

Systems

Catalogue

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Grünbeck water treatment – more than 70 years of experience

QUALITY MADE IN GERMANY

For more than 70 years now, Grünbeck Wasseraufbereitung has been one of the most renowned companies for water treatment in household, trade and industry in Europe. All around the globe, our customers trust in our expertise when it comes to ideal water qualities. The company's headquarters are located in the Bavarian city of Hoechstaedt/Donau, approximately 100 km west of Munich, where all of Grünbeck's products are manufactured – high-class German workmanship with high standards of quality. We have a tight net of sales and service locations in Europe and thus not only ensure the proximity to our customers, but also have quick response times.

Grünbeck offers the entire spectrum of water treatment for drinking water installations and industrial applications. Our product range covers filtration, softening and corrosion protection up to disinfection and pure water generation. Furthermore, Grünbeck also is in the position to offer an ideal solution for the treatment of heating water.



Grünbeck Forum
at headquarters in Hoechstaedt, Germany

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Subject to modifications and errors.

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Piping for fine filters



Piping for fine filters

Parallel piping

For pureliQ fine filters, GENO-fine filters FS-B, BOXER X and GENO-backwash filters MX/MXA

Brass piping with 4 manual shut-off valves, starting with a T-manifold (inlet) and ending with a T-manifold (outlet). Either completely pre-assembled or delivered as individual components without pre-assembly, fine filter/backwash filter **not included.**

Technical specifications

- Max. temperature 20 °C
- Max. operating pressure 10 bar

Brass piping	
Main pipe [DN]	**Filter connection [R]**
Brass piping with brass valves	
40	1"
50	1¼"
50	1½"
80[1]	2"

[1] *Piping made of PVC, valves made of brass*

Parallel piping

For GENO-fine filters FME/FM and GENO-backwash filters MX/MXA

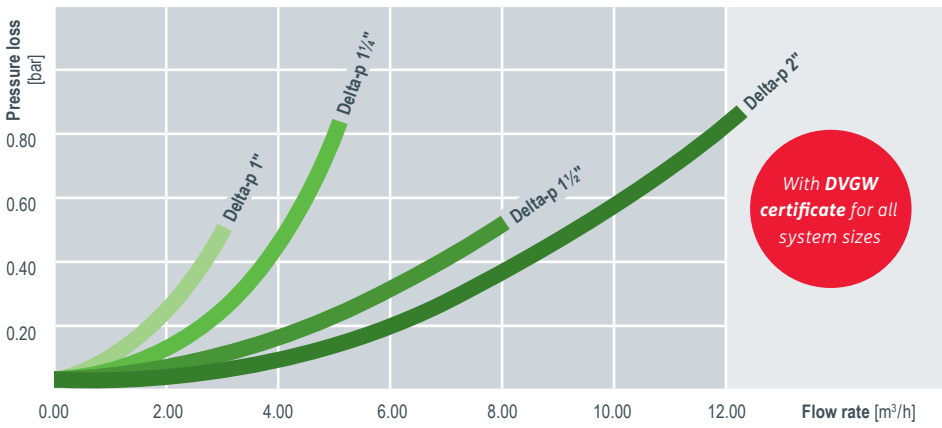
PVC piping with 4 manual shut-off valves as intermediate flaps with locking lever, starting with a T-manifold (inlet) and ending with a T-manifold (outlet). Either completely pre-assembled or delivered as individual components without pre-assembly, fine filter/backwash filter **not included.** For piping material made of PE or PP, please inquire.

Technical specifications

- Max. temperature 20 °C
- Max. operating pressure 10 bar

PVC piping	
Main pipe [DN]	**Filter connection [DN]**
PVC piping with intermediate flaps	
80	50
100	65
100	80
125	80
150	100
200	150

Water softeners for trade and industry





Triple water softeners Delta-p

Water softeners based on the ion exchange principle have been regarded as the tried and tested standard for many years now and have essentially been used to date in large residential buildings, building complexes and industrial applications which consume large volumes of water. Pressure losses caused by the softening and the extremely costly and time-consuming installation and dimensioning of the systems, however, always proved to be disadvantageous. With the triple water softener **Delta-p**, Grünbeck Wasseraufbereitung GmbH has developed a completely innovative solution to these problems. The patented control valve of the triple water softener **Delta-p** guarantees the interruption-free supply of soft water with only a minimum loss of pressure.

Triple softening

Thanks to the outstanding advantages it offers, the **Delta-p** series impresses dealers, trade and builders alike. As a triple water softener, it continuously provides soft water and also sets new standards with its low pressure loss and extremely economic level of resource consumption. The fresh water guarantee whereby the tank content is automatically rinsed before activation of the exchanger tank which is on standby ensures hygienic operation. The selection of the system size is based on the dimension of the pipes laid in the building, therefore extensive calculations of capacity and peak volume flows become superfluous. Illustrated instructions facilitate assembly. Thanks to the electronically controlled blending unit, setting the required residual hardness becomes child's play.

The **Delta-p** is available in the sizes 1", 1¼", 1½" and 2", either as a drinking water or industrial version. A low-salt alarm can additionally be connected to prompt users to refill the brine tank in good time. In addition to the standard brine tanks with a regeneration salt capacity of max. 65 or 180 kg, larger brine tanks are also available. Connection kits with shut-off valves, overflow valve and flexible connection hoses are available for convenient connection to the drinking water installation. All connection hoses are suitable for drinking water and are approved in accordance with KTW category A and W270.



Delta-p 1"



Delta-p 2"

Water softeners Delta-p

Fully automatic triple water softeners based on the ion exchange principle for the generation of fully/partially softened water, with volume-controlled regeneration

3 exchanger tanks made of pressure-resistant plastic with a filling of ion exchanger material, distribution system and adjustable height adapters, central control valve made of dezincification-free brass for hard, soft and regeneration water, microprocessor controller with simple 3-key operation and voltage-free signal contact and additional fault signal contact, 5 contact water meters (the industrial version only has 4) to transmit the water flow rates to the controller, electronically-controlled blending unit, disinfection unit for automatic disinfection according to the electrolysis principle, PE brine tank with lid, sieve bottom and special brine valve, including operation manual.

Water softeners Delta-p-I “industrial version”

As above, without the blending unit, however, for the generation of fully softened water < 0.02 mmol/l, intrinsically safe system (may be connected directly to the drinking water installation).

Technical specifications

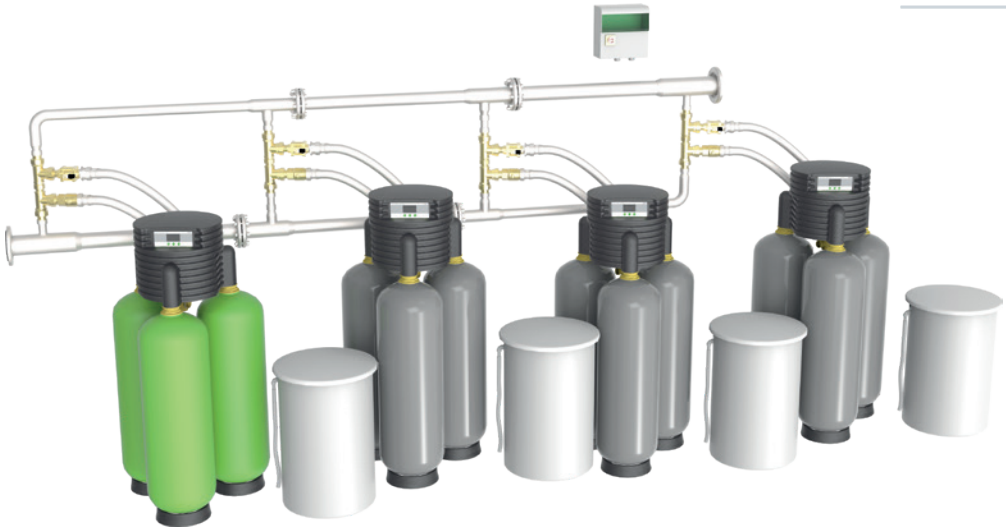
- Max. water temperature 30 °C
- Power supply 230 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 10 bar
- Operating voltage 24 V

Delta-p/Delta-p-I	1"	1¼"	1½"	2"
Nominal connection diameter [DN]	25	32	40	50
Nominal flow [m³/h][1]	3	5	8	12
Nominal flow blending water [m³/h][2]	5	8.3	13.3	20
Pressure loss at nominal flow [bar]	0.5	0.8	0.5	0.8
Capacity per kg of regeneration salt [mol/kg]	5.7	5.7	5.7	5.7
Max. capacity of brine tank [kg][3]	65	65	180	180
Salt consumption per regeneration approx. [kg]	1.5	2.5	5.2	7.2

[1] *The maximum flow decreases in case of high raw water hardness (> 3.5 mmol/l).*

[2] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l (not Delta-p-I).*

[3] *For larger brine tanks, please refer to page 8 (accessories).*



Parallel piping and cascade connection of Delta-p (quadruple)

Parallel piping

For Delta-p/Delta-p-I

Parallel piping (Tichelmann piping) of two or several triple water softeners, including all the necessary connection pieces and connection kits.

Technical specifications

- Max. water temperature 30 °C
- Nominal pressure PN 10

Delta-p/Delta-p-I	2 x 1"	2 x 1¼"	2 x 1½"	2 x 2"	3 x 2"	4 x 2"
Nominal connection diameter [DN]	40	50	65	80	100	125
Nominal flow[1] version "I" [m³/h]	2 x 3 = 6	2 x 5 = 10	2 x 8 = 16	2 x 12 = 24	3 x 12 = 36	4 x 12 = 48
Nominal flow[2] version with overflow valve [m³/h]	2 x 5 = 10	2 x 8.3 = 16.6	2 x 13.3 = 26.6	2 x 20 = 40	3 x 20 = 60	4 x 20 = 80
Weight of stainless steel piping approx. [kg]	20	21	58	63	110	162
Weight of PVC piping approx. [kg]	17	18	51	55	96	145

Parallel PVC piping
Parallel stainless steel piping

[1] *The maximum flow decreases in case of high raw water hardness (> 3.5 mmol/l).*
[2] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l.*

Cascade connection for parallel piping Delta-p

When using several **Delta-p** water softeners in parallel, shortfalls in the soft water withdrawal due to the consumption behaviour on site cannot be excluded.

The controllers of the water softeners feature a flow detection. Thus, additional water softeners can be switched on or off via a dynamic control circuit **in case of increasing or decreasing flow rates.** The master system is changed after each regeneration.

Cascade connection for Delta-p	2 x 1"	2 x 1¼"	2 x 1½"	2 x 2"	3 x 2"	4 x 2"

Water softeners and parallel piping are not included in the price.



Delta-p 2" on pedestal



Connection kit Delta-p 1½ - 2", installation length 260 mm

Water softeners Delta-p/Delta-p-I

Mounted on pedestal and ready for connection

Triple water softeners as described on pages 5, 6 and 7 – mounted on pedestal, incl. connection kit.

Delta-p/Delta-p-I	1"	1¼"	1½"	2"
Dimensions (w x h x d) [mm][1]	770 x 1,500 x 770	770 x 1,500 x 770	960 x 1,960 x 880	960 x 1,960 x 880
Diameter of brine tank [mm][2]	410	410	570	570
Height of brine tank [mm][2]	670	670	860	860
Max. capacity of brine tank [kg][3]	65	65	180	180

[1] *Dimensions without brine tank.*
[2] *Brine tank not mounted on pedestal.*
[3] *For larger brine tanks, please refer to accessories below.*

Accessories Delta-p
Connection kit Delta-p 1" - 1¼" installation length 190 mm[1]
Connection kit Delta-p 1½" - 2" installation length 260 mm[1]
Connection kit Delta-p-I 1" - 1¼" installation length 190 mm[1]
Connection kit Delta-p-I 1½" - 2" installation length 260 mm[1]
Pedestal Delta-p 1" - 1¼" (also for Delta-p-I)
Pedestal Delta-p 1½" - 2" (also for Delta-p-I)
Mechanical blending for Delta-p 1" - 1¼
Mechanical blending for Delta-p 1½" - 2"
Upgrade kit quality-controlled blending unit For the generation of a defined residual soft water hardness in case of fluctuating raw water hardness, only applicable for Delta-p water softeners
NEW Upgrade kit 1" - 1¼"
NEW Upgrade kit 1½" - 2"
Pre-alarm salt supply (infrared light sensor for GENO-mat duo WE-X and Delta-p series)
Communication module DE200 Profibus
NEW Drain connection DN 50 according to DIN EN 1717 including siphon for Delta-p[2]
Surcharge for 210 l brine tank (1" + 1¼")
Surcharge for 750 l brine tank (Delta-p 1½" + 2")

[1] *Screw connection not included.*
[2] *Can be used for all sizes.*

Note: For additional accessories, please refer to pages 13 and 14.



Water softener GENO-mat ZFW



Water softener GENO-mat duo WEW

Warm water softeners GENO-mat

Fully automatic water softeners working according to the principle of ion exchange

ZFW – Single system with timer-controlled regeneration

WFW – Single system with volume-controlled regeneration

duo WEW – Twin system with central control valve and volume-controlled regeneration

Consisting of: Brine tank made of PE with lid and sieve bottom, special brine valve with connecting line – enables maximum continuous flows, warm water-resistant, stainless steel exchanger tank, ion exchanger filling and distribution system, control valve made of red brass, warm water-resistant contact water meter (only for WFW and duo WEW).

Technical specifications

- Full salting for residual hardness of ≤ 0.02 mmol/l
- Max. water temperature 80 °C
- Nominal pressure PN 10
- Power supply 230 V, 50/60 Hz
- Operating pressure min. 2 bar/max. 8 bar
- Operating voltage 24 V

GENO-mat	ZFW 65	ZFW 150	WFW 65	WFW 150	duo WEW 65	duo WEW 150
Nominal connection diameter [DN]	25 male	25 male	25 male	25 male	25 female	25 female
Peak flow [m^3/h]	2.0	3.0	2.0	3.0	2.0	3.0
K_V valve Δp = 1.0 bar [m^3/h]	2.8	2.9	2.7	2.8	2.6	2.7
Nominal capacity [mol]	12.0	26.6	12.0	26.6	12.0	26.6
Max. capacity of brine tank [kg]	130	190	130	190	130	190
Salt consumption/regeneration [kg]	4.1	8.2	3.6	8.0	3.6	8.0



Water softener GENO-mat ZF

Water softeners GENO-mat ZF

Fully automatic single water softener working according to the principle of ion exchange, with timer-controlled regeneration

Consisting of: PE brine tank with lid and sieve bottom, special brine valve with connecting line – enables maximum continuous flows, exchanger tank made of pressure-resistant plastic with ion exchanger filling and distribution system, control valve made of red brass.

Technical specifications

- Full salting for residual hardness ≤ 0.02 mmol/l
- Water temperature 30 °C
- Nominal pressure PN 10
- Power supply 230 V, 50 Hz
- Operating pressure min. 2 bar/max. 8 bar
- Operating voltage 24 V

GENO-mat ZF	65	150	300	450	750
Nominal connection diameter [DN]	25 male	25 male	25 male	40 female	40 female
Peak flow [m^3/h]	2.0	3.0	5.0	6.0	9.5
K_V value Δp = 1.0 bar [m^3/h]	2.8	2.9	3.5	5.0	6.8
Nominal capacity [mol]	12.0	26.6	53.9	80.2	133.2
Max. capacity of brine tank [kg]	130	190	285	485	760
Salt consumption/regeneration [kg]	4.1	8.2	16.3	27.3	42.2



Technical specifications

- Full salting for residual hardness ≤ 0.02 mmol/l (GENO-mat WF 65, 150, 300, 450, 750)
- Economy salting for residual hardness ≥ 0.35 mmol/l (GENO-mat WF 50, 130, 230, 330, 530)
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Water temperature 30 °C
- Power supply 230 V, 50/60 Hz
- Operating voltage 24 V

Water softener GENO-mat WF

Water softeners GENO-mat WF

Fully automatic single water softener working according to the principle of ion exchange, for the generation of fully softened water, with volume-controlled regeneration

Consisting of: PE brine tank with lid and sieve bottom, special brine valve with connecting line – enables maximum continuous flows, exchanger tank made of pressure-resistant plastic with ion exchanger filling and distribution system, control valve made of red brass, microprocessor controller with simple 3-key operation with voltage-free fault signal contact, contact water meter with water meter screw connections.

GENO-mat WF (full salting)	**65**	**150**	**300**	**450**	**750**
Nominal connection diameter [DN]	25 male	25 male	25 male	40 female	40 female
Peak flow [m^3/h]	2.0	3.0	5.0	6.0	9.5
K_V value Δp = 1.0 bar [m^3/h]	2.7	2.8	3.3	4.9	6.4
Nominal capacity [mol]	12.0	26.6	53.9	80.2	133.2
Max. capacity of brine tank [kg]	130	190	285	485	760
Salt consumption/regeneration [kg]	3.6	8.0	16.2	25.3	40.0

Fully automatic single water softener working according to the principle of ion exchange, particularly suited for the generation of partially softened water, with blending valve (option), with volume-controlled regeneration, economy salting for residual hardness of ≥ 0.35 mmol/l, with integrated disinfection device working according to the electrolysis principle.

GENO-mat WF (economy salting)	**50**	**130**	**230**	**330**	**530**
Nominal connection diameter [DN]	25 male	25 male	25 male	40 female	40 female
Peak flow [m^3/h] [1]	3.3	5.0	8.3	10.0	15.8
K_V value Δp = 1.0 bar [m^3/h] [1]	4.5	4.7	5.5	8.2	10.7
Nominal capacity [mol]	9.5	20.9	42.3	60.0	95.2
Max. capacity of brine tank [kg]	65	130	190	285	285
Salt consumption/regeneration [kg]	1.8	4.0	8.1	11.5	16.0

[1] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l.*

Accessories

Circulation device
To reduce the counter-ion effect in case of longer periods of standstill

Technical specifications

- Full salting for residual hardness of < 0.02 mmol/l (GENO-mat duo WE-X 65, 150, 300, 450, 750)
- Economy salting for residual hardness ≥ 0.35 mmol/l (GENO-mat duo WE-X 50, 130, 230, 330, 530)
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Water temperature 30 °C
- Power supply 85 - 250 V, 50/60 Hz
- Operating voltage 24 V DC



Water softener GENO-mat duo WE-X

Water softeners GENO-mat duo WE-X

Fully automatic twin water softener working according to the principle of ion exchange, for the generation of fully softened water, with volume-controlled regeneration

Consisting of: PE brine tank with lid and sieve bottom, special brine valve with connecting line – enables maximum continuous flows, exchanger tank made of pressure-resistant plastic with filling of ion exchange resin and distribution system, a central control valve made of red brass, microprocessor controller with simple 3-key operation and voltage-free signal/fault signal contact as well as programmable input. Controller with LCD graphics display (backlit), integrated SD card to register the operating data, contact water meter with water meter screw connections.

GENO-mat duo WE-X (full salting)	**65**	**150**	**300**	**450**	**750**
Nominal connection diameter [DN]	25 female	25 female	25 female	40 female	40 female
Max. continuous flow [m^3/h]	2.0	3.0	5.0	6.0	9.5
K_V value Δp = 1.0 bar [m^3/h]	2.6	2.7	3.1	4.5	5.6
Nominal capacity [mol]	12.0	26.6	53.9	80.2	133.2
Max. capacity of brine tank [kg]	130	190	285	485	760
Salt consumption/regeneration [kg]	3.6	8.0	16.2	25.3	40.0

Fully automatic twin water softener working according to the principle of ion exchange, with volume-controlled regeneration, particularly suited for the generation of partially softened water, with integrated blending valve up to type 230, starting from type 330 available as an option, economy salting for residual hardness ≥ 0.35 mmol/l.

GENO-mat duo WE-X (economy salting)	**50**	**130**	**230**	**330**	**530**
Nominal connection diameter [DN]	25 female	25 female	25 female	40 female	40 female
Max. continuous flow [m^3/h][1]	3.3	5.0	8.3	10.0	15.8
K_V value Δp = 1.0 bar [m^3/h][1]	4.3	4.5	5.2	7.5	9.3
Nominal capacity [mol]	9.5	20.9	42.3	60.0	95.2
Max. capacity of brine tank [kg]	65	130	190	285	285
Salt consumption/regeneration [kg]	1.8	4.0	8.1	11.5	16.0

[1] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l.*



Connection kit 1¼"



Contact water meter

Connection kits for water softeners 1", 1¼" and 1½"

Connection kits 1", 1¼" and 1½"

Consisting of:

- Connection fitting 1", 1¼" and 1½" with sampling valves
- Installation length 190 mm without screw connection
- Inlet strainer and non-return valve in water inlet
- Shut-off valves system inlet/system outlet
- Integrated overflow valve for emergency operation/peak withdrawal
- Water meter screw connections incl. seals
- Flexible connection hoses with transition fitting

Connection kits 1"-I, 1¼"-I and 1½"-I

Consisting of:

- Connection fitting 1"-I, 1¼"-I and 1½"-I with sampling valves
- Otherwise identical to connection kits 1", 1¼" and 1½", without overflow valve, however

System capacity [m³ x °dH]	50	130	230	330	530	65	150	300	450	750
Connection kits										
Connection kit 1"	•	–	–	–	–	–	–	–	–	–
Connection kit 1¼"	–	•	•	–	–	–	–	–	–	–
Connection kit 1½"	–	–	–	•	•	–	–	–	–	–
Connection kit 1"-I	–	–	–	–	–	•	•	–	–	–
Connection kit 1¼"-I	–	–	–	–	–	–	–	•	•	–
Connection kit 1½"-I	–	–	–	–	–	–	–	–	–	•

Mounting kit 1 for GENO-mat

Compact valve block with R 1" female thread, shut-off valves, bypass valve, hard water outlet, flexible connection hoses 600 mm

Contact water meter

With roller type counter, to read off the volume of soft water flown through

Contact water meter with roller-type counter R 1"

Contact water meter with roller-type counter R 1½"

Contact water meter with roller-type counter R 2"

Safety device protectliQ:A[1]	**20**	**25**	**32**	**40**
Connection diameter	¾"	1"	1¼"	1½"

[1] *For reliable protection against water damage in case there is no drain connection in the floor.*



Electronic blending unit 1" - single

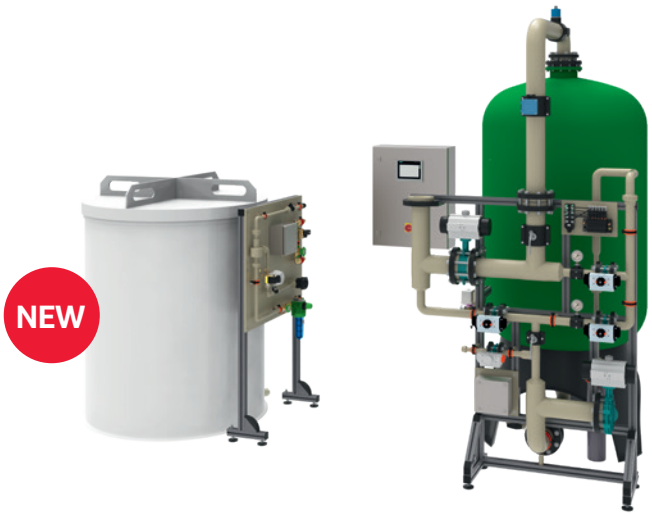


Mechanical blending valve 1¼"

Accessories
Blending valves for the automatic addition of raw water to generate any residual soft water hardness [1]
Mechanical blending valve R 1"
Mechanical blending valve R 1¼"
Mechanical blending valve R 2"
Electronic blending units for the generation of a defined residual hardness in the soft water. In case of single blending, one residual hardness can be set, in case of double blending, two different values for the residual hardness may be entered. [2]
Electronic blending unit 1" single
Electronic blending unit 1" double
Electronic blending unit 1½" single
Electronic blending unit 1½" double
Quality-controlled blending unit to generate a defined residual soft water hardness in case of fluctuating raw water hardness
Quality-controlled blending unit 1"
Quality-controlled blending unit 2"
Voltage-free signal to transmit the operating state to the building management system
Voltage-free signal for ZF; WF
Voltage-free signal for duo WE-X
Automatic empty signal for brine tank (pre-alarm system) for all GENO-mat water softeners
Low-salt alarm (empty signal for WE/WF series, Delta-p series)
Pre-alarm salt supply (infrared light sensor for GENO-mat duo WE-X and Delta-p series)
Boiler feed water shut-off valve for single water softeners GENO-mat WF (refer to page 11), consisting of a solenoid valve with control cable to shut off the soft water pipe during regeneration
Hard water stop R 1"
Disinfection unit GENO-mat duo WE-X for automatic disinfection by means of NaCl electrolysis after every regeneration process
Disinfection unit duo WE-X 50 - 450
Disinfection unit duo WE-X 530 - 750

[1] *Not suitable in combination with Delta-p. For mechanical blending for Delta-p, please refer to page 8 - Electronic blending unit as an alternative.*

[2] *For electronic blending unit to be used with permeate, please refer to page 32.*



Water softener softliQ:XLA, single system

Water softeners softliQ:XLA

Fully automatic, water meter controlled ion exchanger with brine tank

Exchanger tank made of pressure-resistant plastic. Front piping of the filter made of PP with pneumatic fittings, pilot valves and fitting group, preassembled on a system rack made of anodised aluminium with levelling feet, brine tank made of plastic (PE) with light sensor as pre-alarm, including regeneration rack with all the required components such as a precision injector. Also available with brine silo or brine bin. S7 controller with 7" touch screen and TCP[1] communication module for fully automatic operation of the water softener.

