Service manual for control unit of small wastewater treatment plant

ClearFox® easy

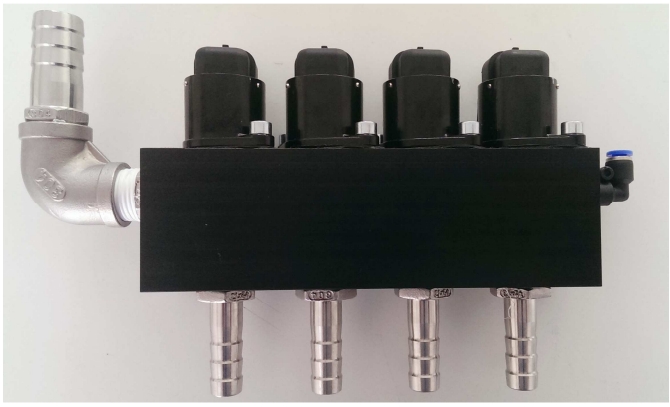
Softwareversion: CF-02.## / CF-AP-##

FW: 05.03 13.03

Subject to change

Specifications

- 1 power plug 230VAC / 50Hz
- 1 integrated socket for compressor (230VAC / max 4A sum of all consumers incl. auxiliary relay output)
- No calibration required - fully automatic
- Level measurement via integrated pressure sensor for energy saving operation and function monitoring of the compressor (pressure)
- Acoustic signal on power failure or other various alarms
- Datalog from last 60 events
- Operating hours recording total and per calendar week can be read individually
- Easy to replace high-performance batteries (3xAA)
- LCD display (2x16 characters)
- Manual mode for all outputs
- Password-protected servicemenue
- Overfill-alarm (when clearwater-pump not empty biology)
- Basic languages: German , English, Polish
- Switching to different program variants in Service mode
- USB interface
- **Air manifold with high-quality step-motors**
  - Open and close almost silently
  - > 95 % energy saving compared with conventional magnetic valves
  - 4 x air outlet ½ " (step motors) with unbreakable hose-connector (stainless steel)
  - 1 x Air Inlet ¾ " (compressor) with unbreakable hose-connector (stainless steel)



Options:

- 1 additional output (230VAC / max. 4A sum of all consumers including compressor) for example for electr. clearwater-pump, dosing pump for P-precipitation or UV lamp.
- Service alarm (optional activated)
- Programming set for program updates via laptop on siteand read out hours of operation and history of failures to print and to save as file **(electronical daily-book for operation hours).**
- graphical visualization of plant functions via USB-cable to existing computer on site
- Other languages on request
- Air outlets ¾ "

Electrical Safety:

If the housing of the controller opens and assembly are carried out at the plugs or connections of inputs and outputs, it is essential to pull out the plug !

Programming and control settings must be performed by trained service technicians.

If checks or changes in the timing must be performed in case of service, these settings can be done with the programming buttons of course only during operation.

Commissioning:

- Connect all hoses for airlift pumps according to color coding
  The counting can always be seen from the pressure sensor connector from the air distribution
  • Yellow aeration
  • Red filling
  • Green secondary sludge
  • Blue clearwater
- Fill biology tank with clearwater till point of water inlet of clear water pump.
- Plug in control unit.
- Ready.
- If necessary the offset value has to adjust (height between clear water discharge point and max water level - emergency overflow to prechamber). In this case, enter the service password and access the menu address 000018. Using the arrow keys, the offset can be adjusted in cm. Click “OK” to confirm value.

Special case "operating with electric. Clear water pump "

- For this service you need a password to enter and access the menu address 000024. Change with arrow ↓↑ the clearwater type to „El.-pump“. Click “OK” to confirm value. The display will show you that parameters saved.
  - The cable of the electric clearwater pump is inserted through the cable gland M16 in the control housing. The cable can now be connected to the free relay terminal (Output 2). (Note: the electric pump may not exceed a rated current (in total with the compressor) of 4A, since this corresponds to the maximum value of the fuse).
- Electrical installation work must be carried out by qualified personal!

Operation:

- This can be done on the front panel using the 4 arrow buttons , OK and ESC
- ↓ ↑ up and down in the menu, selecting numbers
- ← In normal mode - Display of date, time , water level and current level in% current display

- → selection of values
- OK - Confirms the entered values , or standard calling the access control (command service password) .
- ESC - confirm alarms, return to the previous menu

Display:

- The display is 2 x 16 characters.
- After start of controller is displayed the current status (current program step with remaining-time in min./sec. and the current pressure in mbar).
- All other functions can be seen on following pages.
- With arrow ↑ you can display the current stand of Firm- and Softwareversion.

