



**Oxiperm® C 164**  
**Fully automatic chlorine dioxide**  
**processing plant**  
**164-005D, -010D,-030D,**  
**-120D, -220D, -350D,**  
**-700D, -1000D, -1500D,**  
**-2000D**

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**Service manual**



## **Imprint**

**Oxiperm® C 164**  
**Fully automatic chlorine dioxide**  
**processing plant**  
**164-005D,-010D,-030D,-120D,-220D,-350D,-700D,-1000D,-1500D,-2000D**

**Service manual**

**Version 3.0**

Issued by:

ALLDOS Eichler GmbH  
Reetzstraße 85 • 76327 Pfinztal (Söllingen)  
Postfach 1160 • 76317 Pfinztal Germany  
Tel. ++49 (0) 72 40 61-0 / Fax. ++49 (0) 72 40 61-177  
E-Mail: alldos.de@alldos.com  
Internet: <http://www.alldos.com>

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## Installation data



**NOTE**

***Please fill in this form following commissioning. It will help you and your ALLDOS servicing partner to adjust the unit during subsequent corrections.***

*Owner:*

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*ALLDOS customer No.:*

---

*Contract No.:*

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*Order No. of unit:*

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*Serial No. of unit:*

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*Put into service on:*

---

*Location of unit:*

---

*Used for:*

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## Installation diagram

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## 1 General



### NOTE

*In accordance with the regulations for the prevention of accidents GUV 8.15 and VGB 65 § 19 (2), the safety of the chlorine dioxide systems must be checked by an expert on a regular basis, at least once a year and before each start-up.*

*These checks can be carried out by the service centre within the framework of a 6 month or annual maintenance check.*



### WARNING!

*Before any maintenance work is carried out, i.e. if parts and gaskets are replaced, the whole installation must be flushed with water.*

*When maintenance work is carried out, any remains of chemicals must be removed.*

*When working with acids or lyes, ensure that the necessary protective clothing is worn.*

*Maintenance and repair work may only be carried out by authorised qualified personnel.*

### 1.1 Spare parts set

Each spare parts set includes the following parts:

- Spare parts sets for the dosing pumps (diaphragm, valves, O-rings)
- Flat gaskets for connection of solenoid valve or flow limiter
- O-rings for: Bypass line DN20, impeller counter, circulating pump
- Float bodies and O-rings for dosing controller
- Valve unit for the reactor (3 valves for each)
- Ball check DN20 for the bypass line

## 2 Preparing the installation for maintenance

For maintenance work which involves replacing components, the dosing pumps for HCl and NaClO<sub>2</sub> and the reactor must be flushed with demineralised water and the bypass line with process water, in order to avoid direct contact with chemical residues. For dosing pumps with a calibration system (M208), ensure that the chemicals in the pre-lifting chamber are dosed first.

### 2.1 Systems with M208 dosing pumps and a calibration system

For dosing pumps M208 with a calibration system, ensure that the pre-lifting chamber is emptied first.

- Deactivate the installation via the display.
- Remove the suction lines from the chemical containers and place separately in an empty container.
- Push the float switches of the suction lines upwards, in order to not produce any error messages.
- Acknowledge any error messages (pre-empty signals and empty signals) for suction lines, which are caused by the float switches.
- Switch to manual mode on the display
- Set installation capacity to 100%
- Activate installation
- Set stroke setting for dosing pumps to 100%
- Remove cover from pre-lifting chambers

The chemicals can now be dosed from the calibration system. The installation continues to run until no more liquid is left in the pre-lifting chamber.

- Deactivate installation
- Place suction lines in a container that has been filled with demineralised water, or fill the empty container with demineralised water.



**NOTE** *Push float switches of the suction lines upwards, in order to not produce any error messages and, if necessary, acknowledge any error messages*

- Switch to service mode on the display
- Switch to start-up mode
- Activate start-up mode
- Set stroke setting for dosing pumps to 100%

The dosing pumps and reactor can now be flushed with demineralised water.



**NOTE** *If the pre-lifting chamber is emptied so that the dosing head has air in it, and thereby produces a dosing controller error message, then the start-up operation must be stopped in order to deaerate the suction lines and dosing heads. Once this has been done, the start-up operation can be resumed.*

Once the start-up operation has finished, the bypass line then has to be flushed with water.

- Switch to deaeration mode on the display
- Switch bypass on and flush for approximately 3-5 minutes
- Switch bypass off

## 2.2 Systems with M221 dosing pumps

For dosing pumps M221, there is no pre-lifting chamber, which has to be emptied first.

- Deactivate installation via display.
- Remove suction lines from the chemical containers and place separately in a container that has been filled with demineralised water.
- Push float switches of the suction lines upwards, in order to not produce any error messages.
- Error messages (pre-empty signals and empty signals) for suction lines, which are caused by the float switches.