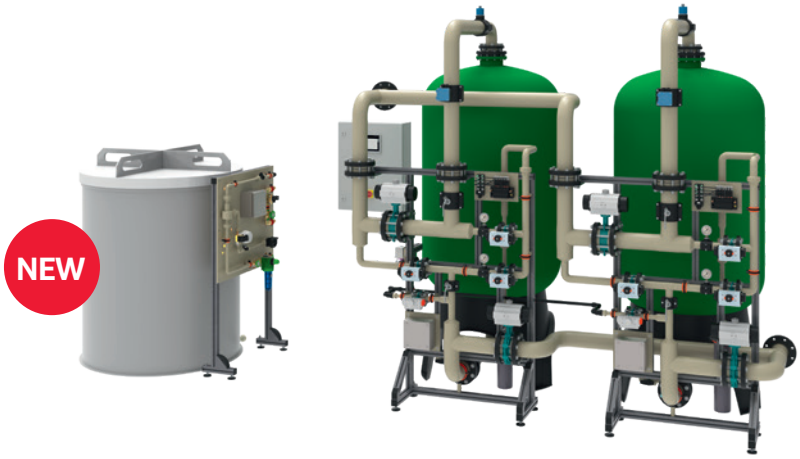
Technical specifications

- Power supply 230 V, 50/60 Hz
- Operating voltage 24 V, 50/60 Hz
- Required water pressure 2.5 barg
- Admissible water pressure PN 10
- Admissible water temperature 30 °C

Single systems in sizes 20000 to 70000

softliQ:XLA	20000	30000	40000	50000	70000
Nominal flow [m³/h] at a residual hardness < 0.1 °dH	20	30	40	50	70
Nominal capacity [mol/m³ x °dH]	321/1,800	429/2,400	576/3,225	777/4,350	1,045/5,850
Nominal connection diameter [DN]	65	80	100	100	125
Diameter of exchanger tank [mm]	770	927	1,074	1,226	1,429
Total height [mm]	2,670	2,750	2,830	2,850	3,200
Required room height [mm]	3,000	3,050	3,150	3,150	3,500
Diameter of brine tank [mm]	1,250	1,250	1,250	1,700	1,700
Total height of brine tank [mm]	1,500	1,500	1,500	1,500	1,500
Capacity per kg of regeneration salt [mol/kg]	5.4	5.4	5.4	5.4	5.4
Salt consumption/reg. [kg]	60	80	108	145	195
Max. capacity of brine tank [kg]	1,650	1,650	1,650	3,100	3,100

[1] *For additional communication modules, please inquire.*



Water softener softliQ:XLA-2, twin system

Water softeners softliQ:XLA-2

Fully automatic, water meter controlled ion exchanger with brine tank

Exchanger tanks made of pressure-resistant plastic. Front piping of the filter made of PP with pneumatic fittings, pilot valves and fitting group, preassembled on a system rack made of anodised aluminium with levelling feet, including connecting pipes made of PP. Brine tank made of plastic (PE) with light sensor as pre-alarm, including regeneration rack with all the required components such as a precision injector. Also available with brine silo or brine bin. S7 controller with 7" touch screen and TCP[1] communication module for fully automatic operation of the water softener. For **technical specifications**, please refer to page 15.

Twin systems in sizes 20000 to 70000

softliQ:XLA-2	20000	30000	40000	50000	70000
Nominal flow [m³/h] at a residual hardness < 0.1 °dH	20	30	40	50	70
Nominal capacity [mol/m³ x °dH]	2 x 321/1,800	2 x 429/2,400	2 x 576/3,225	2 x 777/4,350	2x 1,045/5,850
Nominal connection diameter [DN]	65	80	100	100	125
Diameter of exchanger tank [mm]	770	927	1,074	1,226	1,429
Total height [mm]	2,670	2,750	2,830	2,850	3,200
Required room height [mm]	3,000	3,050	3,150	3,150	3,500
Diameter of brine tank [mm]	1,250	1,250	1,250	1,700	1,700
Total height of brine tank [mm]	1,500	1,500	1,500	1,500	1,500
Capacity per kg of regeneration salt [mol/kg]	5.4	5.4	5.4	5.4	5.4
Salt consumption/reg. [kg]	60	80	108	145	195
Max. capacity of brine tank [kg]	1,650	1,650	1,650	3,100	3,100

[1] *For additional communication modules, please inquire.*



Water softener softliQ:XLA-3, triple system

Water softeners softliQ:XLA-3

Fully automatic, water meter controlled ion exchanger with brine tank

Exchanger tanks made of pressure-resistant plastic. Front piping of the filter made of PP with pneumatic fittings, pilot valves and fitting group, preassembled on a system rack made of anodised aluminium with levelling feet, including connecting pipes made of PP. Brine tank made of plastic (PE) with light sensor as pre-alarm, including regeneration rack with all the required components such as a precision injector. Also available with brine silo or brine bin. S7 controller with 7" touch screen and TCP[1] communication module for fully automatic operation of the water softener. For **technical specifications**, please refer to page 15.

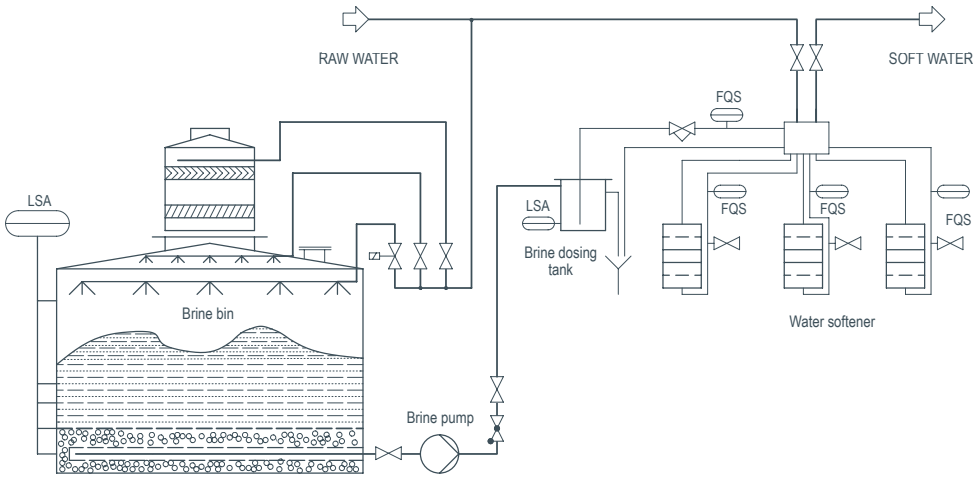
Triple systems in sizes 40000 to 140000

softliQ:XLA-3	40000	60000	80000	100000	140000
Nominal flow [m³/h] at a residual hardness < 0.1 °dH	40	60	80	100	140
Nominal capacity [mol/m³ x °dH]	3 x 321/1,800	3 x 429/2,400	3 x 576/3,225	3 x 777/4,350	3 x 1,045/5,850
Nominal connection diameter [DN]	100	125	150	150	150
Diameter of exchanger tank [mm]	770	927	1,074	1,226	1,429
Total height [mm]	2,670	2,750	2,830	2,850	3,200
Required room height [mm]	3,000	3,050	3,150	3,150	3,500
Diameter of brine tank [mm]	1,250	1,250	1,250	1,700	1,700
Total height of brine tank [mm]	1,500	1,500	1,500	1,500	1,500
Capacity per kg of regeneration salt [mol/kg]	5.4	5.4	5.4	5.4	5.4
Salt consumption/reg. [kg]	60	80	108	145	195
Max. capacity of brine tank [kg]	1,650	1,650	1,650	3,100	3,100

[1] *For additional communication modules, please inquire.*

Accessories

Circulation device per exchanger, to prevent the counter-ion effect
Disinfection unit softliQ:XLA
Compressor for pneumatic valves
Surcharge for 3,100 kg brine tank



Brine bin installation example

Brine bin

For the central generation of regeneration brine from fine salt which is delivered by means of silo trucks

Round, black PE tank, brine withdrawal by means of a drainage system (alligned in a loop) including quartz sand layer as support layer, external level control, spray jet system (alligned in a loop), discharge tower for salt dust, stainless steel salt injection pipe (VA 1.4571) with connecting hose coupling, set of fittings with shut-off and solenoid valves, pre-assembled on PP plate. Including a weather protection hood if set up outdoors.

Accessories required: Brine pump, brine dosing tank with external level control (replaces brine tank of the water softener) as well as electrical switch box.

Technical specifications

- Salt capacity 25 tons
- Diameter (interior) 2,800 mm
- Diameter (bottom) 2,970 mm
- Total height 6,500 mm
- Max. water temperature 30 °C

Brine bin
For indoor use
For outdoor use

Brine dosing tank

To provide the exact amount of brine required for one regeneration of the water softener. Selection is based on the salt requirements of the water softener

PE brine dosing tank with lid, including brine suction valve and external level control.

Brine dosing tank	80	210	500	750	1000	1500
For salt required per regeneration up to [kg]	16,2	40	108	144	216	312
Diameter [mm]	410	570	780	900	1,000	1,250
Height [mm]	670	880	1,100	1,250	1,330	1,300

Accessories
Electrical switch box to control the filling of a brine dosing tank [1]
Brine pump with PVC piping and shut-off valves, mounted on a plate, capacity 4.8 m³/h at 19 mWC, 400 V, 0.75 kW
PVC motor ball valve DN 25 for brine make-up feed per water softener
Tank ascent with operator platform for brine bin

[1] *For electrical switchbox for simultaneous filling control of several brine dosing tanks, please inquire.*

Membrane technology



1. Fine filter
2. Euro system separator
3. Water softener Delta-p "I"
4. Brine tank
5. **Option:** Activated carbon filter for chlorine removal
6. softwatch
7. Reverse osmosis system GENO-OSMO-X
8. Basic pure water tank RT-X
9. Pressure booster system FU-X

Standard system configuration GENO-OSMO-X with water softener for pretreatment and activated carbon filter for chlorine removal

The process

Membrane separation processes use a membrane in order to separate solutions, ions, molecules and particles in the submicron range. Conventional separation processes such as filtration only achieve a cut-off of approx. 40 µm (gravel filter) to approx. 0.2 µm. The membrane processes outlined here are pressure-driven processes, i.e., pressure must be applied to the liquid for the transport of the medium through the membrane.

Reverse osmosis

Reverse osmosis (e.g. GENO-OSMO-X) retains all substances contained in the water except for a residual salt content of approx. 1 % to 5 % in the permeate. With a mixed bed exchanger (e.g. mixed bed cartridge **desaliQ:BA** or **desaliQ:PA**) as the final stage, the residual conductivity can be reduced to < 1 µS/cm. The concentrate of all the separated substances can be discharged to the drain as waste water without any further treatment.



Weichwassermeister GSX 10-I[1]

Weichwassermeister GSX-I “industrial version”

Compact water softener with full salting in modular design

As a pre-stage for reverse osmosis systems, for soft water < 0.02 mmol/l (system separator required), blending and overflow valve **not included.**

Technical specifications

- Dimensions (w x h x d) 485 x 730 x 535 mm
- Water/ambient temperature max. 30/40 °C
- Power supply 85 - 265 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Pressure loss at nominal flow 0.8 bar

Weichwassermeister	GSX 10-I[2]
Max. continuous flow [m³/h][3]	0.75
Approx. salt consumption/regeneration [kg]	0.7

[1] *The drain connection is not included in the scope of supply.*
[2] *Cannot be used upstream of an EDI-X system.*
[3] *In case of a raw water hardness of 3.5 mmol/l.*

Note: In case the reverse osmosis system is installed downstream, please provide an additional diaphragm expansion tank.



GENO-activated carbon filter AKF (stainless steel)



GENO-activated carbon filter AKF (plastic)

GENO-activated carbon filter AKF

For the dechlorination of drinking water

The **GENO-activated carbon filter AKF** is designed for the dechlorination of water with a chlorine concentration of less than 0.2 mg/l upstream of reverse osmosis systems. The water has to be free of mechanical impurities.

Note: If inhouse chlorine dioxide dosing takes place upstream of the reverse osmosis system, additional SW 2000 dosing is required in order to reduce the chlorine dioxide (refer to page 34).

Consisting of: Filter tank, filter elements filled with ultra-finely pressed activated carbon and final filter with a pore size of 5 µm, complete with brass screw connections and piping.

GENO-activated carbon filter AKF	300	600	1100[1]
Max. flow rate [l/h]	300	600	1,100
for GENO-OSMO-X/HLX at a recovery of 75 to 80 %	125K/200	400	800
Material of housing	plastic	plastic	plastic
Connection [R]	¾"	¾"	2 x ¾"

GENO-activated carbon filter AKF	1600	3000	4500	6000	9000[1]	12000[1]
Max. flow rate [l/h]	1,600	3,000	4,500	6,000	9,000	12,000
for GENO-OSMO-X/HLX at a recovery of 75 to 80 %	1200	1600/2200	3000			
Material of housing	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
Connection [R]	1½"	2"	2"	2"	2 x 2"	2 x 2"

Consumables[2]
Activated carbon filter element 250-M (1 pc)

[1] *Including parallel piping.*

[2] *Replacement of filter elements after 3 months at the latest or earlier, in case of chlorine breaking through or a max. differential pressure ≥ 2.5 bar.*



- Compact system TS with integrated permeate tank and pressure booster system
- Microprocessor controller with LCD screen
- Little space required
- Fine filter incl. pressure reducer in soft water inlet
- Compact system TL can optionally be combined with basic pure water tank and pressure booster system (refer to pages 41 and 42)
- Optional blending unit

GENO-OSMO RO 125K

Reverse osmosis systems GENO-OSMO RO 125K

Technical specifications

- Total salt content (NaCl) of feed water max. 1,000 ppm
- Salt rejection > 95 %
- Inlet flow pressure of feed water min. 2.5 bar
- Temperature of feed water min. 10 °C, max. 20 °C
- Protection IP 54
- Power supply 230 V, 50 Hz

GENO-OSMO RO	125K-TS	125K-TL
Permeate capacity at 15 °C [l/h]	125	125
Permeate supply [l]	38	–
Permeate output capacity at 3.5 bar [l/h]	300	–
at 1.0 bar [l/h]	1,200	–
Connected load approx. [kW]	0.85	0.5
Dimensions (w x h x d) [mm]	450 x 1,130 x 600	450 x 1,130 x 600
Operating weight approx. [kg]	75	30

Accessories
Connection kit for RO 125K/AVRO 125
Connection block for RO 125K/AVRO 125[1]
Conductivity meter for RO 125K/AVRO 125[2]
Solenoid valve/forced withdrawal for RO 125K/AVRO 125[3]

Option
Blending unit for RO 125K/AVRO 125[2]

[1] *Only in combination with connection kit for RO 125K/AVRO 125.*
[2] *Combination of blending unit/conductivity meter only possible up to a conductivity < 99 µS/cm.*
[3] *Only possible with TS.*

If > 3.9 mmol/l, consultation with Grünbeck – **Water analysis required**



Reverse osmosis system AVRO 125

Patented *process*



Cross section of AVRO module

Reverse osmosis systems AVRO 125

In the AVRO module, the water flowing onto the membrane is treated with a low direct current and from the calcium and hydrogen carbonate ions contained in the water, calcium carbonate seed crystals are formed at the specially developed cathode. These crystals are washed out and consequently the membrane is reliably protected from scaling. Thus, the AVRO 125 does not need any pretreatment in the form of a water softener or an antiscalant dosing system.

For technical specifications, please refer to **GENO-OSMO RO 125K**, page 21.

Reverse osmosis system AVRO	125 TS	125 TL
Option		
Blending unit for AVRO 125[1]		

[1] *A combination of blending unit/conductivity meter is only possible in case of a conductivity < 99 µS/cm.*



- Compact undersink system requiring only little space
- Flushing solenoid valve for efficient discharge of the concentrate (at high flow velocity)
- Online operation (optional)
- Collection tray (optional)
- protectliQ:A25 (optional)
- Conductivity meter (optional)
- With AVRO, the recovery of the reverse osmosis system is 50 - 75 %.

If > 3.9 mmol/l, consultation with Grünbeck – **Water analysis required**

Installation example for reverse osmosis system GENO-OSMO AVRO 125 RU

Reverse osmosis system GENO-OSMO AVRO 125 RU

For the demineralisation of raw water whose composition complies with the requirements of the German Drinking Water Ordinance (TrinkwV)

Compact system, ready-for-connection, fully mounted on a system rack made of anodised aluminium profile.
Consisting of: Reverse osmosis membrane installed in a pressure pipe made of high-strength PE. Hydro-block with built-in flow sensors for permeate and concentrate, manual control valve for concentrate and fine filter with pressure reducer. High-pressure pump with regulating valve for operating pressure and pressure gauge. Microprocessor controller with LCD display screen and three-key operation for adjustment to requirements on site and voltage-free collective fault signal. The AVRO treatment module for pretreatment can do without softening or hardness stabilisation. Scaling can thus be prevented reliably.

Technical specifications

- Total salt content (NaCl) of feed water max. 1,000 ppm
- Salt rejection 95 - 99 %
- Inlet flow pressure of feed water min. 2.5 bar
- Temperature of feed water min. 10 °C, max. 20 °C
- Protection class I
- Protection IP 54
- Power supply 230 V, 50 Hz
- Nominal pressure PN 16

GENO-OSMO AVRO 125 RU	
Permeate capacity at 15 °C [l/h]	125
Connected load approx. [kW]	0.7
Dimensions (w x h x d) [mm]	900 x 600 x 500
Operating weight approx. [kg]	50
Nominal connection diameter	DN 15 (½" male thread)

Accessories
Connection kit
Connection block
Conductivity meter
Euro system separator GENO-DK 2-Mini
Activated carbon filter AKF 300
Online-skid
Safety device protectliQ:A25
Collection tray
Blending unit RO 125K



Patented process

Mobile reverse osmosis system AVRO-flex 400

Mobile reverse osmosis system AVRO-flex 400

The mobile reverse osmosis system AVRO-flex 400 is designed to directly fill heating systems, district heating networks and other systems with low-salt water. Thanks to the patented AVRO process, no pretreatment by means of a water softener or anti-scaling dosing is required. Given the innovative operation mode, the membranes used nevertheless have a long service life and a highly economic recovery rate. By means of a selector switch, the system can be put into two simple operating modes. In the filling mode, the system switches off automatically once a specific counterpressure has been reached. In the unique workshop mode with regular rinsing, no costly preservation work is required during downtimes.

Technical specifications

- Total salt content (NaCl) of feed water max. 1,000 ppm
- Salt rejection 95 - 99 %
- Max. counterpressure of the system to be filled: 3.5 bar
- Inlet flow pressure of feed water min. 2.5 bar
- Temperature of feed water min. 10 °C, max. 20 °C
- Protection class I
- Protection IP 54
- Power supply 230 V, 50 Hz

Mobile reverse osmosis system AVRO-flex 400	
Permeate capacity at 15 °C [l/h]	400
Connected load approx. [kW]	1.8
Operating weight approx. [kg]	80
Nominal connection diameter	¾" (DN 20) male thread and GEKA coupling





- Increased recovery of up to 80 %
- Energy savings of 30 %
- Frequency-controlled high-pressure pump
- Online operation possible
- Easy operation and start-up
- Interconnection with common BUS systems
- RTU modbus included
- Web access and emailing
- Integrated data logging
- Multi-lingual touch screen
- Automatic, self-regulating system operation
- Nominal pressure PN 16
- Power supply 400 V, 50/60 Hz

Reverse osmosis system GENO-OSMO-X

Reverse osmosis systems GENO-OSMO-X

For the demineralisation of raw water whose composition complies with the requirements of the German Drinking Water Ordinance (TrinkwV)

Consisting of: Control unit with 4.3" touch screen to indicate the operating state and the system values. Voltage-free contacts to transfer pre-alarms and safety shutdown. Ultra-low pressure reverse osmosis membrane(s) installed in pressure pipe made of high-strength PE. High-pressure centrifugal pump made of stainless steel 1.4401 with motor (premium efficiency class IE3) to supply the reverse osmosis membrane(s). Fully automatic monitoring and controlling of the system parameters, permeate conductivity with provision of threshold value in the control unit, recovery, concentrate recirculation and pump frequency. Measuring data logged on integrated SD card. Three-part hydro-block made of chemically nickel-plated red brass. Piping between pump and reverse osmosis membrane(s). High-quality anodised aluminium system rack to house all system components. Ventilation device to be installed on the concentrate pipe provided by others on site. Drinking water filter incl. pressure reducer, fully mounted in system inlet.

GENO-OSMO-X	200	400	800	1200	1600	2200	3000
Permeate capacity at 15 °C [l/h]	200	400	800	1,200	1,600	2,200	3,000
Connected load approx. [kW]	0.53	0.87	0.94	1.4	1.74	2.10	2.30
Dimensions (w x h x d) [mm]	900 x 1,700 x 675		1,035 x 1,700 x 675		1,170 x 1,700 x 675		
Operating weight approx. [kg]	100	115	145	170	195	240	290

	Surcharge for stainless steel system rack GENO-OSMO-X 200 - 3000

Capacity upgrade kit for GENO-OSMO-X

For the subsequent upgrade to the permeate capacity next in size

Retrofitting can be done on site. The required material to do so (e.g. high-pressure pump, frequency converter, membrane and pressure pipe as well as the small parts required) is included in the corresponding kit. Prior to retrofitting the system, however, it must be checked whether the capacity of the pretreatment (e.g. water softener, activated carbon filter) already installed on site will still be sufficient after the retrofitting. If necessary, the pretreatment must be replaced. This is not included in the retroftting kit, however. The retrofitting may only be done by Grünbeck‘s authorised technical service.

Capacity upgrade kit
GENO-OSMO-X 200 to GENO-OSMO-X 400
GENO-OSMO-X 400 to GENO-OSMO-X 800
GENO-OSMO-X 800 to GENO-OSMO-X 1200
GENO-OSMO-X 1200 to GENO-OSMO-X 1600
GENO-OSMO-X 1600 to GENO-OSMO-X 2200
GENO-OSMO-X 2200 to GENO-OSMO-X 3000



GENO-OSMO-X Online



GENO-OSMO-X AVRO

Options

For reverse osmosis systems GENO-OSMO-X

GENO-OSMO-X Online features an outlet pressure of up to 4 bar and can directly supply air humidifiers or airconditioning systems with freshly generated permeate – without the need for an intermediate storage tank or a pressure booster.

GENO-OSMO-X AVRO as pretreatment can do without softening or hardness stabilisation. Scaling can thus be prevented reliably.

	200	400	800	1200	1600	2200	3000
Online-skid[1]							
AVRO-module[2]							
Discharge of first permeate/permeate relief GENO-OSMO-X/ion selector NANO-X							
Communication module for GENO-OSMO-X							
Communication module Profibus DP							
Communication module BACnet-IP							
Voltage-free signals							
Analogue signals							
Antiscalant dosing[3] **for GENO-OSMO-X or ion selector NANO-X**							
Volume-proportional dosing of hardness stabilisers including dosing monitoring to prevent scaling on the membranes of the reverse osmosis system or the ion selector. **Consisting of:** Diaphragm dosing pump with speed-controlled step motor, integrated volume flow measurement and pressure sensor for dosing monitoring, chemical collection tray.							

[1] *Only for GENO-OSMO-X 200 - 3000.*

[2] *Only for GENO-OSMO-X 200 - 1600; in case of a total hardness > 3.9 mmol/l, consultation with Grünbeck, water analysis required.*

[3] *Note: For dosing agents, please refer to page 34.*



- High-pressure centrifugal pump made of stainless steel 1.4301 (V2A)
- Microprocessor controller with LCD display screen to signal functions and maintenance interval
- Recovery of up to 75 %
- Registration of the concentrate and permeate volume via flow sensors and of the system recovery via voltage-free collective fault signal
- Nominal pressure PN 16
- Power supply 400 V, 50 Hz

Reverse osmosis system GENO-OSMO-HLX

Reverse osmosis systems GENO-OSMO-HLX

For the demineralisation of raw water whose composition complies with the requirements of the German Drinking Water Ordinance (TrinkwV)

Consisting of: Microprocessor controller with LCD display screen to signal function and maintenance interval via voltage-free collective fault signal. High-pressure centrifugal pump made of stainless steel 1.4301 to supply the membrane. Ultra-low pressure reverse osmosis membrane(s) installed in pressure pipe made of high-strength PE. Three-part hydro-block made of chemically nickel-plated red brass. Piping between pump and reverse osmosis membrane(s). High-quality anodised aluminium system rack to house all system components. Ventilation device to be installed on the concentrate pipe provided by others on site. Drinking water filter incl. pressure reducer, fully mounted in system inlet.

