top screw connection (7) from the activated carbon filter (1).
2. Remove the activated carbon filter with valve support (2) from the two retaining clamps.
3. Dispose of the activated carbon filter in a professional way.
4. Detach the valve support (2) from the bottom screw connection (3).
5. Unfasten the bottom screw connection (3) and retain it for the new filter.
6. Remove the O-ring, and fit a new O-ring (4).
7. Unfasten the connection piece (6) for the top valve from the valve support. Unscrew and remove the valve, and screw in a new valve (5). Fasten the connection piece again. Observe the flow direction.
8. Unfasten the bottom valve from the valve support. Unscrew and remove the valve, and screw in a new valve (5).
9. Screw the bottom screw connection (3) into the new activated carbon filter and replace the PTFE sealing tape, if necessary.
10. Position the valve support (2) on top of the screw connection.
11. Insert the activated carbon filter with valve support back into the filter support, and fasten the two clamps again.
12. Screw the top screw connection (7) onto the new activated carbon filter.

12.6 OCD-162-30, -60: volume compensation bag and adsorption filter

Warning

Risk of burns due to the escape of chemicals when the hoses are disconnected.

Risk of gas poisoning due to the escape of ClO_2 from the dismantled gas hose.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Do not hold your face over the volume compensation bag or adsorption filter.

12.6.1 OCD-162-30: spare parts sets

Pos.	Spare parts	Order no.
9	2 valves	95717914
12	O-ring	
16	Refill pack of adsorbent 5.07 lbs. (2.3 kg)	
-	1 volume compensation bag	

12.6.2 OCD-162-60: spare parts sets

Pos.	Spare parts	Order no.
9	2 valves	95717918
12	O-ring	
16	Refill pack of adsorbent 5.07 lbs. (2.3 kg)	
-	2 volume compensation bags	

12.6.3 Replacing the volume compensation bag

The volume compensation bag of the OCD-162-30 as well as both volume compensation bags of the OCD-162-60 are situated in the system frame, below the ClO_2 dosing pump.

TM04 0960 1709

Fig. 45 Replacing the volume compensation bag

1. Secure the screw-in part at the volume compensation bag with a 0.66 in. (17 mm) open-ended spanner and unfasten the union nut.
2. Replace the volume compensation bag by a new one. Insert the connection hose into the screw-in part until the stop.
3. In order to avoid damages of the volume compensation bag, secure the screw-in part with a 0.66 in. (17 mm) open-ended spanner and fasten the union nut entirely by hand.

12.6.4 Replacing the adsorbent

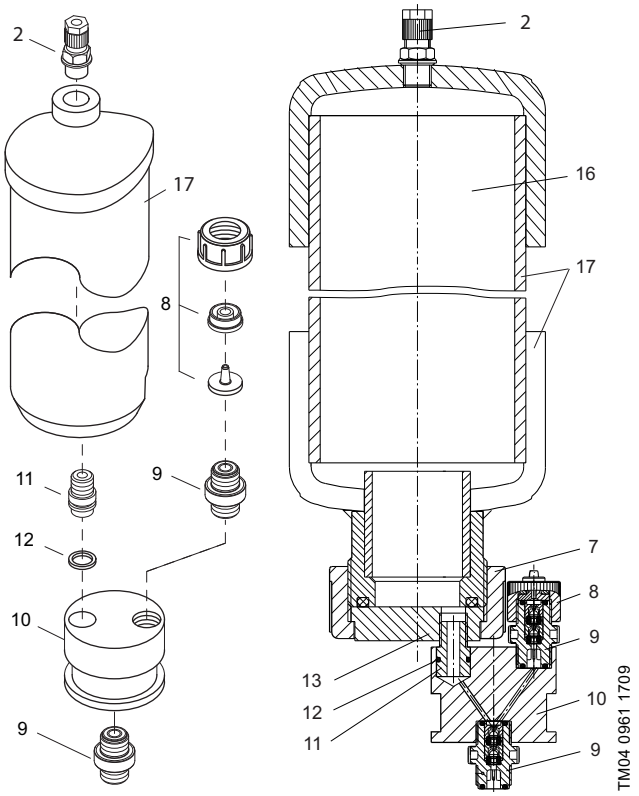

Fig. 46 OCD-162-30, -60

Pos.	Description
2	Top screw connection
7	Union nut
8	Connection piece
9	Valve
10	Valve support
11	Bottom screw connection
12	O-ring at the bottom of the adsorption filter body
13	Pressure disc
16	Adsorbent
17	Adsorption filter

1. Unscrew the top screw connection (2) from the adsorption filter (17).
2. Loosen the adsorption filter retaining clamp by pulling it downwards.
3. Move the adsorption filter slightly upwards, and remove it in direction to the front.
4. Turn the adsorption filter by 180 °, and unscrew the union nut with pressure disc.
5. Empty the adsorption filter and dispose of the adsorbent in a professional way.
6. Fill in one pack of new adsorbent, and screw on the union nut with pressure disc again.
7. Insert the refilled adsorption filter. Introduce the bottom screw connection (11) into the valve support (10).
8. Lock the adsorption filter with the retaining clamp.
9. Screw the top screw connection (2) onto the refilled adsorption filter.

