

Instructions for start-up, operation and maintenance Procedures

EPro15
EPro Commercial
Home Sewage Systems

Control unit version KL24plus



The points described in these instructions must be observed in all cases. Failure to do so shall invalidate the warranty. For any additional items purchased through GRAF, you will receive separate installation instructions in the transport packaging.

The components must be checked for any damage before the system is transferred to the pit.

You will receive separate instructions for installation of the system

Be sure to read before starting up!

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Australia Pty Ltd

WARRANTY

The product is warranted to be free from defects in materials, under normal use and service, for the following warranty periods from the date of commissioning.

Graf Carat Tanks: 15 years

Electrical Components and Air Lift System: 2 years

This warranty only applies if the product has been installed and used in accordance with the manufacturer's instructions. The warranty does not cover damage resulting from use of incorrect voltages, accident, misuse, neglect, abuse, heavy load, natural disasters such as flood, fire, earth quake or lightening, problems with electrical power such as power surges, repair by unauthorised person or exposure to abrasive or corrosive substances. This warranty does not apply to and shall not warrant any material or product that has been repaired or modified without prior approval from the manufacturer. This warranty does not cover consumable items unless the fault or defect existed at the time of purchase.

This warranty is limited to repair or replacement at the manufacturer's discretion. No allowance will be made for labour, transportation, or other charges incurred in the replacement or repair of defective parts.

Please fill out the following details completely and fax or send a copy to **Graf Australia Pty Ltd**.
Address details at bottom of page,

Failure to return this form may void warranty Claim !!

Owner Details

Name:

Address:

.....Postcode:

Phone: Email:

THIS SECTION MUST BE FILLED OUT COMPLETELY BY THE GRAF CERTIFIED INSTALLER.

Product Model Number:

Invoice Number:

Serial Number..... Date of Commissioning:/..... /

Installer Details

Company:

Address:

.....Postcode:

Phone: Email:

Graf Australia Pty Ltd – PO BOX BIBRA LAKE WA 6965 – FAX 08 94374948 – PH 1300131971

Dear Sir/Madam,

We are delighted that you have chosen to buy a modern **EPro** SBR system. Below you will find some important information for the safe operation of your system, and for the long term durability.

- The SBR system is designed to receive all domestic wastewater. Other wastewater, e.g. from restaurants and / or commercial premises etc., may only be received if this was specified and taken into account in the system's design.
- Biocides, toxic substances or substances which are not biocompatible must not enter this system because they hinder bacteria important to wastewater cleaning and cause problems in the biological process (detailed information is provided on the following pages).

To achieve maximum cleaning performance, it is essential that the system is operated in accordance with our operating and maintenance instructions. You will find these instructions on the following pages.

We also ask you to read the following information carefully:

- The External control cabinets should be located as much in the shade as possible to prevent them from overheating in the summer.
- At all times ensure that the cabinet, especially its ventilation vent, are not covered and are freely accessible for maintenance work.
 - ➔ External control cabinet: Ventilation vents are situated on the rear of cabinet.
- The power supply must be ensured at all times. Please ensure that a dedicated (16 amp) power supplied to the control cabinet. Additional electrical fixtures on the same fuse / CB may disrupt operation.

Graf Australia Pty Ltd

1. General

1. General

1.1 Details about your system

In case you have any queries while operating the system, please enter the details of your system here as follows. Should you encounter a fault, these details will enable our staff to find a remedy faster.

You will find these details on the identification label fitted to the outside of internal cabinets and the inside of external cabinets.

GRAF EPro15		10 EP
Top Load	<input type="text"/>	kg Max Daily Flow <input type="text"/> 1,500 L
Max Cover	<input type="text"/> 1200	mm Tank Capacity <input type="text"/> 1 x 4,800 L
Warranty	<input type="text"/> 3	years Weight approx. <input type="text"/> 220 kg
Description	<input type="text"/> I-cabinet KLplus <input type="text"/> LA 80	
Serial No.	<input type="text"/>	<input type="text"/>
Additional modul	<input type="text"/>	<input type="text"/>
Assembly Date	<input type="text"/>	
El. power	<input type="text"/> 230 V / 50 HZ 86 W 1~	IP-Code <input type="text"/> IP44
PH 1300 466 469 Email: info@grafaustalia.com.au		Australian Standard Certified Product AS/NZS 1546.1: 2008 Nr. 183 AS/NZS 1546.3: 2008 Nr. 188

1.2 Original EC declaration of conformity for small wastewater system in plastic tank

Manufacturer: Otto Graf GmbH Kunststoffzeugnisse
 Carl-Zeiss-Str. 2-6
 DE-79331 Teningen
 www.graf.info

hereby declares that the **EPro15 / EPro Commercial 1800**, small wastewater system in plastic tanks meets the requirements of the following standards were applied:

EN 60204-1/A1: 2009 "Electrical equipment of machines. Part 1: General requirements."

EN 13849-1: 2008 "Safety of machinery – Safety-related parts of control systems. – Part 1: General principles for design."

This EC declaration of conformity ceases to apply if the product is modified without consent.


Teningen, 02.08.16

 Arne Schröder
 (Product management team leader)

1. General

1.3 Global Certificate

PRODUCT CERTIFICATE OF REGISTRATION




Global Certification Pty Ltd
Number 188
 Product Performance Testing
AS/NZS 1546.3:2008
 Issued to
Graf Australia Pty Ltd
 Unit 2, 8 Piper Street, Caboolture Qld 4510
 Certification Date:- 26/04/2016 Expiry Date:- 26/04/2020


Product Certified:

Model Options	Disinfection	Nutrient Reduction	Servicing Frequency	Discharge	Disposal Options
E-Pro15 – 1 1500ltr 10PE	Yes	Yes Phosphorus Reduction: 3mg/L (54%) Nitrogen Reduction: 24mg/L (50%)	4 monthly	Pumped via pump chamber with chlorine dispenser	Above ground sprinklers Sub strata irrigation drippers Sub surface irrigation drippers Flatbed Drains Graf Sloker Tunnel Leach drains Soak Wells
E-Pro15 – 2 1500ltr 10PE	No	Yes Phosphorus Reduction: 3mg/L (54%) Nitrogen Reduction: 24mg/L (50%)	6 monthly	Pumped via pump chamber no chlorine dispenser	Sub surface irrigation drippers Flatbed Drains Graf Sloker Tunnel Leach drains Soak Wells
E-Pro15 – 3 1500ltr 10PE	No	Yes Phosphorus Reduction: 3mg/L (54%) Nitrogen Reduction: 24mg/L (50%)	6 monthly	Gravity fed no pump chamber	Flatbed Drains Graf Sloker Tunnel Leach drains Soak Wells
E-Pro15 – 3+O 1500ltr 10PE	No	Yes Phosphorus Reduction: 3mg/L (54%) Nitrogen Reduction: 24mg/L (50%)	6 monthly	Pumped no pump chamber no chlorine dispenser	Sub surface irrigation drippers Flatbed Drains Graf Sloker Tunnel Leach drains Soak Wells

NACE CODES: 2221, 2829

This Certificate of Conformance to the Product Certificate Scheme for 'Domestic Wastewater Treatment Units (Septic Tanks) and Rainwater Tanks' remains the property of Global Certification Pty. Ltd. and is granted subject to the terms and conditions of the Contract Application, in respect of the Product certified on this page and the attached schedule to the Certification of Conformance, bearing the same number as this certificate.


Date of Issue: 20 October, 2016
Bruce Smith Director
 Signed for and on behalf of Global Certification Pty Ltd
 PO Box 195, Morayfield QLD 4508


www.jac-anz.com.au/register

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2. Safety notices

2. Safety notices

This chapter contains details relating to safety measures and residual risks. Read this chapter through carefully before using the system to ensure that it is used as safely as possible.

2.1 Explanation of warning notices and prohibitions



Warning of danger



Warning of dangerous voltage



Warning of tripping risk



Warning of hot surface



Warning of hand injuries



Warning of explosive atmospheres



Fire, naked flames and smoking prohibited

2.2 Danger notices

1. To ensure safety, everyone who comes into direct contact with the system must note the content of this documentation.
2. The system must not be used for any purpose other than that described by the manufacturer.
3. Local operating and safety requirements and legislation must be followed at all times, even if not explicitly mentioned in these instructions. The same applies to environmental requirements.
4. If the operator becomes aware of mistakes or dangers, the manufacturer or responsible maintenance company must be informed immediately.

