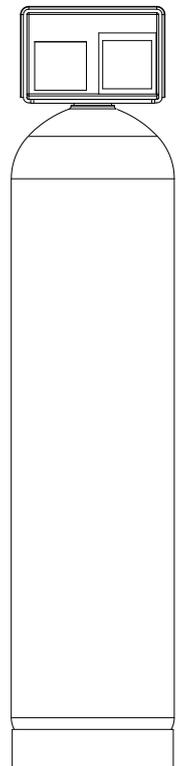


Operation Manual GENO-mat FE-Z Deferrisation system



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Order no. 153 940-inter_035

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A company certified by TÜV SÜD
in accordance with DIN EN ISO 9001,
DIN EN ISO 14001 and SCC

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EC Declaration of Conformity

This is to certify that the systems designated below meets the safety and health requirements of the applicable European guidelines in terms of its design, construction and execution.

If the systems are modified in a way not approved by us, this certificate is void.

Manufacturer: Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Str.1
89420 Hoechstädt/Do., Germany

Responsible for documentation: Markus Pöpperl

Description of the device: Deferrisation system

Device type: GENO-mat FE-Z

Device no.: Refer to type plate

Applicable guidelines: Low Voltage (2014/35/EU)
EMC (2014/30/EU)
RoHS (2011/65/EU)

Applied harmonised
standards
in particular:

Applied national standards
and technical specifications,
in particular:

Place, date and signature: Hoechstädt, 23.01.2020

p.p.

M. Pöpperl
Dipl.-Ing. (FH)

Function of signatory: Head of Technical Product Design

A General

1 | Preface

Thank you for opting for a Grünbeck product. Backed by decades of experience in the area of water treatment, we provide solutions for all kind of processes.

Drinking water is classified as food and requires particular care. Therefore, always ensure the required hygiene in operating and maintaining systems involved in the drinking water supply. This also applies to the treatment of water for industrial use if repercussions for the drinking water cannot completely be excluded.

All Grünbeck systems and devices are made of high-quality materials. This ensures reliable operation over many years, provided you treat your water treatment systems with the required care. This operation manual assists you with important information. Therefore, please read the complete manual before installing, operating or maintaining your system.

Customer satisfaction is our prime objective. Providing customers with qualified advice is crucial to Grünbeck. If you have any questions concerning this system, possible extensions or general water and waste water treatment, our field staffs, as well as the experts at our headquarters in Hoechststedt, are available to help you.

For help and advice

please consult the representatives responsible for your region (see www.gruenbeck.de) In case of emergency, please get in touch with our service hotline at +49 9074 41-444.

We can connect you with the appropriate expert more quickly if you provide the required system data. To ensure that this information is to hand at all times, please keep the precise equipment data to hand (refer to the type plate in chapter C-1).

2 | How to use this operation manual

This operation manual is intended for the operators of our systems. It is divided into several chapters (a letter is assigned to each of them) which are listed in the “Table of contents” on page 2 in alphabetical order. In order to find the specific information you are looking for, check for the corresponding chapter on page 2.

The headers and page numbers with chapter information make it easier to find your way around in the manual.

3 | General safety information

3.1 Symbols and notes

Important information in this operation manual is characterised by symbols. Please pay particular attention to this information to ensure the hazard-free, safe and efficient handling of the system.



Danger! Failure to adhere to this information will cause serious or life-threatening injuries, extreme damage to property or inadmissible contamination of the drinking water.



Warning! Failure to adhere to this information may cause injuries, damage to property or contamination of the drinking water.



Caution! Failure to adhere to this information may result in damage to the system or other objects.



Note: This symbol characterises information and tips to make your work easier.



Tasks with this symbol may only be performed by Grünbeck's technical service/authorised service company or by persons expressly authorised by Grünbeck.



Tasks with this symbol may only be performed by qualified electrical experts according to the VDE guidelines or according to the guidelines of a similar local institution.



Tasks with this symbol may only be performed by water companies or approved installation companies. In Germany, the installation company must be registered in an installation directory of a water company as per §12(2) AVBWasserV (German Ordinance on General Conditions for the Supply of Water).

3.2 Operating personnel

Only persons who have read and understood this operation manual are permitted to work with the system. The safety guidelines are to be strictly adhered to.

3.3 Designated application

The system may only be used for the purpose outlined in the product description (chapter C). The guidelines in this operation manual as well as the applicable local guidelines concerning the drinking water protection, accident prevention and occupational safety must be adhered to.

In addition, appropriate application also implies that the system may only be operated when it is in proper working order. Any malfunctions must be repaired at once.

3.4 Protection from water damage

Warning! In order to properly protect the installation site from water damage:

- a) a sufficiently dimensioned floor drain system must be available or
- b) a water stop device (see chapter C Accessories) must be installed.

3.5 Indication of specific dangers

Danger due to electrical energy! → Do not touch electrical parts with wet hands! Disconnect the system from mains before starting work on electrical parts of the system. Have qualified experts replace damaged cables immediately.

Danger due to mechanical energy! System parts may be subject to overpressure. Danger of injury and damage to property due to escaping water and unexpected movement of system parts. → Check pressure pipes regularly. Depressurise the system before starting repair or maintenance work on the system.

Hazardous to health due to contaminated drinking water! → The system may only be installed by a specialist company. The operation manual must be strictly adhered to! Ensure that there is sufficient flow. The pertinent guidelines must be followed for starting-up after extended periods of standstill. Inspections and maintenance must be performed at the intervals specified!



Note: By concluding a maintenance contract, you ensure that all of the required tasks are performed on time. You may perform the interim inspections yourself.

4 | Shipping and storage



Caution! The system may be damaged by frost or high temperatures. In order to avoid damage of this kind:

Protect from frost during transportation and storage!

Do not install or store the system next to objects which radiate a lot of heat.

The system may only be transported and stored in its original packing. Ensure that it is handled with care and placed the right side up (as indicated on the packing).

5 | Disposal

Comply with the applicable national regulations.

5.1 Packaging

Dispose of the packaging in an environmentally sound manner.

5.2 Product



If this symbol (crossed out waste bin) is on the product, European Directive 2012/19/EU applies to this product. This means that this product and the electrical and electronic components must not be disposed of as household waste.



Find out about local regulations on the separate collection of electrical and electronic products.

Use the collection points available to you for disposing of your product.