12.6.5 Replacing the lower O-ring

1. Detach the valve support (10) from the bottom screw connection (11).
2. Remove the O-ring, and fit a new O-ring (12).

12.6.6 Replacing the valves in the valve support

1. Unfasten the connection piece (8) for the top valve from the valve support.
2. Unscrew and remove the valve (9).
3. Screw in a new valve.
4. Fasten the connection piece again.
5. Unfasten the bottom valve from the valve support.
6. Unscrew and remove the valve (9).
7. Screw in a new valve.
8. Dispose of the old O-rings, valves and old adsorbent.

12.7 Maintenance release

Warning

Check the tightness of all seals, valves, hose connections and chemical lines.

After completion of the maintenance work, confirm the maintenance.

"main menu> service > maint. release".

13. Repair

This section includes the information of how to replace complete components of the system. The order number of the spare parts you find in section *17. Overview spare parts, maintenance kits and accessories*.

Warning

Only authorized service staff may carry out repairing.

Incorrect repairing may result in personal injury and damage to property.

Switch off the system, and disconnect it from the power supply before carrying out repairing.

Warning

Risk of gas poisoning due to escape of gas from a damaged volume compensation bag.

Do not reach into the void behind the control unit.

Warning

Risk of burns due to the escape of chemicals from faulty seals, leaky valves, hose connections and lines.

Before starting work, put on protective clothing: gloves, face mask, protective apron.

Flush the system before starting repairing, see section *12.1 Flushing*.

Note

For details on repairing the pumps or the measuring cell, see installation and operating instructions of the part.

The following sections describe the complete replacement of components.

13.1 Solenoid valve

1. Prepare a 2.64 gal (10 liter) bucket (OCD-162-5, -10) or 6.60 gal (25 liter) bucket (OCD-162-30, -60).
2. Close the dilution water extraction device.
3. Unscrew the hose connection at the bottom of the solenoid valve, and let the water flow down into the bucket.
4. Unscrew the hose connection from the top of the solenoid valve.
5. Unfasten the two screws on the enclosure, and remove the enclosure with the cable connection socket from the system.
6. Unfasten the screw on the cable connection socket, remove the cable connection socket from the plug, and remove the solenoid valve.
7. Take the new solenoid valve, position it on the cable connection socket and screw into place.
8. Screw the valve enclosure back onto the frame.
9. Remove the old strainer and old O-ring from the bottom of the hose connection. Insert the new strainer and the new O-ring.
10. Screw the hose connection back into place.
11. Open the dilution water extraction device.
12. After two minutes, check the top end of the hose connection for leaks.
13. If it is tight, screw down the top hose connection again.
14. Pour the contents of the bucket down the drain. Dispose of the old O-ring and strainer.

13.2 Suction lance

1. Untwist the screw cap from the suction lance in the chemical container.
2. Carefully pull the suction lance out of the container, and immediately insert it into the drip pipe in the collecting tray.
3. If any drips fall onto the container or ground, dilute with water and rinse away immediately.
4. Unscrew the signal cable from the control unit, see section *16. Terminal connections*.
5. Unscrew the suction hose from the pump.
6. Screw the suction hose of the new suction lance onto the pump.
7. Insert the new suction lance into the chemical container, and fasten the screw cap.
8. Connect the signal cable to the control unit, see section *16. Terminal connections*.

13.3 Multi-function valve

Preparation

1. Read the installation and operating instructions for the multi-function valve.
2. Put on protective clothing.
3. Flush the system, see section *7.5 Flushing*.
4. Shut off the main water line.
5. Have ready an empty bucket with ClO_2 breakdown substance.

Replacing the multi-function valve

1. Unfasten the screw connection between the multi-function valve and the discharge side of the dosing pump.
2. Carefully detach the multi-function valve from the dosing pump, and hold it over the bucket together with the lines.
3. Unscrew the screw connection on the overflow line and the screw connection on the dosing line. Allow any residual ClO_2 solution to drain into the bucket, and remove the two lines.
4. Screw the new multi-function valve onto the discharge side of the dosing pump.
5. Screw down the overflow line and the dosing line.
6. Pour the contents of the bucket down the drain, and rinse with water.
7. Dispose of the old multi-function valve.
8. When a new ClO_2 batch is produced, manually vent the dosing pump. See the installation and operating instructions for the multi-function valve.

13.4 Control unit

Warning

Danger of death from electric shock.

Shut down the system and switch off the main switch before removing the control unit.

The control unit is fastened to the frame with three screws. One screw is at the back in the top center, two screws are on the bottom right and left in a void next to the cable connections.

Replacing the control unit

1. Switch off the main switch.
2. Unfasten the cover of the control unit.
3. Unfasten all cables from their connections and pull them out of the glands.
4. Unscrew the two screws on the bottom right and left.
5. Lift the control unit off the screw in the top center.
6. Hook the new control unit onto the screw in the top center.
7. Fasten the bottom right and left screws again.
8. Reconnect the cables as described
9. Screw the cover back into place.
10. Switch on the main switch again.
11. If necessary, make a new set-up.

