



Single-Chamber Biological Nutrient Removal Wastewater Treatment Plant

2021



Owner's Manual & Installation Guide

Rewatec™ Solido SMART

Single-Chamber Biological Nutrient Removal Wastewater
Treatment Plant

Manual Version

OM0012 Solido SMART OM Rev 13 136262

Created On: 03 June 2021



**Installers: To Safeguard Warranty Please
Ensure You Are Using The Latest
Installation Manual**

Customer Checklist

Complete Installation Record



Page 4

Read Important Customer Information



Page 5

Register Your Warranty



Page 6

See Maintenance Schedule



Page 7–8

Familiarise Yourself With This Manual



Page 9>

Installation Record

Please record details of your Solido SMART tank installation here and keep this document in a safe place.

Serial Number:

Commissioning
Date:

Commissioning Company

Name: -----

Address: -----

Contact: -----

Service Company

Name: -----

—

Address: -----

Contact: -----

—

If you require assistance finding a service company, please contact Premier Tech. Your warranty is invalidated if you do not keep to a regular servicing schedule.

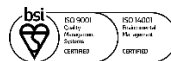


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Important Operator Information

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 Solido SMART 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 PTAU. Any access to the system when required to do so is permitted only if the power has been switched off and the applicable accident prevention regulations are observed (oxygen deficiency).

For Reliable Operation

The purification efficiency of the Solido SMART is based on micro-organism activity. It is a living system.

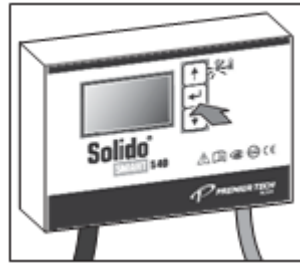
Therefore, observe the following:

- Do not discharge any harmful or damaging substances (sanitary products, chemical or oily wipes, food leftovers, oils and grease, chemical cleaners, hair, heavy disinfectants) into the plant.
- Check the control unit display daily.
- Ensure maintenance is performed on your system annually or half-yearly intervals (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
- Immediately inform your service provider.



Legal grounds

You require a legal water usage permit to operate a small wastewater treatment plant if you discharge more than 2m³ of wastewater per day. 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 tank shell is subject to a factory warranty of 10 years.

The Solido SMART technology is subject to a factory warranty of 3 years (see below).



Note:

Any unauthorised interference with the Solido SMART (for example, changes to the airlift, 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 WATER & ENVIRONMENT (see the relevant section in the chapter “Installation instructions”) are prohibited and will void any warranty claims.



Installation & Assembly Information

Installing the tank/vessel



Caution:

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

On-site conditions

The subsurface must be sufficiently stable and water permeable.

In particular, observe the below:

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

Filling material

The filling material around the tank must be compactable, permeable, and free of sharp objects. Excavated soil, clay or “filler sand” often do not meet these criteria (installation in concrete to be considered).

The thickness of the backfill material should be at least of 250 mm.



Note:

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

Work procedure

Please refer to the Installation Guidance notes.

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 sunlight. It should be located between 10m and max. 30m from the tank (standard cable length: 15m).

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 (Gravity version only), pre-fitted hose on the diffuser and the supply air hose to the Solido SMART capsule connections. For pumped version, connect outlet hose to pump and outlet.

4. Install the Solido SMART capsule

Set the Solido SMART capsule on the lifter in the container or for the pumped version set the Solido SMART capsule on the shelf placed within access turret.

5. Fix the cable in place

Place the control cable into the cable bundle holder.

6. Pumped Version

Suspend the pump on the hooks attached to the turret.

7. Check the complete installation

Check the plant for pipeline gradients, aeration and de-aeration, and accessibility.

8. Perform start-up

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

Thank you for purchasing a Premier Tech product.

10 Year Shell Warranty

3 Year Solido SMART Technology Warranty

- The Blower supplied with your Treatment Plant contains serviceable parts; these MUST be replaced, by a suitably qualified person, in line with the manufacturers operation and maintenance guide supplied.
- Proof of correct installation and plant maintenance (servicing) including purchase of serviceable parts MUST be retained, as these will be required in the event of any warranty claim.

Failure to comply with the above Terms and Conditions will invalidate the warranty.

Premier Tech Water & Environment Ltd accepts no liability for any damage or loss, including consequential loss, caused by the failure of any equipment supplied.

Warranty & Servicing Requirements

- The tank should be installed and commissioned correctly and ideally by any of our authorised installers (documentation may be requested)
- Clear photographic evidence if installed by any other party is expected (showing the backfill under the tank, side backfill, pump installation, view of the capsule, high level alarm position)
- Sludge volume to be recorded on a 6-month basis; the tank is expected to be emptied (desludged) on an annual basis (max).
- Inspection the diaphragm blower on a 6-month basis
- Inspection of the diffuser (including pressure gauge trial) on a 6-month basis
- Cleansing of the diffuser membrane on a 6-month basis (or when the pressure gauge indicates >1.5x of the nominal pressure in the air line (after the blower), use water and soap.
- Inspection (disconnect from the capsule) and emptying of the air supply vent from the condensed water (if any)
- Trial the control panel (test mode to identify issues)

Additional documents

Please retain all important documents if you wish to submit a warranty claim.

- Start-up log
- Operations logbook
- Maintenance log

Solido SMART Maintenance Schedule

Details of servicing & maintenance requirements are located within this manual. Please use this page to record your tanks services and maintenance.

Your warranty is invalidated if you do not keep to a regular servicing schedule.

6 Month Check

Date:

Servicing Company:

Notes:

1st Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

2nd Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

3rd Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

4th Annual Service

Date:

Servicing Company:

Notes:

Solido SMART Maintenance Schedule

6 Month Check

Date:

Servicing Company:

Notes:

5th Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

6th Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

7th Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

8th Annual Service

Date:

Servicing Company:

Notes:

6 Month Check

Date:

Servicing Company:

Notes:

9th Annual Service

Date:

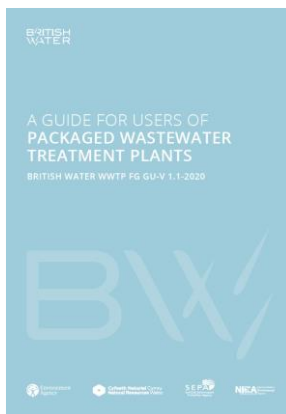
Servicing Company:

Notes:

Additional Resources

British Water's A Guide For Users Of Packaged Wastewater Treatment Plants can be found on the British Water website.

<https://www.britishwater.co.uk>



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1. About this document

1.1 Scope

The “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 SMART 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 SMART small wastewater treatment plants and their options:

List of applicable documents:

- Installation and assembly instructions for Solido SMART ML3/4 tank.
- Short description of the Solido SMART complete system
- Installation instructions for outer column

The Solido SMART technology uses the ML3/4 shell. Its function and technical configuration are dependent on the type.

