uponor

MINIATURE WASTEWATER TREATMENT PLANTS

INSTALLATION AND OPERATION MANUAL

9/2014

WehoPuts 5–10

Contents

1. WehoPuts miniature wastewater treatment plant – general

This manual applies to models WehoPuts 5 and 10 (software version 5.X)

1.1 General

The WehoPuts miniature wastewater treatment plant is a bio-chemical domestic wastewater treatment system intended for year-round use. All wastewater is directed into the treatment plant without separate pre-treatment. Treated water then flows or is pumped to the discharge point.

Further information on the point and manner of discharge must be received from the local environmental authorities before installation.

The WehoPuts treatment plant has been designed to suit a certain number of persons and quantity of wastewater (calculated based on 150l/person/day).

If household water is taken from a private well, its quality must meet the general recommendations to secure good operation of the treatment plant.

Information on the function of the WehoPuts treatment plant is available from the display in the plant control unit and the signal lamp on the machine room ventilation pipe.

NOTE! The signal lamp must be monitored carefully. When the signal lamp is on, the treatment plant is functioning normally. When the light is flashing or has gone out, the treatment plant has a malfunction and the message on the control unit display must be checked immediately!

To simplify plant operation monitoring, the WehoPuts 5 and 10 treatment units offer an optional GSM modem allowing for treatment plant remote monitoring using GSM phones. The GSM modem must be specified when ordering the treatment plant, as well as the need to use more than one GSM phone.

The WehoPuts treatment plants have a 2-year warranty starting from the purchase date. The warranty covers structural, manufacturing and material errors reported to and verified by the manufacturer. Detailed warranty conditions can be found in the warranty certificate supplied with the treatment plant.

MODEL	MAXIMUM LOAD m^3/day	MAXIMUM AMOUNT OF PERSONS
WehoPuts 5	0.75	5
WehoPuts 10	1.5	10

Table 1. WehoPuts treatment plant cleaning capacity

1.2 Operational safety

The tank lid must always be carefully locked.

Only the electrical connections and cleaning process control procedures specified in the installation and operation manual may be performed during maintenance.

When filling the chemical container and handling the chemical pump, the corrosiveness of the chemicals used (pH 2) must always be taken into account. Therefore, special protective equipment such as rubber gloves and protective glasses must be worn. The safety data sheet must be studied in advance. The treatment plant is equipped with device-specific automatic fuses and ground fault switches. Treatment plant grounding is done through the building's main distribution board.

NOTE! The control box casing may only be opened by a professional electrician.

1.3 Foreign material and debris in wastewater

Normal household wastewater, such as domestic water and toilette flushing water, is directed into the treatment plant.

Debris washed down with wastewater may clog or damage the treatment plant pumps and stop the entire treatment process. To ensure the disturbance-free operation of the plant, the following materials and items must not be flushed down with wastewater:

- bottle caps and other small metal items
- cigarette butts
- condoms
- cotton buds
- cotton wads
- hand tissues
- leftover food
- matches
- medicine
- nappies
- oil
- plastics
- petrol
- rubber
- sanitary towels
- sand
- snuff
- soil
- solvents
- tampons
- waste
- other material that may clog pipes, pumps or the treatment plant

NOTE! To prevent the pumps from clogging, we recommend floor drain filters.

1.4 Service work

The periodic service and failurerelated service of the treatment plant are carried out by the manufacturer or a manufacturer-authorised service partner. The owner of the property may also carry out guided service procedures.

The periodic service is recommended to be carried out once a year. The maximum service interval is 2 years.

1.5 Treatment process

The WehoPuts treatment plant works on a batching principle SBR (Sequenced Batch Reactor), treating a certain batch of wastewater at one time. The treatment is based on a bio-chemical process, where the microbes living in the activated sludge decompose the organic matter in wastewater, while the chemical deposits the phosphorus.

The cleaning process is divided into different stages: aerating, chemical feed, settling and removal. These stages are carried out in sequence inside the process tank. Control of these stages is carried out automatically through the control unit. After an electrical outage for example, the treatment plant will automatically resume the process from the interrupted stage.

Process steps

1. Wastewater batch accumulation

Wastewater is directed into the storage tank without separate pretreatment. From the storage tank, the wastewater is pumped into the process tank. Once the wastewater level in the process tank reaches the start-up level, the process starts.

2. Aerating and chemical feed

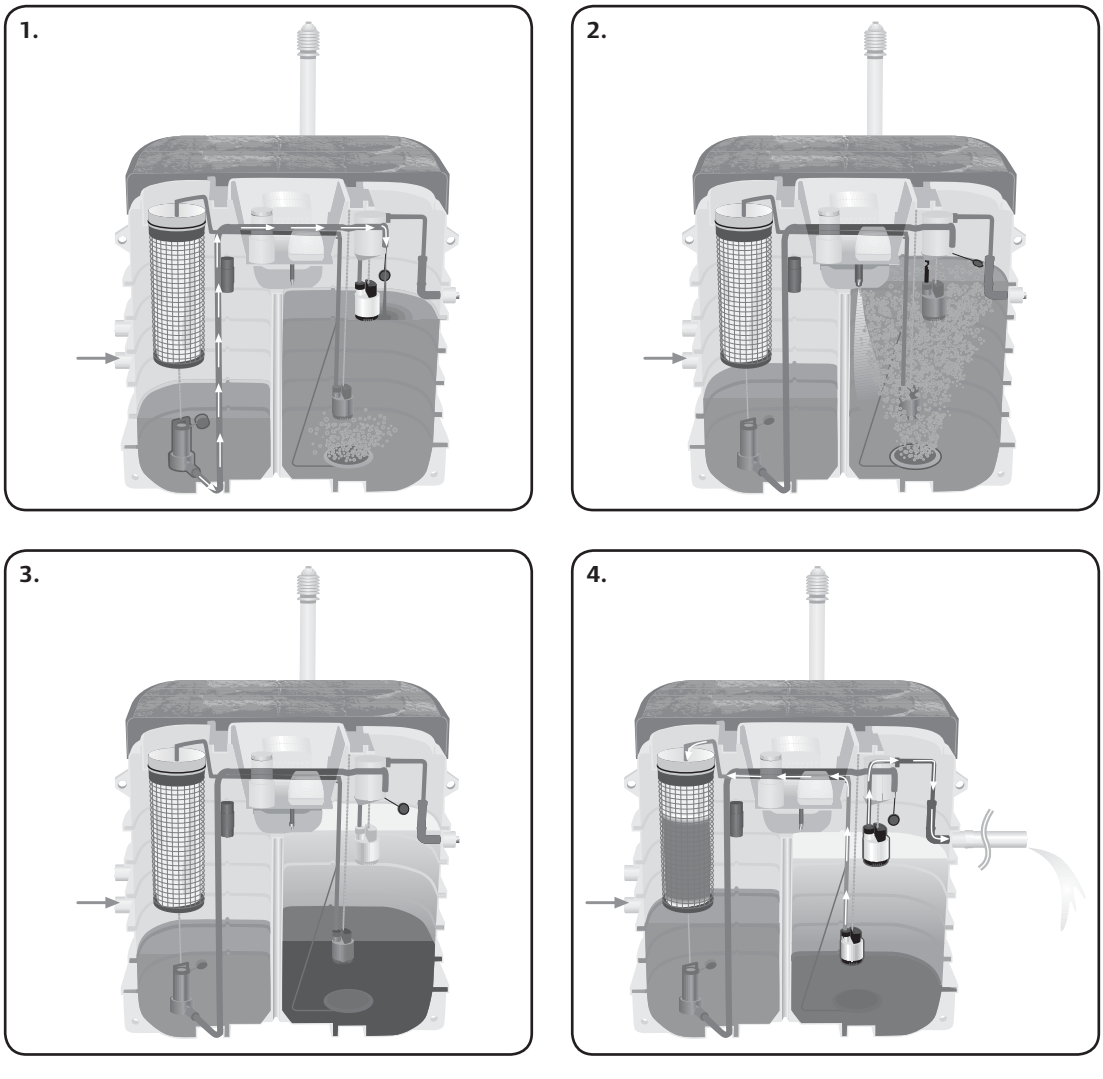
The compressor in the machine room aerates the wastewater. Aerating promotes biological decomposition and the oxidation of nitrogen compounds into nitrate. At the end of the aerating phase, a chemical is added into the wastewater. Phosphorus compounds are separated from the wastewater using the chemical.

3. Nitrogen removal and settling

Aerating is stopped and sludge slowly settles to the bottom of the process tank. The treated, nutrient-free water gathers on top. The nitrate-form nitrogen is reduced to nitrogen gas.

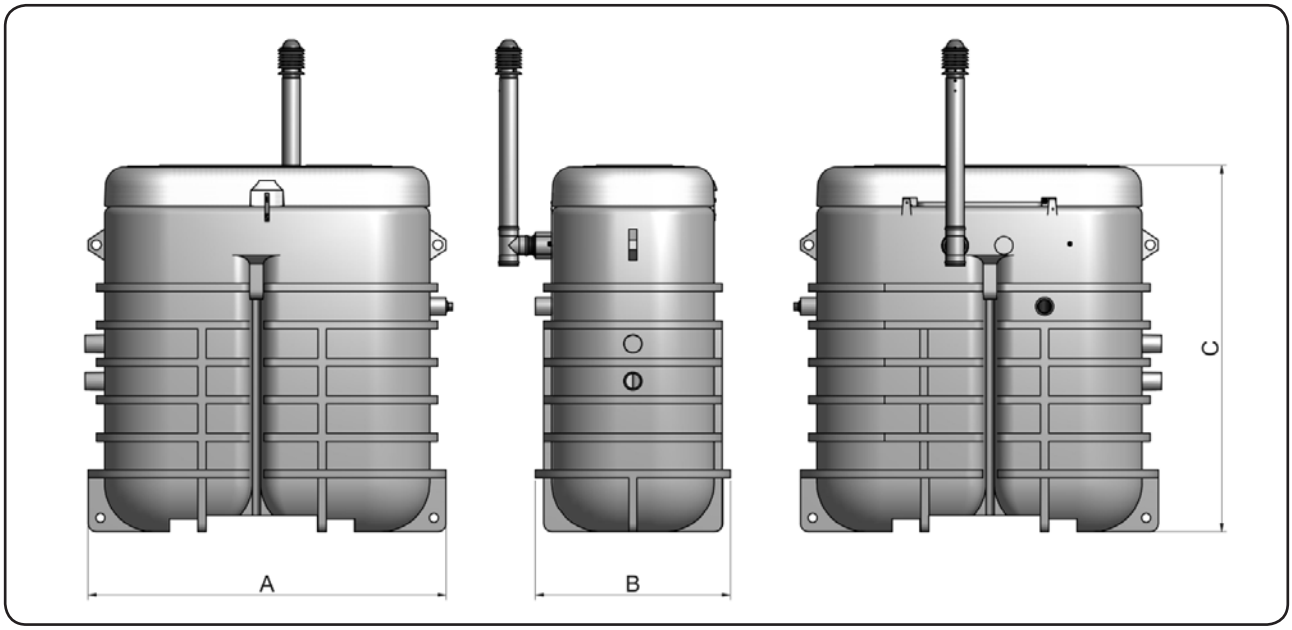
4. Removal of treated water and residue sludge treatment

After settling, the treated water is then discharged. Residue sludge is regularly transferred to the sludge bag. Sludge may be composted with other organic household waste. Alternatively, it can be removed using a vacuum truck.