GENO-OSMO-HLX	200	400	800	1200	1600	2200	3000
Permeate capacity at 15 °C [l/h]	200	400	800	1,200	1,600	2,200	3,000
Connected load approx. [kW]	1.5	2.2	2.2	2.2	4.0	4.0	4.0
Dimensions (w x h x d) [mm]	900 x 1,700 x 675			1,035 x 1,700 x 675		1,170 x 1,700 x 675	
Operating weight approx. [kg]	100	115	145	170	195	240	290



- Increased recovery of up to 80 %
- Energy savings of 30 %
- Frequency-controlled high-pressure pump
- Easy operation and start-up
- Interconnection with common BUS systems
- RTU modbus included
- Web access and emailing
- Integrated data logging
- Multi-lingual touch screen
- Automatic, self-regulating system operation
- Nominal pressure PN 16
- Power supply 400 V, 50/60 Hz

Reverse osmosis system osmoliQ:LB

Reverse osmosis systems osmoliQ

Reverse osmosis systems osmoliQ mounted on a system rack made of high-quality anodised aluminium, 8" pressure pipes made of GRP with built-in ultra-low-pressure reverse osmosis membranes

High-quality low-noise high-pressure pump made of stainless steel with electric motor of efficiency class IE3 and frequency converter. Fine filter with pressure gauge and sampling valve, PE piping to direct the water flow within the reverse osmosis system. Fully automatic monitoring and control of the system parameters permeate and concentrate flow. Non-contact flow measurement using ultrasound or vortex to measure the volume of the system flows permeate, concentrate-to-drain and concentrate recirculation. Quality control of permeate via temperature-compensated conductivity meter. Microprocessor controller with 4.3" touch screen to indicate the operating state. Measuring data logged on integrated SD card. Activation of up to two dosing pumps with calculation of the range of coverage.

osmoliQ:	LB4000	LB7000	LB10000	LB12000	LB16000	LB20000	LB25000	LB30000
Permeate capacity at 15 °C [l/h]	4,000	7,000	10,000	12,000	16,000	20,000	25,000	30,000
Connected load approx. [kW]	4.2	5.3	6.7	7.1	9.4	12.0	9.6	10.1
Nominal connection diameter of feed water supply line [DN]	40	40	50	50	65	80	80	100
Dimensions (w[1] x h x d) [m]	3.7 x 2.05 x 0.9				3.7 x 2.15 x 0.9	4.7 x 2.2 x 1.5		
Operating weight [kg]	485	600	725	830	950	1,290	1,675	2,000

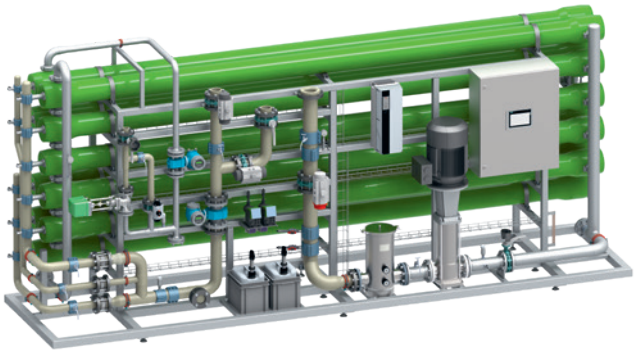
[1] *Please allow for an additional 1,200 mm in width on both sides for the removal of the RO module.*

Surcharge for reverse systems
osmoliQ:LB4000 - LB7000
Stainless steel system rack
Stainless steel pressure pipes for LB4000
Stainless steel pressure pipes for LB7000
Stainless steel piping
Discharge of first permeate/permeate relief [2]
osmoliQ:LB10000 - LB12000
Stainless steel system rack
Stainless steel pressure pipes for LB10000
Stainless steel pressure pipes for LB12000
Stainless steel piping
Discharge of first permeate/permeate relief [2]
osmoliQ:LB16000
Stainless steel system rack
Stainless steel pressure pipes
Stainless steel piping
Discharge of first permeate/permeate relief [2]
osmoliQ:LB20000
Stainless steel system rack
Stainless steel pressure pipes
Stainless steel piping
Discharge of first permeate/permeate relief [2]
osmoliQ:LB25000
Stainless steel system rack
Stainless steel pressure pipes
Stainless steel piping
Discharge of first permeate/permeate relief [2]
osmoliQ:LB30000
Stainless steel system rack
Stainless steel pressure pipes
Stainless steel piping
Discharge of first permeate/permeate relief [2]
Surcharge for reverse osmosis systems osmoliQ:LB4000 - LB 30000
S7-1200 controller with 7" touch screen [1] for osmoliQ
Stainless steel cabinet for S7 controller for osmoliQ
Communication modules for osmoliQ systems
Communication module Profibus DP
Communication module BACnet-IP
Voltage-free signals
Analogue signals

[1] *Installed in varnished switch cabinet.*

[2] *Required in case of a permeate counter-pressure > 0.7 bar (7 mWC).*

- Recovery of up to 80 %
  (depending on the water analysis)
- Up to 100 m³/h of permeate
- Frequency-controlled, low-noise high-pressure pump of premium efficiency class IE3
- Siemens Simatic S7 controller
- The fully automatic, permeate and recovery controlled system keeps the permeate capacity steady, even in case of a fluctuating raw water temperature



Reverse osmosis system GENO-RK-X, capacity 50 m³/h

Reverse osmosis systems GENO-RK-X

For the demineralisation of raw water whose composition complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV).

System rack with adjustable feet to compensate for uneven floors made of stainless steel profile which is closed all around (pickled and passivated), GRP side-port pressure pipes for optimum inflow and low pressure loss, 8" ultra-low pressure reverse osmosis membranes, stainless steel fine filter, PP piping (IR butt welded) in the low pressure range and welded stainless steel piping (1.4404, pickled and passivated) in the high-pressure range, integrated magnetic-inductive flow meters for volume measurement of the system flows permeate and concentrate, workshop tested and ready for connection. Control unit consisting of steel switch cabinet (coated) with touch screen, reliable readability and operability thanks to high-resolution display in 16 million colours, accurate in every detail, measuring data logged on integrated SD card, release of a voltage-free collective fault signal for transmission to the central building and control system/DDC systems on site.

GENO-RK-X	40,000	50,000	75,000	100,000
Permeate capacity at 15 °C [m³/h]	40	50	75	100
Connected load approx. [kW]	24	32	39	47
Dimensions approx. (w[1] x h x d) [m]	6 x 2.7 x 1.4	6 x 2.7 x 1.4	7 x 2.9 x 2	7 x 3.5 x 2.3
Nominal connection diameter of feed water pipe (flange) [DN]	100	125	125	150

[1] *Please allow for an additional 1,200 mm in width on both sides for the removal of the RO module.*



Conductivity-controlled blending unit 1"

	Accessories for reverse osmosis systems
	Switch cabinet to control two membrane systems[1]
	Switch cabinet for priority circuit[1, 2]
	Switch-over valves for pure water make-up feed into two separate tanks
	Set of automatic valves for up to 1.2 m³/h
	Set of automatic valves for up to 4 m³/h
	Set of automatic valves for up to 7 m³/h
	Set of automatic valves for up to 15 m³/h
	Electronically controlled blending units (nickel-plated) For the generation of a defined residual conductivity. In case of a single blending unit, one conductivity and in case of double blending, two different conductivities can be set.
	Electronic blending unit 1" single
	Electronic blending unit 1" double
	Electronic blending unit 1½" single
	Electronic blending unit 1½" double
	Conductivity-controlled blending unit For the generation of a defined residual conductivity in case of fluctuating raw water hardness
NEW	Conductivity-controlled blending unit 1"
NEW	Conductivity-controlled blending unit 2"
	Communication modules for GENO-OSMO-X and osmoliQ
	Profibus DP
	BACnet-IP
	Voltage-free signal
	Analogue signals
	Dosing system for hardness stabilisation/sodium bisulphite dosing With dosing monitoring (GENO-OSMO-X, osmoliQ, GENO-OSMO-RK-X)
	Dosing system (with 1 dosing pump)
	Dosing system (with 2 dosing pumps)[4]
	Tangential mixing device for optimum mixing[3] In case of sodium hydroxide/sodium bisulphite dosing upstream of the reverse osmosis system, material: PVC
	Tangential mixing device DN 25 (for GENO-OSMO-X only)
	Tangential mixing device DN 40 (osmoliQ:LB4000-LB7000)
	Tangential mixing device DN 50 (osmoliQ:LB10000-LB12000)
	Tangential mixing device DN 65 (osmoliQ:LB16000)

[1] *In case the pure water tank does not have a GENO-Multi Niveau filling level indicator with level probe (measuring range up to 2.5 mWC), this device must be quoted additionally.*

[2] *Only possible in combination with the corresponding set of automatic valves.*

[3] *In order to achieve optimum mixing within a corresponding reaction period, a tangential mixer is required in case sodium hydroxide solution or sodium bisulphite is dosed. For additional tangential mixers, please inquire.*

[4] *Quote dosing agent twice.*



Blending unit



Emergency bypass

Blending unit

For GENO-OSMO-X, GENO-OSMO-HLX and osmoliQ

It may be necessary to blend the permeate if certain permeate parameters are desired. Blending is done with pretreated (softened) water or with raw water. Dimensioning/design is done at Grünbeck's headquarters.

Consisting of: Solenoid valve, flow meter, regulating fitting and non-return valve

Blended water volume [l/h]
10 - 100
20 - 250
50 - 500
100 - 1,000
150 - 1,600
200 - 2,500
400 - 4,000
600 - 6,400
1,000 - 10,000

Emergency bypass

For GENO-OSMO-X, GENO-OSMO-HLX and osmoliQ

Consisting of: Emergency bypass solenoid valve with throttle valve and hand lever, solenoid valve to drain the pipe. Emergency bypass fully mounted.

An emergency bypass for the reverse osmosis system might become necessary if the permeate supply in the pure water tank is not sufficient due to peak withdrawals. By means of a level signal in the pure water tank, the solenoid valve with throttle valve for emergency bypass is opened and the water supply ensured.

Solenoid valve with additional hand lever to manually open the make-up water feed. Solenoid discharge valve for automatic draining of the pipe to the pure water tank into the drain if the emergency bypass is not active.

Emergency bypass for reverse osmosis systems
GENO-OSMO-X/osmoliQ
up to 3 m^3/h
up to 10 m^3/h
up to 15 m^3/h
GENO-OSMO-HLX[1]
up to 3 m^3/h
up to 10 m^3/h
up to 15 m^3/h

[1] *Requirement: GENO-Multi Niveau with level probe or alternatively, an external level control with bistable changeover contacts (4 contacts) must be available on site.*

Note: Combining the blending unit with the emergency bypass is only possible if there is an additional switch cabinet as well as a GENO-Multi Niveau.



Dosing agents



Chlorine dioxide measurement

Hardness stabilisation/pretreatment of raw water

The pretreatment of raw water is necessary in order to ensure safe and economic operation. The precipitation (scaling) of slightly soluble minerals in reverse osmosis and nanofiltration systems can negatively affect the functioning of the modules and even render them completely useless. The precipitation of such salts must thus be prevented, either by means of softening or by hardness stabilisation. From a technical and economical perspective, hardness stabilisation is used starting from a system capacity of > 200 l/h. Smaller capacities are pretreated by means of water softeners. Hardness stabilisation is achieved by dosing phosphonates and polyacrclic acids.

Accessories for reverse osmosis
Dosing agents for membrane systems
MT 3000 for hardness stabilisation (not suitable in case of high silicate concentrations) [23.5 kg]
MT 3000 [1,100 kg]
MT 4000 (standard for the hardness stabilisation of drinking water) [23.5 kg][1]
MT 4000 [1,100 kg]
MT 4010 (standard for the hardness stabilisation of drinking water) [10 kg][1] (MT 4010 suitable for GENO-OSMO-X 200 up to and including GENO-OSMO-X 1200)
MT 5000 to prevent silicate deposits [23.5 kg]
SW 2000 to reduce free chlorine and chlorine dioxide [20 kg]
Water test kits
Water test kit for chlorine + pH value
Water test kit for hardness, p and m value
Sulphite reagent, small package
Chlorine dioxide test 0.02 - 0.55 ppm
Silt density measuring device (colloid index measuring device) to determine colloidal substances, e.g. in the feed water upstream of reverse osmosis systems
Silt density measuring device incl. set of fittings and filter paper

[1] *Also for ion selector NANO-X.*



- Recovery of up to 90 % in the second stage (depending on the water analysis)
- 2,700 l/h, only requiring the space of a Euro palette
- Frequency-controlled high-pressure pump
- Easy operation and start-up
- Interconnection with common BUS systems
- RTU modbus included
- Web access and emailing
- Integrated data logging
- High permeate quality
- Automatic, self-regulating system operation
- Nominal pressure PN 16
- Power supply 400 V, 50/60 Hz

GENO-OSMO-X permeate stage

GENO-OSMO-X permeate stage

For the demineralisation of permeate originating from the 1st stage of a reverse osmosis system GENO-OSMO-X in order to generate a high permeate quality

Consisting of: High-quality system rack made of anodised aluminium to house all system components. Concentrate recirculation into the 1st stage to increase the overall recovery. Ultra-low pressure reverse osmosis membrane(s) installed in pressure pipe(s) made of high-strength PE, frequency-controlled high-pressure centrifugal pump made of stainless steel 1.4401 with motor of premium efficiency class IE3 to supply the reverse osmosis membrane(s). Fully automatic monitoring and controlling of all system parameters, provision of threshold values in control unit **GENO-OSMO-X** 1st stage, recovery, concentrate recirculation, system data logged on integrated SD card of the **GENO-OSMO-X**, three-part hydro-block made of chemically nickel-plated red brass, piping between pump and reverse osmosis membrane(s).

GENO-OSMO-X permeate stage [1]	180	360	720	1100	1450	2000	2700
Permeate capacity at 15 °C [l/h]	180	360	720	1,100	1,450	2,000	2,700
Connected load approx. [kW]	0.45	0.4	0.4	0.5	0.6	0.8	0.9
Dimensions (w x h x d) [mm]	900 x 1,700 x 675		1,035 x 1,700 x 675		1,170 x 1,700 x 675		
Operating weight approx. [kg]	100	115	145	170	195	240	290

Options
Discharge of first permeate GENO-OSMO-X permeate stage

[1] *For discharge of first permeate/permeate relief for GENO-OSMO-X permeate stage, please refer to page 27.*

Note: The permeate stage can only be used in combination with a **GENO-OSMO-X** reverse osmosis system. The permeate stage must be installed in the immediate vicinity of the **GENO-OSMO-X**. Subsequent retrofitting of the permeate stage is not possible.

- EDI module with anion and cation selective membranes
- Chambers filled with ion exchange resin
- EDI-tronic controller with graphics display, including required inputs and outputs (additional extension stages available as an option)



Electrodeionisation system GENO-EDI-X

Electrodeionisation systems GENO-EDI-X

For the continuous, electro-chemical residual demineralisation of permeate originating from a reverse osmosis system.

System ready for connection and fully mounted on an aluminium system rack.
Consisting of: Microprocessor controller with LCD graphics display (70 x 38 mm, backlit), display of the EDI system flow chart, supply tank incl. level control, pressure booster system as well as indication of flow rates, pressure, conductivity. Plastic foil keyboard with 12 keys and serial interface RS 232, piping within the electrodeionisation system equipped with pressure sensors, regulating respectively solenoid valves and sampling valves, quality control of diluate via temperature-compensated conductivity meter, digital indication in the display of the control electronics, piping within the system completely made of high-pressure resistant PE plastic pipes, high-quality system rack made of anodised aluminium.

Technical specifications

- Feed water limit values:
  Conductivity (FCE) max. 40 µS/cm
- Power supply 230 V, 50 Hz
- Protection IP54
- Feed water temperature min. 10 °C/max. 25 °C
- Ambient temperature min. 5 °C/max. 35 °C
- Inlet flow pressure of permeate min. 2.5 bar/max. 5 bar
- Outlet pressure of diluate approx. 0.5/1.5 bar
- Dimensions (w x h x d) 900 x 1,700 x 675 mm
- Conductivity < 0.2 µS/cm
- TOC reduction 60 - 80 %
- SiO_2 reduction 90 - 99 %

GENO-EDI-X	100	180	360	720	1100	1450	2000	2700
Diluate capacity at 15 °C [l/h]	100	180	360	720	1,100	1,450	2,000	2,700
Connected load approx. [kW]	0.5	1.0	1.5	1.0	1.0	1.5	1.5	1.5
Dimensions (w x h x d) [mm]	900 x 1,700 x 675							
Operating weight approx. [kg]	95	105	115	170	170	190	190	215

Accessories
For system types 100 to 360
Quality-controlled discharge of permeate
Conductivity & temperature measurement in EDI concentrate
Discharge of EDI diluate
Profibus DP (cannot be combined with single fault signals)
Single fault signals (cannot be combined with Profibus DP)
For system types 720 to 2700
Quality-controlled discharge of permeate
Conductivity & temperature measurement in EDI concentrate
Discharge of EDI diluate
Profibus DP (cannot be combined with single fault signals)
Single fault signals (cannot be combined with Profibus DP)



- For application upstream of a reverse osmosis system GENO-OSMO-X and osmoliQ
- To reduce CO_2 contained in the softened raw water which negatively affects the technical process
- For pH dependent dosing of sodium hydroxide solution

NaOH dosing

NaOH dosing upstream of GENO-OSMO-X and osmoliQ

Consisting of: Self-priming dosing pump with fault signal output and visual indication of operation, empty signal, motor: 230 V, 50 Hz, protection: IP 54, level control for empty signal installed in the tank, dosing group with shut-off valve, 5 m of PTFE dosing hose, tangential mixer to mix the sodium hydroxide solution with the feed water, material: PVC, combined pH measuring electrode incl. installation fitting, pH measuring transducer installed in panel housing or in a central switch cabinet.

NaOH dosing upstream of GENO-OSMO-X and osmoliQ[1]
Accessories
Neutralisation agent FNK, 20 kg (sodium hydroxide solution 10 %)

[1] *For osmoliQ systems only with additional tangential mixer - refer to page 32.*



- Low operating costs
- Little space required
  (can be integrated directly into the reverse osmosis system)
- Easy installation
- Low pressure loss
- No chemicals required
- Less regeneration agents required in ion exchangers installed downstream
- Better deionate quality in electrodeionisation systems (EDI) installed downstream compared to NaOH dosing
- Compact design
- Continuous operation
- Incredibly simple set-up and hygienic operation

GENO-membrane degassing system MEC 500-1

GENO-membrane degassing system

To be used in the permeate downstream of a reverse osmosis system to remove CO_2 negatively affecting the process to the greatest extent possible. Hydrophobic porous membranes are used for membrane degassing as these are impervious to water but allow gases to pass through. In most cases, hollow fibre modules which have a high packing density are used. The water to be degassed is passed along the fibres. The gas diffuses through the membranes due to the partial pressure gradient. The water, however, is retained by the membrane. In order to generate the necessary partial pressure gradient, stripping gas (oil-free compressed air) is used which is continuously passed along the membrane and thus sweeps away the removed gas. On-site requirement to be provided by others: Stripping gas supply as oil-free and aerosol-free compressed air 3 - 10 bar.

GENO-membrane degassing system	MEC 500-1	MEC 500-2	MEC 2200-1	MEC 2200-2	MEC 5000-1	MEC 8000-1
For a permeate capacity of up to [l/h]	500	500	2,200	2,200	5,000	8,000
Removal of CO_2 up to approx. [%]	75 - 80	90	75 - 80	90	75 - 80	75 - 80
Dimensions (w x h x d) [mm][1]	400 x 600 x 200		600 x 1,000 x 250		400 x 1,000 x 300	
Operating weight approx. [kg]	12	15	20	26	35	35
Required amount of compressed air to be provided on site by client, approx. [Nm^3/h] (oil-free compressed air)	0.2 - 1.8	0.4 - 3.6	0.8 - 5.1	1.6 - 10.2	14	21

[1] *In combination with RO/EDI, possible dimensional deviations due to rack assembly have to be taken into account.*

Note: In case of subsequent application, technical clarification with Grünbeck required.
For the compressed air, we recommend an oil content higher than class 2 (0.1 mg/m^3), according to ISA 8573.1 Quality 1.4.2.



- Oil-free compressing
- Built-in automatic discharge of condensate

Compressor size II

Compressor

To supply membrane degassing systems with oil-free compressed air

Technical specifications

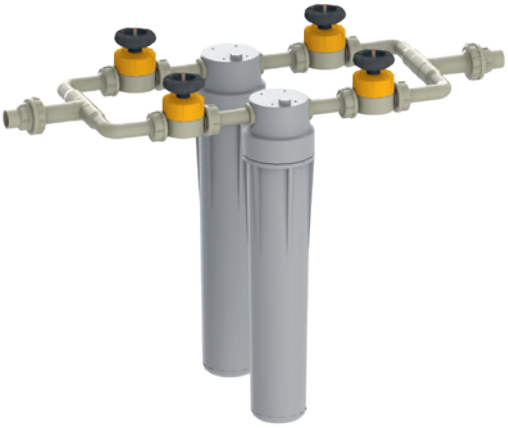
- Ambient temperature 5 - 35 °C
- Max. supply pressure 10 bar

Compressor for compressed air supply	Size I[1]	Size II[2]	Size III[3]
Suction capacity [l/min.]	110	230	420
Volume flow at 6 bar [l/min.]	59	152	252
Compressed air tank, volume [l]	24	40	90
Connected load [V/Hz/kW]	230/50/0.75	400/50/2.2	400/50/2.2
Noise level [dB (A)]	72	73	75
Dimensions (w x h x d) [mm]	640 x 680 x 290	820 x 740 x 475	1,080 x 840 x 570

[1] *Suitable for membrane degassing system type MEC 500-1*
[2] *Suitable for membrane degassing systems type MEC 500-2, MEC 2200-1*
[3] *Suitable for membrane degassing systems type MEC 2200-2, MEC 5000-1, MEC 8000-1*

Accessories[4]
Sound-insulating cover for compressor size I
Sound-insulating cover for compressor size II
Sound-insulating cover for compressor size III

[4] *Always quote the sound-insulating cover as well.*



Sterile water filter W 6000 MV



Add-on parts for loop

Sterile water filters

For ultra-fine filtration of permeate/diluate in pure water (loop) systems for the retention of bacteria (rejection rate 99.9 %)
Consisting of: Sterile filter housing with matching sterile filter element 0.2 µm incl. connection piping, without shut-off valves (type OV) or, alternatively, with shut-off valves (type MV), nominal connection diameter R 1".

Sterile filters	W 3000 OV	W 3000 MV	W 6000 OV	W 6000 MV
For a permeate/diluate capacity of up to [l/h]	3,000	3,000	6,000	6,000
Number of filter elements [quantity]	1	1	2	2

Accessories
Filter element, retention capacity 0.2 µm
Pressure gauge add-on kit (per filter housing)

Add-on parts for loop

To regulate the demi water capacity in a loop
A loop is the main supply pipe for water and branches out in an annular way from the feeding point. The loop comprises all branch-offs and withdrawal points. Loops ensure hygienically safe conditions on a permanent basis and prevent possible hygienic risks due to stagnation by means of regular circulation of the water. The add-on parts are designed for the adjustment of the demi water capacity in a loop provided by others on site. For easy implementation, the add-on parts are already pre-assembled on a mounting plate.

Consisting of: Pressure maintaining valve, membrane valve (PN 10), flow meter, pressure gauge 0 - 6 bar

Flow range [l/h]	Add-on parts for loop	Material
150 - 1,600	DN 15	PVC
150 - 1,600	DN 15	PP
200 - 2,500	DN 25	PVC
200 - 2,500	DN 25	PP
400 - 4,000	DN 32	PVC
400 - 4,000	DN 32	PP
1,000 - 10,000	DN 40	PVC
1,000 - 10,000	DN 40	PP

Note: For stainless steel version, please inquire.

- Recovery of up to 80 % (depending on the water analysis)
- 2,400 l/h, only requiring the space of a Euro palette
- Frequency-controlled high-pressure pump
- Easy operation and start-up
- Interconnection with common BUS systems
- RTU modbus included
- Web access and emailing
- Integrated data logging
- Multi-lingual touch screen
- Automatic, self-regulating system operation
- Nominal pressure PN 16
- Power supply 400 V, 50/60 Hz



Ion selector NANO-X

Ion selector NANO-X

For the partial demineralisation or partial softening of raw water whose composition complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV)

Nanofiiltration is a pressure-driven membrane process that retains dissolved molecules, ions and other small particles. Compared to the reverse osmosis process, nanofiltration uses lower operating pressures. A hardness stabilisation (by means of MT 4000/MT 4100) or a water softener has to be installed as pretreatment upstream of the ion selector NANO-X.

Consisting of: Control unit with 4.3" touch screen to indicate the operating state and system values. Voltage-free contacts to relay pre-alarms and safety shutdowns. Ultra-low pressure nanofiltration membrane(s) installed in pressure pipe(s) made of high-strength PE. High-pressure centrifugal pump made of stainless steel 1.4401, frequency-controlled to make use of the primary feed water pressure, with motors of premium efficiency class IE3 to supply the nanofiltration membrane(s). Fully automatic monitoring and controlling of all system parameters, provision of threshold values in the control unit, recovery, concentrate recirculation and system data logged on integrated SD card. Three-part hydro-block made of chemically nickel-plated red brass. Piping between pump and nanofiltration membrane(s). High-quality system rack made of anodised aluminium to house all system components. Ventilation device to be installed on the concentrate pipe provided by others on site. Drinking water filter incl. pressure reducer, fully mounted in system inlet.

Ionenselector-NANO-X[1, 2]	300	600	900	1200	1800	2400
Permeate capacity at 15 °C [l/h]	300	600	900	1,200	1,800	2,400
Connected load approx. [kW]	0.87	0.94	1.4	1.74	2.1	2.3
Dimensions (w x h x d) [mm]	900 x 1,700 x 675	1,035 x 1,700 x 675		1,170 x 1,700 x 675		
Operating weight approx. [kg]	115	145	170	195	240	290

[1] *For antiscalant dosing for ion selector NANO-X, please refer to page 27.*

[2] *For discharge of first permeate for ion selector NANO-X, please refer to page 27.*



Basic pure water tank RT 1000

Basic pure water tank RT 1000

For intermediate storage of media flowing off unpressurised

Pre-assembled PE tank with PVC overflow pipe as well as connections for inlet and pressure booster system (up to a maximum withdrawal volume of 5 m³/h), with control electronics **GENO-Multi Niveau**, level probe (in tank), incl. 10 m connection cable, four programmable switching contacts for make-up water feed ON/OFF and "tank empty" signal for dry-run protection and release of dry-run protection. Additional tank (without level control and overflow loop) with connecting kit (2 flexible hose lines) for interconnection with the basic tank. In case of version with sterile air filter, the tank is ventilated by means of a 0.2 µm ultra-fine filter.