13.5 Level indicators

Replacing the level indicator in the reaction tank

1. Unscrew the cables from the control unit. See section *16. Terminal connections*.
2. Unfasten and pull out the level indicator of the reaction tank.

Note Do not bend the new level indicator when inserting it.

3. Insert the new level indicator with O-ring, and screw into place.

Replacing the level indicator in the internal batch tank

1. Unscrew the cables from the control unit. See section *16. Terminal connections*.
2. Unfasten and pull out the level indicator of the internal batch tank.

Note Do not bend the new level indicator when inserting it.

3. Insert the new level indicator with O-ring, and screw into place.

13.6 Reaction tank with internal batch tank

13.6.1 OCD-162-5, -10

1. Unscrew the hose connections for water, HCl, $NaClO_2$ and gas at the top of the reaction tank, and remove the hoses.
2. Unscrew and pull out the level indicator at the top of the reaction tank together with the O-ring.
3. Unscrew and pull out the level indicator at the bottom of the internal batch tank with the O-ring.
4. Unscrew all hose connections from the bottom of the internal batch tank.
5. Unscrew and pull out the drain valve with the O-ring.
6. Remove the reaction tank with internal batch tank from the retaining clamps.
7. Position the new reaction tank with internal batch tank and fix it with the retaining clamps.
8. Position the drain valve at the bottom of to the new internal batch tank, and screw into place.
9. Position the level indicator at the top of the new reaction tank, and screw into place.
10. Position the level indicator at the bottom of the new internal batch tank, and screw into place.
11. Fasten the connections and the gas hose to the new reaction tank.
12. Attach the overflow line connection to the bottom of the new internal batch tank.
13. Attach the connection for the dosing pump supply line.
14. Dispose of the old reaction tank with internal batch tank in a professional way.

13.6.2 OCD-162-30

1. Unfasten the control unit, and slide it to the right side.
2. Unscrew the hose connections for water, HCl, $NaClO_2$ and gas at the top of the reaction tank, and remove the hoses.
3. Unscrew and pull out the level indicator at the top of the reaction tank with the O-ring.
4. Unscrew and pull out the level indicator at the bottom of the internal batch tank with the O-ring.
5. Unscrew all hose connections from the bottom of the internal batch tank.
6. Unscrew and pull out the drain valve with the O-ring.
7. Unscrew the reaction tank with internal batch tank from the system frame and remove it.
8. Position the new reaction tank with internal batch tank and fix it with the screws to the system frame.
9. Position the drain valve at the bottom of to the new internal batch tank, and screw into place.
10. Position the level indicator at the top of the new reaction tank, and screw into place.
11. Position the level indicator at the bottom of the new internal batch tank, and screw into place.
12. Fasten the connections and the gas hose to the new reaction tank.
13. Attach the overflow line connection to the bottom of the new internal batch tank.
14. Attach the connection for the dosing pump supply line.
15. Slide the control unit back into place, and fasten the screws.
16. Dispose of the old reaction tank with internal batch tank in a professional way.

13.7 Reaction tank of OCD-162-60

1. Unfasten the control unit, and slide it to the right side.
2. Unscrew the hose connections for water, HCl, $NaClO_2$ and gas at the top of the reaction tank, and remove the hoses.
3. Unscrew and pull out the level indicator at the top of the reaction tank with the O-ring.
4. Unscrew all connections between the reaction tank and the internal batch tank.
5. Unscrew the reaction tank from the system frame and remove it.
6. Position the new reaction tank and fix it with the screws to the system frame.
7. Position the level indicator at the top of the new reaction tank, and screw into place.
8. Fasten the connections and the gas hose to the new reaction tank.
9. Reconnect the reaction tank to the internal batch tank.
10. Slide the control unit back into place, and fasten the screws.
11. Dispose of the old reaction tank in a professional way.

13.8 Internal batch tank of OCD-162-60

1. Unscrew and pull out the level indicator at the bottom of the internal batch tank with the O-ring.
2. Unscrew all hose connections from the bottom of the internal batch tank.
3. Unscrew and pull out the drain valve with the O-ring.
4. Unscrew all connections between the internal batch tank and the reaction tank.
5. Unscrew the internal batch tank from the system frame and remove it.
6. Position the new internal batch tank and fix it with the screws to the system frame.
7. Position the drain valve at the bottom of to the new internal batch tank, and screw into place.
8. Position the level indicator at the bottom of the new internal batch tank, and screw into place.
9. Attach the overflow line connection to the bottom of the new internal batch tank.
10. Attach the connection for the dosing pump supply line.
11. Reconnect the internal batch tank to the reaction tank.
12. Dispose of the old internal batch tank in a professional way.

13.9 Dosing pumps

See the installation and operating instructions for the respective dosing pump.

13.10 Measuring cell

See the installation and operating instructions for the respective measuring cell.

14. Decommissioning

This section includes the information of how to decommission hydraulic and electric components. Beside this you find a description of packaging and storing the system.