2. Safety notices

5. Safety precautions must never be removed or bypassed during normal operation of the machine. Safety precautions may only be temporarily bypassed or deactivated by an approved maintenance technician during repairs and maintenance.
6. When working with chemical substances, contact with the chemicals should be avoided as far as possible. Before these substances may be used, the instructions for use on the packaging or MSDS must be read and followed.
7. If the use of personal protective equipment (safety shoes, protective glasses, gloves, ear defenders, etc.) is prescribed, ensure that they are used. Defective or damaged protective equipment must be immediately replaced with fully functional equipment.
8. Work on electrical equipment must only be undertaken by licenced electricians.
9. All safety and danger notices on the machine should always be kept fully legible.
10. Hot parts must not come into contact with explosive or highly flammable chemicals.
11. Do not put vessels containing liquids on electric switch cabinets; short circuits may occur if the liquid is spilled.
12. The system must not be operated by anyone under the influence of alcohol (remember that alcohol may still remain in the body the day after consumption!) or medication which limits cognitive ability or ability to react.
13. The system must be turned off / isolated before any maintenance or cleaning work.
14. Other than for maintenance purposes, the system should always be left switched on, otherwise efficient wastewater cleaning cannot be guaranteed.

2. Safety notices

2.3 Warning notices



Installation location

Ensure that the control cabinet is not installed above or in the direct vicinity of water vessels. Or in areas that may be prone to flood. Risk of electric shock if improperly installed.



Mains connection

Only connect the machine cabinet to a correctly installed 230 V socket and earth cable which is fused with an upstream 16 A fuse / CB as specified in the technical data.

Electrical equipment connected to the mains may be damaged during a storm. We recommend fitting surge protection to the power supply to protect against this. The connection cable must be laid such that it does not represent a tripping hazard. And must comply with all relevant standards.



Explosive atmospheres

The control unit must not be fitted or activated in environments with potential explosive atmospheres or in places where there are flammable materials. Sparks in such environments may cause an explosion or fire and this may result in physical injuries or even death.



Interferences

The control unit may cause medical equipment to malfunction. This device should therefore not be used in close proximity to medical equipment.



Damage

The control unit must not be operated if the housing or cable insulation is damaged or crushed.



Service work

Service work on the control cabinet may only be undertaken by authorised technicians or electricians.



Voltage supply

The power supply must be ensured at all times. Please ensure that the fuse / CB on the control cabinet is sufficient (16 A). Additional electrical fixtures on the same fuse may disrupt operation.

3. Scope of supply

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This wastewater treatment system basically comprises the septic tank with wastewater treatment technology set-up kit and control cabinet. These main parts are connected to one another using air hoses laid in the ground.

The septic tank is split into two areas, the sludge reservoir and buffer in the inlet area and the SBR reactor in the outlet area.

EPro15 systems are available in 4 different versions:

EPro15 One

with chlorination and effluent pump in additional Sapphire 900 L tank

EPro15 Two

with effluent pump in additional in additional Sapphire 900 L tank

EPro15 Three

w/o additional tank. Free gravity sloping.

EPro15 Three +O

according to EPro15 Three, but with additional effluent pump inside the treatment plant

In the main tank you will find the EPro system pack:

- Air lifts
- Aeration system

In the Sapphire tank you will find:

- Chlorine Tablet feeder (only EPro one)
- Effluent pump
- High-level Alarm Float

In the control enclosure for outdoor installation you will find:

- Quiet, low-maintenance air compressor
- Motor valve unit
- Control unit
- Auxiliary Control unit (only EPro15 One)) / alarm strobe light mounted on top
- Air hoses
- Ventilation fan

3. Scope of supply

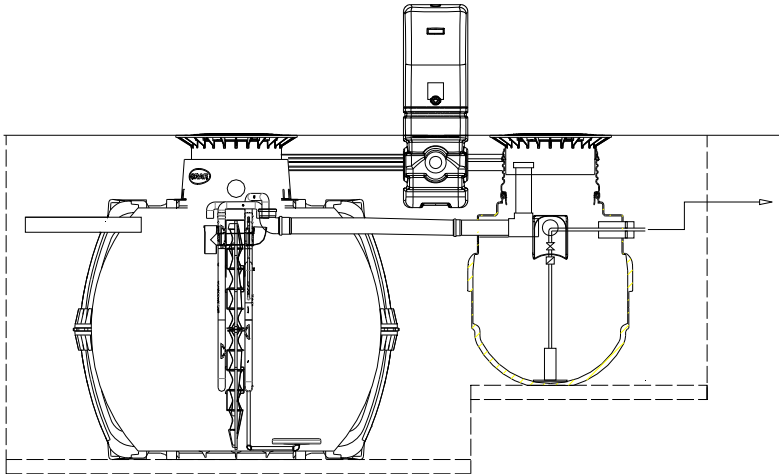


Figure 1: EPro15 One (with chlorination and effluent pump)

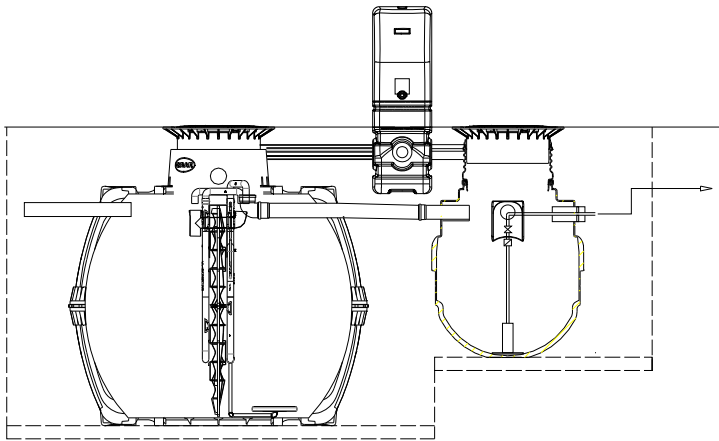


Figure 2: EPro15 TWO (with effluent pump)

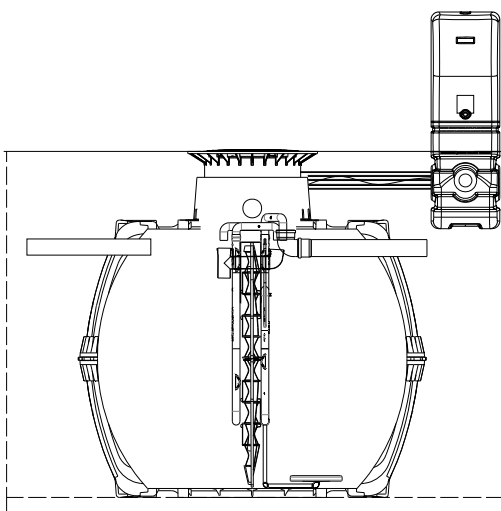


Figure 3: EPro15 Three

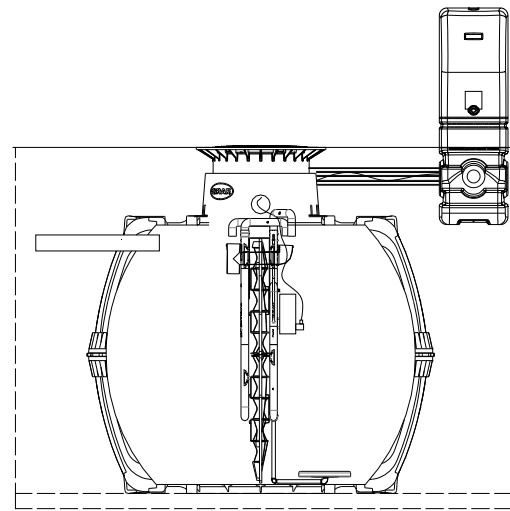


Figure 4: EPro15 Three +O (with effluent pump)

