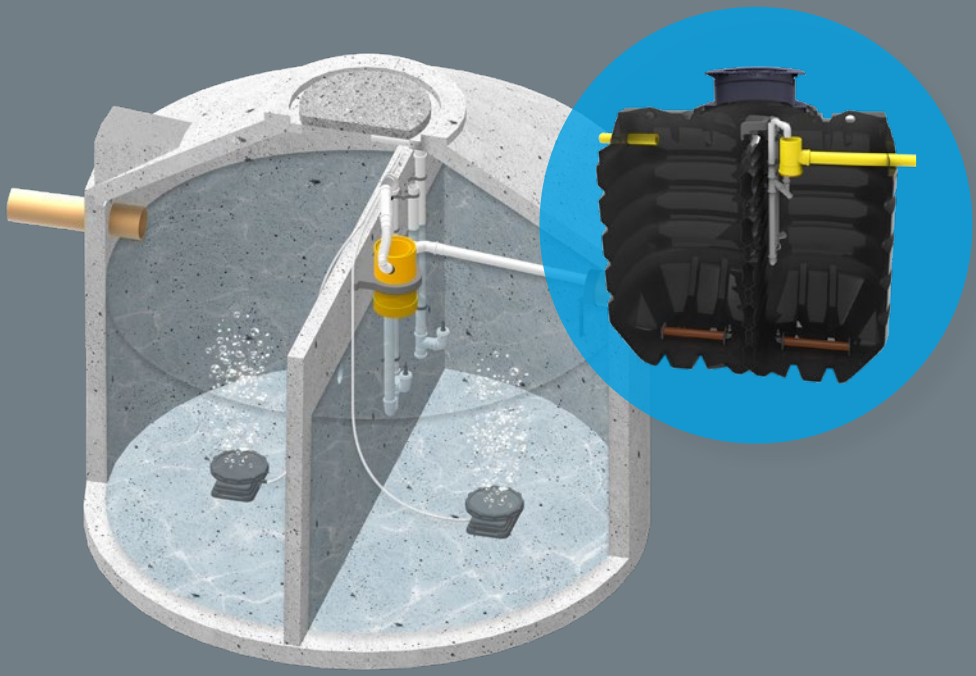
› Installation Manual
› Operation Manual
› Maintenance Manual

AQUATO®
umwelttechnologien

AQUATO® STABI-KOM
SSB® sewage treatment plant



PLEASE NOTE THE FOLLOWING:

The installation manual and the operating diary must be kept directly at the facility, so that both operators and qualified personnel can inspect it at any time.

Manufacturer

AQUATO® Umwelttechnologien GmbH

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II List of abbreviations

TGS = Top Ground Surface
$H_{W\ max}$ = maximum water level in the plant
$H_{W\ min}$ = required minimum water level in the plant
S = Float switch
S1 = Float switch 1
S2 = Float switch 2

1 Manufacturer's declaration

Declaration of Conformity

This certifies the conformity of the AQUATO® K-Pilot 18.1 / 18.3 / 18.4 controllers with the EC directives for CE marking.

Device type:	**Electronic control devices for the automatic operation of a fully biological small wastewater treatment plant according to DIN 4261-2** **AQUATO® K-Pilot 18.1 / 18.3 / 18.4**
Directives:	1. EMC Directive 89 / 336 / EEC 2. Low Voltage Directive 73 / 23 / EEC 3. RoHS Directive
Applied standards:	
for 1.	EN 61000 - 6 - 3 (2006) EN 61000 - 6 - 1 (2007) EN 61000 - 3 - 2 (2014)
for 2.	EN 6 204 - 1 (2007)
for 3.	- not applicable -
Special notes:	- none -
Date:	09/02/2016

Nils Homburg, Technical Manager

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2 Important information

2.1 General information

This manual describes the operation of the K-Pilot 18.1, K-Pilot 18.3 and K-Pilot 18.4 controllers.

With the AQUATO® K-Pilot 18.1/18.3/18.4 controller, you receive a quality product that is designed for controlling small wastewater treatment plants. In addition, it automatically controls compressors and pumps. During operation, the units are current- and pressure-controlled in order to ensure operational safety.

The K-Pilot 18.1/18.3/18.4 control device can be used to operate SSB and SBR wastewater treatment plants.

Please read this information in advance to ensure proper operation and compliance with the required discharge values.

The complete operation manual must be kept directly at the plant so that both the operator and qualified personnel can inspect it at any time.

2.2 Important information

The AQUATO® K-Pilot 18.1/18.3/18.4 controller indicates faults acoustically and optically. It features a mains-independent power failure monitoring system.

After commissioning, please receive instruction in the plant engineering and functioning of the AQUATO® K-Pilot 18.1/18.3/18.4 controller.

The warranty shall become void in the event of improper use!

In the case of repairs, the proper functioning of the plant and the continued validity of the warranty can only be guaranteed if original spare parts or spare parts approved by AQUATO® are used.

The small wastewater treatment plant must always remain in operation!

If you have any problems with your controller, please consult your maintenance company. They will be happy to help you solve any problem you might have.

If the AQUATO® controller is used for other purposes without the express consent of AQUATO Umwelttechnologien GmbH and/or if the safety instructions are disregarded, this may result in danger or injury to persons and malfunctions or defects in the plant.

The relevant accident prevention regulations must be observed!

In this case, all liability shall be excluded.

Modifications to the controller and unauthorised conversions are not permitted.

The AQUATO® K-Pilot 18.1/18.3/18.4 controller must be installed properly and in accordance with the installation instructions (see Chapter 5).

The Controller Operation Manual must be read carefully before installation and commissioning and the instructions contained therein must be strictly followed!

During assembly and installation, commissioning and operation, as well as, if applicable, decommissioning, the applicable standards and regulations must be observed.

All work may only be carried out by trained specialists with an appropriate certificate of qualification.

The operator of the plant must be instructed in its operation by the fitter.

When connecting the controller, national regulations and the specifications on the nameplate must be observed. The device may only be operated on mains types which contain a protective conductor (PE). Connection to the mains must be made by means of a separate fuse and an RCD fuse. Before commissioning, the electrical protective measures must be checked to verify their proper functioning!

Installation work may only be carried out by qualified electricians.
When working on the device, always pull out the power plug.

Never operate a device that
- ► has a malfunction,
- ► was dropped,
- ► was otherwise damaged or
- ► apparently has a damaged connection cable or
- ► apparently has a damaged plug.

The plant must be disconnected from the mains supply for all maintenance and repair work.

If it is necessary to enter the plant, this may only be done in the presence of a second person with appropriate safeguards (gas detector, safety ropes)!

The applicable accident prevention regulations and the accepted rules of technology must be observed!

3 Safety instructions

3.1 General information on the safety information

This manual contains basic instructions that must be observed during installation, commissioning and maintenance.

The manual must be kept directly at the plant so that both the operator and qualified personnel can inspect it at any time.

The safety instructions contained in this installation manual, the applicable national accident prevention regulations and any internal work, operating and safety regulations must be observed.

Non-observance of the safety instructions may endanger both persons and the environment and result in the loss of any claims for damages.

3.2 Definition of Terms

Operator
The operator of the plant is considered to be the person who ensures that the plant is kept in proper operation.

Qualified personnel
are in a position to assess and perform work assigned to them and to recognize and assess dangers on the basis of the technical training and the knowledge and skills imparted to them.

3.3 Hazard analysis

The AQUATO® plants were developed according to the state of the art and subjected to a risk analysis. To eliminate or minimize risks, please follow the instructions below.

3.4 Warning symbols used

Below you will find an overview of the symbols used in this manual and their meanings:

Warning of a danger point

Warning of dangerous electrical voltage

3.5 Duty of care of the operator

Make sure that

- the plant is used only in accordance with its intended purpose (see Chapter 4),
- the plant is only operated in perfect condition,
- the self-checks are carried out by the operator,
- the maintenance intervals are complied with,
- maintenance and repairs are only carried out by qualified personnel,
- the Controller Operation Manual, the Installation, Operation and Maintenance Manual and the operation log can be inspected at any time,
- and only wear and spare parts approved by the manufacturer are used.

3.6 General safety instructions

The accident prevention regulations for work on wastewater plants (DGUV regulation 21 and DGUV regulation 22, formerly: BGV C5) must be observed. The work should only be carried out by skilled personnel. The following safety instructions must always be observed for your own safety when working and coming into contact with the small wastewater treatment plant:

1. Disconnect the small wastewater treatment plant from the mains!
Special care should be taken when performing maintenance work in the pit. In this case, the plant technology must always be disconnected from the mains and secured against unintentional reconnection of the power supply!
Risk of electric shock in case of defective compressor or defective power cables.

The fine-bubble aeration of AQUATO ® diffuser systems causes a water-air bubble mixture with a lower density than pure water. This reduces the buoyancy in the water. Should a person accidentally fall into the reactor, he/she would not be able to swim. (**Danger of drowning**!)

2. Ventilate the plant well, access to the pit only with safeguard and supervisor!

Biological processes produce gases that are dangerous to humans. These can lead to fainting and/or death by suffocation, even if they cannot be detected by smell. For this reason, access to the small wastewater treatment plant is only permitted under the supervision of a person keeping watch outdoors and after a good ventilation with appropriate safeguards (gas detector, safety ropes).
A rescue/safety harness must be worn by each person entering the v
Never climb in after unconscious persons, but get help immediately!

3. Electrical fuse protection, RCD fuse!
Die AQUATO® operate with 230 V / 50 Hz alternating voltage or with 400 V / 50 Hz alternating voltage. When operating the controller, the personnel must also not be exposed to the risk of electric shock due to carelessness (e.g. wet fingers). The socket provided for the control device must be separately protected by an RCD fuse and connected to the mains supply by electrically qualified personnel. Before commissioning the plant, a qualified electrician must check the proper functioning of the electrical protective measures.

3.7 Safety instructions for qualified personnel

Installation, maintenance and repairs may only be carried out by qualified personnel. Before carrying out the work, it must be ensured that
the knowledge and skills of the personnel are adequate to the intended use,
the personnel have received instruction,
have read and understood the **operation manual**.

Before beginning and while carrying out work in the tank, ventilation must be provided to ensure that neither gases in concentrations dangerous to health nor a potentially explosive atmosphere or oxygen deficiency can occur.

Before beginning and while carrying out work, it must be ensured that the plant is disconnected from the mains and secured against being switched on again.

Working in tanks requires protective measures even at low heights. Appropriate measures must therefore be taken against the risk of falling.
If technical measures are not possible, personal protective measures against falling should be taken.

Always wear suitable protective clothing as well as hand, foot and face protection.
Avoid contact with wastewater.

It should be pointed out that, despite all the safety measures taken, residual risks at the installation site cannot be ruled out:

Danger of slipping and tripping
Danger due to electrical voltage
Risk of infection by germs and bacteria

3.8 Rescue measures

Ensure that a second person is always available for protection when working in the tank. Never climb in after unconscious persons, but get help.

4 Area of application of the controller

The K-Pilot 18.1/18.3/18.4 controllers are used for the operation of small wastewater treatment plants. They can be used to operate both SBR and SSB plants. In addition to the standard operating modes of performance classes C and D, a phosphate module or an H module can also be connected to cover effluent classes C+P and D+P or C+H and D+H.

If the plant is to be operated simultaneously with a phosphate module and a UV module (i.e. +P +H), the K-Pilot 18.4 controller is required.

Hygienisation is possible both with a UV lamp and with the additional dosing of a disinfectant.

In the standard version, all necessary pumping operations are carried out with compressed air lifters. When operated with the K-Pilot 18.3/18.4 controllers, one or more lifters can also be replaced by submersible motor pumps. If necessary, an additional 230 V or a 3-phase compressor (400 V) can also be connected via an ORKA-S module.

The K-Pilot 18.1/18.3/18.4 controllers can also be operated with a float switch, in which case the clear water draw-off time is – if possible – shortened and a flood alarm triggered, if necessary. Moreover, it is also possible to operate the controllers in economy mode with somewhat shorter running times.

An additional buffer, which is often useful or even necessary for restaurants, for example, can be operated both in the bypass flow and in the main flow and switched directly with the K-Pilot 18.1/18.3/18.4 controllers.

The K-Pilot 18.1/18.3/18.4 controls also allow the use of a float switch as a pure flood detector – without affecting the cycle.

The K-Pilot 18.3 controller can also operate a buffer with a float switch.

The K-Pilot 18.3/18.4 controllers can also be used to dose an external C source – in times when the plant is operating below full capacity.

In order to implement all these different operating modes, some of the air outputs can be used for different functions and the electrical outputs of the K-Pilot 18.3/18.4 controller can be configured freely.

4.1 K-Pilot 18.1

The K-Pilot 18.1 controller has an electrical output as a socket for the compressor as well as a float switch input.

The K-Pilot 18.1 controller can be used to operate SBR and SSB plants. It is suitable for the standard operating modes of performance classes C and D with a compressor and compressed air lifters. Operation with float is also possible.

4.2 K-Pilot 18.3

The K-Pilot 18.3 controller allows the use of a maximum of **2 additional electrical outputs** and 2 float switch inputs.

In addition to the standard operating modes, dosing for phosphate precipitation, dosing of a C source, hygienisation with UV lamp or disinfectant dosing (e.g. chlorine) can also be activated to cover effluent classes C+P, D+P, C+H and D+H.

Additional compressors can be connected. A three-phase compressor (via an intermediate ORKA-S module) can also be operated instead of a single-phase compressor.

The operation of a buffer in the main or bypass flow is also possible; this can be controlled with a second float switch.

With the K-Pilot 18.3 controller, it is possible to work with a double float switch, i.e. to use one float switch for the lower switching point and another for the upper switching point, thereby increasing the buffer. In this case, however, it is not possible to use a float switch for a buffer.

4.3 K-Pilot 18.4

The K-Pilot 18.4 controller allows the use of a maximum of **3 additional electrical outputs** and 1 float switch input.

This controller allows various combinations of units.

For example, dosing for phosphate precipitation and a hygienisation with UV lamp or disinfectant dosing (e.g. chlorine) can be activated in combination to cover effluent classes C+P+H, D+P+H.

Additional compressors can be connected. A three-phase compressor (via an intermediate ORKA-S module) can also be operated instead of a single-phase compressor.

It is also possible to operate a buffer with time-controlled discharge in the main or bypass flow.

5 Installation manual for the controller

5.1 Safety instructions

The controller is intended for wall mounting and is therefore pre-mounted on a bracket. However, it can also be accommodated in a wall cabinet or an outdoor cabinet.

Commissioning is carried out by connecting the controller to the mains.
Only plug in the power plug after the existing units have been connected to the appropriate devices in the controller (see Chapter 6.2).