Technical specifications

- Volume 1 m³
- Dimensions of basic tank (w x h x d) 780 x 1,900 x 1,000 mm, plus connecting pieces

Pure water tanks	
Basic pure water tank RT 1000	without sterile air filter[1]
Additional tank	without sterile air filter[2]
Basic pure water tank RT 1000	with sterile air filter[1]
Additional tank	with sterile air filter[2]

[1] *Max. withdrawal capacity/suction capacity 5 m³/h.*

[2] *A maximum of 3 additional tanks is possible. For larger tanks, please inquire.*

Note: These pure water tanks are used for e.g. **GENO-OSMO RO 125 K, AVRO 125**, **GENO-OSMO-HLX**, **GENO-EDI-X** and **ultraliQ**.

Filling level indicator GENO-Multi Niveau

Digital filling level indicator with pressure transducer to record tank filling levels and four programmable switching points. By means of the level probe at the bottom of tank, the pressure generated by the water column is registered as analogue signal (4 - 20 mA). The **GENO-Multi Niveau** determines the filling height (cm), the filling level (%) or the filling volume (m³). Four connection terminals to read the filling heights of the tank.

Technical specifications

- Power supply 230 V, 50 Hz/max. 25 VA
- Protection IP 55
- Dimensions (w x h x d) 120 x 300 x 71 mm
- Solenoid valve connection 24 V AC/13 VA

Filling level indicator
Filling level indicator GENO-Multi Niveau with level probe (measuring range up to 2.5 mWC)
Filling level indicator GENO-Multi Niveau with level probe (measuring range up to 4 mWC)



Basic pure water tank RT-X 1000

Basic pure water tank RT-X 1000

For GENO-OSMO-X for intermediate storage of permeate flowing off unpressurised

Pre-assembled PE tank with PVC overflow pipe as well as connections for inlet and pressure booster system (up to a maximum withdrawal volume of 5 m³/h), with level probe (in tank), incl. 10 m connection cable for connection to the **GENO-OSMO-X** control unit, four programmable switching contacts for make-up water feed ON/OFF and "tank empty" signal for dry-run protection and release of dry-run protection. Additional tank (without level control and overflow loop) with connection kit (2 flexible hose lines) for interconnection with the basic tank. In case of version with sterile air filter, the tank is ventilated by means of a 0.2 µm ultra-fine filter.

Technical specifications

- Volume approx. 1 m³
- Dimensions of basic tank (w x h x d): 780 x 1,900 x 1,000 mm plus connecting pieces

Pure water tanks	
Basic pure water tank RT-X	without sterile air filter[1]
Additional tank	without sterile air filter[2]
Basic pure water tank RT-X	with sterile air filter[1]
Additional tank	with sterile air filter[2]

[1] *Max. withdrawal capacity/suction capacity 5 m³/h.*

[2] *A maximum of 3 additional tanks is possible. For larger tanks, please inquire.*

Note: The basic pure water tanks of the X series are only used for reverse osmosis system **GENO-OSMO-X** and **ion selector NANO-X.**

Accessories

Tank connection to stainless steel pipe to provide the option to directly connect stainless steel pipes for inlet (R 1½", female thread) and withdrawal (R 2", female thread) on site
Tank connection, female thread, for RT/RTX



Basic pure water tank K-X with level probe



Basic pure water tank K-X with optional GENO-Multi Niveau

Basic pure water tank K-X

For intermediate storage of media flowing unpressurised from treatment systems

Black PE tank, pre-assembled with overflow and connections for inlet, aeration and deaeration as well as pressure booster system, inspection opening with screw lid, level probe (in tank) with 10 m connection cable. Four programmable switching contacts for make-up water feed ON/OFF and "tank empty" signal for dry-run protection and release of dry-run protection. Additional tank without level probe and overflow.

Basic pure water tank K-X	1100	1500	2000	2500	3000	4000
Volume [l]	1,100	1,500	2,000	2,500	3,000	4,000
Length [mm]	1,400	1,550	2,070	1,870	2,230	2,430
Width [mm]	720	720	720	995	995	995
Overall height [mm]	1,600	1,850	1,900	1,900	1,900	2,200

Additional tank K[1]	1100	1500	2000	2500	3000	4000
Volume [l]	1,100	1,500	2,000	2,500	3,000	4,000
Length [mm]	1,400	1,550	2,070	1,870	2,230	2,430
Width [mm]	720	720	720	995	995	1,000
Overall height [mm]	1,340	1,600	1,600	1,600	1,600	1,900

[1] *When using additional tank(s), a connection kit is compulsory; please refer to page 45.*

Option

Filling level indicator GENO-Multi Niveau without level probe

Note: The above mentioned option **GENO-Multi Niveau** is compulsory when using reverse osmosis systems **GENO-OSMO RO 125K**, **parallel switching of GENO-OSMO-X** or **osmoliQ**, **GENO-OSMO HLX**, **GENO-EDI-X**, **GENO-Ultrafil** and **ultraliQ** or other applications without the aforementioned systems.



Sterile air filter with CO_2-trap

Accessories for basic tanks K/K-X
PVC overflow loop to add onto the tank
Capacity up to 5.0 m³/h DN 50
Capacity up to 10.0 m³/h DN 80
Capacity up to 15.0 m³/h DN 100
Sterile filter add-on kit (with overflow loop only)
Ventilation capacity up to 7.5 m³/h
CO_2-trap (with overflow loop only)
Ventilation capacity up to 5.0 m³/h
Ventilation capacity up to 15.0 m³/h
Combined unit of sterile air filter with CO_2-trap (with overflow loop only)
Ventilation capacity up to 5.0 m³/h

Interconnection kit for basic/additional tanks K/K-X
For 1 basic and the first additional tank K/K-X 1100 - 4000
DN 50 PVC for connection to the tank, withdrawal volume up to 8 m³/h
DN 65 PVC for connection to the tank, withdrawal volume up to 16 m³/h
DN 80 PVC for connection to the tank, withdrawal volume up to 22 m³/h
DN 100 PVC for connection to the tank, withdrawal volume up to 33 m³/h

Interconnection kit for further additional tanks
For every further additional tank K/K-X 1100 - 4000
DN 50 PVC for connection to the tank, withdrawal volume up to 8 m³/h
DN 65 PVC for connection to the tank, withdrawal volume up to 16 m³/h
DN 80 PVC for connection to the tank, withdrawal volume up to 22 m³/h
DN 100 PVC for connection to the tank, withdrawal volume up to 33 m³/h

Fresh water make-up feed for GENO-Multi Niveau[1]
For level-dependent make-up water feed into storage tanks installed downstream; only in combination with make-up water feed control GENO-Multi-Niveau; consisting of a solenoid valve with shut-off valve as pre-assembled unit ready for connection
Connection ½", up to 3 m³/h
Connection ¾", up to 5 m³/h
Connection 1", up to 8 m³/h
Connection 1¼", up to 12 m³/h
Connection 1½", up to 16 m³/h
Connection 2", up to 22 m³/h

[1] *For permeate-resistant version, please inquire.*



Basic pure water tank KR (round)



Basic pure water tank RB (round)

Basic pure water tank RB/KR (round)

For intermediate storage of the permeate/water flowing unpressurised from treatment systems

Black PE-HD tank, pre-assembled with PVC overflow loop (only for version with sterile air filter), discharge valve as well as connections for inlet and pressure booster system, entry dome (hand hole with type series RB 100 - 500 l), level control with 3 magnetic contacts for make-up water feed and “tank empty” signal for dry-run protection.

Basic pure water tank (round)	**100**	**200**	**300**	**500**	**1000**	**1100**	**2000**
Volume [l]	100	200	300	500	1,000	1,100	2,000
Diameter [mm]	460	545	670	800	1,000	1,250	1,650
Cylindrical height [mm]	727	890	900	1,015	1,500	1,000	1,000
Overall height [mm]	850	1,020	1,040	1,150	1,650	1,165	1,215

Basic pure water tank (round)	**2200 B**	**2200 H**	**3000 B**	**3000 H**	**4000**	**4200**
Volume [l]	2,200	2,200	3,000	3,000	4,000	4,200
Diameter [mm]	1,450	1,260	1,660	1,460	1,670	1,970
Cylindrical height [mm]	1,500	2,000	1,500	2,000	2,000	1,500
Overall height [mm]	1,690	2,165	1,715	2,190	2,215	1,755

Basic pure water tank (round)	**5000**	**7000**	**7200**	**10600**	**10800**	**15000**
Volume [l]	5,000	7,000	7,200	10,600	10,800	15,000
Diameter [mm]	1,670	1,980	2,220	2,680	2,240	2,890
Cylindrical height [mm]	2,500	2,500	2,000	2,000	3,000	2,560
Overall height [mm]	2,715	2,755	2,290	2,350	3,290	2,875

Note: For other sizes, please inquire. Various variants are possible, e.g. level measurement with GENO-Multi Niveau.



- Power supply 230 V, 50 Hz
- Protection IP 55
- Medium/ambient temperature 5 - 40 °C

Pressure booster system GENO-FU-X (single system)



Pressure booster system GENO-HR-X (twin system)

Pressure booster systems GENO-HR-X and GENO-FU-X

Pressure booster systems for low-noise water supply of small or medium-sized water distribution networks in buildings with raw water, softened water and partially demineralised water (permeate) originating from reverse osmosis systems. The systems are also suitable for continuous operation. Multi-stage, horizontal centrifugal pump(s) with standard suction, mounted on an aluminium system rack with adjustable feet to compensate for uneven floors, built-on pump controller with power switching, operating switch, backlit graphics display, operation log via SD card, voltage-free signal/collective fault signal contact, two inputs for release of the pump, can be interconnected with bus-compatible **GENO-OSMO-X/osmoliQ** controller, pressure gauge, non-return valve, shut-off valves on suction and pressure side, contact water meter to indicate the flow rate, system piping made of stainless steel/PP/PE. Approved for drinking water and in addition equipped with a diaphragm expansion tank and a discharge valve. In case of twin pressure booster aggregates, an adjustable cascade connection is possible.

The pressure booster systems **GENO-HR-X** are automatically controlled via pressure and flow controllers. Start and stop functions of the pump are controlled based on the actual water withdrawal. A low-on water protection is integrated. The pressure booster systems **GENO-FU-X** are speed-controlled by means of pressure sensor and frequency converter and therefore are highly energy saving. Smooth start and stop of the pump prevents water hammer. The controller keeps the set pressure (adjustable by means of +/- button) constant. The adapted rotation speed results in a material-friendly operation of the pump and of the peripheral devices installed downstream.

GENO-HR-X		**2/40-1N**	**4/40-1N**	**2/40-2N**	**4/40-2N**
		Single system		**Twin system**	
Connected load [kW]		1.1	1.4	2.1	2.7
Nominal diameter	on suction side [DN]	25	32	25	32
	on pressure side [DN]	25	25	25	25
Delivery rate GENO-HR-X					
	[m^3/h]	1.0	2.4	2 x 1.0	2 x 2.4
	at … mWC	54.0	50.0	54.0	50.0
	[m^3/h]	4.2	7.2	2 x 4.2	2 x 7.2
	at … mWC	24.0	16.0	24.0	16.0

GENO-FU-X		**2/40-1N**	**4/40-1N**	**2/40-2N**	**4/40-2N**
		Single system		**Twin system**	
Connected load [kW]		0.7	1.4	1.4	2.7
Delivery rate GENO-FU-X					
	[m^3/h]	1.0	2.0	2 x 1.0	2 x 2.0
	at … mWC	56.0	66.0	56.0	66.0
	[m^3/h]	4.4	8.5	2 x 4.4	2 x 8.5
	at … mWC	25.0	29.0	25.0	29.0

Note: The pressure booster systems **GENO-HR-X/FU-X** are suitable for use with **GENO-OSMO-X/HLX**, **GENO-OSMO RO 125 K**, **GENO-OSMO AVRO 125**, **osmoliQ**, **ion selector NANO-X** or **ultraliQ**.



- Power supply 230 V, 50 Hz
- Protection IP 55
- Medium/ambient temperature 5 - 40 °C



Pressure booster system GENO-FU-X NE (single system)

Pressure booster system GENO-FU-X NE (twin system)

Pressure booster systems GENO-FU-X NE

Speed-controlled

Pressure booster systems to supply small or medium-sized water distribution networks with diluate originating from EDI-X systems or two-stage reverse osmosis systems. The systems are designed for continuous operation. Multi-stage, horizontal centrifugal pump(s) with standard suction, mounted on an aluminium system rack with adjustable feet to compensate for uneven floors, built-on pump controller with power switching, operating switch, backlit graphics display, operation log via SD card, voltage-free signal and collective fault signal contact, two inputs for release of the pump, can be interconnected with bus-compatible **GENO-OSMO-X/ osmoliQ** controller, pressure gauge, non-return valve, shut-off valves on suction and pressure side, contact water meter to indicate the flow rate, system piping made of stainless steel/PP/PE, with diaphragm expansion tank and discharge valve, approved for drinking water. In case of twin pumps, an adjustable cascade connection is possible.

The low-noise pressure booster systems **GENO-FU-X NE** are speed-controlled by means of pressure sensor and frequency converter and therefore are highly energy saving. Smooth start and stop of the pump prevents water hammer. The controller keeps the set pressure (adjustable by means of +/- button) constant. The adapted rotation speed results in a material-friendly operation of the pump and of the peripheral devices installed downstream.

GENO-FU-X		2/40-1NE	4/40-1NE	2/40-2NE	4/40-2NE
		Single systems		Twin systems	
Connected load [kW]		0.7	1.4	1.4	2.7
Nominal diameter	on suction side [DN]	25	32	25	32
	on pressure side [DN]	25	25	25	25
Delivery rate GENO-FU-X					
	[m^3/h]	1.0	2.0	2 x 1.0	2 x 2.0
	at … mWC	56.0	66.0	56.0	66.0
	[m^3/h]	4.4	8.5	2 x 4.4	2 x 8.5
	at … mWC	25.0	29.0	25.0	29.0

Note: The pressure booster systems **GENO-FU-X NE** are suitable for use with **GENO-EDI-X** as well as downstream of two-stage reverse osmosis systems.



Pressure booster system GENO-FU (twin system)

Pressure booster systems GENO-FU (400 V, 50 Hz)

Speed-controlled

Vertical, low-noise, high-pressure centrifugal pump(s) with standard suction, made of stainless steel, with electric motor and frequency converter of efficiency class IE3, for raw water, soft water or permeate. Electronic pump control by means of frequency converter, integrated control unit with microprocessor controller, changeover and peak load activation, prevention of water hammer due to smooth start and stop of the pump, flown-through diaphragm expansion tank to reduce the switch-on frequency of the pump. Fully mounted on an aluminium system rack with adjustable feet to compensate for uneven floors, switch box with power unit(s), pressure gauge, non-return valve, shut-off valves on suction and on pressure side, discharge valve for maintenance purposes, PVC piping

Technical specifications

- Medium/ambient temperature 5 - 35 °C/5 - 40 °C
- Protection IP 55
- Power supply 400 V, 50 Hz

	5/60-1N	10/40-1N	10/60-1N	16/40-1N	16/70-1N	22/40-1N	22/70-1N	33/40-1N[1]	33/70-1N[1]
Single systems									
Connected load [kW]	1.5	2.2	3.0	4.0	5.5	4.0	7.5	5.5	11.0
Nominal diameter									
on suction side [DN]	40	50	50	65	65	80	80	100	100
on pressure side [DN]	32	40	40	50	50	65	65	80	80
Delivery rate [m^3/h]	2.4	5.0	5.0	8.0	8.0	11.0	11.0	15.0	15.0
at ... mWC	72.0	56.1	78.3	54.7	81.5	56.8	88.8	55.2	85.0
Delivery rate [m^3/h]	8.5	14.0	14.0	24.0	24.0	29.0	29.0	40.0	40.0
at ... mWC	33.0	29.0	39.8	28.7	44.2	23.0	42.6	29.6	55.1

	5/60-2N	10/40-2N	10/60-2N	16/40-2N	16/70-2N	22/40-2N	22/70-2N	33/40-2N[1]	33/70-2N[1]
Twin systems									
Connected load [kW]	3.0	4.4	6.0	8.0	11.0	8.0	15.0	11.0	22.0
Nominal diameter									
on suction side [DN]	40	50	50	65	65	80	80	100	100
on pressure side [DN]	40	50	50	65	65	80	80	100	100
Delivery rate [m^3/h]	2.4	5.0	5.0	8.0	8.0	11.0	11.0	15.0	15.0
(per pump) at ... mWC	72.0	56.1	78.3	54.7	81.5	56.8	88.8	55.2	85.0
Delivery rate [m^3/h]	8.5	14.0	14.0	24.0	24.0	29.0	29.0	40.0	40.0
(per pump) at ... mWC	33.0	29.0	39.8	28.7	44.2	23.0	42.6	29.6	55.1

· *In case the pressure booster system GENO-FU is installed in pressure pipes (e.g. in the city water networks to increase the supply pressure), an external pressure switch is required for dry-run protection.*

[1] *Systems are not resistant to permeate.*

Note: Not suitable for ultra-pure water such as diluate downstream of **GENO-EDI-X** systems or 2-stage reverse osmosis systems. If required, please consult with Grünbeck.



Rack-mounted modular system GENO-OSMO-X p

Configuration of rack-mounted modular systems

Rack-mounted modular systems for the pre-assembled delivery of complete system configurations

System rack made of anodised aluminium profile to house and fasten the individual system components, adjustable feet to compensate for uneven floors, entire PP/PE piping between the system components, including filling of exchanger tanks, wiring and workshop testing.

Rack-mounted modular system GENO-OSMO-X p

Aluminium rack, fine filter **BOXER KDX** 1" (starting from size 2200: **BOXER KDX** 1¼"), system separator **GENO-DK 2** 1" (starting from size 2200: DK 2 1¼"), water softener **Delta-p-I** 1" (starting from size 2200: **Delta-p-I** 1¼"), monitoring of limit value for soft water hardness **softwatch**, reverse osmosis system **GENO-OSMO-X** according to type designation and corresponding activated carbon filter AKF.

	200	400	800	1200	1600	2200	3000
Permeate capacity at 15 °C [l/h]	200	400	800	1,200	1,600	2,200	3,000
Dimensions (w x h x d) [mm][1]	2,150 x 1,700 x 900			2,285 x 1,700 x 900		2,420 x 1,700 x 900	

Rack-mounted modular system GENO-OSMO-X WE

Aluminium rack, fine filter **BOXER KDX** 1" (starting from size 2200: **BOXER KDX** 1¼"), system separator **GENO-DK 2** 1" (starting from size 2200: DK 2 1¼"), water softener duo **WE-X** 65 (starting from size 1200: duo **WE-X** 150, starting from size 2200: duo **WE-X** 300), monitoring of limit value for soft water hardness **softwatch**, reverse osmosis system **GENO-OSMO-X** according to type designation and corresponding activated carbon filter AKF.

	200	400	800	1200	1600	2200	3000
Permeate capacity at 15 °C [l/h]	200	400	800	1,200	1,600	2,200	3,000
Dimensions (w x h x d) [mm][1]	2,150 x 1,700 x 900			2,285 x 1,700 x 900		2,420 x 1,925 x 900	

[1] *Dimensions without brine tank.*

Add-on system GENO-RT-X

Basic pure water tank **GENO-RT-X** with sterile air filter and pressure booster system for placement on the floor at the side of a rack-mounted modular system, connecting piping included.

Add-on system	RT-X-HR-X 2/40-1	RT-X-HR-X 4/40-1	RT-X-HR-X 2/40-2	RT-X-HR-X 4/40-2
Type	**Single system**		**Twin system**	
Delivery rate [m^3/h]	1.0 - 4.2	2.4 - 7.2	2 x 1.0 - 4.2	2 x 2.4 - 7.2
at ... mWC	54.0 - 24.0	50.0 - 16.0	54.0 - 24.0	50.0 - 16.0

Add-on system	RT-X-FU-X 2/40-1	RT-X-FU-X 4/40-1	RT-X-FU-X 2/40-2	RT-X-FU-X 4/40-2
Type	**Single system**		**Twin system**	
Delivery rate [m^3/h]	1.0 - 4.4	2.0 - 8.5	2 x 1.0 - 4.4	2 x 2.0 - 8.5
at ... mWC	56.0 - 25.0	66.0 - 29.0	56.0 - 25.0	66.0 - 29.0



Flexible rack-mounted modular system GENO-SKID

Flexible rack-mounted modular system GENO-SKID

Aluminium rack including assembly, PP/PE piping, wiring and workshop testing of various system components yet to be defined and not included in the price.

	Description
GENO-SKID 65 - 300/1"	Possible set-ups: Fine filter, Euro system separator, water softener Delta-p 1" or duo WE-X 65 up to 300, monitoring of limit value for soft water hardness
GENO-SKID 450/1¼"	Possible set-ups: Fine filter, Euro system separator, water softener Delta-p 1¼" or duo WE-X 450, monitoring of limit value for soft water hardness
GENO-SKID 750/1½"	Possible set-ups: Fine filter, Euro system separator, water softener Delta-p 1½" or duo WE-X 750, monitoring of limit value for soft water hardness
GENO-SKID 1000/2"	Possible set-ups: Fine filter, Euro system separator, water softener Delta-p 2", monitoring of limit value for soft water hardness

Flexible rack-mounted modular system GENO-SKID

Aluminium rack including assembly, PP/PE piping, wiring and workshop testing of various system components yet to be defined and not included in the price such as filter systems (FE-Z, AK-Z etc.), basic pure water tanks with pressure booster systems, full demineralisation cartridges, **GENO-EDI-X**, etc. Please take dimensions into consideration.

	Dimensions (w x d) [mm]
GENO-SKID 1/1000	1,000 x 1,000
GENO-SKID 2/1500	1,500 x 1,000
GENO-SKID 3/2000	2,000 x 1,000



Mixed bed cartridge desaliQ:BA6

Mixed bed cartridges desaliQ:BA

Compact mixed bed ion exchanger system for full demineralisation of water of drinking water quality or residual demineralisation of partially demineralised water. For instance for the initial filling or make-up water feed of heating systems. Stainless steel cartridge with high-quality mixed bed resin, interior distribution system, plastic ring with handles, plastic base, oval clip-type lid for easy replacement of the resin, flow stabiliser, vent valve, connection diameter ¾", nominal pressure PN 10, max. water temperature 80 °C.

desaliQ:BA[1]	6	12	13	16	20
Nominal connection diameter	¾"	¾"	¾"	¾"	¾"
Capacity < 10 µS/cm [µS/cm x m³]	215	460	1,040	1,560	2,080
Capacity < 50 µS/cm [µS/cm x m³]	340	800	1,650	2,475	3,300
Nominal flow [m³/h]	0.6	1.2	1.3	1.6	2.0
Weight upon delivery [kg]	12	23	48	68	89
Dimensions, approx. (Ø/h) [mm]	240/400	240/755	410/605	410/820	410/1,065

[1] *For connection to the fitting, the desaliQ hose kit is required.*

Accessories
desaliQ hose kit

Calculation example

- Conductivity of raw water: 500 µS/cm
- Cartridge used: desaliQ:BA6
- 215/500 = 0.43 m³ (corresponds to 430 litres at 10 µS/cm)
- 340/500 = 0.68 m³ (corresponds to 680 litres at 50 µS/cm)

Mixed bed cartridges desaliQ:PA

Technical specifications identical to **desaliQ:BA**, but system filled with ultra-pure water resin and resistant to temperatures of maximum 30 °C. The mixed bed ion exchangers with ultra-pure water resin produce fully demineralised water of the highest quality and purity (< 0.1 µS/cm). The ultra-pure water resin (disposable resin) cannot be regenerated when exhausted.

desaliQ:PA	6	12	13	16	20
Nominal connection diameter	¾"	¾"	¾"	¾"	¾"
Nominal flow [m³/h]	0.6	1.2	1.3	1.6	2.0
Weight upon delivery [kg]	12	23	48	68	89
Dimensions, approx. (Ø/h) [mm]	240/400	240/755	410/605	410/820	410/1,065



Conductivity meter D 100 AN

Accessories for mixed bed cartridges desaliQ

The measuring range of the conductivity meters is 0 - 10/100 µS/cm. Voltage supply 10 - 25 V DC by means of the power supply plug included in the scope of supply, connection ¾". For the connection of the mixed bed cartridges including the conductivity meter, a separate connection kit (including adapter, EPDM hose with stainless steel braiding and flat seals) is available.