Warning

Incorrect dismantling may result in serious personal injury and damage to property. The system may only be dismantled by authorized service staff.

Warning

Risk of burns due to the escape of chemicals from dismantled seals, valves, connections, hoses, lines or injection unit.

Flush the system twice in succession before starting to dismantle it.

Do not bring dismantled suction lances into contact, or place them in the same bucket. Always check the label.

Check that the reaction tank and internal batch tank are empty before dismantling them.

Drain the dosing line and put on protective clothing before dismantling it.

Do not use cleaning agents.

Chemicals react with oils, fats and acids, see section *4. Safety instructions*.

Warning

Risk of gas poisoning due to the escape of ClO_2 from the dismantled gas hose, volume compensation bag and activated carbon filter.

Wear protective clothing (gloves, face mask, protective apron) when dismantling the gas hose and the activated carbon filter.

Do not hold your face over the reaction tank, the volume compensation bag or the activated carbon filter.

Note

If the system is to be recommissioned at a later date, remove the hoses and lines very carefully and do not bend them. Tighten nuts by hand only.

Warning

Risk of electric shock from live lines.

Disconnect the system from the power supply before starting to dismantle it.

14.1 Hydraulic components

14.1.1 Dilution water hose

1. Close the dilution water isolating valve, remove and coil up the hose.
2. Remove the cover from the system.
3. Unscrew the screw connection on the solenoid valve, and detach the dilution water hose from the solenoid valve.

14.1.2 Suction lances

1. Unfasten the screw connection on the suction hose from the HCl pump. Place the suction lance and suction hose in a bucket of water. Rinse thoroughly with water.
   Place on a cloth to dry.
2. Unfasten the screw connection on the suction hose from the $NaClO_2$ pump. Place the suction lance and suction hose in the other bucket of water. Rinse thoroughly with water. Place on a cloth to dry.
3. Close the HCl container with the original cover and dispose in a professional way.
4. Close the $NaClO_2$ container with the original cover and dispose in a professional way.

14.1.3 Dosing line

1. Drain the dosing line at the multi-function valve.
2. Detach the dosing line from the multi-function valve. Drain the ClO_2 solution into a bucket.
3. Detach the dosing line from the injection unit. Remove it from the protective pipe and coil it up. Drain the ClO_2 solution into a bucket.
4. Lay out the dosing line in the open air to allow ClO_2 residues to escape.
5. If applicable, detach the dosing line of the external dosing pump from the internal batch tank. Lay out the dosing line in the open air to allow ClO_2 residues to escape.

14.1.4 Volume compensation bag

1. Wear gloves, face mask and protective apron.
2. Squeeze the volume compensation bag with the hands to let gas residues escape via the activated carbon filter or adsorption filter.
3. Unfasten the screw connection between the hose and the volume compensation bag. Detach the hose to let gas residues escape.

14.1.5 Activated carbon filter/adsorbent

1. Put on protective clothing: gloves, face mask, protective apron.
2. Remove the activated carbon filter, see section *12.5.2 Replacing the activated carbon filter* or remove the adsorbent, see section *12.6.4 Replacing the adsorbent*.
3. Dispose the carbon filter/adsorbent in a professional way.

14.1.6 Measuring cell

1. Detach the hose from the sample-water extraction device, and detach it from the measuring cell.
2. Detach the sample-water discharge hose from the measuring cell, and coil it up.

14.1.7 Measuring module

- Detach the two hoses connecting the measuring module to the main line.

14.1.8 Disposal

- Pour the contents of the buckets down the drain. Rinse the buckets thoroughly with water.
- Clean the installation room.

14.2 Electrical components

1. Detach the power supply cable from the main switch.
2. Detach the power supply cable from the control unit.
3. Detach the cable from the water meter.
4. Detach all cables from the measuring cell.
5. Detach the cable from the measuring.

14.3 System frame

1. Get two people to hold the system frame.
2. OCD-162-5 and -10: Unfasten the three fixing screws in the system frame, remove the system from the wall and place it on a working surface.
   OCD-162-30 and -60: Unfasten the four fixing screws on the floor.

Caution Do not kink the cables and hoses.

3. Leave the system and accessories for at least 24 hours before packaging to allow them to dry.

14.4 Packaging for transport

1. After the system frame has dried, place it in its original packaging, add the suction lances and insulating material.
2. Pack the dry hoses in a box.
3. Pack the cables in a box.
4. Place the fixing screws in a bag and store in the box with the cables.
5. For OCD-162-60: Attach the transport protection of the $NaClO_2$ and HCl dosing pumps, see section *8.1 Transport*.
6. If applicable, place the measuring cell and the accessories in the original packaging, add insulating material and seal ready for transport.
7. If applicable, place the measuring module and the installation accessories, cables and hoses in the original packaging, add insulating material and seal ready for transport.
8. Add the installation and operating instructions, and seal the box ready for storage or transport. Include the delivery note.

Warning

For transportation, the OCD-162-030 and OCD-162-060 systems have to be fastened on a pallet with suitable screws.

14.5 Storage

The storage conditions (temperature, humidity, room conditions, etc.) must correspond to the conditions at the installation site, see sections *8.3 Mounting* and *17. Overview spare parts, maintenance kits and accessories*.