Only allow qualified personnel to carry out the electrical installation. The manufacturer accepts no liability for any damage caused as a result of carrying out the installation on one's own.

Non-compliance with the following safety instructions may result in a limitation or complete loss of liability on the part of the manufacturer.
Only specialists may perform any actions on the device or repairs of any kind.

Before commissioning and switching on the mains voltage, it must be ensured that:

- there is no visible damage to the device and the connection cables,
- in particular the mains connection and the connections of the units are properly connected,
- all connections have been made properly and professionally,
- the laying / routing of all cables and lines comply with the applicable regulations,
- the device is closed properly,
- the plant is properly secured.

Before working on the control console, please note the following important instructions:

- Disconnect the plant from the mains before opening the controller.
- To prevent tearing or damaging cables or hoses, open the control unit carefully and do not simply drop the cover.
- Replace individual fuses only in a de-energized state.
- Never use fuses with currents higher than those specified.
- Do not manipulate the circuitry of the system in any way.
- The relevant applicable regulations (EN, VDE, etc.) as well as the regulations of local energy suppliers must be strictly complied with.
- If a fuse is defective, it may only be replaced by a microfuse of the same type. In the standard case with one compressor, a fuse of the following type is installed at the factory: **microfuse, slow-blow, type 3.15 A, 5 x 20 mm** according to EN 60127-2/III with a maximum power loss of 1.5 W.

With a 2-compressor plant, the following type is used: microfuse, slow-blow, type 5.00 A, 5 x 20 mm.

Note:
For larger plants, a stronger fuse may be installed (max. 6.3 A T). Always replace fuses with a fuse of the same current rating.

The cables to the device must be laid correctly. In particular, it is important to prevent high mechanical stress on the cables, e.g. due to insufficiently fixed cables, as otherwise protection class IP 54 cannot be guaranteed.

5.2 Controller with wall bracket

The controller is fully mounted on the wall bracket.

Mount the control unit with wall bracket in a shady and wind-protected location. In climatically unfavourable locations, it is advisable to install a heater and/or cooling fan.

- When selecting the installation location, the weight of the finished unit (e.g. 10 kg as in this example) must be taken into account.
- A structure that transmits sound or vibrations is unsuitable for installation.
- The installation site must be dry, clean and well-ventilated – high dust accumulation must be avoided, as otherwise the air filter of the compressor can become clogged.
- Mount the controller with wall bracket vertically and horizontally on the wall.
- Place the compressor on the bracket and connect it to the controller using the 90° hose bend and two clamps provided.
- Plug the plug for the power supply of the compressor into the 230 V socket on the side of the controller.
- Please read this manual in full before commissioning the controller.

If the controller has to be opened, disconnect the plant from the mains before opening the controller. To prevent tearing or damaging cables or hoses, open it carefully and do not simply drop the cover.

5.3 Controller in outdoor cabinet or wall cabinet

The same principles as described above apply to the installation.
Set up the outdoor column in a shady and wind-protected location. In climatically unfavourable locations, it is advisable to install a control cabinet heater and/or cooling fan. This also applies if an external wall cabinet is used.
If the controller has to be opened, disconnect the plant from the mains before opening the controller. To prevent tearing or damaging cables or hoses, open it carefully and do not simply drop the cover.

Figure 1: Controllers in various installation variations

6 Connections to the controller

The following figure shows the standard version of the K-Pilot 18.1/18.3/18.4 controller with all connections on the housing. Depending on the application, additional electrical connections may be added.

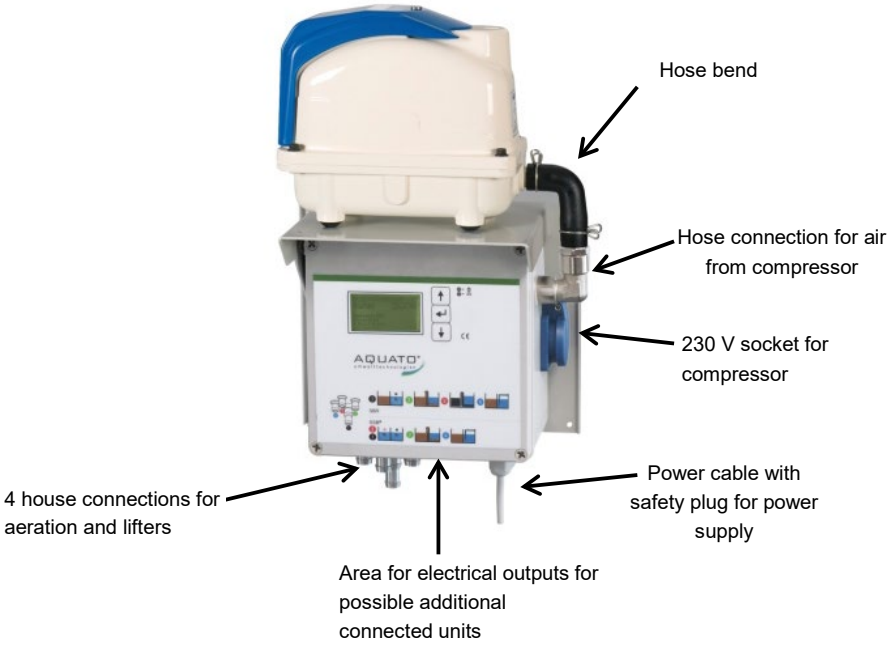


Figure 2: Connections on the K-Pilot 18.1/18.3/18.4 controller with compressor on bracket

6.1 Air connections – K-Pilot 18.1/18.3/18.4

The air inlet for the air supplied by the compressor is located on the right side of the controller. If the compressor is placed below the controller and the hose connection (see Figure 2) is turned downwards, it must be ensured that the air hose inside the controller is not twisted.

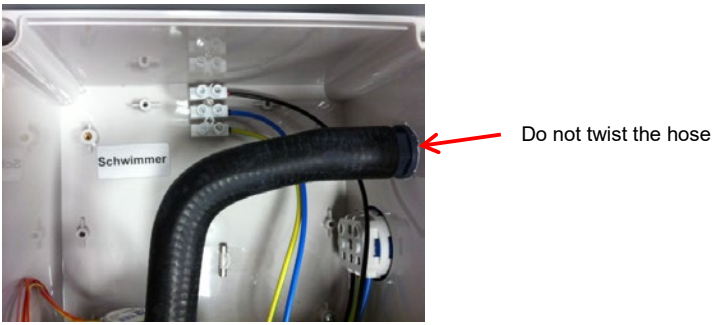


Figure 3: The hose inside the controller must not be twisted.

The hose connections for aeration and the lifters are located at the bottom of the housing. They are identified by colour coding on the front of the controller.

6.1.1 Assignment for SBR plants

The following assignment applies for **SBR** plants:

Aeration (rear) = black ❶
Sludge discharge (right) = green ❷
Charging (front) = red ❸
Clear water discharge (left) = blue ❹

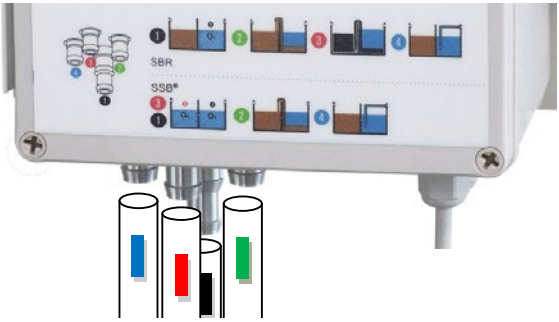


Figure 4: Controller with SBR air hose connections

6.1.1.1 SBR plants with 2 compressors

If 2 compressors are used, the air from the outputs of the two compressors is brought together and then led in a hose to the reactor. Here, the air is distributed to the individual membrane diffusers.

6.1.1.2 SBR plants with 3 compressors

If 3 compressors are used, the air from the outputs of the three compressors is brought together and then led in a hose to the reactor. Here, the air is distributed to the individual membrane diffusers.

6.1.2 Assignment for SSB plants

There are 2 aeration variants for **SSB** plants.

For the **standard variant** (aeration of 1st chamber) (see Chapter 6.1.3.1), the following assignment applies:

Aeration of last chamber(s) (rear)= black ❶
Sludge discharge (right) = green ❷
Aeration of first chamber(s) (front) = red ❸
Clear water discharge (left) = blue ❹

In this variant (see Figure 5), all 4 (air) outputs of the controller are used The front output is used for the aeration of the first chamber, the rear output for the aeration of the last chamber(s). The other two outputs are used for controlling the lifters.

For the **SSB special variant** (see Chapter 6.1.3.2), the following assignment applies:

Aeration (rear) = black ❶
Sludge discharge (right) = green ❷
Unoccupied (front) = red ❸
Clear water discharge (left) = blue ❹

In this variant (see Figure 6), only the rear (air) output of the controller is used for aerating all the chambers. The front output remains unused. The other two outputs are used for controlling the lifters.

6.1.3 Setting the aeration in SSB plants

With the SSB plant, all chambers of the plant are aerated. The first chamber must receive the largest portion of the injected air (approx. 2/3), the remaining air (approx. 1/3) enters the rear chamber(s).

6.1.3.1 Standard variant

During commissioning, "Aeration 1st chamber" is selected.

The front red output marked 3 is used to aerate the first chamber(s). The rear black output marked 1 is used to aerate the last chamber(s).

The controller is preset so that first the first chamber(s) is/are aerated via the front output 3 (display: "Aeration 1st C") and then the last chamber(s) via the rear aeration output 1 (display: "+Aeration"). The aeration times are already preset on the controller so that aeration takes place from the front output (red, chamber 1) 2/3 of the time and from the rear output (black, last chamber(s)) 1/3 of the time.

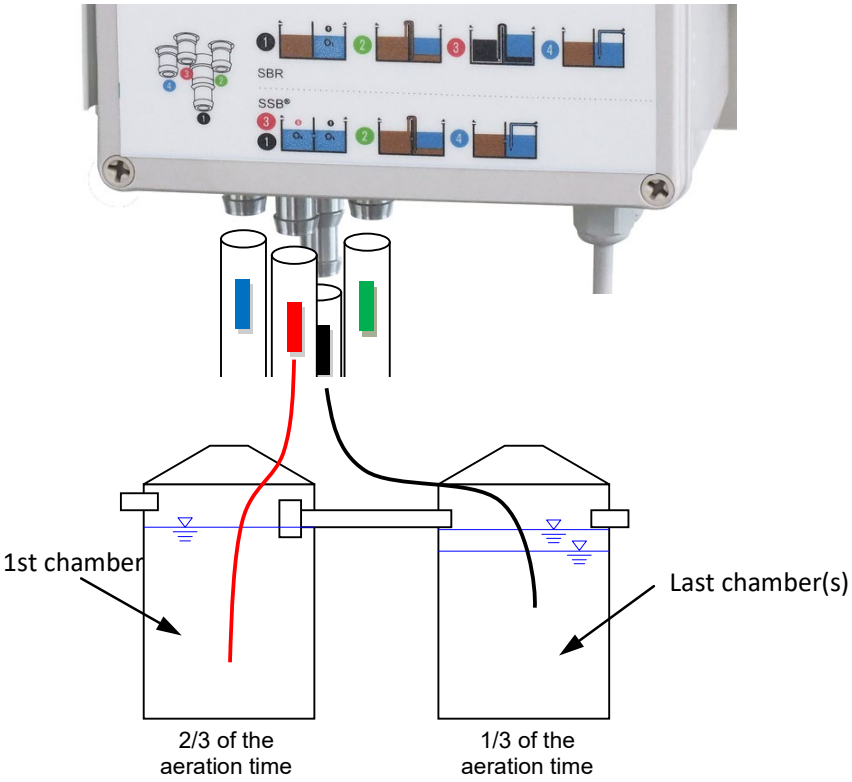


Figure 5: Hose connections – Assignment for SSB standard variant

6.1.3.2 Special variant

If aeration should only take place via output 1, this must be set in the controller, i.e. during commissioning, "Aeration 1st chamber" is selected in the second line "(NEW)" "NO".

The air must be distributed accordingly to the individual chambers using distributors (e.g. Y-pieces, etc.). It must be adjusted manually with shut-off valves so that approx. 2/3 of the air is blown into the first chamber and approx. 1/3 into the last chamber(s).

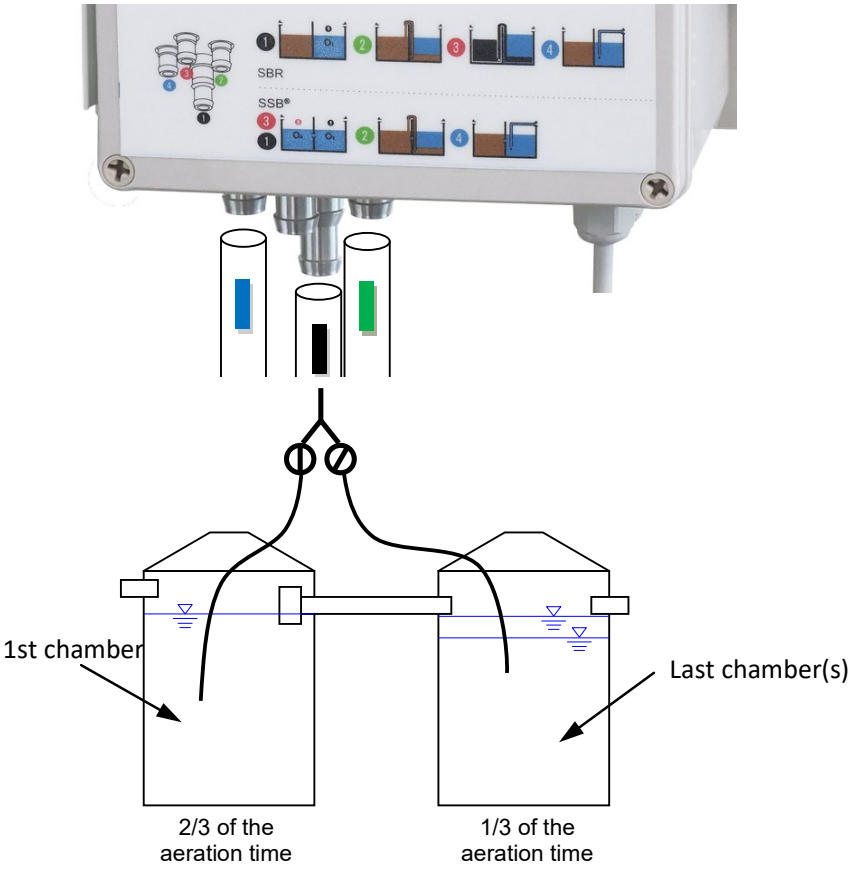


Figure 6: Hose connections – Assignment for SSB special variant

6.1.3.3 SSB plants with 2 compressors

Systems with 2 compressors can only be operated with controllers K-Pilot 18.3/18.4, which offer extended connection options (for connection information, see Chapter 6.2.5).
In such plants, the first tank is aerated directly by compressor 2. Tanks 2 and 3 are supplied with air by compressor 1 via the controller. Tank 2 is ventilated via the front, red controller connection marked 3. The aeration time is 2/3 of the total aeration time. With the remaining 1/3 aeration time, tank 3 is aerated via the rear black connection marked 1 (see

Figure 7).