For information on collection points for your product, contact your municipality, the public waste disposal authority, an authorised body for the disposal of electrical and electronic products or your waste collection service.

B Basic information

1 | Laws, regulations, standards

In the interest of good health, rules cannot be ignored when it comes to the processing of drinking water. This operation manual takes into consideration the current regulations and stipulates information that you will need for the safe operation of your deferrisation system.

Among other things, the regulations stipulate that

- only approved companies are permitted to make major modifications to water supply facilities.
- and that tests, inspections and maintenance on installed devices are to be performed at regular intervals.

2 | Intended use/field of application

The GENO-mat FE-Z deferrisation systems are used for the oxidation of dissolved iron in the raw water. The systems are used for private water supply plants up to maximum values of 3.0 mg/l of iron. If the systems are applied and operated according to the instructions, pure water values with a concentration of less than 0.1 mg/l of iron can be obtained.

The following requirements must be observed in order to obtain optimum results:

- Hydrogen sulphide and oil may not be detected in the water to be deferrised.
- Organic compounds should preferably not be contained in the water; however, the maximum allowable value is 4 to 5 mg/l above the COD.
- The oxygen concentration should be proportionally 15 % of the existing iron concentration and the pH value must be higher than 7.0.
- However, should ammonium (> 0.1 mg/l) be detected in the raw water, an additional treatment step is required.
- Should humic acids be contained in the well water, the pure water quality to be expected might be affected.

3 | Function

The GENO-mat FE-Z deferrisation systems for the removal of iron work with an active insoluble catalytic filter material. A central control valve automatically controls the operating cycle's filtration, backwash and first filtrate.

3.1 Filters

The raw water enters the exchanger tank via the raw water inlet and flows through the catalytic filter material from top to bottom. Thus the reaction of the oxygen with the iron contained in the water is accelerated.

Bivalent iron is transformed into insoluble, filterable, trivalent iron (adding air sparingly might be required in order to improve the oxidation process). The filtered pure water is then directed via the lower distributing nozzle and the rising pipe through the pure water outlet into the piping system.

3.2 Backwashing

During the backwash process, the filter bed is forcibly flushed from bottom to top and thus loosened up. Impurities retained during the filtration process are washed out via the drain outlet at the control valve. The GENO-mat FE-Z deferrisation system must be backwashed every 6 days at the latest (for the setting refer to chapter F).

3.3 First filtrate

By an automatic switch-over of the central control valve, the filter bed will forcibly be flushed from top to bottom. This first filtrate is discharged to the drain and afterwards the deferrisation system is ready for operation once again.

3.4 Regeneration/ disinfection

For operating and hygienic reasons, the deferrisation system must be regenerated every 6 months with the special granulate GENO-Spezialgranulat or GENO-oxi plus.

3.5 Control unit

The GENO-mat FE-Z deferrisation systems are time-controlled via an electrical timer.

In order to properly use the automatic timer control, the time interval between two filter sequences (backwash interval in days) must be set.

C Product description

1 | Type plate

The type plate is located on the GENO-mat FE-Z control valve. Queries and orders will be processed faster if you are able to provide the information listed on your system's type plate. Please copy the indicated information to the table below in order to have it readily available whenever necessary.

GENO-mat FE-Z	Deferrisation system
Serial number:	□ □ □ □ □ □ / □
Order no.:	n n n n n n

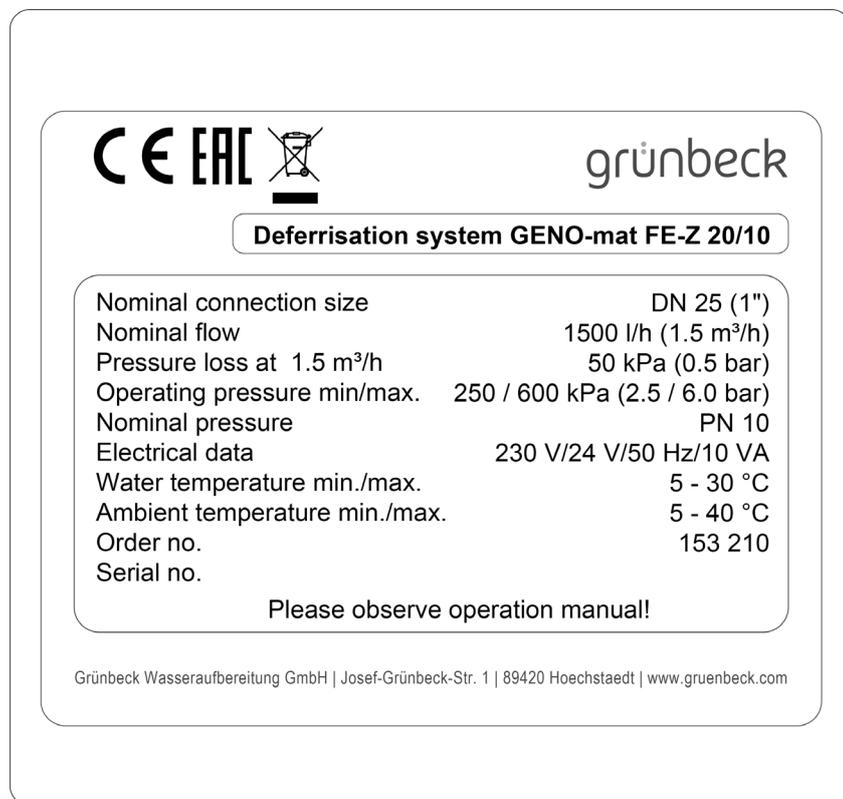


Fig. C-1: Type plate GENO-mat FE-Z deferrisation system

2 | Technical specifications

The GENO-mat FE-Z deferrisation system is a single system with integrated bypass for the supply of raw water during the backwash process. It is equipped with a timer control. The backwash is released after a set time interval.

All system data are summarized on the reverse in table C-1. The data refers to the standard versions of the GENO-mat FE-Z deferrisation systems. Possible deviations in case of special versions are listed separately, if applicable.



Caution! Electrically operated valves. In case of a power failure during the backwash, water may enter the drain. In case of power failure, check the system and shut-off the water supply, if necessary.