**NOTE**

***Push float switches of the suction lines upwards, in order to not produce any error messages and, if necessary, acknowledge any error messages***

- Switch to service mode on the display
- Switch to start-up mode
- Activate start-up mode
- Set stroke setting for dosing pumps to 100%



**NOTE**

***If there is air in the suction line, this will produce a dosing controller error message. Stop the start-up operation and deaerate the suction lines and dosing heads. Once this has been done, the start-up operation can be resumed.***

The dosing pumps and reactor can now be flushed with demineralised water. Once the start-up operation has finished, the bypass line then has to be flushed with water.

- Switch to deaeration mode on the display
- Switch bypass on and flush for approximately 3-5 minutes
- Switch bypass off

### 3 Tests every 6 months

During these tests, the following functions or components are checked, and if necessary cleaned or replaced.

#### 3.1 Dosing tubes for HCl and NaClO<sub>2</sub>

Here, the dosing tubes between the dosing pump and reactor inlet are checked for wear, brittleness or discolouration which can be caused by possible leaking reactor valves. These are replaced if necessary.

##### Wear/Brittleness

- Replace dosing tubes

##### Discolouration

- Replace dosing tubes
- Replace reactor valves



##### NOTE

*If the hose connections should show signs of discolouration, caused by possible leaking reactor valves, then they must be replaced.*

##### Spare hoses

(includes: 2x connection screws DN4 or DN8; 1.5m hose DN4 or DN8)

Order No.	553-1555	Dosing tube DN4 (Colour: red) for HCl
Order No.	553-1556	Dosing tube DN4 (Colour: blue) for NaClO <sub>2</sub>
Order No.	553-1557	Dosing tube DN8 (Colour: transparent) for HCl or NaClO <sub>2</sub>

#### 3.2 Checking the solenoid valves

Here, the function of existing solenoid valves is checked. (depending on option)

- Solenoid valves of the bypass line
- Solenoid valves for suction of housing
- Solenoid valves for suction of batch container



##### NOTE

*If a solenoid valve is faulty, it must be replaced.*

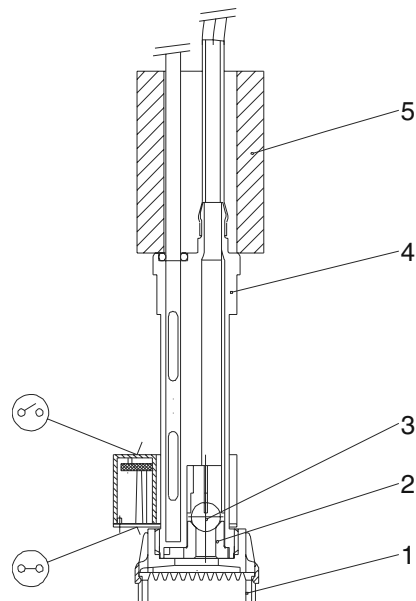
##### Spare valves

45.10245-1/2	Solenoid valve 230V, 50Hz
45.10249-1/2	Solenoid valve 115V, 60Hz



### 3.3 Checking the foot valves and float switch of the suction lines

Here, the foot valves are checked for contamination along with the operation of the float switches.



- Check the connection to the suction line
- Check mesh bottom plate (pos.1), seat (pos.2) and balls (pos.3) for contamination, replace if necessary
- Check the operation of the float switch

#### Spare parts for suction line

Pos.	Part No.	Designation	Installation
1	10.4559-401	Union nut, grey PVC	164-005D to 164-2000D
2	10.7299-400	Valve seat, grey PVC	164-005D to 164-2000D
3	10.6564	Ball, ceramics	164-005D to 164-2000D
4	10.7372-436	Float switch, PP	164-005D to 164-2000D
5	10.2254-400	Weighting stone, KER 1101	164-005D to 164-2000D

### 3.4 Check information signs

Here, the legibility of all installation signs or labels is checked.

- "Warning" label
- "HCl" label on dosing pump
- "NaClO<sub>2</sub>" label on dosing pump



**NOTE** *If the labels are illegible or damaged, they must be replaced.*

#### Label

Part No.	Designation	Installation
12.6029-300	"Warning" label	all
12.6028-410	"HCl" label	all
12.6028-400	"NaClO <sub>2</sub> " label	all

### 3.5 Checking the dosing flow of the pumps for HCl and NaClO<sub>2</sub>

Here, the dosing pumps are calibrated, in order to check the set dosing volume. If these deviate from the specified settings, the dosing pumps must be reset and redosed.