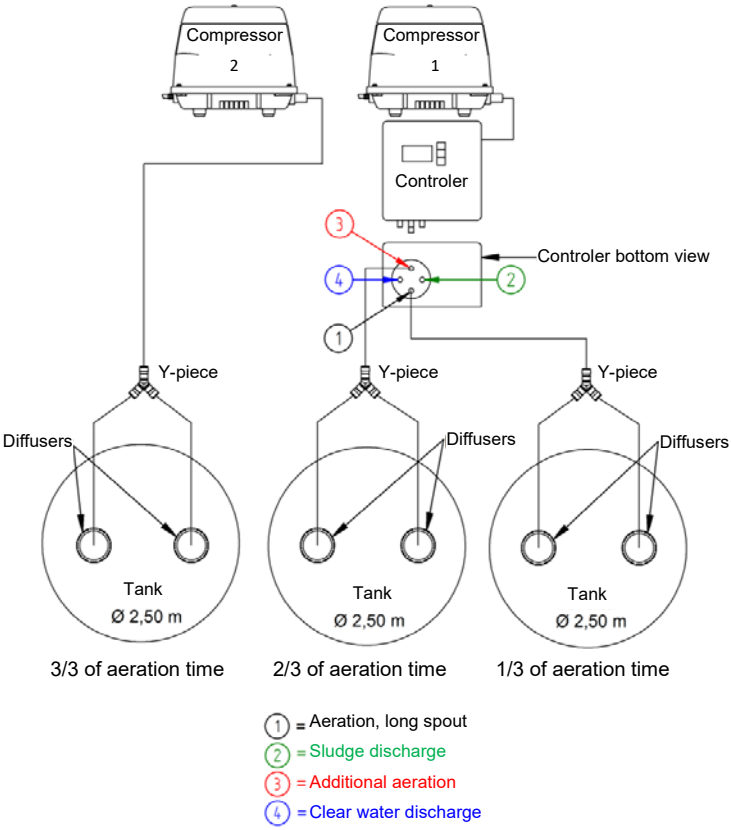


Figure 7: Hose connections – Assignment for SSB 2-compressor plant (3 tanks)

6.1.3.4 SSB plants with 3 compressors

Systems with 3 compressors can likewise only be operated with controllers K-Pilot 18.3/18.4, which offer extended connection options (for connection information, see Chapter 6.2.5).
In such plants, the first tank is aerated directly by compressor 3. Tank 2 is aerated directly by compressor 2. Tanks 3 and 4 are supplied with air by compressor 1 via the controller. Tank 3 is aerated via the front, red controller connection marked 3. The aeration time is 2/3 of the total aeration time. With the remaining 1/3 aeration time, tank 4 is aerated via the rear black connection marked 1 (see Figure 8).

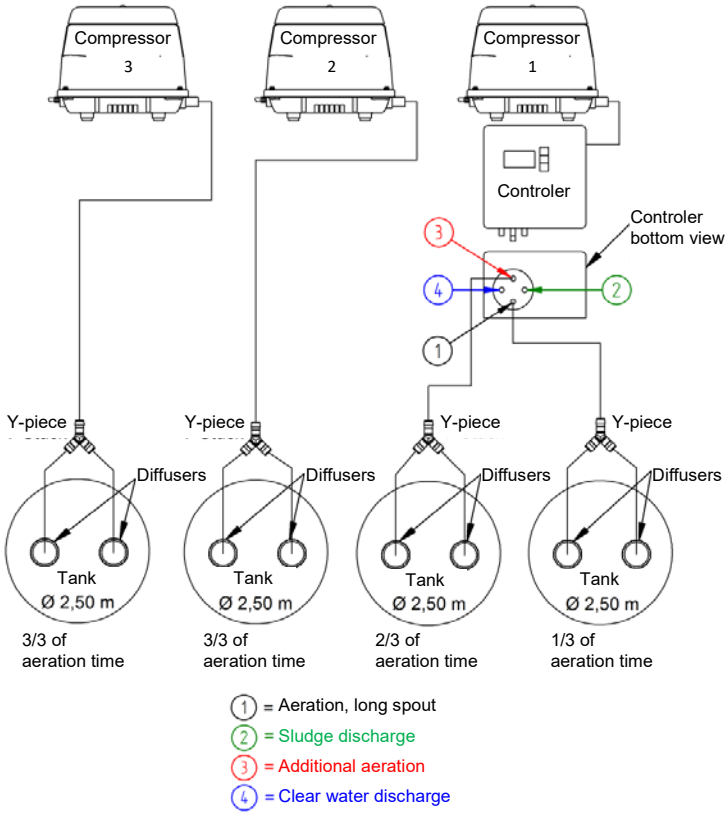


Figure 8: Hose connections – Assignment for SSB 3-compressor plant (4 tanks)

6.2 Electrical connections

6.2.1 Power connection – K-Pilot 18.1/18.3/18.4

The power connection is established using the supplied power cable (length approx. 1.5 m) on the controller with safety plug (terminals L1, N, PE) (plug type F). Fuse protection on grid side: max. 1 x 16 A G.

After plugging in the plug, the controller starts with a self-test with a duration of approx. 3 seconds while displaying "booting system...". Then the start message "AQUATO" appears. The display Vx.xx.xx (e.g. V2.07.09) in the lower part of the message is the version number of the software. A few seconds later, the standard display appears. (A number of settings must still be made at this point during commissioning – see Chapter 8.2, 8.4.2.5, 9.2 and 9.4.2.5.) The device is now ready for operation.

If the compressor (or another optional unit) is running, the green LED lights up. The red LED flashes in the event of a fault/error.

6.2.2 Potential-free contact – K-Pilot 18.1/18.3/18.4

An additional warning/flashing light can be connected via the potential-free contact on the circuit board in the controller housing. This can be supplied with power via the controller or via an independent external line. In **case of an alarm**, the relay closes the connection between **terminals 11 and 12** and opens the connection between 11 and 14.

If, in the event of a fault, the warning/flashing light should light up or flash to indicate the fault, select the connection via contacts 11 and 12 (see Figure 9: Potential-free contact, Figure 10 and Figure 11).

Terminals 14 12 11

Figure 9: Potential-free contact

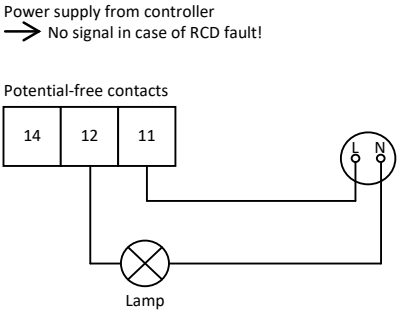


Figure 10: Potential-free contact with error indication – power supplied by controller

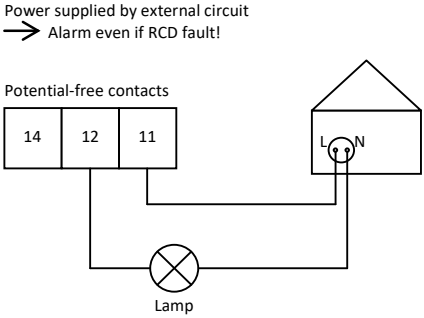


Figure 11: Potential-free contact with error indication even in case of power failure

In order to receive the additional warning signal even in the event of a power failure in the controller, the warning/flashing light must be connected to an external circuit (see Figure 11).

6.2.3 Socket for compressor – K-Pilot 18.1/18.3/18.4

The compressor is connected by plugging the plug into the socket on the side of the controller. Its running times are regulated by the connection via this socket.

Attention: The compressor must **not be connected to an external socket**, as otherwise the aeration cycles will not be maintained.
It must be connected to the designated socket on the side of the controller.

6.2.4 Float switch – K-Pilot 18.1 controller

The float switch for the **"Float" control type** is connected to the K-Pilot 18.1 controller via the lustre terminal attached to the rear panel of the controller (see Figure 12). This controls the clear water discharge and the aeration times and gives a flood alarm.
As a standard, a normally open contact is used with the control voltage: 230 V~ approx. 5 mA; switching between input L and N.

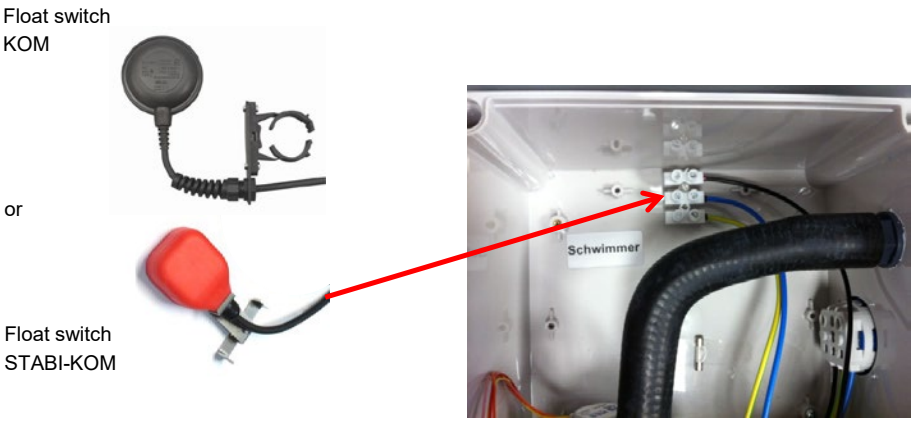


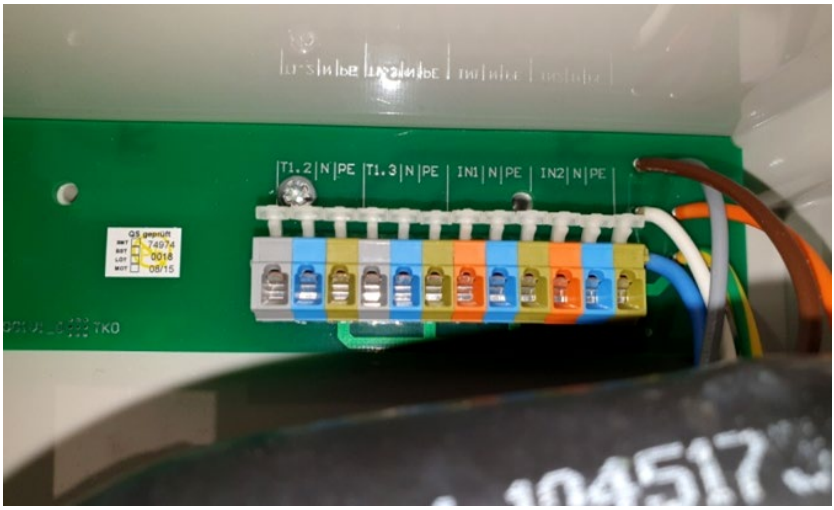
Figure 12: Connection of float switch to K-Pilot 18.1 controller

If the option **"Time" control type** is selected and the float switch is connected (see Figure 12), the float works merely as a flood detector without intervening in the cycle sequence. The float display for this float is then only shown temporarily on the display in the event of flooding.

6.2.5 Other connections – K-Pilot 18.3/18.4

6.2.5.1 Connections – K-Pilot 18.3

In the K-Pilot 18.3 controller, there is a circuit board with 4 electrical connections at the top of the rear panel. Of these, the two left connections are outputs and the two right connections are inputs. The float inputs are permanently occupied. The outputs can be freely assigned to the available functions. The controller therefore has 2 outputs and 2 inputs (see Figure 13).



Output:			**Output:**			**Input:**			**Input:**		
T1.2 grey	N blue	PE green	T1.3 grey	N blue	PE green	IN1 orange	N blue	PE green	IN2 orange	N blue	PE green
Charging pump* Clear water pump Sludge pump 2nd diffuser 3-phase diffuser UV lamp Dosing pump Buffer pump			Charging pump* Clear water pump Sludge pump 2nd diffuser 3-phase diffuser UV lamp Dosing pump Buffer pump			Float with control type: Float Float for flood indicator with control type: Time Float 1 with control type: Double Float			Float for buffer Float for flood indicator with control type: Float Float 2 with control type: Double Float		

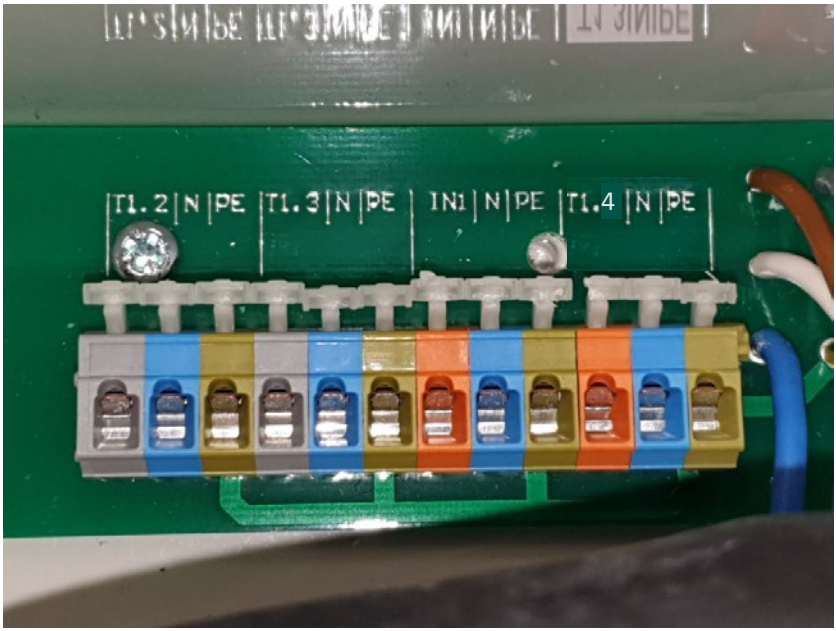
* only with SBR

Figure 13: Electrical connections with K-Pilot 18.3 controller

For example, the 2nd diffuser can be connected to output T1.2 and the clear water pump to output T1.3. The corresponding outputs must then be assigned to the connected units during commissioning (see Chapter 8.2, 8.4.2.5, 9.2 and 9.4.2.5).

6.2.5.2 Connections – K-Pilot 18.4

In the K-Pilot 18.4 controller, there is a circuit board with 4 electrical connections at the top of the rear panel of the controller. Of these, the two left connections and the far right connection are outputs, while the third connection from the left is an input. The outputs can be freely assigned to the available functions. The controller therefore has 3 outputs and 1 input (see Figure 14).