Alarms:

- Power failure alarm (beep when the 230V power supply fails)
  condition: battery is connected and operational. Always enabled in the factory settings.
  Quitt alarm: press "ESC" button for about 1 sec. (it will sound briefly and then beep beep is deleted) - no alarm repetition.

- Under-/Overcurrent alarm (beep when the compressor fails electrically or to high current)
  Quitt alarm: press "ESC" button for about 1 sec . (beep deleted) - Alarm repeat after 24 hours.

- Under-/Overpressure alarm (beep when the compressor fails hydraulic or based on blockage too high presure)
  Quitt alarm: press "ESC" button for about 1 sec . (beep deleted) - Alarm repeat after 24 hours.

- Service alarm (option , activated by a service technician , usually 365 days)
  After the set time, the alarm at regular intervals a beep and the display will show the corresponding display ("SERVICE DUE).
  Quitt alarm: press "ESC" button for about 1 sec . (beep deleted) - Alarm repeat after 24 hours.

  Complete reset by the service technician :
  See separate overview " change parameters "

- Overfill alarm (when the preset switching level "offset" in biology after pumping of clearwater pump is not lowered to 50 % min reason for this may be:
• Clearwater time not enough -> change
• Tank is flooded .
• Wrong offset value entered.

- All alarms (last 60 events) are stored with date / time in the logbook

Special functions:

- Biology build-up
  Factory provided all control-units with 300 cycles without secondary sludge recirculation. This means that at this time, the secondary sludge pump is deactivated. This can be changed by a service technician with the corresponding menu address.

Reprogram parameters (only service):

- See also the following program sequence , as well as " change parameters " . Program steps following the not enumerated, but are visible in the menu, may not be changed !
- Times are in hours / min / sec displayed. To change use the arrow keys into the appropriate place and change with the arrows "up" and "down" the value. Confirm with "OK " to save.

Customer menu (starting from the default display)
- Scroll down on the ↓ button
- Select the OK button
- Use the arrow keys to scroll
- Press ESC to jump back one level

↓ operating hours (for all outputs total and selective according to the calendar week)
↓ reports (log of the last 60 events)
↓ date (set current date)
↓ time (set current time)
↓ change summertime (automatically or off)
↓ language (change of language)
↓ handmode (test of all output functions selectively with “→” activate / disable)
automatic time-out after 5 minutes .
↓ show calibration value in mbar

Standard Program (CF-AP-XX):

1. Filling 1
2. Measure level biology
   (reached level - > Step 3, level not reached, then energy saving mode step 18)
3. Aeration / pause D1
4. Aeration / pause N1
5. Filling 2
6. Aeration / pause D2
7. Aeration / pause N2
8. P- dosing (time input optional, default "0" interval "0" = disabled)
9. P- mixing (time input optional, default "0" interval "0" = disabled)
10. Settling N
11. Sec N
12. UV - start (time input optional, default "0" interval "0" = disabled)
13. Clearwater
14. UV - delay (time input optional, default "0" interval "0" = disabled)
15. Clearwater (only with automatic recalibration every x cycles)
16. Calibration (only with automatic recalibration every x cycles)
17. End normal cycle
18. Aeration / pause E
19. Settling E
20. Sec. E
21. Filling E
22. Measure level biology
    (level reached -> step 1, level not reached energy saving mode step 18, again)

Changing parameters (only with service password):
Press “OK” and enter service password, then enter the desired address

Function	Adress	note
Pulse time	####01	#### Please enter here the step number with leading zeros. Changing the time
Pause time	####02	#### Please enter here the step number with leading zeros. Changing the Time
Intervals	####03	#### Please enter here the step number with leading zeros. Changing the intervals. Interval "0" means, this step is disabled.
Output selection	####05	#### Please enter here the step number with leading zeros. Achtivated outputs for each step.
Switch off step for x cycles	####07	#### Please enter here the step number with leading zeros. Here it is determined that the step is not active for the input number of cycles. **Only use for secondary sludge return!** Standard 300
min. current value	####12	#### Please enter here the step number with leading zeros. Here the min current value can be adjusted for each step. Factory setting 0.2 A
max. current value	####13	#### Please enter here the Step number with leading zeros. Here the max current value can be adjusted for each step. Factory setting 5.0 A
Step execution only all xx-steps	####14	#### Please enter here the step number with leading zeros. Here, the step execution of all xx-steps can be set. Default is 1 Only required for automatic calibration procedures (step15 and 16). **Warning: Only in consultation with the manufacturers change!!!**
Max. time manual mode	000011	Here, the maximum time of manual operation can be set. Factory setting: 5min.
Manual calibration	000016	Here is possible to calibrate by hand Fill biology with water close above inlet point from clearwater pump. Afterward start with the adress the calibration mode. Automatic sequence needs about 15 - 20 minutes.