4. Outside Control Cabinet

4. Outside Control Cabinet

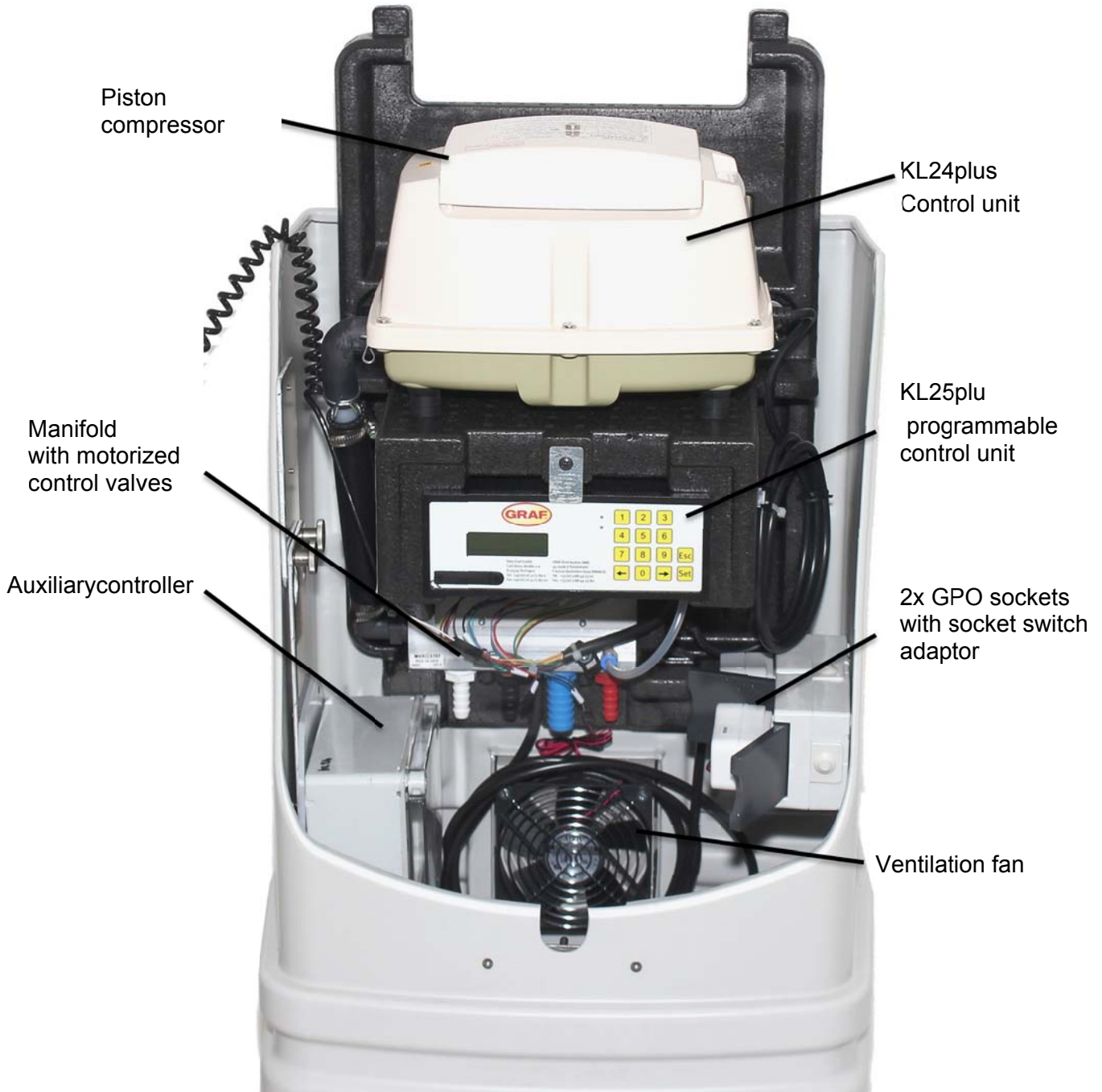


Figure 5: Graf plastic exterior cabinet for EPro15

5. Function of the SBR system

5. Function of the SBR system

EPro is a fully biological domestic wastewater treatment system, which functions on the principle of the SBR process (aeration system in retention process). The system basically comprises 2 stages: A sludge reservoir with integrated upstream buffer and activated sludge stage in closed retention mode (SBR reactor).

The upstream sludge reservoir with integrated buffer fulfils the following functions:

- Storage of primary and secondary sludge
- Retention of deposited materials and floating solids
- Storage of supply water
- Balancing of fluctuations in the wastewater supply related to volume and concentration.

This wastewater treatment system is operated using a microprocessor control, which controls the air compressor and air distribution for the various lifters via solenoid or stepped motor valves.

5.1 Systems for breaking down the organic matter present in the water (removal of carbon: discharge class C)

The process is a series of 5 steps undertaken in turn and repeated several times a day (usually 4 times).

Step 1: Feed

The raw wastewater held in the sludge reservoir is fed to the SBR reactor via an air lift pump. This is arranged such that only water almost free of solids is pumped. The special design of the lifter guarantees a minimum water level in the sludge reservoir.

Step 2: Aeration

In this step, the wastewater is aerated and mixed. Membrane pipe or plate aerators fitted on the base of the chamber aerate the wastewater.

The system's aeration equipment is supplied with ambient air, by an air compressor and valve bank that is installed inside the control enclosure

Aeration usually takes place intermittently, with two simultaneous outcomes:

- The microorganisms in the activated sludge are supplied with oxygen, which is needed for their metabolism and therefore for the pollutants to be broken down
 - There is intensive contact between the wastewater and bacteria.
-

6. Control and machine cabinet

6. Control and machine cabinet

All the system's mechanical and electrical components are installed in a lockable cabinet.

This cabinet contains both the control unit and all machine elements needed. It is opened using the key provided.

6.1 Technical setup

The main components of the machine unit are:

- Quiet air compressor
- Valve unit with 4 solenoid valves / stepped motors for distributing the air for aeration and transferring using air lift pumps (feed, discharge, sludge return)
- Control unit for automatic mode with pre-set operating cycles
- Cooling fan
- Phosphate precipitant pump (optional)
- Auxiliary Controller

6.2 Starting up the cabinet

Once the system has been connected to the power supply, it performs a quick self-test. This test takes a few seconds, then the system automatically enters normal operation (automatic). During the self-test the words "SYSTEM TEST ... OK", the program version and the control unit's serial number are displayed briefly. The system's current operating mode is then displayed in the liquid crystal display. If the time and date has not yet been set, the control unit will display set time fault messages. These can be acknowledged using the Esc key. The time and date can then be set via the menu (see below).

The function of the control unit, three lifters, aeration and if supplied the cabinet fan should then be checked. This can be done via the Manual operation menu item in the control unit.

Please note: The lifters will only work if the chambers are filled above normal working levels.

If the time and date are not set correctly, operating faults are saved with the wrong time and date.

The system should be reset to automatic mode once the manual test is completed successfully.

6. Control and machine cabinet

6.3 System response to disconnection from the power supply

If the system is disconnected from the mains (e.g. due to a power cut), the control program and the operating hours counted are retained in the system control's memory. An intermittent warning tone sounds. This warning tone only sounds after a delay of several seconds (see Item 7.2, Power cut detector). When the power supply to the system is restored, it automatically restarts as described above, provided that there is a sufficiently charged battery in the control unit.

Important information:

If the system is disconnected from the mains for more than 24 hours, the system will be unable to clean the wastewater properly if at all. This may cause problems with pump / filter blockages. Please avoid wherever possible.

7. The small wastewater treatment system's control unit

7. The small wastewater treatment system's control unit

The system is operated using the control unit located inside the outdoor cabinet. The control unit allows operating parameters to be set, operating statuses to be displayed, system parameters to be queried and operating times to be programmed by a specialist.

You can change the display contrast in automatic mode by pressing the ESC and arrow buttons at the same time.

The figures below show the setup of the operating units.

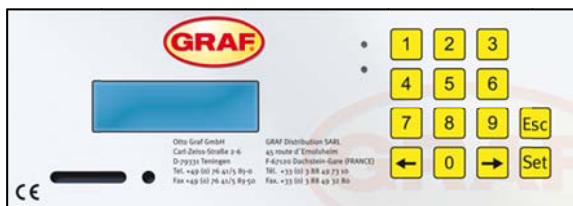


Figure 6: View of the KL24plus operating unit

Operating status display

The system's operating status is indicated by the LED (Green = Operation / Red = Fault) and by text on the LC screen.

In normal operating mode (aeration mode), the liquid crystal display looks like this:

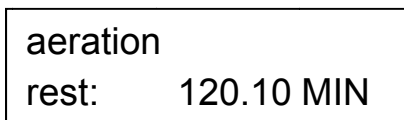


Figure 7: View of liquid crystal display during aeration phase

In automatic mode, the liquid crystal display shows the current operating phase and time remaining in this stage of operation.





Should a fault occur, a message appears in the liquid crystal display indicating which component is faulty (e.g. compressor fault).

→ **Note:** Item 11 describes in more detail how the system behaves in the event of a fault.

7. The small wastewater treatment system's control unit

The following operating phases are displayed:

KL24plus display	Process undertaken
charging	Valve 1 is activated, the feed lifter pumps the wastewater to be cleaned from the sludge reservoir into the SBR bio reactor.
denitrification	Valve 2 is intermittently activated, the activated sludge is briefly mixed with the wastewater. There are long pauses in between (reaction times).
aeration	Valve 2 is activated, the bio reactor is aerated at intervals.
sedimentation	No valves are activated, the activated sludge settles in the bio reactor.
discharging	Valve 3 is activated, the wastewater is pumped into the discharge.
sludge return	Valve 4 is activated, the excess sludge is pumped from the reactor into the sludge reservoir.
cyclepause	Valve 2 is activated, the bio reactor is aerated at intervals (considerably less than in the "aeration" phase).
vacation oper.	Valve 2 is activated, the bio reactor is aerated at intervals, no cleaning cycles are undertaken.
rest: XXX.XX min	Display showing time remaining.

Symbol	Key assignment	Function
	Enter	Select operating mode, confirm input
	Scroll	Display the operating modes and queries
	Acknowledge- ment	Acknowledge input without saving Acknowledge fault messages
	Numbers	Program system by entering numbers

7.1 Connections on the KL24 control units

On the rear of the KL24base and KL24plus control units are the connector plugs and fuses.