Output:			**Output:**			**Input:**			**Output:**		
T1.2 grey	N blue	PE green	T1.3 grey	N blue	PE green	IN1 orange	N blue	PE green	T1.4 orange	N blue	PE green
Charging pump* Clear water pump Sludge pump 2nd diffuser 3-phase diffuser UV lamp Dosing pump Buffer pump			Charging pump* Clear water pump Sludge pump 2nd diffuser 3-phase diffuser UV lamp Dosing pump Buffer pump			Float with control type: Float Float for flood indicator with control type: Time			Charging pump* Clear water pump Sludge pump 2nd diffuser 3-phase diffuser UV lamp Dosing pump Buffer pump		

* only with SBR

Figure 14: Electrical connections with K-Pilot 18.4 controller

For example, the precipitant dosing for phosphate precipitation can be connected to output T1.2, the UV lamp to output T1.3 and the clear water pump to T1.4. The corresponding outputs must then be assigned to the connected units during commissioning (see Chapter 8.2, 8.4.2.5, 9.2 and 9.4.2.5).

6.2.5.3 Float switch – K-Pilot 18.3/18.4

As a standard, a normally closed contact is used with the control voltage: 230 V~ approx. 5 mA; switching between input L and N.

For the K-Pilot 18.3 and K-Pilot 18.4 controllers, the float switch for the **"Float" control mode** is connected to the designated terminals IN 1, N, PE on the circuit board at the top of the rear panel of the controller (see Figure 15).

If the float switch drops down, it switches off the clear water discharge. If it does not drop down by the end of the clear water discharge, it triggers a flood alarm. If it remains down after the clear water discharge – or the subsequent sludge discharge – until the end of the aeration time, the plant switches to economy mode (shorter running times of the units and no clear water discharge). If the float switch floats up again, economy operation ends and the cycle continues with the aeration phase.

Figure 15: Connection for standard float switches for K-Pilot 18.3/18.4 controller

If the option **"Time" control mode** is selected and the float switch is connected to terminals IN 1, N, PE (see Figure 15), the float works merely as a pure flood detector without intervening in the cycle sequence. The float display for this float is then only shown temporarily on the display in the event of flooding.

6.2.5.4 Float switch as flood detector – K-Pilot 18.3

With the K-Pilot 18.3 controller, if the float switch for the **"Float" control mode** is connected to the designated terminals IN 1, N, PE on the circuit board at the top of the rear panel of the controller and "FLOAT" control type was selected during commissioning, a **second float switch** can be additionally connected to the designated terminals **IN 2, N, PE** (see Figure 16). This functions as a pure flood detector without interfering with the cycle sequence, but only if the "FLOAT FOR BUFFER" function (see Chapter 6.2.5.5 and 8.4.2.5) is not selected.

Figure 16: Connection of 2nd float switch as flood detector with K-Pilot 18.3

If the option **"Time" control mode** is selected and the float switch is connected to terminals IN 2, N, PE, it will not function unless the "FLOAT FOR BUFFER" function (see Chapter 6.2.5.5 and 8.4.2.5) is selected.

6.2.5.5 Float switch for buffer – K-Pilot 18.3

A float switch for a buffer (see Chapter 8.4.2.5) can also be connected to the K-Pilot 18.3 controller. This float switch is connected to the designated terminals IN 2, N, PE on the circuit board at the top of the rear panel of the controller (see Figure 17).

The float switch controls the buffer emptying process. If it has floated up, the buffer is emptied after the sludge has been discharged. If it drops down, the emptying process is ended.

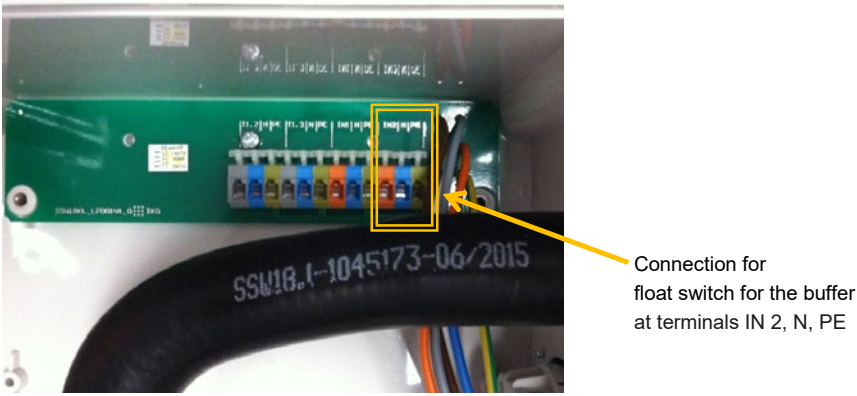


Figure 17: Connection of float switch for buffer to K-Pilot 18.3 controller

6.2.5.6 Double float – K-Pilot 18.3

With the K-Pilot 18.3 controller, it is possible to work with a double float switch. For this purpose, the float switch (S1) for the **"Double Float" control mode** is connected to the designated terminals IN 1, N, PE on the circuit board at the top of the rear panel of the controller (see Figure 18). The float switch (S2) is connected to the terminals IN 2, N, PE (see Figure 18).

With this controller setting, the two float switches are AND-linked, i.e. the controller always switches ON only when both float switches have floated up and always switches OFF only when both float switches have sunk down.

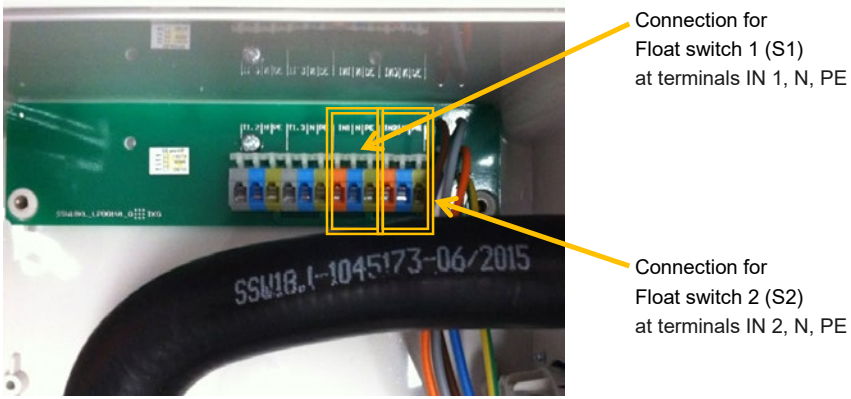


Figure 18: Connection of double float switch to K-Pilot 18.3 controller

6.2.5.7 Clear water pump

A **clear water pump** is used to overcome greater delivery heads. This then replaces the clear water lifter. A pump and an external float switch are used. The float switch is attached to the pump holder of the clear water pump.

The clear water pump and the external float are connected to the controller directly in the housing (see Figure 13 and Figure 14). The float switch is connected to IN1, and the pump can be connected to T1.2 or T1.3 (or with K-Pilot 18.4 also to T1.4). For operation with a clear water pump, the control type "Float" must be selected (for the required controller setting, see Chapter 8.4.2.5 and 9.4.2.5).

Figure 19: Clear water pump with external float switch

Possible connections for clear water pump in the K-Pilot 18.3 controller:
terminals T1.2, N, PE
or
terminals T1.3, N, PE

In the K-Pilot 18.4 controller, terminals T1.4, N, PE are also available

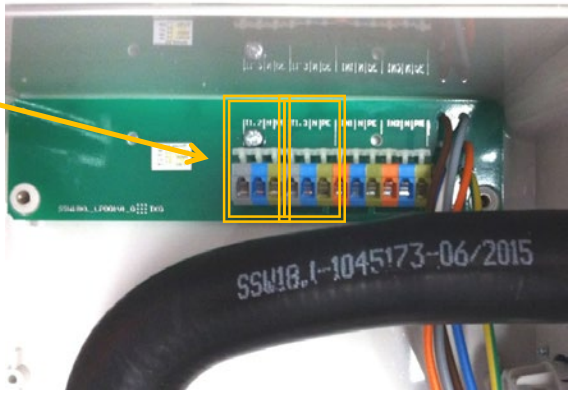


Figure 20: Clear water pump connection in K-Pilot 18.3 controller

Figure 21: Float connection for clear water pump in K-Pilot 18.3/18.4 controller

6.2.5.8 Other connectible units

If a **surplus sludge pump** is required, it can be connected in the same way as a clear water pump. In addition, a **2nd compressor**, a **UV system** (always with float switch and clear water pump), a **dosing pump** (always with float switch) or a **buffer pump** can be connected.

If the plant is to be connected to a **UV lamp** for the purpose of hygienisation, "FLOAT" must be selected as the control type and a clear water pump and a float switch are required for operation (see Chapter 8.4.2.5 and 9.4.2.5).

If a **dosing** is to be selected, "FLOAT" must be selected as the control type. By selecting "PO3", the dosing pump can be used for precipitant dosing for **phosphate precipitation** or, by selecting "C", for the dosing of a **C source** (see Chapter 8.4.2.5 and 9.4.2.5).

When using the controller to operate an SSB plant, a **buffer lifter** can be used to empty the buffer instead of the **buffer pump**. However, in this case, the aeration must be selected in special cases (see Chapter 6.1.3.2, 8.4.2.5 and 9.4.2.5).

It is also possible to use a **3-phase compressor** should this become necessary, e.g. due to high water depth (see Chapter 8.4.2.5 and 9.4.2.5). This is then connected via an ORKA-S module and the compressor for the lifters is not controlled for aeration purposes. The current monitoring can be switched on or off separately for this compressor.

If, for example, a second compressor and phosphate elimination are required to operate the plant, the compressor could be connected to T1.2 and the phosphate elimination to T1.3.

A maximum of two additional units and two float switches can be operated with the K-Pilot 18.3 controller.

Three additional units and one float switch can be operated with the K-Pilot 18.4 controller.

When **operating with two additional compressors**, these are operated in parallel – via a double safety socket – with the setting "2ND AERATOR" and connected to one output. This allows an additional unit to be connected to the K-Pilot 18.3 controller (or 2 additional units to the K-Pilot 18.4 controller). For example, the sockets for the two additional compressors could be connected to T1.2 and a sludge pump to T1.3.

7 Commissioning of the plant

7.1 Prior to commissioning

The relevant accident prevention regulations, guidelines, safety rules and leaflets of the responsible employers' liability insurance association (DGUV), as well as the regulations of the Association of German Electrical Engineers (VDE) must be observed when constructing and operating wastewater treatment plants.

Before commissioning the plant, the installation and setup of the plant components – as described in the **installation and operation manual** – must be completed.

The volumes and structure of the tanks must be designed in accordance with the wastewater treatment and process engineering specifications. The pipelines must be connected appropriately.

Make sure that the roof ventilation functions properly. If it is not sufficient, a separate vent pipe must be installed. Forced ventilation may also be required.

The leak test must be carried out before commissioning.

The technology must be properly installed and connected in accordance with the wastewater treatment and process engineering requirements.

Prior to commissioning, the plant must be filled with water up to 5 cm above $H_{W,min}$.

The electrical installation must have been carried out and completed – by qualified personnel.

(See Chapter 5 and 6)

7.2 Commissioning

The plant is put into operation by connecting the power cable of the controller to the mains (see Chapter 8.2 and 9.2)

Only plug in the power plug after the compressor and – if present – the float switch and motor pump have been connected to the designated devices in the controller.
(See Chapter 6.2)

After plugging in the plug, the controller starts (see 8.2 and 9.2) with a self-test with a duration of approx. 3 seconds. Then the start message "AQUATO" appears. The display Vx.xx.xx (e.g. V2.07.09) in the lower part of the message is the version number of the software.

The green and red LEDs then simultaneously light up continuously, indicating that the device is in the initialization phase.

Then the following points, among others, must first be worked through when commissioning the controller for the first time (see Chapter 8.2 and 9.2): password, language, date and time, basic type, aeration, plant type with PE number, control type time/float and denitrification. The controller then switches to manual mode so that the commissioning engineer can test the functions individually.

At the end of manual mode, the controller switches to the standard display. The device is now ready for operation. This is indicated by a flashing triangle ◄ in the lower right corner of the LCD display. The plant now runs fully automatically.

The commissioning engineer must ensure that the parameter settings in the controller have been made in such a way that they comply with the requirements (e.g. effluent class) from the approval and the water law license for the system on which the controller is to be used.

8 Operation as AQUATO® STABI-KOM

The small wastewater treatment plant must be operated by the owner or a competent person commissioned by the owner (operator).

After commissioning, the plant is operated fully automatically. It is controlled by a PLC. The sequence and flow of the phases are programmed in the controller. The times for the aeration intervals, the denitrification phase (optional) as well as for the discharge of the purified wastewater and the return of the surplus sludge are preset, but can be readjusted if necessary.

In the standard case, the cycles run on a purely time-controlled basis. However, it is possible to use a float switch (see Chapter 6.2.4 and 6.2.5.3) and thereby additionally control the plant via the water level.

If any faults occur during operation of the plant, they are reported visually and acoustically by the controller. The red LED flashes and the buzzer sounds. The error message remains in the main display until the error is acknowledged (see Chapter 8.4.3.5).

The error message remains stored in the error logbook and can thus be evaluated later.

The controller has a power failure alarm. In the event of a power failure, an alarm tone sequence is generated approx. every 30 seconds in order to notify the operator that wastewater treatment has stopped. If the power supply returns after a power failure, the device switches on again automatically.

8.1 Operation and displays of the controller

The controller has a graphic LCD display with 128 x 64 pixels. Indications are made in plain text and using two LEDs. Operation is carried out via three buttons.

Arrow button for selecting menu items

Middle button to confirm inputs

Arrow button for selecting menu items

Figure 22: Control buttons

If the green and red LEDs simultaneously light up continuously, the device is in the initialization phase.

During operation, the illuminated green LED indicates that a unit (e.g. pump or compressor) is running. In addition, a flashing triangle ◄ is visible in the lower right corner of the LCD display, which flashes at one-second intervals throughout operation.

In the event of a fault, the red LED flashes and the buzzer sounds.

The standard display on the LCD shows the date and time in the top line and the current cycle phase in large letters below, e.g. "AERATION". In the other menus, the name of the respective menu is located at the top and the individual menu items below this. The ↓ ↑ buttons are used to change from menu to menu. Press the middle ↵ button to enter the desired menu. The ↓ ↑ buttons are also used to switch between the menu entries.

The selected menu item is marked by means of a dark bar with inversely displayed text. After selecting the line of the desired menu item, press the middle ↵ button to enter the input mode of the respective submenu. Input mode is indicated by a selected (inversely displayed) line or digit. The ↓ ↑ buttons can now be used to select or change the options or digits. The desired entry is confirmed by pressing the middle ↵ button.