Settings, see table

System	ClO <sub>2</sub> generation performance *		Max. system pressure		Consumption of components *		Dilution water requirement for bypass system			
	At 6 bar back-pressure		50 Hz	60 Hz <sub>1</sub>	HCl	NaClO <sub>2</sub>	Solenoid valve <sub>2</sub> (standard)	Bypass pump <sub>3</sub> Internal/external	In batch mode	
	(g/h)	(l/h)							Min. <sub>4</sub>	Max. <sub>5</sub>
164-030D	30	421	10	10	0,7	0,7	420	420	6	14
164-120D	120	426	9	6	2,9	2,9	420	420	25	55
164-220D	220	430	7	7	5,2	5,2	420	420	45	100
164-350D	350	437	9	9	8,3	8,3	420	420	70	160
164-700D	700	933	9	9	16,5	16,5	900	900	140	320
164-1000D	1000	948	9	9	24	24	900	900	200	450
164-1500D	1500	970	9	9	35	35	900	900	300	680
164-2000D	2000	996	9	6	48	48	900	900	400	900

### 3.6 Relay connection for control system

Here, all relay connections are checked. To check on the display, switch to service mode/test mode/relay. The following relays can be checked:

- Dosing pump NaClO<sub>2</sub>
- Dosing pump HCl
- Bypass line (solenoid valve, circulating pump)
- Suction of housing (solenoid valve)
- Electrically isolated output - Auto/Manual
- Electrically isolated output - error messages
- Electrically isolated output - pre-empty signals
- Electrically isolated output - dry-run batch container
- Suction of batch container (solenoid valve)

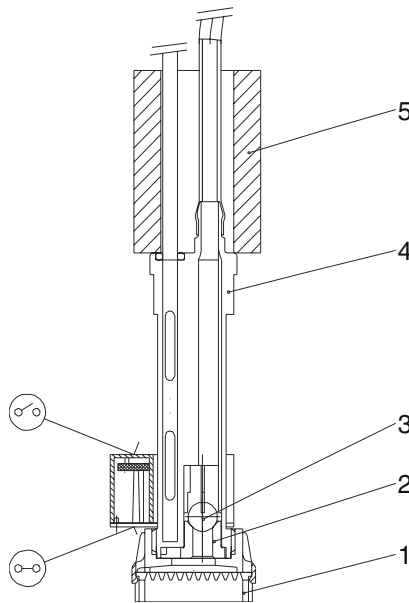
## 4 Maintenance and tests every 12 months

During these maintenance tests, the following components are checked, and if necessary cleaned or replaced.

### 4.1 Tests

- Float switches and foot valves
- Solenoid valve or circulating pump of the bypass line
- Hose connections and pipe lines
- Relay connection for control system

#### 4.1.1 Float switches and foot valves



- Check the connection to the suction line
- Check mesh bottom plate (pos.1), seat (pos.2) and balls (pos.3) for contamination, replace if necessary
- Check the operation of the float switch

### 4.1.2 Solenoid valve or circulating pump

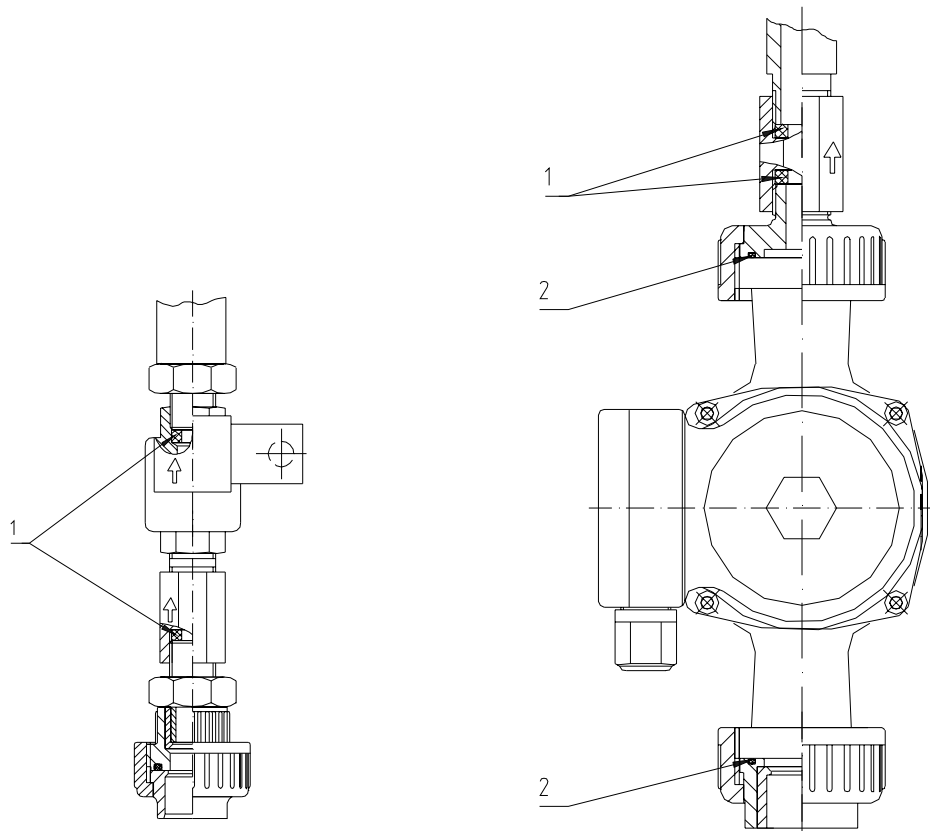
Here, the operation and tightness of the solenoid valve or circulating pump and flow limiter are checked.