1.6 Technical data

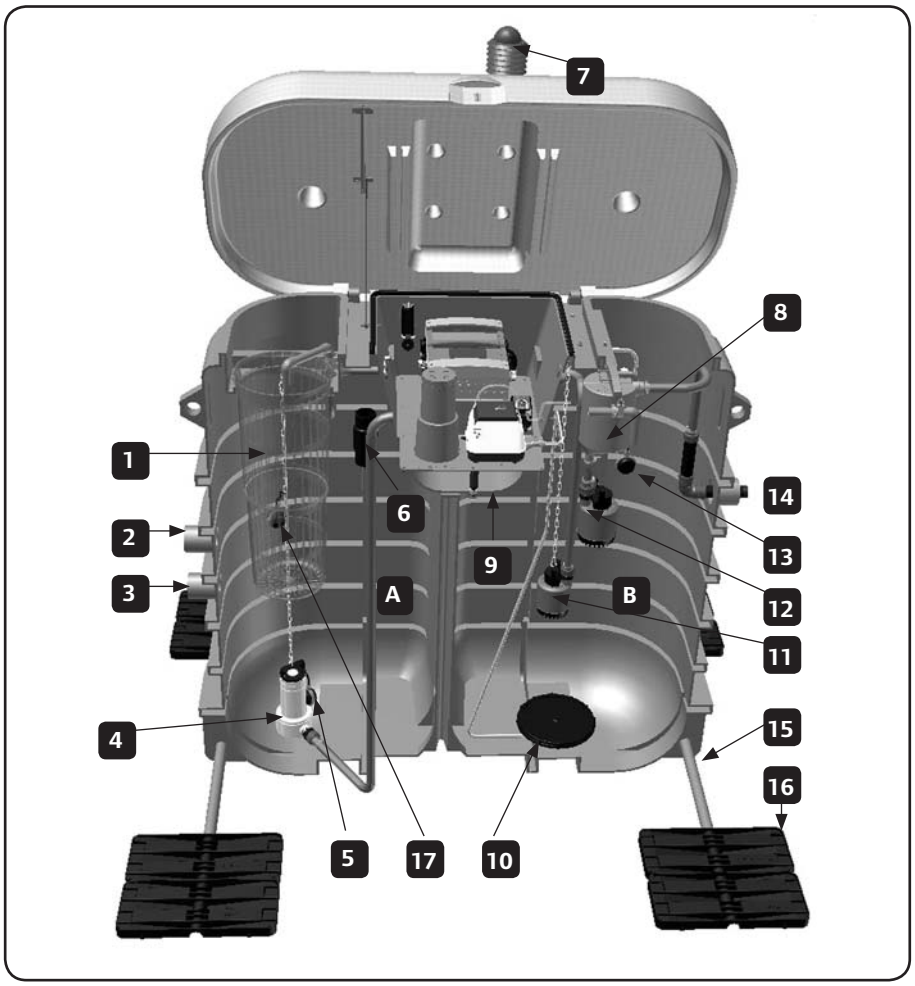
TECHNICAL DATA	WEHOPUTS 5	WEHOPUTS 10
Cleaning capacity m^3/day	0.75	1.5
Batch size m^3	0.250	0.500
Weight kg	325	400
Measures mm		
- length A	2200	2400
- width B	1200	1400
- height C	2250	2400
Connections mm		
- inlet	110	110
- inlet height from ground level	875/1105	920/1160
- outlet	110	110
- outlet height from ground level	1335	1400
Electricity	230V	230V
Distribution board main fuse	1x10A	1x10A
Power supply cable	MCMK 2x1.5/1.5	MCMK 2x1.5/1.5
Annual power consumption kWh	max 357	max 528
Size of chemical tank l	50	50
Chemical consumption l/m^3	0.2	0.2
GSM remote monitoring	optional	optional
Sludge collection system	standard	standard



CE

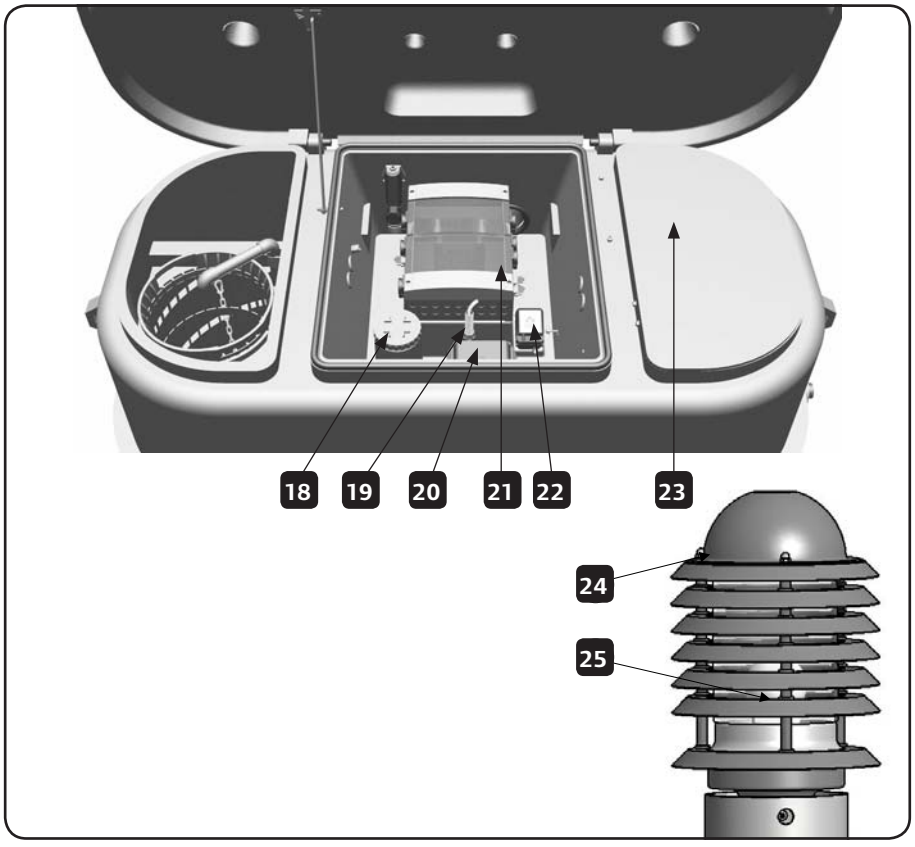
WehoPuts treatment plants meet
the requirements of standard
EN 12566-3 (CEN 2009)

1.7 Equipment specification



A - storage tank, **B** - process tank

1. Sludge basket
2. Inlet pipe connection (Alternative 2)
3. Inlet pipe connection (Alternative 1)
4. Transfer pump
5. Storage tank level switch
6. Overflow pipe connection
7. Machine room ventilation
8. Flushing tank
9. Chemical tank
10. Aerating plate
11. Sludge pump
12. Emptying pump
13. Process tank level switch
14. Outlet pipe connection
15. Anchor rod
16. Anchor plate
17. Overflow level switch
18. Chemical tank filling pipe



19. Chemical level switch
20. Compressor
21. Control unit
22. Chemical pump
23. Isolation lid
24. Signal lamp frame
25. Signal lamp

2. Treatment plant installation

For transport, anchor rods (2 pcs), anchor plates (8 pcs) have been attached to the sides of the treatment plant. The ventilation pipe is packed in to the sludge basket.

2.1 Transport, handling and storage

NOTE! Treatment plants must be transported and stored in an upright position

Transfer and sludge pumps have been attached on supports for transport and installation. During commissioning, the pumps are lowered (section 3.2).

The following items are packed into the sludge basket inside the treatment plant during transport:

- chemical can
- the lower part of the ventilation pipe
- signal lamp
- ventilation pipe
- sludge bags
- sludge bag fixing ring
- settling test measuring glass

2.2 Planning and choice of treatment plant location

A plan is required for wastewater system construction. It is worthwhile to contact the designer at an early stage,since the plan must be presented as part of the permit application when building or renewing a wastewater system.

Planning requires competence and it is best left to water service experts who will carry out the necessary analyses on-site. The requirements for plan contents are stated in the Wastewater Act. When starting to plan, it is important to find out any municipality environmental protection regulations.

In addition to wastewater legislation, regional requirements can be a significant factor in affecting the planning.

2.2.1 Planning

Issues to note when planning

- A location is chosen taking into account treatment plant maintenance (i.e. not inside recreational areas)
- Location must not be inside a pit gathering surface water
- Determining electrical and drain connections and possible need for pumping.
- Treatment plant discharge and overflow must be arranged so that no backflow to the plant can occur
- The discharge and overflow pipes are separately led into the discharge location.
- Freezing and ground frost damage are prevented using insulation if necessary.
- Storm water and irrigation water must not be drained into the treatment plant.
- The drain is ventilated to the roof of the building.
- If necessary, a discharge plug is installed to prevent rodents from entering the discharge pipe.
- Treated water discharge location is chosen taking into account the local conditions.
- Discharge water may only be soaked if the absorption capability of the soil is sufficient.
- The absorption well or area is measured based on the amount of water absorbed at one time, and a bypass option is arranged in case of clogging.
- It is preferable to install an inspection pipe in front of the treatment plant. If the discharge pipe is long, an inspection pipe should also be installed.