Approvals

The Solido SMART wastewater treatment system has the option to operate as part of the following process types:

Product	Carbon Treatment	Nitrification	Denitrification
Solido SMART	C	N	D

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 optimum operation.

This document contains both instructions for the operator of the Solido SMART small wastewater treatment plants and as well as instructions for installation and maintenance personnel. The chapters that the operator must read and instructions 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 in 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.

**Caution/Note:**

Disconnect the mains plug before you carry out repairs.

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:

Abbreviation	Meaning
WWTP (or KKA)	Wastewater treatment plant
SBR	Sequencing batch reactor
BEL	Tube for the diffuser
KWH	Clearwater lifter
KWP	Clearwater pump
SWS	Float Switch

2. Intended use

Thank you for choosing a Solido SMART 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/commercial 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 check-up”).

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 tank 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 (for example: is the protective earth conductor intact?)

Operation

**Caution:**

Never disconnect the mains plug during regular plant operation.

The bacteria in the Solido SMART 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:

Always comply with the relevant accident prevention regulations. There should always be two people present when a WWTP is inspected. Never enter after a person has fallen unconscious; call for help instead.



Caution:

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



Caution:

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



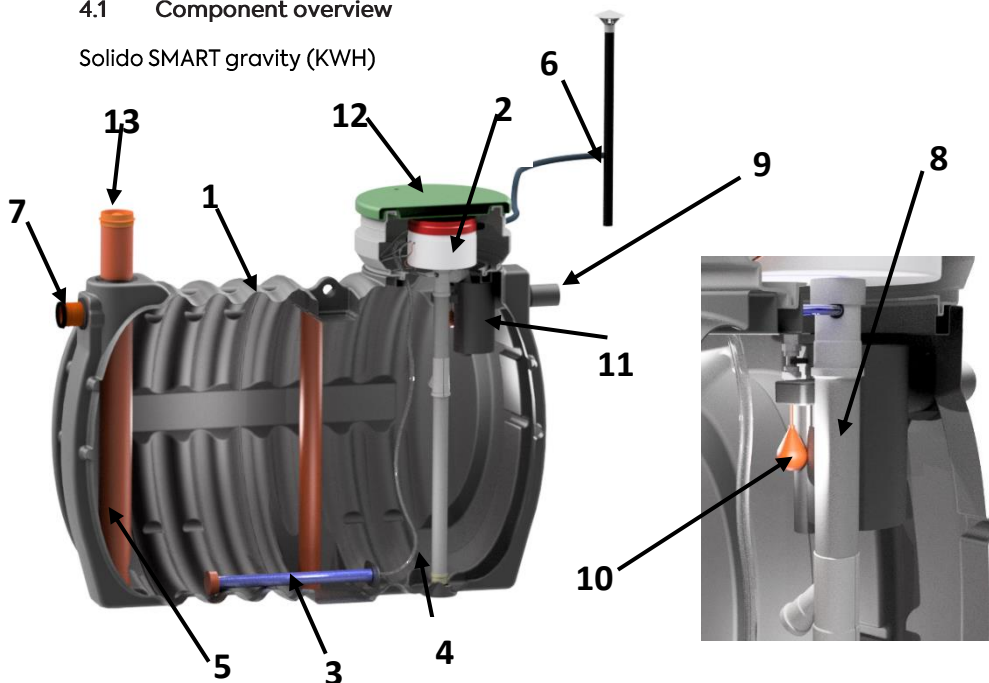
Note:

A small wastewater treatment plant is a stationary electrical system. Like all electrical systems of this type, its safety should be tested annually by an electrical technician as per BS EN 61557 or BS 7919:2000. Recommended checks are: the measurement of the insulating resistance, protective earth conductor resistance & the replacement leakage current.

4. Description of functions

4.1 Component overview

Solido SMART gravity (KWH)



1 – ML3 tank (example)

2 – Solido SMART technology capsule with compressor and solenoid valves

3 – Tube diffuser (BEL)

4 – Air hose

5 – Lower part of the inlet and sludge pipe

6 – Supply air hose and support

7 – Calmed inlet DN110

8 – Clearwater lifter (KWH)

9 – Outlet (100mm)

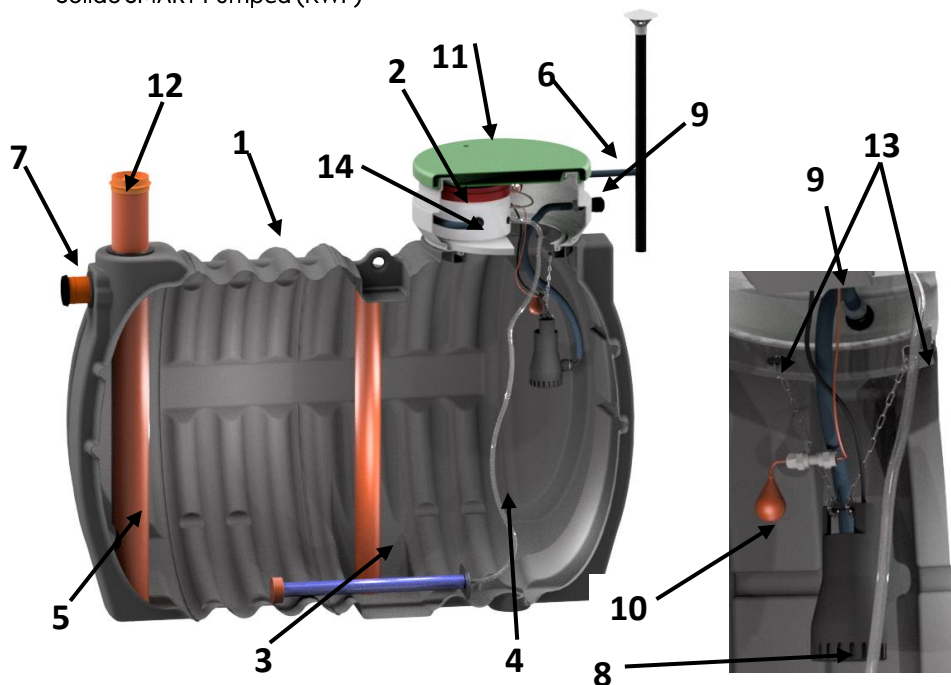
10 – Float switch (SWS)

11 – Sampling pot with emergency overflow that is safe from floating material

12 – Lid Top Cover

13 – De-sludge Pipe DN160

Solido SMART Pumped (KWP)



1 – ML3 tank (example)

2 – Solido SMART technology capsule with compressor and solenoid valves

3 – Tube diffuser (BEL)

4 – Air hose

5 – Lower part of the inlet and sludge pipe

6 – Supply air hose and support

7 – Calmed inlet DN110

8 – Clearwater Pump c/w with a flap valve on hanging Chains

9 – Outlet (32mm Compression)

10 – Float switch (SWS)

11 – Lid Top Cover

12 – De-sludge Pipe DN160

13 – Chain Hooks

14 – Capsule Shelf

4.2 General

The Solido SMART small wastewater treatment plant combines all 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 primary treatment compartment. 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 tank in the sketch drawings on the previous pages.