Please note:

Whenever working on the electrical system disconnect the Power Supply!!

7. The small wastewater treatment system's control unit

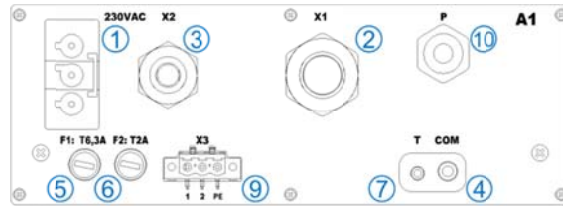


Figure 8: View of rear of KL24plus control unit

Connections:

- 1 Connection for mains cable
230 V AC ~ 50 Hz,
- 2 X1: Pre-assembled cable for valve, ventilation fan, alarm, dosing pump (Please refer to wiring diagram for connection details).
- 3 X2: Schuko coupling for the air compressor connection,
- 4 COM: Connection for communication module (optional) and/or port for PC,
- 5 F1: T6.3A main fuse, slow blow,
- 6 F2: T2A fuse for UV module / outlet pump, slow blow,
- 7 Connection for temperature sensor, "must be plugged in!"
- 9 X3: Connection for UV module and outlet pump
- 10 P: Connection for pressure measuring hose.

7.2 Operating the control unit

You can start various queries when in automatic mode.


Pressing **Set** takes you to the first maintenance level. Now you can call up the individual queries by pressing the two arrow keys **←** **→** followed by **Set**:

KL24plus display	Meaning
Operating mode remaining time	Time remaining in current operating phase
operating hours meter reading	Operating hours display for individual valves and compressor
manual operation	Manual activation of valves
Date Time	Current time, day and date. Can be set by pressing SET
vacation date setup	Set holiday mode (max. 90 days)
read out old errors	Operational faults are saved here and can be read out. Press Set to switch between the error message and the associated date




7. The small wastewater treatment system's control unit


setup report	The current settings can be viewed using the arrow keys
operation code	For specialists
service code	For specialists

7.2.1 Operating hours query

Press the  key. Screen shows:

operating hours
meter reading

Pressing  again displays the number of operating hours for valve 1 (feed). Pressing the arrow keys   allows you to call up the operating hours of other valves, the compressor, UV module and pump for phosphate precipitation in turn. The system utilisation is also displayed.

Pressing the  key once takes you back to the maintenance level. And pressing again restores automatic mode.




→ **Note:** If no key is pressed for 10 minutes, normal mode engages automatically.

7.2.2 Manually controlling the valves and cabinet fan using "Manual mode"

Each valve should run for at least 5 seconds when testing because it takes some time to monitor the power consumption of valves before any faults are detected. After the valves, the cabinet fan (if fitted) can also be activated and checked.



Press , then press the arrow key  until the following appears on screen:

manual operation

Manual mode can now be set for all functions by again pressing  and using the arrow keys   to make the relevant selection.

Taking the example of valve 1, the screen now shows:

manual operation.
valve1: off

By selecting "1" for "ON" and "0" for "OFF", valve 1 can be activated and deactivated in manual mode. You can proceed in the same way with the other valves. The valves are selected with the arrow keys   as described above.

7. The small wastewater treatment system's control unit

Pressing the **Esc** key once takes you back to the maintenance level. And pressing again restores automatic mode.

7.2.3 Setting date/time

Press **Set**, then press the arrow keys **←** **→** until the following appears on screen (example):

```
19-12-2007 Mo
20:15:56
```

By pressing **Set** you can set the time and date using the numerical keys. To confirm each change, you must press **Set**.

Pressing **→** once takes you back on to holiday mode. Pressing **→** again takes you back to manual mode.

The system's time and date MUST be set correctly to ensure accurate recording of operating hours and any malfunctions that may occur. The built-in clock has a maximum deviation of 5 minutes per year. There is no automatic switchover for day light saving time.

→ **Note:** If no key is pressed for 10 minutes, normal mode engages automatically.

7.2.4 Setting holiday mode

→ **Note:** The wastewater treatment system has a reduced operation when in holiday mode. This mode should only be used if no wastewater will be fed into the wastewater treatment system during the selected period. Wastewater which does enter the system during holiday mode is not cleaned. Holiday mode is automatically activated and deactivated on the dates entered.

Press **Set**, then press the arrow keys **←** **→** until the following appears on screen:

```
vacation
date setup
```

The input of holiday data is released by again pressing **Set**:

```
vacation
start.: 21-05-2007
```

Press the **Set** key again and enter the end date for holiday mode using the numerical keys:

```
vacation
end.: 21-05-2007
```

Pressing the **Set** key saves the input of data for holiday mode and exits this function.

→ Holiday mode can be set for a maximum of 90 days.

Pressing **Esc** once takes you back to the maintenance level. And pressing again restores au-

7. The small wastewater treatment system's control unit

automatic mode.

→ **Note:** If no key is pressed for 2 minutes, normal mode engages automatically without the date just entered being saved.

7.2.5 Reading out errors – reading out old faults

The control unit saves fault messages and the operation of valves using "Manual mode" in what is known as a logbook. This function can be used to call up previous fault messages with time and date. The individual messages can be called up using the arrow keys. The menu item can be exited using "Esc".

→ Note: 128 fault messages can be saved. Once this figure is reached, each new message overwrites the oldest one. The memory can be cleared by a maintenance specialist in the Service menu using the "Clear logbook" command.

7.2.6 Displaying settings

The current control unit settings can be viewed under this menu item. These settings cannot be changed. This menu item is used to view the settings without changing them.

7.2.7 Service menu and action code

Operating parameters can be changed in the Service menu. Access is protected by a code. The operating parameters can also be changed using a particular action code. This second maintenance level is reserved for qualified specialists only!

→ **No claims for warranty can be made if the control unit settings are accessed without authorisation!**

7.3 Changing fuses

Before fuses are changed, the system should be switched off using the maintenance Isolation switch! Only competent persons should attempt this

To change or check the fuses, the control cabinet must be opened using the key provided.

The micro fuses described above are located on the rear of the control unit.

Fuses used:

F1 supply : 6.3 A, slow blow

Consumer F2 : 2 A, slow blow

Proceed as follows to change the micro fuses:

- Using an SL 1.0 x 5.5 slotted screwdriver, apply a little pressure to turn the head of the fixture one quarter turn to the left (anticlockwise)
- Remove the head of the fixture with the fuse
- Change the fuse
- Place the head and fuse in the fixture's opening
- Using a screwdriver, apply a little pressure to the head of the fixture and anchor the fuse by turning the head one quarter turn to the right (clockwise).

7. The small wastewater treatment system's control unit

→Note:

If you are unable to remedy the problem, please contact your maintenance company or GRAF as soon as possible.

7.4 Function of the power cut detector

The control unit is equipped with a power cut detector, which is powered via an integrated emergency power supply (buffer). Upon delivery, the emergency power supply is flat. It charges when the control unit is switched on. In the event of a power cut, the charge of one emergency power supply for indicating the power cut will last around 12 hours. If the emergency power supply is not required in response to power cuts, it is prevented from discharging by a switching circuit.

Important: In the event of mains failure, the time / date setting is powered for around 10 days by an extra buffer. All saved data, such as operating hours, program settings etc., is retained. If the time and date are not set, weekly operating hours for the units will no longer be saved. Error messages occurring in the future will be saved with the wrong date.

If the system is disconnected from the mains (e.g. due to a power cut, should the internal fuse blow or by disconnecting from the socket), the indicator issues an acoustic and optical signal in turn regardless of the cause. There is a 5-second delay before the device responds to a mains failure. This prevents brief interrupts, which often occur e.g. during a storm but do not impact on the wastewater treatment system's overall function, from being indicated unnecessarily.

- After the 5-second delay, there is an intermittent beep with a red flashing signal. Five flashing signals and one beep repeat at intervals of 5 seconds for around 12 hours (if the emergency power supply is fully charged).
- The device cannot be switched off when in this state.

When the mains voltage is restored, the device is returned to the monitoring status and the control unit continues from where it left off without any keys having to be pressed. The fault message disappears automatically. If the emergency power supply is flat, the device restarts with a cycle pause.