- Switch to service mode/start-up mode on the display Bypass water
- Switch bypass on, in order to check the operation of the solenoid valve or circulating pump
- The specified amount of water on the display must be within the set tolerances.
- Check the tightness of the solenoid valve or circulating pump, replace if necessary
- Check connection screws and O-rings (pos. 2) of the circulating pump, replace O-rings if necessary
- Check tightness of flow limiter, replace flat gaskets (pos. 1) if necessary



**NOTE** *Observe mounting position (flow direction)!*

- Switch bypass off



### 4.1.3 Dosing tubes and pipe lines

Here, the dosing tubes between the dosing pump and reactor inlet are checked for wear, brittleness or discolouration which can be caused by possible leaking reactor valves. These are replaced if necessary.

#### Wear/Brittleness

- Replace dosing tubes

#### Discolouration

- Replace dosing tubes
- Replace reactor valves



#### NOTE

*If the hose connections should show signs of discolouration, caused by possible leaking reactor valves, then they must be replaced.*

- Checking the return pipes of the dosing pumps
- Check tightness of the bypass line, activate bypass in service mode, if necessary .

#### Spare hoses

(includes: 2x connection screws DN4 or DN8; 1.5m hose DN4 or DN8)

Order No.	553-1555	Dosing tube DN4 (Colour: red) for HCl
Order No.	553-1556	Dosing tube DN4 (Colour: blue) for NaClO <sub>2</sub>
Order No.	553-1557	Dosing tube DN8 (Colour: transparent) for HCl or NaClO <sub>2</sub>

### 4.1.4 Relay connection for control system

Here, all relay connections are checked. To check on the display, switch to service mode/test mode/relay. The following relays can be checked:

- Dosing pump NaClO<sub>2</sub>
- Dosing pump HCl
- Bypass line (solenoid valve, circulating pump)
- Suction of housing (solenoid valve)
- Electrically isolated output - Auto/Manual
- Electrically isolated output - error messages
- Electrically isolated output - pre-empty signals
- Electrically isolated output - dry-run batch container
- Suction of batch container (solenoid valve)

## 4.2 Maintenance

- Reactor valves
- Ball check in the bypass line
- Dosing pump for HCl and NaClO<sub>2</sub>
- Suction injector (optional)
- Dosing controller

### 4.2.1 Reactor valves



**NOTE**

***During these maintenance tests, the reactor valves must be fully replaced.***

- Close ball valve on the injection unit or close ball valve following installation
- Open pipe line connections above the reactor and hose connections of the dosing pumps
- Replace reactor valves
- Tighten pipe line connections above the reactor and hose connections of the dosing pumps

**Spare parts for the reactor (valves, 3x)**

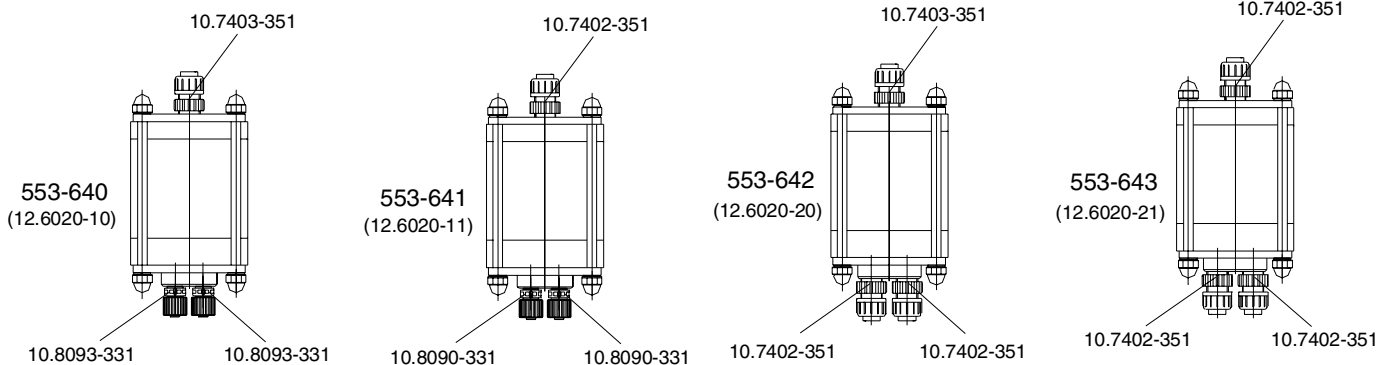
Part No.	Designation	Installation
553-640.1	for system backpressure, lower than 3 bar	164-005D to 164-010D
553-641.1	for system backpressure, higher than 3 bar	164-005D to 164-010D
553-640	for system backpressure, lower than 3 bar	164-030D to 164-220D
553-641	for system backpressure, higher than 3 bar	164-030D to 164-220D
553-642	for system backpressure, lower than 3 bar	164-350D to 164-2000D
553-643	for system backpressure, higher than 3 bar	164-350D to 164-2000D



