

Technical Documentation

Operating Manual Including Operations Logbook, Manual for Installation, Commissioning and Maintenance

Fully Biological SBR Small Wastewater Treatment Plant
without primary treatment

Solido

SMART



Qualified advice by telephone: +49 (0) 30 4401 3830 (9:00 to 16:00, CET)

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On overview of the MOST IMPORTANT information for the operator

Safety instructions



Caution:

The electrical components must be connected, started up, and opened only by qualified authorised personnel. The power cord must be protected with a 30 mA residual-current circuit breaker.



Caution:

The technology capsule must be opened **ONLY** by a specialist company and **ONLY** when the power is switched off.



Caution:

The small wastewater treatment plant should be installed by qualified personnel only. Make sure that the technical components can be accessed without any danger. Any deviations from the installation instructions provided are the responsibility of the specialist company and must be agreed upon with the manufacturer. Any access to the system required to do so is permitted only if the power has been switched off and the applicable accident prevention regulations are observed (oxygen deficiency).

Observe the safety instructions in the relevant chapters.

For reliable operation

The purification efficiency of a small wastewater treatment plant is based on micro-organism activity. It is a living system.

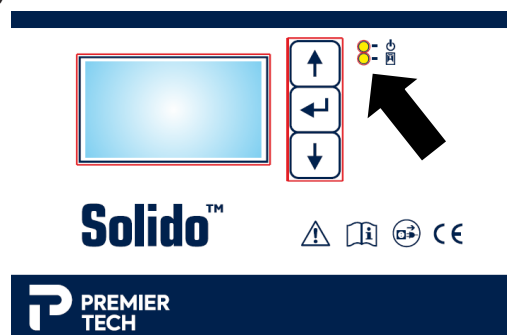
Therefore, observe the following:

- Do not feed in any **harmful or damaging substances** (sanitary products, chemical or oily wipes, food leftovers, chemical cleaner, hair).
- Check the control unit display on a daily basis.
- Make sure that **maintenance** is performed on your system **in half-yearly intervals** (or as specified in your legal water permit), for example, by **concluding a maintenance contract** with an authorised specialist company.

Failures

If the control unit beeps and the red LED warning light flashes:

- Note the error text from the display
- Turn off the warning signal by pressing the middle key on the control unit once
- Inform the maintenance service immediately





Legal grounds

You require a legal water usage permit to operate a small wastewater treatment plant! The approval/start-up of a small wastewater treatment plant can be performed only by an authorised specialist company and must be documented with a start-up log. Otherwise the manufacturer warranty period is reduced to the statutory time.

Warranties



Note:

The following warranty assurance is dependent on the proper handling and correct operation of the plant (also refer to the section “For reliable operation”).

The Premier Tech Germany PE-containers are subject to a factory warranty of 25 years.

The Solido SMART treatment system is subject to a factory warranty of 3 years.

- The factory warranty of 3 years for the Solido SMART treatment system covers the service life of all of the electrical and mechanical components, provided that start-up and maintenance are performed by an authorised specialist company.



Note:

Any unauthorised interference with the small wastewater treatment plant (for example, changes to the air lifters, opening the junction box/connection plug, manipulation of the control unit by non-qualified personnel, etc.) and/or the improper use of the plant and/or deviations from the configuration specified by Premier Tech (see the relevant section in the chapter “Installation instructions”) are prohibited and will void any warranty claims.

Additional documents

Please use the “Master Data Sheet” at the end of this document and retain all important documents if you wish to submit a warranty claim.

Start-up log
Operations logbook
Maintenance log



On overview of the MOST IMPORTANT information **for installation and assembly**

Installing the container



Caution:

When installing the containers, you must observe the **accident prevent regulations** and the **specific installation instructions for the containers** (see the reference in chapter 1.1).

On-site conditions

The subsurface must be sufficiently **stable and water permeable**.

In particular, observe:

- Water table level
- Installation depths (recommendation: do not exceed a maximum installation depth of 1.2 m)
- Distances to buildings and property boundaries
- Traffic loads

Filling material

The filling material around the PE container must be **compactable, permeable, and free of sharp objects**. Excavated soil or “filler sand” often does not meet these criteria.



Note:

Our recommendation: Gravel with a maximum grain size of 8/16 mm

Work procedure

1. Build a stable, level foundation (20 cm) from filling material.
2. Verify the integrity of the containers and their components and carefully place them into the pit without damaging them.
3. Fill up lifter with water (due to uplift) and then fill the containers with water up to a maximum of 25% to stabilise them.
4. Add the filling material and compress in layers using a hand tamper.
5. Connect the inflow, outflow and connection pipe.
6. Position the shaft elements. When doing so, install the shaft assembly set and adjust the height of the shafts as necessary (make sure there is sufficient space for the technology capsule).
7. Pass the cable conduit (DN50/DN100) and air intake hose through the shaft and place the air inlet supports in a suitable position with a steady intake of the cleanest possible air. If necessary, extend the hose (up to max. 10 m). The hose gradient is in the direction of the intake manifold.
8. Fill the rest of the excavated pit with filling material.
9. Check that the supply pipe and the roof deaeration provide sufficient aeration and deaeration for the containers (install a separate aeration pipe if necessary).



Assembling the Solido SMART® wastewater treatment technology

Please observe the following safety instructions and assembly steps:

1. Determine the location for the control unit



Note:

The control unit should not be positioned in direct rain or sun, and it should be located between 10 m and max. 25 m from the treatment tank (standard cable length: 15 m; on-site up to max. 30 m permitted).

2. Lay the cable



Caution:

Never disassemble the cable plug.
Protect the plug from moisture.

Pull the control cable through the cable conduit (DN 50/DN100).

Install the sealing to the building in such a way that it is possible to change the cable at a later point.

3. Connect the hoses

Attach the pre-fitted hose on the lifter and the supply air hose to the Solido SMART capsule connections.

4. Install the Solido SMART capsule

Set the Solido SMART capsule on the lifter in the container.

5. Fix the cable in place

Place the grey control cable into the cable bundle holder.

6. Check the complete installation

Check the plant for pipeline gradients, aeration and deaeration, and accessibility.

7. Perform start-up

Set up the plant, perform a test run, and brief the operator (prepare the protocol).

Please note information for plants with pumped outlet in separate manual DOKK7314E, which is included in the delivery and part of warranty conditions.

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1. About this document

1.1 Scope

This “Technical Documentation for the Solido SMART SBR Wastewater Treatment System” refers primarily to the handling of the Solido SMART as a technical configuration of Solido small wastewater treatment plants.

It is part of a series of technical documents that describe the installation, start-up, operation, function, maintenance, and repair of Solido small wastewater treatment plants and their options:

List of applicable documents:

- Installation and assembly instructions for Solido SMART PE container (DOKK8304E for BL tanks and DOKK8308E for M2 tanks)
- Short description of the Solido SMART PE complete system (DOKK5204)
- Installation manual for Solido SMART pumped outlet (DOKK7314E)
- Installation instructions for kiosk (DOKK7301)

Solido SMART is used in the container types round tank BL and rectangular tank M2 (also see brief description DOKK5204E). Its function and technical configuration are dependent on the type. This documentation uses container BL26 and M2-35 as an example.

Approvals

The Solido SMART wastewater treatment system forms a part of the following plant types, which have received the approvals listed below from the Deutsches Institut für Bautechnik (DIBt - German institute for civil engineering):

Product	Filtration level	DIBt no.	Created on	Valid until	Doc. no.
Solido SMART	C	Z-55.31-673	28.07.2016	28.07.2021	DOKK5411
Solido SMART	N	Z-55.31-674	28.07.2016	28.07.2021	DOKK5412
Solido SMART	D	Z-55.31-675	28.07.2016	28.07.2021	DOKK5413

The CE declaration of conformity as per EN 12566-3 is available (see the appendix).



1.2 Symbols used

In this document, special information and safety instructions are indicated with the following symbols:



Warning:

Disconnect the wastewater treatment plant from the power supply before you continue with the measures described below (repair, maintenance).



Caution:

Safety instructions that have to be followed to prevent a risk to life, risk of injury to persons and damage to the wastewater treatment plant.



Note:

Special information that must be observed to ensure the optimum operation of the wastewater treatment plant.

This document contains both instructions for the **operator** of the Solido small wastewater treatment plants and the instructions for **installation and maintenance personnel**. The chapters that the operator must read and with instructions based upon which the operator must act are indicated with the operator symbol:



Descriptions that the operator of a small wastewater treatment plant should know and observe.



Instructions that can be or must be carried out by a specialist company.

Installation and maintenance personnel must have read and understood the entire documentation to provide support for the operator when working with the small wastewater treatment plant.

The following symbols are used on the control unit and technology capsule:



Caution:

Electrical devices are installed; observe the safety instructions!



Caution/Note:

Read the technical documentation!



Caution/Note:

Do not dispose of obsolete devices as domestic waste; hand them into the specially designated collection points or return them postpaid to Premier Tech.



Caution/Note:

Disconnect the mains plug before you carry out repairs.



2. Intended use

1.3 List of abbreviations used

These instructions frequently use abbreviations (abb.) to make the document easier to read. You can find the meaning of these abbreviations in the list below:

Abb.	Meaning
KKA	Small wastewater treatment plant
SBR	Sequencing batch reactor
BEL	Tube diffuser
KWH	Clearwater lifter
KWP	Clearwater pump
SWS	Float switch

Abb.	Meaning

2. Intended use

Thank you for choosing a Solido small wastewater treatment plant. To ensure a long, reliable service life, it is important that you read and observe the information in this instruction manual.

The Solido SMART SBR wastewater treatment system is used to clean and purify wastewater in domestic areas. This wastewater treatment system is not intended for any other use.

Any other, improper use may cause damage and unexpected hazards. The manufacturer is not liable for any damages to the plant or people if this is the case.

As the operator, you must follow all of the notes about the operation and maintenance of the plant (see chapter "6. Monthly in-house inspection and half-yearly maintenance").

When the plant is taken out of use, it must be properly decommissioned. Commission an authorised specialist company that decommissions the plant and properly disposes of the components.

Make sure that the system is safely disconnected from the mains supply, that the container has structural integrity, and that the inlets and outlets are disconnected.



3. Safety instructions

For the operation of the small wastewater treatment plant installation



Caution:

Electrical components are to be connected, started up, and opened only by authorised specialist personnel. The power cord must be protected with a 30 mA residual-current circuit breaker.



Caution:

The small wastewater treatment plant should be installed by qualified personnel only. Make sure that the technical components can be accessed without any danger. Any deviations from the installation instructions provided are the responsibility of the specialist company and must be agreed upon with the manufacturer. Never enter the system unless the power has been switched off and the applicable accident prevention regulations are being observed (oxygen deficiency).



Caution:

The connection of the small wastewater treatment plant to the mains supply must be performed only by a specialist electrical company.

- 30 mA residual-current circuit breaker provided
- Check the correct operation of the mains connection (protective earth conductor intact?)

Operation



Caution:

Never disconnect the mains plug during regular plant operation.

The bacteria in the small wastewater treatment plant must have a regular supply of oxygen.

For this reason, do not interrupt the power supply to the treatment plant, even during longer periods of absence (such as holidays).



In-house inspection, repair, and maintenance



Caution:

Maintenance work must be carried out only by an authorised specialist company. The proper operation of the small wastewater treatment plant must be checked regularly (twice a year, ideally) as part of a maintenance contract.



Caution:

The technology capsule must be opened **ONLY** by a specialist company and **ONLY** when the power is switched off.



Caution:

Disconnect the plugs for all electrical plant components before entering the small wastewater treatment plant.



Caution:

There may be a lack of oxygen in wastewater treatment plants. Act with special care when you enter the small wastewater treatment plant for repair or maintenance purposes.



Caution:

Comply with the relevant accident prevention regulations at all times. There should always be two people present when a wastewater treatment plant is entered.

Never enter after a person who has fallen unconscious; call for help instead.



Caution:

Secure open treatment tanks from falling. Always close the treatment tank securely after completing the work on the wastewater treatment plant by turning the child safety latch on the TopCover to the lock position.



Caution:

Before opening the control unit or performing repairs on the plant, you must disconnect the mains plug.



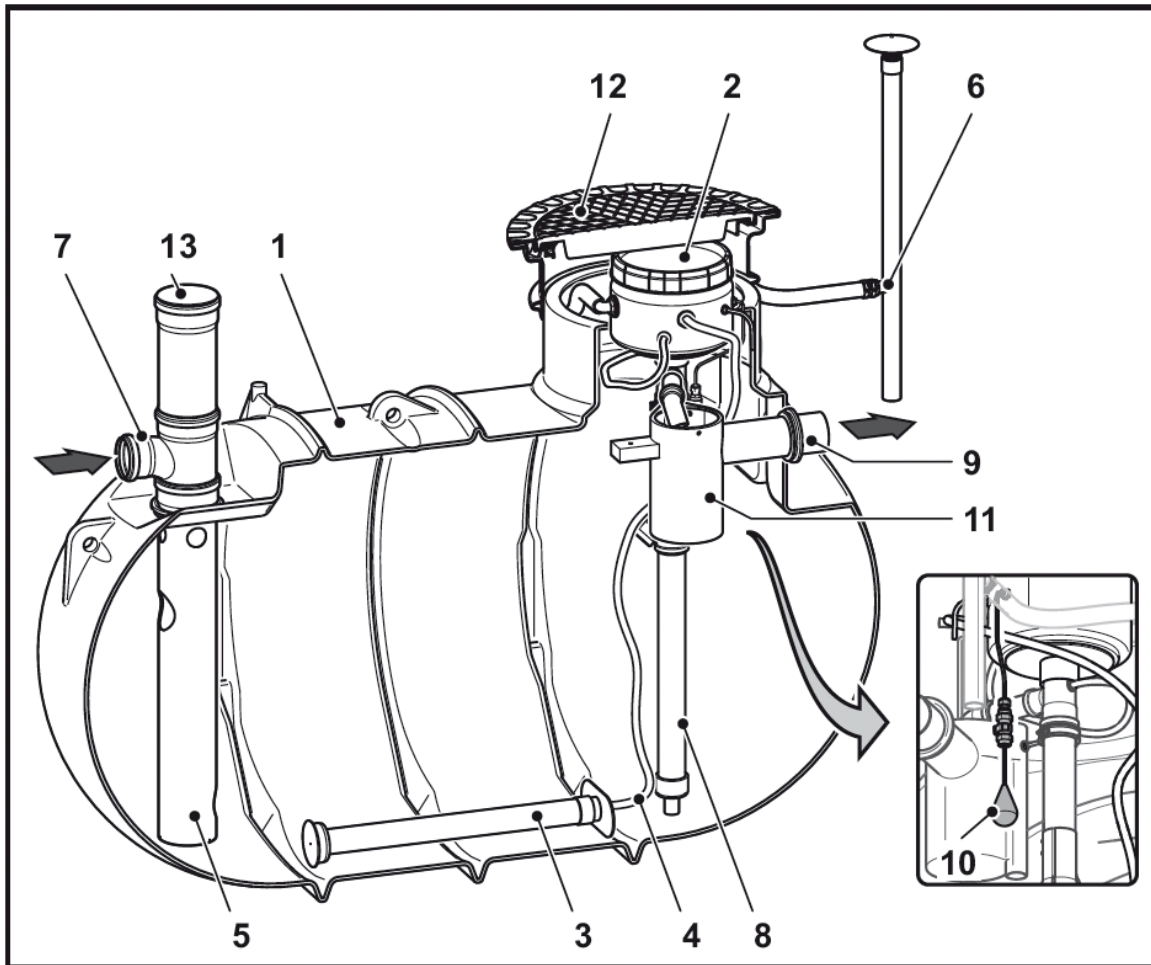
Note:

A small wastewater treatment plant is a stationary electrical system. Like all electrical systems of this type, its safety should be tested every second year by an electrical technician according to VDE 0701-0702. Recommended checks are: the measurement of the insulating resistance, protective earth conductor resistance and the replacement leakage current.