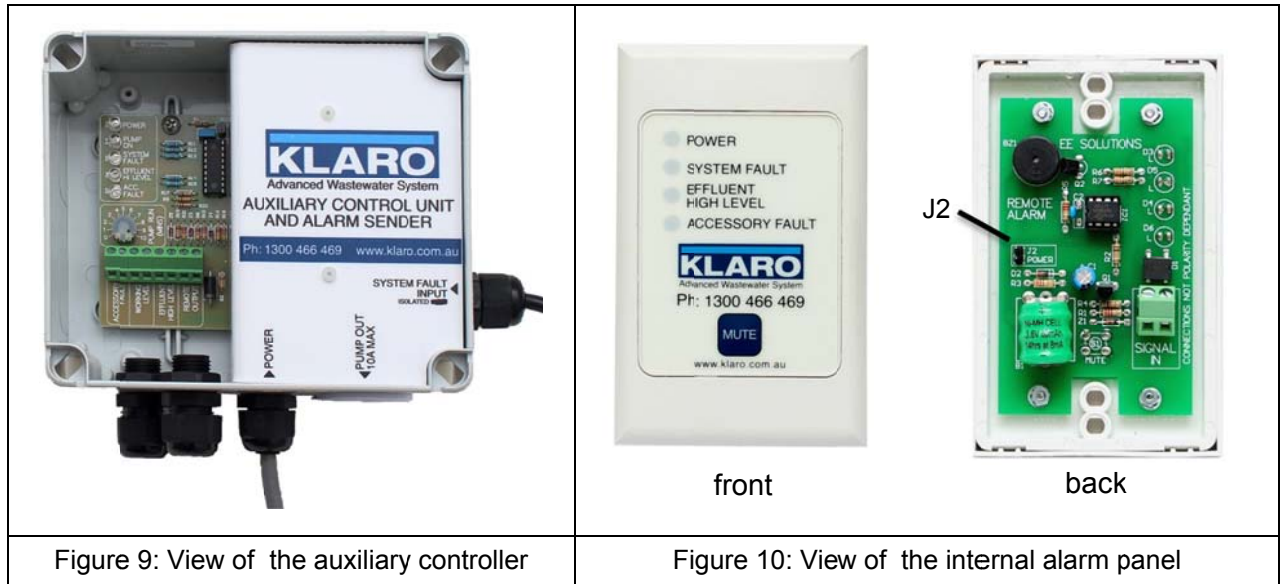


Power cut

→ **Please note:** If the system is disconnected from the mains for more than 24 hours, the system will be unable to clean the wastewater properly if at all. **Never switch off system** (the only exceptions are if maintaining system parts and in the case of system faults restricting function)

8. Auxiliary controllers

8. Auxiliary controllers



8.1 Function description

The auxiliary controller purpose is to bring together alarms from the KL24plus control unit and other alarms such as the high level alarm in the disinfection / pump out chamber.

In the advent of an alarm being activated the aux controller sends an signal to the remote alarm plate, so the appropriate fault indicating LED will be illuminated, as per illustration figure 5,

This alarm plate can be wall mounted in any convenient location in the house so that it can be heard and seen easily, ie entrance way, laundry etc,

There are also fault indicator LED's inside the Aux sender unit which is located in the system control enclosure, as a backup if there is no access to the house.

As well as monitoring alarms the Aux controller controls the pump out pump which plugs into the bottom of Aux controller, to enable a chlorine contact time so there is an reaction time to ensure the treated water safe before being pumped out to the irrigation field, this is achieved by the high level / working float having a dual action, thus by the chamber filling up before pumping out, and if this float is still up after 30 minutes of pumping a high level alarm will be activated, requiring activities mentioned below to be actioned.

It is essential that the Power Bridge J2 on rear of remote alarm plate is moved from one pin too bridge both pins to activate the alarm plate before mounting the alarm plate to wall.



The 2 core alarm connecting cable should be run in a separate conduit to the system power supply to avoid possible interference.

Ensure Pump run time dial is set to 10

8. Auxiliary controllers

8.2 Aux alarm indicator LED's

Power

The power light will be on constantly when power is connected, it will flash if power is disconnected.

System Fault

When this light is on, this means there is a fault activated from the Graf controller, in this case the cause will be displayed on the Graf controller LCD screen, please see Graf operations manual pages 38 and following for correct trouble shooting action.

Effluent High level

1. When this light is on, there is a high level situation in the Disinfection / Pump out chamber
2. Screen on pump could be blocked. Action, clean screen
3. Pump not working. Action, check power supply connection, and auto float operation.
4. Irrigation filters blocked. Action, clean filters if fitted.
5. System batch overloaded. Action try spreading batch hydraulic loadings more equally.

Accessory fault.

This is for other optional extra devices.

Mute button

By pressing this button the audio alarm will be muted for 24 hours, the LED indicating fault will remain on until alarm situation is rectified, the audio alarm will return after 24 hours if alarm is still active, or if a new fault occurs.

9. Additional functions of the KL24plus control unit

9. Additional functions of the KL24plus control unit

9.1 Underload detection



Malfunction

→ Please note: Level-dependent operation should be activated by a Graf approved maintenance technician or an expert. Incorrect calibration of the system could cause it to operate constantly in economy mode (with cycle pause). Correct cleaning is not then possible.

This function is deactivated when the system is supplied. When the system is started up, it runs in automatic mode regardless of the volume of wastewater flowing in. **We would recommend activating this function after a run-in phase of 3 months at the earliest!** The KL24plus control unit is fitted with a pressure sensor as standard and this can be used to establish the level in the first chamber. This function is used to save energy when the flow of wastewater is low.

9.1.1 Function

The water level is measured using the pressure in the feed lifter during the feed phase. If the water level in the sludge reservoir/buffer (chamber 1) exceeds a preset level ("Level measurement setting"), the system starts a cleaning cycle. If the level is not reached, the system goes into cycle pause for 6 hours. In this mode, the SBR reactor is only vented sporadically to keep the bacteria alive. If the preset water level is not reached in the first chamber after 4 consecutive measurements, the system pumps water from the reactor into the first chamber via the excess sludge lifter. After pumping back, the system measures the water level again. After a certain time, new feed is therefore supplied to the reactor even with little or no wastewater supply. The normal cleaning line can therefore be kept for long periods even in the event of absence or underload.

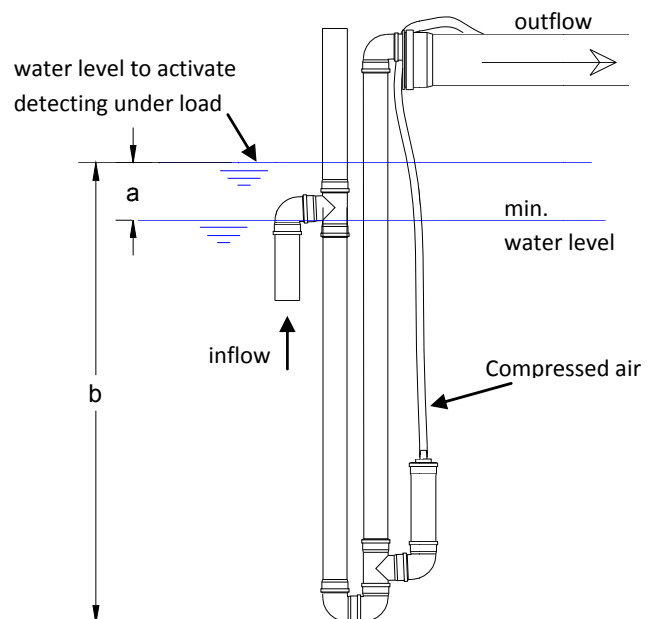


Figure 11: Feed lifter

The number of cleaning cycles undertaken can be queried using the operating hours menu item. This indicates the cleaning cycles actually undertaken with the cycles performed in automatic mode (4 a day) as a ratio and as a percentage (25% to 100% utilisation).

9. Additional functions of the KL24plus control unit

9.1.2 Start-up



When working with an open cesspit cover, there is a risk of stumbling and falling!

Risk of falling

Suitable measures must be taken to cordon off the open pit.

The first chamber (sludge reservoir/buffer), where the feed lifter is located, must be filled with water up to the height at which a cleaning cycle is to be triggered. This level depends on the geometry of the tank and the number of connected inhabitants. The recommended buffer heights above the minimum water level are specified for the various configurations in the table below.

Recommended maximum buffer heights in sludge reservoir / buffer:

Type	EPro15	EPro18 Commercial
Type	4800 l	6500 l
b [cm]	127	150

1st step: Calibrating the pressure sensor





It is absolutely essential that the sensor is calibrated for starting up underload detection. Please carefully work through the following points in order:


service code	Go to "SERVICE CODE INPUT", press the Set key and enter the following code when prompted to do so: 9 9 9 9
calibrate? No	Use the arrow keys (←→) to select "CALIBRATE YES", confirm with the Set key and start the calibration ...
measuring...	3 measurement processes are undertaken automatically
enter current water level: xxx cm	Enter the current level b of chamber 1 as measured with rule (measured from base of tank to surface of water) and confirm with Set .
save? ___ cm No	The measurement now specified states the distance c between the tank base and blow-in point of the lifter. Use the arrow keys (←→) to select "Save yes" and confirm with the Set key. The calibration is complete and you can exit this menu with the "ESC" key.