**NOTE**

***The reactor valves are not identical to the valves of the dosing pumps!***

***Do not interchange valves!***



#### 4.2.2 Ball check in the bypass line

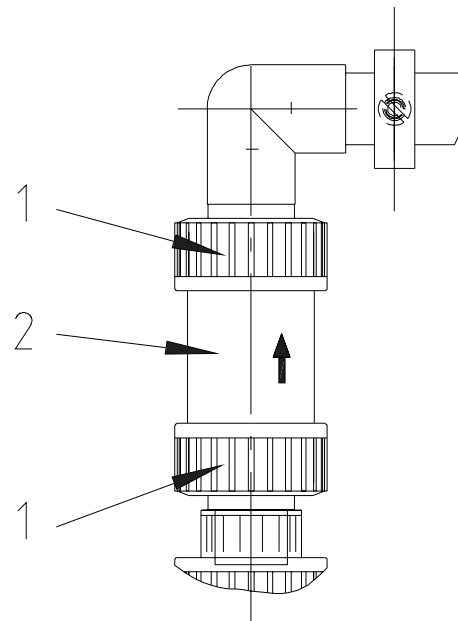
Here, the ball check is replaced in the bypass line.

- Deactivate installation
- Close ball valves before and after installation
- Loosen screws (pos. 1) of the non-return valve
- Replace non-return valve



**NOTE** *Observe mounting position (flow direction)!*

- Tighten screws (pos. 1)





### 4.2.3 Dosing pump for HCl and NaClO<sub>2</sub>

#### Removing the diaphragm

- Insert suction lines of the pumps into a water container and allow the installation to run until the dosing heads of the pumps have been fully flushed with water.
- Loosen deaeration screws by 1 turn, until the deaeration lines are flushed as well. Then switch the installation off.
- Loosen the four dosing head screws
- Remove the dosing head and unscrew the diaphragm in an anticlockwise direction.

#### Assembly

- Insert the intermediate ring in such a way that the relief hole faces downwards.
- Screw in diaphragm
- Switch on pump briefly, until the diaphragm reaches the back dead point.
- Carefully fit the dosing head and gradually tighten the screws in a diagonal sequence, so that the dosing head is not damaged
- Deaerate the pump

#### Dosing pump M208

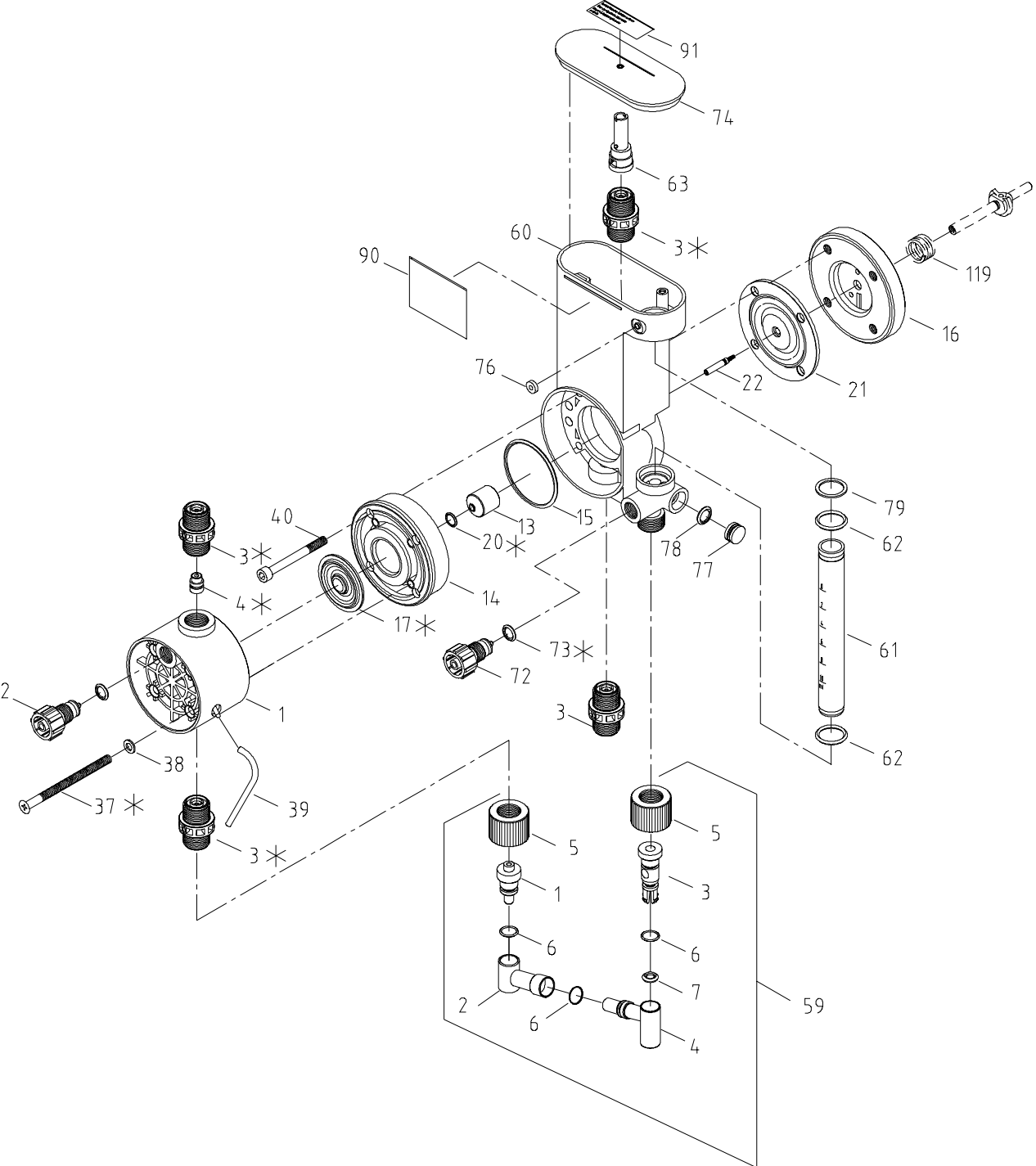
Here, the dosing pumps for HCl and NaClO<sub>2</sub> are serviced. Those parts are replaced which are on the spare parts set.