4. Description of functions

4.1 Component overview in round tank BL



Component overview (example: EBL-26)

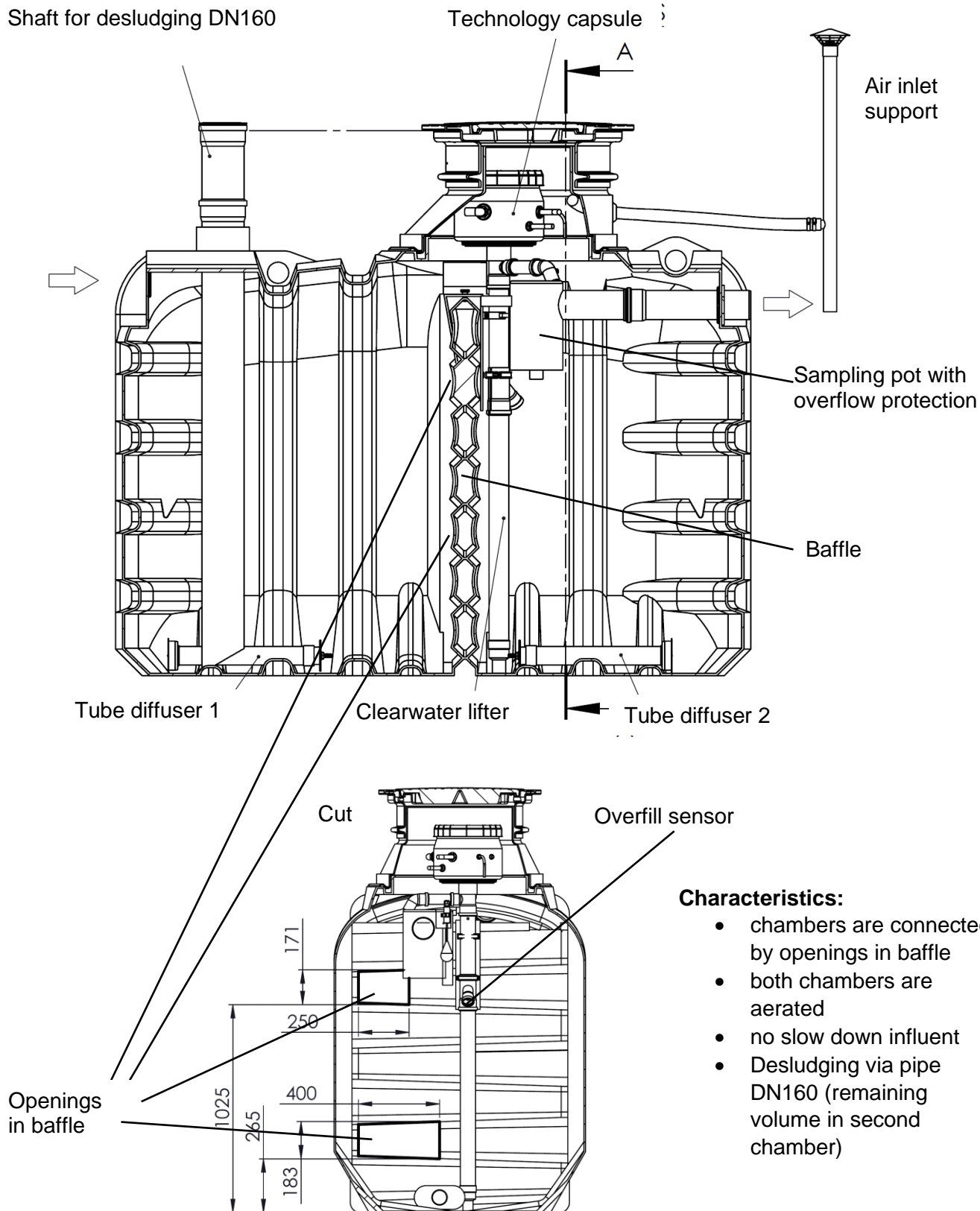
Legend for the component overview:

- | | |
|---|---|
| 1 - BL26 container (example) | 7 - Calmed inlet DN110 |
| 2 - Solido SMART technology capsule with compressor and solenoid valves | 8 - Clearwater lifter (KWH) |
| 3 - Tube diffuser (BEL) | 9 - Outlet |
| 4 - Air hose | 10 - Float switch (SWS) |
| 5 - Lower part of the inlet and sludge pipe | 11 - Sampling container with emergency overflow that is safe from floating material |
| 6 - Supply air hose and support | 12 - TopCover |
| | 13 - Shaft for removing sludge DN160 |



4. Description of functions

4.2 Component overview in rectangular tank M2





4.3 General

The Solido SMART small wastewater treatment plant combines all of the benefits of the trusted SOLIDO technology in an extremely compact space. The SBR procedure used works in a similar way to a municipal treatment plant - by directly aerating the incoming wastewater without a preliminary treatment chamber.

This ensures very effective wastewater purification and prevents the build-up of harmful biogases.

The Solido SMART small wastewater treatment plant is shown with the BL container in the following figure.

The volume and shape of the container for your small wastewater treatment plant may differ, but the functional principle shown here is the same.

4.4 Treatment process with the Solido SMART

The Solido SMART SBR small wastewater treatment plant is comprised of highly resistant polyethylene plastic containers and works as a sequencing batch reactor. It is available in a variety of versions for different numbers of users (referred to in the text below as inhabitants).

The special feature of the plant design is that all mechanical coarse material separation and pretreatment is dispensed with. All primary and secondary sludge is aerobically treated in one chamber.

The simultaneous aerobic sludge stabilisation leads to a significant reduction in sludge accumulation and unwelcome odours in comparison to SBR plant designs with two stages

Using a time-controlled twelve-hour SBR cycle (intermittent aeration, sedimentation, discharge of clearwater), the same multi-purpose chamber is used as a reactor, sludge reservoir, and buffer.

As a result, the whole volume benefits from practically the full scope of relevant functions at the various cycle times.

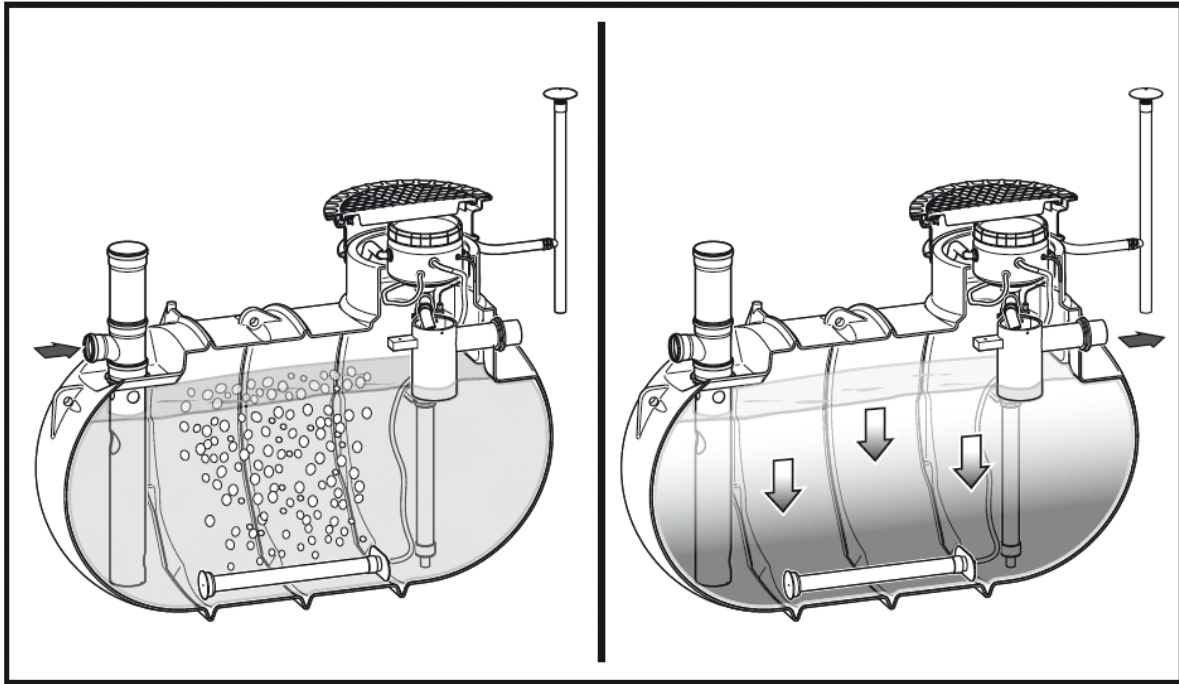
All of the process cycles are performed by an electronic controller that includes an operating hour meter, a logbook function, visual and audible warning signals to indicate faulty hydraulic or electrical functions and a mains-independent power failure monitoring system. An overflow alarm is provided using sensors (float switches) in the container.



4. Description of functions

Intermittent aeration

Aeration/mixing is performed with tube diffusers. During a cycle, aeration is performed intermittently to supply micro-organisms with oxygen and ensure the required level of mixing.



Intermittent aeration/sedimentation and discharge of clearwater

Sedimentation and discharge of clearwater

At the end of a cycle, phase separation between the activated sludge and clearwater is performed in a sedimentation phase lasting 90 minutes at minimum, followed by the discharge of clearwater.

The clearwater is extracted using compressed air lifters or alternatively with a clearwater pump (option).

Automatic backwash system

The patented design of the compressed air lifter allows backwashes to be performed automatically before each operation. The output of activated sludge from the SBR reactor is significantly reduced and the lifetime of downstream filtration is increased as a result. The automatic backwash system also effectively prevents potential lifter blockages.



Plant control unit

The Solido SMART system is equipped with an S40-type electronic controller. The sequence program is designed in a way that guarantees that the required outflow values are maintained through the proper adjustment of the parameters.

When you enter the number of inhabitants for the plant, the preset control parameters are automatically loaded.

If it appears that the plant is underloaded or overloaded, these parameters must be adjusted according to the actual conditions by a specialist company (upon consultation with the Premier Tech specialist service if required).

For a detailed description of how the controller works, see chapter “8. S40 control unit and available settings”.

Holiday economy mode

For longer periods where no wastewater is generated, e.g. holidays, you can select an **economy mode for max. 120 days**.

- In this case, the aeration time is reduced to 50% of the set value.

After this time, the controller automatically switches back to normal mode.

Consult your service technician and also refer to the menu overview and navigation in chapter “8. S40 control unit and available settings”.

Operating hour meter and logbook functions

The electronic controller in your plant has an operating hour counter and logbook function. Consult your service technician and also refer to the menu overview and navigation in chapter “8. S40 control unit and available settings”.

Float switch

The Solido SMART system is equipped with a sensor (float switch) that is used as an overflow alarm.

The plant triggers an alarm as soon as the sensor detects that the fill level is too high.



4. Description of functions

Sampling device

The Solido SMART system allows you to take samples using

- an integrated sampling device in the reactor with an emergency overflow function that is safe from floating material
- a sampling bottle that is integrated into the clearwater hose on the clearwater pump (option)

The sample is a mixed sample from the preceding clearwater discharge that provides a sufficiently representative sample; also see chapter “6. Monthly in-house inspection and half-yearly maintenance”.

Device for sludge removal

The Solido SMART system has a sludge pipe that is permanently indicated using a pictograph and that ensures proper desludging.

- Desludging is required if the sludge level reaches 70% of the max. permitted water level at the end of the sedimentation.
- You must check whether the functions of the calmed inlet, aeration devices, and clearwater lifter are impacted by damaging substances. Substances that are damaging to functions should be removed each time that maintenance is performed.
- During desludging, you must ensure that lifters and aeration devices are not damaged, the plant is not right in the middle of the sedimentation phase whenever possible, and that at least 15% of the sludge quantity remains in the container.

Clearwater pump instead of clearwater lifter (option)

Practical with unfavourable height conditions in the outflow Required components:

- Clearwater pump with integrated dry-run protection connected directly to technology capsule



5. Operating notes

You help to prevent operating failures through your everyday conduct as the operator of the Solido SMART small wastewater treatment plant and by performing regular checks.

If you observe the operational guidelines listed here, you will save unnecessary costs while protecting the environment.

You can:

- Ensure safe wastewater purification by not exceeding the limit values
- Lower your costs through optimum consumption quantities and energy consumption for the wastewater treatment plant (by avoiding unnecessary amounts of washing and cleaning agents)
- Avoid unnecessary repair costs due to damaging substances
- Lower energy consumption and extend the service life by having the optimum settings configured by a specialist maintenance service
- Ensure longer permeability in the downstream filtration systems and therefore a longer service life for your plant

5.1 Everyday conduct

Please observe the codes of conduct recommended in this chapter in your everyday work to ensure the faultless operation of the Solido SMART small wastewater treatment plant and protect the environment.

Please instruct all persons living, working, or staying as guests in your household about the codes of conduct and ensure that they comply with them.

Violations of the codes of conduct lead to blockages in the small wastewater treatment plant or piping, a backflow of wastewater, service visits and possibly to plant repairs.

- An overload of the small wastewater treatment plant and untreated water, and to service visits.
- Contamination of the environment and damage to the small wastewater treatment plant, which may require intensive cleaning and repair of the small wastewater treatment plant and the erosion of the surrounding soil.



