OPERATION AND MAINTENANCE OF WWTP TOPAS 5 - 15 PE

1. Operating manual
2. Description WWTP TOPAS
3. WWTP function
4. Overview of regular maintenance
5. How to do maintenance
6. Control unit
7. The most common faults of the WWTP

TOPOLWATER

1.

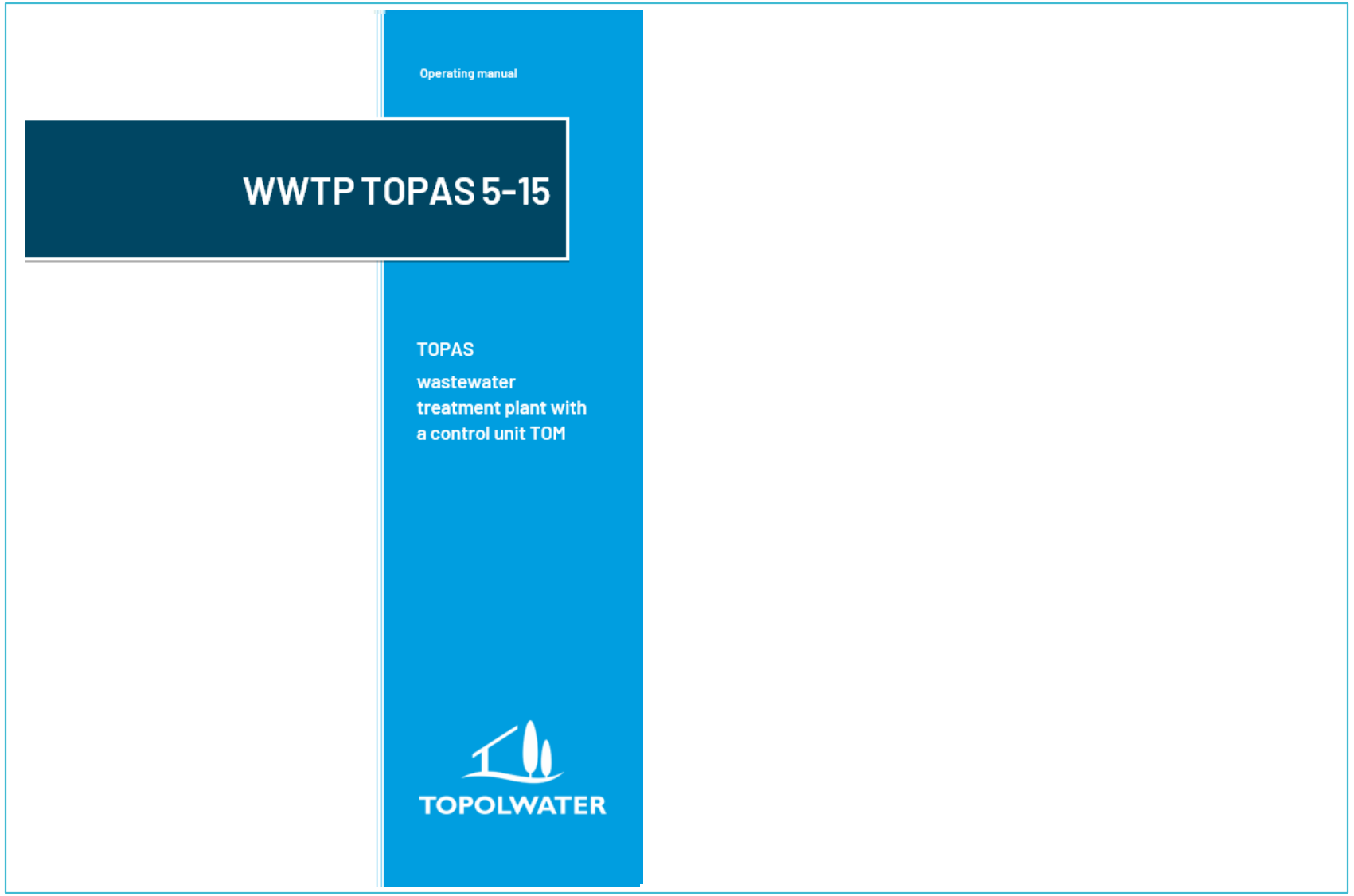
OPERATING MANUAL 5-15

QR CODE FOR MANUAL DOWNLOADING

TOPAS 5 -15

SAMPLE

TOPOLWATER

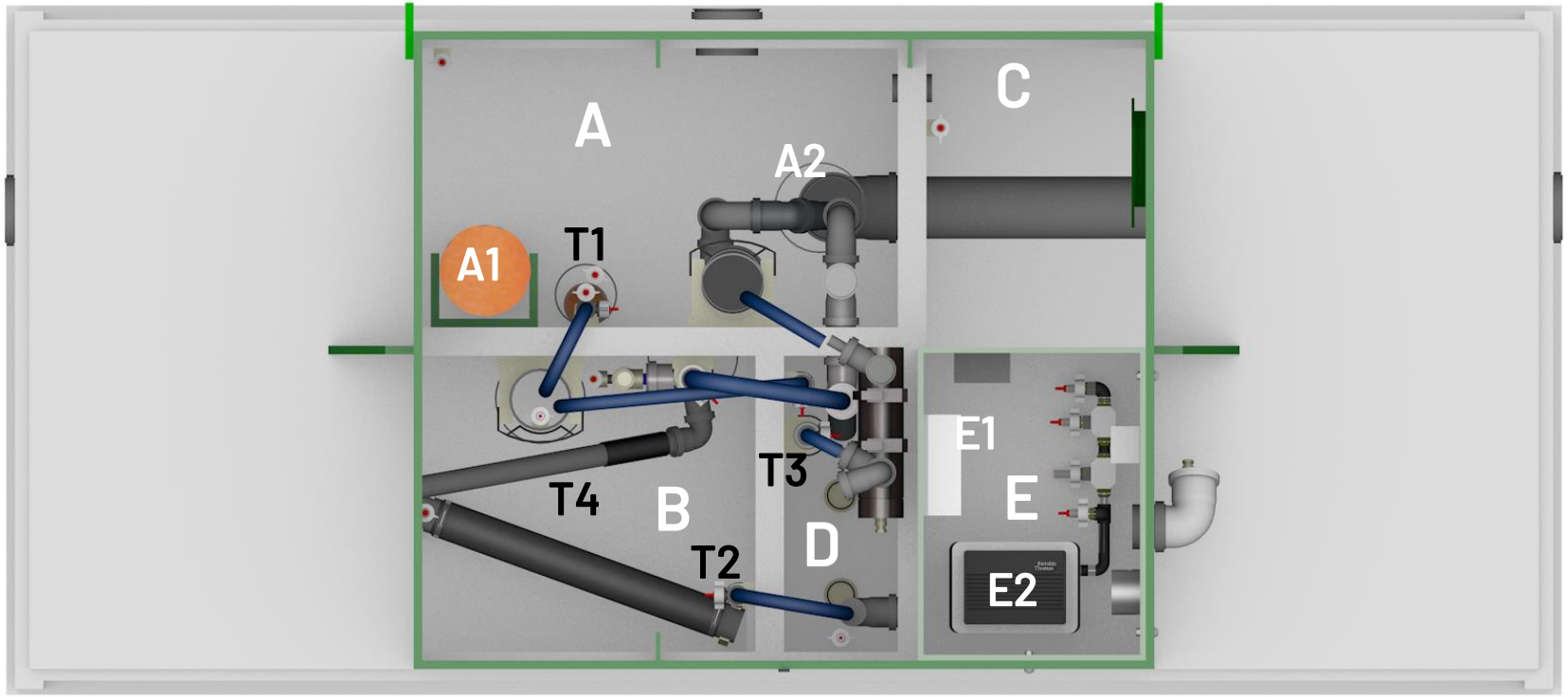


2.

DESCRIPTION OF TOPAS 5 SF

A. Accumulation tank
   A1. Dosing container