If a multi-digit number input is required, the highest digit is changed first using the ↓ ↑ buttons. The middle ↵ button is used to confirm the selection, after which one moves on to the next digit, etc. If the selection of different options is required for the input (e.g. YES / NO), the desired selection is also made using the ↓ ↑ buttons. If the desired option appears on the display, it is confirmed with the middle button.

You can also switch back from the submenus to the main menu level using the ↓ ↑ buttons by moving the selection bar in one direction until it disappears from the menu, after which the next main menu opens.

An error is acknowledged by pressing the middle ↵ button. Then the buzzer is switched off and the window "DELETE ALARM?" opens, after which it automatically switches to the query "ARE YOU SURE?" If you answer "YES", the error display is deleted and the red LED goes out. The error message remains stored in the error logbook and can thus be evaluated later.
If the "ARE YOU SURE?" query is answered with "NO", the error message remains in the main display.

Then the info window opens for approx. 3 seconds with the information about the selected settings.

8.2 Commissioning of the controller

Before commissioning the plant, primary sedimentation and biological treatment must be filled with water up to 5 cm above $H_{W,min}$ and the housing of the controller – if it was opened – must be closed.

The commissioning of the controller begins with the insertion of the power plug of the controller. After plugging in the plug, the controller starts with a self-test with a duration of approx. 3 seconds while displaying "booting system...".
Then the start message "AQUATO" appears. The display Vx.xx.xx (e.g. V2.07.09) in the lower part of the message is the version number of the software. The check of the valve runs simultaneously. During this initialization phase, the green and red LEDs simultaneously light up continuously.

The display "FIRST SETTINGS" then appears during initial commissioning.
Subsequently, when commissioning the K-Pilot 18.1, 18.3 and 18.4 controllers, the following must first be entered (see Chapter 8.4.2.5, 8.4.3.1 and 8.4.3.6):

- Password (4 digits) with password 1 for K-Pilot 18.1, 18.3 and 18.4
  or password 2 for advanced options for K-Pilot 18.3/18.4
- Language
- Date and time
- Basic plant type – here select: "**STABI SSB**"
- Aeration 1st chamber YES / NO
- Depending on selection, buffer operation with air-lifter YES / NO
- Depending on selection, float for buffer YES / NO
  (Attention! Do not select for controller 18.1/18.4; although selectable, it does not function!)
- Plant size, e.g. "4 PE"
- Control mode: "TIME", "FLOAT" or "2x FLOAT"
  (Attention! If the additional functions **Dosage** and/or **Hygienisation** are required, select the control type: "**Float**" here.)
- Denitrification? YES / NO

For controller **K-Pilot 18.1/18.4, do not** select **Float for buffer**. Although this function is displayed, it is not available for the K-Pilot 18.1 and 18.4 controllers.

For controller **K-Pilot 18.1/18.4, do not** select **2x Float**. Although this function is displayed, it is not available for the K-Pilot 18.1 and 18.4 controllers.

The following additional options can only be selected for the K-Pilot 18.3 and K-Pilot 18.4 controllers during commissioning if password 2 was entered (see Chapter 8.4.2.5):

- Three-phase aerator? YES / NO
- Additional functions, e.g. "2nd AERATOR", "BUFFER", "HYGIENISATION" or "DOSAGE" (see Chapter 8.4.2.6).
  A **clear water pump** is always additionally required for hygienisation with **UV lamp**.
  The input of additional functions is ended with the selection: "BACK": (see Chapter 8.4.2.5)

Additional queries follow depending on the selection (see Chapter 8.4.2.5):

- If the "BUFFER" function was selected, a query appears after the menu has been exited as to whether the buffer should be operated with a float switch. If this is intended, the query "FLOAT FOR BUFFER" must be answered with "YES".
- If the "HYGIENISATION" function was selected, a query appears after the menu has been exited as to which type of hygienisation is desired/required. If a **UV lamp** is to be operated, select "**UV**"; if a **disinfectant**, e.g. chlorine, is to be added, select "**Cl**". A clear water pump is additionally required for the operation of the UV lamp.
- If the "DOSAGE" function was selected, a query appears after the menu has been exited as to which type of dosing is desired/required. If a **phosphate precipitation** is to be operated, select "**PO3**"; if a **C source** is to be added, select "**C**".

After these inputs, the controller automatically switches to manual mode (see Chapter 8.4.2.2 and 8.4.2.3). The various functions can be checked in manual mode. Once manual mode has been ended, the valve position required for the automatic cycle is approached, then the controller displays the message "booting system...", after which the start message "AQUATO" appears again and the valve is checked.

The automatic cycle is then started. This concludes the commissioning process.

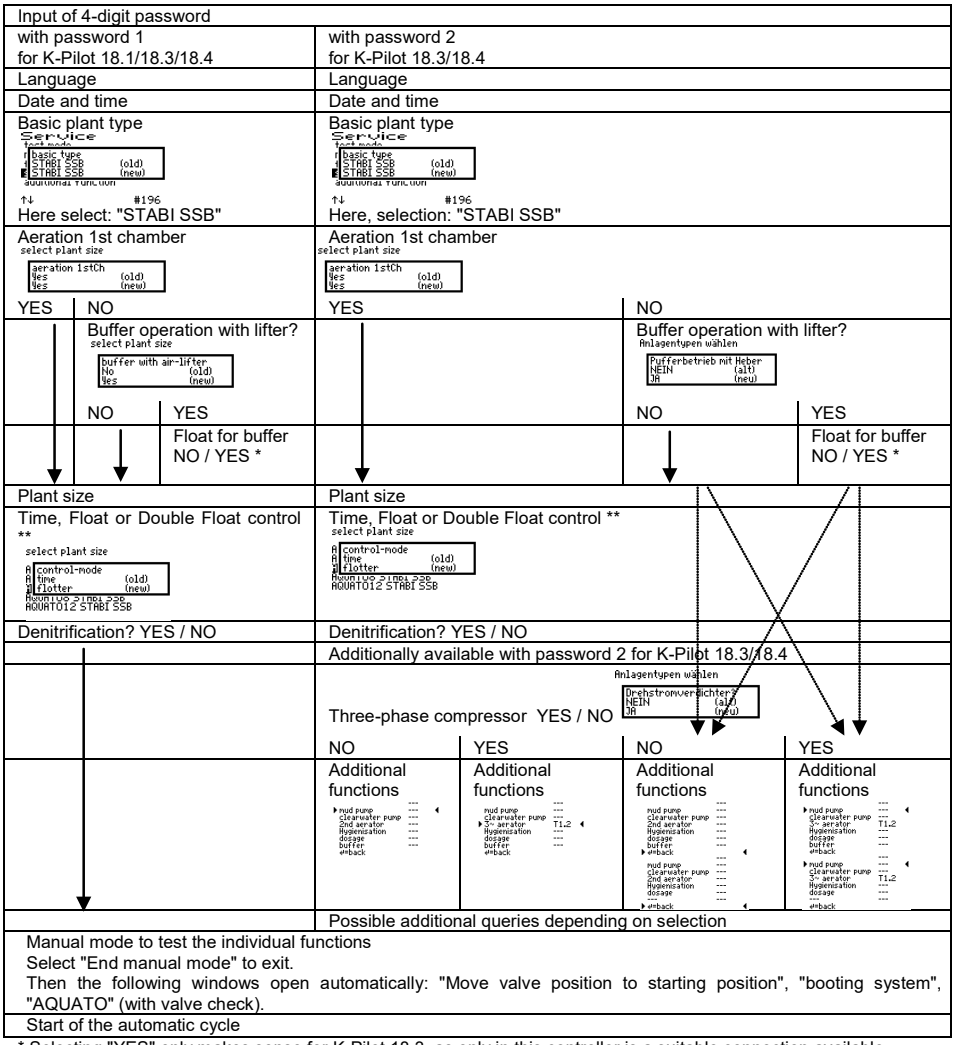
The commissioning engineer must ensure that the parameter settings have been made in such a way that they comply with the requirements (e.g. effluent class) of the approval and the water law license for the system on which the controller is to be used.

The automatic cycle goes through the following work phases (these vary depending on the exact setting):

- Surplus sludge discharge
- Buffer emptying
- Pressure monitoring
- Aeration
- Dosing
- Sedimentation phase
- Clear water discharge

After completing these phases, the next cycle starts again from the beginning.

The following is a flowchart of the commissioning process:



* Selecting "YES" only makes sense for K-Pilot 18.3, as only in this controller is a suitable connection available.
** Select "2x Float" only makes sense for K-Pilot 18.3, as only in this controller are suitable connections available.

Figure 23: Commissioning sequence for K-Pilot 18.1/18.3/18.4 controller

Do not select any additional functions for K-Pilot 18.1, as there are no physical outputs for these functions, i.e. they do not work, although they are displayed in the Manual Mode and Parameters menus.

8.3 Main display

In the standard display, the controller shows the switching status of the plant and the units, e.g.:

1st line: Date and time and, if the setting aeration 1st chamber "Aeration 1st ch" "YES" was selected, the asterisk "*" after the time indicates this setting

2nd line: Current SSB phase, including "Sludge Return", pressure monitoring “Check Press.”, "+Aeration", "+Aeration 1stCh", etc. (or for aeration in special cases: "Aeration"), "Sedimentation", "Clearwater” discharge and additional phases depending on the setting

2nd line (right): Normal, economy or holiday mode of the plant and below that, in normal mode, the remaining time of the current phase or, in economy mode, the time that has elapsed since the start of the economy mode phase.

3rd line Indicates denitrification (for effluent class D only), otherwise blank line

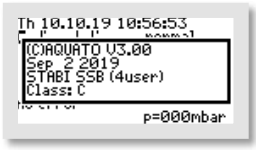
4th line: Indicates which unit is active, otherwise – if no unit is switched on – blank line

5th line: Operating current of the active unit (compressor, if applicable clear water pump, etc.)

6th line: Error display, otherwise "NO ERROR" if there is no error message

7th line: Float status up / down (only visible if float is activated), buffer float up / down (only visible if buffer float is activated), on the right the currently available back pressure, on the far right triangle "◄" flashing every second as an operation indicator

If the ↵ button is pressed in the standard display, an info window appears for approx. 3 seconds. This window displays the following:



- Software version
- Date of the version
- Type STABI SSB and the set PE number
- Effluent class, special settings, e.g.: cw pump (=clear water pump) or buffer

The exact display depends on the selected settings.

In addition, the ↵ button can be used in this menu to shut off the buzzer or the alarm (see also Chapter 8.4.3.5).

8.4 Menu

8.4.1 Menu structure

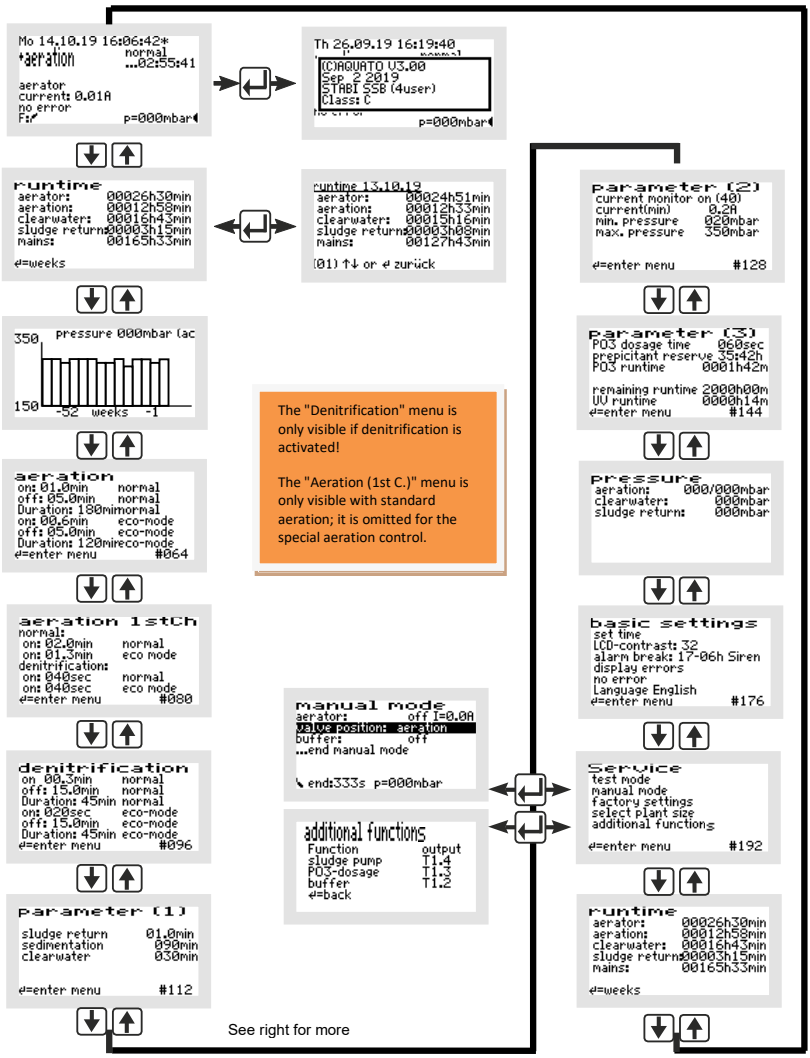


Figure 24: Menu structure of the AQUATO® STABI-KOM

The exact display depends on the status of the system and the set parameters. The different variants of the display are explained in more detail below.

Use the ↓ ↑ buttons to move from menu to menu. If you move constantly in the same direction, you will eventually return to the standard display.

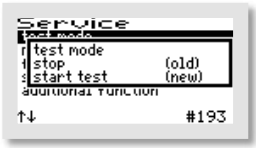
To access the submenus in the menu displayed, the ↵ button must be pressed. After pressing the ↵ button, either a window opens directly or the first menu item is marked by a black bar, depending on the selected menu.

The individual points are selected with the ↓ ↑ buttons. The ↵ button is used, wherever possible, to enter the submenu or edit mode.

8.4.2 "Service" menu

The Service menu is basically intended for the service technician. The following can be selected:
- System test / test mode
- Manual mode
- Factory settings (only with password 2)
- Select plant types (only with password 1 or 2)
- Additional functions

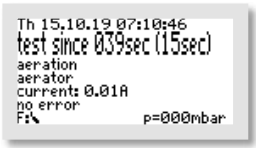
8.4.2.1 System test / test mode



Test mode is used to check whether the units consume power properly. If the automatic test mode has been selected with the ↓ ↑ buttons via the menu item "TEST MODE", it is called up with the ↵ button. The "TEST MODE" window offers the selection "STOP" or "START TEST". These two options are selected with the ↓ ↑ buttons in the bottom line "(NEW)". After selecting and confirming "START TEST", the system test begins.