5. Operating notes

Dispose of the following objects and substances in the proper way instead of contaminating wastewater (drain, toilet) with them. **Avoid:**

Blocking the small wastewater treatment plant through:	Proper disposal
Adhesive plasters	Dustbin
Bathroom wipes, wet	Dustbin
Bird sand	Dustbin
Cat litter	Dustbin
Cigarettes	Dustbin
Condoms	Dustbin
Corks	Dustbin or collection point
Cotton swabs	Dustbin
Frying oil/grease/fats	Dustbin
Hair (insofar as can be avoided)	Dustbin
Nappy wipes, oily cloths	Dustbin
Razor blades	Dustbin
Sanitary towels	Dustbin
Sanitary towels, tampons	Dustbin
Textiles (cleaning cloths etc.)	Dustbin
Wallpaper adhesive	Collecting point
Overloading the small wastewater treatment plant through:	Proper disposal
Ash	Dustbin
Cooking oil	Dustbin
Food leftovers (solid and liquid, e.g. out-of-date milk)	Dustbin
Contaminating the environment through:	Proper disposal
Backwash water from water softening plants	Collecting point
Chemicals	Collecting point
Cleaning agent	Collecting point
Disinfectants	Do not use
Engine oil	Collection point or petrol station
Insecticide	Collecting point
Medications	Collection point or pharmacy
Oily waste	Collecting point
Paint	Collecting point
Paintbrush cleaner	Collecting point
Paint thinner	Collecting point
Pesticide	Collecting point
Pipe cleaner	Do not use
Toilet blocks	Do not use
Varnish	Collecting point



5.2 General recommendations

Economical cleaning agent dosages

An increasing number of “strong cleaning agents” are available on the market, which contain substances that feed on the oxygen necessary for the decomposition process and compromise the decomposing bacteria.

The use of washing and cleaning solutions should be kept to a basic minimum in order to achieve optimal decomposition.



Note:

Reduce the amount of solution until you are no longer completely happy with the cleaning result, then gradually increase the amount you use.

This is especially important in households that use drinking water very sparingly and heavily reduce consumption (to less than 80 l per inhabitant). As a result, the incoming wastewater may enter the plant twice as concentrated as normal domestic wastewater and the outflow concentrations may exceed the limit values stipulated by the authorities even if the plant is in perfect technical and biological working order.

Running-in phase and purification efficiency

The full biological purification efficiency (= COD decomposition > 85%) takes several months to develop and is only achieved if:

- There are no structural defects (e.g. heavy underloading or overloading, extraneous water inflow, faulty aeration and deaeration, installation faults)
- It is certain that the domestic wastewater contains no forbidden substances (poisonous or damaging substances: see the next page) and that it is characteristic domestic wastewater (COD < 1000 mg/l; pH value = approx. 6.5 to 8.0)
- The proper function of the aggregates is assured through regular maintenance; see chapter “6. Monthly in-house inspection and half-yearly maintenance”.



Note:

Supervision of the running-in phase by qualified personnel is advisable. In the running-in phase, SBR plants should be supervised and, where possible, configured by a specialist company.

Building a stable biological function is a prerequisite for ensuring fault-free plant functionality.



5.3 Daily function check

Check that the wastewater treatment plant is running fault-free on a daily basis.



Caution:

Report any operating failure that occurs (for example, an error message from the control unit) to the maintenance service immediately.

5.4 Monthly in-house inspection (as per German law)

The operator must have the inspection and maintenance work performed by a qualified expert if he or she does not have the necessary expertise.



Note:

In Germany, a certificate of qualification is available from DWA e.V., the German association for water, wastewater and waste (www.dwa.de).
“Qualified experts” are those persons engaged by the operator or contracted third parties who are considered to have the training, knowledge and practical experience qualifying them to carry out the inspection of small wastewater treatment plants.

Follow the instructions in chapter “6.2 Monthly in-house inspection”.

5.5 Half-yearly maintenance (as per German law)

In accordance with the legal water usage permit, the operator must take out a maintenance contract with a specialist company (qualified expert) that covers a fixed scope of work. Maintenance is generally performed twice a year, in six month intervals.

5.6 Other maintenance recommendations

A small wastewater treatment plant is a stationary electrical system. Like all electrical systems of this type, its safety should be tested every second year by an electrical technician according to VDE 0701 and VDE 0702. Recommended checks are: the measurement of the insulating resistance, protective earth conductor resistance and the replacement leakage current.

5.7 Important documents for operation and maintenance

You must maintain an operations logbook for your small wastewater treatment plant. A template for an operations logbook can be found on the last page of this document. Failures, maintenance work, sludge removal, maintenance reports and other incidents should be recorded in the operations logbook. The operations logbook is to be handed over to the responsible authorities upon request.



6. Inspection, maintenance and desludging



As the operator of a small wastewater treatment plant, you are obligated to:

- Have a monthly in-house inspection performed or to perform it yourself if you have an appropriate certificate of competence
- Have half-yearly maintenance performed by an authorised specialist company

6.1 Opening and closing the TopCover



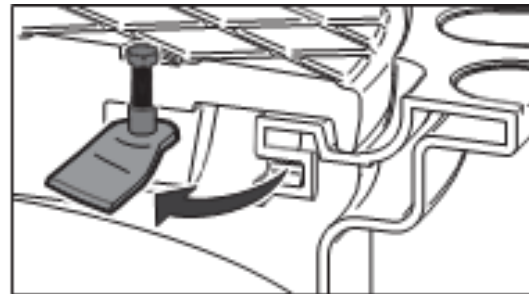
Tool: Size 13 key.



Secure open treatment tanks from falling. Always close the treatment tank securely after completing the work on the wastewater treatment plant by turning the locking latch on the TopCover to the **locked** position, for example, as a child safety feature.

Opening the cover:

- Turn both of the nuts that are visible on the cover by 90° in a clockwise direction to unlock the cover.
- Lift off the cover to perform visual inspections or other service work.



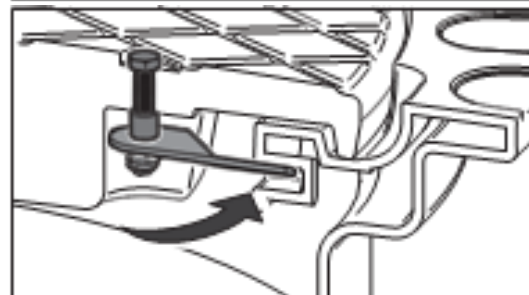
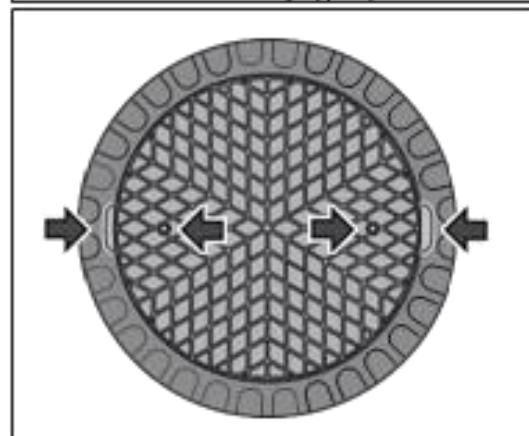
Closing the cover:

- Position the cover so that the retaining pin on the lower side of the cover can be inserted into the relevant shaft hole.



The visible locking latch nuts should be across from the shaft grip recesses.

- Turn the two nuts by 90° in a clockwise direction until they stop in order to seal the cover tight.
- Test whether the small wastewater treatment plant is tightly sealed.





6.2 Monthly in-house inspection



As a **qualified operator**, you must perform the following work on a monthly basis or have it performed by a company commissioned by you:

- Perform a visual inspection of the outflow (and in the inspection chamber if necessary) to check for sludge output.



Note:

Sludge output endangers the ability of any downstream filtration plants to operate.

- Check the inflow and discharge for blockages (visual inspection).
- Check the plant for any floating sludge.
- Enter the operating hours of the aggregates into the **operations logbook** (also see chapter “5.7 Important documents for operation and maintenance”).

The manufacturer also recommends

- Perform a check for the formation of bubbles and of the lifter pump function.



Note:

The consistent formation of bubbles and unrestricted lifter pump operation are extremely important for the treatment procedure. Contact the maintenance service if there is a reduction in performance due to reduced compressed air performance (a measurement of the tube diffuser counter pressure is required, contact Premier Tech if required).



6.3 Half-yearly maintenance



General maintenance (legally required)

Have maintenance performed on the wastewater treatment plant **by a specialist company on a half-yearly basis**. The following work is to be performed and recorded in the **operations logbook**:

- Inspection of the **operations logbook** and determination of regular operation (target/actual comparison).
- Function check of the important plant components (mechanical, electrical-technical, other), checking in particular for the formation of bubbles and the pumping function of the air lifters
- Function check of the control unit and the alarm function
- Maintenance of the compressor
- Optimisation of the operation parameters on the basis of inspection results from the SBR and outflow, if necessary in consultation with Premier Tech.



Warning:

Disconnect the wastewater treatment plant from the power supply before you continue with the measures described below.

- Check whether the functions of the calmed inlet, aeration devices, and clearwater lifter are impacted by damaging substances. Substances that are damaging to functions should be removed each time that maintenance is performed.
- Check the volume of sludge and have the sludge removed by the operator if necessary.



Information about measuring sludge volume and desludging see next chapter!

- General cleaning maintenance, e.g. removal of sediment deposits
- Inspection of the structural condition of the plant
- Checking that aeration and deaeration is sufficient
- Checking the concentration of oxygen in the SBR basin (SBR reactor)
- Entering the maintenance results in the **operations logbook**



Sampling and its verification according to the legal water usage permit

In addition, sampling is to be performed and the following values are to be verified (the legal water usage permit is authoritative here):

- Temperature
- pH value
- Solids that sediment
- COD
- NH4-N (if required)
- Ninorg (if required)
- BOD5 (if required)



Caution:

In SBR plants, outflow samples can be taken at any time from the sampling container, which is installed in the discharge of the SBR chamber.

Performance

- Use a thin sampling dipper and take a representative clearwater sample of the last clear water drained from the integrated sampling container in the outflow immersion pipe.

The maintenance activities specified above are performed and the inspection results are recorded in a **maintenance report**.

This **maintenance report** is submitted to you as the operator of the wastewater treatment plant. **Include the maintenance report with the operations logbook** and submit it to the responsible water authorities upon request.

Checking the filter

The compressor filter must be inspected regularly during maintenance, and promptly replaced if necessary.



Note:

To check and, if necessary, replace the filter, the technology capsule must be opened. This must be done only by qualified personnel. In this case, you must ensure that the cover is well closed again (recommended: torque 25 Nm). We recommend resealing it and occasionally greasing the seal with Vaseline.

Tip: Use the “capsule key” to open the capsule



6.4 Take sample of activated sludge from reactor chamber

- measure **current water level** in reactor (HR)
- aerate reactor per manual mode for 2min
- evaluate mixing and size of bubbles
- take **250 ml sample of mixed activated sludge** and fill into 1000 ml cylinder
- fill up with **750 ml of clearwater** from sample pot (using the small sample taking device) to reach “1+3 dilution”
- allow **settlement for 30min**
- **multiply resulting sludge level by factor 4** to get **SSV30 in ml/l**
- take **picture** and save it as part of maintenance report



- Measure sludge volume in all chambers/tanks.
- Contrary to regular SBR-plants the Solido SMART system is working with comparatively high sludge volume values.

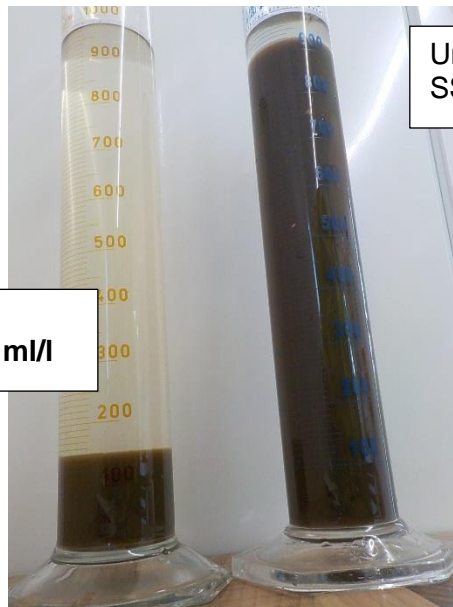


Why dilute 1+3?

Example after 30min sedimentation:

Dilution „1+3“:
 $SSV30 = 150\text{ml/l} \times 4 = 600\text{ ml/l}$

The result of **600ml/l** is much closer to the real conditions in the tank.



Undiluted
 $SSV30 = 930\text{ml/l}$




6.5 Evaluation of sludge level SSV90norm and recommendation for desludging

For proper evaluation of SSV90_{norm} sludge level calculate according to this formula:

$$\text{SSV90}_{\text{norm}} = 0,95 \times \text{SSV30} \times \text{HR} / \text{HRmax}$$

SSV90_{norm}	true sludge level in reactor after 90min of sedimentation normalized / standardized to HRmax
0,95	factor for conversion of SSV30 to SSV90 (30 resp.90 min sedimentation)
SSV30:	measurement of sludge level in reactor in 1+3 dilution after 30min sedimentation at current water level HR during service
HR:	current water level at service
HRmax:	max. reg. water level at full hydraulic load (see table below)

	Desludging is required when SSV90_{norm} = 700 ml/l
---	--

EXAMPLE

- Type: EM2-35
- HR at service: 1,16 m
- HRmax according to table: 1,28 m
- level in cylinder (30min): 130 ml (1+3)
(250ml sample+750ml clearwater)
- SSV30 = 520 ml/l (4x130)
- SSV90_{norm}
= 0,95 x 520 x (1,16 / 1,28) ml/l
= 448 ml/l

→ **SSV90_{norm} = 448 ml/l**

→ **around 2/3 of total sludge storage volume capacity is currently filled**

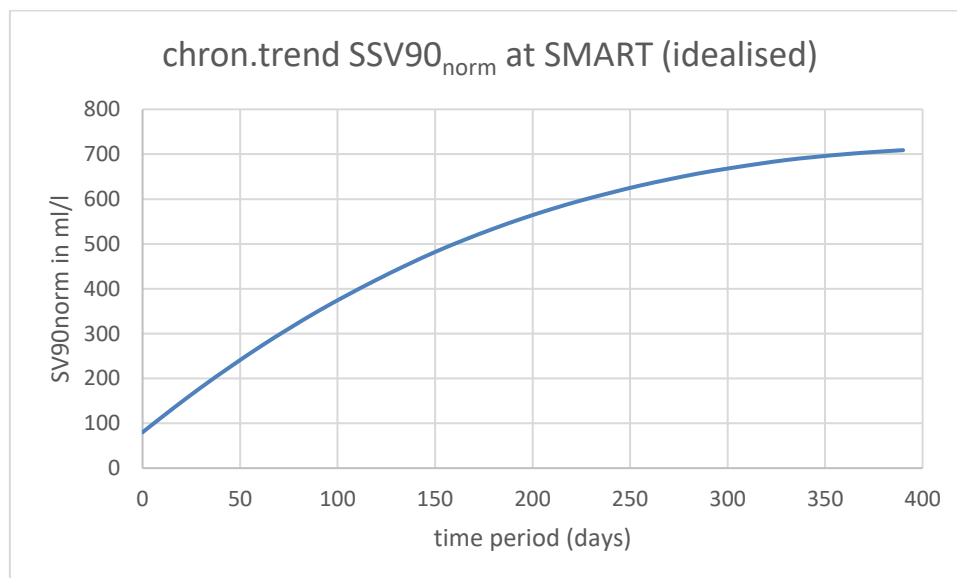


Table of max.regular water level at full hydraulic load HRmax:

Plant type	PE	HRmax	Height tank bottom to edge of manhole as refernce for on-site measurement [m]
EBL-26	5 PE	0,92 m	1,57
EBL-30	5 PE	1,12 m	1,96
EBL-45	8 PE	1,35 m	2,24
EBL-52	10 PE	1,54 m	2,21
EBL-76	15 PE	1,68 m	2,28
EBL-99	20 PE	1,81 m	2,28
EBL-76X2	30 PE	1,71 m	2,28
EBL-99X2	40 PE	1,81 m	2,28
EBL-99X3	50 PE	1,85 m	2,28
EM2-35	5 PE	1,28 m	1,65
EM2-45	8 PE	1,23 m	1,65
EM2-60	10 PE	1,46 m	1,92

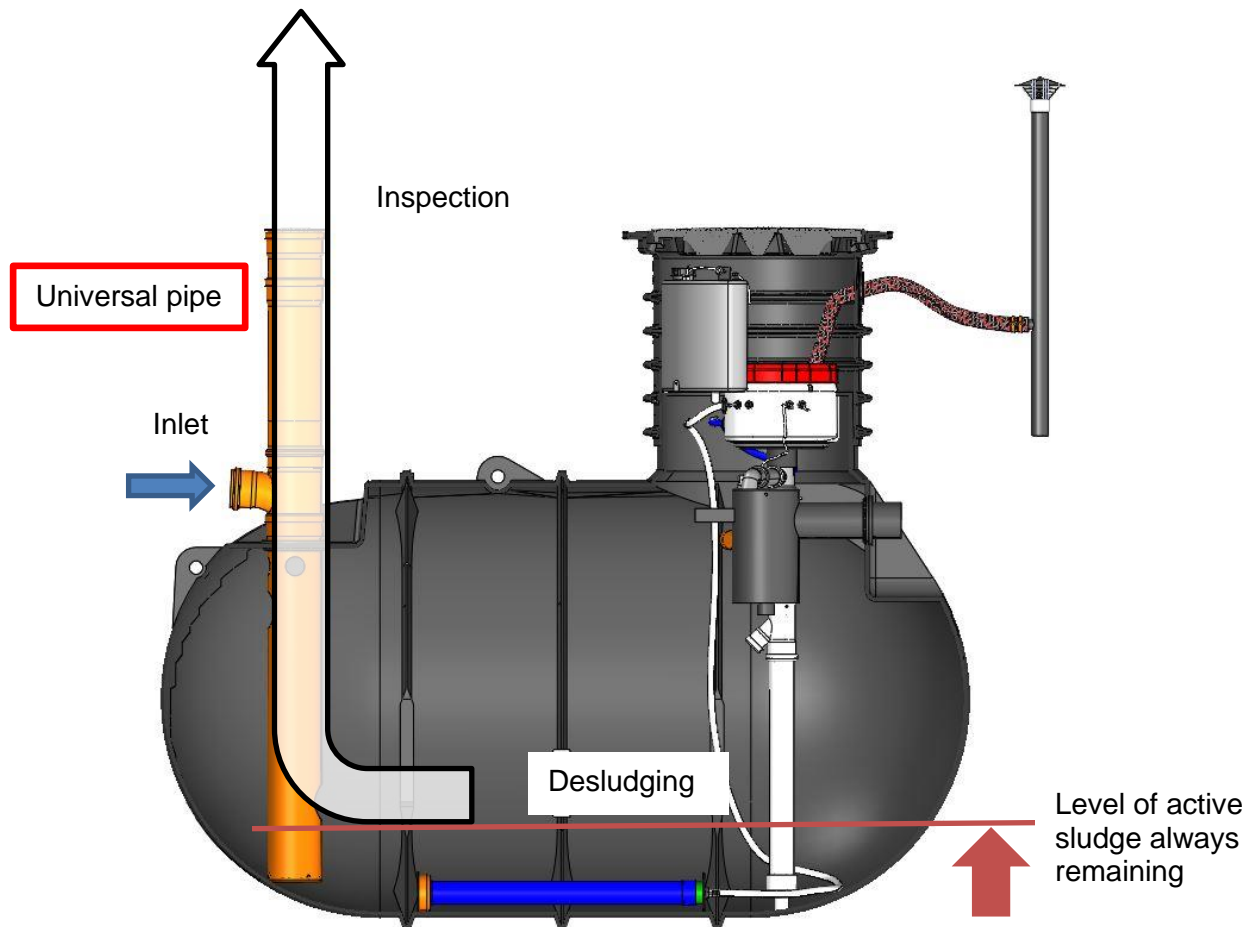


Usually the growth of SSV90 norm decreases slightly over time:





6.6 Desludging



- **Make sure of desludging (on demand) if $SSV90_{norm}$ -level (referred to HRmax) is reaching 700 ml/l** (measure with dilution 1+3 and multiply result by 4).
- For desludging make sure to use integrated desludging/inspection pipe (d=160mm) indicated by this pictogram only, in order to enable proper desludging and to prevent damage to components.
- Avoid desludging during sedimentation phase (around 12 to 2pm).
Recommended: between 2 and 3 pm, low water level after clearwater discharge.
- There is no need to open the lid of the system or take out the capsule for desludging.
- The design of the pipe will make sure that at least 10% of the volume will stay inside the tank. This is mandatory to keep up the performance of the plant right after desludging.
- It is recommended to fill up tank with water after desludging (around 1/3 of max. level)
- Make sure to document desludging in operations logbook



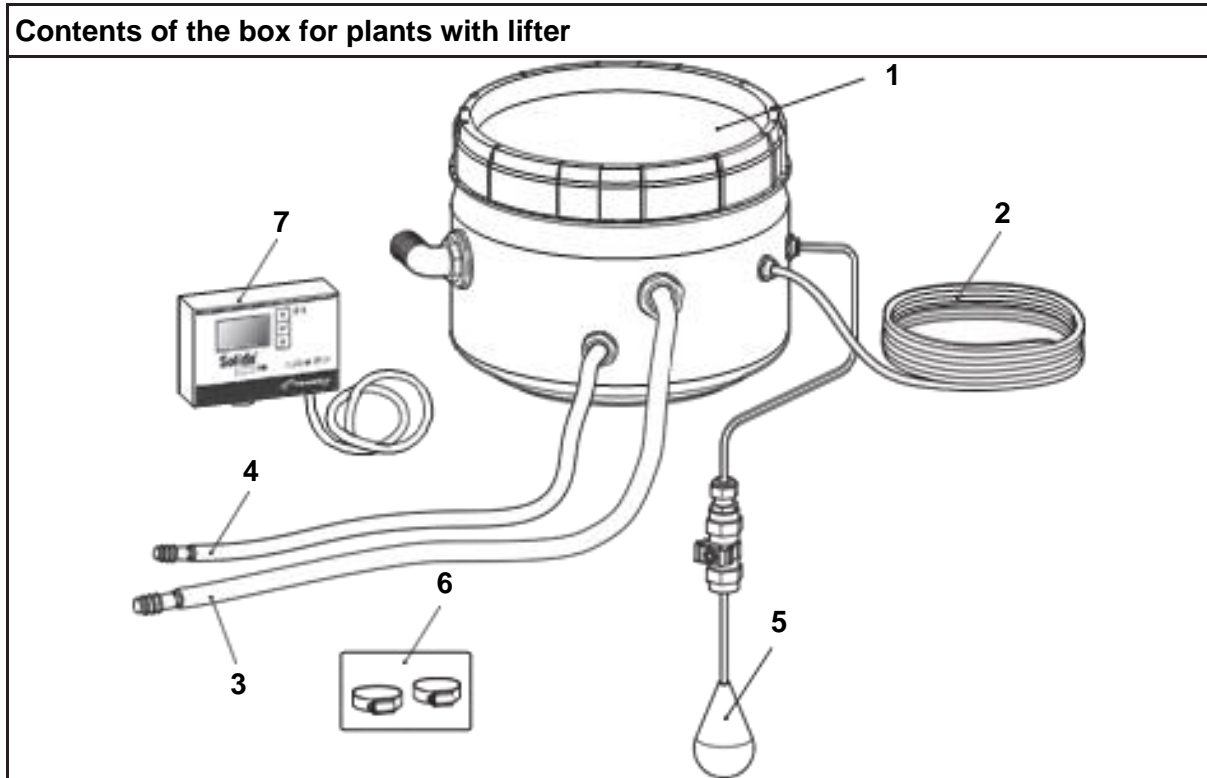
With **SMART+P EM2** (two chamber tank M2) the desludging is done in the same way. There is an opening in the baffle at a specific height, in order to desludge the first chamber almost completely and leaving a water level of about 25cm in the second chamber. Considering the whole volume there will remain enough sludge to continue the biological process.



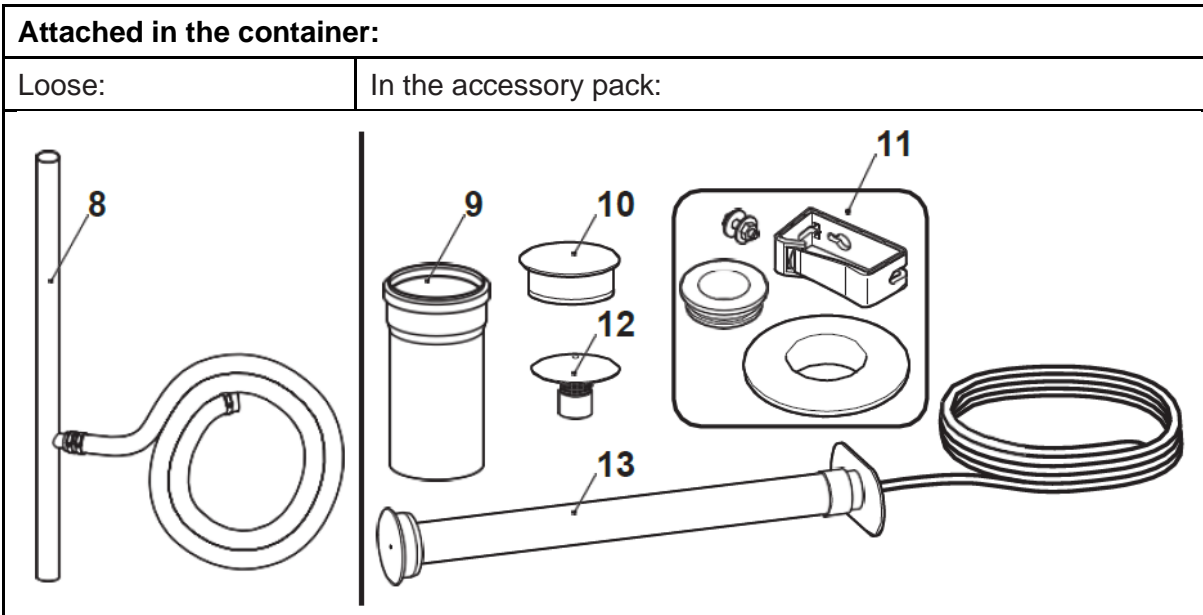
7. Installation and start-up

7.1 Checking the system components for completeness

Before the installation, check that the components are complete and in flawless condition:



Item	Quantity	Description
1	1 pc	Technology capsule
2	1 pc	Control cable, grey, with connection plug (15 m or 30 m); pre-assembled
3	1 pc	Compressed air outlet for tube diffuser (BEL), DN13 and/or DN16, white; pre-assembled
4	1 pc	Compressed air outlet for clearwater lifter (KWH), DN10, blue, pre-assembled
5	1 pc	Overfill Alarm (Float switch SWS); pre-assembled
6	2 pc	Hose clamps
7	1 pc	Control unit
	1 pc	Technical Documentation
	1 pc	Approval



Attached in the container:		
Loose:		
Item	Quantity	Description
8	1 pc	Air inlet support with 3 m hose, DN25
In the accessory pack:		
9	1 pc	Upper piece of the sludge removal pipe, DN160
10	1 pc	Cover for sludge removal pipe, DN160
11	1 pc	Shaft assembly set
12	1 pc	Air vent for air inlet support
13	1 pc	tube diffuser with hose, DN13 and/or DN16 (tank M2: additional tube diffuser, T-piece, stop cock)
	1 pc	Optional, without a figure: DN16 nozzle for tube diffuser (from compressor HP-120 onwards)



Important note:

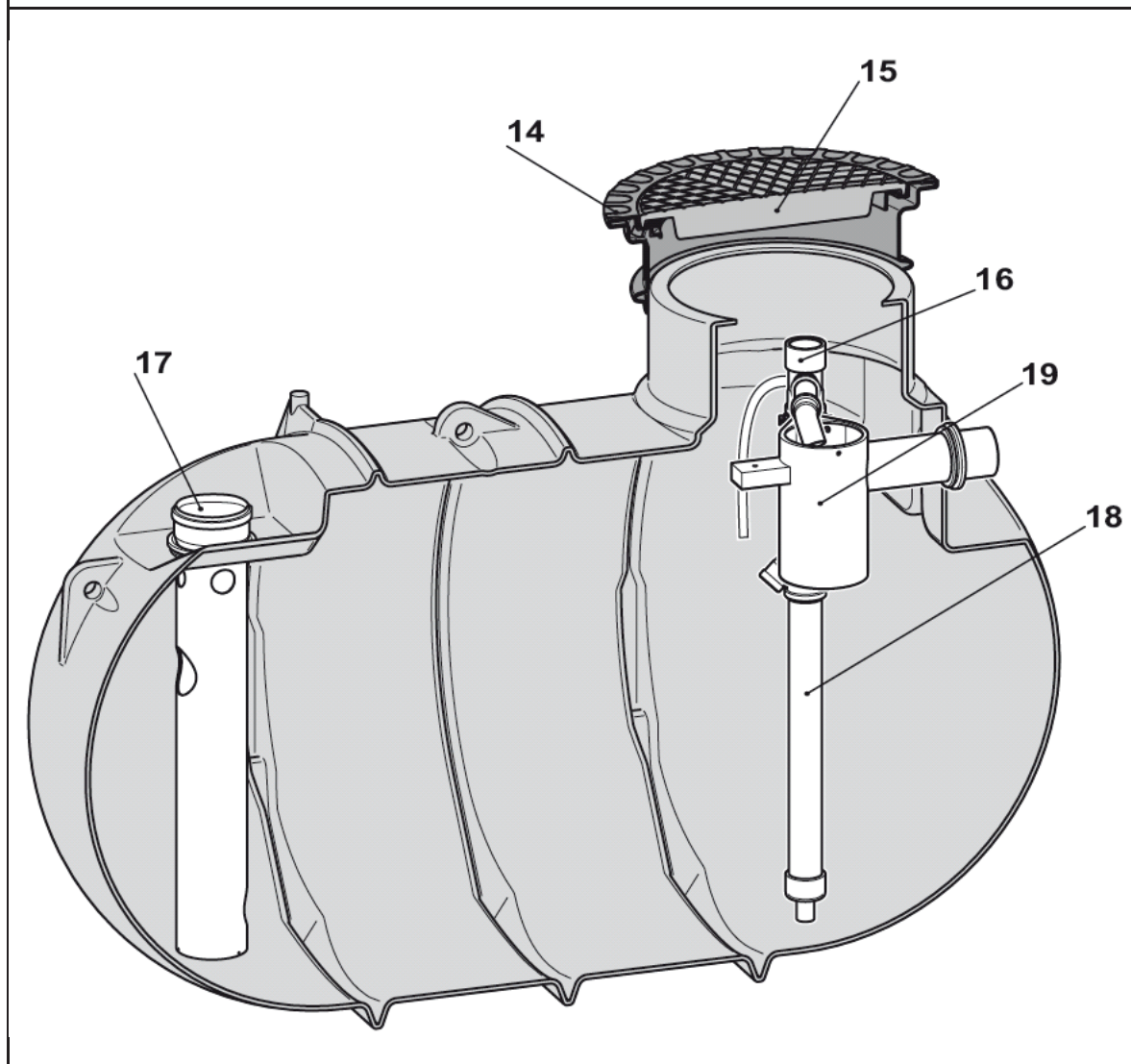
The diagram showing the scope of delivery and the following installation steps apply to the standard version single-container plant.

Please note information for plants with pumped outlet in separate manual DOKK7314E, which is included in the delivery and part of warranty conditions.



With the Solido SMART treatment tank from Premier Tech, the basic components of the Solido SMART SBR wastewater treatment system are already pre-installed (see figures):

Pre-installed components in the treatment tank BL



Item	Quantity	Description
14	1 pc	Shaft
15	1 pc	Cover
16	1 pc	Technology capsule holder
17	1 pc	Lower part of the inlet and sludge pipe
18	1 pc	Clearwater lifter (KWH) and compressed air hose (blue)
19	1 pc	Sampling pot with emergency overflow that is safe from floating material and clip for overfill alarm

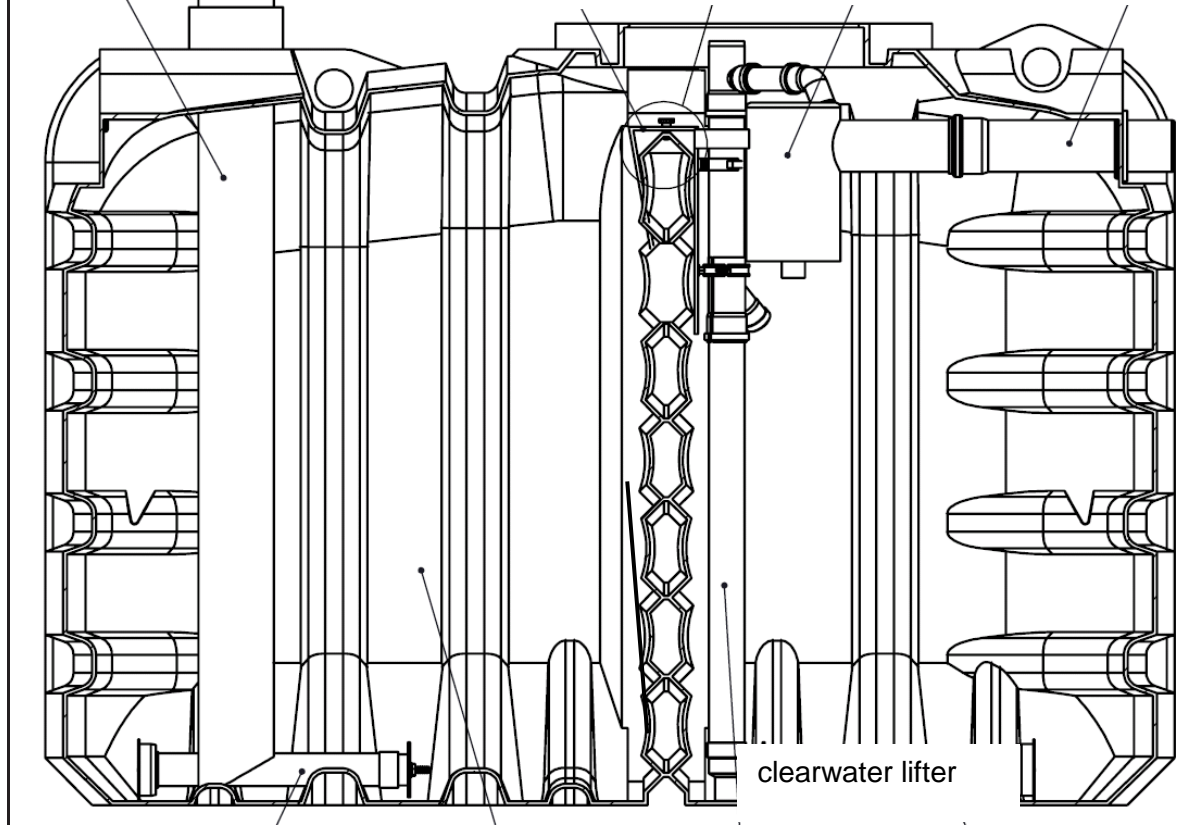


Pre-installed components in the treatment tank M2

Sludge removal
pipe DN160

Support for
clearwater lifter

Sampling pot with emergency
overflow



clearwater lifter



7.2 Checklist BEFORE assembling the Solido SMART treatment system

	Ok
1. Is the control unit located between 10 m and 25 m away from the treatment plant? Is the control unit protected from rain and sun? Is the Solido SMART cable long enough? (Alternatively: set up external control columns next to the plant)	<input type="checkbox"/>
2. Is a 230 V power supply plug with a 30 mA residual-current circuit breaker available? Is the protective earth conductor functioning?	<input type="checkbox"/>
3. Is the treatment tank installed according to the installation instructions (soil cover max. 120 cm above tank shoulder, the inflow and outflow correctly positioned)?	<input type="checkbox"/>
4. Is the DN160 shaft for removing sludge installed in accordance with the installation instructions?	<input type="checkbox"/>
5. Are the seals from the shaft assembly set (see chapter 7.3.1) for the supply air hose and cable conduit set in place? Is the cable holder installed?	<input type="checkbox"/>
6. Is the air inlet support set in place? Is the hose pulled into the shaft up to the red marking? (Standard hose length 3 m, extension up to 10 m possible, max. 30 cm deep into the ground, slope to inlet support = condensate trap!)	<input type="checkbox"/>
7. Is(are) the pipe ventilator(s) installed in the centre of and horizontally on the container floor?	<input type="checkbox"/>
8. Are the lifters filled with water to prevent them from being lifted?	<input type="checkbox"/>
9. Is sufficient space available in the shaft to receive the technology capsule?	<input type="checkbox"/>
10. Is the outlet pipe from the building connected to the inflow on the plant, and is the outflow of the wastewater treatment system connected to the receiving water or seepage system?	<input type="checkbox"/>
11. Is sufficient treatment tank aeration and deaeration provided? (Roof deaeration or separate aeration and deaeration is required)	<input type="checkbox"/>
12. Is a cable conduit (DN 50 with taut wire, on-site) installed for the Solido SMART cable between the treatment plant and the control unit location?	<input type="checkbox"/>
13. Is the chamber approximately half-filled with water?	<input type="checkbox"/>



7.3 Assembly steps for the Solido SMART treatment system

7.3.1 Installing the shaft assembly set

- Install the seals and the cable holder for the shaft assembly set as required.
- Perform the assembly for the BL containers in the shaped container dome shaft



Note:

To install the seals, you require a hole saw with diameter of $D = 60 \text{ mm}$

7.3.2 Filling up the lifter with water

- You must fill the lifter with water using a hose before you fill the container.

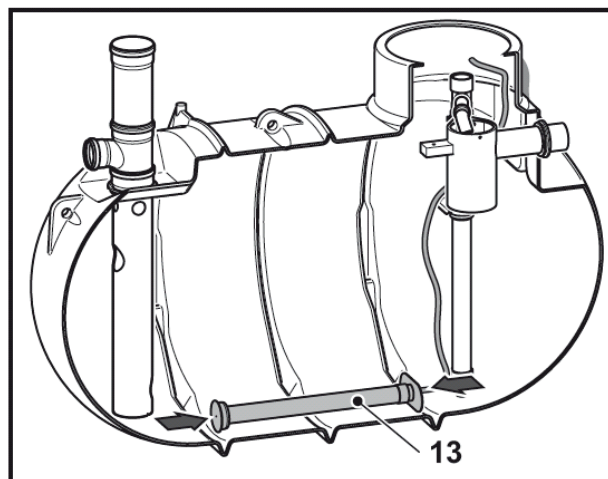


Note:

There is a risk of rapid uplift when the lifter is completely empty.

7.3.3 Assembling the tube diffuser

- Place the tube diffuser (13) on the white hose onto the container floor and position it in the centre of the container.



Notes:

For larger or two-chamber containers, two tube diffusers (incl. T-piece and two stop cocks) are supplied. To reach an equal distribution of the air on the two diffusers use the stop cocks.

On capsules with HP-120 compressors or larger, the white air hose is in DN16. The nozzle on the tube diffuser must be replaced (included in the scope of delivery).



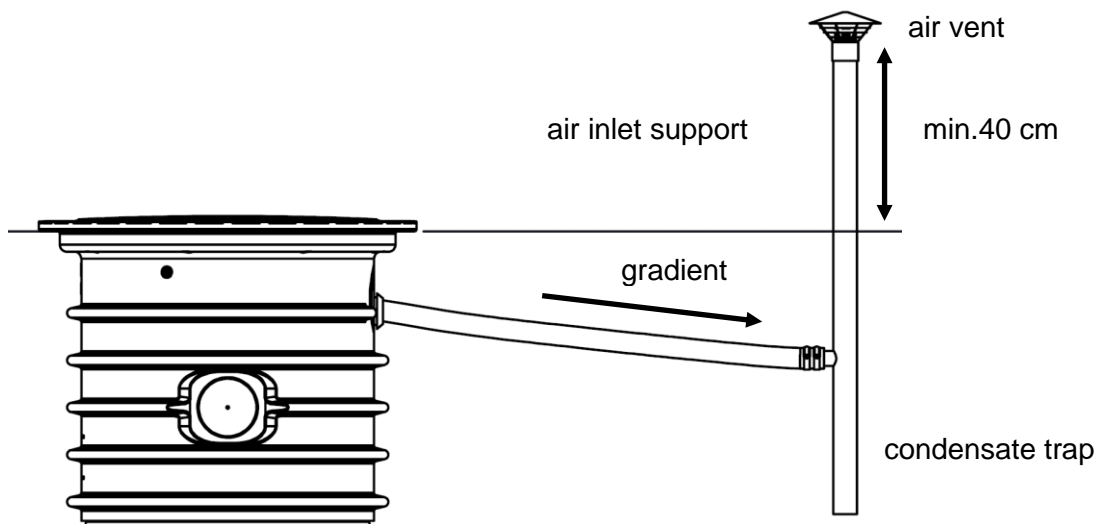
7.3.4 Connecting the air inlet supports

- Push the supply air hose (8) through the seal on the shaft.
- Set the air inlet support in a suitable position next to the treatment tank at a max. half of total length into the ground (at least 40 cm above ground; if necessary, the hose can be extended up to a total length of 10 m).



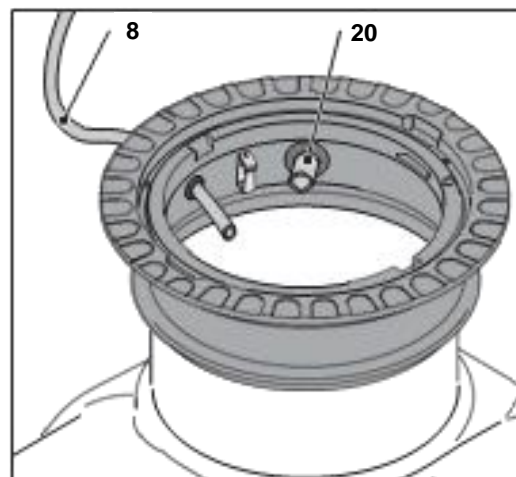
Note:

When laying the hose, ensure there is a gradient in the direction of the air inlet support (lower part of the air inlet support = condensate trap). When doing so, ensure that the hose is pushed into the shaft up to the red marking so that a sufficiently long hose piece that can comfortably be guided up to the top ground surface remains in the shaft. Set the aeration cap included in the scope of delivery onto the air inlet support.



7.3.5 Laying the control cable

- Place the technology capsule **next to** the ready and installed treatment tank with shaft, at the same level.
- Pull the control cable through the control cable (20) conduit connected to the seal on-site up to the control unit installation position. Whilst doing so, protect the plug from moist or dirt.
- Hang any excess cable either next to the control unit or in the cable holder in the shaft (removing the plug or shortening the cable voids your warranty claim).



- Seal the conduit so that no unpleasant smells can escape. Do not wall it in, etc., because the control cable may need to be pulled out in the case of damage.



