

Water softener Delta-p

Intended use

The water softeners Delta-p are have been developed for the continuous production of softened and partially softened water and can be used in these areas:

- Continuous soft water supply
- Softening and partial softening of
 - Well water
 - Process water
 - Boiler feed water
 - Cooling water
 - Air-conditioning water
 - Cold drinking water
 - Industrial water

The water softeners Delta-p **cannot** be used in these areas:

- Slow removal of water
- Widely diverging performance
- Load above nominal flow

Please also observe the information in the technical specifications.

Application limits

Refer to the table of performance data and the continuous flow curve.

Function

The water softeners Delta-p are triple systems for the continuous supply of soft water according to ion exchange technology.

Physical

The water softeners Delta-p are equipped with a central control valve for the three exchangers and are controlled depending on the quantity.

Regeneration is triggered when the next exchanger to be regenerated is exhausted or 50 % of the next but one exchanger to be regenerated is exhausted.

The water softener regenerates with raw water.

Chemical

The exchanger contains ion exchanger resin in the form of small resin beads. Sodium ions adhere to each resin bead. Hard water with a large proportion of calcium and magnesium ions flows through the exchanger.

The ion exchanger resin absorbs calcium and magnesium ions from the water in exchange for sodium ions. This reaction is called ion exchange. The calcium and magnesium ions are retained in the exchanger. Soft water without calcium and magnesium ions, but containing sodium ions, leaves the exchanger.

This process continues until no more sodium ions are available. The ion exchanger resin is exhausted.

The exchange can be reversed if a large amount of sodium ions is added.

The exchanger is rinsed with brine, water containing salt.

By their sheer number, sodium ions displace calcium and magnesium ions on the ion exchanger resin. This water containing calcium and magnesium ions is discharged to the drain. The initial condition is restored.

The ion exchanger resin is regenerated, and thus ready for operation.

Design

- Three exchanger tanks
- Electronically controlled transfer, regeneration and blending valve
- Microprocessor control with RS 485 interface
- Signalling and fault signal contact
- Brine tank made of PE incl. sieve bottom