If the "FLOAT" CONTROL MODE is set, the float switch must be moved up and down 3 times at the beginning of the system test to check the function of the float switch. After that, the test proceeds fully automatically.
With the "TIME" CONTROL MODE, the float test is skipped and the fully automatic test mode starts immediately.

The function test of the float switch is only carried out at the beginning of the system test with the "FLOAT" CONTROL MODE.



During test mode – which lasts approx. 100 seconds – the main display of line 2 changes to: "Test since XX sec".
The system test checks the individual functions successively and tests whether they function correctly. If everything is functioning correctly, no alarm message is issued.
Test operation can be cancelled by pressing the ↵ button.

If the "FLOAT FOR BUFFER" option is set, the float switch for the buffer must be moved up and down 3 times at the end of the system test to check the function of the float switch. Test mode then ends.

The function test of the float switch in the buffer at the end of the system test is only carried out if the option "FLOAT FOR BUFFER" is selected.

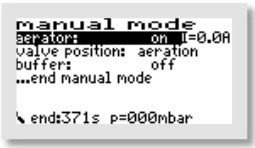
The system test lasts approx. 100 seconds. Then test mode ends automatically. If the function test of the float switch is not carried out, the system test ends after approx. 300 seconds without further testing.

After completing the test mode, the interrupted cycle is continued in automatic mode. If the sedimentation phase is interrupted by the system test in the last 30 minutes of its running time, the remaining time of the sedimentation phase is automatically extended to 30 minutes following manual mode in order to ensure that only the purified water can be discharged from the plant.

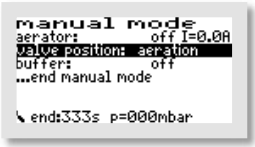
8.4.2.2 Manual mode with the K-Pilot 18.1 controller

The different settings for the "Aerator" and the "Valve Position" can be made in the manual mode of the K-Pilot 18.1 controller. The exact display depends on the parameters set (during commissioning).

In manual mode, the “AERATOR” can be switched "ON" or "OFF" manually and any available VALVE POSITION can be approached (e.g. for a test run).
The ↓ ↑ buttons are used to select the ROTARY VALVE or the AERATOR.

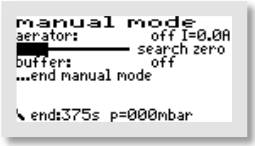


If the AERATOR is selected, it can be switched "ON" or "OFF" with the ↵ button.



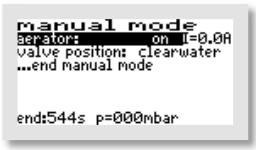
If the "VALVE POSITION" is selected, the ↵ button is used to open the window for setting the valve position for the different possible operating states available depending on the specific preset ("SLUDGE", "BUFFER", "AERATION", "AERATION 1st CH", "CLEARWATER").

The ↓ ↑ buttons are used to select the desired valve position and, after pressing the ↵ button, the valve moves to this position. If the compressor is switched to "ON", the function can be tested additionally in the tank.



After selecting the desired valve position, the controller first searches the zero point.

The selected position is then approached. This is indicated by the progress bar in the menu.



Once the position has been reached, the function is also carried out with the compressor switched on as in automatic mode, as in this example the clear water discharge, and can also be checked in the tank.

If "FLOAT" control mode was selected (during commissioning), the float switch symbol indicating the current float position is visible at the bottom left.

If the float switch is moved up and down, the indicator in the display also changes accordingly.

Manual mode is ended via the menu item "...END MANUAL MODE".

The valve is moved back to its initial position.

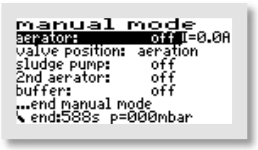
At the end of manual mode, the treatment cycle continues.

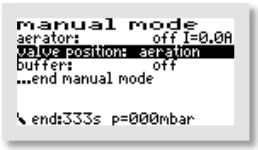
If the manual mode is not ended with "...END MANUAL MODE", the controller automatically switches back to automatic mode 15 minutes after the last pressing of a button.

Once manual mode has been ended, the controller continues the interrupted cycle in automatic mode. If the sedimentation phase is interrupted by manual mode in the last 30 minutes of its running time, the remaining time of the sedimentation phase is automatically extended to 30 minutes following manual mode in order to ensure that only the purified water can be discharged from the plant.

8.4.2.3 Manual mode with the K-Pilot 18.3 and 18.4 controllers

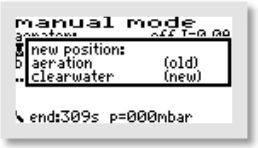
In addition to the "Aerator" and "Valve position" parameters, which are always available, the manual mode of the K-Pilot 18.3 and 18.4 controllers allows further settings to be made. The exact display depends on the parameters set (during commissioning).





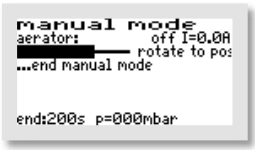
The ↓ ↑ buttons can be used to select between the always available parameters "AERATOR" and "VALVE POSITION" as well as further menu items varying according to the preset, such as "SLUDGE PUMP", "CLEARWATER PUMP", "BUFFER", "2nd AERATOR", "HYGIENISATION" and "DOSAGE". The selection is made by moving the black bar to the desired entry.
If "AERATOR" is selected, it can be switched "ON" and "OFF" with the ↵ button.

If the "VALVE POSITION" is selected, the ↵ button is used to open the window for setting the valve position for the different possible operating states available depending on the specific preset ("SLUDGE", "BUFFER", "AERATION", "AERATION 1st CH", "CLEARWATER").

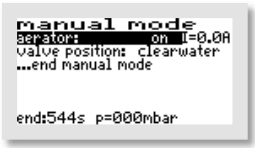


The ↓ ↑ buttons are used to select the desired valve position and, after pressing the ↵ button, the valve moves to this position. If the compressor is switched to "ON", the function can be checked additionally in the tank.

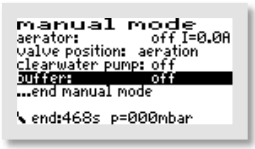
After selecting the desired valve position, the controller first searches the zero point.



The selected position is then approached. This is indicated by the progress bar in the menu.



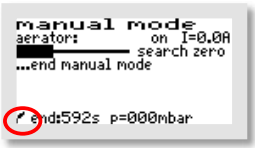
Once the position has been reached, the function is also carried out with the compressor switched on as in automatic mode, as in this example the clear water discharge, and can also be checked in the tank.



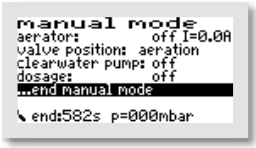
If **additional functions** were selected during commissioning, the other units, such as a buffer pump ("BUFFER"), are found below the always available parameters "AERATOR" and "VALVE POSITION". The other menu items – which vary depending on the preset – such as "SLUDGE PUMP", "DOSAGE", "CLEARWATER PUMP", "2nd AERATOR", "HYGIENISATION" and "BUFFER", can also be selected with the ↓ ↑ buttons by moving the black bar to the desired entry. The selected unit can be switched "ON" and "OFF" with the ↵ button. This allows the functioning of the units to be tested individually.

In the example, the menu item "HYGIENISATION" was selected and switched "ON" with the ↵ button.

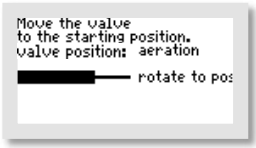
If "FLOAT" control mode was selected (during commissioning), the float switch symbol indicating the current float position is visible at the bottom left.



If the float switch is moved up and down, the indicator in the display also changes accordingly.



Manual mode is ended via the menu item "...END MANUAL MODE".



The valve is moved to its initial position.

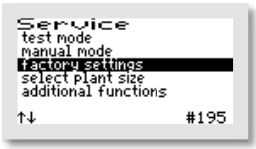
At the end of manual mode, the treatment cycle continues.

If the manual mode is not ended with "...END MANUAL MODE", the controller automatically switches back to automatic mode 15 minutes after the last pressing of a button.

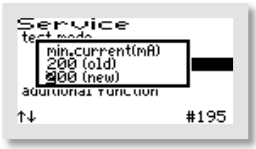
Once manual mode has been ended, the controller continues the interrupted cycle in automatic mode. If the sedimentation phase is interrupted by manual mode in the last 30 minutes of its running time, the remaining time of the sedimentation phase is automatically extended to 30 minutes following manual mode in order to ensure that only the purified water can be discharged from the plant.

8.4.2.4 Factory settings

Under "FACTORY SETTINGS", the current error limit can be changed. The **resetting** of the controller, which is also possible in the factory settings, is **not permitted** throughout operation. Access to the factory settings is possible **with password 2 only**.



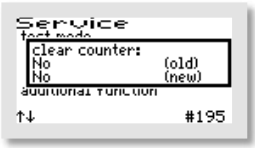
The following values can be changed/reset in the "FACTORY SETTINGS".



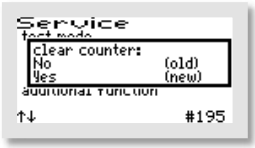
The first window that opens is "MIN. CURRENT (mA)". Here you can change the limit at which an error is displayed. The default setting is 200 mA. The lowest possible limit is 50 mA. The ↓ ↑ buttons can be used to change the values digit by digit starting from the left in the bottom line "(NEW)". The selected value is accepted with the ↵ button. After confirming the 3rd digit, the next window opens automatically.

The subsequent deletion options are not permitted during the entire operating time of a small wastewater treatment plant. The queries must be answered with "NO".

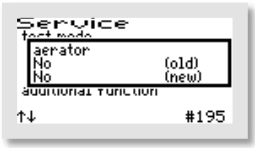
All queries in the Factory Settings menu must be answered with "NO".



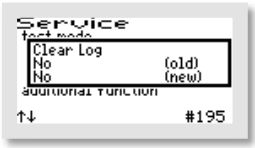
The "CLEAR COUNTER" window opens.
If "NO" is selected, the menus with the individual units are skipped and the "CLEAR LOG" window opens immediately.
→ **Answer: "NO".**



If "YES" is selected, the controller moves on to the individual units each time the ↵ button is pressed. In the first window to follow, i.e. "AERATOR", the counter of the running time of the compressor can be reset to zero with the ↓ ↑ buttons by selecting "YES" in the bottom line "(NEW)".
→ **Answer: "NO".**



The same procedure can be followed in the subsequent windows "AERATOR", "FILLINGPHASE", "AERATION", "CLEARWATER", "SLUDGE RETURN", "MAINS", "UV" and "DOSAGE TIME".
→ **Answer: "NO".**

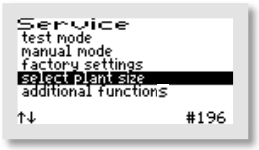


The last window to open in this menu is "CLEAR LOG". If "YES" is selected here, all entries and settings are deleted. Then the controller starts over again with commissioning.
→ **Answer: "NO".**

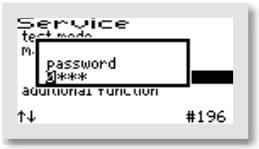
PLEASE NOTE! The operations "**Clear counter**:" and "**Clear log**" are **prohibited** throughout the operation of a plant, as the operation log must record the running times.

8.4.2.5 Selecting a plant type with the K-Pilot 18.1/18.3/18.4 controller

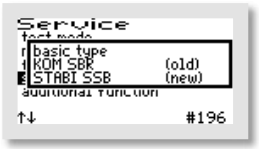
In this menu, you can set/change the plant type and size as well as other parameters required for operation.



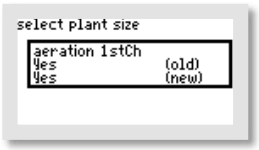
Select the menu item "SELECT PLANT SIZE".



Then enter password 1 – or, for further settings with K-Pilot 18.3 /18.4, password 2 – digit by digit and confirm with the ↵ button to enter the menu.

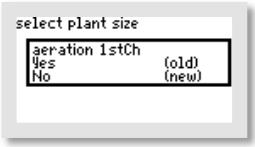


First, the "BASIC TYPE" of the system is requested: "KOM SBR" or "STABI SSB". Use the ↓ ↑ buttons to select the desired type in the second line "(NEW)".
For operation as SSB plant, select "**STABI SSB**" and confirm with the ↵ button.

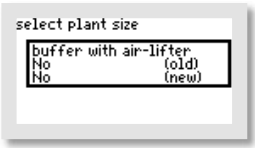


After selecting the basic type, "AERATION 1st Ch" is queried in the window. In the standard case, the plant is set so that the first chamber is aerated via the front output 3 marked in red (with the red cap). For this, confirm the selection "YES" with the ↵ button to select this setting.
("YES" → continue with → Select Plant Size PE number)

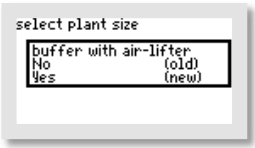
In the standard variant, the aeration of the first chamber is carried out separately via output 3 (see Chapter 6.1.3.1). However, if a compressed air lifter is to be used to empty a buffer, the special aeration variant can also be selected (see Chapter 6.1.3.2).



If all chambers of the plant are to be aerated from the rear, longer output 1 (black) (= special control, see Chapter 6.1.3.2), "NO" must be selected in the window "AERATION 1st Ch". Since output 3 (red) is now still available, a compressed air lifter can be connected to empty the buffer in this case.

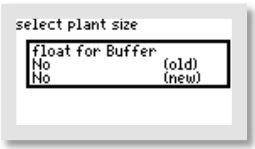


For this reason, "BUFFER WITH AIR-LIFTER" is offered as the next selection.
("NO" → continue with → Select Plant Size PE number)



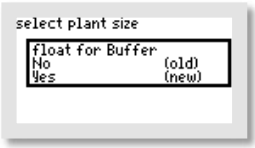
If the plant is to be operated with a buffer emptied with a compressed air lifter, select the "YES" option under "BUFFER WITH AIR-LIFTER".

The next window asks whether the buffer emptying process should be controlled by a float switch.

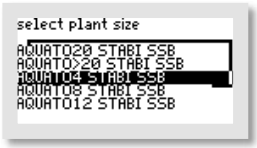


With the **K-Pilot 18.1/18.4** controller, the buffer can **only** be operated on a purely **time-controlled** basis without a float switch. Therefore "**NO**" must be selected for the query "**Float for buffer**".
("NO" → continue with → Select Plant Size PE number)

For **K-Pilot 18.1/18.4**, be sure to select "**NO**" for the "**Float for buffer**" query, as there is no physical input for an additional float.