Accessories
Conductivity meter D 100 LED (0 - 100 µS/cm)
Conductivity meter D 10 AN (0 - 10 µS/cm)
Conductivity meter D 100 AN (0 - 100 µS/cm)
Conductivity meter D 10 ANR (0 - 10 µS/cm) [1]
Conductivity meter D 100 ANR (0 - 100 µS/cm) [1]
desaliQ connection kit [2]

Regeneration for mixed bed cartridges
Regeneration of high-quality mixed bed resin for desaliQ:BA6
Regeneration of high-quality mixed bed resin for desaliQ:BA12
Regeneration of high-quality mixed bed resin for desaliQ:BA13
Regeneration of high-quality mixed bed resin for desaliQ:BA16
Regeneration of high-quality mixed bed resin for desaliQ:BA20
New filling of ultra-pure water resin for desaliQ:PA6
New filling of ultra-pure water resin for desaliQ:PA12
New filling of ultra-pure water resin for desaliQ:PA13
New filling of ultra-pure water resin for desaliQ:PA16
New filling of ultra-pure water resin for desaliQ:PA20

[1] *With voltage-free relay output.*

[2] *One connection kit required per mixed bed cartridge. Absolutely necessary when using an LED, AN or ANR conductivity meter.*

Hygiene and Disinfection

Reasons for disinfection

The aim of water disinfection is to render any pathogens contained therein, e.g. viruses and bacteria, harmless. This can be achieved either with chemicals (e.g. chlorine or chlorine dioxide) or by treatment with UV-C light or by using an adsorption system. Disinfection processes form the final stage and are located downstream of water treatment systems. The limit and guideline values for the microbiological constituents of water are regulated by statutory provisions (e.g. the German Drinking Water Ordinance (TrinkwV)) and technical rules (e.g. VDI 6022) depending on the requirements and intended application.

UV light

The disinfecting effect of the UV light (**GENO-UV systems**) is due to the application of a special kind of lamp whose light – similar to sunlight – acts as a disinfectant.

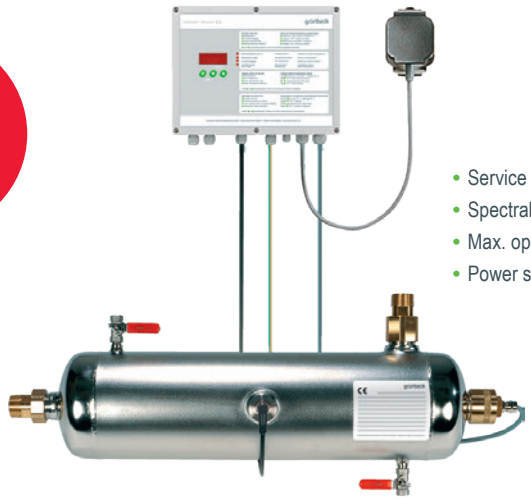
- **GENO-UV systems** (household/industry)
- Elimination of legionellae
- Combined process of disinfection by means of air washers **(GENO-LUWADES$_2$)**

Dosing of disinfectants

In principle, pathogens are killed by dosing liquid disinfectants via volume-controlled dosing pumps. A distinction is made between adding ready-made dosing solutions (**GENO-Chlor A**) or dosing solutions prepared on site (**GENO-Baktox**) as well as continuously generated disinfection solutions **(chlorine dioxide)**.

- Dosing of **GENO-Chlor A (GENODOS DM-T)**
- Dosing of **GENO-Baktox (GENODOS DM-B/BO)**
- Generation and dosing of chlorine dioxide **(GENO-Baktox MRX/RX/X)**

Sales only after consultation with Grünbeck – ***Water analysis required***



- Service life of lamps up to 16,000 h
- Spectral absorption coefficient$_{254}$ max. 2.7 m^{-1}
- Max. operating pressure 10 bar
- Power supply 230 V, 50 Hz

GENO-UV-60 S

GENO-UV systems “drinking water version”

For the disinfection of clear drinking water which is free of turbidities, iron and manganese and only slightly microbiologically loaded, for use in the HVACR sector and for private water supplies. The systems are certified according to DVGW work sheet W 294-2

Consisting of: Electro-polished stainless steel pipe with high-intensity UV lamps 2 flushing/discharge valves, 2 water meter screw connections, flow limiter, calibrated UV-C system sensor as per W 294-3, protective quartz pipe, flow distribution device, control unit **GENO-Multi-BS** with operating hour meter and switch-on counter, display of the irradiation intensity in W/m^2 as well as power output for connection of an optional safety valve (compulsory for DVGW-compliant operation of the UV system) and an optional temperature-controlled flushing device.

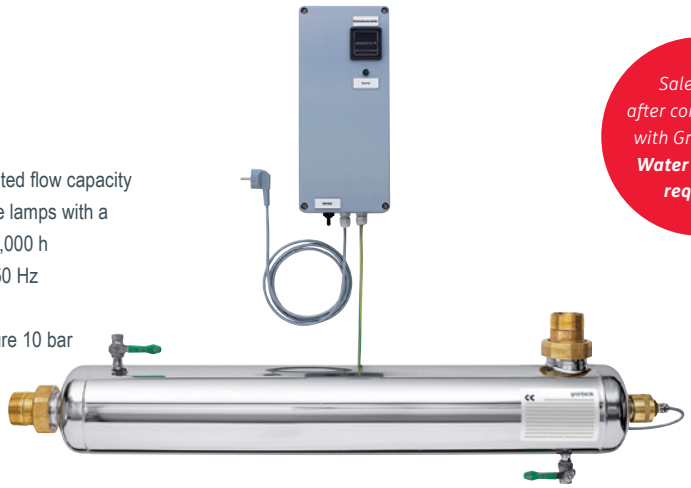
GENO-UV-	60 S	120 S	200 S
Nominal connection diameter [R]	1"	1½"	2"
Installation position	horizontal, outlet at the top, self-venting		
Max. flow at 5 - 30 °C [m^3/h]	3.3	8.0	12.0
Max. flow at 30 - 70 °C [m^3/h]	–	–	8.0
Inlet water temperature [°C]	5 - 30	5 - 30	5 - 70
Ambient temperature [°C]	5 - 40	5 - 40	5 - 40
Connected load [VA]	75	145	215
Overall length incl. screw connection [mm]	795	1,185	1,430

GENO-UV systems to be applied for permeate or diluate[1]

[1] *Connecting parts in contact with the medium are resistant to permeate/diluate; no DVGW-approval for GENO-UV systems for use with permeate or diluate (variant#.10).*

- Hydraulic part with tested flow capacity
- Use of special long-life lamps with a service life of up to 16,000 h
- Power supply 230 V, 50 Hz
- Protection IP 54
- Max. operating pressure 10 bar

Sales only after consultation with Grünbeck – ***Water analysis required***



GENO-UV-120 I

GENO-UV systems “industrial version”

For the disinfection of process and swimming pool water which is essentially free of turbidities and only slightly contaminated

Consisting of: Electro-polished stainless steel pipe with centred high-intensity UV lamp, 2 flushing/discharge valves for system cleaning, 2 water meter screw connections, protective quartz pipe which can be removed, flow distribution device, control unit with operating hour meter and ballast, voltage-free relay contact.

GENO-UV-	60 I	120 I	200 I
Nominal connection diameter [R]	1"	1½"	2"
Nominal flow [m³/h][1]	3.3	8.0	12.0
Water/ambient temperature inlet [°C][2]	5 - 30/5 - 40	5 - 30/5 - 40	5 - 30/5 - 40
Connected load [VA]	75	145	215
Installation length with screw connection [mm]	560	960	1,212
GENO-UV systems to be applied for permeate or diluate[3]			

[1] *Nominal flow at a guaranteed room irradiation of 400 J/m² and a spectral absorption coefficient (254 nm) of 2.7 m⁻¹.*
[2] *In case the UV-120 I is used for swimming pool water, the application limit is Tmax = 40 °C.*
[3] *Connection parts in contact with the medium are resistant to permeate/diluate.*

Accessories
Safety device for GENO-UV-60 S
Safety device for GENO-UV-120 S
Safety device for GENO-UV-200 S
Temperature-controlled flushing for GENO-UV-60 S up to 200 S
Temperature-controlled flushing for GENO-UV-60 S up to 200 S (for application with permeate/diluate)
Temperature-controlled flushing for GENO-UV-60 I up to 200 I
Temperature-controlled flushing for GENO-UV-60 I up to 200 I (for application with permeate/diluate)
Protective UV goggles
Stainless steel connection kit 1" for GENO-UV-60-S/I
Stainless steel connection kit 2" for GENO-UV-120-S/I and 200 S/I
Wall bracket for UV systems GENO-UV-60-S/I to 200 S/I
Floor rack for GENO-UV-60 S/60 I
Floor rack for GENO-UV-120 S/120 I
Floor rack for GENO-UV-200 S/200 I
USB data logger for UV systems GENO-UV-60 S - 200 S
Flushing kit to clean the UV system with GENO-clean CP
Cleaning agent GENO-clean CP (10 x 1 litre)

Sales only after consultation with Grünbeck – ***Water analysis required***



GENO-UV-M system M4/200 S

GENO-UV-M system “industrial version”

For the disinfection of process and swimming pool water which is essentially free of turbidities and only slightly contaminated (UV system)

Consisting of: GENO-UV-M (2 - 5)/200 S fully mounted on a stainless steel rack with electro-polished pressure pipes, 2 connection flanges, 2 flushing valves for system cleaning, UV system sensor, sensor shell, protective quartz pipes, UV lamps, ballasts, control unit **GENO-UV-tronic$_2$**, temperature sensor, electric lines, power cable and operation manual.

Technical specifications

- Max. nominal pressure PN 10
- Min. drain connection DN 50
- Protection IP 54
- Pressure loss at max. flow < 0.2 bar
- Power supply 230 V, 50 Hz
- Inlet water temperature 8 - 40 °C
- Max. ambient temperature 40 °C
- Service life of lamps up to 16,000 h

GENO-UV-	M2/200 S	M3/200 S	M4/200 S	M5/200 S
Nominal connection diameter [DN]	80	80	100	100
Nominal flow [m^3/h][1]	28	47	71	98
Connected load [W]	620	735	850	965
Number of lamps	2	3	4	5

[1] *Nominal flow at a guaranteed room irradiation of 400 J/m^2 and a spectral absorption coefficient$_{254}$ value of 2.7 m^{-1}.*

Accessories
Flow sensor for UV system M2/M3 with connection line
Flow sensor for UV system M4/M5 with connection line
Flushing valve for temperature-controlled flushing
Flushing kit for UV system “industrial version”
Cleaning agent GENO-clean CP



GENODOS DM-T 6



GENODOS DM-T 20

Sales only after consultation with Grünbeck – ***Water analysis required***

Dosing systems GENODOS DM-T

For the flow-dependent dosing of GENO-Chlor A from transportation canisters or dosing tanks for the disinfection of drinking and industrial water

Low-noise dosing pump 1/40 4G, self-priming and automatically deaerating against pressure, continuously adjustable diaphragm pump with pump head made of chemical-resistant plastic, synchronous motor, with fastening bracket for wall or floor mounting, with connection options for external pulse control, empty signal with pre-alarm, indicator for membrane breakage, including voltage-free fault signal output, contact water meter with pulse cable to the pump electronics, including water meter screw connections or flanges, PVC dosing group 2.70 with non-return valve, pressure maintaining valve DHV 4, factory-set to 4 bar, dosing line made of PTFE.

- Suction lance for transportation canister made of PVC (DM-T 6 and DM-T 10)
- 60 l dosing tank (black) with suction lance (DM-T 20 and DM-T 30)
- 200 l dosing tank (black) with suction lance (DM-T 80 and DM-T 100)

Technical specifications

- Nominal pressure PN 10
- Temperature min. 5 °C - max. 30 °C
- Power supply 230 V, 50/60 Hz, 18/21 W

GENODOS dosing system	DM-T 6	DM-T 10	DM-T 20	DM-T 30	DM-T 80	DM-T 100
Water meter [1]	R 1"	R 1¼"	R 1½"	R 2"	DN 80	DN 100
Max. operating range [m³/h]	6	10	20	30	80	100
Pressure loss at max. flow [bar]	0.5	0.5	0.8	0.8	0.6	0.8
Tank volume [litres]	20	20	60	60	200	200

[1] *With submerged-type contact mechanism.*

Disinfectant
GENO-Chlor A (25 kg) for all pipes, except for stainless steel pipes [2]

Accessories
PVC dosing group 2.72 with non-return valve and ball valve
Water test kit for chlorine and pH value (measuring range chlorine: 0.1 - 2.0 mg/l; pH: 6.9 - 8.2)
Chemical collection tray for 20 l canisters
Chemical collection tray for 60/100 l dosing tanks

[2] *Sufficient for the treatment of approximately 3,000 m³ of water (dosing volume 1.0 mg/l)*

Sales only after consultation with Grünbeck – ***Water analysis required***



GENODOS DM-B 6[1]



GENODOS DM-B 10[1]

Dosing systems GENO-Baktox

For temporary continuous disinfection of drinking and industrial water by means of chlorine dioxide

Continuously adjustable, self-priming diaphragm dosing pump, automatically deaerating against pressure, with synchronous motor, connection options for empty signal, external control and voltage-free fault signal output, pump factory-set and under seal, contact water meter with pulse cable and pulse division for **GENODOS-pump** and dosing valve, gas-tight suction lance with integrated pre-alarm and empty signal, pressure maintaining valve.

Dosing systems GENODOS DM-B

Dosing system DM-B 6 pre-assembled on mounting plate, dosing systems DM-B 10 - 30 consisting of indiviual components

Specifications

- Power supply 230 V, 50/60 Hz
- Water temperature 5 - 30 °C
- Ambient temperature 5 - 20 °C
  (in case of ambient temperatures of > 20 °C, the service life of the disinfectant is considerably shorter)
- Nominal pressure PN 8
- Factory setting of pressure maintaining valve: 4 bar

Dosing system	GENODOS DM-B[1]			
	6[2]	10	20	30
Nominal connection diameter [R]	1"	1¼"	1½"	2"
Nominal flow Q_N [m³/h]	3	5	10	15
Flow Q_{max} [m³/h]	6	10	20	30
Pressure loss at Q_{max} [bar]	0.5	0.5	0.7	0.8

· *GENO-Baktox as well as the water test kit are not included in the system's scope of supply.*

Accessories
Chlorine dioxide test 0.02 - 0.55 mg/l
Chemical collection tray for 20 l canisters
M-Bus measuring transducer D-DAM, complete
Data logging for DM-BO[3]
Set of safety stickers GENO-Baktox

[1] *For disinfectants, please refer to page 60.*
[2] *For dosing system GENODOS type DM-B 6 (order number 163 820) only 3-litre canisters are suitable.*
[3] *For new systems only. Regarding the retrofitting of exisiting systems, please inquire.*



Sales only after consultation with Grünbeck – **Water analysis required**

GENODOS DM-BO with online measurement

Dosing systems GENODOS DM-BO with online measurement

For temporary continuous disinfection of drinking and industrial water

"Plug and play" dosing system, completely pre-assembled on aluminium rack, self-priming and continuously adjustable diaphragm dosing pump, automatically deaerating against pressure, with synchronous motor, pump factory-set and under seal, contact water meter with pulse cable and pulse division for **GENODOS-pump**, online chlorine dioxide measurement, blending module with integrated dosing valve, gas-tight suction lance with integrated pre-alarm and empty signal, pressure maintaining valve.

Technical specifications

- Power supply 230 V, 50/60 Hz
- Water temperature 5 - 30 °C
- Ambient temperature 5 - 20 °C
  (In case of ambient temperatures of > 20 °C, the service life of the disinfectant is considerably shorter)
- Nominal pressure PN 8

Dosing system GENODOS DM-BO	6[1]	10	20	30
Dimensions (w x h x d) [mm]	785 x 1,100 x 480	785 x 1,100 x 480	785 x 1,100 x 480	785 x 1,100 x 480
Nominal connection diameter [R]	1"	1¼"	1½"	2"
Nominal flow Q_N [m³/h]	3	5	10	15
Flow Q_{max} [m³/h]	6	10	20	30
Pressure loss at Q_{max} [bar]	0.5	0.5	0.7	0.8

· *GENO-Baktox and the water test kit are not included in the system's scope of supply.*

[1] *For dosing system GENODOS type DM-BO 6 (order number 163 865) only 3-litre canisters are suitable.*

Note: For technical specifications and accessories, please refer to page 59.

Disinfectants

1 litre of **GENO-Baktox** is sufficient

- for a water volume of 10 m³ (dosing volume 0.2 mg/l) in case of standard dosing (DM-B, DM-BO)
- for a water volume of 1 m³ (dosing volume 2 mg/l) in case of system disinfection (MOBIdos)

Disinfectants
GENO-Baktox (3 l)
GENO-Baktox (10 kg)
GENO-Baktox (20 kg)

Note: In order to ensure efficient disinfection, the prepared **GENO-Baktox solution** should be used up within two months.

Sales only after consultation with Grünbeck – ***Water analysis required***



- Ready for connection
- Material-friendly concentration of chlorine dioxide preparation
- Visualisation of the system components in graphics display
- Online measurement of chlorine dioxide without loss of measuring water (type MRX)
- Gas absorption unit to neutralise gaseous ClO_2

GENO-Baktox MRX

Chlorine dioxide generation systems GENO-Baktox MRX/RX/X

For continuous generation and flow-controlled dosing of chlorine dioxide for the disinfection of drinking and industrial water

Generation system in plastic switch cabinet incl. control unit and touch screen display, reaction and supply tank, two hose pumps for chemicals including suction lances, two safety collection trays, gas absorption unit, self-priming diaphragm dosing pump(s), automatically deaerating against pressure, pressure maintaining and dosing valve(s), contact water meter as pulser, in addition for type MRX: innovative blending module with integrated online measurement of chlorine dioxide, set of safety stickers **GENO-Baktox**.

Technical specifications

- Nominal pressure PN 8
- Power supply 230 V, 50 Hz, max. 80 VA
- Water/ambient temperature max. 30/30 °C
- Generation capacity 10 g/h

Chlorine generation system GENO-Baktox MRX	**10**	**20**	**25**	**30**	**50/1**	**50/2**
Generation system mounted on aluminium rack, with blending module and online chlorine dioxide measurement						
Number of dosing pumps	1	1	1	2	2	2
Nominal connection diameter of water meter	R 1¼"	R 1½"	R 2"	R 2"	DN 80	DN 100
Flow Q_{max} [m^3/h]	10	20	25	30	50	50
Pressure loss at Q_{max} [bar]	0.6	0.4	0.7	0.9	0.5	0.5

Chlorine generation system GENO-Baktox RX	**10**	**20**	**25**	**30**	**50/1**	**50/2**
For stand-alone placement. Generation system mounted on aluminium rack (Technical specifications as for type MRX, however, blending module and online chlorine dioxide measurement are not included.)						

Chlorine generation system GENO-Baktox X	**10**	**20**	**25**	**30**	**50/1**	**50/2**
For wall mounting (Technical specifications as for type MRX, however, blending module and online chlorine dioxide measurement are not included.)						



GENO-Baktox weiss/GENO-Baktox blau



Personal safety kit GENO-Baktox

Agents and accessories

For chlorine dioxide systems GENO-Baktox MRX/RX/X

Agents
GENO-Baktox blau, 20 kg canister [1]
GENO-Baktox weiss, 20 kg canister [1]
Gas neutralising agent (half-yearly replacement)

Accessories
Personal safety kit GENO-Baktox
Personal safety kit GENO-Baktox II (incl. breathing equipment)
Chlorine dioxide test 0.02 - 0.55 ppm
Manual analysis device Chematest 35
Room air monitoring for chlorine dioxide, chlorine and ozone

[1] *Sufficient for the treatment of approx. 3,800 m³ of water (dosing volume 0.2 mg/l).*

Water treatment in water supply

Well water and spring water have high fluctuations in quality. During heavy rainfall or snowmelt, surface-influenced springs are often contaminated by turbidity and pathogens.
In low-oxygen ground water elevated concentrations of iron and manganese may occur which are – especially for technical and visual reasons - undesirable in drinking water. These water constituents may cause brown to black discolouration and stains that are difficult to remove. Microbiological loads and anthropogenic pollution result in well and spring water often containing substances such as hydrogen sulphide, ammonium or nitrate. Special geological conditions cause some types of raw water to have a low pH value and therefore to contain carbon dioxide in its free, aggressive form.

Ultrafiltration

The ultrafiltration system **ultraliQ** is designed for the reduction of microbiological loads (germs, bacteria, viruses, parasites) as well as for the removal of turbidity and particles contained in the drinking water. The modules installed in the ultrafiltration system **ultraliQ** consist of a multitude of capillary membranes with a cut-off limit of 0.02 µm, thus ensuring a reliable separation of the loaded raw water side and the pure water side. The water is prefiltered by a fine filter (e.g. pureliQ:K) and then directed to the raw water side of the membrane filter where it flows through the entire membrane surface from the inside out. Thus, micro-organisms, turbidity and particles are reliably retained on the membrane's surface and a high pure water quality is ensured.

Multi-layer and activated carbon filtration

Undissolved impurities are retained in the filter material, accumulated and must eventually be removed from the filter tanks by means of a backwash process. By means of combined air/water flushing, the collected impurities are flushed from the filter in the counter-flow and directed to the drain. The backwash process is fully automatic. The filter systems **filtraliQ** can either be operated in series or in parallel. For dechlorination purposes and the improvement of smell and taste, a filter filling containing activated carbon is available for the **filtraliQ** system type as well.

Oxidation filtration

During the treatment by means of our oxidation filter system **fermaliQ**, dissolved iron and manganese are converted into their hardly soluble forms and filtered off. Apart from iron and manganese, the oxidation filter system **fermaliQ** – by way of a combination of raw water atomisation, aeration and multi-layer filtration - fully automatically reduces ammonium, solid particles and odorants contained in the raw water as well. Depending on the content of free carbon dioxide, the processes used also achieve a deacidification of the raw water. Thanks to the combination of above-mentioned processes in one system, a high pure water quality is achieved.

NEW



Sales only after consultation with Grünbeck – **Water analysis required**



Ultrafiltration system ultraliQ:SB2000 with front cover

Ultrafiltration system ultraliQ:MA10000

Ultrafiltration system ultraliQ

Treatment system to produce clear water which is free of germs as per DIN 2001-1

Ultrafiltration membranes with a cut-off limit of 0.02 µm, sampling valves (flame-sterilisable) for quality monitoring, adjustable flushing interval and duration, scope of supply fully mounted on aluminium system rack including control unit, solenoid valves, pressure gauges, water meter to detect the current and the total system flow. Including the required connection points for CIP cleaning as well as a connection to conduct an integrity test.

Ultrafiltration system ultraliQ:	SB500	SB1000	SB1500	SB2000	MA5000	MA10000
Nominal capacity [m³/h]	0.5	1.0	1.5	2.0	5.0	10.0
Dimensions approx. (w x h x d) [mm]	750 x 1,750 x 960				1,500 x 1,805 x 860	
Min. operating pressure [bar] [1]	2.5 - 4.5					
Max. operating pressure [bar]	6.0					
Power supply [V/Hz]	230/50					
Nominal connection diameter [R]	1" male thread				2" male thread	

Accessories for ultrafiltration system ultraliQ

Diaphragm expansion tanks
for continuous water supply during system backwash
Tank volume
100
300
500

Front cover for ultraliQ
Front cover for ultraliQ:SB series
Front cover for ultraliQ:MA series

Accessories
S 7-1200 controller for ultraliQ
Integrity test ultraliQ
Mobile cleaning system CIP:UF60
Diaphragm expansion tank DD 33, G 3/4 [2]

[1] *The min. inlet pressure depends on the raw water quality and the intended use as well as on the pure water pressure required.*

[2] *To prevent water hammer if a pressurised water tank provided by the client on site is used as storage tank for the filtrate.*



Filter system filtraliQ

Filter systems filtraliQ

Fully automatic filter system to reduce undissolved impurities, with oxidation stage installed upstream also suitable for the filtration of iron and manganese. With activated carbon filling also suitable for polishing, improvement of smell or reduction of chlorine

Filter tank made of GRP, including ventilation and interior water distribution system, filter piping at the front with pneumatic fittings and pilot valves. Flow meter to adjust the filter capacity, differential pressure switch to release the backwash process. Pre-assembled on an anodised aluminium system rack with levelling feet.

Technical specifications:

- Min. water pressure required: 2.5 barg
- Max. admissible water pressure: 6.0 barg
- Admissible water temperature: 30 °C

Filter system filtraliQ:LA	5600	10000	16000	24000	30000	40000
Nominal flow [m³/h] at 20 m/h[1]	5.6	10.0	16.0	24.0	30.0	40.0
Diameter of filter tank [mm]	610	816	1,074	1,226	1,429	1,623
Total height [mm]	2,700	2,800	2,800	2,900	3,450	3,900
Room height required [mm]	3,000	3,050	3,050	3,100	3,650	4,100
Pipe connection raw water/pure water/first filtrate	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Pipe connection for flushing water	DN 32	DN 50	DN 50	DN 80	DN 100	DN 100
Pipe connection for waste water	DN 40	DN 50	DN 80	DN 100	DN 125	DN 125
Backwash capacity [m³/h]	8.4	15.0	24.0	36.0	48.0	60.0
Flushing water demand [m³]	1.7	3.0	4.8	7.0	9.6	12.0
Scavenging air [m³/h]	16.0	40.0	60.0	80.0	100.0	140.0
Pipe connection for scavenging air	DN 20	DN 25	DN 40	DN 40	DN 50	DN 50
Drain connection required	DN 50	DN 50	DN 50	DN 50	DN 50	DN 70

[1] *Subject to the actual water quality.*



Scavenging air blower for filter system filtraliQ

Accessories for filter system filtraliQ

Accessories for filter system filtraliQ:LA	5600	10000	16000	24000	30000	40000
Filter filling for multi-layer filter						
Filter filling for activated carbon filter						
Scavenging air blower Including power unit in switch cabinet, flow meter, fittings and safety loop, completely pre-assembled						
Flushing water pump Including power unit in switch cabinet, flow meter and adjusting valve						
Compressor for pneumatic valves						
Fittings group for compressor						

Accessories
Electrical switch cabinet
For 1 filter system
For 2 filter systems
For 4 filter systems

NEW



Sales only after consultation with Grünbeck – **Water analysis required**

Oxidation filter system fermaliQ:MA3000

Oxidation filter system fermaliQ

Multi-stage, fully automatic water treatment system for oxidation, degassing and filtration of well and spring water. By means of atomisation, aeration and subsequent filtration, an effective reduction of impurities, iron, manganese, ammonium, hydrogen sulphide and free carbon dioxide is achieved.