Scope of supply

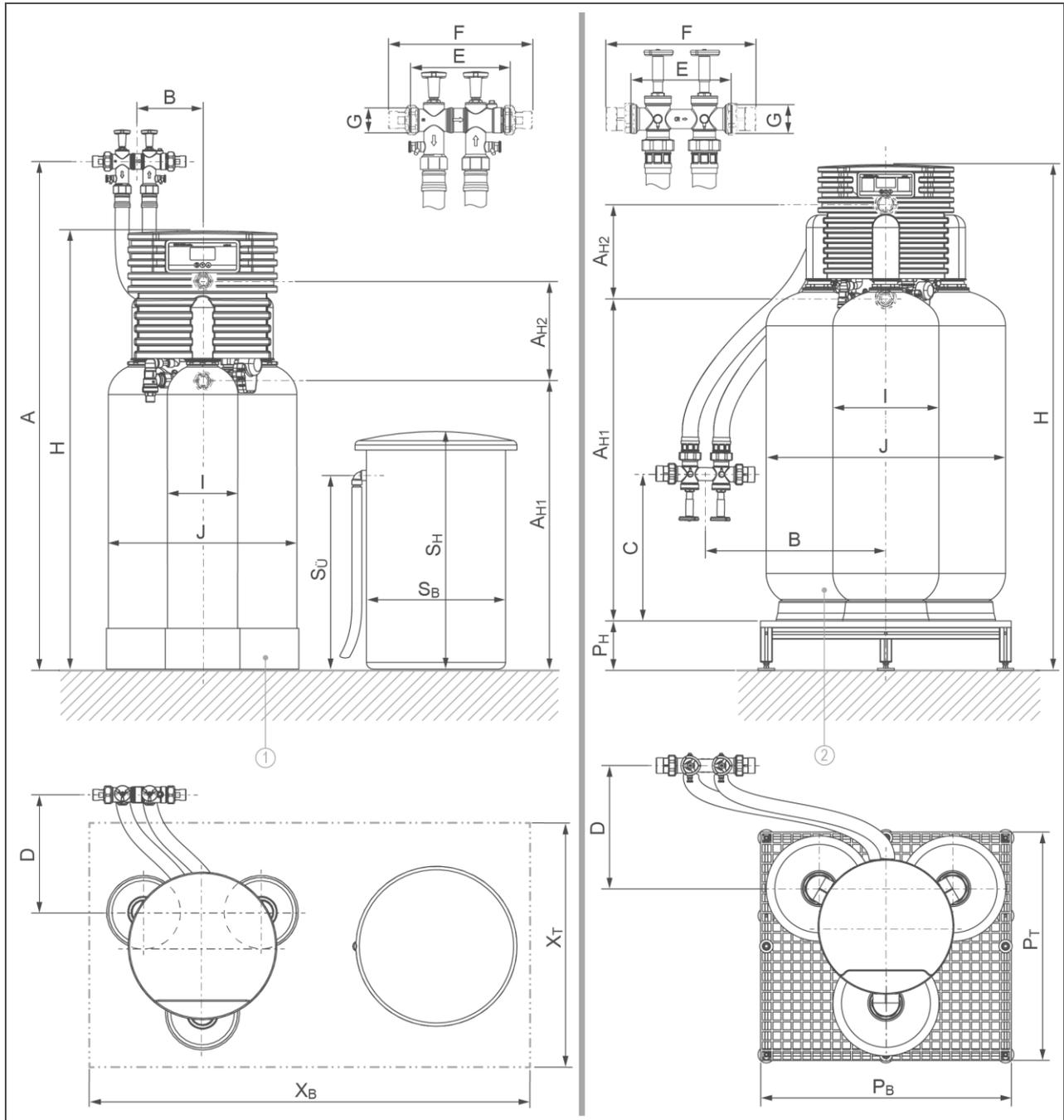
Delta-p/Delta-p-I

- Water softener in parts, complete
- Brine tank
- Water test kit "Total hardness"
- Operation manual

Delta-p/Delta-p-I with pedestal

- Water softener ready for connection mounted on a platform

Technical specifications I



Item	Designation	Item	Designation
1	Delta-p/Delta-p-I without platform (1", 1¼")	2	Delta-p/Delta-p-I with platform (1½", 2")

Technical specifications II

Water softener Delta-p/Delta-p-I		1"	1¼"	1½"	2"
Dimensions and weights					
A	Connection height (high line)	mm	1000 – 2000		1550 – 2250 1700 – 2400
B	Lateral offset	mm	350±20		600±20
C	Connection height (low line)	mm	0 – 1000		350 – 550 500 – 700
D	Distance to wall	mm	200±20		550±20
E	Installation length without screw connections	mm	190		260
F	Installation length with screw connection	mm	276		378
G	External thread		1½"		2½"
H	System height (without/with platform)	mm	1300/1500		1640/1840 1760/1960
I	Ø exchanger	mm	210	257	369 406
J	System width	mm	580	630	900 960
AH1	Connection height of control valve (raw water)	mm	860		1125 1245
AH2	Distance height control valve (soft water)	mm	290		360
SH	Salt tank height (standard/accessories)	mm	670/860 (210 l)		860/1250 (750 l)
SB	Ø salt tank (standard/accessories)	mm	410/570 (210 l)		570/900 (750 l)
SÜ	Safety overflow height (standard/accessories)	mm	575/785 (210 l)		785/1100 (750 l)
PW x PD x PH	Platform dimensions	mm	770 x 770 x 200		960 x 880 x 200
XW x XD	Foundation dimensions min. (recommended)	mm	1240 x 920	1400 x 1020	1770 x 1400 1850 x 1450
	Operating weight, approx.	kg	255/ 403 (210 l)	322/ 471 (210 l)	745/ 1400 (750 l) 862/ 1270 (750 l)

Connection data					
Nominal connection diameter		DN 25 (1" male thread)	DN 32 (1¼" male thread)	DN 40 (1½" male thread)	DN 50 (2" male thread)
Min. drain connection.		DN 50			
Rated voltage range	V	230			
Rated frequency	Hz	50 – 60			
Max. rated load in operation	W	26		32	
Power input in standby	W	19			
Protection/protection class		IP 54/⊕			