NOTE! Ensure discharge and overflow pipe functionality in winter conditions

2.3 Installation

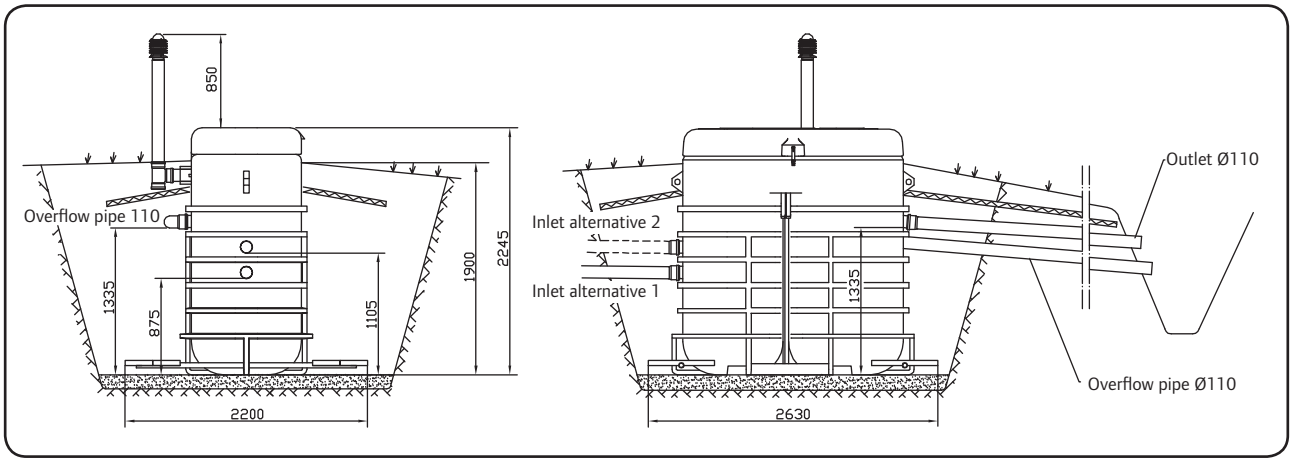
2.3.1 Before installation

- Before installation, verify that the tanks or treatment plant equipment have not been damaged during transport.
- Remove the anchor package from the sides of the plant.
- Take out the parts and supplies packed inside the plant.

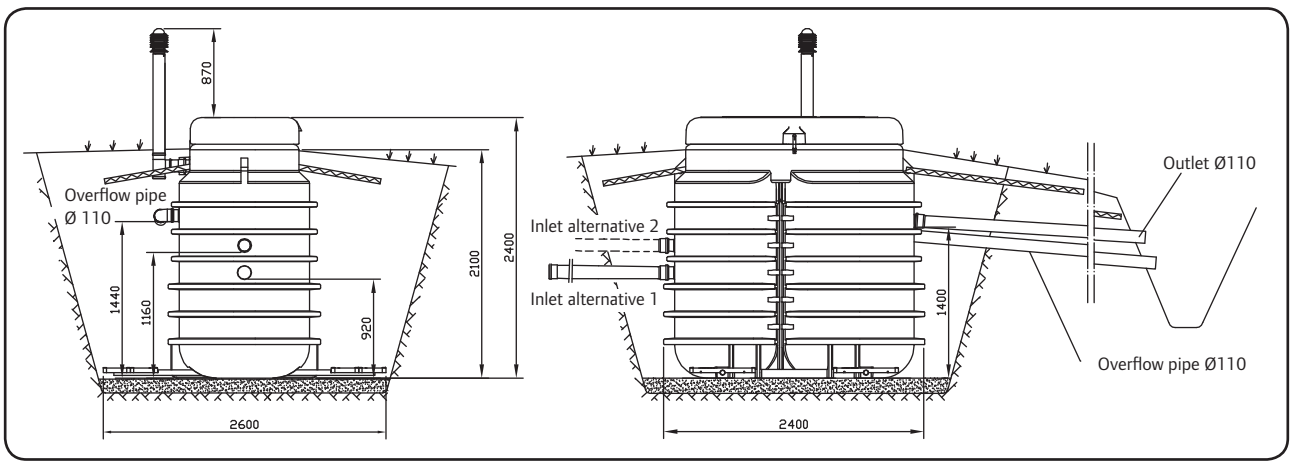
2.3.2 Digging trench

- Pay attention to work safety when digging the trench, and leave sufficient working room around the treatment plant.
- Level and mechanically compress the bottom of the trench using sand or gravel (bedding level min. 150mm).
- Ensure that the bottom of the trench is level under the tank
- Make subsurface drains in trenches dug inside clay or bedrock.

WehoPuts 5



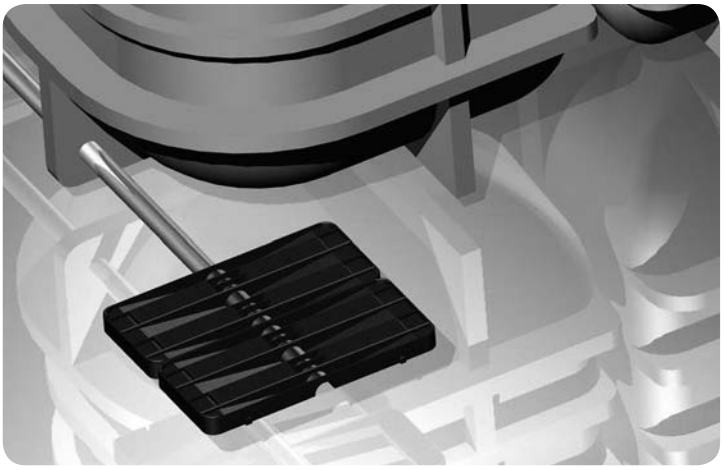
WehoPuts 10



WehoPuts 5

2.3.3 Anchoring and installation of treatment plant

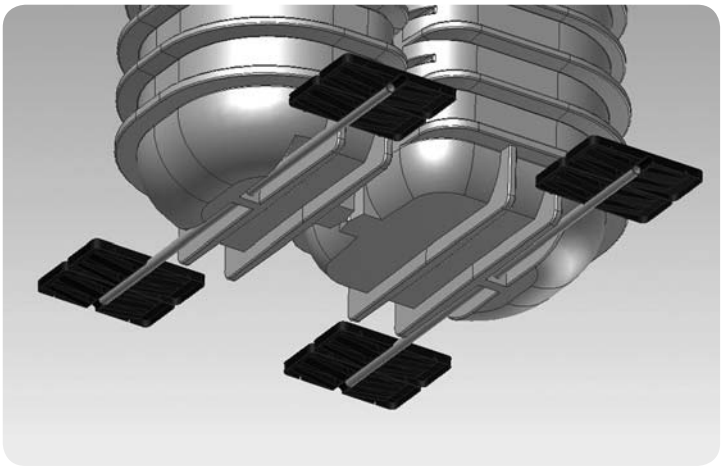
The treatment plant is delivered with a ready-made anchoring package, including 8 anchoring plates and 2 anchoring rods. The anchoring rods are installed before the treatment plant is lowered into the trench. Anchoring is especially important in locations where the soil contains mostly clay or high groundwater levels.



WehoPuts 5

WehoPuts 5

- Install the anchor rods through the holes in the treatment plant bottom ribs on each side of the unit.



WehoPuts 10

WehoPuts 10

- Install the anchor rods through the holes at the bottom of the tank (see picture).

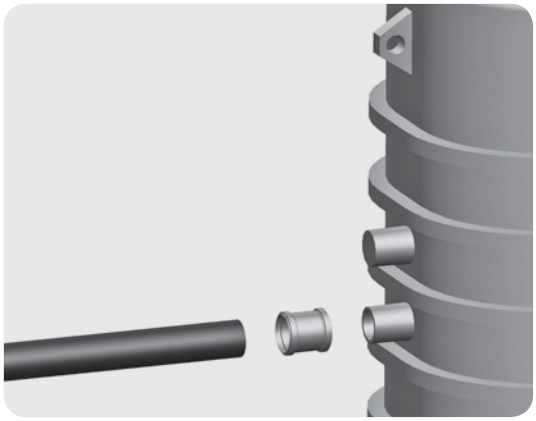
- Lower the treatment plant into the trench using the lifting rings.
- Install the anchor plates (4 pcs/rod) on the rods inside the trench.
- Fill in the trench in layers, constantly compacting (grain size max 20mm) to the level of the inlet spigot.

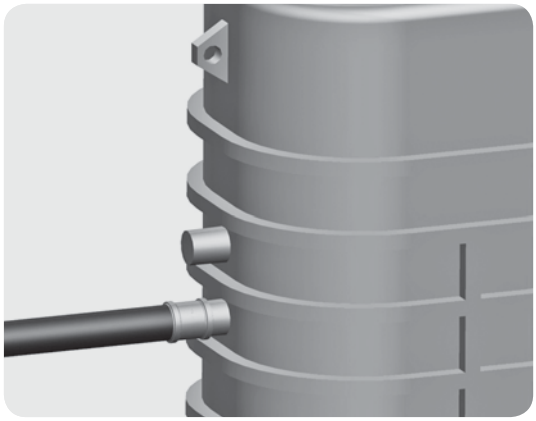
2.3.4 Making pipe connections

- Inlet pipe Ø 110mm
- Overflow pipe Ø 110mm
- Cleaned water discharge pipe Ø 110mm

Inlet spigot connection

- Connect the inlet pipe (110mm) to the lower inlet which has been pre-opened. When using the upper spigot, plug the lower spigot tight.
- The upper spigot can also be used as an overflow pipe in e.g. properties with a basement.