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

4.3 Treatment process with the Solido SMART SBR

The Solido SMART Intermittent Cyclical Extended Aeration System (ICEAS) SBR small wastewater treatment plant is comprised of high density polyethylene plastic tank and works as a sequencing batch reactor.

The special feature of the plant design is that all form of pre-treatment 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

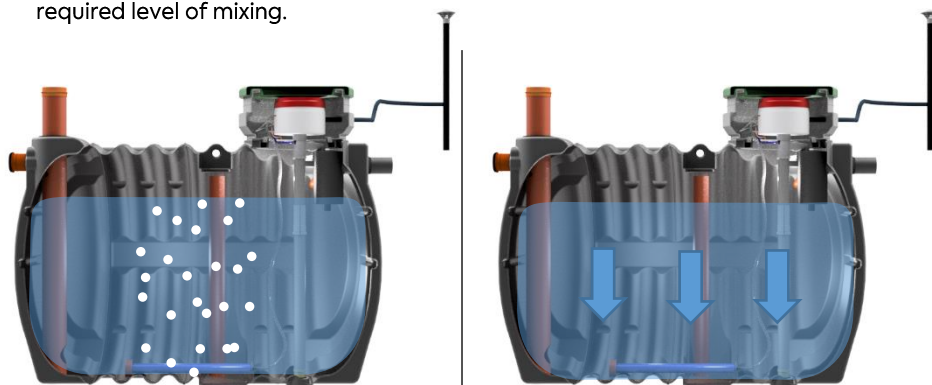
Using a time-controlled twelve-hour SBR cycle (intermittent aeration, sedimentation, discharge of clearwater), the same multi-purpose chamber is used as a reactor, sludge reservoir, and buffer.

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

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 tank.

Intermittent aeration

Aeration/mixing is performed with 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 a compressed air lift or a submersible pump.

Automatic backflush system (Airlift version only)

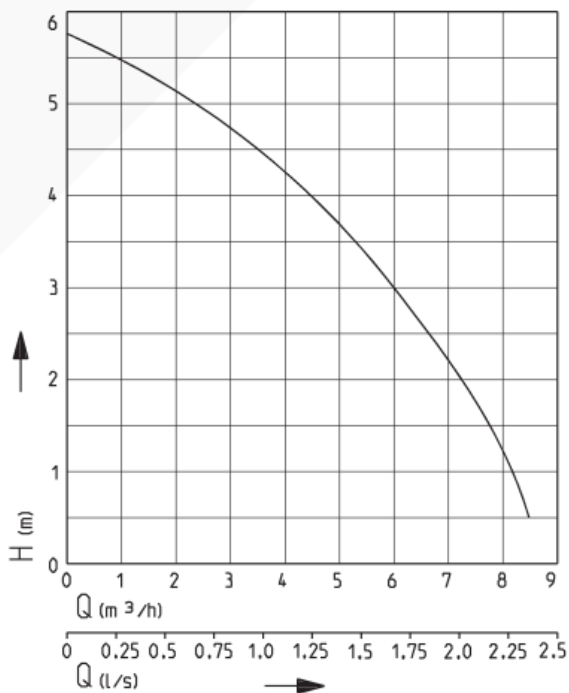
The patented design of the compressed air lifter allows backflushes to be performed automatically before each operation. The discharge of activated sludge in the effluent from the SBR reactor is significantly reduced and the lifetime of the soakaway is increased as a result. The automatic backflush system also effectively prevents potential lifter blockages.

Pumps, capacity and rates (pumping version only)

The pumping set is installed to precisely empty the tank and ensure a consistent operation. The pumps are set to the desired level and flow to guaranty that a specific amount of effluent liquid will be driven out of the system per the fundamental design criteria.

The employed submerged pump(s) is manufactured by Jung Pumpen (OXYLIFT 2 (S)), ideal for applications related to wastewater engineering. The pumping rate is showed at the following plot (see picture next page).

PERFORMANCE



41880-01

Plot provided by the manufacturer, pump performance is subjected to ISO 9906 tolerances

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 pre-set 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 Premier Tech Water & Environment. 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. 30 days** (longer periods require decommissioning).

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

Sampling device (KWH only)

The Solido SMART system allows you to take samples using

- an integrated sampling pot in the reactor with an emergency overflow function that is safe from floating material

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”.

For the pump version an independent sampling chamber is required.

Device for sludge removal

The Solido SMART system has a sludge pipe that is permanently installed in the tank and that ensures proper desludging.

- Desludging is required if the sludge level reaches 70% of the max. permitted.
- If the sludge volume fraction is lower than that, then an annual desludging is the maximum acceptable period for solids' accumulation.
- Your service provider should carry out this test by using two volumetric cylinders, one empty and one half full of water. Further details on par. 6.3.
- You must check whether the functions of the calmed inlet, aeration devices, and clearwater lifter are impacted by damaging substances (i.e fats, rugs, inert solids). Substances that are damaging to functions should be removed each time that maintenance is performed.
- During desludging, you must ensure that airlift and aeration devices are not damaged, the plant is not in the middle of the sedimentation phase whenever possible, and that at least 15% of the sludge quantity remains in the container (inlet pipe has a corresponding opening to allow for the specific volume).

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.

- 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 (if applicable) 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 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 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 treatment plant and the erosion of the surrounding soil.

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

Blocking the small wastewater treatment plant through:	Alternative 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:	Alternative disposal
Ash	Dustbin
Cooking oil	Dustbin
Food leftovers (solid and liquid, e.g. out-of-date milk)	Dustbin

Contaminating the environment through:	Alternative 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

“Strong cleaning agents” often contain substances that feed on the oxygen necessary for the purification process compromising the active bacteria.

The use of washing and cleaning solutions should be kept to a basic minimum to achieve optimal effluent quality. Biodegradable agents based on ethanol instead of chlorine is also recommended

This is especially important in households that use mains water very sparingly and heavily reduce consumption (to less than 80 l per capita). As a result, the incoming wastewater may enter the plant twice as concentrated as normal

domestic wastewater risking the outflow concentrations 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 removal > 85%) takes several weeks to develop and is only achieved if:

- There are no structural defects (e.g. heavy underloading or overloading, extraneous water inflow, faulty aeration and de-aeration, 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 (BOD < 600 mg/L; COD < 1000 mg/l; pH value = approx. 6.5 to 8.0; $\text{NH}_{3-4}\text{-N}$ < 60 mg/L)
- 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 highly 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

Daily check for messages on the control unit to ensure that the wastewater treatment plant is running fault-free.



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

Inspect the tank for a no-fault operation and inform a qualified expert where maintenance is required. Follow the instructions in chapter “6.2 Monthly in-house inspection”.

5.5 Half-yearly maintenance

Premier Tech Water & Environment recommends that the tank is fully inspected and tested by a suitably qualified service company every 6 months.