9. Additional functions of the KL24plus control unit

2nd step: Setting the control parameters

It is absolutely essential that the control parameters for the level measurement are set for the system to function correctly. Please carefully work through the following points in order:

service code	Go to "SERVICE CODE INPUT", press the  key and enter the general service code when prompted to do so:
level measuring setup	Use the left arrow key (←) to select "Level measurement setting" and confirm with the  key.
water level start at: xxx cm	Enter the water level <i>b</i> from which a treatment cycle is to start. Confirm with the  key.
Recirculation 2 min	Use the numerical keys to enter "2 min" and confirm with the  key. The necessary settings are complete and you can exit the menu with "ESC".
alert flooding at: xxx cm	(as of software 8.29) → NOTE: It is not essential for the overflow warning message to be activated for the system to function correctly. If 000 cm is saved, this warning message remains deactivated.

To activate, measure the height between the base of the tank and bottom edge of the emergency overflow in the dividing wall or, in full circle systems, on the discharge. With tanks, you can enter the relevant value for your system from the table (see item 9.1.2). Please refer to the delivery slip for the name of your tank. Confirm with the  key.

→ If 000 cm is saved, the overflow warning message is deactivated.

3rd step: Function check

The level measurement can now also be undertaken in manual operation for checking purposes. This requires the level measurement to be activated with "1". The control unit automatically takes a measurement. Once the process is complete, the measured value appears.

9.1.3 Deactivating the level measurement

To deactivate the level measurement and again run the cycles dependent on time, the 2nd step described above must be repeated. Water level *b* must be set to 0 cm. Recirculation can remain at 2 minutes.

9.1.4 Safety and fault messages

If the sensor measures a value below 40 mbar, the following message appears in the display: "Fault: min. level". If this happens, the system reverts to the normal time-controlled mode. This is either triggered by too low a water level (≤ 40 cm) in the sludge reservoir / buffer or a leak in the pressure or measurement line. We recommend contacting the manufacturer if this happens.

9. Additional functions of the KL24plus control unit

9.1.5 Phosphate precipitation with dosing pump



Attention: The precipitant (ferric chloride or polyaluminium chloride) is harmful to health when swallowed and irritates the skin. There is the danger of serious eye injuries.

There is a danger of explosion in conjunction with alkali metals, allyl chloride and ethylene oxide. **Before using phosphate precipitants, read the associated safety data sheet! Wear protective clothing when handling ferric chloride.** Store precipitant containers in a secure area so that they are inaccessible to unauthorised persons and out of the reach of children.

Systems delivered with the phosphate precipitation function come with the necessary peristaltic pump in the cabinet. One suction hose and one pressure hose are connected to the pump.

The runtime of the peristaltic pump is determined by the pump time set in the service menu. The amount of precipitant added is therefore dependent on the set time. The large Compact pump has a potentiometer for setting delivery. The table below shows the amounts that can be metered. Refer to the building authority approval for the amount required in each case.

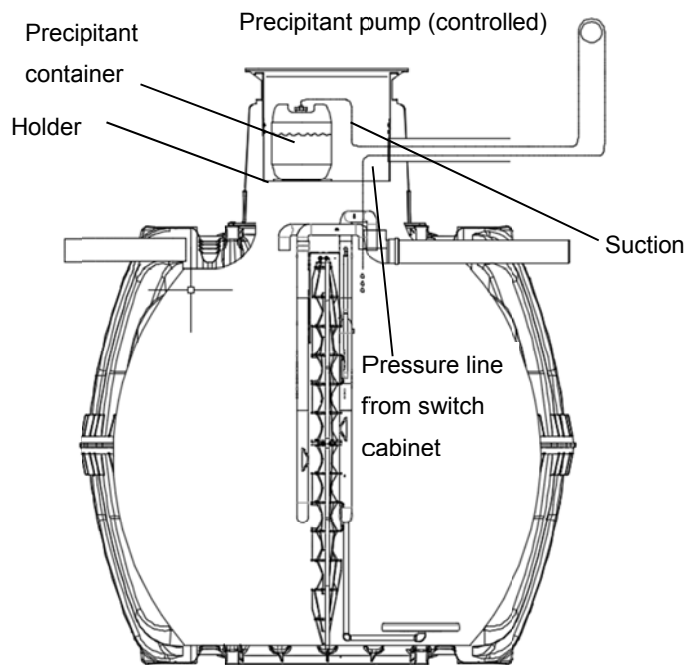


Figure 12: Sketch of precipitant equipment

In order to start up the precipitant device, the precipitant container must be placed in a frost-proof location (e.g. machine cabinet, on the dividing wall or in the system's dome shaft). The pressure and intake hoses should also be laid in frost-free areas. The pressure hose is to be routed into the SBR reactor and placed inside the reactor with the outlet located above the reactor basin, ensuring that the precipitant flows directly into the wastewater to be treated and does not contact any components (aggressive chemicals entail a risk of damage to components!). The outlet must never be submerged in the water!

9. Additional functions of the KL24plus control unit

- Feed the suction hose into the precipitant container far enough to ensure suction from the base.
- Connect the suction and pressure hoses to the hose nozzles of the pump and fix them with the cap nuts.
- Switch the phosphate pump on via the menu item 'Manual Operation' and check that the precipitant is sucked in correctly. Swap the hose connections if necessary.
- The suction hose can optionally be equipped with a suction lance.

10. Operation and maintenance

10. Operation and maintenance

The system must be kept switched on at all times, except for maintenance requirements. As the operator of a small wastewater treatment system, you are obliged to ensure that the system runs perfectly. Almost all operating problems will result in the system's cleaning capacity being impaired. Such problems should therefore be detected early on and immediately rectified by yourself or a qualified maintenance technician.



When working with an open tank cover, there is a risk of stumbling and falling!

Suitable measures must be taken to cordon off the open tank. People could fall into the tank whether they are involved in the maintenance work or not! Children are at particular risk!

The biological decomposition processes that take place in small wastewater treatment systems result in the formation of (potentially toxic) gases. Anyone entering the system must therefore always be accompanied by a second person. Never follow anyone who has lost consciousness, instead seek help as quickly as possible.

Always follow any legislative OHS confined space entry requirements that may apply to this activity!!



When doing anything other than operating the controller, the cabinet's main power supply should be isolated!

Work, such as maintenance and repairs on the control system, should only be undertaken by an approved maintenance technician or electrician!

10.1 Duties of the operator / Maintenance provider.

Measurements, deviations from nominal values and operating faults should be entered in an operating log. The water authorities may ask to see this log. To ensure smooth operation, the following checks must be undertaken:

Daily check (Preferred)

- Check that the system is running properly. This is the case when the operating LED light is green and there are no warn. A fault is indicated as described in the System control unit chapter. Should a fault occur, please consult the Graf controller LCD screen, and inform the maintenance company of the displayed fault.

10. Operation and maintenance

Weekly checks (Weekly checks are not prescribed, but are recommended)

- Check water levels, sludge must not enter the SBR chamber uncontrolled.
- Check the supply and discharge routes for blockages (visual check).
- Read operating hours counter for air compressor (total operating hours), aeration (valve 2) and sludge return (valve 4) and if necessary any other units and note in operating log.
 - Check function of lifters and aeration using the "Manual mode" setting.

4 monthly service checks as per service report

Visually check for any sludge leaks, clouding or discolouration in the discharge.

- Check the supply and discharge routes for blockages (visual check).
- Read operating hours counter for air compressor (total operating hours), aeration (valve 2) and sludge return (valve 4) and if necessary any other units and note in operating log.

Checking the air filters:

The filter for aerating the control cabinet (ventilation grille on left and right in housing wall of internal cabinet or on rear of external cabinet) should be checked and cleaned or replaced if required. The grille on the outside of the cabinet must be removed for this purpose. Apply a little pressure with a screwdriver to release the clip fastener and remove the grille by hand. The filter mat is not secured in the ventilation shaft and can be shaken and/or blown out.

The time at which the air compressor filter is to be cleaned or replaced depends on the extent of contamination caused by the atmospheric conditions of the application. Follow the service documents provided by the compressor manufacturer to check or replace the filter on the compressor.

10.2 Tablet Feeder Operation and Maintenance...



Before handling chlorine tablets, Please read and understand the MSDS (material safety data sheet) instructions, before filling the feed tube always wear rubber gloves and safety glasses or a face shield, avoid breathing vapor for personal protection,

Please note: NEVER mix different types of tablets.

To fill the feed tube once they have eroded down, remove it from the feeder housing rinse the tube thoroughly with fresh water dry as required.

To fill, hold the tube slotted end up at a 30 to 45 degree angle and slide the tablets into the open end of the tube, one tablet at a time, Insure each tablet lies flat and evenly against each other,

10. Operation and maintenance

once full carefully return tablet tube to the upright position, replace the top cap and return tube back into the feeder housing, taking care to locate ribs on the bottom of the tube into the grooves in the bottom of housing.