Table C-1: Technical specifications	GENO-mat FE-Z deferrisation system							
	20/10	25/13	30/14	40/17	40/18	50/19	60/20	
Connection data								
Nominal connection diameter	DN 25 (1")			DN 40 (1½")				
Min. drain connection	DN 50					DN 70		
Nominal flow rate (depending on the iron concentration) [m³/h]	1.5	2.0	3.0	4.0	5.0	6.0	8.0	
Power supply [V]/[Hz]	230/50 (system operation with protective low voltage 24/50)							
Connected load [VA]	10							
Protection/protection class	IP 22/ □							
Performance data								
Nominal pressure	PN 10							
Min./max. operating pressure [bar]	2.5/6.0							
Pressure loss at nominal flow [bar]	0.5	1.1	1.0	1.1	1.0	0.8	1.1	
Dimensions and weights¹⁾								
Total height [mm]	1360	1620	1620	1900	1900	1870	2100	
Exchanger tank ∅ [mm]	210	260	340	370	420	550	620	
Regeneration tank ∅ [mm]	465					680		
Height regeneration tank [mm]	840					1010		
Connection height/raw water piping [mm]	1160	1420	1420	1710	1710	1680	1910	
Connection height/pure water piping [mm]	1210	1470	1470	1735	1735	1705	1935	
Distance to wall [mm]	200	230	280	280	300	365	405	
Depth of foundation [mm]	400	450	500	500	550	600	650	
Length of foundation [mm]	1850	1950	2050	2050	2100	2250	2350	
Operating weight (incl. water) [kg]	50	85	150	200	240	425	580	
Filling volumes and consumption data¹⁾								
Bottom filter layer I, quartz gravel 3.0 - 5.6T [kg]	-	-	25	25	25	50	50	
Bottom filter layer I, quartz gravel 3.0 - 5.6T [l]	-	-	18	18	18	36	36	
Bottom filter layer I, quartz gravel 3.0 - 5.6T (dimension a) [mm]	-	-	1100	1400	1430	1320	1570	
Top filter layer II GENO-Ferrocacat [l]	28	52	72	100	112	224	308	
Top filter layer II GENO-Ferrocacat (dimension b) [mm]	290	360	270	460	570	390	520	
Free board [l]	5	8	15	18	36	45	88	

Amount of regeneration agent required								
Preparation amount	[l]	30 ²⁾	50 ²⁾	60 ²⁾	100 ²⁾	100 ²⁾	200 ²⁾	300 ²⁾
GENO-oxi plus	[l]	5	9	11	17	17	35	53
GENO-Spezialgranulat (special granulate)	[g]	105	175	210	350	350	700	1050
Regeneration/disinfection interval		Regeneration as required / disinfection at the latest after 6 months						
Concentration of preparation	[%]	0.35						
Total waste water volume per regeneration at 3 bar approx.	[m ³]	1	1.3	1.7	2	2.7	3.4	5.4
Duration of washing out (regeneration)	[min.]	30						
Duration of backwash	[min.]	10						
Backwash capacity	[m ³ /h]	1.6		3.4			5.7	
Ambient data								
Max. water temperature	[°C]	30						
Max. ambient temperature	[°C]	40						
Order no.	153 ...	210	220	230	240	250	260	270
Continuation Table C-1:		GENO-mat FE-Z deferrisation system						
		20/10	25/13	30/14	40/17	40/18	50/19	60/20
Spare filter fillings ¹⁾								
GENO-Ferrocatt (28 l per bag)		1x 170170	1x 170170	2x 170170	3x 170170	4x 170170	8x 170170	11x 170170
GENO-Ferrocatt (4 l per bucket)		-	6x 153610	4x 153610	4x 153610	-	-	-
Quartz gravel SB 3.0 - 5.6 T (25 kg per sack)		-	-	1x 170208	1x 170208	1x 170208	2x 170208	2x 170208

- 1) All indications are approximate.
- 2) If the liquid product GENO-oxi plus is used, the GENO-oxi plus amount must be subtracted from the preparation amount.

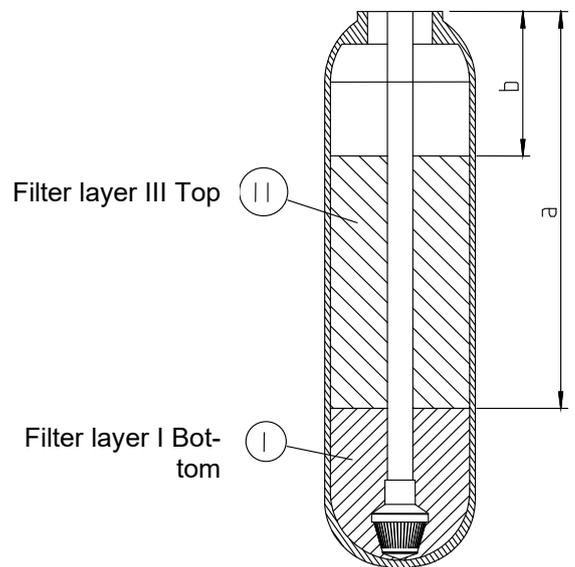


Fig. C-2: Filling of filter layers

3 | Intended use

The system is adjusted to the water demand to be expected at the installation site. It is not suitable for considerably differing performances. The maximum flow must not be exceeded under any circumstances.

The system may only be operated if all components are installed properly. Safety devices must never be removed, bridged or otherwise tampered with.

Designated application of the system also implies that the information contained in these operating instructions and all safety guidelines applying at the installation site be observed. Furthermore, the maintenance and inspection intervals have to be observed.

4 | Scope of supply

- 4.1 Basic configuration**
- Exchanger tank in double walled plastic housing.
 - Filter materials (gravel, GENO-Ferrocatt, quartz gravel).
 - Control valve made of red bronze with integrated timer control.
 - Water test kit for iron.
 - Operation manual.

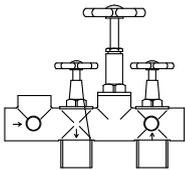
5 | Optional accessories



Note: It is possible to retrofit existing systems with optional components. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechststedt for details.

PE tank 100 litre or 300 litre with litre scale and hand mixer to prepare the regeneration solution. Tank has integrated suction device.