5.6 Other maintenance recommendations

The Solido SMART is a stationary electrical system. Like all electrical systems of this type, its safety should be tested once a year by an electrical technician according to BS EN 61557 or BS 7919:2000. 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. Monthly in-house inspection and 6-month maintenance



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 6-month maintenance performed by an authorised specialist company

6.1 Opening and closing the Top Cover



Tool: Size 13 key.



Prevent open treatment tanks from rolling over.

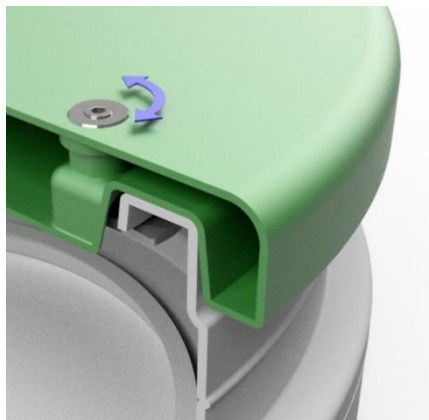
Always close the treatment tank securely after completing the work on the wastewater treatment plant by turning the locking latch on the top cover to the **locked** position, for example, as a child safety feature.

Opening the cover:

- Turn both nuts that are visible on the cover 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 (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 discharge (and in the inspection chamber if necessary) to check for suspended solids 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 air output from diffuser and the airlift pump (if applicable).



Note:

Consistent air output and unrestricted airlift 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 (a measurement of the tube diffuser counter pressure is required, contact PREMIER TECH WATER & ENVIRONMENT if required).

6.3 Half-yearly maintenance



General maintenance

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 plant components (electromechanical), in particular the aeration formation (bubbles uniformity) and of the airlift/pump operation.

- Function check of the control unit and the alarm function
- Maintenance of the compressor
- Optimisation of the operational parameters based on inspection results from the SBR and outflow.



Warning:

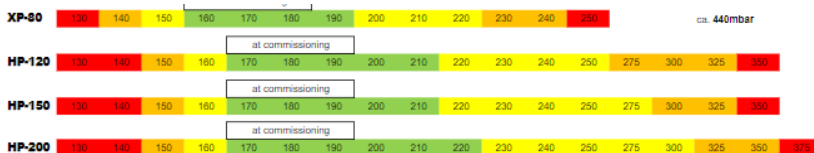
Disconnect the wastewater treatment plant from the power supply before you continue with the measures described below.

- Check whether the functions of the calmed inlet, aeration devices, and clearwater lifter are impacted by damaging objects. 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.
- To do so, the sludge volume index (SVI) is usually measured on site using a measuring cylinder after a 30-minute setting period (SV30 value).*
- Desludge if required (see note below), do not allow sludge build-up for more than a year

As good practice, we also advise on the actions below:

- inspection the diaphragm blower (clean diaphragm if required)
- clean diaphragm if required
- inspection of the diffuser (including pressure gauge trial)
- cleansing (water and soap) of the diffuser membrane on a 6-month basis (or when the pressure gauge indicates >1.5x of the nominal pressure in the air line (after the blower)
- inspection (disconnect from the capsule) and emptying of the air supply vent from the condensed water (if any)
- trial the control panel (test mode to identify issues if any)
- Pressure reading after the blower

See below indicative range the pressure build-up at the blower(s)



The above actions are essential for the warranty extension (3 years).

* Your service provider should carry out this test by using two volumetric cylinders, one empty and one half full of water (1:2 dilution). Mixed liquor during

aeration (ideally at max working water level) should be abstracted and positioned in the cylinders and left for 30 minutes. After settling the service team will be able to visualize the corresponding sludge level in the tank (wastewater typically contain pathogens – take all health and safety means to avoid coming in contact with partly treated wastewater). The maximum limit of the sludge build-up should be no more than 70% (the corresponding level of the ‘previously empty’ cylinder; or the 35% of the 1:2 diluted cylinder).



Note:

- Desludging is required if the sludge level reaches 70% of the max. permitted water level at the end of the sedimentation.
- During desludging, you must ensure that the airlift pump and aeration devices do not become damaged.
- The plant should not be in the middle of the sedimentation phase whenever possible
- At least 15% of the sludge quantity should remain in the container
- The sludge pipe indicated in the pictograph enable the accurate desludging of the system.
- General cleaning maintenance, e.g. removal of sediment deposits
- Inspection of the structural condition of the plant
- Checking that aerobic and anoxic duration is sufficient
- Checking the concentration of oxygen in the SBR basin (SBR reactor)
- Entering the maintenance results in the **operations logbook**

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.

Sampling

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 (if required)
- $\text{NH}_4\text{-N}$

- pH value (if required)
- TSS
- TN (if required)
- COD (if required)
- N-inorg (if required)
- BOD₅
- TP (if required)



Caution:

In SBR plants, effluent samples can be taken at any time from the sampling pot, which is installed in the discharge of the SBR chamber.; for a pump version an independent sampling chamber can be installed downstreams the tank

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 30 Nm). We recommend resealing it and occasionally greasing the seal with Vaseline.

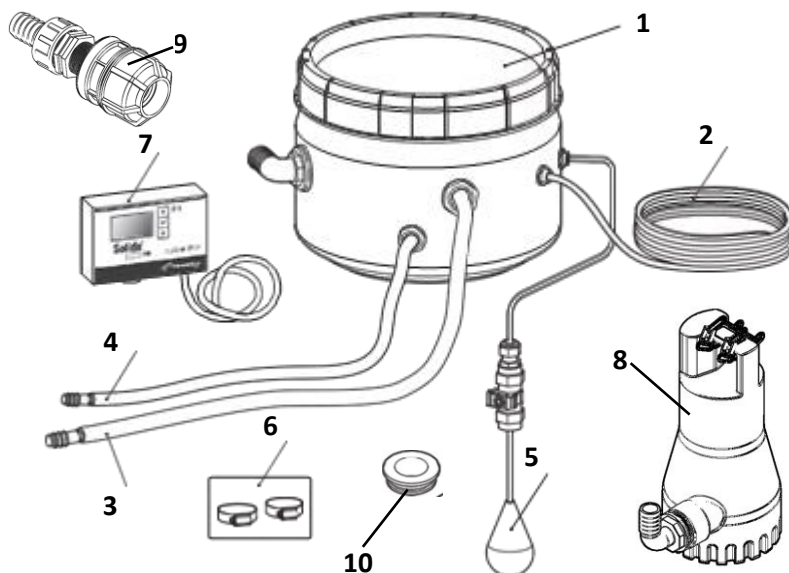
Tip: Use the “capsule key” to open the capsule

7. Installation and start-up

7.1 Checking the system components for completeness

Before installation check that all components are complete and flawless.