Filter tank made of hot-dip galvanised steel, including built-in parts, level control and conical jet, blower with air filter box[1], PE piping including all the fittings and flame-sterilisable sampling valves required, pre-assembled on an anodised aluminium rack with levelling feet, switch cabinet with control unit for fully automatic operation of the filter system.

Oxidation filter system fermaliQ:	MA2000	MA3000	MA5000	MA10000
Nominal flow [m³/h][2]	2.0	3.0	5.0	10.0
Daily capacity [m³][2]	12	24	36	65
Nominal connection diameter for raw water	1" male thr.	1" male thr.	1¼ male thr.	1½" male thr.
Nominal connection diameter for filtrate	1½" male thr.	1½" male thr.	2" male thr.	2½" male thr.
Tank diameter [mm]	550	650	800	1,100
Dimensions (w x d x h) [mm]	900 x 1,500 x 1,750	1,000 x 1,600 x 1,750	1,200 x 1,800 x 1,750	1,600 x 2,600 x 2,200
Room height required [mm]	2,000	2,300	2,300	2,600
Inlet pressure	min. 2.0 bar / max. 5.0 bar			
Power supply [V/Hz]	230 / 50			
Pressurised water tank required [l]	500, 6 bar	750, 6 bar	1,000, 6 bar	2 x 1,000, 6 bar

[1] *For surcharge for ultra-fine dust filtration, please refer to page 68.*

[2] *Subject to the actual water quality.*



Oxidation filter system fermaliQ:MA3000 including pressurised water tank and front cover

Filter fillings for fermaliQ

Filter filling of quartz sand and hydro-anthracite
To filter undissolved impurities
fermaliQ:MA2000
fermaliQ:MA3000
fermaliQ:MA5000
fermaliQ:MA10000

Filter filling of quartz sand, hydro-anthracite and GENO-Fermanit
To reduce iron/manganese and ammonium
fermaliQ:MA2000
fermaliQ:MA3000
fermaliQ:MA5000
fermaliQ:MA10000

Accessories for oxidation filter system fermaliQ

Pressurised water tank
As a supplement to an existing pressure tank or for a new installation, including external sight pipe to check the filling level
150 l
300 l
500 l
750 l
1,000 l

Front cover
fermaliQ:MA

Ultra-fine dust filtration for blower
Surcharge for ultra-fine dust filtration, filter class F7 according to EN779

Water test kits
Water test kit for iron, 0 - 0.8 mg/l and 1 - 10 mg/l [1] (30 determinations)
Water test kit for manganese, 0.03 - 0.5 mg/l [1] (100 determinations)
Refill pack of reagents for water test kit for manganese (100 determinations)
Water test kit for pH value, 4.5 - 10 [1] (100 test strips)

[1] *Measuring range*

Cooling water treatment

The type of water treatment used for the make-up and circulation water of cooling systems depends on the intended application, the composition of the water and the type of cooling system.



Installation example for cooling water treatment systems

Based on the specified limit values for the composition of the cooling water, the potential concentration factor of the cooling water can be calculated. The optimal water treatment system for the respecitve type of cooling system can then be determined by means of cost-efficiency calculations.

One option for the treatment of cooling water is to apply a purely chemical treatment, i.e., the dosing of corrosion and scale inhibitors and of biocides which prevent microbiological growth.

Another option is the use of water softeners as well as the aforementioned dosing systems. The softened water in cooling systems is normally blended to 0.35 mmol/l to 0.55 mmol/l as pure water with a hardness of 0° would have an adverse effect on the formation of a protective layer in the cooling water network.

In order to achieve higher concentration factors, the salt concentration of the raw water has to be reduced. This can be done in a cost-efficient way by applying a reverse osmosis system. When using low-salt feed water, the cooling tower system is operated with a concentration factor that is 8 times higher.

An automatic salt reduction system is required to maintain the concentration factors; such a system keeps the salt concentration in the circulation water at a constant level by way of monitoring the conductivity value. When the set index value is exceeded, circulation water is discharged and replaced by treated water.

Grünbeck's automatic salt reduction system **GENO-KWA** can carry out important **measuring and control functions** as recommended by **VDI 2047-2**, such as:

- Conductivity measurement
- pH monitoring
- Monitoring of UV irradiation as per DVGW
- Preliminary salt reduction and stop of salt reduction in case of biocide dosing
- Activation of cooling water circulation pump
- Data logger with memory card

The respective process technology and system components are selected based on the the raw water analysis and system data provided.



GENO-KWA-50k



GENO-KWA-60i

Automatic salt reduction system GENO-KWA

Compact system with microprocessor control GENO-KWA-tronic$_2$, ready for connection

Conductive or indcutive temperature and conductivity sensor, salt reduction valve closes automatically in case of power failure, designed as motor ball valve DN 25 with exchangable flow orifice, piping with manually operated flow restrictor. All components are fully piped and wired on a mounting plate, including 3 m mains connection cable with shock-proof plug.

GENO-KWA-	50k	60i
Measuring method	conductive	inductive
Conductivity measuring range [µS/cm]	10 - 5,000	50 - 5,000
Power supply [V/Hz]	230/50	230/50
Dimensions (w x h x d) [mm]	500 x 750 x 230	500 x 750 x 230

Automatic salt reduction system GENO-KWA-60i in weather-proof cabinet

Pre-assembled with heating module.

GENO-KWA-60i in weather-proof cabinet	
Measuring method	inductive
Power supply [V/Hz]	230/50
Dimensions (w x h x d) [mm]	800 x 1,200 x 400

Automatic salt reduction system GENO-KWA-60i-BZ in weather-proof cabinet

Automatic salt reduction with biocide dosing system, pre-assembled in weather-proof cabinet.

Consisting of: Automatic salt reduction system **GENO-KWA-60i**, dosing pump **GENODOS** 10/40-4G, external control cable, suction lance B 10/20, dosing group 3.01, dosing line, weather-proof cabinet with heating module.

GENO-KWA-60i-BZ in weather-proof cabinet	
Measuring method	inductive
Power supply [V/Hz]	230/50
Dimensions (w x h x d) [mm]	1,100 x 1,200 x 600

Accessories
pH monitoring
Data logger with memory card

- Full salting for a residual hardness of ≤ 0.02 mmol/l (GENO-mat duo WE 65, 150, 300, 450, 750)
- Economy salting for a residual hardness of ≥ 0.35 mmol/l (GENO-mat duo WE 50, 130, 230, 330, 530)
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Water temperature 30 °C
- Power supply 230 V, 50/60 Hz
- Operating voltage 24 V



Water softener GENO-mat duo WE-KWA

Water softeners GENO-mat duo WE-KWA

Fully automatic twin water softener based on the principle of ion exchange for the generation of fully softened water, with volume-controlled regeneration

Consisting of: PE brine tank with lid and sieve bottom, special brine valve with connecting line allows for maximum continuous flows, exchanger tank made of pressure-resistant plastic with filling of ion exchanger material and distribution system, central control valve made of red brass, contact water meter with water meter screw connections, control electronics **GENO-IONO-matic** not included, controlled via the control electronics of the automatic salt reduction system KWA-tronic.

GENO-mat duo WE-KWA (full salting)	**65**	**150**	**300**	**450**	**750**
Nominal connection diameter [DN]	25 female	25 female	25 female	40 female	40 female
Max. continuous flow [m^3/h]	2.0	3.0	5.0	6.0	9.5
K_V value Δp = 1.0 bar [m^3/h]	2.6	2.7	3.1	4.5	5.6
Nominal capacity [mol]	12.0	26.6	53.9	80.2	133.2
Max. capacity of brine tank [kg]	130	190	285	485	760
Salt consumption/reg. [kg]	3.6	8.0	16.2	25.3	40.0

Fully automatic twin water softener based on the principle of ion exchange, ideal for the generation of partially softened water, with integrated blending valve up to size 230, optional as of size 330, with volume-controlled regeneration, economy salting for a residual hardness of ≥ 0.35 mmol/l.

GENO-mat duo WE-KWA (economy salting)	**50**	**130**	**230**	**330**	**530**
Nominal connection diameter [DN]	25 female	25 female	25 female	40 female	40 female
Max. continuous flow [m^3/h][1]	3.3	5.0	8.3	10.0	15.8
K_V value Δp = 1.0 bar [m^3/h][1]	4.3	4.5	5.2	7.5	9.3
Nominal capacity [mol]	9.5	20.9	42.3	60.0	95.2
Max. capacity of brine tank [kg]	65	130	190	285	285
Salt consumption/reg. [kg]	1.8	4.0	8.1	11.5	16.0

[1] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l.*

Note: For additional accesories, please inquire.



Filter system GENO-mat F 500-H-KW



Filter system GENO-mat F 600-A-KW

Filter systems GENO-mat F

Filter system for the partial flow filtration of unpressurised cooling water originating from open evaporative cooling systems, completely pre-assembled on mounting plate, including AC circulation pump, for manual (H-KW series) or automatic (A-KW series) operation.

Technical specifications

- Nominal connection diameter of inlet 2" female thread
- Nominal connection diameter of recirculation DN 40
- Power supply 230 V, 50 Hz
- Max. inlet pressure 0.3 bar
- Max. nominal pressure 2 bar

GENO-mat F	500 H-KW	500 A-KW	600 H-KW	600 A-KW
Filter capacity [m³/h]	6	6	12	12
Backwash capacity [m³/h]	8	8	15	15
Delivery rate of pump [m³/h at mWC]	8.5/8.0	8.5/8.0	14.0/8.0	14.0/8.0
Connected load [kW]	0.58	0.58	0.97	0.97

Filter filling

Filter filling for GENO-mat F
Consisting of quartz sand
500 H-KW/A-KW
600 H-KW/A-KW
Consisting of AFM
500 H-KW/A-KW
600 H-KW/A-KW

Differential pressure switch

For the automatic, differential pressure controlled backwash of the GENO-mat F A-KW filter systems (in addition to time-controlled backwash)

Differential pressure switch for filter system
GENO-mat F 500 A-KW
GENO-mat F 600 A-KW



UV disinfection GENO-UV KWA

UV disinfection GENO-UV KWA

For UV disinfection of filtered cooling water that is low in turbidities and originating from open evaporative cooling systems, with measurement of irradiation intensity according to VDI 2047-2 (signal processing by means of the KWA-tronic$_2$ control unit of Grünbeck's automatic salt reduction system), with centred high-performance UV lamp, control unit equipped with operating hour meter and ballast.

GENO-UV-	60-KWA	120-KWA	200-KWA
Nominal connection diameter [R]	1"	1½"	2"
Nominal flow [m³/h]	3.3	8.0	12.0
Water temperature [°C]	5 - 30	5 - 30	5 - 30
Ambient temperature [°C]	5 - 40	5 - 40	5 - 40
Power supply [V/Hz]	230/50	230/50	230/50
Connected load [VA]	75	145	215

Accessories
Protective UV goggles
Stainless steel connection kit 1" for GENO-UV-60-KWA
Stainless steel connection kit 2" for GENO-UV-120-KWA and 200-KWA
Wall bracket for UV systems GENO-UV-60-KWA to 200 KWA
Floor rack for GENO-UV-120-KWA
Floor rack for GENO-UV-200-KWA
Flushing kit to clean the UV system with GENO-clean CP
Cleaning agent GENO-clean CP (10 x 1 litre)

Control unit GENO-KWA-tronic$_2$

Control unit **GENO-KWA-tronic$_2$**, if automatic salt reduction is provided by others on site, to monitor the irradiation intensity of the UV system and other functions (refer to automatic salt reduction system **GENO-KWA**).

GENO-KWA-tronic$_2$	
Power supply [V/Hz]	230/50
Dimensions (w x h x d) [mm]	500 x 750 x 230



*Sales only after consultation with Grünbeck – **Water analysis required***

GENO-LUWADES$_2$

Compact air washer system GENO-LUWADES$_2$

For quality-controlled salt reduction and disinfection in air washer systems

Compact system, ready for connection, **consisting of:** Microprocessor controller **GENO-KWA-tronic$_2$**, conductive temperature and conductivity sensor, in case of a power failure self-closing salt reduction valve as a motor-driven ball valve DN 25 with exchangeable flow orifice, circulation pump with flow control, UV disinfection system **GENO-UV module 40 S** with monitoring of the irradiation intensity, manually operated flow restrictor, pressure gauge and coarse dirt trap. All components piped and fully wired on a mounting plate, including 2 m power supply cable with shock-proof plug.

In the **LUWADES$_2$**, the microprocessor controller **GENO-KWA-tronic$_2$** serves as measuring, control and regulating electronics for various parameters, especially for the treatment of circulation water in air washers. Via the flow-controlled circulation pump, circulation water is continuously drawn from the basin of the air washer and returned to the basin via the UV system. The UV system and sensors are protected by a coarse dirt trap. Salt reduction may be controlled via the conductivity of the circulation water and the irradiation intensity of the UV system. At the same time, a temperature compensation of the conductivity value takes place.

There are additional control **options**, e.g. biocide dosing system, dosing system for make-up water conditioning, etc.

Compact air washer system	GENO-LUWADES$_2$
Nominal connection diameter inlet/outlet	DN 32 (female thread 1¼") / DN 25 (female thread 1")
Power supply [V/Hz]	230/50
Dimensions approx. (w x h x d) [mm]	700 x 1,200 x 400
Ambient/water temperature [°C]	0 - 40/5 - 35

Accessories
Data logger with memory card for KWA-tronic$_2$
pH monitoring for GENO-KWA
System rack for GENO-LUWADES$_2$, for stand-alone installation



Technical specifications

- Max. suction head 1.5 mWC
- Temperature min. 5 °C - max. 30 °C
- Max. delivery pressure 8 bar up to GP 6/40 (6 bar starting from GP 10/40)
- Power supply 230 V, 50/60 Hz, 18/21 W

Dosing system GENODOS DM

Dosing systems GENODOS DM

For flow-dependent dosing of active agents from transportation canisters or dosing tanks into water-carrying systems.
Consisting of GENODOS-GP-/40 and a water meter.
Dosing line, dosing group, suction lance and dosing tank need to be selected separately.
Dosing pump **GENODOS GP-/40** as continuously adjustable, low-noise diaphragm pump, self-priming and automatically deaerating against pressure, with pump head made of chemical-resistant plastic, synchronous motor 230 V, 50/60 Hz, with fastening bracket for wall or floor mounting, with connection options for external pulse control, empty signal, including voltage-free fault signal output. Contact water meter with pulse cable to the pump electronics including screw connections.

Dosing system GENODOS DM	1/20 S	1/40 S	2/40 S	1/200 ST	2/200 ST
Dosing pump type	2/40	6/40	6/40	10/40	10/40
Water meter with contact mechanism	R 1"	R 1½"	R 2"	DN 80	DN 100
Standard capacity of water meter [m^3/h]	6	20	30	80	100
Pressure loss at standard capacity [bar]	0.8	0.7	0.8	0.6	0.8
Pulse sequence [l]	2.5	5	5	3.8	3.8

Dosing systems GENODOS BZ for the addition of biocides

Consisting of: Dosing pump 10/40-4G, external control cable, suction lance B 10/20, dosing group 3.01 and dosing line 5 m; switch box “digital timer control” for timer-controlled BZ 10/40 only.

Dosing system GENODOS	BZ 10/40	BZ 10/40
	timer-controlled	KWA-tronic-controlled

Accessories
Suction lance for transportation canisters, length 465 mm
Dosing tank 60 l, outside diameter 450 mm, height 550 mm, with suction lance and hand mixer
Dosing tank 100 l, outside diameter 465 mm, height 780 mm, with suction lance and hand mixer
Chemical collection tray for 20 l canisters
Chemical collection tray for 35 l canisters
Chemical collection tray for 60/100 l dosing tanks
Dosing group 3.01 PVC, max. 10 bar, 35 °C
Connecting cable with plug to transmit the voltage-free fault signal to the building control system, length 3 m
PVC overflow valve to protect the dosing pump and pressure lines from inadmissible pressure increases, adjustable from 3 to 10 bar, suitable for dosing lines with inside diameter = 10 mm/ outside diameter = 16 mm

Cooling water products →	KW 0	KW 0	KW 5 NEW	KW 5	KW 1700	KW 1700
Closed | semi-closed systems						
Chemical resistance group of GP pump	standard	standard	standard	standard	standard	standard
Steel corrosion protection	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕	⊕⊕	⊕⊕
Copper/nonferrous metal corrosion protection	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕	⊕⊕⊕
Aluminium corrosion protection	⊖	⊖	⊖	⊖	⊕⊕	⊕⊕
Hardness stabiliser	⊕	⊕	⊕	⊕	⊕	⊕
Dispersion	⊕⊕	⊕⊕	⊕⊕	⊕⊕	⊕⊕	⊕⊕
Biocide	⊖	⊖	⊖	⊖	⊖	⊖
pH range	7.5 - 10	7.5 - 10	7.5 - 10	7.5 - 10	7.5 - 9	7.5 - 9
Circulation concentration [g/m³]	1,000 - 3,000	1,000 - 3,000	1,000 - 2,000	1,000 - 2,000	2,000 - 5,000	2,000 - 5,000
Analytical proof via molybdenum concentration	⊕	⊕	⊕	⊕	⊕	⊕
Analytical proof via peroxide test	⊖	⊖	⊖	⊖	⊖	⊖
Analytical proof via org. Po_4	⊖	⊖	⊖	⊖	⊖	⊖
Canister volume [kg]	20	5	20	5	20	5

Cooling water products →	KW 4500	KW 4800	KW 4130	KW 4130	KW 2000
	Biocide				**Biodisperser**
Chemical resistance group of GP pump	4G	4G	4G	4G	4G
Steel corrosion protection	⊖	⊖	⊖	⊖	⊖
Copper/nonferrous metal corrosion protection	⊖	⊖	⊖	⊖	⊖
Aluminium corrosion protection	⊖	⊖	⊖	⊖	⊖
Hardness stabiliser	⊖	⊖	⊖	⊖	⊖
Dispersion	⊖	⊖	⊖	⊖	⊕⊕⊕
Biocide	⊕⊕⊕	⊕⊕⊕	⊕⊕	⊕⊕	⊖
pH range	6 - 10	6 - 10	6 - 10	6 - 10	3 - 11
Circulation concentration [g/m³]	100 - 200	10 - 50	200 - 300	200 - 300	10 - 100
Analytical proof via molybdenum concentration	⊖	⊖	⊖	⊖	⊖
Analytical proof via peroxide test	⊖	⊖	⊕	⊕	⊖
Analytical proof via org. Po_4	⊖	⊖	⊖	⊖	⊖
Canister volume [kg]	20	10	25	220	5

⊕⊕⊕ *very well suited* ⊕⊕ *well suited* ⊕ *suited* ⊖ *unsuitable*

The values indicated above are guide values. You must always take into account all other water parameters as well.
Please inquire about cooling water agents for special application areas!
We recommend contacting Grünbeck's consultation service before making a final decision!

Cooling water products →	KW 1510	KW 1600	KW 1620	KW 1830
Open evaporative systems				
Chemical resistance group of GP pump	standard	standard	standard	standard
Steel corrosion protection	⊕⊕	⊕⊕	⊕⊕	⊕⊕
Copper/nonferrous metal corrosion protection	⊖	⊕⊕	⊕⊕	⊕
Aluminium corrosion protection	⊖	⊖	⊕⊕	⊖
Hardness stabiliser	⊕⊕⊕	⊕	⊕	⊕⊕⊕
Dispersion	⊕⊕⊕	⊕	⊕⊕	⊕⊕⊕
Biocide	⊖	⊖	⊖	⊖
pH range	7 - 10	7.5 - 9	6.5 - 8.5	7 - 10
Circulation concentration [g/m³]	5 - 30	80 - 120	30 - 50	50 - 70
Analytical proof via molybdenum concentration	⊖	⊖	⊖	⊖
Analytical proof via peroxide test	⊖	⊖	⊖	⊖
Analytical proof via org. Po_4	⊕	⊕	⊕	⊕
Canister volume [kg]	20	20	20	20

Cooling water products →	KW 11	KW 12	KW 5510	LW 20	GENO - perox
Open evaporative systems					
Chemical resistance group of GP pump	standard	standard	standard	standard	standard
Steel corrosion protection	⊕⊕⊕	⊕⊕	⊕	⊕	⊖
Copper/nonferrous metal corrosion protection	⊕	⊕⊕	⊖	⊕	⊖
Aluminium corrosion protection	⊖	⊖	⊖	⊖	⊖
Hardness stabiliser	⊕⊕	⊕	⊕⊕	⊕	⊖
Dispersion	⊖	⊖	⊖	⊕	⊖
Biocide	⊖	⊖	⊕	⊕⊕	⊕⊕
pH range	6 - 8	7.2 - 7.8	6 - 10	7.5 - 10	6 - 10
Circulation concentration [g/m³]	20 - 35	45 - 60	30 - 50	400 - 600	450 - 600
Analytical proof via molybdenum concentration	⊖	⊖	⊖	⊖	⊖
Analytical proof via peroxide test	⊖	⊖	⊖	⊖	⊕
Analytical proof via org. Po_4	⊕	⊕	⊕	⊕	⊖
Canister volume [kg]	20	20	20	20	11

⊕⊕⊕ *very well suited* ⊕⊕ *well suited* ⊕ *suited* ⊖ *unsuitable*

The values indicated above are guide values. You must always take into account all other water parameters as well.
Please inquire about cooling water agents for special application areas!
We recommend contacting Grünbeck's consultation service before making a final decision!

Heating water

Varying technical rules, modern materials, complex components and a compact design with small pipe cross-sections extremely increase the demands on the filling water. However, heating systems can only work effectively if their efficiency is not reduced by deposits. The solution is quite simple: Fully demineralised water.



- Suitable for closed heating and cooling circuits such as heating supply networks of biogas systems, combined heat and power plants and large buildings
- According to AGFW worksheet FW 510 (VdTÜV 1466) 1 - 3 % of the circulation volume have to be treated in the partial flow per day
- Fully automatic backwash and regeneration
- No replacement of filter material, hardly any maintenance effort required
- No water loss in the circuit
- Backwash and regeneration with fresh water
- Optional: Separate dosing system for selective increase of the pH value



Partial flow filter GENO-VARIO 3000

Partial flow filter GENO-VARIO 3000

Fully automatic filter system for the treatment of partial flows in heating and cooling circuits for the generation of fully softened water, with volume-controlled regeneration

Consisting of: Bypass pump for easy integration into the return, 2 exchanger tanks made of stainless steel as sand filter and softening unit, system separator to secure the drinking water network during backwash and regeneration, fully automatic control unit to monitor the fully automatic backwash and regeneration, entire system pre-assembled on system rack made of anodised high-precision aluminium profile and ready for connection. Option: Extension module for fully automatic refill of make-up water that is treated at the same time and integrated leakage monitoring – please inquire.

GENO-VARIO 3000	Stand-alone system	Mobile system[1]
Nominal connection diameter [DN]	25 male	25 male
Nominal flow [m³/h]	2.5	2.5
Max. water/ambient temperature [°C]	80/40	80/40
Operating pressure of raw water min./max. [bar]	3/8	3/8
Operating pressure of system circuit min./max. [bar]	2/6	2/6
Nominal softening capacity [mol]	26.8	26.8
Max. capacity of brine tank [kg]	50	50

Accessories
NEW Dosing system to increase the pH value for GENO-VARIO 3000
GENO-SW 2010 (20 kg) liquid phosphate product
Neutralisation agent FNK, 20 kg (sodium hydroxide solution, 10 %)
Combined measuring device for pH and conductivity including calibration solutions
Hardness determination B to determine residual hardness in circulation water
Analysis case (pH, conductivity, determination of raw water hardness, determination of hardness B)
Water sample cooler, max. 40 bar

[1] *System rack on wheels as mobile model.*

Dosing agents

Product	Applications	Characteristics
GENO-safe A full heating protection	Warm water heating systems as per VDI 2035	Full heating protection for one-family and multi-family homes as well as industrial buildings. Combination product for hardness stabilisation and corrosion protection, suitable for all types of heating systems and materials. The required quantity is 1 litre for every 200 l of filling volume.
GENO-heating protection FSK	All heating system as well as cooling circuits, heat pumps and solar systems	Corrosion and anti-freeze protection as combined agent. Full corrosion and scaling protection is guaranteed if at least a minimum of 20 % of the system volume is added. The required concentration to be applied depends on the anti-freeze protection desired.
GENO-phos Nr. 1 and SW 2010	Steam boiler systems and warm water heating systems as per VDI 2035 with metal pipes and radiators	Trisodium phosphate, precipitation of residual hardness, alkalinisation by means of pH increase, non-steam-volatile. In case of aluminium and aluminium components, a pH value of 8.2 - 8.5 has to be observed.
GENO-phos Nr. 2	Steam boiler systems where alkalinity is too high	Sodium dihydrogen phosphate (granulate), to reduce high alkalinity, pH reduction, precipitation of residual hardness.
Sodium sulphite and SW 2000	Steam boiler systems, warm water and hot water circuits	Oxygen binding agent, for chemical oxygen binding in water, non-steam-volatile.
GENO-amin	Steam boiler systems with corrosion in steam and condensate network caused by CO_2	Film-forming corrosion inhibitor, alkalising effect by binding CO_2, steam-volatile, amine-based.