- Regeneration device 100 litre (FE-Z 20/10 – FE-Z 40/18) 153 094
- Regeneration device 300 litre (FE-Z 50/19 – FE-Z 60/20) 153 095



Mounting kit 1:

for convenient hydraulic connection, Compact valve block R 1" internal thread, integrated bypass with shut-off valve, shut-off valves for hard and soft water, outlet for raw water (e.g. garden hose), 2 connection hoses

- Mounting kit R 1" (up to size 30/14) 125 845

6 | Consumables

Only use genuine consumables in order to ensure the reliable operation of the system.

6.1 Oxidising agents for the regeneration/disinfection of deferrisation systems

GENO-Spezialgranulat ¹⁾ (1 kg)	170 016
GENO-Spezialgranulat ¹⁾ (5 kg)	170 017
GENO-oxi plus (20 kg/19.7 litre)	170 029



¹⁾ **Note:** Registration by the Federal Surveillance Authority for Opium according to the Controlled Substances and Precursors Act required.

6.2 Test device for iron measuring range 0.0 mg/l - 0.8 mg/l or 1.0 mg/l - 10.0 mg/l respectively

For the quantitative, colorimetric determination of dissolved iron in the measuring range of 0.0 mg/l – 0.8 mg/l respectively 1.0 mg/l – 10 mg/l. Quick test kit consisting of:

Iron test device	170 150
1 test glass with 3 chambers and scale;	
Test tablets (0.0 mg/l-0.8 mg/l) 30 tablets;	
Test tablets (0.1 mg/l-10 mg/l) 30 tablets;	

6.3 Spare filter filling, complete

Refer to table C-1 „Technical specifications“

6.4 Wearing parts

In case of heavy duty, seals and control pistons are subject to a certain wear and tear. Wearing parts are listed below.



Note: Although these are wearing parts, we grant a limited warranty period of 6 months. The same applies for electrical components.

Seals, control piston, injector, actuator

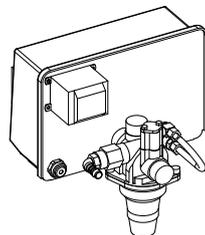


Fig. C-3: Control valve
Nominal connection diameter DN 25 (1“)

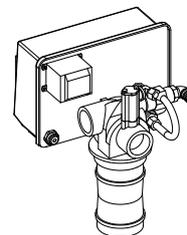


Fig. C-4: Control valve
Nominal connection diameter DN 40
(1½“)

D Installation and operation

1 | General installation instructions

The installation site must provide adequate space. A foundation of a sufficient size and adequate carrying capacity must be provided. The required connections must be provided prior to the installation. For dimensions and connection data, please refer to table D-1.

Table D-1: Installation data	GENO-mat FE-Z deferrisation system							
	20/10	25/13	30/14	40/17	40/18	50/19	60/20	
Connection data								
Nominal connection diameter	DN 25 (1")				DN 40 (1½")			
Min. drain connection	DN 50					DN 70		
Nominal flow rate (depending on the iron concentration) [m³/h]	1.5	2.0	3.0	4.0	5.0	6.0	8.0	
Power supply [V]/[Hz]	230/50 (system operation with protective low voltage 24/50)							
Connected load [VA]	10							
Protection/protection class	IP 22/ □							
Dimensions and weights¹⁾								
Total height [mm]	1360	1620	1620	1900	1900	1870	2100	
Exchanger tank Ø [mm]	210	260	340	370	420	550	620	
Regeneration tank Ø [mm]	465					680		
Height regeneration tank [mm]	840					1010		
Connection height/raw water piping [mm]	1160	1420	1420	1710	1710	1680	1910	
Connection height/pure water piping [mm]	1210	1470	1470	1735	1735	1705	1935	
Distance to wall [mm]	200	230	280	280	300	365	405	
Depth of foundation [mm]	400	450	500	500	550	600	650	
Length of foundation [mm]	1850	1950	2050	2050	2100	2250	2350	
Operating weight (incl. water) [kg]	50	85	150	200	240	425	580	

¹⁾All indications are approximate.



Note: For the installation of systems with optional accessories (see chapter C, item 5), also observe the operation manuals supplied with these components.

1.1 Water installation

When installing the GENO-mat FE-Z deferrisation system, certain rules must be strictly complied with. Additional recommendations are given in order to facilitate the handling of the systems. The installation information described below is also illustrated in fig. D-2.

Binding rules



The installation of the GENO-mat FE-Z deferrisation system represents a major interference with the drinking water system. Therefore, only authorised experts may install such systems. In Germany, the installation company must be registered in an installation directory of a water company as per §12(2) AVBWasserV (German Ordinance on General Conditions for the Supply of Water).

- Observe local and general installation guidelines.
- Provide a drain connection to discharge the backwash water.
- The installation room must have a floor drain (DN 100). If no floor drain is available, a corresponding water stop device has to be installed.
- Observe the flow direction!

Recommendations

- Provide a sampling valve and a pressure gauge directly upstream and downstream of the GENO-mat FE-Z deferrisation system (0 - 10 bar). This simplifies the sampling for the regular determination of the iron concentration (functional check).

1.2 Electrical installation

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.

2 | Preliminary Work

1. Unpack all system components.
2. Check for completeness and perfect condition.
3. Place the filter tank at the designated location.

Extract from Table D-1		GENO-mat FE-Z deferrisation system						
Table D-2: Fill volumes ¹⁾		20/10	25/13	30/14	40/17	40/18	50/19	60/20
Filling volumes and consumption data								
Bottom filter layer I, quartz gravel 3.0 - 5.6T	[kg]	-	-	25	25	25	50	50
Bottom filter layer I, quartz gravel 3.0 - 5.6T	[l]	-	-	18	18	18	36	36
Bottom filter layer I, quartz gravel 3.0 - 5.6T (dimension a)	[mm]	-	-	1100	1400	1430	1320	1570
Top filter layer II GENO-Ferrocatt	[l]	28	52	72	100	112	224	308
Top filter layer II GENO-Ferrocatt (dimension b)	[mm]	290	360	270	460	570	390	520
Free board	[l]	5	8	15	18	36	45	88

¹⁾All indications are approximate.