- Deactivate the installation or dosing pumps

**Spare parts for double head system 164-030/120D Order No. 553-1486**

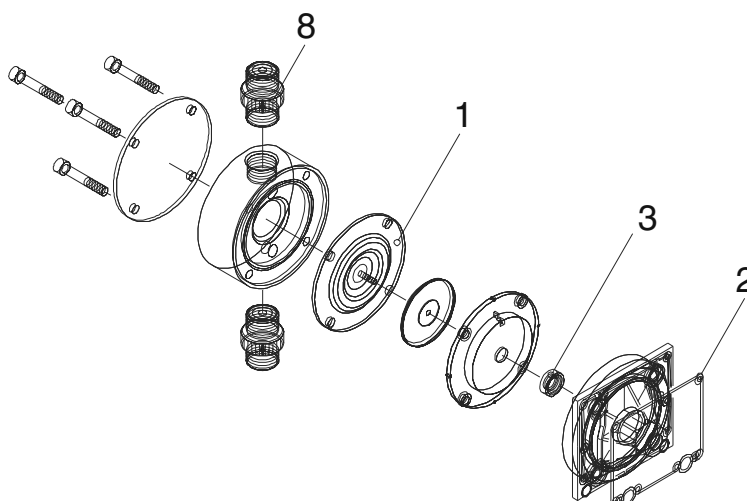
**Spare parts for double head system 164-220D Order No. 553-1488**

Pos.	Part No.	Designation
3	10.8090-331	SD valve DN4
4	10.8092-430	Deaeration cartridge
17	10.8077-302	Dosing diaphragm
20	52.183	O-ring, Viton
37	50.272	Oval head screw
73	52.337	O-ring, Viton



**Dosing pumps M221**

Dosing pumps for 164-350D and 164-700D



**Spare parts for dosing head M221**

**Order No. 553-520-3**

Pos.	Part No.	Designation	Installation
1	10.5503-300	Dosing diaphragm, PTFE/NBR	164-350D and 164-700D
2	54.154-400	Profiled gasket, NBR	164-350D and 164-700D
3	54.125	Grooved ring, Perbunan	164-350D and 164-700D
8	10.7400-321	SD valve DN8	164-350D and 164-700D

Dosing pumps for 164-1000D

**Spare parts for dosing head M221**

**Order No. 553-521-3**

Pos.	Part No.	Designation	Installation
1	10.5940-300	Dosing diaphragm, PTFE/NBR	164-1000D
2	54.154-400	Profiled gasket, NBR	164-1000D
3	54.125	Grooved ring, Perbunan	164-1000D
8	10.7400-321	SD valve DN8	164-1000D

Dosing pumps for 164-1500D

**Spare parts for dosing head M221**

**Order No. 553-522-3**

Pos.	Part No.	Designation	Installation
1	10.6001-300	Dosing diaphragm, PTFE/NBR	164-1500D
2	54.154-400	Profiled gasket, NBR	164-1500D
3	54.125	Grooved ring, Perbunan	164-1500D
8	10.7400-321	SD valve DN8	164-1500D

Dosing pumps for 164-2000D

Spare parts for dosing head M221			Order No.	553-523-3
Pos.	Part No.	Designation	Installation	
1	10.5898-300	Dosing diaphragm, PTFE/NBR	164-2000D	
2	54.154-400	Profiled gasket, NBR	164-2000D	
3	54.125	Grooved ring, Perbunan	164-2000D	
8	10.7400-321	SD valve DN8	164-2000D	

**4.2.4 Suction injection (optional) for enclosure exhausting**

In the case of water which has a high deposit content, deposits can change the nozzle ratio of the injector in such a way that it causes a drop in performance during suction. In this case the nozzle must be cleaned.