7.3.6 Connecting the technology capsule

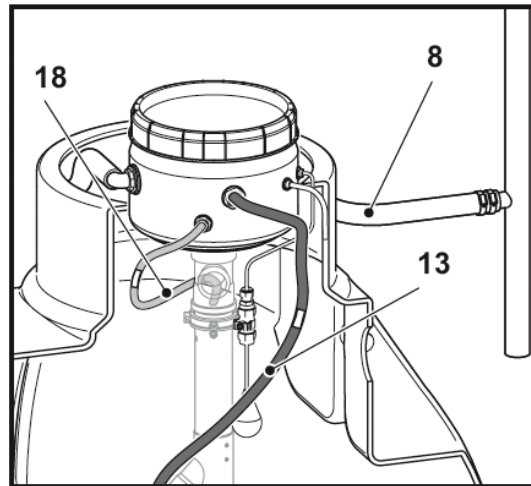
- Remove the supply air hose (8), the blue compressed air hose (18) that is pre-assembled in the container, and the white tube diffuser hose (13).
- If necessary, shorten the compressed air hoses to the required lengths.



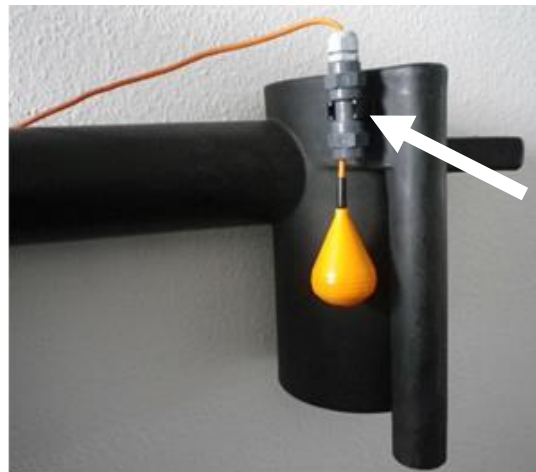
Note:

The length of the hoses is sufficient for installation with a shaft design of max. 1.20 m. With the standard version as per the scope of delivery, shortening the hoses by up to 60 cm is recommended).

- Connect the hoses according to the colour coding.
- Connect the supply air hose to the capsule outside the shaft.
- Loosely bundle the hoses using a cable tie, and place them around the capsule.
- Lock the SWS float switch in place on the pre-assembled retaining clip for the sampling bottle in the container.



- Fix overfill alarm (float switch SWS) to the pre-installed clip at the sample pot
- Please check that the clip clicks between the two sleeves (see white flash).



7.3.7 Inserting the technology capsule

- Slightly turn the capsule when lowering it onto the shaft, so that the hoses are placed around the capsule.
- Carefully place the technology capsule onto the holder on the top end of the clearwater lifter so that the capsule is positioned securely. For larger installation depths, the capsule can be positioned on an extension pipe (HT DN75, 1 m long, purchase order number KKZT0033) to improve accessibility.
- Make sure that all hoses are connected properly so that they lie next to the capsule in the shaft and ensure that it is possible to remove the capsule for maintenance purposes.

7.3.8 Notes for plants with pumped outlet KWP (option)

Please note information for plants with pumped outlet in separate manual DOKK7314E, which is included in the delivery and part of warranty conditions.



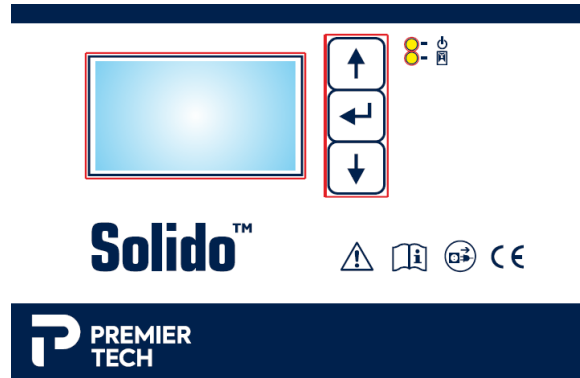
8. S40 control unit and available settings

8.1 About the S40 control unit

The S40 control unit has been developed for the Solido SMART small wastewater treatment plant from Premier Tech.

It includes:

- A graphical display
- Three operating buttons
- A seven-pin electrical socket for connecting the Solido SMART technology capsule (standard design)
- A mains cable for connecting to the mains supply
- A type plate (see details in chapter 10)



Symbols on the control unit:



Caution:

Electrical devices are installed; observe the safety instructions!



Caution/Note:

Read the technical documentation!



Caution/Note:

Do not dispose of obsolete devices as domestic waste; hand them into the specially designated collection points or return them postpaid to Premier Tech.



Caution/Note:

Disconnect the mains plug before you carry out repairs.



The following terms and abbreviations are used on the control unit user interface:

Aeration:	The aeration process that occurs during the cycle
Pause:	Break between the intermittent aeration intervals
DENI phase:	Break between the intermittent aeration intervals
Sedimentation phase:	90-minute sedimentation phase at the end of a cycle
clearwater discharge:	Clearwater discharge, either continuous (cont., default value) or intermittent (see chapter 8.6.3)
Compressor:	The compressor in the capsule as a unit
BEL:	Aeration resp. tube diffuser
KWH:	Clearwater lifter
KWP:	Clearwater pump (optional instead of the clearwater lifter)
DOP:	Dosing pump (optional)
SSP:	Sludge pump (optional)
Start125%:	The aeration time is increased to 125% of the set value. The duration of the start-up phase can be set. The start-up phase can be activated optionally.

8.2 Navigation in the control menu

You can use the three arrow buttons on the control unit to navigate as follows in the control menu:



Navigate up or down in the menu list to activate a menu item (an active menu item is highlighted in black)



Press a menu item to go to a lower menu level or to start entering or changing a setting.



When you reach the last item in a list, pressing the down button again returns you to the higher menu level.

8.3 Installation

The housing is mounted to the wall using two screws and the two fastening brackets included in the scope of delivery. The corresponding spacers can be glued to the rear side of the housing in the lower section.



Note:

When installed outdoors, the unit should not be positioned in direct sunlight or where it will receive direct rainfall. However, installation in a covered outdoor area (e.g. under a carport) is permitted.



8.4 Settings during start-up

If the S40 control unit is being connected to the Solido SMART plant and mains supply, the start-up routine is called automatically. Important plant parameters are defined, in which the following logic applies in the three-line “pop-up” menus:



General

In the example (figure)

- Line 1:** Header - which parameter is defined
- Line 2:** Current setting
- Line 3:** New setting to be selected if required (can be changed using arrow buttons)



Possible result after the change:
Selection of “Language English”

The following parameters are requested in the following order, using a comparable logic:

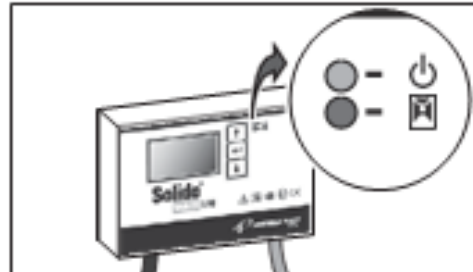
- **Language**
- **Set time**
- **Password:** 7682, fixed (only valid for start-up), or service password based on the “established” pattern
- **Solido SMART:** YES
- **Cycles per day:** 2 (standard)
- **Cont.CW discharge:** YES (standard, with infiltration/seepage system: NO, see chapter 8.6.3)
- **Compressor selection:** 60, 80, 120, 150, or 200 l/min
- **Select aeration level:** medium or high
- **Select number of PE:** Select between 2 to 26 PTs (for 8 PTs or more, the selection is made in two steps)
- **KWP instead of KWH:** NO (setting “YES” after installation of a clearwater pump instead of lifter = pumped outlet)
- **DOP** NO
- **SSP** NO
- **Test mode starting:** All consumers are activated once, test mode is finished by pressing the button
- **Inputs okay:** YES/NO (when you enter NO, start-up begins again)



Once start-up is complete, the control unit starts with a clearwater discharge process. The basic screen then appears and the control unit returns to the current cycle after a short synchronisation pause:



The **green, upper LED** on the control unit illuminates, showing that it is ready for operation.
The **red, lower LED** on the control unit flashes when there are alarm messages.



8.5 Power failure recognition

The control unit has a power failure recognition function. If the power supply is interrupted, a recurring audible alarm is emitted. "Network not available" is displayed on the screen. Switch off the alarm completely by pressing and holding the middle button for longer than six seconds.



Note:

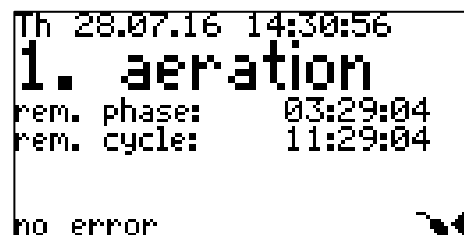
- After a network interruption of more than 45 min, the controller restarts with a clearwater discharge process.
- After a network interruption of less than 45 min, the controller restarts at the relevant point in the cycle.

8.6 Menu structure

8.6.1 Basic screen

The following information is displayed on the basic screen:

- Weekday - date - time
- **Current cycle activity**
- Remaining time - phase
- Remaining time - cycle
- Error - float switch symbol





8.6.2 Other main menu levels

Press the arrow buttons to navigate from the basic screen through the main menu levels

```

Th 28.07.16 14:30:56
1. aeration
rem. phase: 03:29:04
rem. cycle: 11:29:04

no error
  
```

Display the **operating hours** for individual consumers and for the plant as a whole. Press the confirmation button to switch to a weekly display.

```

operat. hours
compressor: 00000h07min
KWH: 00000h01min

total: 00000h09min

e=weeks
  
```

Changes can be made to the **system settings**, for example, changes to the "alarm pause" (time interval in which no audible alarm is emitted)

```

system
set time
LCD-contrast: 32
alarm pause: 20h-08h
display errors
Language English
e=enter menu #048
  
```

Settings and a test mode that must be made and performed only by service technicians are provided in the **Service** menu.

```

service
test mode
manual mode
clear counter
select type of plant
medium 4PE 80
e=enter menu #064
  
```

DENI:
30 min pre-selected, also in filtration level C

```

settings
BEL /20min 07.2min
Sedimentation 090min
DENI 030min
KWH / cycle 16.5min
e=enter menu #080
  
```

12 hour cycle -> two start times,
24 hour cycle -> one start time,
set to low-inflow times

```

start time
1. start time: 02:00
2. start time: 14:00
start125% 000 d
↑↓ #100
  
```

Start125%: Start-up phase, aeration time at 125% of the set value (max.18 min), Can be de/activated, duration in days, configurable



8. S40 control unit and available settings

The **Holiday** setting can be activated or deactivated and set to max. 120 days; in this time, the aeration time is reduced to 50% of the set value

You can ignore lines 5 and 6.

```

holiday
remaining: 000d 00h
activate holiday mode
stop holiday mode
AUS BEL KWH KWP UU DOP
Rel 1 2 0 0 0
#=#enter menu #112

```

```

current monitor
compressor off
#=#enter menu #128

```

BEL and/or KWH/d: planned running times per day -> to check the effect of the changed settings

```

information
compressor: off
valve KWH: off
BEL / d: 13:06:52
KWH / d: 00:34:12
current: 0.0A

```

If you use a clearwater **pump** (KWP, option) instead of a clearwater **lifter** (KWH), the menus and displays are adjusted accordingly:

For example, in the display for the **operating hours**



```

operat. hours
compressor: 00006h36min
KWP: 00001h03min

total: 00028h45min
#=#weeks

```

or in the display **Current monitor**



```

current monitor
compressor off
KWP: 2.3A max.
#=#enter menu #128

```

The clearwater pump can be manually switched to manual mode.



8.6.3 Application example in the password-protected

Select type of plant area:

A Solido SMART plant is set to filtration level C with 4 PT and a 80 l/min compressor and is to be changed to filtration level N/D with 4 PT and a 60 l/min compressor:

Choose **Service** in the main menu. Press the middle button and use the arrow button to scroll to **Select type of plant**.

```

service
test mode
manual mode
clear counter
select type of plant
medium 4PE 80
↑↓ #069
  
```

Press the middle button again and then enter the **service password**.

```

service
t
password
*****
SELECT TYPE OF PLANT
medium 4PE 80
↑↓ #069
  
```

Choose **Select type of plant** again and press the middle button to confirm.

```

service
test mode
manual mode
clear counter
select type of plant
medium 4PE 80
↑↓ #069
  
```

Use the middle button to confirm
Solido SMART Yes

```

SERVICE
Solido SMART
Yes
Yes
SELECT TYPE OF PLANT
medium 4PE 80
↑↓ #069
  
```

Use the middle button to confirm
Cycles per day -2-

```

SERVICE
cycles per day
-2-
-2-
SELECT TYPE OF PLANT
medium 4PE 80
↑↓ #069
  
```

Note:

Only set 1 cycle per day (24 hour cycle) when there is low hydraulic utilisation!

Use the middle button to confirm
Cont. CW discharge YES

```

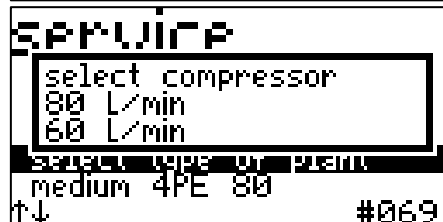
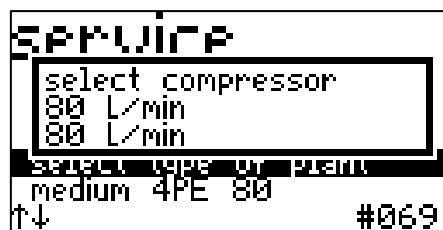
SERVICE
cont CW discharge
Yes
Yes
SELECT TYPE OF PLANT
medium 4PE 80
↑↓ #069
  
```

Note:

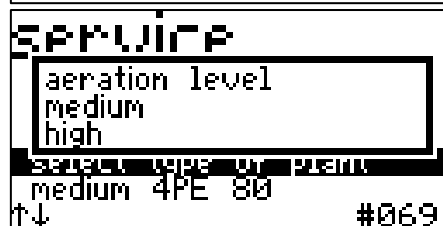
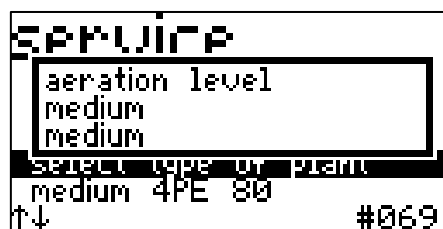
We recommend NO, when there are downstream filtration units, this means: intermittent CW discharge (10 doses of different duration, every 10min, total duration discharge: 100min)



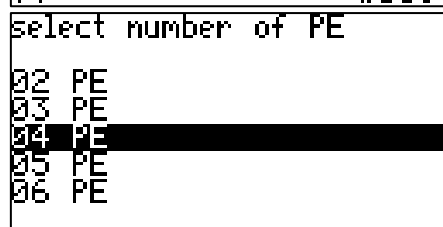
Use the arrow buttons to select the **compressor type** of **80 l/min** to **60 l/min** and choose the middle button to confirm



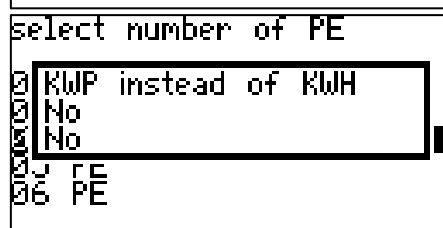
Use the arrow buttons to change the **aeration level** from **medium** to **high** and choose the middle button to confirm



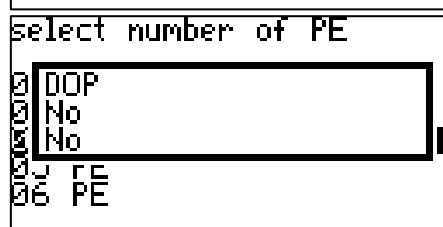
Press middle button again, then select the number of persons PE



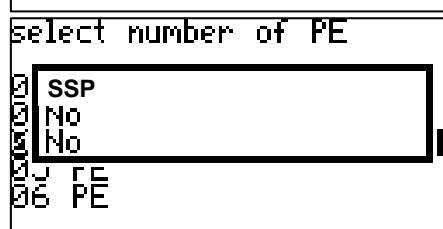
Press the middle button to confirm **KWP** instead of **KWH** NO



Press the middle button to confirm **DOP** NO



Press the middle button to confirm **SSP** NO





Press the middle button again to close the **Select type of plant** menu item.