Keep a record of tablet consumption and FAC (free available chlorine) which should be kept between 0.5 to 2.0 mg/l, this can be achieved by adjusting the sliding sleeve that covers the tube slots, Up to increase FAC, down to decrease FAC.

10.3 Emptying sludge

The level of sludge that has accumulated in the sludge reservoir is measured by a maintenance specialist using a sludge judge / plunging siphon. The Systems is designed such that the sludge reservoir compartment is generally sufficient for 12 months if run permanently at full load and if the operator and maintenance obligations are met. This period extends accordingly if used less stipulates "empty sludge as required", i.e. if a high level of sludge is measured during maintenance, it must be reduced. Floating sludge must also be taken into consideration during the measurement. The sludge should be disposed of when the sludge reservoir is 70% full or before. The operator / maintenance provider must arrange for the sludge to be disposed of.

If maintenance and sludge removal are to be undertaken at the same time, perform maintenance first. Sludge removal should be noted in the operating log / service report. Note this information is provided by your specialist maintenance company.

The following should be noted when removing sludge:

- **First** remove the floating sludge from the surface, **then** place the intake pipe on the floor of the chamber.
- **Around 10 cm of water should be allowed to remain in the pre-treatment section.**
- **After emptying the pre-treatment section should be refilled with fresh water.**

10.4 Maintenance must be performed by an approved maintenance specialist.

The maintenance should be undertaken by a specialist company (experts)¹. Depending on the land release requirements, it should take place at least twice (three times) a year (interval of

¹ Specialist companies are those not affiliated to an owner / operator, whose staff (specialists) are suitably qualified and licenced to operate and maintain small wastewater treatment systems through their professional training and from and having received relevant approved training from Graf.

10. Operation and maintenance

approx. 4/6 months). The intervals and work defined by the local water authority in the licence issued under local government law also apply. The system owner must take out a maintenance contract with a qualified specialist for this work.

Maintenance should include the following:

- Inspection of the operating log to check for correct operation (nominal/actual comparison)
- Check the air filter on the air compressor and the supply/exhaust air vents on the control cabinet
- **Air compressor maintenance according to details provided by manufacturer (see Annexes)**
- Function check on mechanical, electro-technical and other system parts key to operation, such as aerator, lifts, control unit, valves, alarm equipment, ventilation fan, power cut detector
- Check level of sludge in the sludge reservoir. If necessary, the operator / maintenance provider must arrange for the sludge to be removed (see Item 10.1),
- Carry out general cleaning work, e.g. remove deposits
- Check the structural condition of the system
- Check sufficient aeration and ventilation
- Analysis of the aeration basin:
 - oxygen concentration ($O_2/l > 2$ mg), if necessary adjust the compressor operating times
 - sludge as proportion of volume (< 400 ml/l) MLSS
 - ➔ If the sludge makes up more than 400 ml/l, the excess sludge return duration should be increased, in agreement with the manufacturer;
- Sampling of final effluent and analysis of the following values when required:
 - temperature of wastewater
 - substances that can settle TSS
 - pH
 - odour
 - colour
 - depth of visibility
 - BOD₅ (every other maintenance)

10. Operation and maintenance



- COD value
- NH₄-N (if required)
- nanorg (if required)
- P (if required)

When maintenance work undertaken, any damage found, repairs undertaken and other information should be summarised in the maintenance report by the maintenance company. A suitable template is provided in the Annex. Anything found during the analyses should also be documented in this report. The system owner / operator should be given the maintenance report so that it can be passed to the responsible authorities if demanded. The maintenance report should be attached to the operating manual. Please keep the operating log in a place where it can be easily accessed.

11. Fault messages and rectification

11. Fault messages and rectification

Technical system operation faults (failure of a unit) are indicated both visually and acoustically.

The control unit's acoustic fault signal can be deactivated by pressing . The optical error display is only acknowledged once  is pressed again.

If the power supply fails, an integrated non-mains-dependent power cut detector emits an alarm which alternates with a visual signal. If this happens, no acknowledgement can be performed.



Voltage!

During all work on the machine cabinet extending beyond operating the control unit, the cabinet should be disconnected from the mains voltage.

11.1 Fault message on display

- Error message as text on the liquid crystal display
- Operating LED lights up red

Display	Possible cause	Rectification
Liquid crystal display		
No display, no lamp	<ul style="list-style-type: none"> • Power supply is interrupted 	<ul style="list-style-type: none"> • Check the power supply to the system and control unit • Check microfuse F1 on the supply cable • Check the position of the maintenance switch (position 1) <p>→ If the buffer is flat, mains failure will not be indicated acoustically or optically.</p>
No display, lamp green		<ul style="list-style-type: none"> • Switch off system and switch on again after 10 seconds.
No / faint display	<ul style="list-style-type: none"> • Contrast is set incorrectly 	<ul style="list-style-type: none"> • Press and hold Esc key and use arrow keys to adjust contrast.
Set clock	<ul style="list-style-type: none"> • Internal time/date not set 	<ul style="list-style-type: none"> • Go to Time and date to set
error compressor error	<ul style="list-style-type: none"> • Compressor not working / not drawing power 	<ul style="list-style-type: none"> • Check main fuse F1 • Check compressor in manual mode
valve 1 error	<ul style="list-style-type: none"> • Valve not working • Fuse tripped • Solenoid defective • Valve blocked by dirt 	<ul style="list-style-type: none"> • Check valve in manual mode • Check microfuse of consumers F2 • Check valve for traces of powder • Unscrew valve from metal strip and check for contamination and remove any found (see maintenance instructions in Annex).
valve 2 error		
valve 3 error		
valve 4 error		
UV unit error	<ul style="list-style-type: none"> • UV module not working 	<ul style="list-style-type: none"> • Check UV module and remaining lamp life

11. Fault messages and rectification

Display	Possible cause	Rectification
Liquid crystal display **error** min. water level	<ul style="list-style-type: none"> Compressed air line leaking between control unit and feed lifter, e.g. due to loose hose 	<ul style="list-style-type: none"> Check hose line for leaks
Alert flooding	<ul style="list-style-type: none"> Water level in 1 chamber is too high Compressed air line blocked, e.g. due to kink in hose 	<ul style="list-style-type: none"> See Item 9.2 Check hose line for kinks
temperature max.	<ul style="list-style-type: none"> Temperature sensor not plugged in Cabinet fan not working Filters in cabinet and in compressor are dirty Direct sunlight on cabinet The temperatures entered in the Service menu for switching on the cooling fan and the maximum temperature are too high Air compressor defective Temperature sensor defective 	<ul style="list-style-type: none"> Plug temperature sensor onto rear of control unit Check the functionality of the cabinet fan Check air filter in cabinet Provide site with shade Ensure good aeration Check air filter in air compressor Check air compressor in manual mode Have set temperatures checked by maintenance company Replace temperature sensor
error temp.-sensor	<ul style="list-style-type: none"> No temperature sensor Temperature sensor not fully plugged into bush Temperature sensor defective 	<ul style="list-style-type: none"> Replace sensor Ensure a reliable connection between control unit and temperature sensor, then de-energise control unit for 10 sec. and switch on again, check whether a temp. sensor fault message is displayed.
error power failure	<ul style="list-style-type: none"> Power cut System switched off via maintenance switch Switch cabinet is not energised FI fuse has blown 	<ul style="list-style-type: none"> Wait for power to be restored Switch system back on via maintenance switch Check supply line to switch cabinet Establish cause for earth leakage circuit breaker blowing and remedy (possible cause: solenoid valve defective). .
modem error	<ul style="list-style-type: none"> Batteries in module are not yet fully charged Modem has no mains voltage No SIM card inserted in modem SIM card not logged into mains 	<ul style="list-style-type: none"> Wait 5 minutes until batteries are charged Connect modem to the mains Insert SIM card in modem Wait until card has logged in or move antenna into position where reception is available.