**ATTENTION**

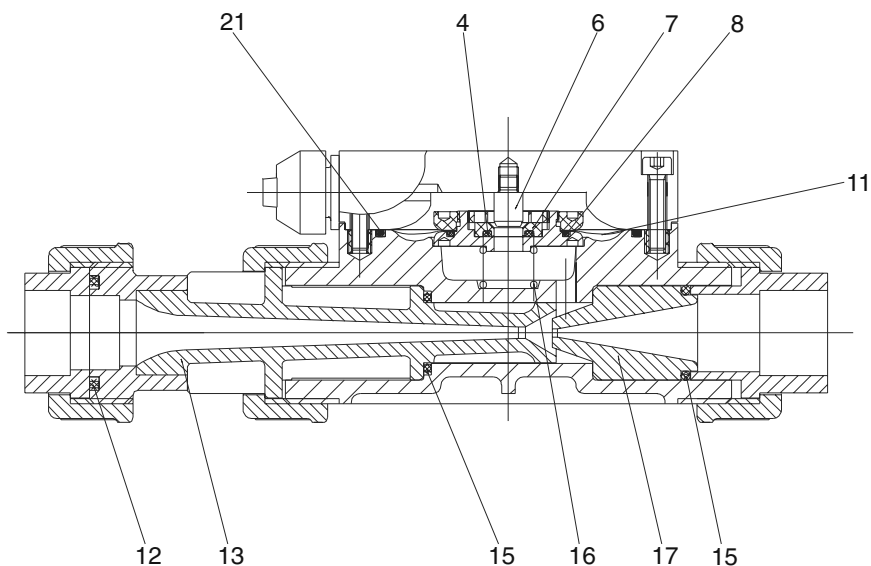
***Do not use sharp objects to clean the nozzles.***

***Diluted hydrochloride acid has proven to be the most suitable cleaning agent.***

***Observe the regulations when using hydrochloric acid!***

For each service, the operation and tightness of the suction injector must be checked, replace the following parts if necessary:

Pos. 12, 15, 11, 8, 7, 6, 4, 21

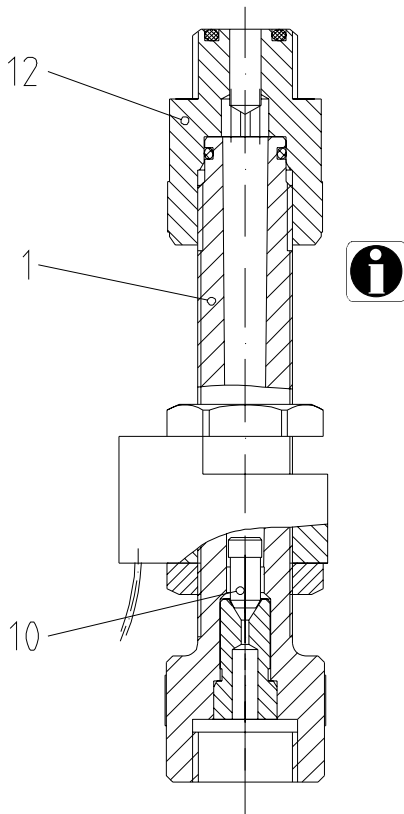
**NOTE**

***The following parts are not included on the spare parts set!***

Pos.	Designation	Part No.	Installation
4	O-ring	52.125	
6	PTFE piston	12.171-4	
7	Seat	12.120-4	
8	O-ring	52.139	
11	Diaphragm	12.312-4	
12	O-ring	52.141	
13	Diffuser B, complete	12.591-42	164-030D,164-120D, 164-220D
	Diffuser C, complete	12.591-43	164-350D,164-700D, 164-1000D,164-1500D, 164-2000D
15	O-ring (2x)	52.123-2	
17	Nozzle B	12.584-42	164-030D, 164-120D, 164-220D
	Nozzle C	12.584-43	164-350D, 164-700D, 164-1000D 164-1500D, 164-2000D
21	O-ring	52.164	

#### 4.2.5 Dosing controller

When the dosing controller is serviced, the float bodies are replaced and if necessary also the O-rings of the connection.



- Deactivate the installation
- Loosen the screws on the dosing tubes
- Unscrew the dosing controller (pos. 1) from the dosing pump
- Unscrew the upper part (pos. 12)
- Replace the float body (pos. 10)

**NOTE** *Observe mounting position!*

- Check O-rings, replace if necessary
- Fit upper part back on
- Fit dosing controller back onto the pump
- Tighten dosing tubes again

## 5 Tests every 24 months



### NOTE

***For this test, we recommend replacing the following components!***

### 5.1 Oxiperm (Standard version)

Bypass line with solenoid valve + flow limiter

- Replace the solenoid valve + flow limiter
- Replace the impeller counter (flow meter)