   A2.Outfow
B. Bioreactor
C. Sludge tank
D. Sand filter
E. Box for technology
   E1. Control unit
   E2. Blower

TOPOLWATER



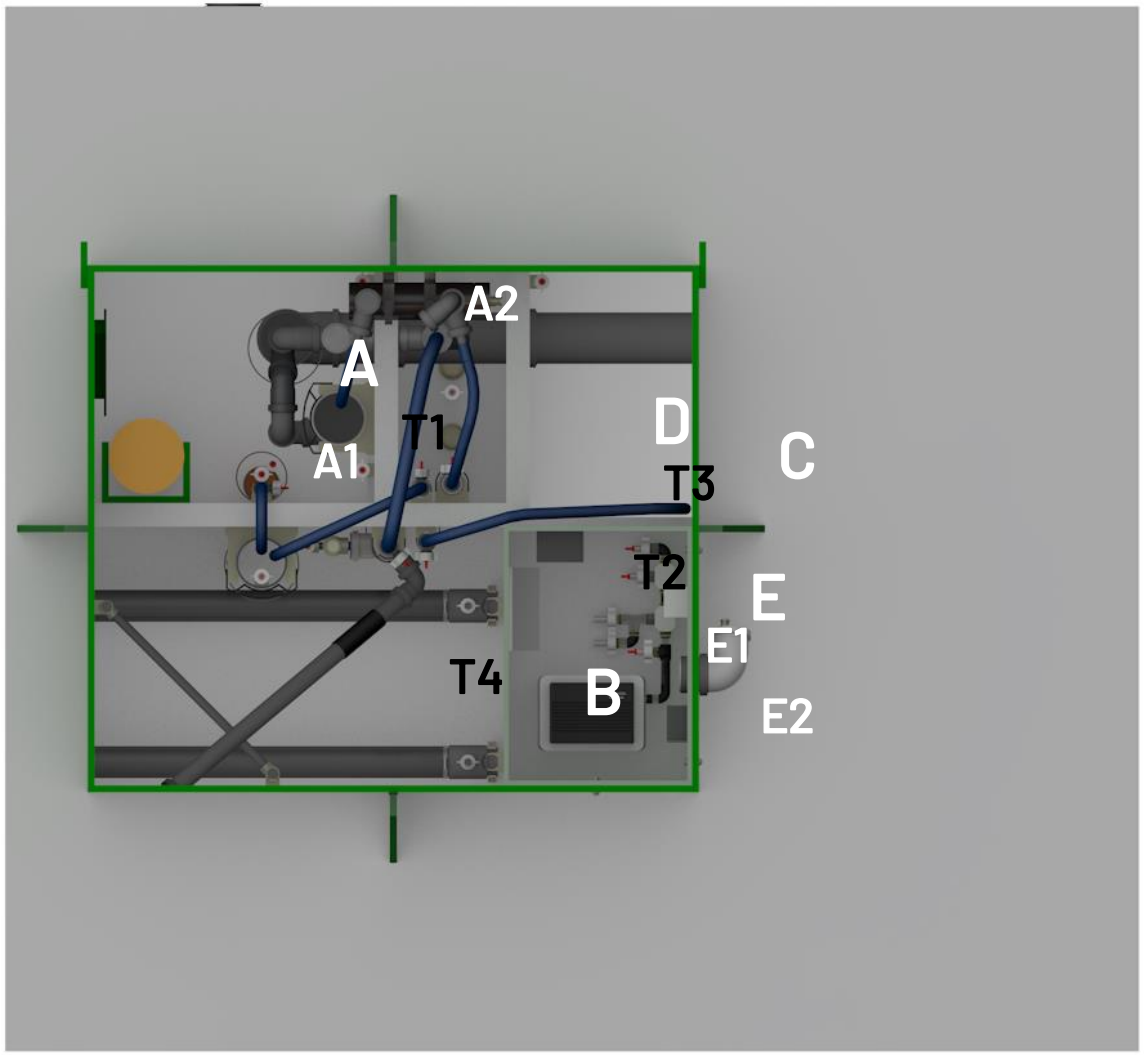
T1. Raw water air-lift pump and raw filter
T2. Sludge air-lift pump
T3. Sand filter air-lift pump
T4. Decanter

2.

DESCRIPTION OF TOPAS 10 SF

A. Accumulation tank
   A1. Dosing container
   A2.Outfow
B. Bioreactor
C. Sludge tank
D. Sand filter
E. Box for technology
   E1. Control unit
   E2. Blower