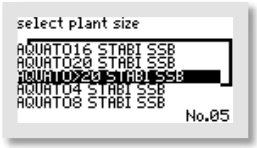


With the **K-Pilot 18.3** controller, the buffer can be operated both with a float switch and on a time-controlled basis without a float switch.
If the buffer is to be operated with a float switch, select "YES" for the query "FLOAT FOR BUFFER", otherwise "NO".

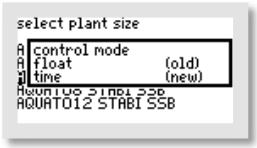


Then use the ↓ ↑ buttons to select the desired/required PE number as the plant size. If the marker (= black bar) is on the correct PE number (according to the wastewater treatment calculation), confirm with the ↵ button. If the required PE number is not directly available for selection, select the next largest entry.

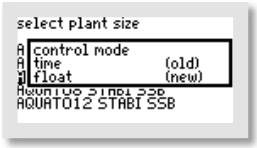
All parameters for the treatment cycle are automatically preset through this selection, but can be readjusted if necessary.



For plant sizes from 21 to 50 PE, please select "AQUATO>20 STABI SSB". The cycle presets for plant sizes from 21 to 50 PE are the same; the different air volumes required are reached with different sizes and volumes of membrane diffusers and compressors. These settings can be readjusted where necessary.

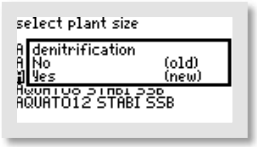


The "CONTROL MODE" window allows you to choose between a time-controlled cycle or a float-controlled cycle. The desired control type can be set in the second line "(NEW)". Press the ↓ ↑ buttons to select "TIME" or "FLOAT". The selected Control type is accepted with the ↵ button. If "TIME" is selected, the cycle sequence is only controlled through time, but if "FLOAT" is selected, it is also float-controlled.



To operate a system with UV lamp or a dosing unit, the "FLOAT" CONTROL MODE must be selected.

For operation with "**UV**" lamp or "**DOSAGE**", "**FLOAT**" must always be selected as the control type.



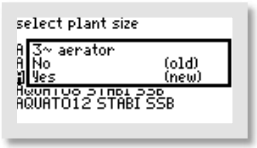
If "DENITRIFICATION" is desired/required, it can be activated in the next window. The desired option can be selected in the second line "(NEW)". Use the buttons to select "YES" or "NO". The selected state is accepted with the middle button. "YES" means that the plant is running with a denitrification phase, "NO" means that this phase is switched off.

If password 1 was used, the menu item "SELECT PLANT SIZE" is completed at this point for both the K-Pilot 18.1 and the K-Pilot 18.3 and K-Pilot 18.4 controllers and the software jumps back to the "SERVICE" main menu.

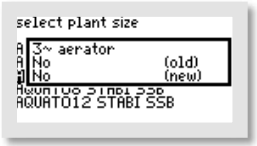
If the menu item "SELECT PLANT SIZE" was selected with password 2 for the K-Pilot 18.3 and 18.4 controllers, the additional functions follow as further setup options.

The **additional functions** are **not available for K-Pilot 18.1** because it does not feature any physical inputs and outputs for additional functions.

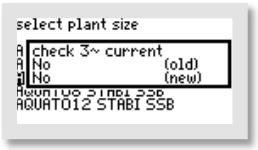
The **additional functions** are only available for the **K-Pilot 18.3** and **18.4** controllers and can be put into operation **with password 2 only**.



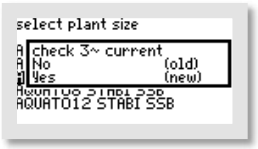
First, you can select "YES" in the lower line of the window with the query "3~ AERATOR" so that a 3-phase compressor with 400 V can be controlled. With this option, the standard current monitoring is switched off. This setting is required if an ORKA S200 or ORKA S400 module is selected to control the compressor. The option "YES" must always be selected if one or more units are controlled via one contactor. With this setting, the compressor for the lifters is connected as usual. It is not switched on during aeration.



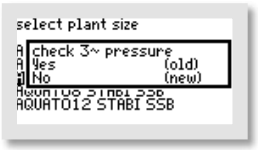
If you do not require this option, please answer the query with "NO".



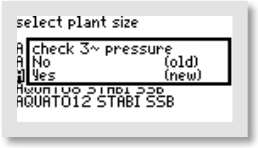
If you have selected "YES" for the query "3~ AERATOR", you will be asked whether the three-phase compressor should be monitored for current errors.
If you do not require this monitoring, you can switch it off with "NO".



If you switch on the monitoring by selecting "YES" in the menu "CHECK 3~ CURENT", an error message will be generated if the device fails. **For this monitoring, however, the controller must be prepared at the factory.** If the controller was not prepared, select "NO".



Subsequently you will be asked whether the three-phase compressor should be monitored for pressure errors.
If you do not require this monitoring, you can switch it off with "NO".



If you switch on the monitoring by selecting "YES" in the menu "CHECK 3~ PRESSURE", an error message will be generated if the device fails. **For this monitoring the pressure sensor must be connected to the air hose between compressor and diffusers.** If the sensor is not connected, select "NO".

Then the menu for **selecting the further additional functions** opens. Depending on the previously selected settings, some of the additional functions are not available and are therefore not displayed in this menu.

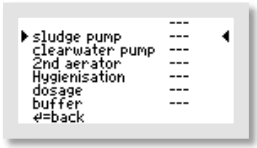
The following units/additional functions can be selected:

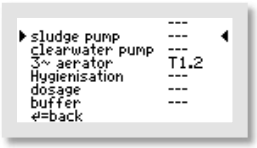
- "SLUDGE PUMP",
- "CLEARWATER PUMP",
- "2nd AERATOR" (only if "Three-phase compressor" was not previously selected) for the operation of 2 or more compressors (see Chapter 6.2.5.8),
- "3~ AERATOR" (only if "Three-phase compressor" was not previously selected) for operation with ORKA-S module,
- "HYGIENISATION" for hygienisation by means of a UV lamp or for dosing a disinfectant, e.g. chlorine (the query as to which of these two options is to be used appears in a separate window after closing the menu by pressing "BACK");
  for hygienisation, always select the "FLOAT" control type beforehand,
  for hygienisation with a UV lamp (select "UV"), always select Clear Water Pump beforehand,
- "DOSAGE" for dosing a precipitant for phosphate elimination or for dosing a C source (the query as to which of these two options is to be used appears in a separate window after closing the

menu by pressing "BACK");
for dosing, always select the "FLOAT" control type beforehand,
- "BUFFER" (if "Buffer operation with lifter" was not previously selected) for operating a buffer with a pump.

For operation with "**UV**" lamp or "**DOSAGE**", "**FLOAT**" must always be selected beforehand as the control type.
If the additional function "**UV**" is selected, the additional function "**CLEAR WATER PUMP**" must also be selected.

In the additional functions, the selected line is marked with left and right triangles ► ◄. By default, no outputs are preset: "---".

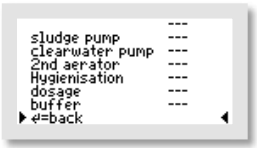




In order to activate a unit, the line with the desired/required additional function must be selected with the ↓ ↑ buttons. Then the ⏎ button is used to select the electrical output to be used. Each time the ⏎ button is pressed, the display changes in the selected line. It changes from "- - -" to outputs T1.2, T1.3 , T1.4 and then back again to "- - -".

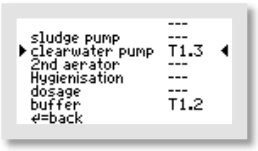
A three-phase compressor is only displayed if it was previously selected.

If you do not need any of the functions offered in this menu, you can exit the menu directly by selecting "BACK".

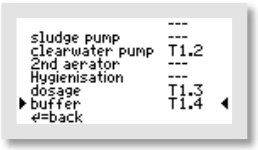


To exit this menu, move the ► ◄ marker to "BACK" in the last line and then press the ⏎ button.

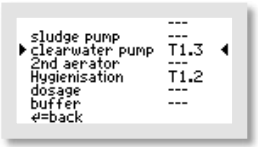
If you connected additional units, such as a clear water pump or a 2nd compressor (see Chapter 6.2), you must assign the outputs selected when you connected them to these units in this menu.



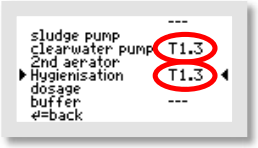
For the **K-Pilot 18.3** controller, outputs "**T1.2**" and "**T1.3**" are available. Thus a maximum of 2 additional functions can be selected, e.g. buffer and clear water pump, as in this example.



For the **K-Pilot 18.4** controller, outputs "**T1.2**", "**T1.3**" and "**T1.4**" are available. Thus a maximum of 3 additional functions can be selected, e.g. clear water pump, hygienisation and dosage, as in this example.

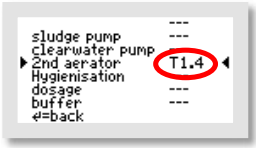


If a "**UV" lamp** is to be used for hygienisation, such as in this example, it is **essential** to additionally select the "**CLEAR WATER PUMP**".



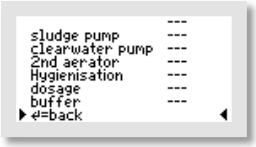
A different output must be assigned to each selected function. **No output** may be assigned with **2 different functions**! If an output is selected twice, a warning tone sounds when exiting the submenu and the line marker jumps back to the top line – without exiting the menu. This allows the selection in the relevant lines to be corrected.

The outputs may not be assigned 2 different functions! In other words, **the same output must not be selected twice**.



The output "**T1.4**" may **not** be assigned when using the **K-Pilot 18.3** controller, as it is not physically available! If a function is assigned to this output, it cannot be performed Output "**T1.4**" is only available for the **K-Pilot 18.4** controller.

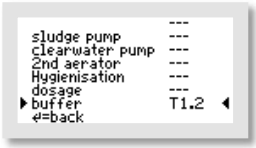
Do **not assign** a function to output **T1.4** when using **K-Pilot 18.3**! It is not physically available.



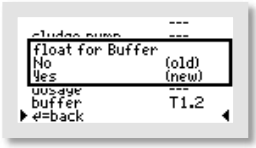
The selection and assignment of the additional functions is concluded by selecting ► "BACK" ◄ in the bottom line with the ↓ ↑ buttons and then confirming with the ↵ button.

Depending on the previous selection, the software then either jumps directly back to the "SERVICE" main menu – then use the ↓ ↑ buttons to exit the menu – or **further supplementary queries** are displayed beforehand.

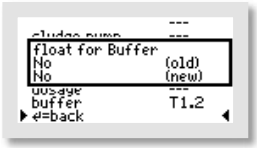
The following are a number of examples to illustrate the further queries:



If, as in the example, the "BUFFER" function was assigned to output "T1.2" to operate a buffer with a buffer pump, the electrical connection of the buffer pump must also be assigned to this contact.



In this case, after exiting the menu, a query appears asking whether the buffer emptying process should be controlled with a float switch: "FLOAT FOR BUFFER". If the buffer is to be emptied with float control, select "**YES**". This option may **only** be selected for the **K-Pilot 18.3** controller. If the buffer is to be emptied with time control only, select "NO".

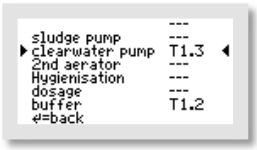


The "**NO**" option must be selected for the **K-Pilot 18.4** controller as there is no connection for the buffer float. The buffer can only be emptied on a purely time-controlled basis.

For **K-Pilot 18.1/18.4**, be sure to select "**NO**" for the "**Float for buffer**" query, as there is no physical input for this float.

The selection of the hygienisation or dosing function represents a special case. In each case, there are two selection options available, which are queried in another window after closing the additional menu.

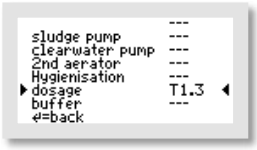
If hygienisation is selected as an additional function, a selection menu is opened to define the type of hygienisation. A UV lamp or the dosing of a disinfectant, e.g. chlorine, can be selected: "UV" or "CL".



If, as in the example, the "HYGIENISATION" function was assigned to output "T1.2", the electrical connection for the hygienisation (UV lamp or disinfectant dosing unit) must also be assigned to this contact.

In this case, after exiting the menu, a query appears asking for the desired type of "HYGIENISATION". If a UV lamp is to be operated, select "UV"; if a disinfectant, e.g. chlorine, is to be added, select "CL".

If dosing is selected as an additional function, it is possible to select either a precipitant dosing for phosphate precipitation or the dosing of a C source: "PO3" or "C".

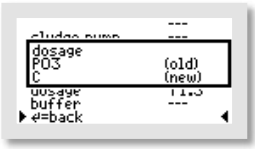


If, as in the example, the "DOSAGE" function was assigned to output "T1.3", the electrical connection of the dosing pump must also be assigned to this contact.

In this case, after exiting the menu, a query appears asking for the desired/required type of "DOSAGE". If a phosphate precipitation is to be operated, select "PO3"; if a C source is to be added, select "C".

Only one type of "**Dosage**" may ever be selected: either C source or phosphate precipitant. A disinfectant dosing, e.g. with chlorine, is selected separately via the additional function "Hygienisation".

If "PO3" is selected, the precipitant is added once per cycle during normal mode. In economy mode, dosing is omitted, as no new phosphate is added to the plant during this time.



Only if, as in the example, a "„**C**" source was selected for the "DOSAGE" function does a query follow asking how often the C source is to be added. The dosing of the "C" source is only carried out in economy mode if no other nutrients are added to the biological treatment.

In the window "AFTER HRS ECO", select the frequency of dosing by specifying the number of hours after which the C source should be added.
In the example, a dosage every 12 hours was selected. This means that dosing occurs approx. 2 times per day in economy mode.

The software then jumps back to the "SERVICE" main menu. Use the ↓ ↑ buttons to exit the menu.

8.4.2.6 Displaying the additional functions

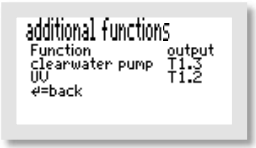
The "ADDITIONAL FUNCTIONS" menu (only available on the K-Pilot 18.3 and 18.4 controllers) displays the special functions selected during commissioning, such as "Clear Water Pump" or "Dosage", as well as the outputs to which they have been assigned. For this reason, the menu looks different depending on the selection. If no special functions are selected, the menu remains empty.