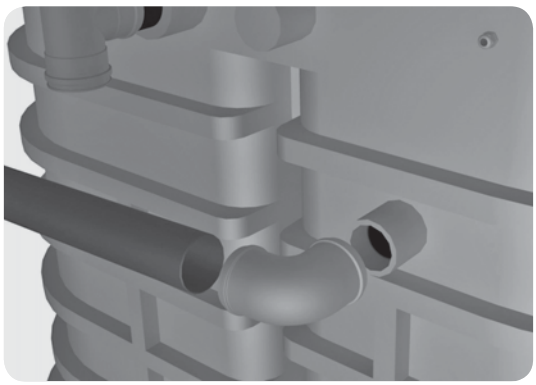


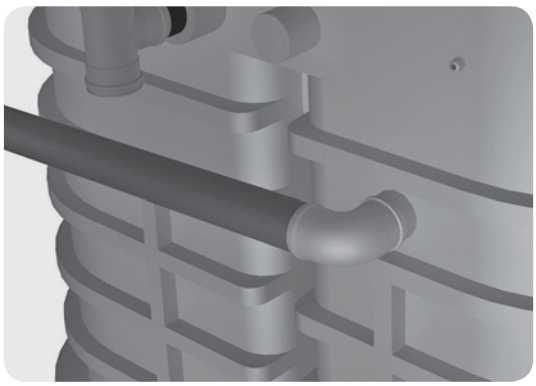


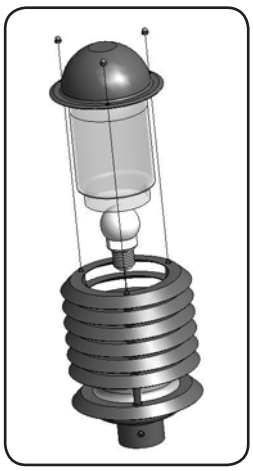
Overflow pipe and discharge pipe connection

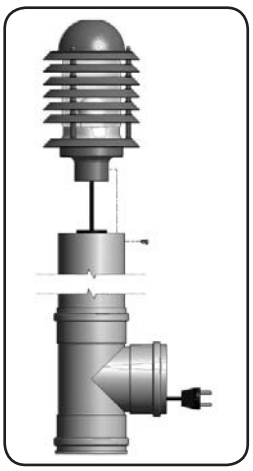
- Fill the trench in layers to the level of the overflow pipe and discharge pipe connection
- Connect the overflow pipe (110mm) to the overflow spigot behind the treatment plant.
- Run the overflow pipe to the discharge point stated in the plan.
- Install the discharge pipe (110mm) to the outlet spigot.
- Run the discharge pipe to the discharge location stated in the plan.

NOTE ! Do not combine the discharge and overflow pipes.

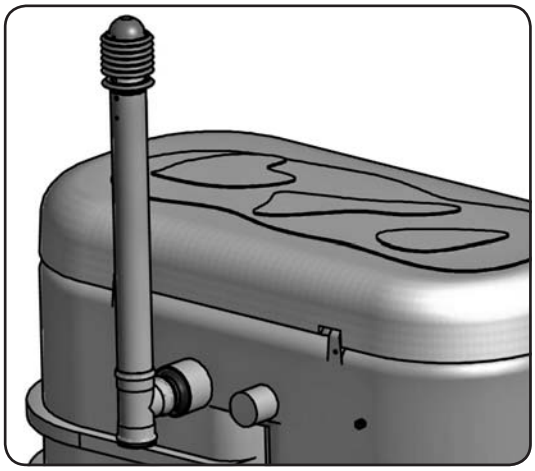








Picture 22 b



Treatment plant discharge and overflow must be arranged so that no backflow to the treatment plant can occur. The overflow pipe ensures that water cannot rise to the treatment plant machine room. The pipes to be joined are insulated if necessary, and the pipe is slanted enough to prevent water remaining in it (min. 1cm/m).

NOTE! Ensure the discharge location does not freeze during winter!

2.3.5 Assembling of ventilation pipe and signal lamp

- Install the single branch in the lower part of the ventilation pipe.
- Pass the electrical cable of the signal lamp trough the ventilation pipe.
- Attach the signal lamp at the end of the ventilation pipe and lock it with a screw (picture 22b).
- Install the ventilation pipe in place and pass the cable to the machine room.
- Connect the signal lamp plug into the X7 socket.

2.3.6 Electrical connections

Electricity is connected to the treatment plant as a fixed land installation from the property's main distribution board. The electrical cable is brought to the machine room from the electrical pass-through at the back of the treatment plant. The cable should be installed inside sand or protective tubing and marked according to protection requirements.

The electricity cable is connected to the single-phase socket in the treatment plant machine room. The control unit is connected to the socket with a plug.

Treatment plant grounding is done through the building's main distribution board.

NOTE! Electrical cable connections are to be carried out by a professional electrician!

Electrical connections from the property distribution board to the treatment plant:

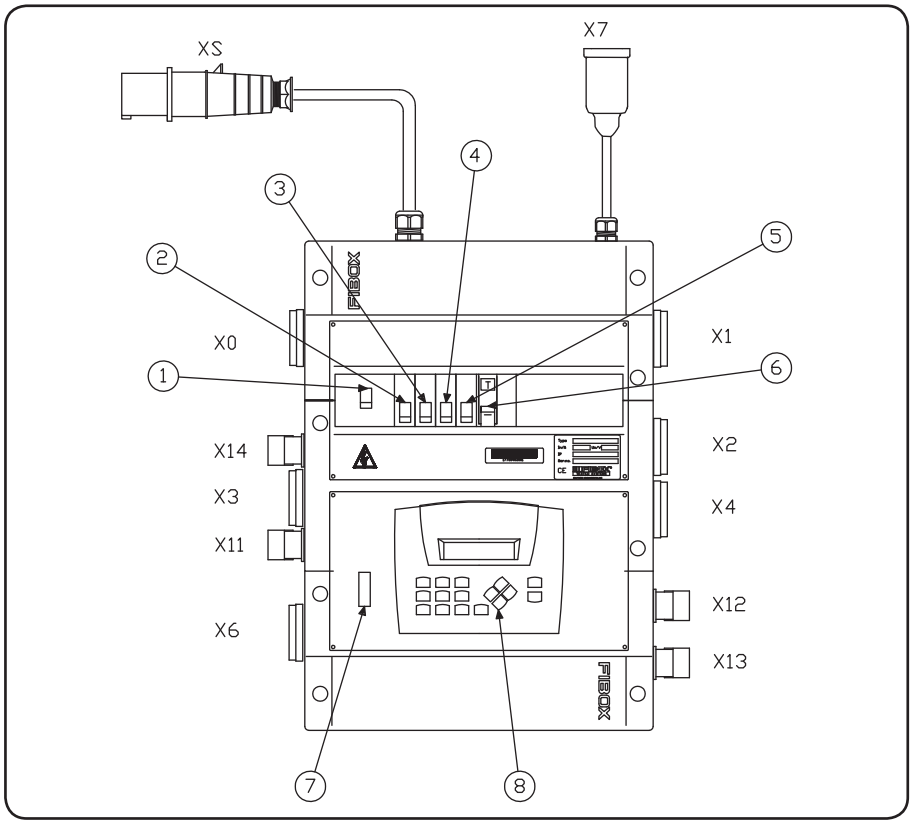
- 230V, 50Hz
- Distribution board main fuse 10A
- Electrical cable e.g. MCMK 2 x 1.5/1.5, if distance to treatment plant is less than 100m

Control unit:

1 Main circuit breaker Q1
2 Main fuse F1 10A
3 Control fuse F2 2A
4 Pumps fuse F3 6A
5 Heater fuse F4 6A
6 Ground fault switch F5 2B 25A 30mA
7 SIM card installation rail for GSM modem (optional)
8 PLC-HMI
X0 Storage tank transfer pump P0
X14 Overflow level switch LS4
X3 Compressor P3
X11 Storage tank level switch LS1
X6 Service socket (heater, optional)
X1 Process tank emptying pump P1
X2 Chemical pump P2
X4 Process tank sludge pump P4
X12 Process tank level switch LS2
X13 Chemical tank level switch LS3
X7 Signal lamp H1
XS Control unit main plug

Electrical connection X6 is a process control independent socket that can be temporarily used e.g. during service.

NOTE! Equipment not part of the treatment plant must not be connected to control unit!



2.3.7 Constructing ground frost isolation

- Isolate both the treatment plant and the inlet, outlet and overflow pipes.
- Insulation thickness min 50mm and width 1,200mm.
- Install the insulation plates on the sides of the treatment plant, slanting outward from the plant.
- The treatment plant is entirely insulated to ground level.

2.3.8 Filling and locking

After installation, the trench is filled up and the ground is shaped so it is slanted away from the treatment plant. The supplied interim covers are installed on top of the storage and process tanks. The treatment plant cover is closed by pulling the chain at an angle to the left. The treatment plant must be kept locked.

3. Startup

The treatment plant startup consists of the following procedures:

- Inspecting treatment plant installation
- Releasing pumps
- Filling chemical container
- GSM modem initialisation (optional)
- Turning on power from the main switch
- Selecting sludge emptying method
  sludge bag (default installation, see sections 4.3 and 5.3.1)
  vacuum truck (see sections 4.3 and 5.3.2)

3.1 Installation inspection

After installation, the treatment plant is inspected for the following items:

- Pipe and electrical connections: to the extent possible, verifying that connections have been made carefully.
- There must be no sand or stones on the bottom of the storage and process tanks after installation.