Contents of the box

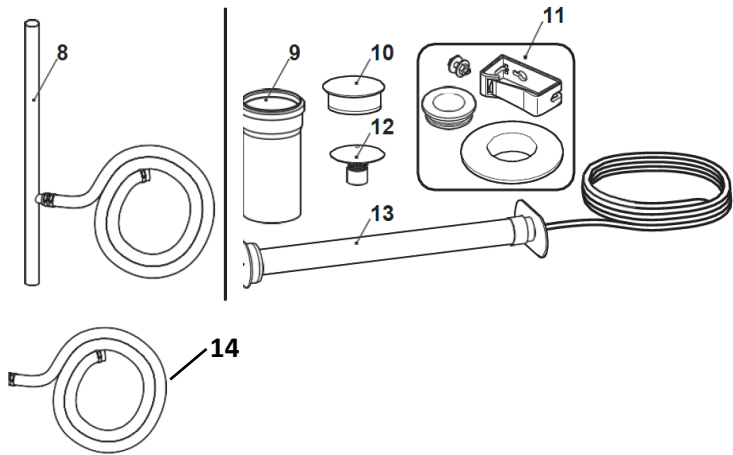


Item	Quantity	Description
1	1 pc	Technology capsule
2	1 pc	Control cable, grey, with connection plug (15 or 30 m); pre-assembled
3	1 pc	Compressed air outlet for tube diffuser (BEL), DN13 or DN16, white; pre-assembled
4	1 pc	Compressed air outlet for clearwater lifter (KWH), DN10, blue, pre-assembled (Gravity version only)
5	1 pc	Float switch (SWS); pre-assembled
6	2 pc	Hose clamps
7	1 pc	Control unit
8	1 pc	Submersible pump (KWP where applicable)
9	1 pc	32mm outlet connection (KWP where applicable)
10	1pc	Flap valve
-	1 pc	Technical Documentation

Attached in the container:

Loose:

In the accessory pack:



Attached in the container:

Loose:

Item	Quantity	Description
8	1 pc	Air inlet support with 3 m hose, DN25
14	1 pc	Hose to connect outlet to pump (Pumped version only)

In the accessory pack:

9	1 pc	Upper piece of the underground sewer sludge removal pipe, DN160
10	1 pc	Sealing plug for underground sewer 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
-	1 pc	Optional, without a figure: DN16 nozzle for tube diffuser (from compressor HP-120 onwards)

Important note:

7.2 Checklist BEFORE assembling the Solido SMART package sewage treatment plant

1. Is the control unit located between 10 m and 30 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)
2. Is a 230 V power supply plug with a 30 mA residual-current circuit breaker available?

Is the protective earth conductor functioning?
3. Is the treatment tank installed according to the installation manual UTG9509 or UTG9510 (inflow depth max. 1.2m below ground level, the inflow and outflow correctly positioned)?
4. Is the DN160 shaft for removing sludge installed in accordance with the installation instructions?
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? For pumped version, is the outlet installed (see chapter 7.3.8)?
6. Is the air inlet support set in place?

Is the hose pulled into the shaft up to the red marking? (Standard hose length 3m, extension up to 10m possible, max. 300mm deep into the ground)
7. Is(are) the diffuser pipe installed in the centre of and horizontally on the tank floor?
8. Are the lifters filled with water to prevent them from being lifted? (Not applicable to pumped version)
9. Is sufficient space available in the shaft to receive the technology capsule?
10. Is the outlet pipe from the building connected to the inflow on the plant, and is the outflow of the wastewater treatment system

Ok
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

connected to the receiving water or seepage system?

11. Is allowable aerobic and anoxic time sufficient?

(Roof deaeration or separate aeration and deaeration is required)

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?

13. Is the chamber approximately half-filled with water?

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

7.3 Assembly steps for the Solido SMART package sewage treatment plant

7.31 Installing the shaft assembly set

- Install the seals and the cable holder for the shaft assembly set as required.
- Fit the extension pieces as per UTG9509/UTG9510 installation guidelines.



Note:

To install the seals, you require 2 hole saws with diameters of $D = 51\text{mm}$ and $D = 60\text{mm}$

7.32 Filling up the lifter with water

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

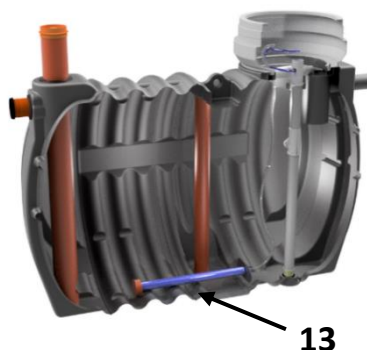


Note:

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.



Note:

For larger tanks, two tube diffusers are supplied. 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 Positioning the pump at the appropriate level (pumped version)

The pump needs to be positioned at a specific height that is pre-arranged based on the length of the chain. Modifications on the chain links is not recommended as this might have an impact to the performance of the plant (alter emptying volumes and in-balance the tank). Specifically, positioning the pump at the final chain link is recommended for both 10 and/or 8 PE. This would allow the development of the space that is required not only to accommodate the proposed volume but also absorb a certain degree of fluctuations incoming flow and concentrations.

Important is to make sure that the pump is withheld in position from the chain and not from the pumping hose. Since the hose is coming at a prolonged size, no modifications are required to make sure that the hose is loose and the links bear the pump weight.

7.3.5 Connecting the air inlet supports

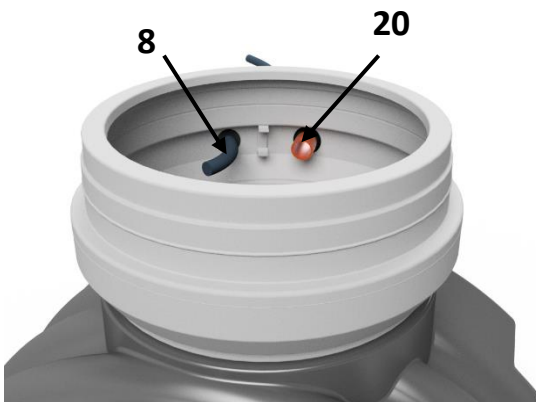
- Push the supply air hose (8) through the seal on the shaft.
- Set the air inlet support in a suitable position next to the treatment tank at a max. depth of 300mm into the ground (if necessary, the hose can be extended up to a total length of 10m). allow for a gradient towards the plant.

**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.

7.3.6 Laying the control cable

- Place the technology capsule **next to** the 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 glue it in, etc., because the control cable may need to be pulled out in the case of damage.

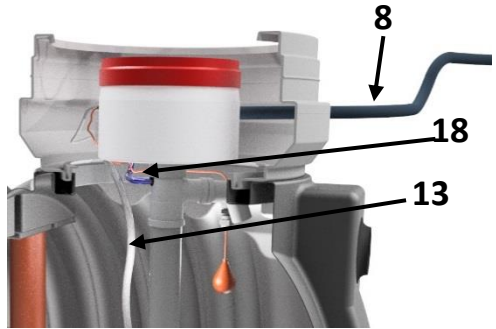
**7.3.7 Connecting the technology capsule**

- 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. 1.20m to inlet invert. With the standard version as per the scope of delivery, shortening the hoses by up to 600mm 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 pot in the tank.