TOPOLWATER



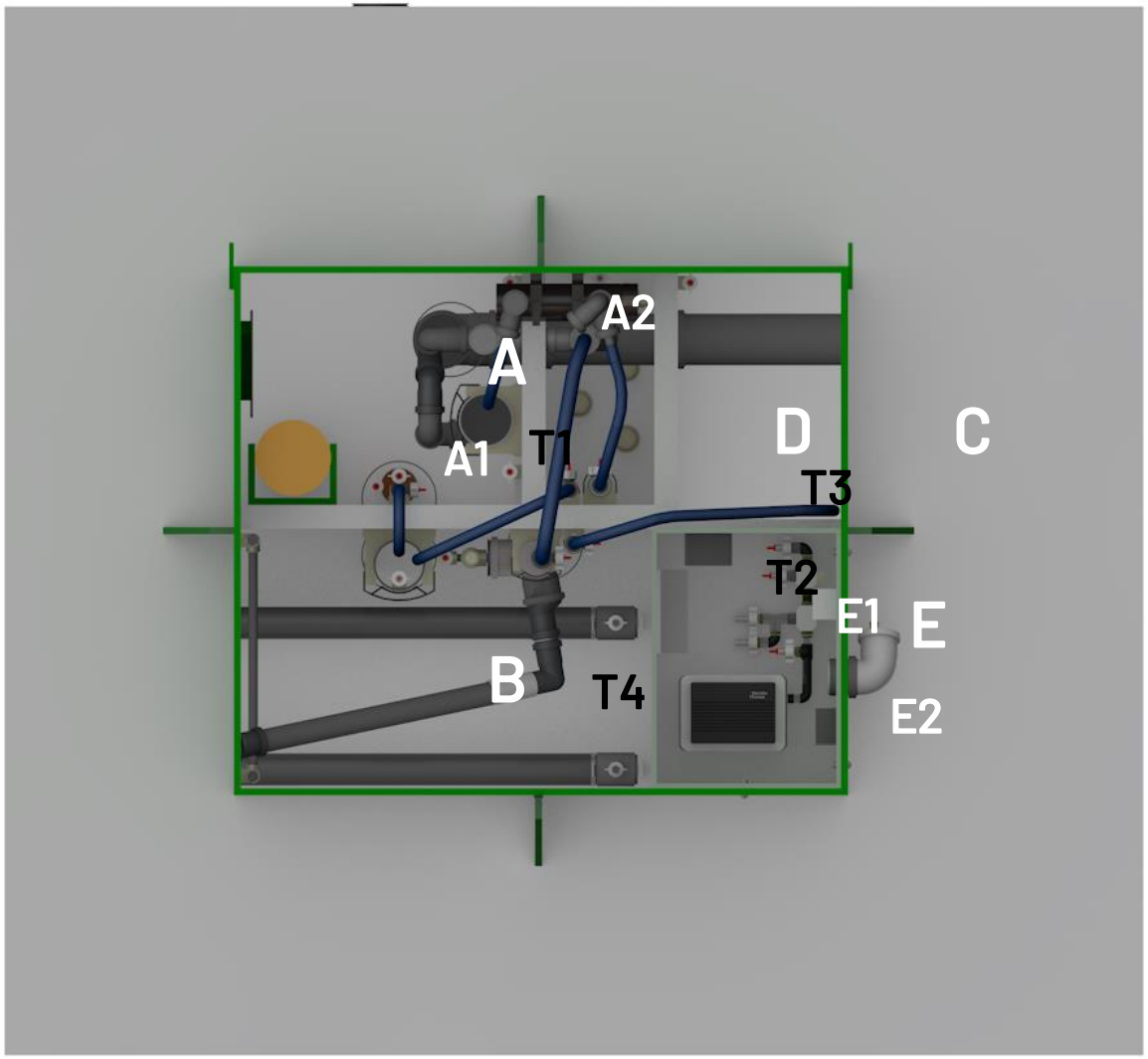
T1. Raw water air-lift pump and raw filter
T2. Sludge air-lift pump
T3. Sand filter air-lift pump
T4. Decanter

2.

DESCRIPTION OF TOPAS 15 SF

A. Accumulation tank
   A1. Dosing container
   A2.Outfow
B. Bioreactor
C. Sludge tank
D. Sand filter
E. Box for technology
   E1. Control unit
   E2. Blower

TOPOLWATER



T1. Raw water air-lift pump and raw filter
T2. Sludge air-lift pump
T3. Sand filter air-lift pump
T4. Decanter

3.

WWTP FUNCTION

Technological process :

1. Filling of the activation tank

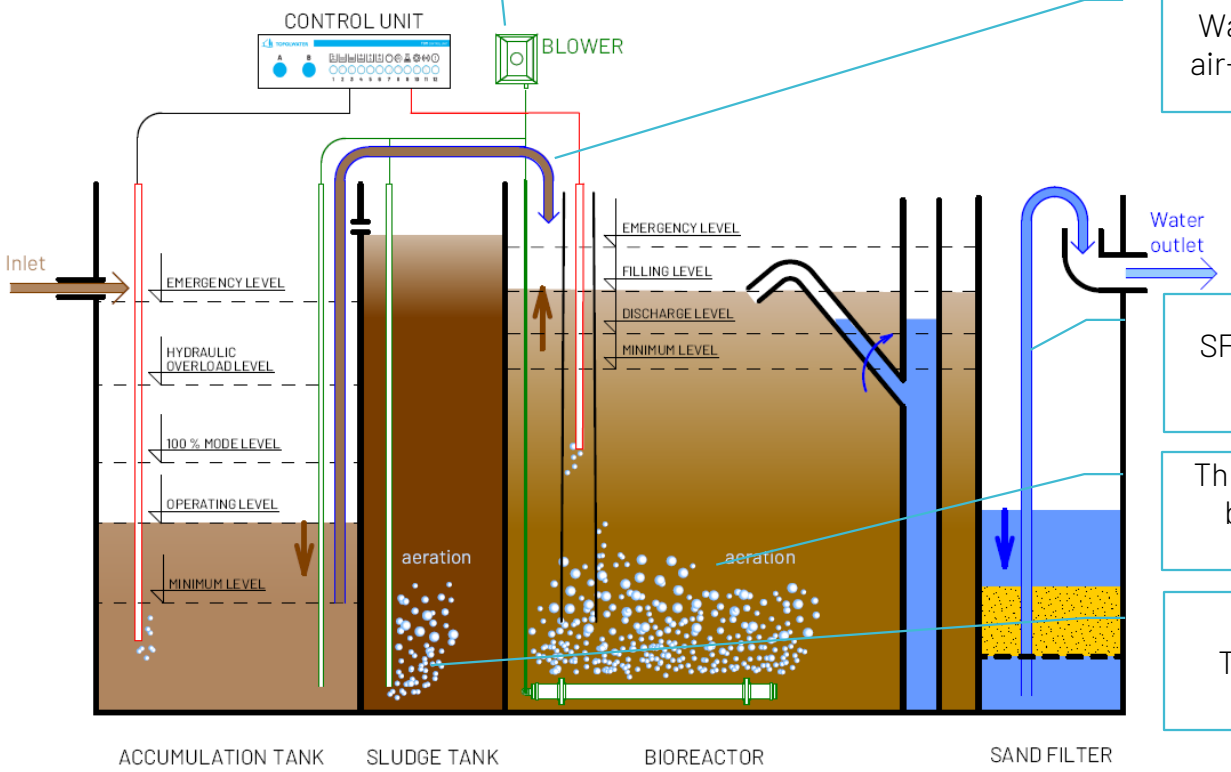
2. Sedimentation
3. Filling of the decanter
4. Desludging
5. Driving water out of the activation tank

TOPOLWATER

BIOREACTOR FILLING

The phase lasts until the level in the reactor reaches the filling level or the set time has elapsed.