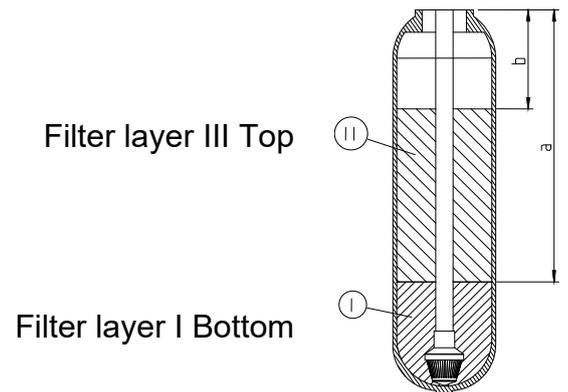
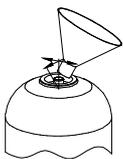
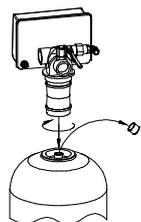


Fig. D-1: Filling of filter layers



Centre rising pipe,
Fill with filter material

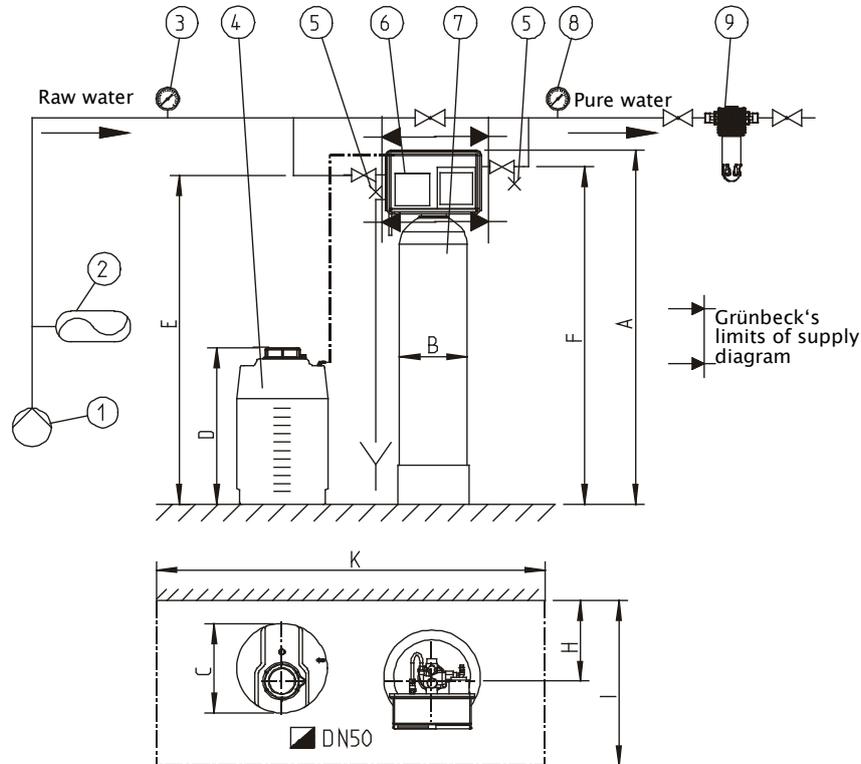


Remove protective cap,
secure control valve

1. Fill filter tank up to 50 % with water.
2. Check whether the rising pipe is covered by a protective cap, plug on the protective cap, if necessary. The protective cap prevents material from entering the rising pipe.
3. Centre the filter tank in the rising pipe.
4. Centre the rising pipe in the filter tank. Use the funnel supplied with the system (refer to figure). Refer to Table D-2 for fill volumes.
5. Fill up the filter tank with water
6. Centre the rising pipe properly and exactly.
7. Clean the filter tank's screw thread and the sealing surface for the connection of the control valve from any filter material that might be clinging to them.
8. Remove the protective cap from the rising pipe.
9. Put the control valve from above onto the rising pipe and fasten it by turning it to the right.

3 | How to connect the system

1. Establish water connection as described in the erection drawing (fig. D-2 (a) (b) while observing the guidelines and recommendations given in section 1.



- | | | |
|---|--|--|
| ① Pump (provided by others) | ④ Regeneration tank for deferrisation (option) | ⑦ GENO-mat FE-Z deferrisation system incl. filter material |
| ② Membrane expansion vessel (provided by others) | ⑤ Sampling valve (by others on site) | ⑧ Pressure gauge outlet pressure (by others on site) |
| ③ Pressure gauge inlet pressure (by others on site) | ⑥ Control valve operating voltage | ⑨ Drinking water filter BOXER K |

Fig. D-2 (a) : Erection drawing GENO-mat FE-Z deferrisation system

Dimensions in Fig. D-2 (a); Extract from table D-1		GENO-mat FE-Z deferrisation system							
		20/10	25/13	30/14	40/17	40/18	50/19	60/20	
Dimensions and weights¹⁾									
A	Total height	[mm]	1360	1620	1620	1900	1900	1870	2100
B	Exchanger tank Ø	[mm]	210	260	340	370	420	550	620
C	Regeneration tank Ø	[mm]	465				680		
D	Height regeneration tank	[mm]	840				1010		
E	Connection height/raw water piping	[mm]	1160	1420	1420	1710	1710	1680	1910
F	Connection height/pure water piping	[mm]	1210	1470	1470	1735	1735	1705	1935
G	Distance to wall	[mm]	200	230	280	280	300	365	405
H	Foundation depth	[mm]	400	450	500	500	550	600	650
I	Foundation length	[mm]	1850	1950	2050	2050	2100	2250	2350
K	Operating weight (incl. water)	[kg]	50	85	150	200	240	425	580

¹⁾All indications are approximate.



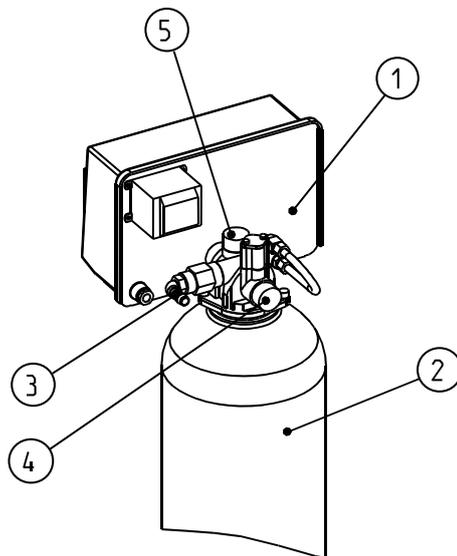
Caution! Dirt and corrosion particles might damage the system (control valve). Flush the supply pipe prior to start-up.