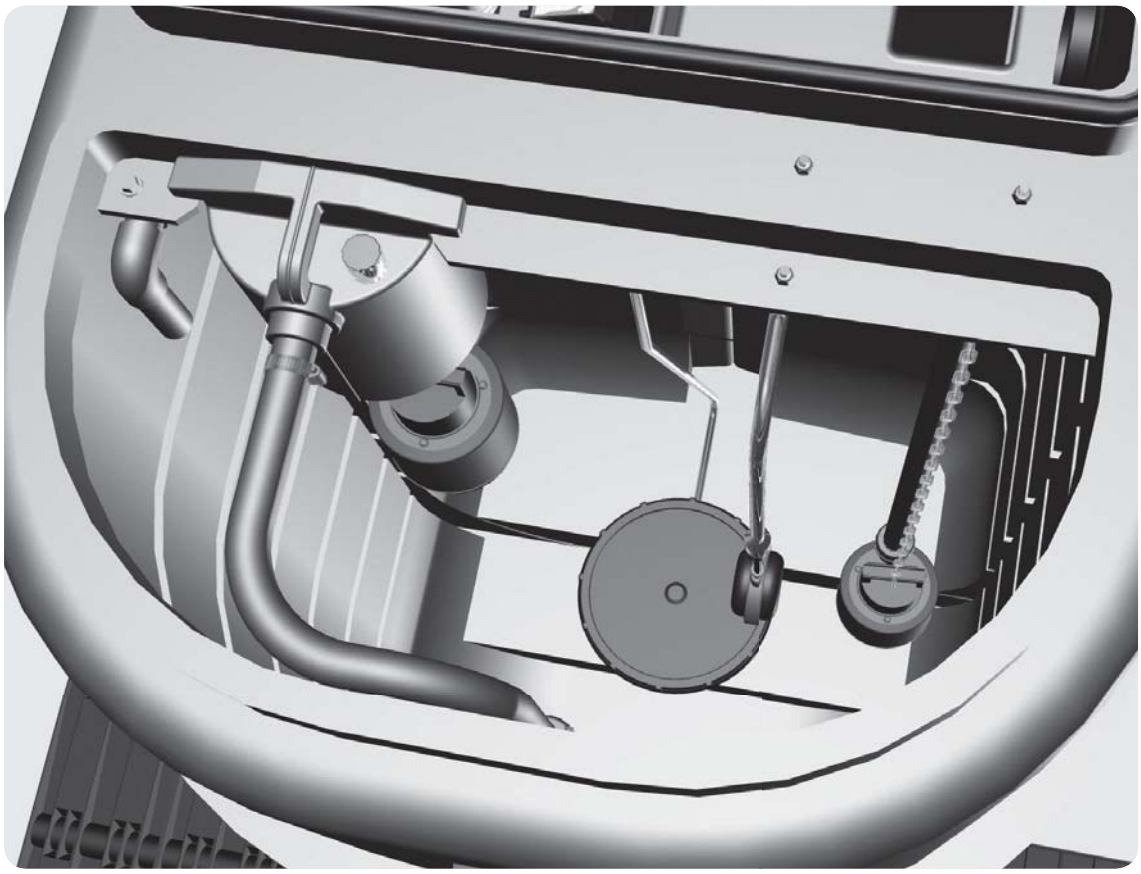
3.2 Releasing pumps

For transport and installation, the treatment plant pumps (2 pcs) have been lifted to the brackets at the top. The compressor located in the treatment plant machine room has been attached with a tightening strap to the machine room bottom plate for transport (see equipment specification 1.7).

1. Release the transfer pump (storage tank) and sludge pump (process tank) from the brackets and lower them down.
2. Reattach the chain.
3. The pumps will automatically align at the correct height.
4. Loosen the binding strap around the compressor. There is no need to remove the strap.

3.3 Filling chemical container

See instructions for filling the chemical container under section 5.2.



3.4 GSM modem initialization

When ordering the treatment plant, you can simultaneously order an optional GSM modem. At the startup stage, a SIM card is installed in the GSM modem and a mobile phone number for sending the alarm messages is registered in the operation settings.

NOTE! If the administration of the treatment plant needs to be distributed to more than one GSM number, the numbers need to be reported to the supplier when ordering. Adding or removal of numbers later on requires a software update!

3.4.1 SIM card installation

Installing the SIM card does not require removing the screw-attached front panel. The front wall of the GSM modem is visible on the left side of the control unit display. The SIM card installation rail is opened by pressing the open button.

Install the SIM card as follows:

1. Prepare the SIM card as in a normal mobile phone: Remove PIN code prompt. Remove all existing messages.
2. Shut down the treatment plant.
3. Open the SIM card installation rail by pressing the open button e.g. with a pen tip. The attachment plate will come off its rails.
4. Insert the card so it clicks into place.
5. Lower the plate onto the rails and push it into place.
6. Connect main power.

The functionality of the modem may be tested by sending "?" in an SMS to the number of the SIM card. The modem will reply with the current process stage. If the modem does not reply, repeat and inspect the SIM card installation stages.

3.4.2 Determining GSM number

A single number can be registered in the GSM modem for the treatment plant to send alarm messages to. The number is registered through a software menu. See instructions for registering the GSM number in section 4.3.

3.5 Turning on treatment plant

After the startup procedures are completed, the treatment plant main power is turned on. However, the power is only connected once treatable wastewater is fed into the plant.

Once power is turned on, the treatment plant moves into standby mode, waiting for the accumulation of the first wastewater load to be treated. In standby mode, the compressor aerates the wastewater. Once a certain amount of wastewater has accumulated in the process tank, the cleaning process begins.

3.6 Sludge removal using a vacuum truck

In the treatment plant, sludge is removed by default using a sludge bag.

If you want to change this and remove sludge using a vacuum truck, change the default setting according to section 4.3.

3.7 Sludge removal using sludge bags

See the sludge bag installation instructions in section 5.3.1.

Open button

SIM card installation rail

4. Treatment plant management

A Arrow keys used to move in the software submenus
B Enter key used to accept choices

4.1 Treatment plant control unit

The technical centre inside the treatment plant has a control unit controlling the operation of the treatment plant. The progress of the treatment process and any reminders or alarms may be monitored from the control unit PLC display.

The logic keyboard can be used for the following operational settings and choices:

- Operating language
- Sludge emptying method selection
- Sludge removal reminder
- Date and time settings
- GSM modem startup (optional)
- Sampling time
- Alarm acknowledgement

4.2 Process monitoring

The control unit display provides information on the treatment plant and its functionality. Texts on screen can be browsed using the arrow keys: The ▲ button returns to the beginning, the ▼ button moves forward.

IN NORMAL MODE, THE FOLLOWING TEXTS ALTERNATE ON THE DISPLAY:	
WehoPuts 5/10 v 5.X Run time 10d	Treatment plant model and software version Treatment plant running time
Active GSM 2	Treatment plant running, no alarms GSM modem functional, signal strength 2
Settling 10.1. 11.40	Current process stage and starting time
Process n. 50 10.1. 00.40	Total number of processes and starting time of last process
Compressor run time 200 h	Number of compressor working hours
Last sludge removal 5 d	Sludge bag use time in days (not shown by default)

Process steps displayed:

PROCESS STEP	LEGEND
Sleep mode 1	The previous process has finished and the treatment plant is waiting for the accumulation of a new wastewater load. The compressor will also run during sleep mode.
Sleep mode 2	Sleep mode has continued for over one hour. The compressor runs in pulses.
Continuous air	Continuous aeration, compressor runs continuously.
Periodic. air	Sequential aeration, compressor runs in pulses.
Settling	Settling stage where sludge settles at the bottom of the tank.
Emptying	The treated water is pumped into the discharge pipe.
Sludge pumping	When using a sludge bag (default), sludge is pumped from the process tank into the sludge bag. Pumping into the sludge bag is not done if sludge removal using a vacuum truck has been selected as the setting.

4.3 Operation settings

The operation settings and alarm acknowledgements are carried out in the software menu.

The menu is opened by pressing the Enter key (◄↵) at any stage in the software. The arrow keys (◄ and ►) are used to navigate in the menu. The desired operation setting may also be selected using the shortcut number key. The table below presents the shortcut keys.

The desired setting is selected using the Enter key. The setting is changed by pressing the arrow keys and accepted using the Enter key. The number key 9 exits the menu.

OPERATION SETTING MENUS:		Change the setting with the arrow keys (◄ and ►) and accept by pressing Enter (↵). The number key 9 exits the menu.
◄ Menu ► Fin -> Swe/Eng 0	Fin -> Swe / Eng ◄ Suomi ►	**Language selection** Move to language selection by pressing Enter. Change language by pressing the arrow keys and accept by pressing Enter.
◄ Menu ► Sludge bag 1	Sludge bag ◄ Yes ►	**Sludge emptying method selection** In the treatment plant, sludge is removed by default using a sludge bag. If you want to remove sludge using a vacuum truck, move to the selection by pressing Enter, change the default setting with the arrow buttons (No) and confirm the selection by pressing Enter. The sludge pump does not transfer sludge into the sludge bag. The sludge removal reminder is given automatically after 6 months. The sludge counter resets when you acknowledge the reminder. If you remove sludge using a vacuum truck before the sludge removal reminder, reset the sludge counter by pressing the ▼ button.
◄ Menu ► Sludge alarm 2	Sludge bag alarm ◄ No ►	Sludge bag replacement reminder every 3 months (not on by default). The function is activated by choosing Yes and pressing Enter. If you change the sludge bag before the sludge removal reminder, reset the sludge counter by pressing the ▼ button.
◄ Menu ► Process block 3	Process block ► 16.00 ◄ No ►	**Specifying sampling time** The function is activated by choosing Yes and pressing Enter. Feed the process block end time in numbers and press Enter. The time is specified by being 7 h 30 min before the sampling time. Sampling will not succeed, however, if the process has not started due to low load.
◄ Menu ► Alarms 4	Reset ◄ No ►	**Alarm acknowledgement** If there are several alarms, you can use the ► key to browse the alarm screens.
◄ Menu ► Night alarm 5	Night alarm ◄ No ►	Sending alarm messages (GSM modem) between 22.00 and 07.00. When night alarm is not in use, the alarm SMS will be sent at 07.01 (not on by default)
◄ Menu ► Time settings 6	Time setting 11.01. 16.06	**Date and time** Input the correct time with the number keys. The number is input in sequences of four digits. Pressing Enter moves to the next sequence.
◄ Menu ► Alarm GSM number 7	Alarm GSM number +35840123456	**The mobile phone number where the alarm message (GSM modem) is sent** Enter the number starting with the country code (Finland:+358) and leave out the first 0 in the GSM number. After each sequence of four numbers, press Enter. If the length of the number differs from setting (default: Finland), acknowledge the last field of 4 digits by leaving 0 as the final digit. Remove the extra final number by pressing the ◄ key. Re-enter the 3 final digits and acknowledge.
◄ Menu ► IO-test 8	Test In 0000 Out 000000	**Testing of active level switch and equipment** When the device or switch is active, the zero is replaced by a 1. During IO testing, the process is stopped. **In 0000 active level switches in order: From left** Storage tank level switch Process tank level switch Chemical tank level switch Overflow pipe level switch **Out 000000 running equipment in order:**

	Test number key
Transfer pump	0
Emptying pump	1
Chemical pump	2
Compressor	3
Sludge pump	4
Lamp	5

To test the functionality of a device, press the corresponding number key. If you press the ▼ button, the chemical pump runs for 60 sec. while the signal lamp flashes.