14.6 Recommissioning

Warning

When the system is dismantled, the screw connection between the gas hose and the volume compensation bag is disconnected to allow residual gas to escape.

Remember to reconnect the gas hose when reinstalling the system.

When the system is dismantled, the used activated carbon filter or the adsorbent is removed and disposed of.

Remember to fit a new activated carbon filter when reinstalling the system.

15. Disposal

Note

The system and its associated parts must be disposed of in an environmentally sound way. Use appropriate waste collection services. If this is not possible, contact the nearest Grundfos company or service workshop.

The system may only be dismantled by authorized service staff.

The operating company is responsible for ensuring an environmentally friendly disposal.

The system must be flushed before dismantling in order to remove the chemicals from the reaction tank, the internal batch tank, the hoses and the pumps. The dosing line must be placed outdoors to let residual ClO_2 escape.

16. Terminal connections

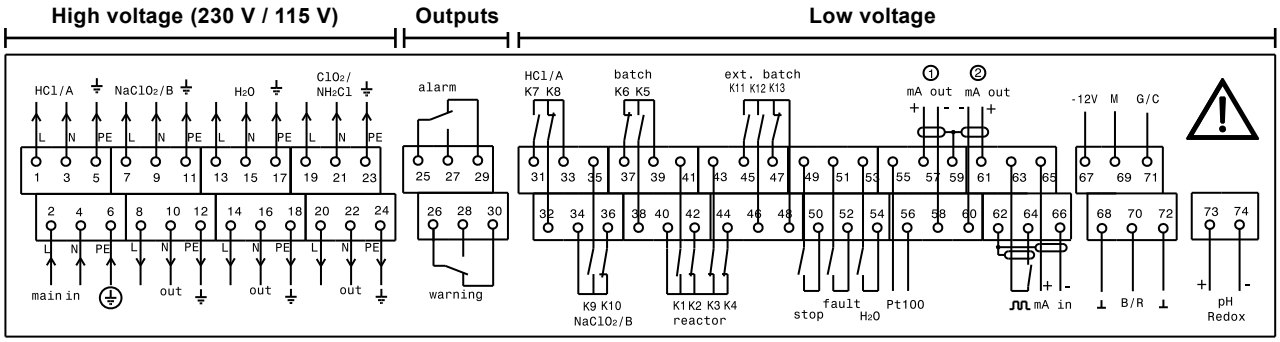

Fig. 47 Terminal connection plan

High voltage (230 V / 115 V)

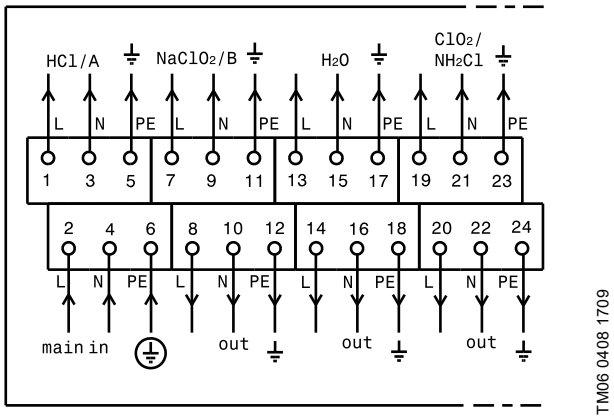

Fig. 48 Terminal connection plan - left section

Terminals and protective earth			Caption	Description	Factory fitted
L	N	PE			
1	3	5	HCl/A	HCl dosing pump	●
2	4	6	main in	power supply cable	-
7	9	11	$NaClO_2$/B	$NaClO_2$ dosing pump	●
8	10	12	out	measuring cell cleaning motor	-
13	15	17	H_2O	solenoid valve	●
14	16	18	out	digital ClO_2 dosing pump	● / -*
19	21	23	ClO_2 / NH_2Cl	mechanical ClO_2 dosing pump	● / -*
20	22	24	out	external device, non-switching	-

* The cable is factory-fitted, if the system is supplied with a ClO_2 dosing pump.

Each of the power supply outputs "out" can be charged with a maximum of 100 VA. If a device with protective earthing conductor is connected, the conductor must be connected correctly at the corresponding terminal.

Color abbreviations according to IEC 60757

IEC 60757	color
BK	black
BN	brown
RD	red
WH	white
GN	green
GY	grey
YE	yellow
BU	blue

Outputs

The outputs are electrically isolated.