The plant type that is now selected is a Solido SMART, aeration level high, 4 PT and a 60 l/min compressor.

```

service
test mode
manual mode
clear counter
select type of plant
high 4PE 60
↑↓ #069
  
```

**Note:**

After changing the plant type, the “Start125%” start-up phase is **always activated automatically**, to deactivate it, see chapter ‘8.6.4 “Start125%” start-up phase’.

8.6.4 “Start125%” Start-up phase

If the start-up phase is activated, the aeration time is automatically increased to 125% of the set value, but at max. 18.0 min. The duration can be set.

From software version V1.08 on, the default value is 0 days (not activated). In former versions the default value was 240d.

Press the middle button again and then enter the **service password**.

```

start time
1. start time: 02:00
2. start time: 14:00
Start125% 000 d
↑↓ #100
  
```

```

start time
1. start time: 02:00
2. start time: 14:00
password
*****
↑↓ #100
  
```

```

start time
Start125% 0:00
000 (old) 1:00
000 (new) 00 d
↑↓ #100
  
```

Enter the desired duration in number of days and confirm with the middle button.

```

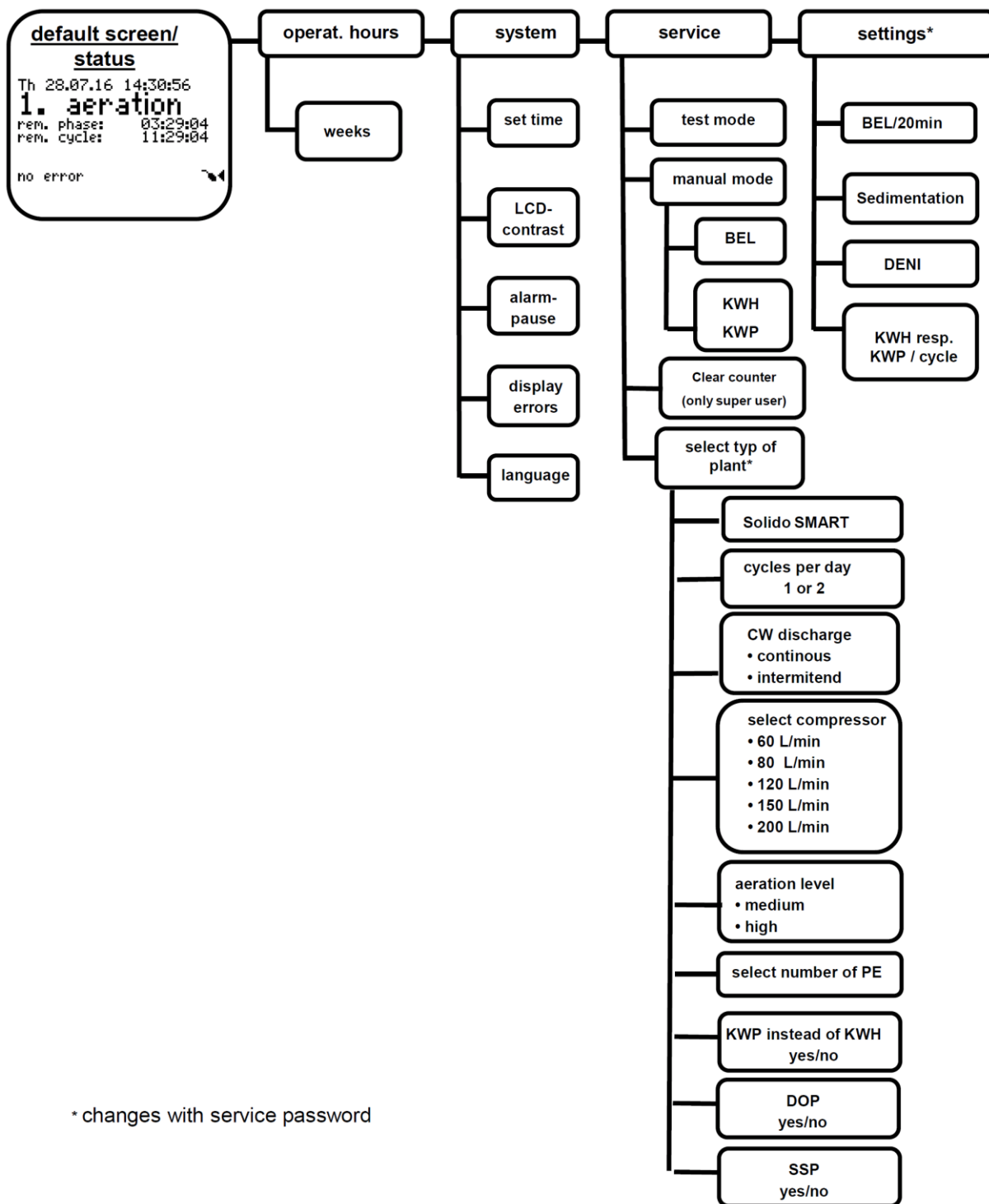
start time
Start125% 2:00
000 (old) 1:00
120 (new) 00 d
↑↓ #100
  
```

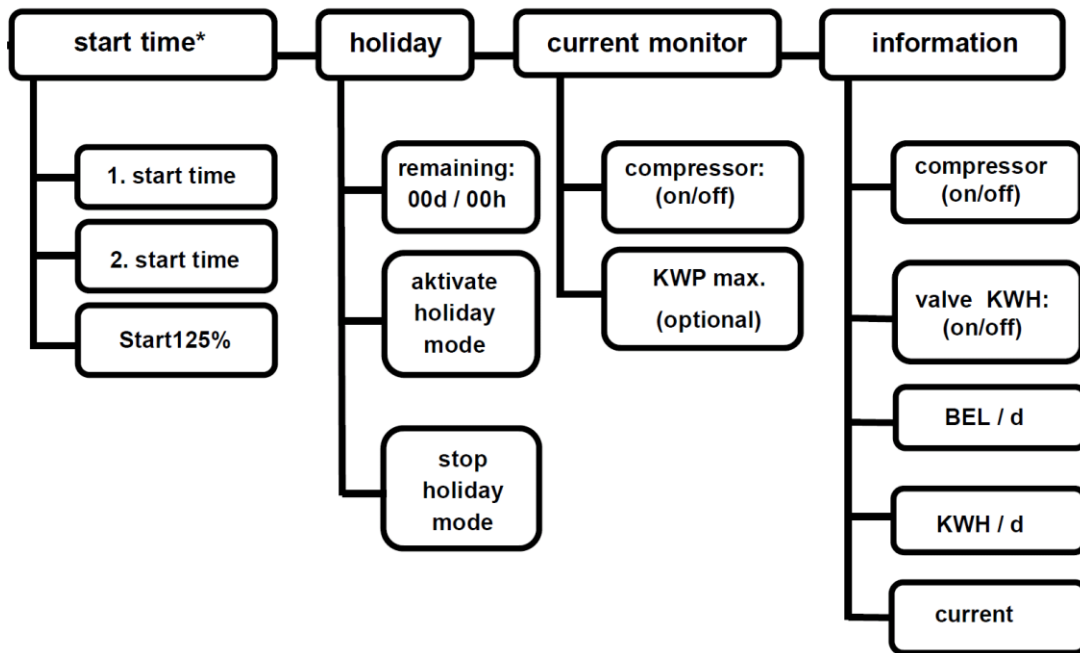
```

start time
1. start time: 02:00
2. start time: 14:00
Start125% 120 d
↑↓ #100
  
```



8.7 Solido SMART S40 menu overview







8.8 Alarm relay (for an external signaller)

The control unit has an alarm relay, whereby contacts 11 and 12 of the relay can be connected to an external signalling device (e.g. warning light). Ensure that the external device has a separate power supply so that a power failure in the control unit can also be signalled. When an alarm sounds or there is a power failure, contacts 11 and 12 are connected to one another. Finally (to be performed by a qualified electrician only), the pre-punched opening on the housing is opened and the cable is expertly led through with a PG gland.

8.9 Service and maintenance (specialist companies only)

Replacing the fuse:

If the **control fuse is released**, it should only be replaced by a **microfuse of the following type: T 4.0 A, 250 V, H** (time-delay glass tube microfuse 4.0 A; 5 x 20 mm with a high breaking capacity (opaque) according to EN 60127-2/III).

Changing the battery: Battery maintenance is not required; however, if the alarm duration begins to decrease or the alarm **Accu**, we recommend replacing the accumulators with new ones (type NiMH AA, capacity 1800 to 2100 mAh).

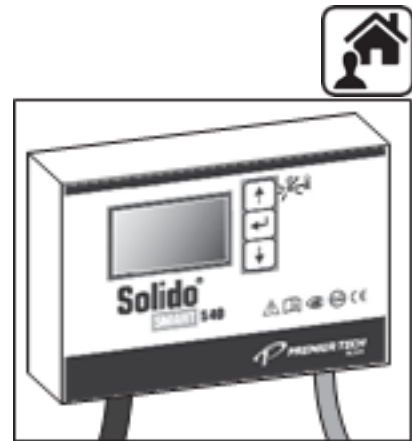
Only rechargeable accumulators are permitted; never use normal batteries.



9. Operational failures and resolving them

9.1 S40 control alarm messages

In the event of an alarm, an acoustic signal sounds and the red LED starts to flash. The standard version of the Solido SMART plants (basic controller version) can display the following alarm messages in the bottom line on the basic screen:



Network not available

► The plant power supply is interrupted.



Note:

- Check the power supply in your house (fuse, general power outage) and inform the relevant maintenance service if necessary.

Breakdown compressor

► The minimum power requirement for the compressor has not been met.



Note:

Power consumption setpoints	XP-60	0.3 A	HP-150	0.9 A
	XP-80	0.4 A	HP-200	1.3 A
	HP-120	0.8 A		

Overfill Alarm

► The floating switch in the SBR is triggered and indicates a plant overflow.



Note:

Check the plant for an overflow immediately. If the cause of the overflow cannot be corrected immediately, remove the mains plug and operate the plant in emergency overflow mode. Otherwise, there is a risk of a massive sludge output. Please inform your maintenance company immediately.

Accu

► The accumulator batteries have to be changed. See chapter 8.9.



Plants with KWP instead KWH (optional):



Blockage KWP

► The maximum power requirement of the clearwater pump (KWP) has been met.



Measures to be taken when an alarm occurs

Recommendations for the operator: • Press the middle button once 	
▶ The warning signal is <u>permanently</u> stopped	
▶ The red LED light continues to flash	
▶ Error message remains in the bottom line of the basic screen	
▶ Alarm is <u>not</u> triggered again	

Only for specialist companies: • Press the middle button again 	
▶ Alarm is deactivated (until it is entered in the fault memory)	
▶ Red LED stops flashing	
▶ Error message at the bottom of the basic screen	
▶ The plant is now “re-armed”. An alarm is issued again at the next available opportunity if the cause of the error has not been eliminated	

An interruption in the power supply will also deactivate an alarm.

The S40 control unit has a ring memory for 40 error and event messages (e.g. also NETWORK ON/OFF). You will find it in the menu “system”: **display errors**

A short interruption of power supply (<1 min) will be registered as **mains break**.
An interruption >1 min will be registered as **mains OFF** and **mains ON** (with time and date).

Exception: **Overflow alarm** cannot be deactivated.
The alarm stops once the sensor moves down again.



Note:

For more information, see chapter 8 “S40 control unit and available settings”



9.2 Other failures

In addition to the monitoring function performed by the control unit (see chapter 9.1 “S40 control alarm messages”), the basic plant functions must be checked with visual inspections.

It is important to be able to recognise unusual water levels.

Plant fault	Probable cause	Repair
<p>The plant is too full overall; the water level is so high that the wastewater is flowing out of the emergency overflow.</p>	<p>The clearwater cannot be transported out of the plant because the receiving water or seepage system will not absorb it.</p> <p>The plant is hydraulically overloaded.</p> <p>The clearwater discharge is not functioning, because:</p> <ol style="list-style-type: none"> a. The hose is connected incorrectly b. The air lifter is not receiving enough compressed air 	<ul style="list-style-type: none"> ▶ Switch on the clearwater lifter and observe whether the wastewater is carried away or whether it flows back into the plant. ▶ Ask the operator if an unusual amount of wastewater or external water has entered the plant. ▶ Check the function by activating the clearwater lifter in manual mode. ▶ Check that the blue hose is connected correctly. <p>Check:</p> <ul style="list-style-type: none"> ▶ Whether the compressor is performing optimally during aeration (check filters if necessary). ▶ Whether the blue hose is damaged or bent. ▶ Whether hose connections/nozzles are damaged, including in the capsule. ▶ Whether the air lifter is blocked. ▶ The valve is either defective or not activated correctly by the controller.