2. Establish waste water connection as per DIN EN 1717. Shorten the rinse water hose to the correct length and guide it to the drain. Ensure there is a free outlet (min. 20mm) to the drain. Secure the hose with suitable fittings to prevent the hose from moving about (regeneration water is pressurised).



Caution! Danger of damage and malfunctions due to a waste water backflow. Therefore, do not bend the hose and do not lead it higher than the system height.

3. Connect the mains plug to the socket (cf. 1.2).
4. Water the system
In order to prevent the filter material from being washed out, it must be watered for 24 hours.



- | | |
|--------------------|--------------------|
| ① Control valve | ④ Raw water inlet |
| ② Filter tank | ⑤ Raw water outlet |
| ③ Drain connection | |

Fig. D-2 (b): GENO-mat FE-Z deferrisation system, rear view

E Start-up



The work described below may only be performed by trained experts. We recommend having the start-up performed by Grünbeck's technical service/authorised service company.



Warning! Danger of contamination due to stagnation! According to VDI 6023, filling the system with drinking water before normal operation commences is prohibited.

The GENO-mat FE-Z deferrisation system must therefore must only first be connected to the drinking water system immediately prior to commissioning.

1 | How to start up the system

1. Open the valve at the raw water inlet.
2. Open the valve at the pure water outlet.
3. Perform a visual check. Ensure that no water leaks from the system anywhere.
4. Rinse out fine particles
The filter material contains a small amount of fine particles which must be flushed by means of a backwash prior to start-up. Release a manual regeneration (refer to chapter F, item 1.4).



Note: The backwash process must be repeated until the backwash water that flows to the drain in the process step „first filtrate“ is clear.

5. Take a water sample at the sampling valve downstream of the system.
6. Determine the iron concentration by means of the water test kit.
7. Fill in the cover sheet and column 1 in the operation log.

F Operation

1 | How to operate the control unit

The control unit regulates the operation of the deferrisation system.

1.1 How to set the time The GENO-mat FE-Z systems are factory-set in a way that the automatic regeneration is always released at 02:00 (at night). Upon start-up or after a power failure, the current time must be set.

1. Loosen the screw at the housing cover (top right).
2. Open the housing cover.
3. Press and hold the red button (Fig. F-1, Item 6).
4. Turn the 24 hour disk until the reference arrow (Fig. F-1, Item 2) points to the current time.
5. Release the red button (Fig. F-1, Item 6).



Note: In case the preset time for the backwash (02:00) should be unfavourable for internal reasons, set a time which deviates from the current time at the 24 hour disk in order to adjust the starting time for the backwash.

Example:

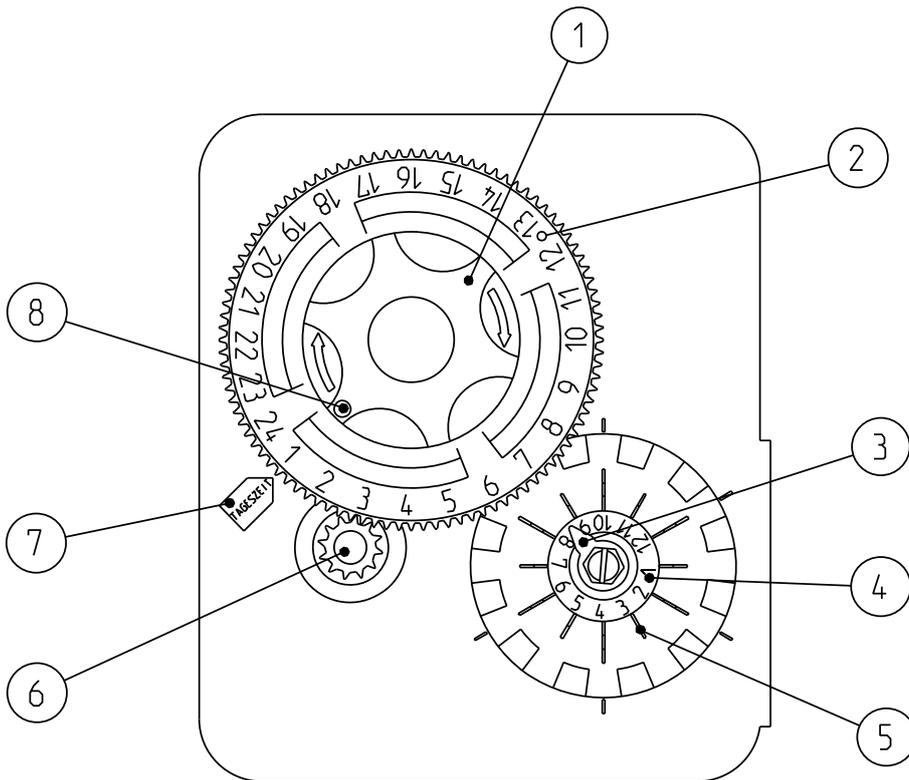
Desired starting time of the backwash: 22:00

→ Move clock forward 4 hours.

1.2 How to set the backwash interval

The maximum backwash interval is 12 days. Furthermore, an automatic backwash can be carried out after 6, 4, 3, 2 or 1 day(s) (factors of 12). Fig. F-1 indicates the setting for a backwash to be carried out every 2 days.

1. Determination of the backwash interval.
 - For hygienic reasons, a backwash should be carried out every 6 days (factory-setting).
 - If the differential pressure of the filter is > 0.3 bar above normal after 6 days due to a higher concentration of dirt in the water, a backwash process should be initiated every 4 days or at even shorter intervals.
 - The same applies in case of an early breakthrough of dirt particles.



- | | |
|---|--|
| ① Backwash wheel | ⑥ Button to set the time |
| ② Hour wheel | ⑦ Reference arrow for current time and operating state (black) |
| ③ Reference arrow (red) | ⑧ Reference point for operating state (white) |
| ④ Day disk | |
| ⑤ Steel switching pin (in home position moved to centre point, in switch position moved outwards) | |

Fig. F-1: Control unit and operating elements „front view“

2. Push the switching pin (Fig. F-1, Item 5) outwards for the 1st day.
3. Set the other switching pins as required.
On all days where the switching pins are pushed outwards, the backwash is released. In order to set, for example, a backwash interval of 3 days, the switching pins in positions 1, 4, 7 and 10 on the day disk must be pushed outwards (Fig. F-1, Item 4).