The blower operates



Wastewater is pumped by an air-lift pump to the bioreactor

SF air-lift pump pumps clean water to the outlet

The bioreactor is aerated and biological treatment is in proccess

The sludge tank is aerated

3.

WWTP FUNCTION

Technological process :

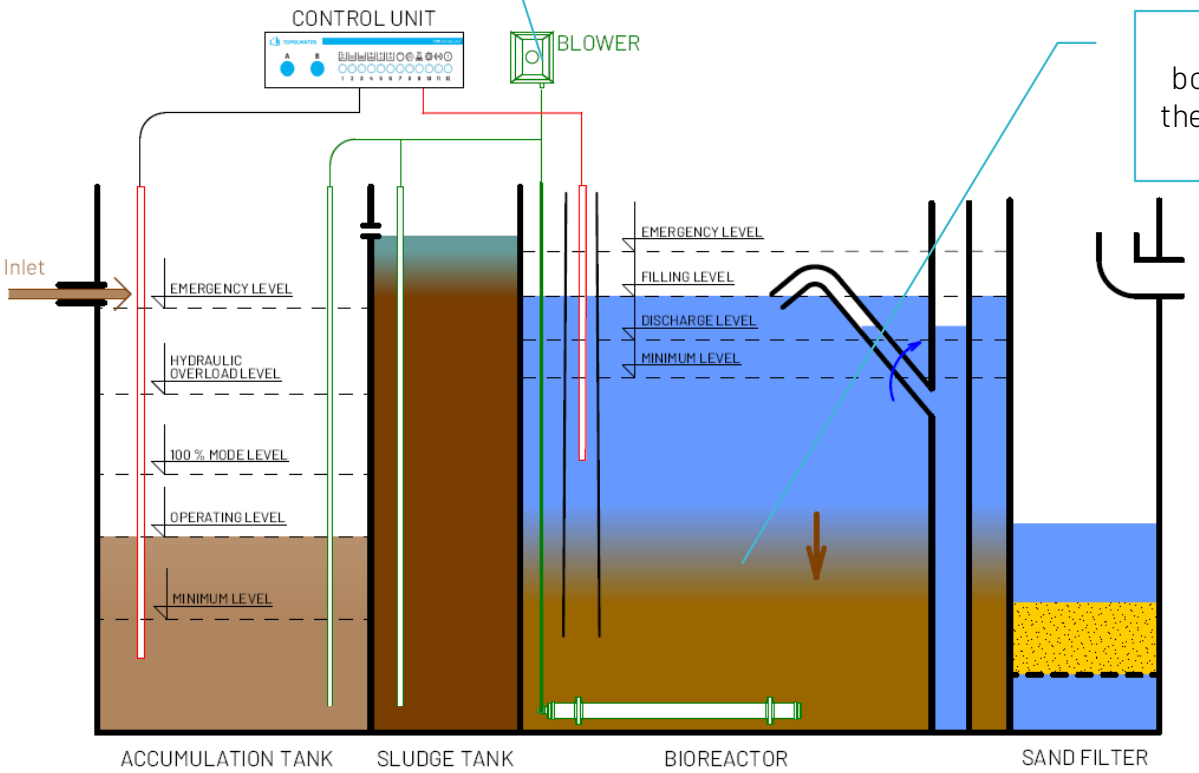
1. Filling of the activation tank
2. **Sedimentation**
3. Filling of the decanter
4. Desludging
5. Draving water out of the activation tank

TOPOLWATER

SEDIMENTATION

The sedimentation process lasts for a default time (usually for 20 minutes).

The blower is off



The sludge settles to the bottom in the bioreactor and the treated water is separated from the sludge layer

3.

WWTP FUNCTION

Technological process :

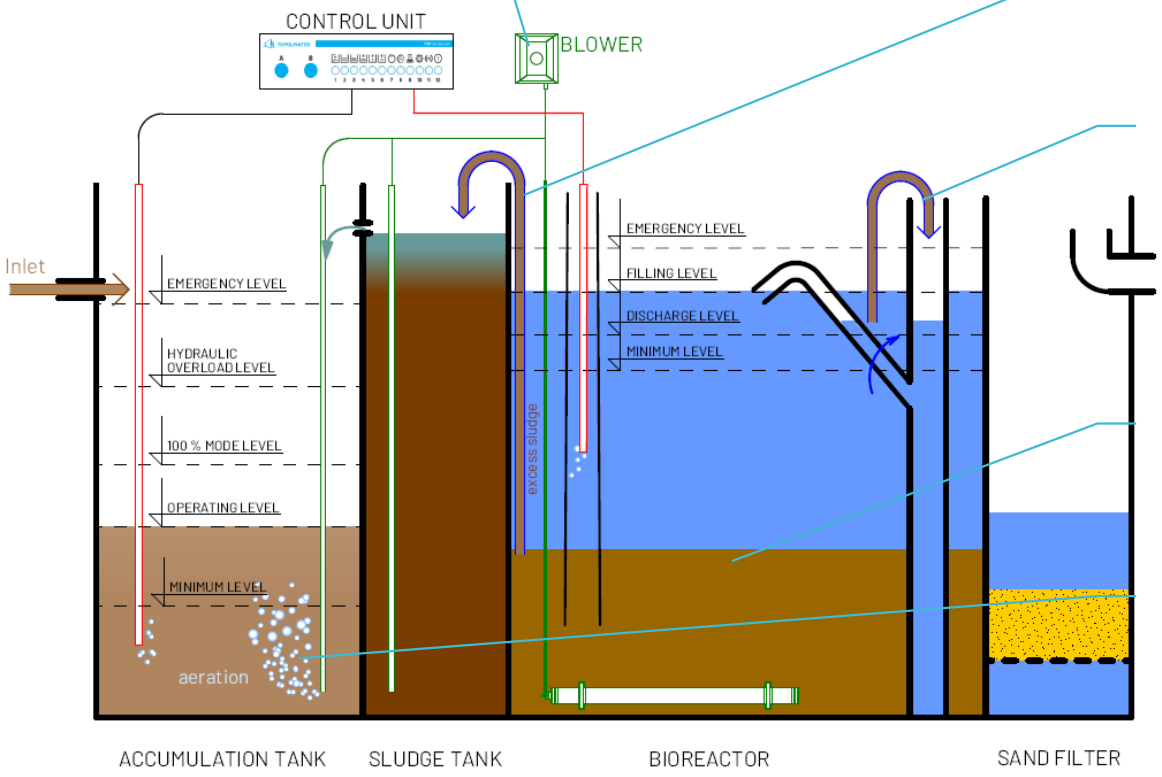
1. Filling of the activation tank
2. Sedimentation
3. **Filling of the decanter**
4. Desludging
5. Draving water out of the activation tank

TOPOLWATER

FILLING OF THE DECANTER

The phase lasts for the set time (approximately 5 minutes).