Plant fault	Probable cause	Repair
<p>Not enough oxygen (O₂) in the SBR reactor, possibly followed by odour build-up/ poor purification efficiency, etc.</p>	<p>The aeration is not working or is insufficient because the tube diffuser is installed incorrectly</p> <p>a. The tube diffuser is not receiving enough compressed air</p> <p>b. Tube diffuser pressure loss is too high (calcification, silting, etc.)</p> <p>c. The aeration/ deaeration for the overall plant is not functioning correctly</p>	<p>The function of the tube diffuser can be checked by switching it on in manual mode.</p> <ul style="list-style-type: none"> ▶ Check the position of the tube diffuser (horizontal, approximately in the centre of the container floor?). <p>Check:</p> <ul style="list-style-type: none"> ▶ Whether the compressor is performing optimally during other functions such as feeding (check filters if necessary). ▶ Whether the white hose is damaged or bent. ▶ Whether hose connections/nozzles are damaged, including in the capsule. ▶ The valve is either defective or not activated correctly by the controller. ▶ Increase the aeration period on the control unit ▶ Measure the tube diffuser counter-pressure using the pressure gauge, record the water level, replace the tube diffuser if necessary (contact Premier Tech) ▶ Ensure there is sufficient aeration/deaeration (unhindered circulation)



Plant fault	Probable cause	Repair
<p>The purification efficiency of the plant is unsatisfactory</p> <p>NOTE: The plant achieves full purification efficiency after a start-up period, which, when heavily underloaded or at low temperatures < 12°C, may even last for several months. If necessary, SBR plants can be injected with suitable activated Sludge from a different fully biological small wastewater treatment plant to shorten the start-up time</p>	<p>Most of the faults mentioned above lead to reduced purification efficiency</p> <p>The following causes also lead to insufficient outflow values:</p> <ul style="list-style-type: none">a. Introduction of cleaning agents or disinfectants or other prohibited substancesb. Insufficient air intake and/or treatment tank aeration and deaerationc. Assembly errord. Container not sealede. Inflow of external water (e.g. rain water)f. Sludge not removedg. Incorrect setting for inhabitant valuesh. Plant disconnected from the mains supply for a long time	<p>In the interest of the environment, you should contact your service company immediately to ensure the proper operation of the plant</p>



9. Operational failures and resolving them

NOTES:

10. Appendix

10.1 Technical data and environmental conditions for the control unit

Technical Data

Housing material:	Polycarbonate for wall mounting
Dimensions:	200 x 120 x 60 mm
Type of protection:	IP54
Supply voltage:	230 V AC, 50 Hz
Control:	Time-controlled using real time clock
Inputs:	1 float switch input
Outputs:	4 relay outputs
Alarm output:	1 alarm relay
Interface:	Internal RS232 interface
Current measurement:	Available Power failure monitoring
Connection technology:	1 x 7-pin flange socket (binder)
Mains voltage via shock-proof plug:	3 x 1.0 mm ² , 1.5 m long
Microfuses:	2x T 4.0 A, 250 V, H (time-delay glass tube microfuse) 4.0 A; 5 x 20 mm with a high breaking capacity, opaque, as a joint fuse for all outputs (L/N)
Sound level:	Max. 57 dB(A) when the acoustic alarm is sounding at a distance of 1 m

Environmental conditions for control unit

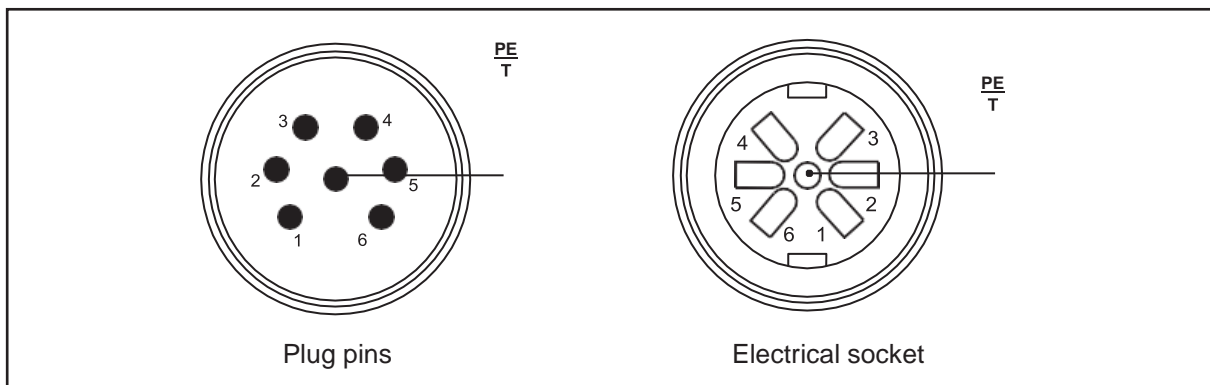
Permitted ambient temperatures:

Operating temperature:	Unit function: -20°C to +55°C -25°C to +60°C
Storage temperature:	
Air pressure:	During operation and during storage, 80 kPa to 106 kPa
Relative humidity:	max. 95% rH (condensing) permitted
Ice formation:	Not permitted

Type plate control unit



10.2 Wire configuration/terminal scheme for Solido SMART with S40 control



Basic S40 version

Aggregate	Function	Plug pin no.
All	PE	PE
All	N	1
Compressor	L	2
KWH valve (or KWP)	L	3
Free	L	4
Free	L	5
SWS	SWS ON	6

L: phase (german: Leiter)

10.3 Technical data for Solido SMART technology capsule

Outer dimensions of technology capsule:	D = 340 mm, H = 252 mm (High capsule: H = 352 mm)
Material:	HD-PE
Approval:	UN / 1H2 / X 38 / S
Protection class:	IPX6
Relative humidity:	max. 95% rH (condensing) permitted
Sound level:	max. 36 dB(A) at a height of 1.50 m directly above the cover of a small wastewater treatment plant installed in the ground (with XP-60)
Solenoid valves:	1 x 3/2-way solenoid valves, DN 13, 1/2" female thread, IP65

Installed compressor:

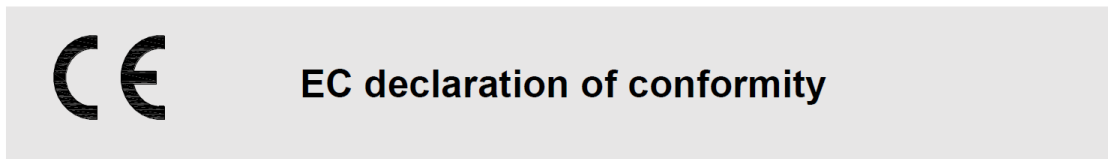
HIBLOW membrane compressor models	XP-80
Operating pressure (mbar)	147
Applicable pressure range (mbar)	60-270
Air feed rate at operating pressure (l/min)	80
Max. apparent output of technology capsule (S) (VA)	205
Weight (kg)	4.3
Dimensions (mm x mm x mm)	208 x 132 x 186
Protection class	IP45

In the higher capsule:

HIBLOW membrane compressor models	HP-120	HP-200
Operating pressure (mbar)	177	200
Applicable pressure range (mbar)	30 to 300	30 to 300
Air feed rate at operating pressure (l/min)	120	200
Max. apparent output of technology capsule (S) (VA)	285	510
Weight (kg)	8.5	9.0
Dimensions (mm x mm x mm)	256 x 200 x 222	256 x 200 x 222
Protection class	IP45	IP45

For any other information, please see the relevant supplied documents: HIBLOW Instruction Manual (DOKK5107 070313 TD HIBLOW HP compressor)

10.4 EC declaration of conformity



No. DOKK5453E 050320

Premier Tech Water and Environment GmbH (authorised distributor)
Am Gammgraben 2
19258 Boizenburg

confirm hereby that the packaged domestic wastewater treatment plants for up to 50 PT in plastic container

Typ Solido SMART comply with these EC-directives:

2006/42/EG	Machinery Directive*
2004/108/EG	Electromagnetic compatibility
2006/95/EG	Low voltage equipment
305/2011/EU	Construction products

*In the context of an evaluation process it was proved, that all relevant aspects regarding safety and health of Appendix I, Machinery Directive are met.

It was proved, that the following harmonised European standards are met:

EN ISO 12100-1-2:2003/A1:2009	Safety of machinery: Basic concepts, technical principles
EN ISO 13849-1-2:2008-09	Safety of machinery: Safety-related parts of control systems
EN ISO 14121-1:2007	Safety of machinery: Principles for risk assessment
EN 61010-1:2002-08	Safety requirements for electrical equipment for control systems
EN 61000-3-2:2006+A1:2009+A2:2009	Electromagnetic compatibility: Limits for harmonic currents
EN 61000-3-3:2008	Electromagnetic compatibility: Limits for voltage variation
EN 61000-6-1:2007	Electromagnetic compatibility: Interference immunity
EN 61000-6-3:2007	Electromagnetic compatibility: Emitted interference
EN 61326-1:2006-10	Electromagnetic compatibility requirements
EN 12566-3:2005+A1:2009+A2:2013	Small wastewater treatment plants for up to 50 PT

This declaration confirms compliance with the named directives and standards.

It does not guarantee for any properties of the product. All provided safety advices, technical documentation and guides for mounting, installation, commissioning, operation and maintenance must be regarded.

Boizenburg, March 05, 2020

Date of first marking: February 15, 2016

Marco Rumberg, managing director Premier Tech Water and Environment GmbH and Documentation Agent



10.5 Declaration of performance according to the Construction Products Regulation



Declaration of Performance (according to Construction Product Regulation CPR No. 305/2011)

No.DOKK5452E 050320

- 1 Name of product **Solido SMART EBL-xx / EM2-xx: Packaged domestic SBR-wastewater treatment plants made of PE rotomoulding**
- 2 Product Identification **EBL-26 / -30 / -45 / -52 / -76 / -99: one-tank plants BL-type
EBL-76X2 / -99X2 / -99X3: multiple-tank plants BL-type
EM2-35 / -45 / -60: one-tank plants M2-type**
- 3 Intended use Underground treatment (no vehicle load, outside of buildings) of faecal water and organic effluent for up to 50 PE
- 4 Manufacturer **Premier Tech Water and Environment GmbH
Am Gammgraben 2, D-19258 Boizenburg, Germany**
- 5 Authorized person Marco Rumberg (managing director), rumm@premiertech.com
- 6 System of assessment 3
- 7 Harmonized standard EN 12566-3:2005+A1:2009+A2:2013 first year of CE-declaration: 2016
- 8 Notified body PIA GmbH (NB 1739) performed the initial inspection in the system of assessment 3 and created several test report, e.g. No PIA2015-239B22.e

9	treatment efficiency		effluent	influent	EBL-26 was tested at 0.30 kg BOD ₅ /d and 0.90 m ³ /d NOTE: treatment efficiency in the field depends on quality and flow pattern of raw wastewater			
	%							
	COD	95,1%	39 mg/l	796 mg/l				
	BOD ₅	98,5%	5 mg/l	333 mg/l				
	suspended solids	97,1%	13 mg/l	448 mg/l				
	NH ₄ -N	98,0%	0,7 mg/l	35 mg/l				
	N _{tot}	83,1%	10 mg/l	59 mg/l				
	P _{tot}	68,5%	2,3 mg/l	7 mg/l				
model Solido SMART		Treatment capacity	daily load* (kg BOD ₅ /d):	daily flow* (m ³ /d)	peak flow (m ³ /12h)	Power consumption* (kWh/d)	max. H water table from base of plant (m)	max. H backfill (m)
	EBL-26	5 PE	0,30	0,75	0,80	0,68	WET 0,70m	1,00 m
	EBL-30	6 PE	0,36	0,90	0,80	0,80	WET 0,70m	1,00 m
	EBL-45	8 PE	0,48	1,20	1,10	1,04	WET 0,85m	1,00 m
	EBL-52	12 PE	0,72	1,80	1,60	1,76	WET 1,00m	1,00 m
	EBL-76	18 PE	1,08	2,70	2,10	2,60	WET 1,00m	1,00 m
	EBL-99	25 PE	1,50	3,75	2,70	3,58	WET 1,00m	1,00 m
	EBL-76X2	40 PE	2,40	6,00	4,10	5,68	WET 1,00m	1,00 m
	EBL-99X2	50 PE	3,00	7,50	5,30	7,08	WET 1,00m	1,00 m
	EBL-99X3	50 PE	3,00	7,50	8,00	7,08	WET 1,00m	1,00 m
	EM2-35	8 PE	0,48	1,20	0,90	1,04	WET 1,40m	1,00 m
	EM2-45	10 PE	0,60	1,50	1,10	1,28	WET 1,40m	1,00 m
	EM2-60	12 PE	0,72	1,80	1,50	1,76	WET 1,65m	1,00 m
11	Water tightness (test with water)	pass						
12	Structural behaviour (pit-test)	pass (WET conditions)						
13	Durability	pass						
14	Reaction to fire	E						
15	Release of hazardous materials	pass						

The manufacturer according to nr. 4 is solely responsible for this declaration.

* at full PE load every day, all year around

This declaration confirms compliance with the named regulations, directives and standards. It does not guarantee for product properties.

All provided safety advices and technical documentations for installation, commissioning, operation and maintenance must be regarded.

Signed for and on behalf of the manufacturer by:

Boizenburg, March 2020





11. Solido SMART operations logbook

Date	Operating hours (monthly check)			Comments/specific incidents In/outlets okay? Sludge removal? Maintenance, power failure, errors, sludge removal etc.
	Total running time [h:min]	Compressor [h:min]	Clearwater lifter KWH [h:min]	



11. Solido SMART operations logbook

Date	Operating hours (monthly check)			Comments/specific incidents In/outlets okay? Sludge removal? Maintenance, power failure, errors, sludge removal etc.
	Total running time [h:min]	Compressor [h:min]	Clearwater lifter KWH [h:min]	

Master data sheet for your Solido small wastewater treatment plant

You can use this sheet to keep a record of important technical details about your small wastewater treatment plant. With these details, your maintenance service company or the Premier Tech service team can provide quick assistance at any time. Please note that these details are required if you wish to make a warranty claim.

Plant type: _____

Premier Tech

Order or
delivery note number: _____

Date Start-Up _____

Or:
Delivery date + dealer: _____

Solido SMART series no. (see
bottom of technology capsule or
sticker) _____


Maintenance performed by: _____

Maintenance frequency: _____

Controller series no.: _____

Software version Control: _____

Tip: Attach the supplied label here. (sample label)

PTA		Qualitätskontrolle
S076740		Bauteil: 1/1
KSTK060S		Datum: 19.04.2016
		Bearbeiter: QS
		Signatur: _____

EXAMPLE

Included, you will find a label sticker that lists the important information regarding the Solido SMART technology capsule (item and serial number).

Store this label in a safe place or place it here. Thank you!

Premier Tech Water and Environment GmbH April 2020
Premier Tech reserves the right to make technical changes to this documentation. All rights reserved.
Premier Tech is not liable for printing errors.

The contents of the technical documentation are part of the warranty conditions.
All applicable standards and other guidelines, as well as accident prevention regulations,
must be observed during planning and installation of the product.