Performance data					
Nominal pressure		PN 10			
Min./max. operating pressure	bar	2/10			
Nominal flow (0 °dH, 0 °f, 0 mol/m³) acc. to DIN EN 14743 at a pressure loss of 1.0 bar (theoretical value)	m³/h	4.2	5.6	11.3	13.4
Nominal flow at a pressure loss of 1.0 bar acc. to DIN 19636-100 (raw water hardness 20 °dH (35.6 °f, 3.56 mol/m³), soft water hardness 8 °dH (14.2 °f, 1.42 mol/m³)) not with Delta-p-I	m³/h	5	8.3	13.3	20
Pressure loss at nominal flow	bar	0.5	0.8	0.5	0.8
Nominal flow (restricted by hard raw water from 20 °dH / 35.6 °f / 3.56 mol/m³)	m³/h	3	5	8	12

• **Product data sheet**
Water softener Delta-p

Water softener Delta-p/Delta-p-I		1"	1¼"	1½"	2"
Performance data					
Continuous flow (Maximum value reduced by hard raw water from 20 °dH / 35.6 °f / 3.56 mol/m ³)		Dependence on raw water hardness refer to continuous flow curve			
Minimum quantity of water removed for system control (raw water hardness 0 °dH (0 °f, 0 mol/m ³)) Systems with a blending valve increase the minimum quantity according to the proportion of which is blended.		70		180	
		l/h			
		m ³ x °dH		48 79 165 229	
Nominal capacity		m ³ x °f		85.4 140.6 293.7 407.6	
		mol		8.2 13.2 27.8 38.6	
Capacity per kg of regeneration salt		mol/kg		5.7	
Filling volumes and consumption data					
Resin volume (tank)		l		21 33 75 100	
Freeboard (resin in form of sodium), approx.		mm		135 160 195 265	
Salt consumption per regeneration, approx.		kg		1.5 2.5 5.2 7.2	
Regenerating salt supply max. standard brine tank/accessories for brine tank		kg		65/180 (210 l) 180/630 (750 l)	
Salt consumption		kg/(m ³ x °dH)		0.03	
per m ³ and °dH		kg/(m ³ x °f)		0.018	
per m ³ and °f		kg/mol		0.18	
per m ³ and mol					
Max. rinsing water volume		m ³ /h		0.6 0.9 1.9 2.0	
Total waste water volume per regeneration, approx.		l		68 110 235 315	
Waste water volume		l/(m ³ x °dH)		1.42	
per m ³ and °dH		l/(m ³ x °f)		0.79	
per m ³ and °f		l/mol		7.8	
per m ³ and mol					
Operating water volume		l		4.2 6.9 14.4 20	
General data					
Water temperature		°C		5 – 30	
Ambient temperature (drinking water)		°C		5 – 25	
Ambient temperature (technical application)		°C		5 – 40	
Max. humidity of air (non-condensing)		%		90	
Iron content in the raw water max.		mg/l		0.2	
Manganese content in the raw water max.		mg/l		0.05	
DVGW-registration number (not Delta-p-I)		NW-9151BU0049			
SVGW-certificate-number (not Delta-p-I)		1305-6162			
ÜA registration number <i>The Office of the Vienna Provincial Government – City of Vienna</i>		R-15.2.3-21-17496			
Data record in the control unit		CA31		CA32 CA35 CA36	
Order no. Delta-p		185 100		185 110 185 120 185 130	
Order no. Delta-p ready for connection on pedestal		185 105		185 115 185 125 185 135	
Order no. Delta-p-I		185 200		185 210 185 220 185 230	
Order no. Delta-p-I ready for connection on pedestal		185 205		185 215 185 225 185 235	