1.3 Reading the operating status

The current operating state may be read from the position of the reference point (Fig. F-1, Item 8) on the backwash wheel (Fig. F-1, Item 1).

The reference point (Fig. F-1, Item 8) lies opposite the reference arrow (Fig. F-1, Item 7).	Operating mode: pure water is available.
All other settings from the reference point (Fig. F-1, Item 8).	Backwash; the backwash wheel (Fig. F-1, Item 1) turns clockwise; the progress of the backwash can be read from the position of the reference point (Fig. F-1, Item 8).

The day disk (Fig. F-1, Item 4) turns counter-clockwise once in 12 days. The red reference arrow (Fig. F-1, Item 3) points to the position where a switching pin turned outwards releases a backwash. In the operating mode, the distance between the reference arrow (Fig. F-1, Item 3) and the following switching pin which is turned outwards is an indication for the number of days until the next backwash.

1.4 How to release a manual backwash

Manual regeneration should be released if

- the differential pressure of the deferrisation system is more than 0.3 bar above normal before the timer control releases the backwash.
- the systems are restarted after longer periods of standstill.
- maintenance or repair work has been carried out.

Irrespective of the set backwash interval and the time, the backwash can be released manually at any time.

1. Check operating state.

Only in operating mode:

2. Turn backwash wheel (Fig. F-1, Item. 1) to the right by one catch (pay attention to the snap!).

The deferrisation system starts the backwash process, the backwash wheel (Fig. F-1, Item 1) slowly turns clockwise. After approx. 3 hours, the backwash is terminated and the white reference point (Fig. F-1, Item 8) is located opposite of the black reference arrow for the current time again (Fig. F-1, Item 7).

G Maintenance and care

1 | Basic information

In order to guarantee the reliable function of the GENO-mat FE-Z deferrisation systems over a long period of time, some maintenance work has to be performed at regular intervals. This applies in particular to the backwash in the drinking water sector where the required measures are defined in the pertinent regulations and guidelines. All regulations and guidelines which apply at the installation site must be strictly adhered to.

DIN EN 806-5 stipulates:

- Inspection every 2 months
- Maintenance every 6 months
- Maintenance must be performed by the Grünbeck's customer service/authorised service company or by a specialised company.
- An operation log must be kept in order to document the maintenance work performed.



Note: A maintenance contract ensures that all the required maintenance work will be performed in due time.

The operation log is attached to this operation manual.

2 | Inspection (functional check)

You may perform the regular inspections yourself.

Summary: Inspection work

- Determine inlet water (iron concentration).
(Water test kit)
- Determine pure water (iron concentration).
(Water test kit)
- Differential pressure of the system
- Check controller settings:
 - a) Time
 - b) Check backwash interval



Note: Minor deviations are normal and cannot be prevented technically. If you detect major deviations, please contact Grünbeck's customer service/authorised service company.

- Check the entire system for outward tightness.
- Check control valve to drain for tightness (in operating mode).

3 | Maintenance



Maintenance work on the GENO-mat FE-Z deferrisation systems may only be performed by Grünbeck's technical service/authorised service company or by an approved specialist.

An operation log must be kept for GENO-mat FE-Z deferrisation systems. In this operation log, the customer service technician records all maintenance and repair work performed. In case of malfunctions, this log helps to identify possible sources of error. In addition the log documents the proper system maintenance.

Make sure that all maintenance work is recorded in the operation log.

Summary: Maintenance work

- Read water pressure, flow pressure and if necessary water meter reading.
- Determine iron concentrations.
- Check release of backwash.
- Check control valve for tightness, replace wearing seals if necessary, check the proper function of the drive motor of the control valve, clean injector and sieve.
- Regenerate and disinfect the system.
- Check the level of the filter material in the filter tank. Refill filter material, if required.

3.1 Regeneration/disinfection of the GENO-mat FE-Z deferrisation system



Note: We recommend having the regeneration/disinfection performed by Grünbeck's authorised technical service/authorised service company.

3.1.1 Oxidising agents

Designated area of application:

Oxidising agents are used for the regeneration and disinfection of GENO-mat FE-Z deferrisation systems. Furthermore, they are dosed upstream of GENO-mat FE-Z deferrisation systems in order to completely oxidise iron II compounds.

The dosing and the dosing volumes depend on the iron concentrations contained in the raw water.

You can use either our GENO-Spezialgranulat¹⁾ agent or GENO-oxi plus (liquid).

3.1.2 Preparing the regeneration agent

- Fill the regeneration tank with filtered water (for respective quantities refer to Table G-1). We recommend installing a filling tap in the pure water pipe for this purpose.
- Pour the GENO-Spezialgranulat (special granulate)¹⁾ or GENO-oxi plus into the tank and mix by means of the integrated hand mixer until the special granulate has dissolved completely.
- Install a suction hose between the regeneration tank and the ball valve at the control valve.



¹⁾ **Note:** Registration by the Federal Surveillance Authority for Opium according to the Controlled Substances and Precursors Act required.

Table G-1: Amount of regeneration agent required	GENO-mat FE-Z deferrisation system						
	20/10	25/13	30/14	40/17	40/18	50/19	60/20
Preparation amount [l]	30 ²⁾	50 ²⁾	60 ²⁾	100 ²⁾	100 ²⁾	200 ²⁾	300 ²⁾
GENO-oxi plus [l]	5	9	11	17	17	35	53
GENO-Spezialgranulat ¹⁾ [g]	105	175	210	350	350	700	1050

²⁾ If the liquid product GENO-oxi plus is used, the GENO-oxi plus amount must be subtracted from the preparation amount.

3.1.3 Timer settings

- For the regeneration/disinfection the corresponding regeneration tank and the appropriate regeneration agent are required (refer to 3.1 preparation of the regeneration agent).
- Flip the cover of the control valve to the side.
- Release a manual regeneration (refer to chapter F, item 1.4).
- Flip the timer to the right and wait for 10 minutes until limit switch 1 is free (Fig. G-1, picture 1) and the actuator of the control piston has stopped.
- Unplug mains plug.
- Open the ball valve on the back of the control valve and suck the regeneration agent from the connected regeneration tank.
- Close the ball valve again after the regeneration agent has been completely sucked off.
- Reconnect mains.
- Wait until limit switch 1 is pressed again (Fig. G-1, picture 2) and the actuator of the control piston has stopped.
- Unplug mains plug.
- Flush for at least 30 minutes in order to wash out all residues of the regeneration agent from the filter bed.
- Reconnect mains.
- The deferrisation system is ready for operation again when the limit switches 1 and 2 are free (fig. G-1, picture 3).
- Screw cover back on.