7.3.8 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 (KWH version) so that the capsule is positioned securely.
- 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.

7.3.9 Installing outlet (Pumped version)

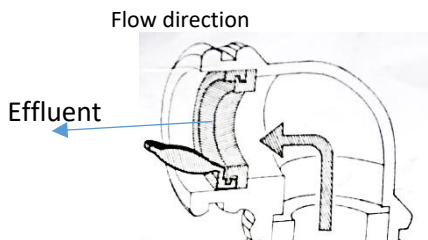
- Drill Hole at required level and orientation.
- Fit provided outlet into position, ensuring the wall of the shaft is between the rubber seals on the threaded section of the compression fitting.



To install the outlet, you require a hole saw with diameter of 40mm.

7.3.10 Installing the flap valve in the pump (pumped version)

The flap valve is a rubber valve that must be positioned at the exit of the pump to nullify any possibility of reversed flow and surcharge – attention for siphoning.



8. S40 control unit and available settings

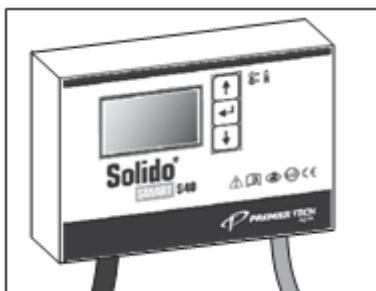


8.1 About the S40 control unit

The S40 control unit has been developed for the Solido SMART small wastewater treatment plant by Premier Tech Water & Environment.

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



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 to specially designated collection points or return them post-paid to PREMIER TECH WATER & ENVIRONMENT.



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:	90-minute sedimentation phase at the end of a cycle
CW discharge:	Clearwater discharge, either continuous (cont., pre-configured) or intermittent
Compressor:	The compressor in the capsule as a unit
BEL:	Tube diffuser
KWH:	Clearwater lifter
KWP:	Clearwater pump (optional instead of the clearwater lifter)
Start125%:	Start-up phase that is activated automatically during start-up. The aeration time is increased to 125% of the set value for 240 days. The duration of the start-up phase can be set. The start-up phase can optionally be used or deactivated.

8.2 Navigation in the control menu

You can use the three arrow buttons on the control unit to navigate in the 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.



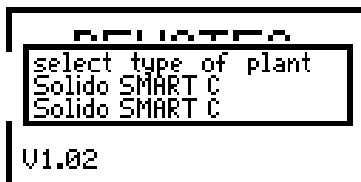
Note:

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 started automatically. Important plant parameters are defined, in which the following logic applies in the three-line “pop-up” menus:



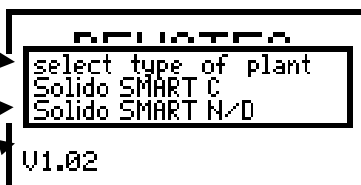
General

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 the “SOLIDO smart C” plant type

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

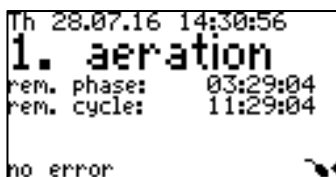
- | | |
|--------------------------------|---|
| • Language | Choose accordingly |
| • Set time | Set correctly |
| • Password: | 7682, fixed (only valid for start-up), or service password based on the “established” pattern |
| • SOLIDO SMART: | YES |
| • Cycles per day: | 2 (standard) |
| • Cont.CW discharge: | YES (as standard; press NO if your system has a tertiary unit only (i.e. Ecoflo as polishing) |
| • Compressor selection: | 60, 80, 120, 150, or 200 l/min |
| • Aeration level: | High (press medium if ammonia removal is not required) |
| • Select type of plant: | Solido SMART C (vs. Solido SMART N/D) |
| • Select number of PE: | Select between 2 to 26 PE |
| • KWP instead of KWH: | NO (or “YES” after installation of a clearwater pump) |

- **DOP (Dosing for phosphorus removal)** NO
- **Test mode starting:** All consumers are activated once, test mode is finished by pressing the button
- **Inputs okay?:** YES/NO (pressing NO, start-up begins again)

In some models, during setup, extra options may appear (depending on manufacturing date)

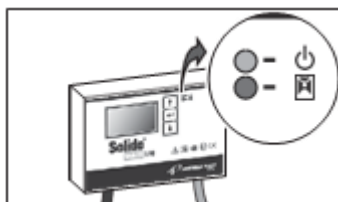
- **UV: Yes / No (press No)**
- **SSP: Yes / No (press No)**

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.



Note:

After start-up, the “Start 125%” start-up phase is activated automatically. To deactivate it, see the “Service” menu.

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**
- Cycle time – Start 125%* start-up phase (optional)
- Remaining time – phase
- Remaining time – cycle
- Error – float switch symbol

```
Th 28.07.16 14:30:56
1. aeration
rem. phase: 03:29:04
rem. cycle: 11:29:04
no error
```

* Plant is in the running-in phase, aeration time 25% longer than the set value, but max. 18.0 min.

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 process and for the whole plant. Press the confirmation button to switch to a weekly display.

```
operat. hours
compressor: 00000h07min
RWH: 00000h01min

total: 00000h09min
#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
#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
Solido SMART N/O 4PE 80
#enter menu      #064
  
```

DENI:

30 min pre-selected, also in filtration level C

```

settings (smart)
BEL / 20min      10.8min
Sedimentation    090min
DENI             030min
KWH / cycle      17.1min
#enter menu      #080
  
```

Start 125%: start-up phase, aeration time at 125% of the set value (max.18 min), can be deactivated, duration in days, configurable
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%        240 d
#enter menu      #096
  
```

The **Holiday** setting can be activated or deactivated and set to max. 30 days;

```

holiday
remaining: 00d 00h
activate holiday mode
stop holiday mode
#enter menu      #112
  
```

in this time, the aeration time is reduced to 50% of the set value

```

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

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



```
operat. hours
compressor: 00006h36min
KWP:        00001h03min

total:      00028h45min
d=weeks
```

or in the display **Current monitor**



```
current monitor
compressor off
KWP:        2.3A max.

d=enter menu #128
```

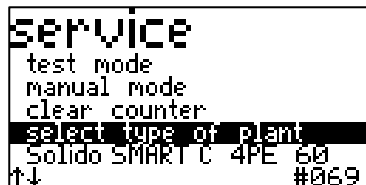
The clearwater pump can be manually switched to manual mode.

8.6.3 Application example in the password-protected

Select type of plant area:

A Solido SMART plant is set to top water level (TWL) C with 4 PE and a 80 l/min compressor and is to be changed to TWL N/D with 4 PE and a 60 l/min compressor:

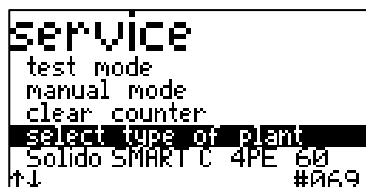
Choose **Service** in the main menu. Press the middle button and use the arrow button to scroll to **Select type of plant**.