The "ADDITIONAL FUNCTIONS" menu can display the following special functions individually or in different combinations, depending on the selection made beforehand:

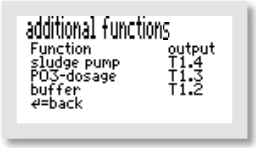
"SLUDGE PUMP"
"CLEAR WATER PUMP"
"2nd AERATOR" for the operation of 2 or more compressors (see Chapter 6.2.5.8)
"3~ AERATOR" for operation with ORKA-S module
"UV" for hygienisation with a UV lamp (always in combination with the Float control mode and clear water pump)
"CHLORINATION" for hygienisation by adding a disinfectant, e.g. chlorine (always in combination with the Float control mode)
"PO3 DOSAGE" for phosphate precipitation (always in combination with the Float control mode)
"C-DOSAGE" for dosing a C source (always in combination with the Float control mode)
"BUFFER" for operation of a buffer with pump
"BUFFER OPERATION WITH LIFTER" (only possible with STABI-KOM without Aeration 1st Chamber)

The "ADDITIONAL FUNCTIONS" menu displays the special features selected during commissioning. It is not possible to make any entries here. Use the middle ↵ button to return to the Service menu.

In this example, no additional functions were previously selected.



As an example, here is the display of the "ADDITIONAL FUNCTIONS" with the selected setting "Clear Water Pump" on output "T1.3" and "UV" for the UV lamp on "T1.2".



In this example of the "ADDITIONAL FUNCTIONS" display, the selected setting "SLUDGE PUMP" is on output "T1.4", "PO3 DOSAGE" for precipitant dosing for phosphate precipitation on "T1.3" and "BUFFER" on "T1.2" for the buffer pump.

8.4.3 "Settings" menu

The operator settings can be configured in the "SETTINGS" menu. Press the middle ↵ button to enter the menu to select the desired item.

8.4.3.1 Setting the date and time

To correct the time and/or date, use the ↓ ↑ buttons to select the "SET TIME" line. If the marker (= black bar) is on the desired entry, the middle ↵ button opens the window for adjusting the values.

The first digit can be changed with the ↓ ↑ buttons. If the correct value has been set, the middle ↵ button is used to accept the digit. The same procedure applies to all subsequent digits.
Input sequence: 2 digits each:
day, month, year, hour, minute (DD/MM/YY_hh:mm)

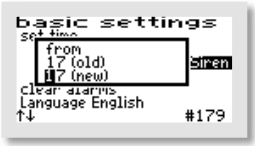
The clock is quartz-controlled. It should also be checked during maintenance. Care should be taken to ensure that the clock is set correctly, as this makes it easier to evaluate the maintenance.

Example: Time changed from 09:22 to 09:24.

8.4.3.2 LCD contrast

The LCD contrast can be optimized here. As a rule, no change is necessary.

8.4.3.3 Alarm buzzer (Alarm break)



By default, the acoustic alarm is switched off from 17:00 to 6:00. During this time, errors are only displayed optically. This setting can be changed in the menu item "CLEAR ALARMS".

Attention:
No acoustic alarm is sounded during the time set here!

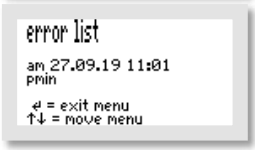
The sound for the alarm buzzer is set here. You can choose between: "SIREN", "MELODY" and "OFF"

The default setting is "SIREN".

Attention:
No acoustic alarm is sounded if the "OFF" setting is selected.

8.4.3.4 Display errors

The error logbook is called up via the "DISPLAY ERRORS" menu item.



The error logbook shows the last 30 error events with the date and time. The ↓ ↑ buttons are used to scroll through the logbook, the ↵ button is used to exit the menu.
Nothing can be deleted in the error logbook!

8.4.3.5 Delete alarm

If a fault (alarm) has occurred, the alarm message can be reset by pressing the ↵ button after selecting the "CLEAR ALARMS" line. A window with the message "OK" opens for approx. 1 second and then the display in the menu changes to "NO ERROR". The red LED goes out and the error message in the standard window is deleted.
The error message remains stored in the error logbook and can thus be evaluated later.

Note: If the ↵ button is pressed in the main display – which is the standard display during operation – in the event of a fault, the buzzer is switched off and the "CLEAR ALARMS" window opens, which automatically changes to the query "ARE YOU SURE?" after a short time.
If you answer "YES", the error display is deleted and the red LED switches off. The error message remains stored in the error logbook and can thus be evaluated later.
If the "ARE YOU SURE?" query is answered with "NO", the error message remains in the main display.

Then the info window opens for approx. 3 seconds with the information about the plant settings.

8.4.3.6 Language

The language of the controller is selected here. The controller is prepared for several languages. The currently programmed languages are:
– German
– English
– Spanish
– Italian
– Swedish
– French
– Finnish
– Polish
– Russian

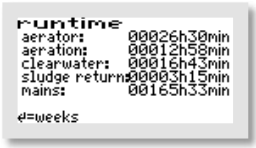
8.4.4 Other menus with displays or settings

In the following menus, all current parameters of the plant can be displayed and, in some cases, individually set.
An adjustment may only be performed by a specialist, as the purification performance of the system may be reduced under certain circumstances and the national technical approval may become void.

In order to change the displayed values, however, the password must first be entered.

In order to restore the original factory settings after changes have been made to the settings (e.g. changed aeration times), you can select the plant type with the correct settings again (see Chapter 8.4.2.5).

8.4.4.1 Operating hours display

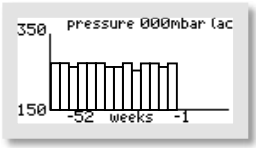


The operating hours of the individual units are displayed in the "RUNTIME" menu. The operating hours are counted up if the controller has switched on the compressor (or possibly a pump if the K-Pilot 18.3/18.4 controller is in use). The display is in hours and minutes.

If the ↵ button is pressed, the operating hours of the last (up to 52) weeks are displayed (operation log).
The last line shows the calendar week (in the example: the 52th CW) in which the values were stored (always on Sunday).
The ↓ ↑ buttons can be used to scroll from week to week.

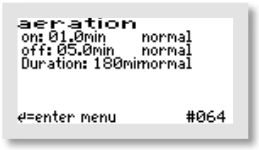
Note:
This function only works correctly if the date and time were set correctly.

8.4.4.2 Pressure log



In the graphic menu "PRESSURE", the current pressure is documented in the upper line and the counterpressure (from the pressure monitoring) is documented on a weekly basis in the graphic.
The pressure is only displayed graphically starting at 150 mbar.
When operating with a buffer, however, the display has only limited informative value.

8.4.4.3 Aeration and +Aeration



The "AERATION" menu displays the selected aeration intervals in normal mode, i.e. for how many minutes aeration is alternately switched "ON" / "OFF" (clocking).
In addition, it displays the total aeration duration ("DURATION:").
The times can be changed individually, if necessary.
Use the ↵ button to enter the menu. The lines to be changed are selected with the ↓ ↑ buttons. The menu item is called up with the ↵ button. The settings are changed with the ↓ ↑ buttons and confirmed with the ↵ button.

Note:
The "ECO MODE" displays at the bottom of the AERATION window are only visible when "FLOAT" CONTROL MODE is set.

The aeration interval is also displayed for economy mode, i.e. for how many minutes aeration is switched "ON" or "OFF".
In addition, it displays the total aeration duration in economy mode ("DURATION: XXXmin ECO-MODE").

Economy mode starts after the first aeration phase with the float switch not floated up and runs for three days. If the float does not float up again during this time, the plant goes into holiday mode. The aeration times for this are not adjustable. They are automatically set to one third of the set economy mode duration. As soon as the float floats up again, economy or holiday mode is interrupted and the plant returns to normal mode. This begins with the aeration phase.

Note:
This menu is only visible if "AERATION 1st CH" was selected when selecting the plant type.

This menu displays the aeration interval, i.e. for how many minutes aeration is switched "ON" in the first chamber, also during the denitrification phase if selected and, with the Float control type, also during economy mode.
The times can be changed individually, if necessary.

Note:
The display "DENITRIFICATION" in the AERATION 1st CH window is only visible if denitrification is activated.

Note:
The "ECO-MODE" display in the “AERATION 1st CH” window is only visible if "FLOAT" CONTROL MODE is set.

8.4.4.4 Denitrification

Note:
This menu is only visible if denitrification is activated.

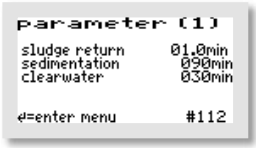
The "DENITRIFICATION" menu displays the selected aeration intervals in normal mode, i.e. for how many minutes aeration is alternately switched ON / OFF (clocking).
In addition, it displays the total aeration duration ("DURATION:").
The times can be changed individually, if necessary.
Use the ↵ button to enter the menu. The lines to be changed are selected with the ↓ ↑ buttons. The menu item is called up with the ↵ button. The settings are changed with the ↓ ↑ buttons and confirmed with the ↵ button.

Note:
The "ECO-MODE" display in the "DENITRIFICATION" menu is only visible if "FLOAT" CONTROL MODE is set.

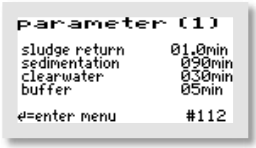
The aeration interval, i.e. for how many minutes aeration is switched "ON" or "OFF", is also displayed for economy mode.
In addition, it displays the total aeration duration in economy mode ("DURATION: XXXmin ECO-MODE").

8.4.4.5 Parameters 1

Different parameters are displayed in the "PARAMETERS 1" menu depending on the setting. The parameters "SLUDGE" discharge, "SEDIMENTATION" phase and "CLEAR WATER" discharge are always available.



This menu displays – depending on the setting – the duration of the following cycle phases:
- "SLUDGE" discharge
- "SEDIMENTATION" phase
- "CLEAR WATER" discharge
- "BUFFER" discharge

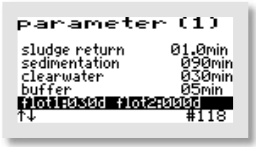


Note:
The "BUFFER" menu item is only visible if buffer operation was selected.

The times can be changed individually, if necessary.

If password 2 is entered, the "Parameters 1" menu displays the connected float switch(es) with the set waiting time until warning in the bottom line.
In the example, the float message becomes active after 30 days without a float switching operation.

If 2 float switches are connected, the time until the message is issued is displayed individually for each of them.
In the example, the float message for each float becomes active after 30 days without a float switching operation.



In the bottom line, the waiting times until the warning can be adjusted by entering password 2.

Entering 0 days switches the float message off.

In the example, the float message for float 1 becomes active after 14 days without a float switching operation. The message for float switch 2 is switched off.

8.4.4.6 Parameters 2

Different parameters are displayed in the "PARAMETERS 2" menu depending on the setting. The parameters "CURRENT MONITORING", "MIN. PRESSURE" and "MAX. PRESSURE" are always available.

If the controller switches on a unit (e.g. the compressor or a pump), it is not ensured with certainty that it will run. Even if the switching relay is switched on, overheating, defective cables or other defects may nevertheless prevent the unit from running. The controller therefore monitors whether a current is also flowing in the circuit. If the current falls below a limit value that is set by default to 0.2 A on the software side, a current alarm is displayed (e.g.: I Bel).

The controller also monitors the pressure generated during aeration, sludge return and clear water discharge. By default, the minimum pressure is set to 20 mbar and the maximum pressure to 350 mbar. If the minimum permissible pressure is not reached or the maximum permissible pressure is exceeded, the controller issues an alarm (pmin or pmax).

In this menu, “CURRENT MONITOR” can be switched "OFF" or "ON". By default, current monitoring is set to "ON".
In addition, the currently flowing current is displayed in the main display for monitoring purposes.
The minimum and maximum permissible pressures can also be changed in this menu, if necessary.

If a three-phase aerator is selected, current monitoring can be switched "ON" or "OFF" separately for this compressor with the menu item “CHECK 3~ CURRENT”.

For this monitoring, however, the controller must be prepared at the factory. If the controller was not prepared, select "NO".

If a three-phase aerator is selected, also pressure monitoring can be switched "ON" or "OFF" separately for this compressor with the menu item “CHECK 3~ PRESSURE”.

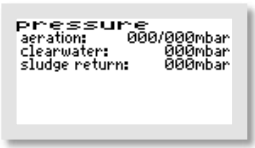
For this monitoring the pressure sensor of the controller has to be connected to the air hose between aerator and diffusers. If the air hose is not connected to the pressure sensor, select "NO".

8.4.4.7 Parameters 3

Additional parameters may be displayed in the "PARAMETERS 3" menu depending on the presetting.

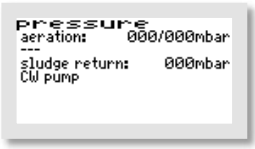
The exact appearance of the menu depends on the respective presets. If no relevant functions are selected, the menu remains empty.
In the example, a dosing pump for phosphate precipitation and a UV module are connected. In this case, the data regarding the dosing agent supply and the dosing time can be adjusted and the remaining UV time can be reset.

8.4.4.8 Pressure displays



This menu displays the respective pressure during the last cycle. The clear water discharging and surplus sludge discharging counterpressures are each stored for each individual process. Only the pressure measurement of the respective last phase is displayed.

For aeration, 2 values are displayed: the minimum and maximum pressure.

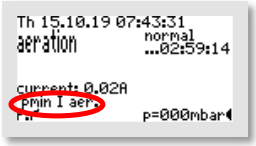


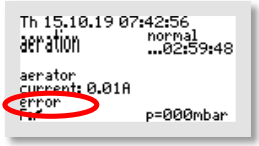
If a sludge and/or clear water pump is connected instead of the relevant lifter, this is displayed as text below the actual pressure displays. In addition, this output is not displayed as a pressure output.

In the example, a clear water pump is connected.

8.5 Faults / Alarm

Faults are indicated by flashing of the red operating LED and the sounding of the buzzer. In the display, errors are reported by the display in the main menu in alternation with the fault display. The following figures show an example of an error message:



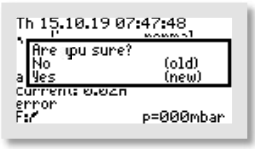


These three views alternate until the error is acknowledged.

An error message is acknowledged by pressing the ↵ button.

This switches off the buzzer and the "DELETE ALARM" window opens. This is immediately followed by the "ARE YOU SURE?" query.

This query can be answered with either "NO" or "YES" by selecting with the ↓ ↑ buttons in the bottom line "(NEW)". If "NO" is selected, the error message remains and only the acoustic warning signal is switched off.



If "YES" is selected, the error message in the display is also deleted.

Then the info window opens with the information about the selected controller settings. After approx. 3 seconds, the view changes back to the standard window.

The fault message in the display only disappears if the error is eliminated and also reset on the controller – as described above or in the "SETTINGS" menu (see Chapter 8.4.3.5).

The error message remains stored in the error logbook and can thus be evaluated later.

The warranty will void if operation and maintenance of the sewage treatment plant are not carried out in accordance with the instructions and specifications of the operating instructions.

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