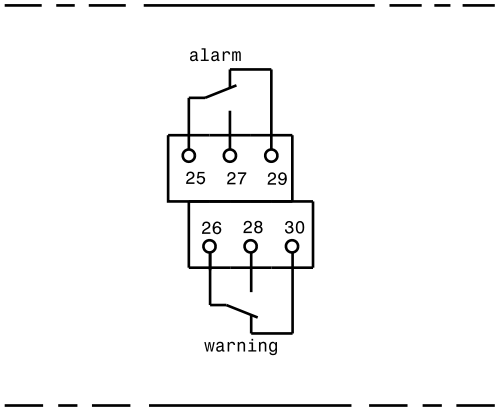

Fig. 49 Terminal connection plan - middle section

Terminals			Caption	Description	Factory fitted
COM	N.O.	N.C.			
25	27	29	alarm	collective alarm relay	-
26	28	30	warning	collective warning relay	-

Low voltage

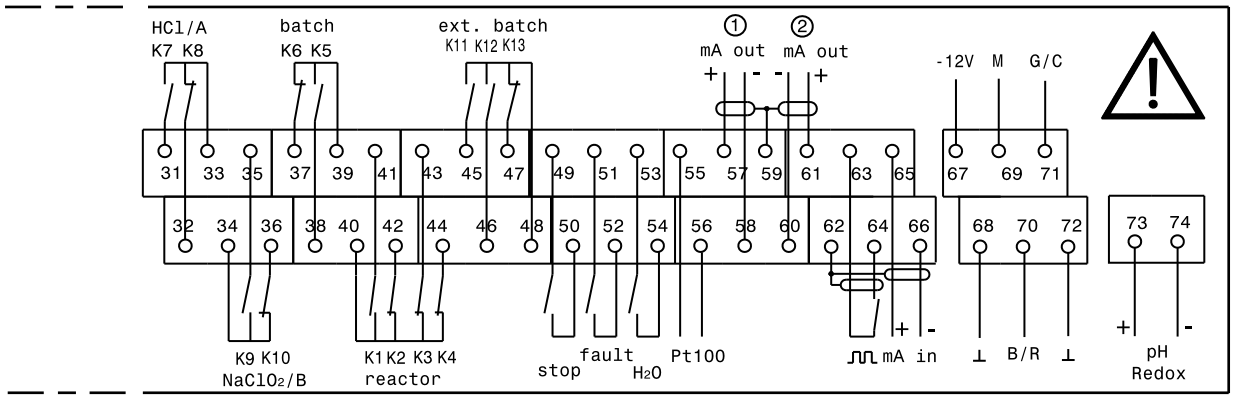

Fig. 50 Terminal connection plan - right section

Terminals	Caption		Description		Factory-fitted
31 (WH)	HCl/A	K7	HCl suction lance	low-level signal	●
32 (GN)		K8		empty signal	●
33 GND (BN)					
35 (WH)	$NaClO_2$/B	K9	$NaClO_2$ suction lance	low-level signal	●
36 (GN)		K10		empty signal	●
34 GND (BN)					
37 (WH)	batch	K6	level indicator internal batch tank	full signal	●
38 (GN)		K5		empty signal	●
39 GND (BN)					
40 GND (BN)	reactor		level indicator reaction tank		●
41 (GY)		K1			●
42 (YE)		K2			●
43 (GN)		K3			●
44 (WH)		K4			●
45	ext. batch	K11	level indicator external batch tank	minimum level	-
46		K12		maximum level	-
47		K13		maximum-maximum level	-
48 GND					-
49, 50	stop		dosing stop input		-
51, 52	fault		failure input		-
53, 54	H_2O		input for sample-water sensor		-
55 (BU), 56 GND (BK)	Pt100		temperature sensor		-
57 + 58 - 59 screen	mA out (1)		current output for digital ClO_2 dosing pump		● / -
61 + 60 - 59 screen	mA out (2)		current output to record the measured ClO_2 concentration		-
62 screen 63 (+13 V) 64 input	⎍⎍		input for water meter with pulse signal		-
65 + 66 - 62 screen	mA in		input for water meter with current signal		-

Terminals	Caption	Description		Factory-fitted
67	-12 V	measuring cell AQC-D6, see *8.8.2 Measuring cell*	-12 V	-
68	⊥		GND	
69	M	measuring cell AQC-D1/-D11, see *8.8.2 Measuring cell*	measuring signal	
70	B/R		reference electrode	
71	G/C		counter-electrode	
72	⊥		GND	
73 + 74 -	pH / Redox	input for pH/ORP measurement		-