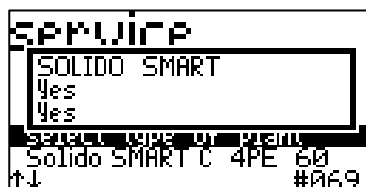
Press the middle button again and then enter the **service password**.



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



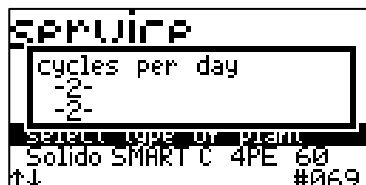
Use the middle button to confirm
SOLIDO smart Yes



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

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

Note:

Alternatively, intermittent CW discharge only when there are downstream filtration units

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

Use the arrow buttons to change the **type of plant** from **SOLIDO smart C** to **N/D** and choose the middle button to confirm

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

```
SERVICE
┌───────────────────────────┐
│ cont CW discharge         │
│ Yes                       │
│ Yes                       │
└───────────────────────────┘
SELECT TYPE OF PLANT
Solido SMART C 4PE 60
↑↓                                     #069
```

```
SERVICE
┌───────────────────────────┐
│ select aerator            │
│ 80 L/min                 │
│ 80 L/min                 │
└───────────────────────────┘
SELECT TYPE OF PLANT
Solido SMART N/D 4PE 80
↑↓                                     #069
```

```
SERVICE
┌───────────────────────────┐
│ select aerator            │
│ 80 L/min                 │
│ 60 L/min                 │
└───────────────────────────┘
SELECT TYPE OF PLANT
Solido SMART N/D 4PE 80
↑↓                                     #069
```

```
SERVICE
┌───────────────────────────┐
│ select type of plant      │
│ Solido SMART C           │
│ Solido SMART C           │
└───────────────────────────┘
SELECT TYPE OF PLANT
Solido SMART C 4PE 60
↑↓                                     #069
```

```
SERVICE
┌───────────────────────────┐
│ select type of plant      │
│ Solido SMART C           │
│ Solido SMART N/D        │
└───────────────────────────┘
SELECT TYPE OF PLANT
Solido SMART C 4PE 60
↑↓                                     #069
```

```
select number of PE
02 PE
03 PE
04 PE
05 PE
06 PE
```

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

```
select number of PE
0 KWP instead of KWH
0 No
0 No
0 PE
06 PE
```

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

```
service
test mode
manual mode
clear counter
select type of plant
Sollido SMART N/D 4 PE 60
↑↓ #070
```

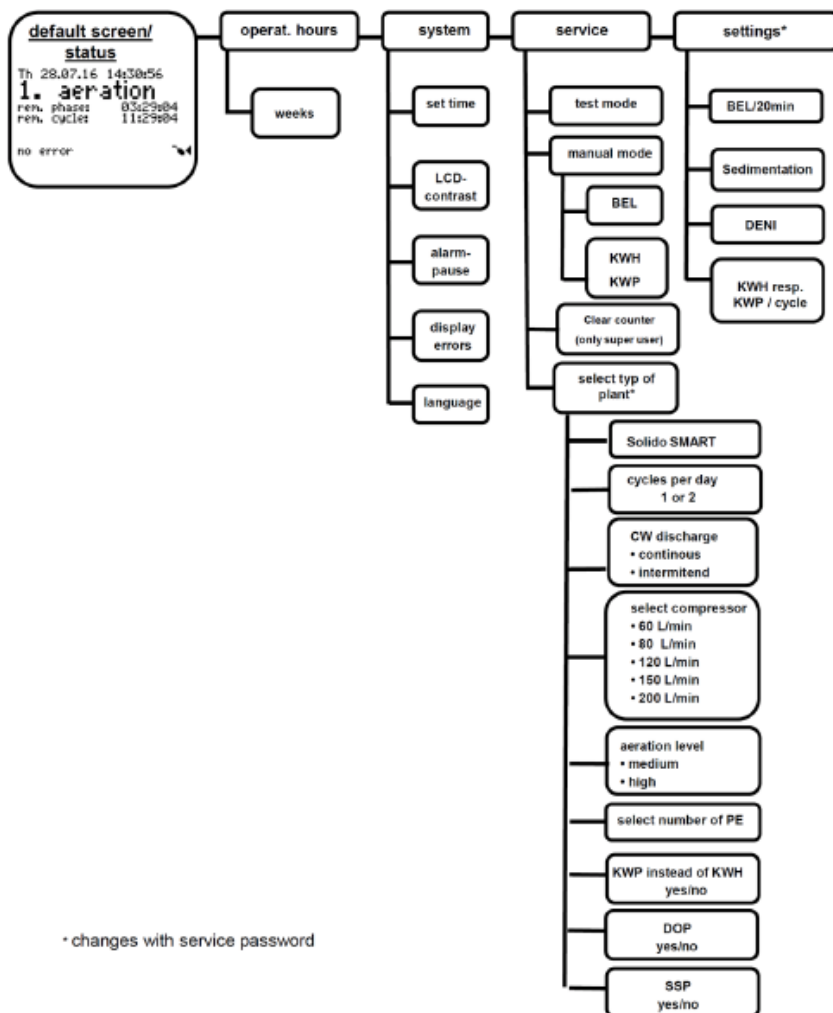
The plant type that is now selected is a Solido SMART N/D 4 PE and a 60l/min compressor.

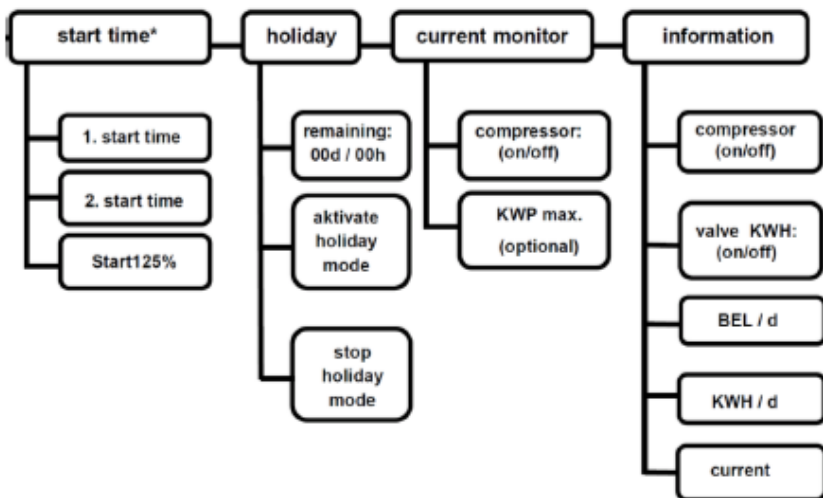


Note:

After changing the plant type, the “Start125%” start-up phase is ***always activated automatically***; to deactivate it, see chapter ‘8.5.4 “Start125%” start-up phase’.