11. Fault messages and rectification

11.2 Unusual water levels - remedying a fault

Observation	Possible cause	Rectification
The water level in the pre-treatment section is unusually high, but is normal in the aeration section.	<ul style="list-style-type: none"> • The lifter at valve 1 is not activated. • The pump time for lifter 1 has too short a setting. • The feed lifter is blocked. • The air supply to the feed lifter is leaking. 	<ul style="list-style-type: none"> • In manual mode, activate valve 1 and check function of lifter. • Have time for valve 1 extended by service company • Allow pre-treatment section to be pumped empty and clean lifter • Allow pre-treatment section to be pumped empty and seal hose connections
The water level in the pre-treatment section and aeration basin is unusually high.	<ul style="list-style-type: none"> • System running in holiday mode. • System running continuously in cycle pause. • Control unit settings are incorrect. • The discharge lifter is blocked. • The air hose to the discharge lifter is leaking. • Flooding in the discharging system is not allowing water to drain from the system. • Control unit is defective. 	<ul style="list-style-type: none"> • Exit holiday mode (see Item 7.2.4) • Have control unit settings checked by a maintenance specialist • Allow SBR reactor to be pumped empty and clean lifter • Allow SBR reactor to be pumped empty and seal hose connections • Wait for flooding to drain away • Contact maintenance company
The system smells, the cleaned wastewater is cloudy and/or discoloured	<ul style="list-style-type: none"> • Too little air is being drawn into the system • Aeration on one side only due to defective membrane unit 	<ul style="list-style-type: none"> • Have aeration time extended by service company • Check aeration pattern, contact maintenance company
Aeration pattern is one-sided and/or large air bubbles are forming in some areas	<ul style="list-style-type: none"> • Membrane unit defective • Seal on aerator bar leaking 	<ul style="list-style-type: none"> • Contact maintenance company • Contact maintenance company
Solenoid valves switching unusually loudly	<ul style="list-style-type: none"> • Valve seat of solenoid valve is dirty 	<ul style="list-style-type: none"> • Unscrew open and clean solenoid valve

12. Operating instructions

12. Operating instructions

Basically only substances with the characteristics of domestic wastewater may enter the system.

Biocides, toxic substances or substances which are not biocompatible or biodegradable must not enter the system because they cause biological process problems. The following are not permitted:

- rainwater from roofs and yards
- infiltration water (e.g. drainage water)
- liquid or solid residue from keeping animals
- commercial or agricultural wastewater, unless it is comparable to domestic wastewater
- chemicals, pharmaceuticals, mineral oils, solvents
- cooling water
- solids in the form of food waste, plastics and hygiene articles, coffee filters, bottle tops and other domestic items
- milk and milk products
- water discharged from swimming pools
- large volumes of blood

If discharging larger volumes of grease or plant-based oils, we would recommend pre-cleaning the wastewater containing the greases/oils in a grease separator upstream of the wastewater treatment system (caution: faeces must not be allowed to enter the grease separator!).

12. Operating instructions

The table below contains a list of substances which must not be disposed of in the wastewater treatment system:

Solids or liquids which should not be disposed of via the sink or toilet:	Why not:	Correct disposal:
Ash	Does not break down	Dustbin
Chemicals	Contaminate the wastewater	Collection points
Disinfectants	Kill bacteria	Do not use
Paints	Contaminate the wastewater	Local collection point
Photochemicals	Contaminate the wastewater	Local collection point
Chip fat	Is deposited in pipes and causes blockages	Dustbin
Adhesive plaster	Blocks the pipes	Dustbin
Cat litter	Blocks the pipes	Dustbin
Cigarette butts	Are deposited in the system	Dustbin
Condoms	Blockages	Dustbin
Corks	Are deposited in the system	Dustbin
Varnishes	Contaminate the wastewater	Local collection point
Medicines	Contaminate the wastewater	Collection points, pharmacies
Engine oil	Contaminate the wastewater	Collection points, service stations
Waste containing oil	Contaminate the wastewater	Collection points, service stations
Plant protection agents	Contaminate the wastewater	Local collection point
Paintbrush cleaners	Contaminate the wastewater	Local collection point
Cleaning agents, except chlorine-free products (environmentally sound)	Contaminate the wastewater, corrode piping and seals	Local collection point
Razor blades	Risk of injury to staff in the sewage system and treatment plant	Dustbin
Pipe cleaners	Corrode piping and seals, contaminate the wastewater	Local collection point
Pesticides	Contaminate the wastewater	Local collection point
Panty liners	Cause blockages, non-degradable plastic films blight watercourses	Dustbin
Cooking oil	Cause deposits and pipe blockages	Local collection points

12. Operating instructions

Food waste	Cause blockages, attract rats	Dustbin
Wallpaper paste	Causes blockages	Local collection point
Textiles (e.g. nylon tights, cleaning cloths, handkerchiefs etc.)	Block pipes, may paralyse a pump station	Used textiles collection point
Thinner	Contaminates the wastewater	Local collection point
Bird sand, cat litter	Cause deposits and pipe blockages	Dustbin
Cotton buds	Block the system	Dustbin
Toilet blocks	Contaminate the wastewater	Do not use
Nappies	Block the pipes	Dustbin
Cement water	Is deposited, results in production of concrete	Contact specialist company

Thank you for your trust.

Graf Australia Pty Ltd

Dated 05/2016

Subject to technical modifications.

13. Annex I: Template for weekly / monthly check notes

13. Annex I: Template for weekly / monthly check notes

For systems requiring maintenance three times a year, the parameters should be noted weekly; for systems requiring maintenance twice a year, the parameters should be noted monthly

Date of check	Sludge overflow?		Turbidity/discolouration?		Congestion inlet/outlet?		Air filter checked?		Operating hours counter				
	Yes	No	Yes	No	Yes	No	Yes	No	Valve 1	Valve 2	Valve 3	Valve 4	Total

13. Annex I: Template for weekly / monthly check notes

For systems requiring maintenance three times a year, the parameters should be noted weekly; for systems requiring maintenance twice a year, the parameters should be noted monthly

Date of check	Sludge overflow?		Turbidity/discolouration?		Congestion inlet/outlet?		Air filter checked?		Operating hours counter				
	Yes	No	Yes	No	Yes	No	Yes	No	Valve 1	Valve 2	Valve 3	Valve 4	Total

13. Annex I: Template for weekly / monthly check notes

For systems requiring maintenance three times a year, the parameters should be noted weekly;
for systems requiring maintenance twice a year, the parameters should be noted monthly

Date of check	Sludge overflow?		Turbidity/discolouration?		Congestion inlet/outlet?		Air filter checked?		Operating hours counter					
	Yes	No	Yes	No	Yes	No	Yes	No	Valve 1	Valve 2	Valve 3	Valve 4	Total	

14. Maintenance log for GRAF small wastewater treatment systems

14. Maintenance log for GRAF small wastewater treatment systems

Location (address): _____

Maintenance company: _____ Date of maintenance: _____

Serial number: _____ Order no.: _____

System size: _____ EP Actual connection _____ EP

Operator's name: _____ Customer no.: _____

1st line of address: _____ Tel. no.: _____

Town/city, postcode: _____ Fax no.: _____

Installed by: _____ Start-up: _____

Will the system process commercial wastewater too? No

Restaurant without kitchen Restaurant with kitchen Other _____

Grease separator present, NG Emptying needed _____

Structural condition (visual evaluation of pit body when filled):

Dividing walls are OK Pit is sealed to the outside

Dividing wall between sludge reservoir
+ buffer & SBR is leaking Corrosion damage

Comments: _____

Function check of system parts important to operation:

Feed lifter / valve 1 (red) Aeration / valve 2 (blue)

Discharge lifter / valve 3 (black) Excess sludge lifter / valve 4 (white)

Power cut detector (optional)

Air inlet / aeration: moderate intensive, circulation clearly visible

Aerator pattern / aeration: fine bubbles even

Comments: _____

14. Maintenance log for GRAF small wastewater treatment systems

Sludge accumulator + buffer:

Sludge height: _____ cm Floating sludge height: _____ cm

The operator should arrange for the cesspit to be emptied.

SBR reactor:

Oxygen concentration: _____ mg/l (normally approx. 4-6 mg/l, at least 2 mg/l)

Sludge as proportion of volume: _____ ml/l (maximum 400 ml/l) MLSS

Comments: _____

Control unit:

Control unit type: _____ Σ operating hours: _____

Feed (valve 1): _____ Aeration (valve 2): _____

Discharge (valve 3): _____ Excess sludge reservoir (valve 4): _____

Comments: _____

Blower:

Blower type: _____ Blower OK

Change the slats (slat length: _____ mm) Change the membranes

Filter change Cooling fan OK

Comments: _____

Time of sampling:

Date: _____ Time: _____

Sampling site: _____ Sampling shaft SBR chamber

Sample transport: _____ cooled 4°C frozen

Air temperature: _____ °C Water temperature: _____ °C

Odour none weak strong rotten earthy

Colouring none weak strong beige brown

Cloudiness none weak strong opaque

Floating matter none a little a lot

14. Maintenance log for GRAF small wastewater treatment systems

Dry substance

Activated sludge

P_{total}

Substances that can settle TSS

ml / l

pH

BOD₅

ml / l

COD

ml / l

NH₄-N

ml / l

N_{tot}

ml / l

Additional comments:

Operating log available.

Maintenance noted in the log.

Programming modified:

Fault rectified:

Additional comments:

To be arranged by the operator:

The operator is asked to note the substances which must not enter the system (see operating log).

Tank is overflowing, operator must arrange pump out of content, and notify maintenance provider immediately.

Empty primary chamber.(dispose of sludge reservoir when over 70 % full of settled sludge).

Date and signature