Full heating protection
GENO-safe A, 1 litre
GENO-safe A, box 10 x 1 litre
GENO-safe A, canister 11 kg

Full heating protection with anti-freeze protection
GENO-heating protection FSK (20 kg)

Dosing agents to increase the pH value
GENO-phos Nr. 1 (granulate) [500 g]
GENO-phos Nr. 1 (granulate) [3.5 kg]
GENO-phos Nr. 1 (granulate) [25 kg]
GENO-SW 2010 (liquid) [20 kg]
GENO-SW 2010 (liquid) [100 kg]
FNK (liquid) [20 kg]

Dosing agents to decrease the pH value
GENO-phos Nr. 2 (granulate) [3.5 kg]
GENO-phos Nr. 2 (granulate) [25 kg]

Dosing agents to bind oxygen
Sodium sulphite (granulate) [6 kg]
Sodium sulphite (granulate) [25 kg]
GENO-SW 2000 (liquid) [20 kg]

Combined product to increase the pH value and to bind oxygen
GENO-SW 2040 (liquid) [25 kg]

Steam-volatile corrosion inhibitor for steam boilers
GENO-amin (liquid) [20 kg]



Dosing pump GENODOS GP

Dosing pumps GENODOS GP

As self-priming diaphragm pump, automatically deaerating against pressure, with pump head made of chemical-resistant plastic, control electronics, low-noise synchronous motor, fastening bracket for wall or floor mounting. Pump with operation indicator, continuously adjustable stroke length 30 - 100 %, shock-proof plug 230 V, 50/60 Hz, with approx. 2 m power supply cable, suitable for manual and fully automatic operation, connection option for external pulse controller (e.g. feed water pump, contact water meter) and indication for internal dosing monitoring. In case of automatic control, the dosing capacity may be adjusted by means of a frequency controller. Including voltage-free fault signal output, pulse division and multiplication, control via analogue signals is possible.

Technical specifications

- Max. suction head 1.5 mWC
- Temperature min. 5 °C - max. 30 °C
- Delivery rate (see table)
- Power supply 230 V, 50/60 Hz, 18/21 W

Dosing pumps GENODOS GP	-/40	-/40
Chemical resistance group[1]	**Standard**	**4G**
GENODOS GP 0/40 0.04 - 0.15 l/h at max. 10 bar		
GENODOS GP 1/40 0.27 - 0.9 l/h at max. 10 bar		
GENODOS GP 2/40 0.6 - 2.0 l/h at max. 10 bar		
GENODOS GP 6/40 1.8 - 6.8 l/h at max. 8 bar		
GENODOS GP 10/40 2.64 - 8.8 l/h at max. 6 bar		

[1] *The choice of the pump depends on the dosing agent used.*

Observe the information and instructions given for the dosing agents!



Contact water meter



Switch box “digital timer control”

Contact water meters

To control dosing pumps

Connection diameter	R ¾"	R 1"	R 1¼"	R 1½"	R 2"	DN 80	DN 100
Pulse sequence [l]	0.33	0.33	0.50	0.93	1.33	3.80	3.80
Max. flow [m^3/h]	4	6	10	20	30	80	100
Pressure loss at max. flow [bar]	0.3	0.5	0.5	0.8	0.8	0.6	0.8

Accessories
Switch box “digital timer control” for the time-dependent control of dosing systems, wall-mounted box (100 x 74 x 135 mm), 1.5 m power supply cable with shock-proof connector plug, electronic timer, precise to the minute, freely programmable, with voltage-free output and 150 hour power reserve, incl. 3 m control cable for the GENODOS-pump
Voltage-free level signal (pre-alarm) Additional controller for separate and voltage-free relay of the pre-alarm level of the suction lance, with shock-proof connector plug
Connecting cable with plug to relay the voltage-free fault signal to the central building control system, length 3 m
Connecting cable for external activation (red) for GENODOS-pump, length 3 m
Pressure maintaining valve DHV 3 CB18 made of PVC for dosing into unpressurised systems or tanks, adjustable from 1 to 10 bar, suitable for dosing line i.d. = 10 mm/o.d. = 16 mm
Overflow valve made of PVC, to protect the dosing pump and the pressure lines from an inadmissible pressure increase, adjustable from 3 to 10 bar, suitable for dosing line i.d. = 10 mm/o.d. = 16 mm
Document pouch to store operation manual, chemical data sheet, safety data sheet, preparation instructions, etc.
Safety package for caustic substances **consting of:** Acid-proof goggles, eye rinsing bottle, gloves as well as warning and instruction signs



Suction lance for transportation canister



Dosing tank with automatic stirring device

Suction lances/Dosing tanks/Collection trays

The agents are withdrawn either by means of

- Suction lances for 10/20 kg transportation canisters or dosing tanks provided by others on site, made of PVC, with bottom filter, foot valve, 1.5 m suction and return hose as well as float switch with two switching points as pre-alarm and empty signal (dry-run protection).
- Dosing tanks with hand mixer or automatic stirring device with stirring controller and shock-proof connector plug, suction lance with bottom filter, foot valve, 1.5 m suction and return hose as well as float switch with two switching points as pre-alarm and empty signal (dry-run protection).

Accessories
Suction lances
For transportation canisters (465 mm long)
For dosing tank provided by others on site (750 mm long)
For disposable 100 l / 200 l barrel (with empty signal, l = 980 mm)
For 1000 l IBC container (with empty signal, l = 1,200 mm)
Dosing tanks
60 l, outside diameter 450 mm, height 550 mm, with suction lance and hand mixer
As above, but with automatic stirring device
100 l, outside diameter 465 mm, height 780 mm, with suction lance and hand mixer
As above, but with automatic stirring device
200 l, outside diameter 560 mm, height 955 mm, with suction lance and hand mixer
As above, but with automatic stirring device
300 l, outside diameter 680 mm, height 955 mm, with suction lance and hand mixer
As above, but with automatic stirring device
500 l, outside diameter 800 mm, height 1,070 mm, with suction lance and hand mixer
As above, but with automatic stirring device
Chemical collection trays
For 20 l canisters
For 35 l canisters
For 60/100 l dosing tanks



Dosing groups 2.25 + 3.01



Dosing group 2.31

Dosing groups

To inject the dosing solution into the flow pipe, including 3 m connection hose as well as the corresponding connection kit for the **GENODOS-pump**.

Dosing groups
2.21 (max. 10 bar, 110 °C, 1" female thread)
2.25 (max. 10 bar, 110 °C, injection pipe made of VA 1.4571, 1" female thread)
2.55 (max. 10 bar, 110 °C, VA 1.4571)
KE 4/6 (max. 10 bar, 130 °C, VA 1.4571, R ½")
2.31 (max. 10 bar, 140 °C with siphon, 1" female thread)
3.01 (max. 10 bar, 35 °C, PVC, ¾" male thread)
2.60 (max. 10 bar, 35 °C, PP/PVDF, ½" male thread)
2/4 (dosing valve, 10 bar, 60 °C, FPM)
4/6 (dosing valve, 10 bar, 35 °C, FPM)

	Heating water	Steam boiler	Cooling water
2.21 (PPE/red brass/GTW/steel)	•	–	–
2.25 (PPE/red brass/GTW/steel/1.4571)	•	–	–
2.55 (1.4571/PTFE)	•	–	–
KE 4/6 (1.4571/PTFE)	–	•	–
2.31 (PPE/red brass/steel/1.4571)	–	•	–
3.01 (PVC)	–	–	•
2.60 (PP/PVDF)	–	–	•

DVGW-certified dosing groups for GENODOS DM
2.71 (PVC/EPDM)
2.73 (PVC)
3.02 (PVC)[1]
2/4 (PPE/EPDM)
4/6 (PVC/EPDM/silicone)

[1] *Connection kit already included in the scope of supply of the GENODOS-pump.*

Technical specifications

- Nominal connection diameter 6/8 mm
- Dimensions (w x h x d) 350 x 250 x 140 mm
- Power supply 85 - 305 V, 47 - 440 Hz
- Operating pressure 0.5 - 5 bar



softwatch

Technical specifications

- Nominal connection diameter R ¾"- R 2"
- Power supply 230 V, 50 Hz
- Dimensions (w x h x d) 280 x 300 x 140 mm



GENO-control with differential pressure transmitter R ¾"

Hardness control measuring device softwatch

Fully automatic analysis system to monitor the residual total hardness

The limit value is determined by the selection of the indicator. The electronic control system for microprocessor-controlled analyses, with function monitoring in case of lack of indicator, automatic monitoring of measuring chamber/water shortage/turbidity, offers a large range of analysis and control options. These are visualised via a graphic display and can be stored on an SD card. The system is approved for operation without constant supervison.

Hardness control measuring device
softwatch

Accessories
Pressure reducer for softwatch [1]
Indicators for softwatch [2]
Residual hardness, 500 ml, SWK [mmol/l] 0.018
Residual hardness, 500 ml, SWK [mmol/l] 0.054 [3]
Residual hardness, 500 ml, SWK [mmol/l] 0.09
Residual hardness, 500 ml, SWK [mmol/l] 1.8
Indicators for GENO-control SP [2]
Residual hardness, 500 ml [mmol/l] 0.009 - 0.09
Residual hardness, 500 ml [mmol/l] 0.045 - 0.45
Residual hardness, 500 ml [mmol/l] 0.18 - 1.8

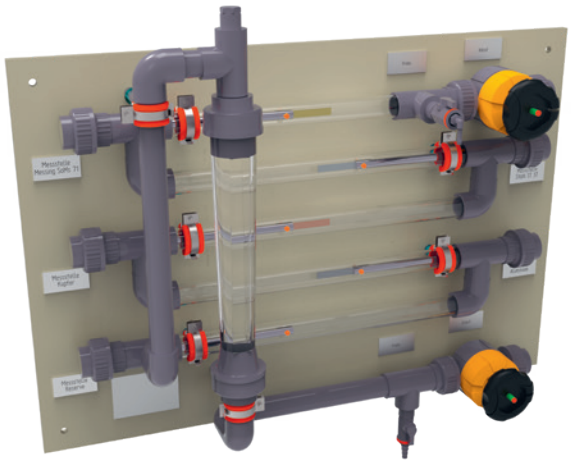
[1] *In case of inlet pressures > 5 bar at the softwatch.*
[2] *Shelf life: 2 years.*
[3] *Recommended for use with RO systems.*

Residual hardness monitoring system GENO-control

For continuous monitoring of residual hardness in soft water, compact device for connection to a differential pressure transmitter

To protect against hardness breaking through downstream of ion exchangers. Short-term, minor hardness breakthroughs (e.g., when the complete system is started) do not trigger alarms (observe application areas and application limits!). Hardness monitoring device with shut-off valves and hose connections, control unit with visual operation and hardness indication and output for visual/acoustic signals and/or shutdown function for a system downstream, measuring hose with connections, spare sensor.

Residual hardness monitoring system
GENO-control, without differential pressure transmitter
Differential pressure transmitter R ¾"
Differential pressure transmitter R 1¼"
Differential pressure transmitter R 2"
Spare sensor for GENO-control



Corrosion measuring section

Corrosion measuring section[1]

To check the corrosion rates of the respective metals used

There are 5 corrosion measuring points available to attach the selected corrosion coupons.

Consisting of: Corrosion measuring section, pre-assembled on PVC plate, flow meter, sampling valve, shut-off valves, 4 corrosion coupons (steel, aluminium, copper, brass, 1 as spare).

Corrosion measuring section with 5 measuring points[1]

[1] *Including initial set of coupons (steel, Ms, Cu, Al).*

Corrosion coupon[2]
For steel
For copper
For brass
For aluminium
For VA 1.4306
For VA 1.4404

[2] *Including evaluation by Grünbeck*

Water test kits

Cooling water
Water test kit molybdenum (5 - 250 mg/l Mo^{6+})
Water test kit molybdenum (0 - 50 mg/l Mo^{6+})
Organophosphate in cooling water (2 - 15 mg/l PO_4)
Combined measuring device for pH + conductivity incl. calibration solutions
Microbiological quick test with dip slides (10 analyses) TTC/Rose Bengal/agar, reddish colonies
Microbiological dip sildes (10 analyses), CASO agar, colourless colonies, with disinhibitor[3]
Small-scale incubator for incubation of dip slides

[3] *For the evaluation, an incubator is required.*



Test kit to determine the molybdenum concentration



Water sample cooler

Water test kits

Heating water, boiler feed water
Water test kit for total hardness, p and m value
Water test kit for total hardness type B (100 determinations)
Water test kit for total hardness GENO-plex B
Water test kit for ortho-phosphate 2 - 15 mg/l[1] (250 determinations)
Water test kit for ortho-phosphate 1 - 20 mg/l[1] (75 determinations)
Water test kit for pH value 7 - 14[1] (100 test strips)
Water test kit for residual oxygen 0 - 100 ppb[1] (30 determinations)
Water test kit for sulphite 10 - 1000 mg/l[1] (100 test strips)
Water test kit for sulphite drip test 0.5 - 20 mg/l[1] (80 determinations)

[1] *Measuring range*

Spare reagents for phosphate and sulphite test kits
Phosphate reagent I (250 ml) for order no. 170 103
Phosphate reagent II (250 ml) for order no. 170 103
Sulphite reagent 1/2/3 (large package 100/100/250 ml) for order no. 170 107
Sulphite reagent 1/2/3 (small package 15/15/50 ml) for order no. 170 107

Wall and analysis cabinets/analysis cases	(w x h x d) [mm]
Wall cabinet with two doors, made of formica, with work counter, test kit not included	640 x 625 x 250
Wall cabinet with one door, test kit not included	350 x 570 x 260
Analysis cabinet for steam boilers with test kits for hardness, p and m values, phosphate and sulphite concentration, pH value and conductivity	310 x 380 x 190
Analysis case for steam boilers with test kits for hardness, p and m values, phosphate and sulphite concentration, pH value and conductivity	
Heating analysis case for heating/boiler water with test kits for phosphate, sulphite, total hardness and pH value	

Water sample cooler (material 1.4301)
Version for 40 bar (overpressure)

Technical specifications

- Max. water temperature 30 °C
- Power supply 230 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 10 bar
- Weight approx. 900 kg



Mobile water softener Delta-p 2" for rent

Water softener Delta-p 2"

Fully automatic triple water softener based on the principle of ion exchange for the generation of fully/partially softened water, with volume-controlled regeneration

3 exchanger tanks filled with ion exchange resin, central control valve, microprocessor controller, disinfection device, PE brine tank (volume 200 kg) with lid, sieve bottom and special brine valve.

Note: Regeneration salt not included in the scope of supply.

The mobile water softener is equipped with C-couplings for quick installation. Additional reinforced hoses are not included in the scope of supply. The rental system comes with forklift pockets for transportation by means of a forklift, it is fully wired and pre-assembled on a pedestal.

Water softener Delta-p	**2"**
Dimensions Delta-p (w x h x d) [mm]	1,100 x 1,950 x 1,800
Brine tank diameter [mm]	570
height [mm]	860
Nominal connection diameter [DN]	50
Nominal flow [m^3/h]	12.0
Nominal flow of blended water [m^3/h][1]	20.0

Rental costs[2]	
For the first 10 working days	
For each additional week	
Accessories and consumables[3]	
Regeneration salt 25 kg	

[1] *In case of a raw water hardness of 3.5 mmol/l and a blending hardness of 1.4 mmol/l (not for Delta-p-I).*
[2] *Upon request, start-up and briefing on site against payment of a fee.*
[3] *Can be ordered as required from wholesalers in the sanitary and heating trade.*

Note: Costs for shipment and return shipment upon proof.



Reverse osmosis system GENO-OSMO-RO 2250 Online

Reverse osmosis system GENO-OSMO-RO 2250 Online on mobile system rack

To fill heating systems/district heating networks and other systems with fully demineralised water

Compact demineralisation system based on the principle of reverse osmosis, ready for connection, fully mounted on a system rack with dosing system upstream for hardness stabilisation. The mobile reverse osmosis system is designed for the demineralisation of feed water which, in terms of its composition, complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV). Depending on the requirements on the pure water, e.g. subsequent softening or a dosing system to increase the pH value might be necessary.

Technical specifications

- Capacity approx. 2,250 l/h online
- Weight approx. 420 kg
- Dimensions (w x h x d) 1,240 x 1,640 x 960 mm
- Power supply required 2.5 kW, 3 x 380 - 415 V, 50 Hz, plug 16 A
- Connection GEKA couplings
- Outlet pressure 4 bar

Rental costs	(
For the first 10 working days	
For each additional working day	
Operating rate per m³ of generated permeate up to 50 m³	
Operating rate per m³ of generated permeate up to 100 m³	
Operating rate per m³ of generated permeate in excess of 100 m³	

Note: Costs for shipment and return shipment upon proof.



Reverse osmosis system RKF-X 3000

Reverse osmosis system RKF-X 3000 on mobile system rack

To fill heating water systems/district heating networks and other systems with demineralised water

Compact demineralisation system based on the principle of reverse osmosis, ready for connection, fully mounted on a system rack with dosing system upstream for hardness stabilisation. The mobile reverse osmosis system is designed for the demineralisation of feed water which, in terms of its composition, complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV). Depending on the requirements on the pure water, e.g. subsequent softening or a dosing system to increase the pH value might be necessary.

Technical specifications

- Capacity approx. 3,000 l/h online
- Weight approx. 650 kg
- Dimensions (w x h x d) 1,700 x 1,950 x 800 mm
- Power supply required 3 x 380 - 415 V/50 Hz, approx. 8 kW, fuse 32 A
- Electrical connection cable with 5-pin CEE plug 3/N/PE
- Connection kit with female thread R 1½"/R 1½", GEKA couplings
- Outlet pressure of permeate 0.5 - 4 bar

Rental costs
For the first 10 working days
For each additional working day
Operating rate per m³ of permeate up to 50 m³
Operating rate per m³ of permeate up to 100 m³
Operating rate per m³ of permeate in excess of 100 m³

Note: Costs for shipment and return shipment upon proof.



Mobile system for residual softening

Mobile system for residual softening

Optional accessory for reverse osmosis systems for rent. Mobile system mounted on a trolley with pneumatic wheels for the residual softening of permeate originating from a reverse osmosis system with hardness stabilisation for rent, ready for connection

Consisting of: Trolley with two rubber wheels, softening cartridge 26.6 mol made of plastic, with ion exchanger filling, water meter as readable roller-type counter R ¾", hose kit with 2 transition pieces for GEKA couplings, all components in a permeate-resistant version.

Note: Only for use in combination with our reverse osmosis system for rent

Technical specifications

- Nominal flow 3,000 l/h
- Weight approx. 100 kg
- Nominal capacity 26.8 mol
- Operating pressure: max. 8 bar
- Operating temperature: max. 20 °C
- Power supply 230 V, 50 Hz

Rental costs
For the first 10 working days
For each additional working day

Note: Costs for shipment and return shipment upon proof.



Reverse osmosis system GENO-OSMO-RO 18000 Online (system example)

Reverse osmosis system GENO-OSMO-RO 18000 Online

Reverse osmosis system installed in a 20 ft container

Compact reverse osmosis systems (2 x 9 m³/h) based on the principle of reverse osmosis, ready for connection, fully mounted on a system rack with dosing system upstream for hardness stabilisation. The reverse osmosis system is designed for the demineralisation of feed water which, in terms of its composition, complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV). For filling heating systems/district heating networks and other systems with fully demineralised water as well as for temporary supply during construction work. Depending on the requirements on the pure water, e.g. subsequent softening or a dosing system to increase the pH value might be necessary.

Technical specifications

- Capacity 18 m³/h
- Weight approx. 6 t
- Primary pressure required min. 3 bar
- Outlet pressure min. 3 bar
- Power supply required 25.0 kW, 63 A, 3 x 380 - 415 V, 50 Hz
- Connections
  Raw water: Flange DN 80
  Permeate: Flange DN 65
  Waste water: KG sliding socket joint DN 100
- Minimum temperature in container: 8 °C
- Dimensions (w x h x d) 2,500 x 2,600 x 6,100 mm

Rental costs
For the first 10 working days
For each additional working day
Operating rate per m³ of generated permeate up to 500 m³
Operating rate per m³ of generated permeate in excess of 500 m³

Note: Costs for shipment and return shipment upon proof.

Commissioning and maintenance when performed by Grünbeck's technical service

Grünbeck products are made of high-quality materials in order to ensure long and trouble-free operation. In order to guarantee the maximum process performance for many years after the start-up, maintenance of the systems is required at regular intervals. A maintenance contract ensures the functionality of your system for many years beyond the warranty period. Maintenance work and supply of consumables, chemicals, etc. should be performed by authorised experts. Please inquire about commissioning and maintenance prices.

Devices, systems, services
Dosing
Dosing systems GENODOS DM, DME, DM-T, DM-oxi
Dosing systems GENODOS DM-B, MOBIdos
Dosing systems GENODOS DM-BO
Water softeners with DVGW certification
Twin system GSX10-I
Delta-p 1" - 1¼"
Delta-p 1½" - 2"
Disinfection Delta-p 1" - 1¼"
Disinfection Delta-p 1½" - 2"
Extended start-up Delta-p 1" - 1¼"
Extended start-up Delta-p 1½" - 2"
Water softeners without DVGW certification (incl. system separators)
Single systems R 1"
Single systems R 1½"
Twin systems R 1"
Twin systems R 1½"
Reverse osmosis
GENO-OSMO-RO 125 K-TS
GENO-OSMO-RO 125 K-TL
AVRO 125 TS
AVRO 125 TL, AVRO-flex
GENO-OSMO-X 200
GENO-OSMO-X 400 - 1600
GENO-OSMO-X 2200/3000
GENO-OSMO-X 200 Online, one diaphragm expansion tank
GENO-OSMO-X 400/800 Online, one diaphragm expansion tank
GENO-OSMO-X 1200/1600 Online, two diaphragm expansion tanks
GENO-OSMO-X 2200/3000 Online, three diaphragm expansion tanks
GENO-OSMO-X 200 AVRO, one module [1]
GENO-OSMO-X 400 AVRO, two modules [1]
GENO-OSMO-X 800/1200 AVRO, three modules [1]
GENO-OSMO-X 1600 AVRO, four modules [1]
Antiscalant dosing
GENO-OSMO-HLX 200/400
GENO-OSMO-HLX 800/1200
GENO-OSMO-HLX 1600 - 3000
Electrodeionisation
GENO-EDI-X 100 - 360
GENO-EDI-X 720 - 2700
Mixed bed demineralisation
Mixed bed cartridges desaliQ:BA, desaliQ:PA

[1] *Price for AVRO-systems without replacement of modules.*

Commissioning and Maintenance, Standard Terms and Conditions of Sale and Delivery

Devices, systems, services
GENO-therm
GENO-VARIO 3000
UV disinfection
Types 60 S, 120 S, 200 S
Types 60 I, 120 I, 200 I
Water supply
ultraliQ:SB
ultraliQ:MA
fermaliQ:MA
Monitoring systems for hardness
GENO-control
softwatch
GENO-Baktox (room air monitoring not included)
MRX 10/20/25
MRX 10/20/25 | ½ yearly maintenance
MRX 10/20/25 | yearly maintenance
MRX 10/20/25 | 1½ yearly maintenance
MRX 10/20/25 | 2 yearly maintenance
MRX 30/50,1/50,2
MRX 30/50,1/50,2 | ½ yearly maintenance
MRX 30/50,1/50,2 | yearly maintenance
MRX 30/50,1/50,2 | 1½ yearly maintenance
MRX 30/50,1/50,2 | 2 yearly maintenance
X/RX 10/20/25
X/RX 10/20/25 | ½ yearly maintenance
X/RX 10/20/25 | yearly maintenance
X/RX 10/20/25 | 1½ yearly maintenance
X/RX 10/20/25 | 2 yearly maintenance
X/RX 30/50,1/50,2
X/RX 30/50,1/50,2 | ½ yearly maintenance
X/RX 30/50,1/50,2 | yearly maintenance
X/RX 30/50,1/50,2 | 1½ yearly maintenance
X/RX 30/50,1/50,2 | 2 yearly maintenance
Cooling water
GENO-KWA-50k/-60i
GENO-LUWADES$_2$
Analyses packages
Public water suppply
Well water
Swimming pool water[1]
Dimensioning of reverse osmosis systems
Heating water
Local/district heating, biogas systems
Cooling water[1]
Pipe sample / deposits / corrosion coupons

[1] *Swimming pool water and cooling water, open: For a detailled assessment, we recommend an addditional analysis of the filling and make-up water.*

Note: *In individual cases, additional cost may occur for increased analysis efforts.*

Regeneration costs[2]
Regeneration of high-quality mixed bed resin for desaliQ:BA6
Regeneration of high-quality mixed bed resin for desaliQ:BA12
Regeneration of high-quality mixed bed resin for desaliQ:BA13
Regeneration of high-quality mixed bed resin for desaliQ:BA16
Regeneration of high-quality mixed bed resin for desaliQ:BA20
New filling of ultra-pure water resin for desaliQ:PA6
New filling of ultra-pure water resin for desaliQ:PA12
New filling of ultra-pure water resin for desaliQ:PA13
New filling of ultra-pure water resin for desaliQ:PA16
New filling of ultra-pure water resin for desaliQ:PA20

[2] *Plus costs for round trip resp. outgoing and return freight by carrier.*

Standard Terms of Sale and Delivery of Grünbeck Wasseraufbereitung GmbH

1 APPLICATION, SUBJECT MATTER OF CONTRACT AND CONCLUSION OF CONTRACT

1.1 These Standard Terms of Sale and Delivery (hereinafter: "STS") apply for the sale of goods ("Delivery") as well as for the provision of services or work contract services ("Service"). Our STS apply for all (including future) business relationships with our customers (hereinafter: "Purchaser") and irrespective of whether we manufacture the object ourselves or obtain it from suppliers or perform the service or work contract service ourselves or through third parties. We do not accept standard business terms of the Purchaser. We object to their application. The STS also apply if we, having knowledge of conflicting standard business terms of the Purchaser, carry out deliveries without reservation.