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 fed 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 with a micro fuse of the following type: T 4.0 A, 250 V, H (time-delay glass tube micro fuse 4.0 A; 5 x 20 mm with a high breaking capacity (opaque) according to EN 60127-2/III.

Changing the battery: If the alarm displays messages such as 'accu', 'sync' or freezes, we recommend the replacement of the batteries with new ones (type NiMH AA, capacity 1800 mAh). As good practice, these should be replaced by the servicing agent every 2 years.

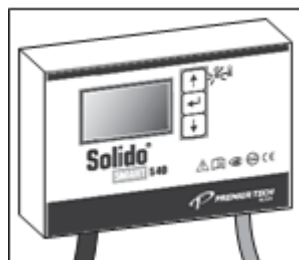
Only rechargeable accumulators are permitted; never use normal batteries.

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 float 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 untreated effluent discharge. Please inform your maintenance company immediately.

Measures to be taken when an alarm occurs


Recommendations for the operator:



- Press the middle button once 
 - ▶ The warning signal is permanently stopped
 - ▶ The red LED light continues to flash
 - ▶ Error message remains in the bottom line of the basic screen
 - ▶ Alarm is not 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).

Exception: Overfill 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 “9.1S40 control alarm messages”), the basic plant functions must be checked with visual inspections.

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

Plant fault	Probable cause	Repair
The plant is too full overall; the water level is so high that the wastewater is flowing out of the emergency overflow.	<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> <p>a. The hose is connected incorrectly</p>	<ul style="list-style-type: none">▶ Switch on the airlift pump 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 airlift pump in manual mode.▶ Check that the blue hose is connected correctly.

Plant fault	Probable cause	Repair
	<p>b. The airlift pump is not receiving enough compressed air</p> <p>c. The clearwater pump is not pumping (in the pumped version)</p>	<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.
<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>The function of the aeration 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?).

Plant fault	Probable cause	Repair
	<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 aerobic/anoxic sequence for the overall plant is not functioning correctly</p>	<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 back pressure using the pressure gauge, record the water level, replace the tube diffuser if necessary (contact Premier Tech Water & Environment) ▶ Reconfigure the aerobic/anoxic timing sequence (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 poor effluent quality discharge:</p> <ul style="list-style-type: none"> a. Introduction of cleaning agents or disinfectants or other prohibited chemicals b. Insufficient air intake and/or treatment tank aeration and de-aeration c. Assembly error d. Container not sealed e. Infiltration (e.g. rain water) f. Sludge not removed g. Incorrect setting for operational values h. 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>

NB: After looking through the above if you are still having problem with your unit please contact your service provider.

10. Appendix

10.1 Technical data and environmental conditions for the control

Technical Data

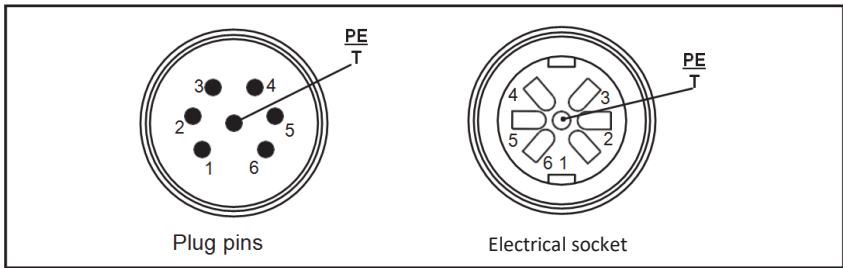
Housing material:	Polycarbonate for wall mounting
Dimensions:	200 x 120 x 60 mm
Type of protection:	IP54
Supply voltage:	230 V AC, 50 Hz
Control:	Time-controlled using real time clock
Inputs:	1 float switch input
Outputs:	4 relay outputs
Alarm output:	1 alarm relay
Interface:	Internal RS232 interface
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
Storage temperature:	-25°C to +60°C
Air pressure:	During operation and during storage, 80 kPa to 106 kPa
Relative humidity:	max. 95% rH (condensing) permitted
Ice formation:	Not permitted

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

10.3 Technical data for Solido SMART technology capsule

Outer dimensions of technology capsule:	D = 340mm, H = 252mm (High capsule: H = 352mm)
Material:	Polyethylene

Approval: UN / 1H2 / X 38 / S

Protection class: IP55

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-60	XP-80
Operating pressure (mbar)	>140	>140
Applicable pressure range (mbar)	130 to 180	130 to 180
Air feed rate at operating pressure (l/min)	60	80
Max. apparent output of technology capsule (S) (VA)	120	205
Weight (kg)	4.3	4.3
Dimensions (mm x mm x mm)	208 x 132 x 186	208 x 132 x 186
Protection class	IP45	IP45

In the higher capsule:

HIBLOW membrane compressor models	HP-120	HP-150	HP-200
Operating pressure (mbar)	177	200	200
Applicable pressure range (mbar)	30 to 300	30 to 300	30 to 300
Air feed rate at operating pressure (l/min)	120	150	200
Max. apparent output of technology capsule (S) (VA)	285	330	510
Weight (kg)	8.5	9.0	9.0
Dimensions (mm x mm x mm)	256 x 200 x 222	256 x 200 x 222	256 x 200 x 222
Protection class	IP45	IP45	IP45

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

10.4 CE – declaration of performance (or declaration of conformity)



PERFORMANCE RESULTS

Premier Tech Aqua GmbH
Bei der neuen Münze 11, 22145 Hamburg, Germany

EN 12566-3, Annex B
Small wastewater treatment systems for up to 50 PT 3

Small wastewater treatment system Solido SMART
One-chamber SBR system in one PE tank

Test report PIA2015-239B22.e

Nominal organic daily load	0.30 kg BOD ₅ /d	
Nominal hydraulic daily load	0.90 m ³ /d	
Material	Polyethylene	
Watertightness (Annex A)	pass	
Structural behaviour (Pit Test)	pass (also wet conditions)	
Durability	pass	
Treatment efficiency (nominal sequences)		
	Efficiency	Effluent
	COD	95.1 % 39 mg/l
	BOD ₅	98.5 % 5 mg/l
	SS	97.1 % 13 mg/l
	NH ₄ -N	98.0 % 0.7 mg/l
	N _{tot}	83.1 % 10 mg/l
	P _{tot}	68.5 % 2.3 mg/l
Electrical consumption	0.81 kWh/d	

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.



Notified Body
No. 1739



Certified according to
ISO 9001:2008



Prüfinstitut für Abwassertechnik GmbH
Signature
geprüft - getestet - tested

Elmar Lance

Mai 2016

11. Solido SMART® operations logbook

[illegible]

12. Solido SMART® operations logbook

[illegible]

12. 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 WATER & ENVIRONMENT 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 WATER & ENVIRONMENT

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: _____