The blower operates



Excess sludge is pumped from the bioreactor to the sludge tank

The decanter filing air-lift pump operates

The bioreactor is idle

The accumulation tank is aerated

3.

WWTP FUNCTION

Technological process :

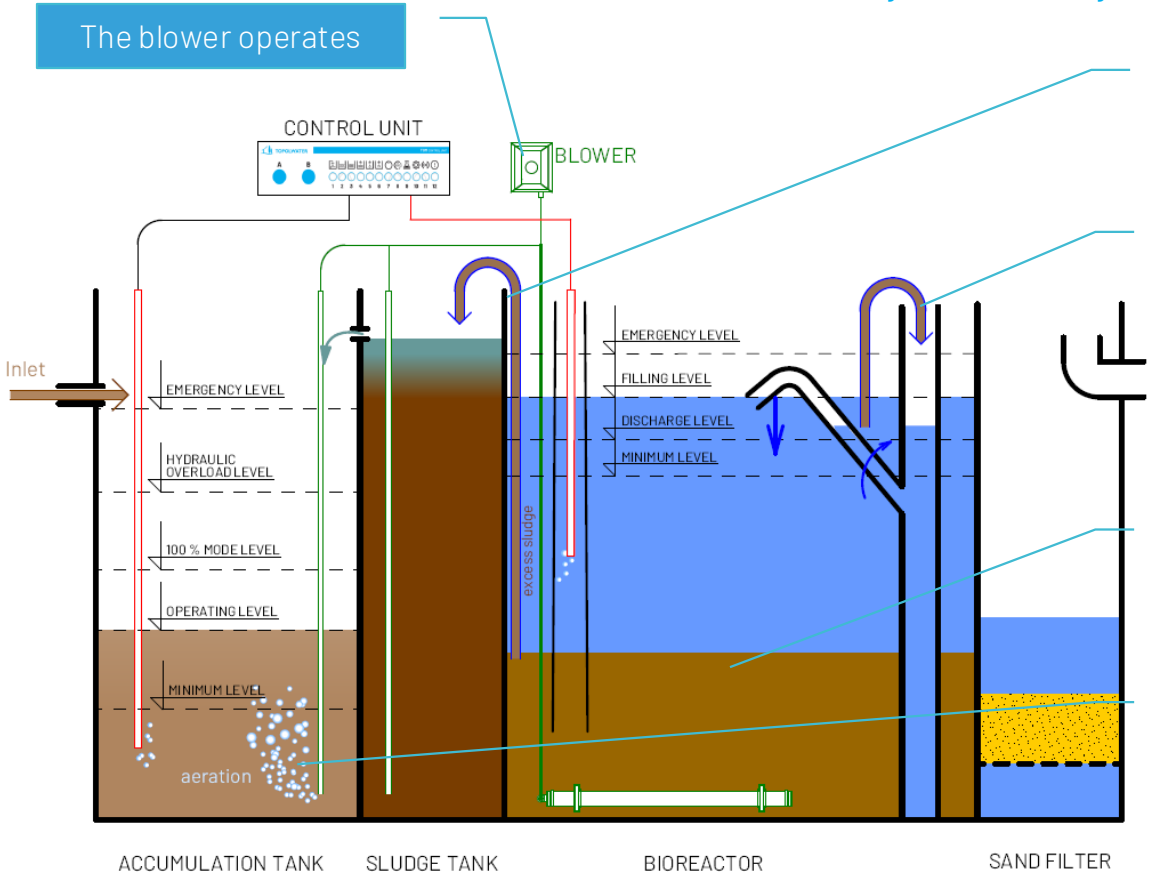
1. Filling of the activation tank
2. Sedimentation
3. Filling of the decanter
4. **Desludging**
5. Draving water out of the activation tank

TOPOLWATER

DESLUDGING

The desludging causes drop of the water level by a defined layer (usually 3 cm).

The blower operates



Excess sludge is pumped from the bioreactor to the sludge tank

The decanter filing air-lift pump operates

The bioreactor is idle

The accumulation tank is aerated

3.

WWTP FUNCTION

Technological process:

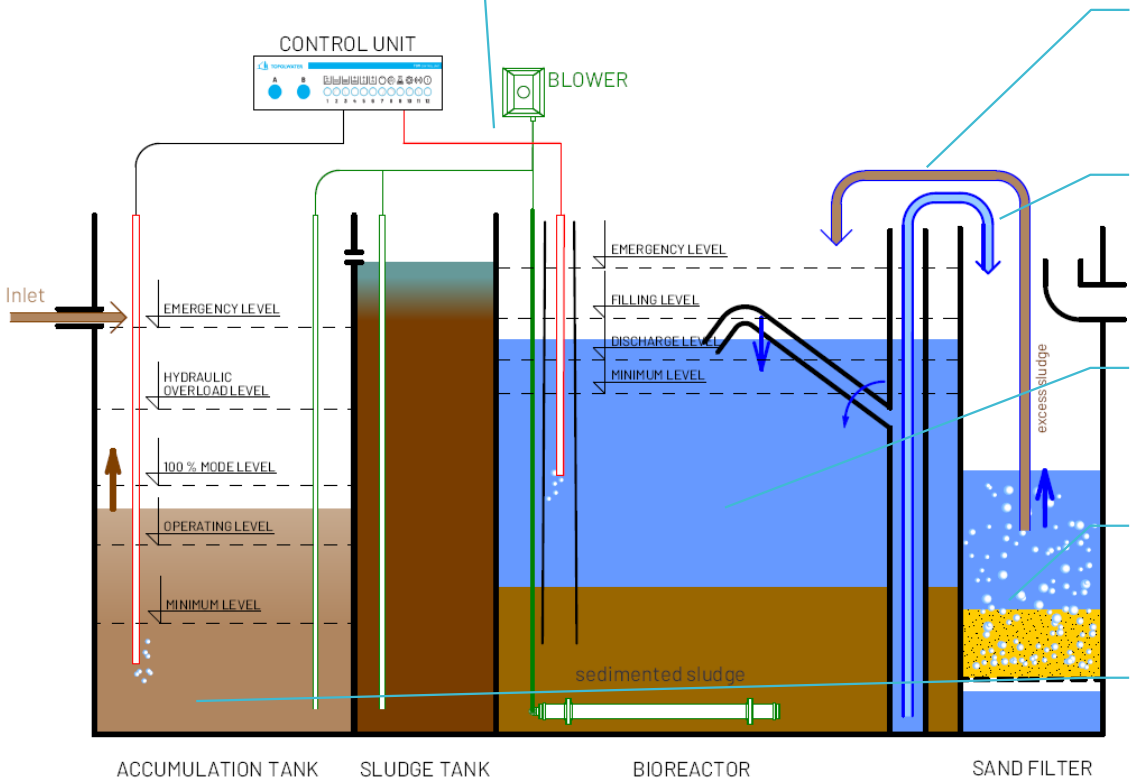
1. Filling of the activation tank
2. Sedimentation
3. Filling of the decanter
4. Desludging
5. **Drawing water out of the activation tank**

TOPOLWATER

DRAWING WATER OUT OF THE ACTIVATION TANK

The blower operates

The stage ends when the set layer is reached (minimal water level in reactor).