17. Overview spare parts, maintenance kits and accessories

17.1 Spare parts OCD-162-5, -10

Spare parts		Description	Version	Order no.
Dosing pump	for HCl	230 V	DDE 10-6	98163454
		115 V		98163456
	for $NaClO_2$	230 V		98163419
		115 V		98163440
	for ClO_2	230 V	DDA, complete	98163484
		115 V		98163486
Suction lance	for HCl	for 7.92 gal (30 liter) container	complete	98163672
		for 55 gal (208.19 liter) container		98163679
	for $NaClO_2$	for 7.92 gal (30 liter) container		98163639
		for 55 gal (208.19 liter) container		98163678
Hose	PTFE 4/6, red	to reaction tank	4.92 ft (1.5 m)	96727507
	PTFE 4/6, blue			96727509
	PTFE 4/6, white	to volume compensation bag		96727482
	PE 6/9	to solenoid valve	32.80 ft (10 m)	96727412
	PVC 6/12			96653571
	PVC 8/11, transparent	to drain valve of internal batch tank	4.10 ft (1.25 m)	95717381
Connection	PVC G 5/8 female/hose set	for suction lances	U2 metric connection set for Europe, PVC, for hoses: 4/6, 6/9, 6/12, 9/12	97691903
	PVDF G 5/8 female/hose set	for dosing line of multi-function valve	U2 metric connection set for Europe, PVDF, for hoses: 4/6, 6/9, 6/12, 9/12	97691904
	G 5/8 female/hose set	for dosing line of multi-function valve, USA	U7 connection set for USA, PVDF, for hoses: 1/8 x 1/4, 1/4 x 3/8, 3/8 x 1/2	97691907
	G 1/4 male for hose 4/6	to input of reaction tank	2 pieces	95717382
Solenoid valve	for dilution water	230 V	without screw connections	95717903
		115 V		95717904
Level indicator	of reaction tank		4 switches	95717905
	of internal batch tank		2 switches	95717906
Reaction tank with internal batch tank		OCD-162-5	complete	95717907
		OCD-162-10		95717911
Drain valve at the internal batch tank			1 piece	95717384
Volume compensation bag			1 piece	95717908
Activated carbon filter			1 piece	95717909

Spare parts		Description	Version	Order no.
Valve at the activated carbon filter		inlet and outlet valve	2 pieces	95717436
Multi-function valve			complete	95704598
Cover			complete	95717438
Control unit	OCD-162-5	230 V	complete	95715737
		115 V	complete	95715738
	OCD-162-10	230 V	complete	95715740
		115 V	complete	95715741
Strainer		for input of solenoid valve	5 pieces	95717437
System frame				98163701
Hose	T-piece for PTFE hose 4/6	to volume compensation bag	1 piece	95714891
	Set of hoses 4/6, with connections	for suction lances	red and blue, 4.92 ft (1.5 m) each	98163781
Connection	pieces between connection for hose and solenoid valve, see fig. 36.	G 5/8 female for hose 6/9: for input of solenoid valve	1 complete set	95727673
		PE hose 1/4 x 3/8: for input of solenoid valve, USA		95727674
		G 5/8 female for hose 4/6 for output of solenoid valve		95727672
	for hoses 6/9 and 6/12	for input of solenoid valve		95717385
	for PE hose 1/4 x 3/8, USA			95717528
	G 3/8 female for hose 4/6	for output of solenoid valve	2 pieces	95717529
	G 5/8 female for hose 4/6	for internal connections	5 pieces	99026031
Fastening set		hose clamps and screws		95717531

17.2 Spare parts OCD-162-30, -60

Spare parts	Description		Version	Order no.
HCl dosing pump	OCD-162-30	230 V	DDE 15-4, complete	98163923
		115 V		98163925
$NaClO_2$ dosing pump		230 V		98163904
		115 V		98163921
ClO_2 dosing pump		220-240 V	DMX 16-10	95715682
		115 V		95715681
		230 V	DDI 60-10	95715632
		115 V		95735144
HCl dosing pump	OCD-162-60	230 V	DMX 35-10	95717388
		115 V	DDE 15-4	98163925
$NaClO_2$ dosing pump		230 V	DMX 35-10	95717389
		115 V	DDE 15-4	98163921
ClO_2 dosing pump		230 V	DMX 35-10	95716872
		115 V		95716873
		230 V	DDI 60-10, complete	95715632
		115 V		95735144
HCl suction lance	for 15.85 gal (60 liter) container		complete	98164260
	for 55 gal (208.19 liter) container			98163679
	for 52.83/264.17 gal (200/1000 liter) container			98164293
$NaClO_2$ suction lance	for 15.85 gal (60 liter) container			98164258
	for 55 gal (208.19 liter) container			98163678
	for 52.83/264.17 gal (200/1000 liter) container			98164291
PTFE 9/12 hose	for internal connection		1.5 m	96727489
PE 6/9 hose	to solenoid valve		10 m	96727412
PVC 6/12 hose				96653571
PVC 8/11 hose	to drain valve of internal batch tank		1.25 m	95717381
PVC G 5/8 female/hose set	for suction lances		U2 metric connection set for Europe, PVC, for hoses: 4/6 mm, 6/9 mm, 6/12 mm, 9/12 mm	97691903
PVDF G 5/8 female/hose set	for dosing line of multi-function valve		U2 metric connection set for Europe, PVDF, for hoses: 4/6 mm, 6/9 mm, 6/12 mm, 9/12 mm	97691904
Connection G 5/8 female for hose 1/4 x 3/8	for dosing line of multi-function valve		U7 connection set USA, PVDF, for hoses 1/4",3-8" and 1-2"	97691907
Connection G 1/4 male for hose 4/6	from output of reaction tank		2 pieces	95717382
Solenoid valve for dilution water	230 V		without screw connections	95717444
	115 V			95717445
Level indicator of reaction tank	OCD-162-30		4 switches	95717446
Level indicator of internal batch tank			2 switches	95717447
Reaction tank with internal batch tank			complete	95717448