◄ Menu ► Exit 9		The number key 9 or Enter exits the menu.

4.4 Acknowledging alarms and reminders

The alarms issued by the treatment plant together with their causes are listed in section 6.1. The alarms are acknowledged by pressing the Enter key twice or by pressing key 1 and Enter. If there is more than one alarm, the three latest unacknowledged alarms alternate on the display.

ALARM ACKNOWLEDGEMENT	
1 No process in 7d 10.1. 11.40	1 = latest alarm Move to alarm acknowledgement by pressing Enter Alarms: Transfer fault Emptying fault Add chemical Compr. service Remove sludge! No process in 7d Overflow Compr. pressure (optional)
Reset ◄ Yes ►	Acknowledge by pressing Enter The software will automatically return to normal display.

4.5 GSM remote management

When ordering, the control unit may be equipped with a GSM modem, allowing for the treatment plant to be remotely controlled and monitored by mobile phone. Th e property owner will purchase a SIM card for the GSM modem and register a GSM number to the treatment plant during startup, see SIM card installation under 3. Startup.

The treatment plant will send alarms and reminders to the mobile phone by SMS. The messages are resent once a week until the fault has been corrected and the alarm acknowledged.

The status of the treatment plant may also be supervised by status queries which the plant will reply to using SMS messages. Messages correspond to readings in the control unit display.

SENT MESSAGES		RESPONSES E.G.	
?	Plant status query Plant replies with SMS	WehoPuts run for 12 d. Active. Continuous aeration Compressor run time 1445 h Add chemical	Treatment plant run time days Plant operational Process stage Compressor running hours Last unacknowledged alarm
Time#09.15#	Time setting		
Block#16.00#	Specifying sampling time The time in the message is specified by being 7 h 30 min before the sampling time		
Reset	Alarm acknowledgement The messages are resent once a week until the fault has been corrected and the alarm acknowledged.		
Test?	Treatment plant technical status query Plant replies with three SMSs	1. Message WehoPuts 5 24.09. 15.30 Inputs 1100. Outputs 000101. 2. Message Continuous aeration 24.09. 7.57 44 min left CompServCnt 1450 h 3. Message Process n.22 24.09. 7.57 Last sludge removal 12 d	1. Message Treatment plant type Date and time Active level switches Operating devices 2. Message Active process stage Start date and time of stage Remaining stage duration 44 min Compressor operating hours 3. Message Number of processes Start time of previous process Latest sludge removal done 12 d ago

5. Operation and maintenance

Correct operation and service guarantee good functionality and long operating life for WehoPuts miniature treatment plant. Operation and service should be logged in the treatment plant operation journal.

NOTE! Protective gloves must be worn and instructions followed during service. The treatment plant lid must be locked after the procedures.

A working treatment plant requires the following regular maintenance procedures:

- Monitoring treatment plant operation using the control unit display and plant signal lamp or GSM remote monitoring
- Monitoring amount of WehoPuts flocculation chemical and filling chemical tank as required
- Emptying the sludge bag as required, normally on average between 2 to 4 months (WP 10: 1 to 3 months)
- Alternatively, the sludge can be removed using a vacuum truck at least 2 times per year or based on a settling test
- Periodic service once a year, at least every 2 years

5.1 Treatment plant operation monitoring

To ensure disturbance-free treatment plant operation, pay regular attention to the signal lamp, control unit display and compressor. In case of alarm/failure, proceed as described in section 6.1.

The following procedures are part of regular monitoring:

- Verify the signal lamp is constantly on, if the light goes out or is flashing, see section 6.1.
- Follow compressor activity every week.
- Follow aeration functionality by monitoring process tank water level. If the air bubbles are single and large, the aerating equipment requires service
- Observe the quality and odour of outgoing water.
- Check the functionality of the control unit ground fault switches at least once a year. The switch is checked by pressing the Test button in the control unit. Pressing the button should trigger the fuse, which is restored after the test.

NOTE! You can test the functionality of the compressor or pumps by moving the device plug to the X6 service socket or choosing IO test in the software menus (section 4.3)

5.2 Filling chemical container

The treatment plant control unit will alarm when the chemical tank is emptying. The alarm will not interrupt the cleaning process itself, but more chemicals need to be added as soon as possible.

The treatment plant consumes ca. 0.2l of chemical per 1m^3 of wastewater. The chemical tank holds 50 litres.

We recommend not filling the chemical container completely if the treatment plant is not in active use. The chemical may form layers with ageing.

The WehoPuts flocculation chemical is sold in containers of 10 and 20 litres.

Only the WehoPuts flocculation chemical may be used in the treatment plant.

The WehoPuts flocculation chemical is a corroding agent (pH 2). The chemical safety data sheet must be studied before handling the chemical.

NOTE! Filling the chemical tank must be registered in the operation journal!

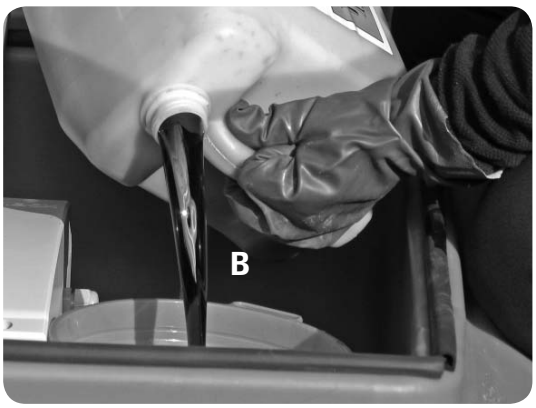
The chemical tank is located below the treatment plant machine room and it is filled through the pipe in the machine room.

NOTE! Use protective gloves and glasses when handling the chemical!

Filling chemical container:

1. Study the chemical safety data sheet.
2. Open the filler pipe cap (picture 32, A)
3. Empty the chemical container using the funnel (picture 33 B). Be careful not to spill the chemical.
4. During filling, monitor the surface of the chemical from the fill pipe to prevent overfilling. The tank holds 50l.
5. Close the cap.
6. The chemical alarm is automatically acknowledged when chemical has been added into the container.

Picture 32



Picture 33

Picture 34

5.3 Sludge removal

In the WehoPuts 5 and 10 treatment plants, you can remove sludge by either using a sludge bag or using a vacuum truck. The sludge removal reminder can be enabled according to the instructions in section 4.3 when using a sludge bag. Selecting a vacuum truck sludge removal reminder comes automatically twice a year.

5.3.1 Sludge removal with sludge bag

During the cleaning process, residue sludge is pumped into a separate sludge bag that needs to be regularly emptied. In the WehoPuts 5 model, the bag needs to be emptied every 2 to 4 months, depending on family size and treatment plant load. In the WehoPuts 10 model, the replacement interval is on average 1 to 3 months. The sludge bag should be replaced when the surface of sludge in the bag reaches the halfway mark. If no sludge has accumulated in the sludge bag, see section 6.4.3.

The sludge basket has been attached to the brackets in the upper part of the storage tank.

Sludge bag installation and replacement:

1. Open treatment plant lid and move the sludge pipe to the side before removing the sludge basket (picture 34).
2. Lift up the entire sludge basket.
3. Release the string holding the mouth of the bag and lift the sludge bag up together with the protective bag. You can compost the sludge bag with organic or garden waste.
4. Stretch the protective bag and install the sludge bag inside the protective bag. Bend the mouths of both bags over the edge of the basket and fix with the ring. Ensure the bottoms of the bags reach the bottom of the basket (pictures 35 and 36).
5. Install the sludge basket back in the storage tank.
6. Insert the residue sludge pipe back in the bracket.
7. Lock the lid and wash hands.

NOTE! The bags are installed with the bottoms touching the bottom of the basket!

5.3.1.1 Sludge bag composting

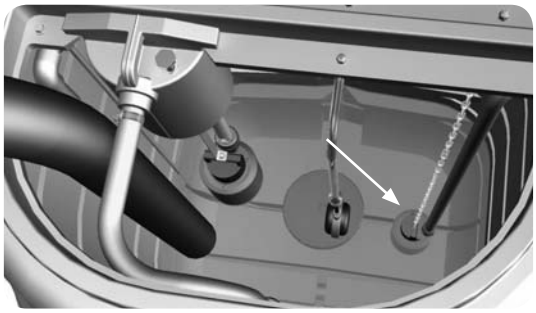
The recommended treatment method for the WehoPuts miniature treatment plant sludge bag is composting. When complete, the compost is a good nutrient for e.g. growing flowers.

The best way to compost the sludge bag is to place it in a factory-built composter together with leftover food or in a garden compost with plant residue.

Picture 35

Picture 36

Picture 37



Picture 38 Sludge pump

Picture 39

Composting guidelines:

1. Take into account any municipal regulations on composter placement.
2. Use a sufficiently large composter which will house leftoverfood, sludge bags and the required additives.
3. Always supply additive to the composter when adding waste.
4. If needed, stir the compost and supply additive. A suitable additive is e.g. a mixture of peat and woodchip. The peat will absorb odours and extra fluid and woodchip will ensure oxygen circulation. When the sludge bag is placed in the composter, a larger amount of additive is supplied.
5. When replacing the sludge bag, use protective gloves and wash hands after touching the sludge bag or compost.

The sludge bags may also be composted in a so-called garden compost for plant residue. The bottom of the garden compost must be sealed with e.g. tarpaulin or construction plastic. A frame can be built around the compost, together with a lid to prevent water from entering. The bottom layer of the garden compost is filled with twigs. A layer of plant waste or other additive is always added on top of the sludge bag.

The "raw compost" removed from the composter or compost requires post-composting.

A suitable time for post-composting is one year. This ensures the compost is hygienic. Use the compost material primarily for decorative plants.