Excess sludge is pumped from the sand filter to the bioreactor

The treated water air-lift pump pumps water from the bioreactor to the sand filter tank

The bioreactor is idle

The sand filter is aerated

The accumulation tank is idle

4.

OVERVIEW OF REGULAR MAINTENANCE OF THE WWTP DURING THE YEAR

Follow the recommended intervals or as needed!

TOPOLWATER

	Maintenance	1. Q	2. Q	3. Q	4. Q
A	Sludge quantity control	X	X	X	X
B	Desludging procedure	X	X	X	X
C	Cleaning the blower dust filter		X		
D	Cleaning of the raw water air-lift pump (RWA) and raw filter (RF)		X		
E	Cleaning of the sludge air-lift pump		X		
F	Cleaning of sand filter air-lift pump		X		
G	Cleaning of the decanter		X		
H	Cleaning or replacing nozzles on air-lift pumps		X		

5.

HOW TO DO MAINTENANCE

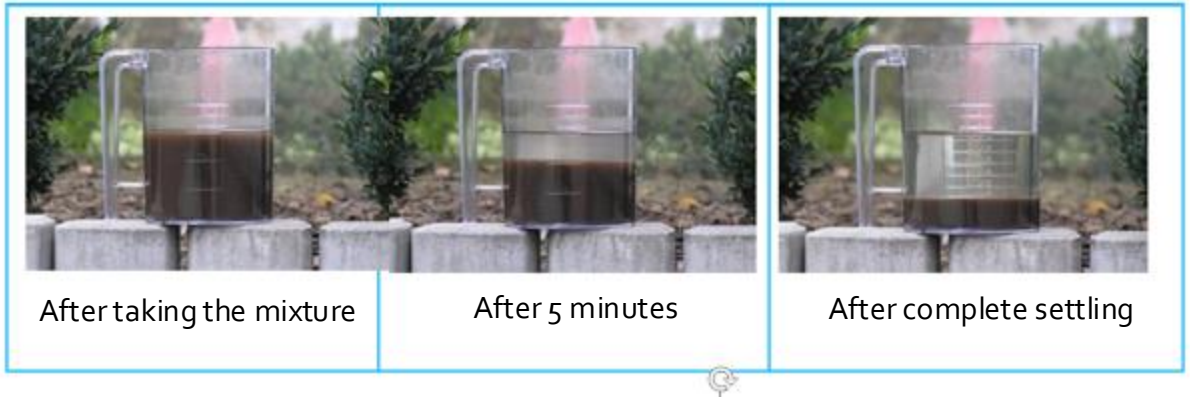
A. **Sludge quantity control**
B. Desludging the sludge tank
C. Cleaning the blower dust filter
D. Cleaning the raw water air-lift pump
E. Cleaning the sludge air-lift pump
F. Cleaning sand filter air-lift pump
G. Cleaning the decanter

TOPOLWATER

Sludge quantity control

- Prepare a transparent plastic container or bottle
- Turn on the WWTP to Stage 1 Fill the bioreactor (if not in it)
- Take approximately 1 litre of activated mixture from the bioreactor into the bottle (see chamber B)
- Leave the bottle at rest for about 20 minutes until the sludge is separated from the treated water
- Drain the sludge according to the result of the check:

✓ **More than 50% sludge –** immediate desludging required!
✓ **30% - 50% of sludge -** we recommend to defecate
✓ **Up to 30% of sludge -** no need to desludge!
✓ **No settled sludge -** problem with WWTP biology, must be solved!



After taking the mixture | After 5 minutes | After complete settling

5.

HOW TO DO MAINTENANCE

A. Sludge quantity control
B. <u>Desludging the sludge tank</u>
C. Cleaning the blower dust filter
D. Cleaning the raw water air-lift pump
E. Cleaning the sludge air-lift pump
F. Cleaning sand filter air-lift pump
G. Cleaning the decanter

TOPOLWATER

Desludging procedure

1. The sludge removal is provided by a septic pumper truck or by a sludge pump.
2. The pump is inserted into the sludge tank of the WWTP (see chamber C) and connected to the power supply.
3. The sludge is pumped to compost in the garden (the entire volume of the sludge tank must be pumped out).
4. A second clean water pump is then used and clean water is pumped into the sludge tank.

5.

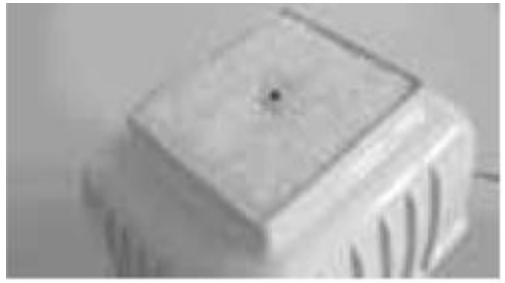
HOW TO DO MAINTENANCE

A. Sludge quantity control
B. Desludging the sludge tank
C. <u>Cleaning the blower dust filter</u>
D. Cleaning the raw water air-lift pump
E. Cleaning the sludge air-lift pump
F. Cleaning sand filter air-lift pump
G. Cleaning the decanter

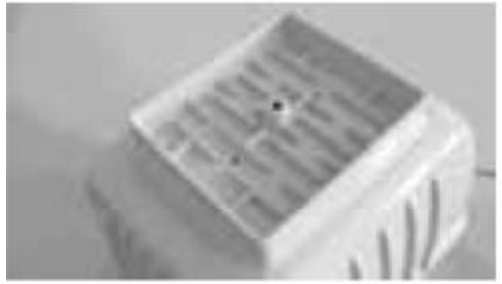
TOPOLWATER

Cleaning the blower dust filter

Unscrew the filter cover screw.



Remove the filter cover.



Take out the filter element
and clean it, or replace it if necessary.

5.