Technical specifications III

Continuous flow curve Delta-p

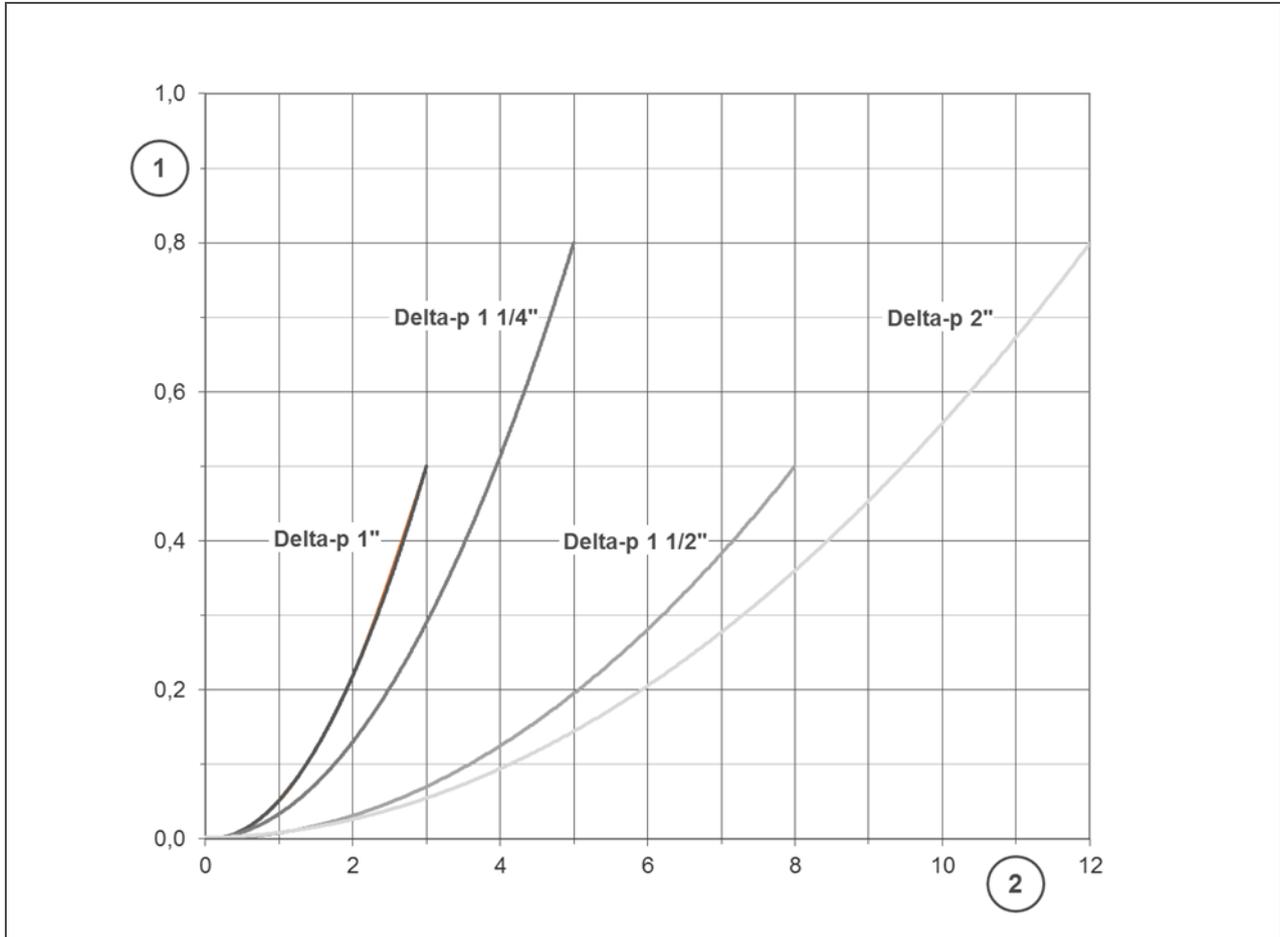


Item	Designation	Item	Designation
1	max. continuous flow in % of nominal flow rate at 0 °dH, 0 °f, 0 mol/m ³	2	Raw water hardness in °dH

Conversion table											
°dH	14	16	18	20	22	24	26	28	30	32	34
°f	24.9	28.5	32.0	35.6	39.2	42.7	46.3	49.8	53.4	57.0	60.5
mol/m ³	2.49	2.85	3.20	3.56	3.92	4.27	4.63	4.98	5.34	5.70	6.05