1.2 As far as not otherwise mentioned in an offer, our offers are subject to change and non-binding. An order of the Purchaser is deemed to be a binding offer of contract. As far as the order does not indicate to the contrary, we are entitled to accept the Purchaser's order within four (4) calendar weeks after receipt. The acceptance shall occur through confirmation or by delivery of the order to the Purchaser.

1.3 Individual terms deviating from these STS are only valid if they are confirmed in writing. Legally binding declarations or notices of the Purchaser after conclusion of the contract (e. g. setting of deadlines, notice of defects, declaration of rescission or reduction of price) must be made in textual form.

1.4 The minimum order value amounts to EUR 100.00 net. In the case of orders under EUR 100.00 we are entitled to apply a reduced quantity charge of EUR 20.00 for the processing costs.

2 SERVICES

2.1 We provide services within the scope of our existing technical and operational possibilities. The services include in particular assembly, start-up operation, customer service and maintenance.

2.2 In the case of services to be provided by us including (but not limited to) development services and/or analysis services, in general no particular result is owed. In connection with the performance of services we do not assume any responsibility for a particular result and are entitled to perform the services through subagents (subcontractors). This shall not apply upon conclusion of a separate contractual agreement.

2.3 If exceptionally an acceptance is stipulated for our services, the Purchaser shall accept the work contract services as provided by us, including partial work contract services, without delay and declare the acceptance or partial acceptance as far as there are no defects in the services which materially impair the suitability or the function.

2.4 If after the making available for acceptance or partial acceptance no objection of substantial defects is made within seven (7) calendar days or if the Purchaser uses the work services or partial work contract services which were made available, the acceptance (partial acceptance) shall be deemed to have occurred as far as the Purchaser is a merchant.

3 SPECIAL PROVISIONS FOR ASSEMBLY, START-UP OPERATION, CUSTOMER SERVICE AND MAINTENANCE

In the event that the order includes assembly, start-up operation, customer service and/or maintenance, the following terms have supplementary application. In the case of contradictions the provisions of this Section 3 have priority over the other provisions of these STS.

3.1 Assembly works

As far as the order includes assembly works, the Purchaser shall ensure at the construction site at his expense that at the start of and during the assembly works

3.1.1 there is freedom to build, i. e. we can perform the contractually owed services without being obstructed by third parties;

3.1.2 suitable access possibilities and openings to bring in items exist in the size specified by us such that the installation can be transported with all necessary vehicles to the site where it is to be set up; the transport path shall not be obstructed;

3.1.3 all terminal points of supply for power supply and signal transmission exist at the agreed location according to the agreed specifications;

3.1.4 the assembly site is protected against weather influences and damaging influences by animals and is secured against unauthorized access;

3.1.5 a power connection of 230/400 V, 50 Hz in accordance with the VDE regulations respectively exists at the assembly site and/or there is an assembly room with such a connected wattage;

3.1.6 appropriate load-bearing points exists on the building and/or ceiling structure to affix hoists;

3.1.7 the interfaces to connect to existing systems, including if applicable necessary isolation valves, are implemented.

3.2 Start-up operation, customer services and maintenance

As far as the order includes the start-up operation, customer service works and/or the maintenance of the installation or individual components, the Purchaser shall at his expense and having regard to the cooperation duty applicable in 3.1 ensure that at the start of and during such works in addition

3.2.1 there is freedom to build; i. e. we can perform the contractual services without being obstructed by third parties;

3.2.2 all necessary operating media with the necessary volume power and flow pressure are available ready for operation;

3.2.3 the water quality (product water, waste water) produced by the installation is accepted with the relevant volume streams;

3.2.4 the air volume streams necessary for the operation of the installation can be and are permitted to be discharged;

3.2.5 all electrical voltages necessary for the operation of the installation are ready for operation together with the necessary connected wattage;

3.2.6 in the case of swimming pools the basin is filled with water;

3.2.7 all signals necessary for the operation of the installation together with third parties and/or agreed signals are available for operation;

3.2.8 suitable climate conditions of the assembly site

3.2.9 location for individual components and/or operating resources are complied with.

3.3 Works abroad

As far as the services are to be performed abroad and our technical personnel requires a residence and/or work permit for that purpose, the Purchaser shall, subject to agreement in a particular case, support us free of charge in the necessary scope in relation to the local authorities in the application for, the extension of or the change of the permit required for the performance of the service.

4 INTELLECTUAL PROPERTY RIGHTS, KNOW-HOW

The Purchaser recognizes our know-how as well as our intellectual property rights. As far as not stipulated otherwise, we reserve our rights of ownership and copyrights to illustrations, drawings and other documents. They may not be made accessible to third parties. This applies in particular for confidential documents. As far as not expressly stipulated elsewhere, e. g. in the order, we do not grant to the Purchaser any rights of use to the know-how or intellectual property rights which arose in connection with our services.

5 DELIVERY, TIME LIMITS, SCOPE OF SERVICE, DEFAULT

5.1 The delivery shall be made EXW “Ex Works” (Incoterms 2020). The place of performance is Höchstädt/Donau. At the request of the Purchaser the goods shall be sent to another destination at his expense. As far as not stipulated otherwise, we are entitled to ourselves to determine the manner of shipment (in particular shipping company, shipping route, packaging). The risk passes to the Purchaser upon delivery to the shipping agent or upon collection at the factory site, as far as the Purchaser is a merchant. If the Purchaser is a consumer, the transfer of risk is governed by the respective statutory provisions. Please note that we are exempted from mandatory freight forwarders' insurance (SLVS-Verzichtskunde).

5.2 Delivery and service deadlines are non-binding unless their binding effect is expressly stipulated.

5.3 We are not responsible for delays which arise through the fact that we do not receive timely or proper supplies from our supplier if we have carefully selected the supplier and have timely placed an order with him such that timely delivery was to be expected. The same applies in the case of delays of services if we have carefully selected the subcontractor and have timely engaged him such that timely service was to be expected.

5.4 The contract fulfilment including compliance with time limits is subject to the condition that there are no conflicting hindrances on the basis of German, US as well as other applicable national, EU or international foreign trade regulations and no embargos or other sanctions.

5.5 Our goods correspond to German safety and quality guidelines. The compliance with foreign guidelines is not ensured as far as not stipulated in a particular case. The purchaser of the goods agrees to inform himself of the regulations under the law to be complied with concerning distribution and the use of our goods in the country of destination and shall comply therewith. If we require information or the participation of the Purchaser in connection with the export or import of the goods in the country of destination, the Purchaser agrees to provide them upon request without delay at his expense.

5.6 The compliance with deadlines for our deliveries or services require the timely receipt of all documents to be provided by the Purchaser, the performance of the cooperation services as well as the compliance with the agreed payment terms and other obligations. If these conditions are not timely fulfilled, the delivery or service time limits shall be reasonably extended.

5.7 If we cannot meet delivery or service deadlines we shall inform the Purchaser thereof without delay and at the same time indicate the probable new deadline or a new date.

5.8 Any rights due to delay, delivery or service can only be asserted by the Purchaser after an unsuccessful warning notice with the setting of a reasonable time limit. A reasonable time limit is considered to be four (4) weeks.

5.9 Partial deliveries and partial services are permissible in a scope which can be reasonably expected and can be brought to account as such. We can provide partial services for acceptance (hereinafter "partial acceptance"). This includes self-contained phases to fulfil the contractually agreed services and self-contained functioning parts.

5.10 In the event that the Purchaser does not timely accept the delivery or service the statutory provisions on delay of acceptance apply. The Purchaser shall in such a case in particular bear the additional costs (e. g. for a second delivery) involved therewith.

5.11 Rules concerning exchange of pallets if the Purchaser is a merchant.

5.11.1 As far as nothing is stipulated otherwise, for the shipping of the goods by a shipping company Euro Pool exchange pallets according to the Cologne Pallet Exchange shall be used.

5.11.2 The Purchaser is obligated upon delivery of the palleted goods to return the same amount of exchangeable pallets of the same type and quality. The UIC standard 435-4 of the International Union of Railways applies for the exchangeability.

5.11.3 The Purchaser must provide a receipt for the number and type of the loaded pallets and note in writing the reservations concerning the quality, provide empty pallets in the same number and type in exchangeable condition, obtain a receipt for the delivery and note reservations concerning the quality, as well as in the event of non-exchange, if no pallets of the same type and quality or not of a sufficient quantity are provided or the acceptance is rejected as not being capable of exchange, to confirm this.

5.11.4 In the case of non-exchange if no pallets of the same type and quality or not of a sufficient quantity are provided or the acceptance is rejected as not being capable of exchange, we will invoice the procurement of replacements for missing or non-exchangeable pallets.

6 PRICES

6.1 As far as not agreed otherwise, our prices are for delivery ex works, including packaging without VAT. The VAT and other costs shall be separately stated in the invoice.

6.2 As far as not agreed otherwise, the provision of the services shall occur Monday to Friday during our usual business hours (max. 8 h/day) and the calculation of the services according to the time spent by us, at the hourly rates respectively currently applied by us plus the respectively applicable material prices and as far as relevant plus travel expenses (in particular, but without limitation, travel to and from the site, accommodation). If at the request of the Purchaser our employees work overtime, the overtime compensation shall be borne by the Purchaser. The same applies for extra pay for Sunday and holiday work. Overtime, Sunday and holiday work shall be charged in accordance with the respectively applicable collective bargaining provisions of the Bavarian metal industry. The Purchaser agrees to verify and countersign working hours certificates which are prepared by our employees. If compensation at a fixed price is agreed, we are entitled to make a down payment for self-contained parts of the service or after completion of a project phase (e. g. contract commencement, initial partial delivery, making available for acceptance, acceptance).

6.3 Costs increases which arise on the basis of requests for change by the Purchaser, in particular delays involved therewith shall be borne by the Purchaser.

6.4 Reasonable price changes in accordance with our price list are reserved if the delivery occurs in accordance with the contract more than four (4) months after conclusion of the contract and as far as the list price increase is attributable to a subsequent increase of the acquisition costs (prices for raw, auxiliary or operating materials, such as material price increases, collective bargaining wage increases or other preliminary services necessary for the subject matter of the contract) on which we have based our price indication upon conclusion of the contract.

7 PAYMENT TERMS

7.1 The agreed compensation shall become due without deduction immediately after performance has been provided and an invoice issued. As far as in a particular case a discount was agreed, no discount can be deducted from wage, packaging and freight costs.

7.2 Upon default of the Purchaser the respectively outstanding residual amount shall bear interest of 5 percentage points above the base interest rate and in the case of legal transactions in which no consumer is involved, 9 percentage points above the base interest rate. In the case of a default by a Purchaser who is a merchant, we are in addition entitled to charge a collection fee of EUR 40.00. The collection fee shall be set off against any damages which are owed as far as the damages are based on costs of the pursuit of legal rights.

7.3 If the Purchaser despite a warning notice does not comply with the payment terms or if the financial circumstances of the Purchaser deteriorate such that there are justified doubts as to his ability to make payments or creditworthiness, we can make further deliveries/services dependant on the Purchaser providing sufficient security. If the Purchaser is not in a position to do so, we are entitled to rescind the contract, if appropriate after setting a time limit.

7.4 The Purchaser is only entitled to apply set-off and to assert a right of retention based on claims which have been finally adjudicated or which are undisputed. Thus does not apply for the reciprocal claims which are characteristic for the exchange of the main performance and counter-performance under the contract. The right of retention is limited to a counterclaim arising from the same contractual relationship.

8 INFORMATION, WARRANTY

8.1 The information in our catalogues, brochures, list of types, data sheets and other advertising writings, in specifications, specification sheets and other technical delivery terms, in certificates and other forms or documents are not guarantees which go beyond the normal warranty.

8.2 In the case of any reliability information (useful life, long-term stability, etc.) statistically determined average values are involved. They are provided according to best knowledge and belief, but in a particular case may be exceeded or not reached.

8.3 For the rights of the Purchaser in the case of physical defects

We understand water.

and defects in title (including incorrect and insufficient delivery as well as improper assembly or defective assembly instructions), the statutory provisions apply as far as nothing is stipulated otherwise below. A defect in particular does not exist to the extent that we have performed our services in accordance with the illustrations proved by the Purchaser or data provided by the Purchaser.

8.4 If the Purchaser is a merchant, he shall inspect or cause to be inspected the delivery or service without delay after receipt as to proper delivery or service, completeness and apparent defects.

8.5 If the Purchaser is a merchant, he loses the right to refer to a defect if he does not notify us thereof within seven (7) calendar days after the day on which he determines it or should have determined it, and exactly specifies the manner of non-compliance with the contract. The timely sending of the notice is sufficient to comply with the time limit.

8.6 If the Purchaser objects to a defect, he must provide to us the allegedly defective parts or devices or allow us a review of such parts in his premises during the usual business hours and provide us with the necessary time and opportunity for the replacement performance.

8.7 If the Purchaser is a merchant and if the delivery or a work service is defective, we can initially choose whether we provide a replacement performance through elimination of the defect (improvement) or through delivery of a defect-free item (replacement). Depending on a particular case we are entitled to at least three (3) improvement attempts.

8.8 If only an individual part of the facility is to be exchanged, we can request that the Purchaser himself replaces that part of the installation which is provided to him by us if the costs for the sending of the technical personnel are disproportionately high.

8.9 The warranty period is

8.9.1 two years, if the Purchaser is a consumer;

8.9.2 one year, if the Purchaser is a merchant;

8.9.3 two years for all DVGW-certified devices, including for industrial and commercial use, as far as the special stipulation of the SHK liability assumption agreement with the German Sanitation, Heating and Air-Conditioning Association (ZVSHK) applies to the contractual relationship between us and the Purchaser. All requirements of that agreement must be fulfilled, in particular the compliance with the applicable operation manual as well as the proper assembly, start-up and maintenance;

8.9.4 one year in the case of used goods (consumer and merchant).

8.10 The warranty does not – as far as not stipulated otherwise in this Section 8 – cover wear-and-tear parts such as sealings, ion exchange resins, membranes, etc. and damages which arose through excessive electrical voltage, frost or improper treatment, operation and maintenance, in particular in deviation from the operation manual. Our liability is also excluded for damages which arose through the use of unsuitable dosing solutions and chemicals.

8.11 Services which do not serve to remove defects in connection with the warranty shall be invoiced separately to the Purchaser.

8.12 After an unsuccessful replacement performance, in relation to the defect removal the Purchaser retains the right at his option to rescind the contract or to reduce the agreed compensation. The right to damages instead of performance shall not be affected thereby.

8.13 The place of performance for the replacement performance is in the case of companies the place of the registered office of Grünbeck, unless the defective products or parts thereof cannot be disassembled. In that case the place of performance of the replacement performance is the agreed place of delivery of the affected product/installation.

8.14 In cases of breach of warranty concerning installations which are not installed in Germany, the warranty service shall be undertaken by the local customer service authorized by Grünbeck as far as it exists. If in a particular country no customer service exists, the customer service of Grünbeck ends at the German border in cases in which the Purchaser is a merchant. All other costs arising in this connection, except material, shall be borne by the Purchaser.

9 RETURNS

9.1 The return of new goods with original packaging can only occur after prior agreement and only within twelve (12) months after the delivery date. The return fee amounts to 20 % of the net merchandise value. No credit note can be issued for returns which have a net merchandise value of EUR 50.00 after deduction of the return fee. Any necessary processing costs shall be charged separately. The return must be made free of charge to the address mentioned by us.

9.2 A return of goods with a limited expiry date (e. g. chemicals) will not be accepted by us. The same applies for the return of goods which are manufactured according to the Purchaser's specifications.

9.3 After prior agreement defective goods can also be returned after the warranty period has expired. Repairs shall be made after a cost estimate. If the Purchaser does not respond to our cost estimate within 8 weeks, we are entitled to return the defective goods to the Purchaser at his expense and to charge the expense incurred by us to the Purchaser.

9.4 For the purpose of the return the Purchaser shall receive an RMA number which must be indicated at the time of return.

10 DISPOSAL OF B2B DEVICES ACCORDING TO ELECTROG (ELECTRICAL AND ELECTRONIC EQUIPMENT ACT)

10.1 The buyer assumes the obligation to properly dispose of the delivered goods after the end of use at his own expense in accordance with the statutory provisions.

10.2 The Buyer indemnifies the Supplier from the obligations under § 19 (1) ElektroG (manufacturers' obligation to accept returned devices) and related third-party claims.

10.3 The Purchaser shall contractually obligate commercial third parties to whom he delivers goods to properly dispose of them after the end of use at their expense in accordance with the statutory provisions and to impose a corresponding further obligation in the event of redelivery.

10.4 If the purchaser fails to obligate a third party to whom he delivers the goods to take over the obligation to dispose of the goods and to impose a corresponding further obligation in the event of redelivery, the purchaser is obliged to take back the delivered goods at his own expense after the end of use and to dispose of them properly in accordance with the statutory provisions.

10.5 The manufacturer's entitlement for takeover/exemption by the customer does not expire before a period of two years after the final termination of the use of the device. The two-year limitation period starts at the earliest upon receipt of a written notification from the purchaser to the manufacturer of the end of use.

11 LIMITATION OF LIABILITY

11.1 If nothing is stipulated to the contrary, the following exclusions and limitations of liability apply for our liability, regardless of the legal grounds, subject to the other statutory claim requirements, and which also apply for our employees, agents and other third parties whom we engage for the performance of the contract.

11.2 The following liability limitations however do not apply as far as we have fraudulently concealed a defect, provided a guarantee for the quality of the merchandise, claims of the Purchaser exist under the Product Liability Act or injury to body or health are caused.

11.3 We are liable for damages as far as we are responsible for intentional actions or gross negligence. In the case of simple negligence we are only liable for damages arising from injury to life, limb or health and for damages arising from the breach of a material contractual duty (obligation the fulfilment of which first makes possible the proper performance of the contract and on the fulfilment of which the contractual partner as a rule relies and is entitled to rely). Where there is a breach of substantial contractual obligations, in the case of simple negligence our liability is limited to the indemnification of the foreseeable, typically arising damages.

11.4 If the Purchaser is a merchant, we are liable – except in the case of liability for intentional acts – for any damages which do not result from injury to life, limb or health or under the German Product Liability Act and only up to a maximum amount of EUR 250,000.00 per calendar year. If our insurance company pays a higher amount for the claims asserted by the Purchaser than this maximum amount, this higher paid out amount constitutes the maximum amount.

11.5 The Purchaser may only rescind or terminate the contract due to a breach of duty which does not constitute a defect if we are responsible for the breach of duty. Other rights of termination of the Purchaser are excluded.

12 FORCE MAJEURE

12.1 We are not liable for force majeure events which make the performance of the contractual services substantially more difficult for us, which temporarily obstruct or make impossible the proper implementation of the contract. Force majeure shall be deemed to be all circumstances which cannot be foreseen or influenced by us and the Purchaser and which arise after conclusion of the contract, including but without limitation natural catastrophes, fire, blockades, embargos, epidemics, pandemics, war, war-like situations and other military conflicts, revolutions, rebellions, uprisings, riots, mobilization, acts of terrorism, strikes or lock-outs.

12.2 As far as we are prevented from the fulfilment of the contractually agreed obligations through force majeure, this shall not be deemed to be a contractual violation and the contractually agreed deadlines shall be reasonably extended in accordance with the duration of the hindrance. The same applies as far as services are performed by third parties and they provide performance to us with delay due to force majeure. If the force majeure circumstances or circumstances outside the sphere of influence of the contracting party last longer than two (2) months, the contracting parties shall reach an agreement on the continuation of the contract within one (1) week.

13 RESERVATION OF TITLE

13.1 Until the fulfilment of all claims (including all outstanding balance claims based on the current account) to which we are entitled for any legal reasons against the Purchaser now or in the future, the goods remain our property.

13.2 The goods which are subject to the reservation of title may not be pledged to third parties nor transferred by way of assignment until complete payment of the secured claims. The Purchaser shall inform us in writing without delay if and the extent seizures of the goods belonging to us made are made by third parties. In the case of seizures by third parties of the goods which are subject to a reservation of title, the Purchaser shall refer to our ownership and inform us without delay.

13.3 The Purchaser is entitled to resell and/or process in the ordinary course of business the goods which are subject to the reservation of title. In this case the following provisions have supplementary application.

13.3.1 The reservation of title extends to the processing of products created through the processing, mixing or combination of our goods in their full value; we shall be deemed to the manufacturer. If in the case of processing, mixing or combination with the goods of third parties their right of ownership remains in place, we shall acquire co-ownership in the ratio of the invoice values of the processed, mixed or combined goods. In other respects the same applies for the created product as for the goods delivered subject to the retention of title.

13.3.2 The claims against third parties arising from the resale of the goods or the created product are hereby assigned to us by the Purchaser in full or in the amount of any co-ownership in accordance with Section 13.3.1 above by way of security. We accept the assignment. The obligations of the Purchaser mentioned in Section 13.2. also apply with respect to the assigned claims.

13.3.3 The Purchaser remains entitled to collect the claim in addition to us. We do not agree to collect the claim as long as the Purchaser complies with his payment obligations toward us, does not default on payment, no application for the commencement of an insolvency proceeding has been made and there is no other deficiency in his payment capability. If this is however the case, we can request that the Purchaser disclose the claims assigned and the debtors thereof, provide all information necessary for collection, deliver the associated documents and inform the debtors (third parties) of the assignment.

13.3.4 If the realizable value of the security exceeds our claims by more than 10 %, we shall at the request of the Purchaser release security of our selection.

14 CONFIDENTIALITY

Each contracting party shall keep secret the information received from the respective other party. This also applies after fulfilment of the delivery or services. This obligation does not apply (i) for information which was legitimately known to the receiving party upon receipt without a duty of confidentiality or (ii) thereafter legitimately becomes known without a duty of confidentiality or (iii) which are or become generally known without a breach of contract by one of the parties. The same applies for information which is developed by a contracting party independently of the information received in connection with the delivery or fulfilment of services. Each party reserves ownership and any rights to the documents or data carriers provided. Duplications and the passing on of such documents or data carriers is only permissible with the consent of the providing contracting party.

15 PRIVACY

15.1 For the duration of the business relationship and to maintain legal retention periods, we process contact details (such as name, email address) of the buyer, his employees and his partners ("contact persons"). These have been obtained from the buyer or partner or collected from publicly available sources (e.g., buyer website). We process the data for the purpose of providing our services and, as long as there is no objection, to promote our offers; the latter is based on the interest-weighting clause of the EU General Data Protection Regulation (DSGVO).

15.2 Contact persons may request information and restrict the processing, provision, correction, publication and deletion of the data (for example via info@gruenbeck.com), **object** to the processing and file a complaint with data protection supervisory authorities.

15.3 Buyers are obliged to forward the above information about our data processing to their contact persons or employees; In this way, our own information obligations towards these contacts are fulfilled. If the buyer requires further details, he can retrieve them at *https://www.gruenbeck.de/en/privacy-policy/* or contact our data protection officer (info@gruenbeck.com).

16 DISPUTE RESOLUTION

If the Purchaser is a consumer, the European Commission provides a platform for online dispute resolution under *http://ec.europa.eu/consumers/odr/*. We try hard to settle possible dissensions resulting from contracts directly with our contracting partner. However, we are not obliged to participate in the online dispute resolution procedure according to the Consumer Dispute Resolution Act (VSBG) and cannot offer you participation in such procedure. Please contact us with questions and problems directly under *info@gruenbeck.com*.

17 APPLICABLE LAW, PLACE OF JURISDICTION, SEVERABILITY

17.1 The law of the Federal Republic of Germany, with the exception of the UN law on the sale of goods (CISG), has exclusive application.

17.2 If the Purchaser is a merchant, the exclusive place of jurisdiction for all disputes arising directly or indirectly in connection with the contractual relationship is Dillingen/Donau. We are however entitled to also raise claims against the Purchaser at the place of the registered office of the Purchaser.

17.3 As far as individual provisions of this agreement are or become invalid in whole or in part, the validity of the remaining contractual provisions shall not be affected thereby. In place of the void or invalid provision the parties shall agree on a valid provision which comes as close as possible to it in a commercial sense as far as a supplementary interpretation of contract does not have priority or is not possible. The same applies accordingly as far as the contract contains a lacuna not intended by both contracting parties.

Status: 11/2020

YOUR LOCAL WATER EXPERTS!



Company profile

Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Str. 1
89420 Hoechstaedt
GERMANY

General manager
Dr. Günter Stoll

Staff
Approx. 660

Sales organisation
Subsidiaries and authorised representations in Germany, representations in all EU member countries as well as associated partners world-wide

Certifications
DIN EN ISO 9001, ISO 14001, SCC^{P} by TÜV Management Service, OHRIS

Product certifications
DVGW, SVGW, ACS, EAC

Approvals
for welding, specialised welding company according to DIN EN ISO 3834-3. Manufacturing of pressure equipment according to the Pressure Equipment Directive 97/23/EC as per AD 2000 data sheet HPO and DIN EN 13480. Manufacturer of steel constructions according to DIN EN 1090. WEEE reg. no.: DE 77585882

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