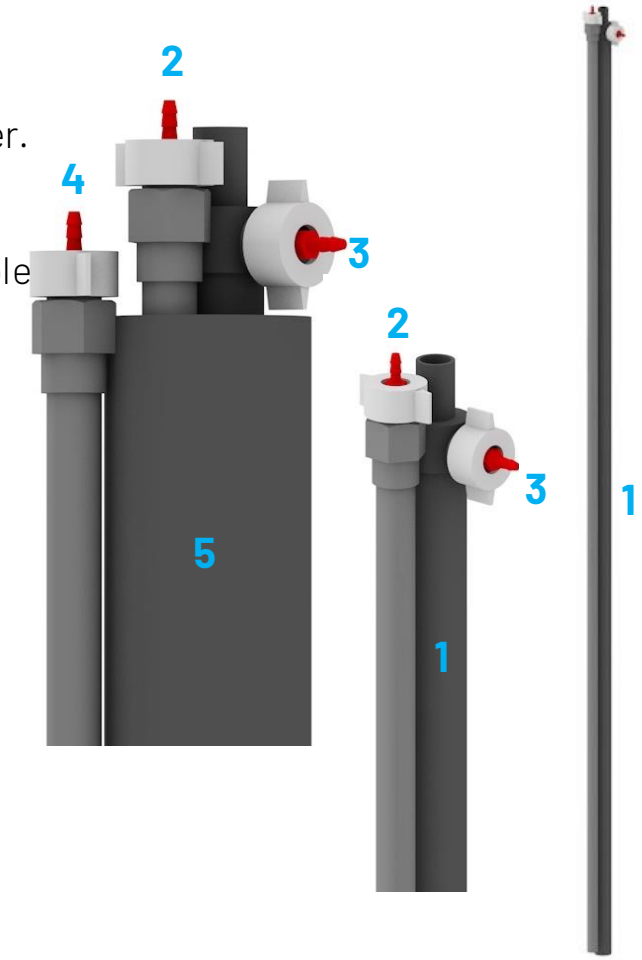
HOW TO DO MAINTENANCE

A. Sludge quantity control
B. Desludging the sludge tank
C. Cleaning the blower dust filter
D. <u>Cleaning the raw water air-lift pump</u>
E. Cleaning the sludge air-lift pump
F. Cleaning sand filter air-lift pump
G. Cleaning the decanter

TOPOLWATER

Cleaning of the raw water air-lift pump (RWA) and raw filter (RF) – T1

1. Disconnect RWA (1) and RF (5) from the air supply.
2. Remove the air-lift pump from the filter.
3. Check the flow capacity of the air-lift pump and filter.
4. Flush with a stream of clean water.
5. Clean the nozzles (2,3,4) with a stream of water.
6. Put the air-lift pump back into the filter and the whole filter entire back into the WWTP.



5.

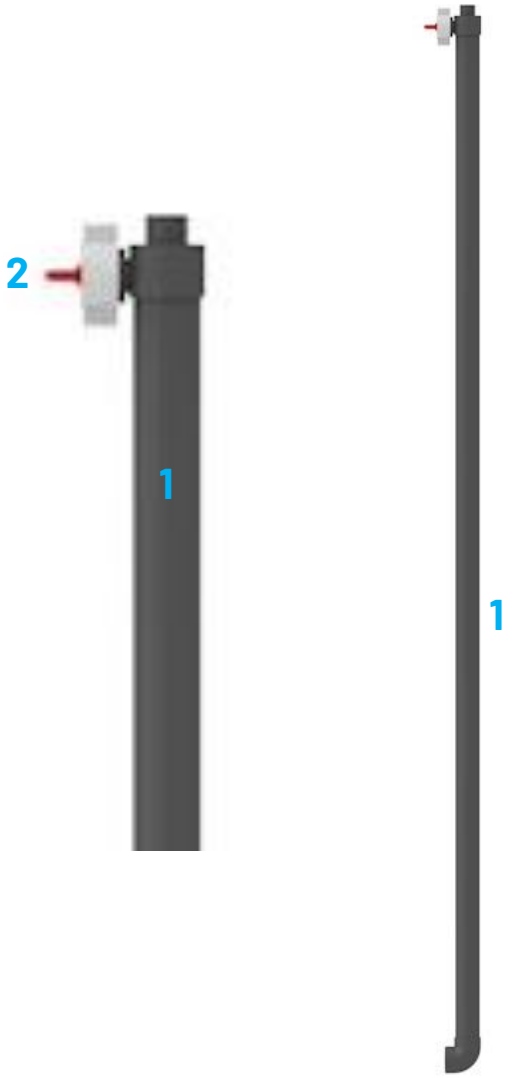
HOW TO DO MAINTENANCE

A. Sludge quantity control
B. Desludging the sludge tank
C. Cleaning the blower dust filter
D. Cleaning the raw water air-lift pump
E. <u>Cleaning the sludge air-lift pump</u>
F. Cleaning sand filter air-lift pump
G. Cleaning the decanter

TOPOLWATER

Cleaning of the sludge air-lift pump – T2

1. Disconnect the sludge air-lift pump (1) from the air supply.
2. Remove the air-lift pump from the WWTP.
3. Check the flow capacity of the air-lift pump .
4. Flush with a stream of clean water.
5. Clean the nozzle on the air-lift pump (2) with a stream of water.
6. Put the air-lift pump back into the WWTP.



5.

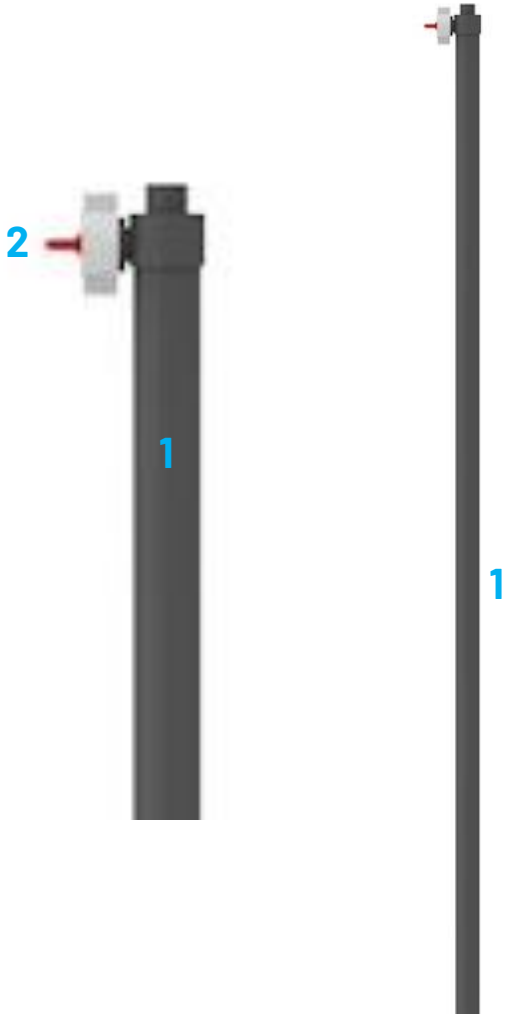
HOW TO DO MAINTENANCE

A. Sludge quantity control
B. Desludging the sludge tank
C. Cleaning the blower dust filter
D. Cleaning raw water air-lift pump
E. Cleaning the sludge air-lift pump
F. <u>Cleaning sand filter air-lift pump</u>
G. Cleaning the decanter

TOPOLWATER

Cleaning of sand filter air-lift pump – T3

1. Disconnect the SF air-lift pump (1) from the air supply.
2. Remove the air-lift pump from the WWTP.
3. Check the flow capacity of the air-lift pump .
4. Flush with a stream of clean water.
5. Clean the nozzle on the air-lift pump (2) with a stream of water.
6. Put the air-lift pump back into the WWTP.