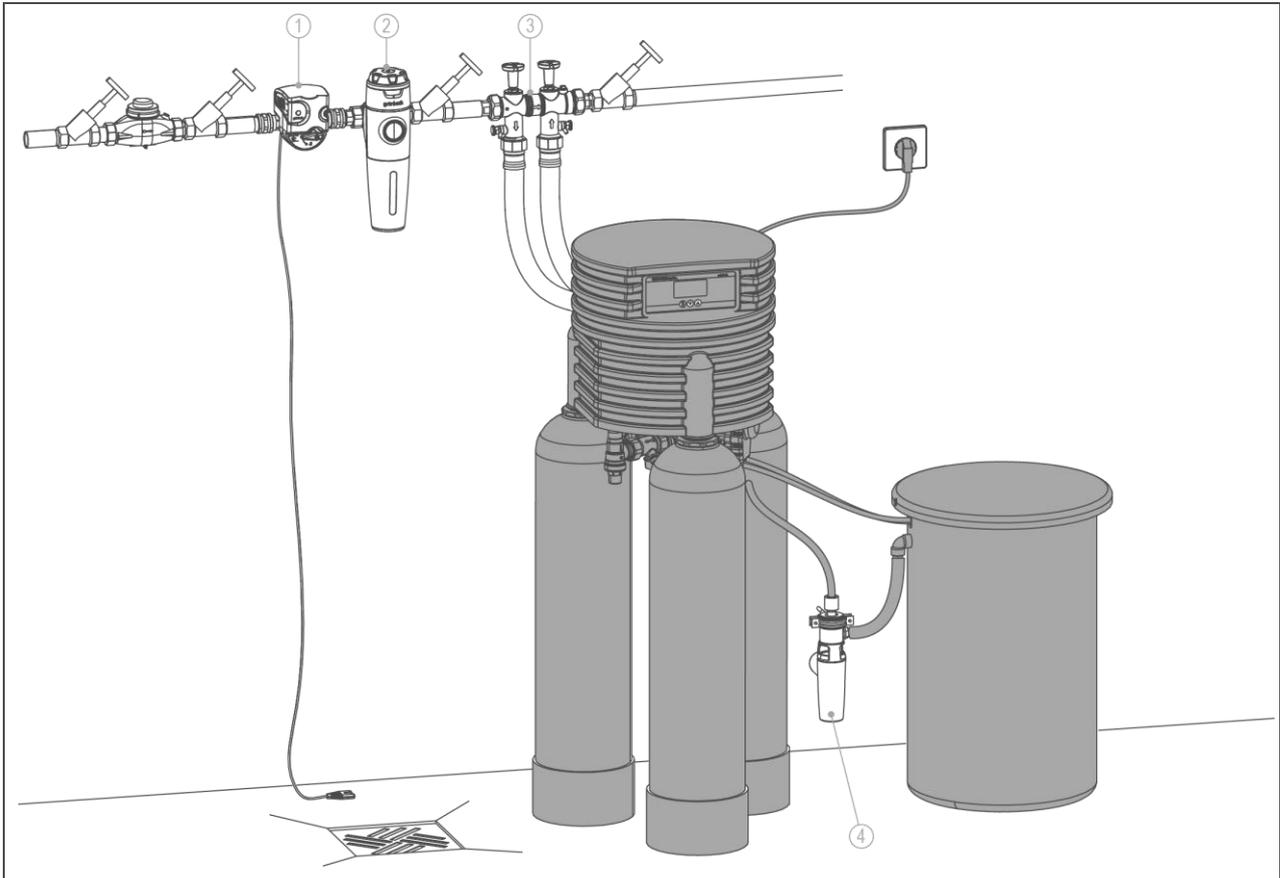
Technical specifications IV

Pressure loss curve Delta-p



Item	Designation	Item	Designation
1	Pressure loss in bar at 0 °dH, 0 °f, 0 mol/m³	2	Flow rate in m³/h

Installation example



Item	Designation	Item	Designation
1	Safety device protectliQ	2	Drinking water filter pureliQ:KD
3	Connection set Delta-p/Delta-p-I	4	Drain connection Delta-p, DN 50 acc. to DIN EN 1717

Installation requirements

Observe local installation directives, general guidelines and technical specifications. The installation site must be frost-proof and ensure the system's protection from chemicals, dyes, solvents and their vapours.