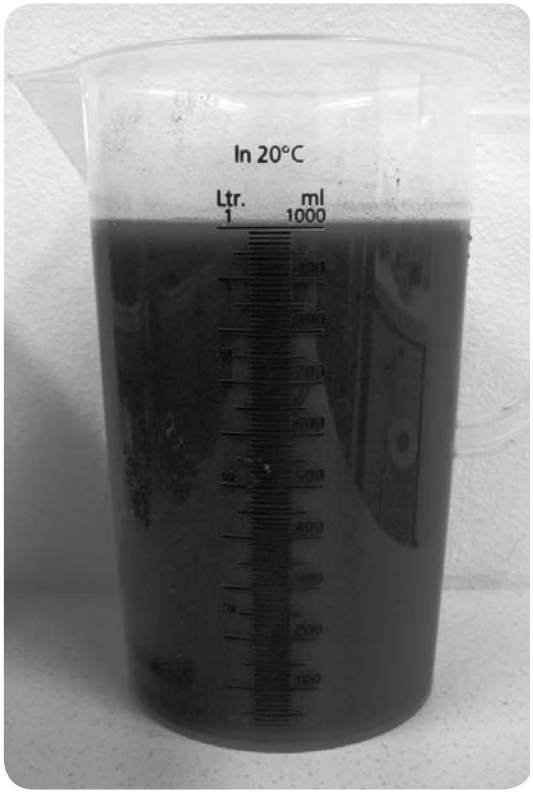
5.3.2 Sludge removal using a vacuum truck

Sludge removal using a vacuum truck is normally performed twice a year. Vacuum truck emptying is not the default setting in the treatment plant. Sludge pumping into the sludge bag is enabled until vacuum truck emptying is enabled via the software (see section 4.3).

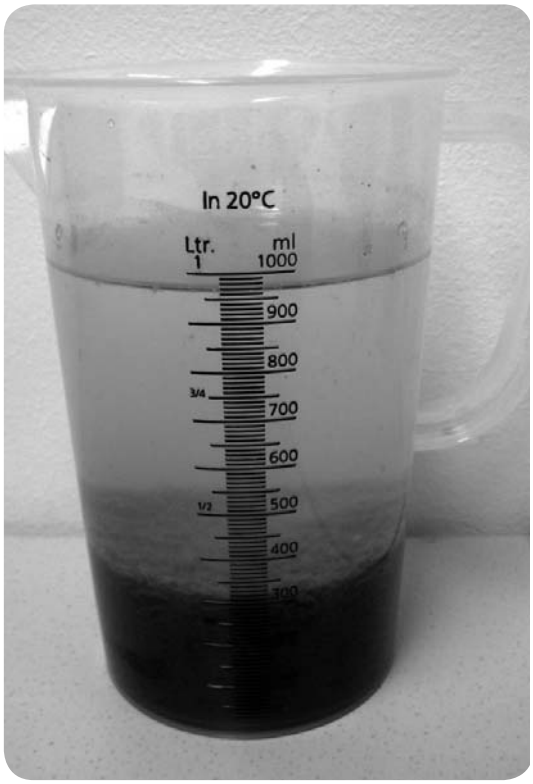
When vacuum truck emptying has been selected, the sludge removal reminder comes automatically every six months. The reminder is a guideline. The best way to determine the need for sludge emptying is to perform a settling test every two months. See the settling test instructions in section 5.3.2.1. When the settling test result shows a sludge amount of over 500ml with a 90-minute settling, it is time to order sludge emptying.

1. Check the sludge amount in the process tank with the settling test.
2. Order sludge emptying when necessary.
3. Aeration must be active during vacuum truck emptying. If the process tank does not show bubbles, change the X3 into the X6 socket to force the compressor on. Aeration starts immediately in the process tank.
4. The process tank is emptied from the front of the tank (picture 37) minding the aeration disc at the bottom (picture 38) until the sludgepump appears .
5. At the same time, also empty the storage tank entirely (picture 39). Mind the pump and level switch at the bottom of the storage tank
6. Transfer the compressor plug back to its own place after emptying.
7. Acknowledge the sludge removal reminder or reset the sludge counter (section 4.3).
8. Lock the treatment plant cover.

NOTE! Mind the pumps, level switch and the aeration disc at the bottom of the process tank during sludge removal!



Picture 40



Picture 41

5.3.2.1 Settling test

If sludge is removed using a vacuum truck, the sludge amount is determined with a sludge settling test in the process tank every two months. A one-litre measuring glass has been supplied with the treatment plant for the settling test.

The settling test should be done when the treatment plant process is in the continuous aeration phase. A text on the PLC display indicates the ongoing process phase and its start time.

If some other process phase is going on in the treatment plant (see process phases in section 4.2), the settling test result is only indicative. If the sludge level in the measuring glass is above 500ml when the settling test is taken into sleep mode, repeat the test within one week. Aeration must be on also in sleep mode. You can start the compressor by moving the X3 plug into the X6 socket. Remember to move the plug back to its place after the settling test!

When the treatment plant is in the settling or emptying phase, wait a few hours before taking the test.

Testing instructions:

1. Check the process phase from the PLC display.
2. If a phase other than continuous aeration is going on in the treatment plant, ensure that aeration is on by moving the X3 compressor plug into the X6 socket. Wait 10 minutes for the sludge to mix evenly in the tank.
3. Wear protective gloves when taking the settling test!
4. Take sludge from the process tank on the right side into the measuring glass up to the one-litre marker (picture 40).
5. Place the measuring glass on an even surface (temperature above 0 degrees).
6. After 90 minutes, check the clarifier and sludge separation surface (picture 41).
7. If, after 90 minutes, the sludge surface in the measuring glass is above 500ml and the sample has been taken in the continuous aeration phase, you need to order the vacuum truck.
8. Move the compressor plug back to its place.
9. Lock the treatment plant cover.

NOTE! Note the risk of falling into the tank!

5.4 Sampling

Sampling should be performed by professionals. The clean water sample can be taken from a purpose-fitted sampling well, the discharge location of the plant, or the top part of the process tank (at a maximum depth of 0.2 to 0.3 metres from the water surface) at the end of the settling stage, 5 to 10 minutes before emptying.

The process start time can be determined for sampling purposes. The desired process start time is entered in the operation settings of the PLC by using process block (see section 4.3 table). The process block operates so that the treatment plant gathers the batch but does not start the process until the set time. The process starts at the set time if a sufficient amount of water has been provided for the batch. The pump-out starts after approximately 7 hours and 30 minutes from the set time. Make sure that the logic clock is on time!

Contact the manufacturer in matters related to sampling.

Picture 42

Picture 43

Picture 44

5.5 Treatment plant pH adjustment

A low pH in the treatment plant process tank may result in a decrease in sludge particle size, which influences sludge behaviour in the sludge bag. However, the treatment results are not directly influenced by the pH value.

The simplest way to adjust the treatment plant pH is by liming. The pH adjustment is recommended if the pH value in the treatment plant is below 6.

If the household water pH is low, so is the treatment plant pH. Well water should be examined according to recommendations at least every three years.

5.5.1 Lime type

The correct type of lime for the treatment plant is lime ground from limestone crush. Limestone crush is used in agriculture and as garden fertilizer. The lime should be as fine as possible for it to have an efficient effect. The pH can also be adjusted with sodium (sodium hydroxide).

Hydrated lime must not be added into the treatment plant as it is a strong alkali that may lead to active sludge death.

5.5.2 Dosing and monitoring

Lime is added into the treatment plant's process tank (picture 43). Aeration should be on in the process tank at the time of liming so that the lime dissolves as efficiently as possible. If the process tank is not bubbling at the time of liming, the compressor plug can be temporarily moved to the X6 service socket to start the aeration process immediately. The plug must be put back to its own place after liming. Lime will raise the pH to neutral (pH 7). There is no risk of overdosing with the correct lime type. In the beginning, it is recommended to add 2dl of lime 2 to 3 times per week. The dosage amount depends on the treatment plant pH.

The active sludge of the process takes some time to adjust to the changed conditions, and the pH should be monitored, for example, using pH strips that are available at pharmacies (picture 44). When the pH reaches a neutral value, it may not be necessary to maintain it with a weekly dose.

6. Faults and malfunctions

The WehoPuts treatment plant signal lamp supplies constant information on the status of the plant.

The signal lamp is located inside a cowl at the end of the treatment plant ventilation pipe.

Signal lamp on	The plant has no alarms
Signal lamp off	The plant has a malfunction requiring service procedures. The display reading must be inspected.
Signal lamp flashing	The plant has a malfunction which has stopped the process and requires service. The display reading must be inspected.

6.1 Alarms and reminders

The following chart describes the different alarms and reminders, their causes and required corrective actions.

The treatment plant alarms and reminders are dentified by the signal lamp. The alarm name is stated on the control unit display. If there is more than one alarm, the three latest unacknowledged alarms alternate on the display.

NOTE!

- Only original spare parts may be used in the WehoPuts treatment plant. These are available from Uponor Infra Ltd and authorised service vendors!
- The periodic service and failure-related service of the treatment plant are carried out by the manufacturer or a manufacturer-authorised service centre! The owner of the property may also carry out guided service procedures.
- Put service reports in your treatment plant folder!
- Repairs carried out by the property owner may affect the warranty conditions presented in the treatment plant warranty certification!

If GSM remote monitoring is used in the treatment plant, the treatment plant alarms will also be sent by SMS. The alarms are sent to the phone number registered in the control unit (section 4.3).

6.2 Activities during disturbances

The alarms and reminders are acknowledged by pressing Enter twice. After the first press of the Enter ◄┘ button, the software asks if you want to acknowledge the alarm, and the default setting is Yes. If you press Enter a second time, the alarm is acknowledged. If you do not want to acknowledge the alarm, chose the No option with the arrow keys.

You can also acknowledge the alarm by pressing number key 1, which will move the software to alarm acknowledgement confirmation. If you press the Enter ◄┘ button now, the alarm will be acknowledged.