Part No.	Designation	Installation
12.3532-405	Solenoid valve 230V with flow limiter 7 l/min	164-005D to 164-350D
12.3532-406	Solenoid valve 115V with flow limiter 7 l/min	164-005D to 164-350D
12.3532-403	Solenoid valve 230V with flow limiter 15l/min	164-700D to 164-2000D
12.3532-404	Solenoid valve 115V with flow limiter 15l/min	164-700D to 164-2000D
12.6010-1	Flow meter FHKU 100	all

### 5.2 Oxiperm with internal bypass pump

Bypass line with internal circulating pump + flow limiter

- Replace the circulating pump + flow limiter
- Replace the impeller counter (flow meter)

Part No.	Designation	Installation
12.6078-400	Bypass pump 230V, cpl.	164-005D to -2000D
53.650-005	Bypass pump 115V	164-005D to -2000D
12.6010-1	Flow meter FHKU 100	164-005D to -2000D
53.625-70	Flow limiter 7 l/min	164-005D to - 350D
53.625-150	Flow limiter 15 l/min	164-700D to -2000D

### 5.3 Oxiperm with external bypass pump

Bypass line with external rotary pump + flow limiter

- Replace flow limiter
- Replace the impeller counter (flow meter)

Part No.	Designation	Installation
12.6010-1	Flow meter FHKU 100	164-005D to 2000D
53.625-70	Flow limiter 7 l/min	164-005D to - 350D
53.625-150	Flow limiter 15 l/min	164-700D to -2000D

## 5.4 Oxiperm for batch operation

Bypass line with solenoid valve + ball valve

- Replace solenoid valve
- Replace the impeller counter (flow meter)
- Replace pressure retention valve

Part No.	Designation	Installation
12.6010-1	Flow meter FHKU 100	164-1000D to 164-2000D
12.6010-2	Flow meter FHKU 40	164-350D
12.6010-3	Flow meter FHKU 56	164-700D
12.6010-4	Flow meter FHKU 25	164-220D
12.6010-5	Flow meter FHKU 20	164-120D
12.6010-6	Flow meter FHKU 15	164-030D
12.6010-7	Flow meter FHKU 10	164-005D/-010D
53.919-10	PVC solenoid valve 230V 50/60Hz	all
53.919-11	PVC solenoid valve 110V 50/60Hz	all
525-0567	Pressure retention valve DN8	164-030D to 164-220D
525-1113	Pressure retention valve DN20	164-350D to 164-2000D

## 5.5 Suction lines

Here, the suction lines are checked.

- Replace foot valve + ball
- Check suction lines for brittleness, replace if necessary

## 5.6 Option enclosure exhausting

Here, the operation of the solenoid valve is checked.



### NOTE

***In the event of a faulty solenoid valve, it must be replaced.***

### Spare valves

45.10245-1/2	Solenoid valve 230V, 50Hz
45.10249-1/2	Solenoid valve 115V, 60Hz

## 6 Tests every 5 years



**NOTE**

***For this test, we recommend replacing the following components!***

- Replace the dosing pump for HCl
- Replace the dosing pump for NaClO<sub>2</sub>



## 7 Start-up after maintenance

After each maintenance procedure, the following points or settings should be checked:

- System type and operating mode
- Dosing flow of the pumps for HCl and NaClO<sub>2</sub> (dosing flow, see documentation, Settings), the dosing pumps must be calibrated, if necessary, deaerate the dosing head
- Operation of dosing controller, adjust if necessary
- Volume of bypass water
- Screws
- Tightness of installation

### 7.1 Systems with M208 dosing pumps and a calibration system

For dosing pumps M208 with a calibration system, ensure that the water is emptied out of the pre-lifting chamber.

- Deactivate installation via display.
- Remove suction lines from the water containers
- Push float switches of the suction lines upwards, in order to not produce any error messages.
- Error messages (pre-empty signals and empty signals) for suction lines, which are caused by the float switches.
- Switch to manual mode on the display
- Set installation capacity to 100%
- Activate installation
- Set stroke setting for dosing pumps to 100%
- Remove cover from pre-lifting chambers

The water is now dosed from the calibration system. The installation continues to run until no more liquid is left in the pre-lifting chamber.

- Deactivate installation
- Connect suction lines to the chemical containers

The settings listed in Section 3 are now checked.

- System type and operating mode
- In Service mode/Deaeration, deaerate both dosing pumps
- Check operation of dosing controller, adjust if necessary
- Check volume of bypass water
- Calibrate dosing pumps (e.g manual mode, installation capacity 100%) and set to the required dosing line
- Activate installation and check the tightness of all screws

## 7.2 Systems with M221 dosing pumps

For dosing pumps M221, there is no pre-lifting chamber, which has to be emptied first.

- Deactivate installation via display.
- Connect suction lines to the chemical containers

The settings listed in Section 3 are now checked.

- System type and operating mode
- In Service mode/Deaeration, deaerate both dosing pumps
- Check operation of dosing controller, adjust if necessary
- Check volume of bypass water
- Calibrate dosing pumps (e.g manual mode, installation capacity 100%) and set to the required dosing line
- Activate installation and check the tightness of all screws