Spare parts	Description		Version	Order no.
Level indicator of reaction tank	OCD-162-60		4 switches	95717455
Level indicator of internal batch tank			2 switches	95717456
Reaction tank			complete	95717457
Internal batch tank				95717458
Drain valve at the internal batch tank			1 piece	95717384
Volume compensation bag			1 piece	95717449
Adsorption filter			1 piece	95717450
Valve at the adsorption filter	inlet and outlet valve		2 pieces	95717436
Multi-function valve			complete	95704598
Cover				95717438
Foot cover				95717443
Control unit	OCD-162-30	230 V	complete	95715743
		115 V		95715744
	OCD-162-60	230 V		95715745
		115 V		95715746
Strainer	for input of solenoid valve		5 pieces	95717437
System frame				95717451
Foot				95717452
Hose PTFE 4/6, white	to volume compensation bag		4.92 ft (1.5 m)	96727482
T-piece for PTFE hose 4/6			1 piece	95714891
Connection pieces between connection for hose and solenoid valve, see fig. 37	G 5/8 male/G 1/4 male: for input of solenoid valve		1 complete set	95723465
	G 1/4 male/G 5/8 male: for output of solenoid valve			95723463
Connection for PE hose 6/9	for input of solenoid valve			95717385
Connection for PE hose 1/4 x 3/8, USA				98165337
Isolating valve	for dosing line		2 pieces	98165354
Connection G 5/8 female for hose 9/12	for internal connections		5 pieces	98165381
Fastening set	hose clamps and screws			95717459
Pipe elbow	at input of reaction tank			95717386

17.3 Maintenance kits

OCD-162-5	Order no.
Dosing pump DDE 6-10 (230 V / 115 V)	97751479
Dosing pump DDA 7.5-16 (230 V / 115 V)	98359993
Solenoid valve (230 V / 115 V)	95702990
O-rings for reaction tank and internal batch tank	95702992
Pair of Isolating valves (11.60 psi (0.8 bar), installed in the suction lance)	98165354
Activated carbon filter and volume compensation bag	95702994
Complete kit with dosing pump service parts for DDA 7.5-16	99136353
Complete kit without dosing pump	99136354

OCD-162-10	Order no.
Dosing pump DDE 6-10 (230 V / 115 V)	97751479
Dosing pump DDA 7.5-16 (230 V / 115 V)	98359993
Solenoid valve (230 V / 115 V)	95702990
O-rings for reaction tank and internal batch tank	95702992
Pair of Isolating valves (11.60 psi (0.8 bar), installed in the suction lance)	98165354
2 activated carbon filters and 2 volume compensation bags	95705995
Complete kit with dosing pump service parts for DDA 7.5-16	99136355
Complete kit without dosing pump	99136356

OCD-162-30	Order no.
Dosing pump DDE 15-4 (230 V / 115 V)	97751479
Dosing pump DDI (230 V / 115 V)	95715695
Dosing pump DMX (230 V)	95715694
Solenoid valve (230 V / 115 V)	95717912
Pair of Isolating valves (11.60 psi (0.8 bar), installed in the suction lance)	98165354
O-rings for reaction tank	95717913
Adsorption filter and volume compensation bag	95717914
Complete kit with dosing pump service parts for DMX	98162637
Complete kit with dosing pump service parts for DDI	98162644
Complete kit without dosing pump	98162647

OCD-162-60	Order no.
Dosing pump DMX (230 V / 115 V)	95715693
Dosing pump DDI (230 V / 115 V)	95715695
Solenoid valve (230 V / 115 V)	95717912
Pair of isolating valves (11.60 psi (0.8 bar), installed in the suction lance)	98165354
O-rings for reaction tank	95717913
Adsorption filter and 2 volume compensation bags	95717918
Complete kit with dosing pump service parts for DMX (230 V)	95717919
Complete kit with dosing pump service parts for DDI	95717920
Complete kit without dosing pump	95717921

17.4 Accessories

Prior to installation, the operator must purchase the following accessories according to the product numbers in the OCD-162 data booklet.

Accessories	Available from Grundfos
Protective clothing	●
Plastic buckets	-
Sodium thiosulfate	●
Container with $NaClO_2$ (diluted concentration of 7.5 % by weight in accordance with EN 938)	-
Container with HCl (diluted concentration of 9 % by weight in accordance with EN 939)	-
Two collecting trays for the chemical containers	●
Inductive or ultrasonic water meter, if necessary	●
Water meter connection cable, if necessary	●
• Tapping sleeve	-
• Extraction device	●
• Connection for dilution water hose	●
• Sample-water filter; in case of insufficient water quality	●
For main water line	
• Tapping sleeve for injection unit	-
• Two tapping sleeves for extension module, if necessary	-
• Tapping sleeve for sample-water extraction	-
Hoses	
• Hose between dilution water extraction device and solenoid valve	●
• Dosing line between dosing pump and injection unit	●
Measuring cell hoses	
• Hose between measuring cell and sample-water extraction device	●
• Hose between measuring cell and drain	●
For measuring module, if installed	
• Hose between measuring module and main water line and hose back to measuring module	●
• Protective pipe for dosing hose	-
• Main switch	-
Cables	
• System power supply cable	-
• Power cable for measuring module, if necessary	-

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