SIGNAL LAMP	MESSAGE IN DISPLAY	EVENT AND CAUSE	ACTION
Off	- (no alarm message)	Signal lamp broken. Power failure, fuses	Replace signal lamp. Inspect cause of power failure. The process will continue after the outage.
Off	Add chemical! 31.12.	The chemical tank is emptying/ empty. If the process issues the alarm despite sufficient chemical in the tank, the treatment plant requires service. The alarm will not interrupt the process.	Fill chemical tank and acknowledge alarm normally. Order service.
Off	No process 7d 31.12.	The treatment plant has not accumulated sufficient wastewater to start the process during one week. If the alarm occurs during normal load and the storage tank surface is high, the treatment plant requires service. Ensure no second alarm is in the background.	The alarm will reset itself during the next process. You can also acknowledge the alarm normally. Order service if the water surface in the storage tank reach overflow level.
Off	Compr. service 31.12.	The compressor service interval has expired and the device requires periodic maintenance. The alarm is issued once compressor hours reach 15,000, 16,000 and 17,000. The alarm will not interrupt the process.	Order service! The compressor membranes and filter are replaced during periodic service and operation hours are reset. Reset requires a password. NOTE! The alarm is acknowledged three times, but the operating hours are not reset.
Off	Remove sludge! 31.12.	Three months have passed since the last sludge bag replacement or six months since the last vacuum truck emptying. The sludge bag reminder is not on by default. You can activate the reminder by using the instructions in section 4.3. The replacement interval is a guideline! When sludge removal with vacuum truck is selected in the operation settings, the reminder is given automatically every six months. The alarm will not interrupt the process.	Change the sludge bag./ Remove the surplus sludge using a vacuum truck. The alarm acknowledgement resets the change interval counter (see section 4.3 for details).
Flashing	Overflow 31.12.	Temporary overload in treatment plant, water level at over-flow level.	Alarm will reset itself once load evens. If overflow is due to equipment malfunction, order service.
Flashing	Transfer fault 31.12.	Transfer of wastewater from storage tank to process tank failed. The alarm will stop the process and set treatment plant on standby to await fault repair and alarm acknowledgement.	Clean the storage tank transfer pump according to section 7.1 or order service. If the transfer pump is pumping water from the storage tank to the process tank and the process tank is full, there is a malfunction in the process tank level switch.
Flashing	Emptying fault 31.12.	Removal of treated water failed. The alarm will stop the process and set treatment plant on standby to await fault repair and alarm acknowledgement.	Ensure the discharge pipe/location is not frozen or blocked. Remove blockage and acknowledge alarm. If the pump is clogged, clean emptying pump according to section 7.2 or order service. If the treated water has been pumped out from the process tank (the emptying pump occurs during the fault) there is a malfunction in the process tank level switch.

6.2.1 Faulty equipment

If the treatment plant develops an equipment malfunction which stops operation (e.g. broken pump), disconnect the device from the control unit. Leave the main power switch on to ensure uninterrupted aerating. Only acknowledge the alarm once the fault has been repaired.

Faulty equipment may also trigger the wire protection of the device. You can try to restart the device by lifting the wire protection back into position 1. If the protection is triggered again, unplug the device and contact service.

Check the functionality of the ground fault switch at least once a year.

6.2.2 Testing equipment using service socket

The control unit X6 service socket can be used to test treatment plant equipment by moving the plug to the service socket. After testing, remember to move the plugs in their correct places.

6.2.3 Equipment diagnostics and testing via PLC

You can also test the equipment operations in the logic operation settings menu. See detailed instructions in section 4.3, IO testing.

6.3 Electrical outage

In case of an electrical outage, the WehoPuts treatment plant control unit will remember the interrupted process stage and resume process normally when power is restored.

6.4 Cleaning process malfunctions

6.4.1 Odours

If the treatment plant is working normally, there should be NO noticeable odours. A slight smell of wastewater may be present when the treatment plant transfers untreated wastewater from the storage tank to the process tank. If the treatment plant has a strong odour, the process tank sludge should be inspected. If the sludge is black in colour, the active sludge has died. This may be due to a long break in operation, aerating malfunction or foreign substance in the treatment plant.

You can determine the functionality of treatment plant aeration by moving the compressor socket (X3) to the service socket (X6). At this time, immediate aeration should begin in the process tank, causing air bubbles. If this does not happen, contact service. After inspection, move the sockets back in their places.

If the active sludge has died, the treatment plant process tank must be emptied using a vacuum truck. Rinsing the tank during cleaning is also recommended. After this, the treatment plant can be used normally.

6.4.2 Foaming

Foaming in the process tank is normal when the treatment plant is started. Foaming is due to the active sludge method starting. Foaming will settle once operation continues and the active sludge strengthens. Momentary foaming may also appear due to large temperature variations during different seasons as well as during drastic load changes. Plentiful use of detergents will also show as foam. If foaming is strong and constant, contact service.

6.4.3 No sludge collected in sludge bag

Every few cleaning processes, a small amount of sludge is pumped from the bottom of the process tank into the sludge basket. There is no alarm for the sludge pump clogging. If no sludge has collected in the bag, check the sludge pump operation by moving the pump plug (X4) into the service socket (X6). Also test the pump operation via the operation settings menu in the software (see section 4.3). Sludge pumping should begin immediately. If nothing happens, order service or clean the pump according to section 7.2. Remember to move the sockets back in their places!

7. Service

Picture 45

Picture 46

Picture 47

7.1 Periodic service

The recommended service interval for the treatment plant is 1 year. Regular service procedures guarantee treatment plant functionality and long service life.

A periodic service refers to a once yearly inspection and service visit at the treatment plant. During the visit, the Uponor Infra authorised service partner will inspect the functional units and carry out the procedures in the service schedule. A written service report is always prepared.

7.2 Service instructions for pumps and level switches

The pumps and level switches should be cleaned each year or when needed. Cleaning is part of the periodic service, but if so desired, the owners of the treatment plant may carry it out by themselves. The pumps can be easily lifted from the attachment chains. The structure of the treatment plant is explained in section 1.7.

Before starting service, disconnect the voltage from the treatment plant by disconnecting the machine room electrical socket! (picture 45)

Use protective gloves when servicing.

NOTE! Before service, ensure that the electrical supply to the treatment plant is disconnected!

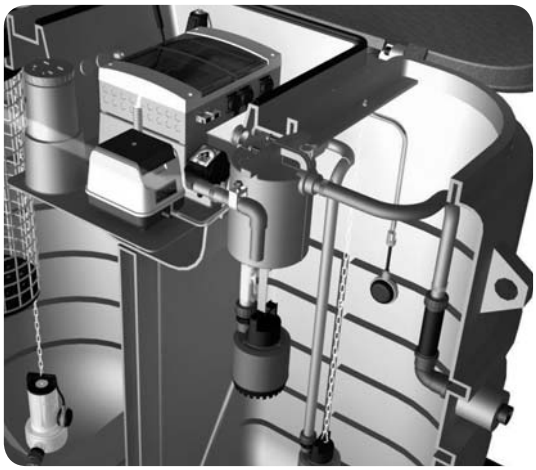
NOTE! Note the risk of falling into the tank!

7.2.1 Transfer pump cleaning

The transfer pump is located inside the treatment plant storage tank.

1. Before service, remove the control unit electrical socket from the treatment plant machine room (picture 45).
2. Lift the sludge basket out of the storage tank. Use the chain to lift the transfer pump out of the tank (picture 46). The pump may be rinsed to simplify service.
3. Check the pump casing (picture 47) and remove any clogging.
4. Ensure the free rotation of the blade wheel inside the pump case by rotating it (picture 48).
5. If the blade wheel does not move, remove the pump bottom plate and remove any clogging. Carefully put the bottom plate back in its place.
6. Finally, clean the pump attachment chain and the level switches. Lower the pump back in place by using the chain.
7. Reattach the control unit electrical socket.
8. Test pump operation by moving pump plug X0 into socket X6. The pump should immediately begin pumping the wastewater from the storage tank into the process tank, if water has accumulated in the storage tank. If the pump does not work, call service.
9. After service, reinstall the sludge basket and sludge pipe.

Picture 48



Picture 49

Picture 50

7.2.2 Cleaning of emptying pump and sludge pump

The emptying pump and sludge pump are inside the process tank (section 1.7). Both pumps are cleaned in the same way.

1. Before service, remove the control unit electrical socket from the treatment plant machine room (picture 45).
2. Open the hose clamp of the emptying pump from the flush tank and remove the pump hose. Be careful not to drop the clamp into the tank.
3. Remove the mounting screws of the flush tank.
4. Lift the emptying pump up by the flush tank handle (picture 49). The pump may be rinsed to simplify service. It is also recommended to clean the flush tank when servicing the pump.
5. Use the attachment chain to lift the sludge pump out of the tank. The pump may be rinsed to simplify service.
6. Open the three screws at the bottom of the pump (picture 50).
7. Remove the pump bottom plate (pictures 51 and 52). Remove any clogging.
8. After cleaning, ensure the free rotation of the blade wheel (picture 53).
9. Reassemble the pump after cleaning. Carefully reattach the bottom plate screws! Clear any accumulated dirt from the pump attachment chain. Lower the pump back into the process tank by using the chain.
10. After the service procedures, remove the compressor plug X3 and reconnect the treatment plant control unit electrical plug.
11. Test pump operation by moving the plug of the cleaned pump into socket X6. When placing emptying pump plug X1 in socket X6, the pump will immediately start pumping water from the process tank to the discharge location. If the surface is low in the process tank, pump operation may be verified by listening for pump operating noise. The sludge pump is tested by moving plug X4 into socket X6. Sludge pumping should begin immediately.
12. Remember to move the sockets back into their places!
13. If the service procedures did not help, order service.

NOTE! Avoid unnecessarily pumping of untreated water into the discharge location or absorption field!

Picture 51

Picture 52

Picture 53

Picture 54

7.2.3 Cleaning of level switches

The treatment plant has three level switches, one next to the transfer pump in the storage tank, one in the upper edge of the process tank (picture 54) and the third is attached to the transfer pump chain in the storage tank. The structure of the treatment plant is explained in section 1.7.

Cleaning storage tank level switches, see section 7.1 items 1, 2, 6 and 9.

Cleaning process tank level switch is easier when the switch is attached on place.

Turn off the main power switch (section 2.3.6). Remove any accumulated dirt from the switch. The level switch may also be rinsed if needed. Reconnect power after cleaning.

NOTE! Note the risk of falling into the tank!

Operation journal

The property owner must regularly complete an operation journal of the operation and service procedures carried out on the treatment plant.

DATE	EVENT/ALERT	SERVICE PROCEDURE

DATE	EVENT/ALERT	SERVICE PROCEDURE

DATE	EVENT/ALERT	SERVICE PROCEDURE

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