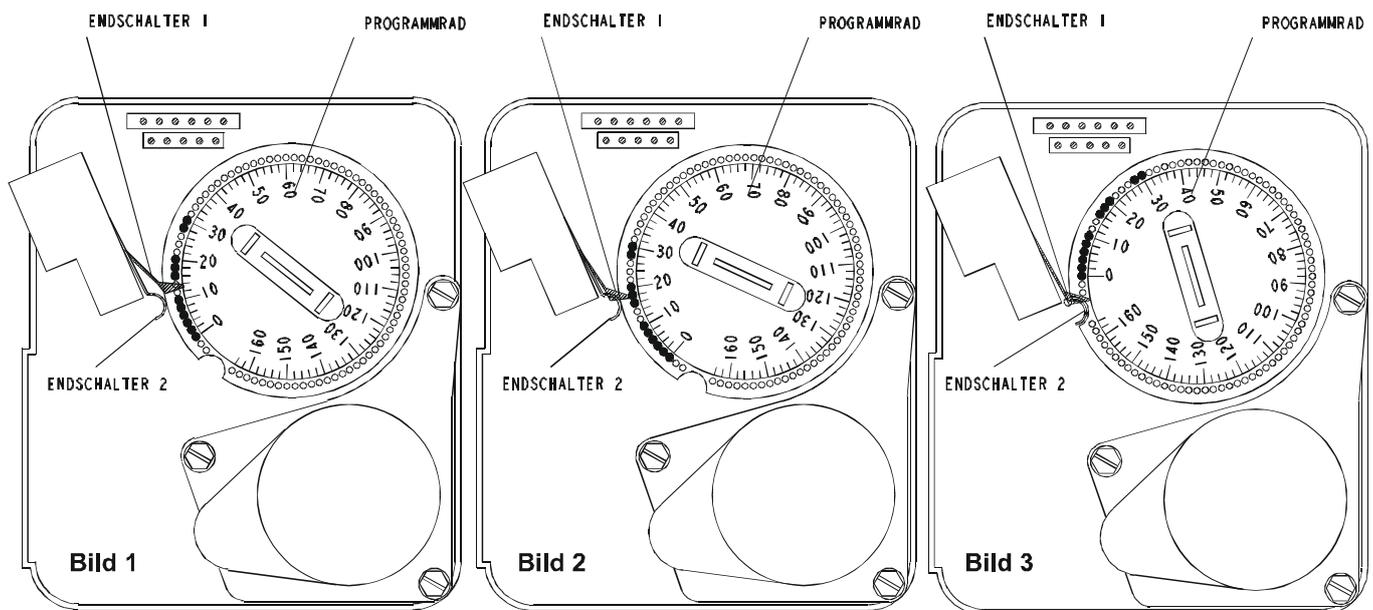


Fig. G-1: Rear of timer

3.2 Operation log

The operation log is located in chapter G, item 5 of this operation manual. When starting up the system, make sure to record all data on the cover sheet of the operation log and fill in the first column of the check list.

The customer service technician will fill in a column of the check list whenever maintenance is performed. This document provides evidence of proper maintenance.

4 Spare parts

You may order spare parts and consumables from your local Grünbeck representative (refer to www.gruenbeck.de).

5 Operation log

Customer

Name:

Address:.....

.....

.....

GENO-mat FE-Z deferrisation system

(Please check appropriate box)

Serial number

Installed by.....

Filter: Make/Type/

20/10

25/13

30/14

40/17

40/18

50/19

60/20

Connection data:	Drain connection DIN EN 1717	<input type="checkbox"/>	yes	<input type="checkbox"/>	no
(Please check appropriate box)	Floor drain available	<input type="checkbox"/>	yes	<input type="checkbox"/>	no

Maintenance work required on the GENO-mat FE-Z deferrisation system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)	Start-up		
Measured values			
Water pressure [bar] upstream and downstream of the system			
Flow pressure [bar] upstream and downstream of the system			
Water meter reading [m ³]			
Iron inlet (measured)			
Iron pure water (measured)			
Inspections and checks of control unit and control valve			
Release of backwash checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Function of driving motor checked			
System "regeneration and disinfection"			
System treated with special granulate			
Connections, hose connections, seals			
Seals and hose connections checked			
Miscellaneous			
Notes			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

Maintenance work required on the GENO-mat FE-Z deferrisation system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)			
Measured values			
Water pressure [bar] upstream and downstream of the system			
Flow pressure [bar] upstream and downstream of the system			
Water meter reading [m³]			
Iron inlet (measured)			
Iron pure water (measured)			
Inspections and checks of control unit and control valve			
Release of backwash checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Function of driving motor checked			
System "regeneration and disinfection"			
System treated with special granulate			
Connections, hose connections, seals			
Seals and hose connections checked			
Miscellaneous			
Notes			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

Maintenance work required on the GENO-mat FE-Z deferrisation system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)			
Measured values			
Water pressure [bar] upstream and downstream of the system			
Flow pressure [bar] upstream and downstream of the system			
Water meter reading [m ³]			
Iron inlet (measured)			
Iron pure water (measured)			
Inspections and checks of control unit and control valve			
Release of backwash checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Function of driving motor checked			
System "regeneration and disinfection"			
System treated with special granulate			
Connections, hose connections, seals			
Seals and hose connections checked			
Miscellaneous			
Notes			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

Maintenance work required on the GENO-mat FE-Z deferrisation system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)			
Measured values			
Water pressure [bar] upstream and downstream of the system			
Flow pressure [bar] upstream and downstream of the system			
Water meter reading [m³]			
Iron inlet (measured)			
Iron pure water (measured)			
Inspections and checks of control unit and control valve			
Release of backwash checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Function of driving motor checked			
System "regeneration and disinfection"			
System treated with special granulate			
Connections, hose connections, seals			
Seals and hose connections checked			
Miscellaneous			
Notes			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			