If the softened water is intended for human consumption in the sense of the German Drinking Water Ordinance, the ambient temperature must not exceed 25 °C. For applications that are purely technical, the ambient temperature must not exceed 40 °C.

Always install a drinking water filter and, if required, a pressure reducer (e.g. fine filter pureliQ:KD) upstream of the product.

A shock-proof socket is required within a distance of approx. 1.2 m of the system. The socket requires a permanent power supply and must not be connected to light switches, emergency heating switches or similar devices.

A drain connection (DN 50) must be available to discharge the regeneration water.

The installation location must be provided with a floor drain. If this is not available, an appropriate safety device protectliQ or a protection device with water stop of the same quality must be installed to prevent water damage.

Ensure that lifting systems are resistant to salt water.

There must be a water withdrawal point near the product.

Accessories

Pedestal Delta-p

Size	Order no.
1" - 1¼"	
770x770x200 mm	185 820
1½" - 2"	
960x880x200 mm	185 825

Frame made of aluminium sections with adjustable feet and grating.

Pre-alarm salt supply

Order-no. 185 335

For monitoring the salt supply by means of light sensor on the brine tank cover.

Connection set

Size	Order no.
1" - 1¼"	185 807
1" - 1¼" - I	185 808
1½" - 2"	185 823
1½" - 2" - I	185 824

Compact valve block, built-in overflow valve (not with Delta-p I version), shut-off valves for hard and soft water, sample valves for raw and soft water (only with 1"-1¼"), 2 flexible, pressure-resistant connection hoses. (For Switzerland, connection hoses are not included in the scope of delivery. Install the fixed pipework on site.)

Connection screw fitting

Size	Order no.
1"	185 846
1¼"	185 847
1½"	185 848
2"	185 849

Water meter screw connections with seals for pre-installation of the connection block.

Brine tank

Size	Order no.
210 litres	185 510
750 litres	185 525

Disinfection set

Size	Order no.
1" - 1¼"	185 830
1½" - 2"	185 835

Disinfection of the water softener, e.g. after extremely long periods of stagnation or contamination. With GENO-perox, canister and personal protective equipment.

Parallel piping

Size	Order no.
2x 1" PVC	185 450
2x 1¼" PVC	185 455
2x 1½" PVC	185 460
2x 2" PVC	185 465
3x 2" PVC	185 470
2x 1" VA	185 400
2x 1¼" VA	185 405
2x 1½" VA	185 410
2x 2" VA	185 415
3x 2" VA	185 420

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

Cascade connection

Size	Order no.
1" - 1¼" – 2-fold	185 360
1½" - 2" – 2-fold	185 365
2" – 3-fold	185 370
2" – 4-fold	185 375

Cascade control for parallel-piped water softeners Delta-p. The cascade connection is required in connection with water softeners Delta-p in parallel connection.

M-bus measuring transducer

D-DAM, complete

Order no. 115 850

To transmit the flow rate and the meter reading as well as statistical values of the water meter by means of M-Bus (IEC 870).

Flow-dependent pulse output, analogue output and relay contact to Grünbeck control unit.

Communication module

DE200 Profibus

Order no. 185 890

Drain connection DN 50

Order no. 185 775

acc. to DIN EN 1717 including siphon for Delta-p.

Dosing system GENODOS

DME Delta-p

Order no. 163000010000

For addition of mineral-based exaliQ solutions into the drinking water in proportion to quantity. The water softener Delta-p sends the dosing signal.

Optional insert with injection

point G¼" for the soft water outlet of the Delta-p

Size	Order no.
Delta-p 1"	185000010000
Delta-p 1¼"	185000020000
Delta-p 1½"	185000030000
Delta-p 2"	185000040000

Consumables

Regenerating salt 25 kg

Order no. 127 001

Regenerating salt in tablet form acc. to EN 973 Type A for the regeneration of ion exchangers.

Water test kit for total hardness °dH and °f

1x	Order no. 170 187
10x	Order no. 170 100

Contact

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

+49 9074 41-0

+49 9074 41-100

info@gruenbeck.com
www.gruenbeck.com