Offset biology	**000018**	Here the offset of biology must be entered (height difference between the inlet point clearwater pump and emergency overflow to prechamber). **Note: If this value is set incorrectly (too large) then the system runs always in energy saving mode without pumping clearwater - Subsequent flooded!**
Service alarm	000020	Service alarm can be activated. Depending on the number of set days (up to 730), a service alarm sounds after this time has elapsed, which can be deleted with "ESC" or "OK" for 2 days reset by customer. Complete reset by a service technician. Factory setting 0 = disabled
Min. airpressure	000022	Here the min. airpressure value can be adjusted, basicly for every steps with blower.
Max. airpressure	000023	Here the max. airpressure value can be adjusted, basicly for every steps with blower.
Change to electr. Clearwater pump	000024	This adjustment will switch off the blower in all clearwater steps. Change with arrow ↓↑ the clearwater type to „El.-pump". Click "OK" to confirm value. The display will show you that parameters saved.

Changing to emergency program (without alarms and energy saving mode):

Press "OK" and enter following password

Function	Adress	note
Set factory parameters	123000	In case wrong calibrations or any other failures, it is possible to start this program. Every times are the same except of alarms and energy saving mode. This program is not possible to change back by client, only in case of new programming via computer by next maintenance.

Further Explanation
The Adress can be seen as three 2-digit-blocks:

Layer – Step number – Function
XX - XX - XX

Funktion 01 02 03
Schrittnummer

Step	Funktion	Zeit EIN	Zeit AUS	Intervalle
1	Befüllen 1	00:05:00	00:00:00	1
2	Messen Niv. Bio	00:00:30	00:00:10	1
3	Belüften N1	00:15:00	00:05:00	2
4	Belüften D1	00:05:00	00:15:00	1
5	Befüllen 2	00:02:00	00:00:00	0 / 1 (ab 6EW)
6	Belüften N2	00:15:00	00:05:00	4
7	Belüften D2	00:05:00	00:15:00	2
8	Befüllen 3	00:01:30	00:00:00	0 / 1 (ab 8EW)
9	Belüften N3	00:15:00	00:05:00	6
10	Belüften D3	00:05:00	00:15:00	3
11	Absetzen	00:10:00	00:50:00	1
12	Sekundär	00:00:07	00:00:00	1
13	UV Vorlauf	00:05:00	00:00:00	0 / 1 (bei UV)
14	Klarwasser	00:15:00	00:00:00	1
15	UV Nachlauf	00:05:00	00:00:00	0 / 1 (bei UV)
16	Kalibrierung	00:00:30	00:00:10	1
17	Ende Zyklus	00:00:05	00:00:00	1
18	Belüften E	00:10:00	00:10:00	2
19	Absetzen E	00:10:00	00:10:00	1
20	Sekundär E	00:00:10	00:00:00	1
21	Messen Übervoll	00:00:30	00:00:10	1
22	Alarm Übervoll	00:00:03	00:00:00	1

Different layer don't exist in the CF-Easy due to Hardware restrictions. It will always contain the numbers **00**.

For changing steps, take a look at the quality pass or the inside of the cabinet door. Choose the step you want to change. Leading zero is necessary. For example: step 6 means you have to type in **06**. For changing general functions (e.g. airpressure value) it has to contain the numbers **00**.

The last block is asking what has to be changed. Leading zeros are required. The most used are **01** for pulse time, **02** for pause time and **03** for intervals.

Important note:

Never change steps **"Calibration"**, **"End cycle"**, **"Measure overfill"** and **"Alarm overfill".**

Quick Overview

(For adjusting program CF-AP_410_KC and CF-AP_410_KD)

Set Offset

OK -> Service password -> 00 00 18 -> number in cm (see recommendation on nameplate)

Activate Filling 2

OK -> Service password -> 00 05 03 -> set to 1 (= activate)

Activate Filling 3

OK -> Service password -> 00 08 03 -> set to 1 (= activate)

Activate UV

OK -> Service password -> 00 13 03 -> set to 1 (= activate)
OK -> Service password -> 00 15 03 -> set to 1 (= activate)