5.

HOW TO DO MAINTENANCE

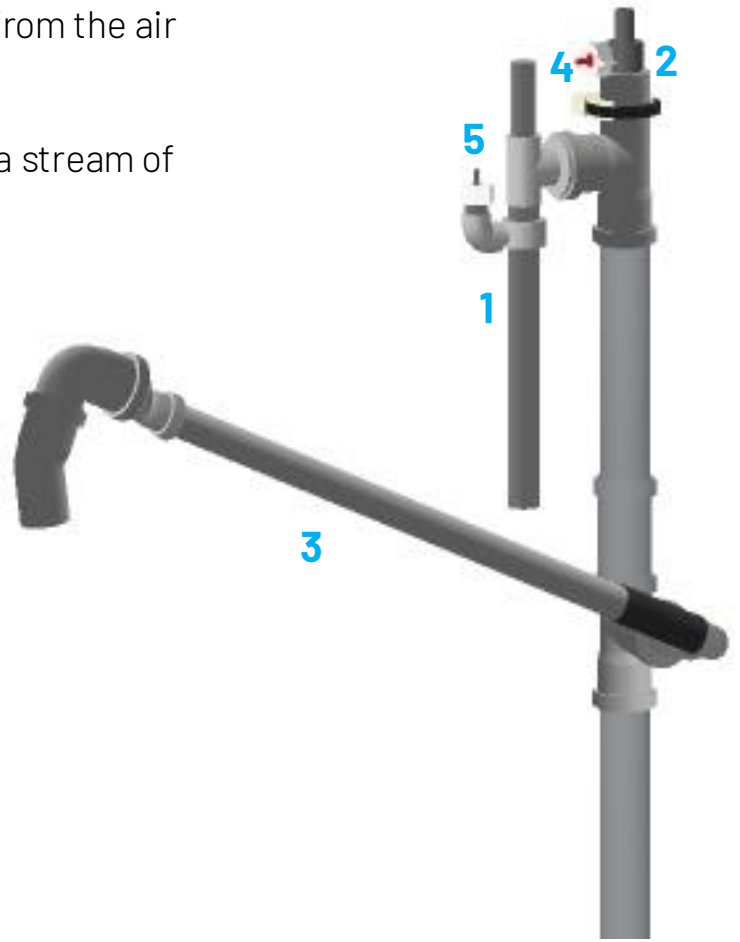
A. Sludge quantity control
B. Desludging the sludge tank
C. Cleaning the blower dust filter
D. Cleaning the raw water air-lift pump
E. Cleaning the sludge air-lift pump
F. Cleaning sand filter air-lift pump
G. <u>Cleaning the decanter</u>

TOPOLWATER

Cleaning of the decanter – T4

1. Disconnect the decanter and the air-lift pump from the air distribution system.
2. Remove the decanter from the WWTP.
3. Clean the nozzles on the air-lift pump (4,5) with a stream of water.
4. Flush with a stream of clean water:
   - Air-lift pump decanter filling (1)
   - Clean water air-lift pump (2)
   - Decanter arm (3)

5. Return the air-lift pumps to the decanter and the whole decanter entire back into the WWTP.



6.

CONTROL UNIT

Overview of TOM CU functions

TOPOLWATER

Control unit

- Signals an actual process
- Identifies
  - faults - by flashing
  - faults – by shining
- Manual testing of WWTP phases
- Connection of other devices, e.g. GSM module

CONTROL UNIT FUNCTIONS DESCRIPTION

INFORMATION ABOUT THE ONGOING PROCESS:

1 Filling	4 Sludge reduction	7 100% Mode	10 Additional equipment
2 Sedimentation	5 Treated water pumping	8 ECO Mode	11 Inactive
3 Decanter filling	6 Recirculation	9 Dosing	12 Error

INFORMATION ABOUT FAILURES AND MALFUNCTIONS:

12 Flashing (Failure)

1 Low power of raw water air-lift pump
4 De-sludging air-lift pump
5 Emergency water level of reactor
8 Raw water air-lift pump
9 Chemicals are low

Pressing "B" briefly starts flashing failure specifications.

12 Shines (Malfunction)

1 Increased inflow and raw water air-lift pump
2 Blower malfunction
4 De-sludging air-lift pump malfunction
5 Decanter malfunction
8 Excessive inflow of water
9 Out of chemicals

To reset the error, press "B" for 2 seconds. If the malfunction is not removed the control unit will signal the error again!

MANUAL PHASE TESTING:

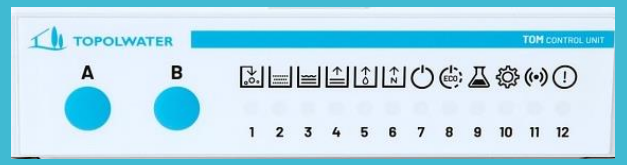
1 Filling	- press 1 x „A" + 1 x „B"
2 Sedimentation	- press 1 x „A" + 2 x „B"
3 Decanter filling	- press 1 x „A" + 3 x „B"
4 Sludge reduction	- press 1 x „A" + 4 x „B"
5 Treated water pumping	- press 1 x „A" + 5 x „B"

To go back wait 60 seconds or press "A" + "B" at the same time!

7.

THE MOST COMMON FAULTS OF THE WWTP

Defects,that are signaled by the control unit



TOPOLWATER

Defect	Flashing	Cause	Removal method
E104	Diode 1	Poor raw water air-lift pump function or increased wastewater inflow	• Remove, inspect and clean the raw water air-lift pump
E106	Diode 4	Poor function of sludge air-lift pump	• Remove, inspect and clean the sludge air-lift pump
Failure	**Shining**	**Cause**	**Removal method**
E101	Diode 1	Emergency level in the accumulation tank - bypassing the WWTP through the safety overflow large amount of wastewater - non-functioning raw water air-lift pump	• Check inflow size • Remove, check and clean the raw water air-lift pump
E107	Diode 4	Set max. time for the desludging phase exceeded: failure of the sludge air-lift pump	• Remove, check and clean the sludge air-lift pump
E103	Diode 5	Set max. discharge phase length exceeded - decanter failure	• Remove, check and clean the decanter • Remove, check and clean the filling air-lift pump • Remove, check and clean the clean water air-lift pump

TOPOLWATER