Aquarium controller Aqua-4P

Features:

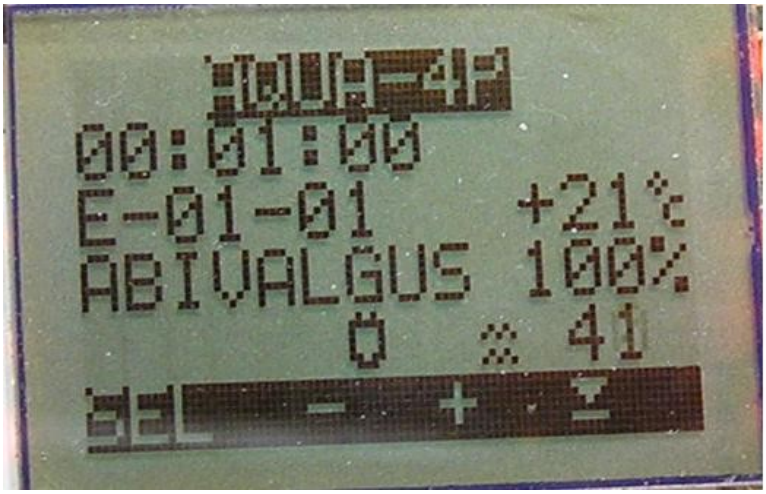
- Controls 4 independent 220V (only mains transormer must be replased if 120V mains is used) loads in ON/OFF style. Although menu refers to delays and ON power %, these values are for compatibiltity with later versions. Power % will be ignored, delay will postpone switching for amount of seconds set;
- Controls 3 independent 12V loads (internal 6W power supply) like in mentioned but now dimming is enabled. Menu line PWR specifies power (speed in case of vents or brightness in case of LED-lamps) % while ON, such power will be achieved in DLY (next line) seconds. So one can immitate sunrise: PWR=70% and DLY=240s etc;
- Measures water temperature by means of Dallase sensor DS1820 (NB! Must be in water-proof case!!!!!); Result is displayed in degrees of Centigrade only (yet...).
- Measures water level by means of a 10 cm long capacitive sensor. Level below mentioned 10 cm will be displayed not 0 but about 43%. Alarms will be generated in such case, if level sensor is enabled. Device operation is checked continuaóusly and in case of errors alarm will be generated, heater is disabled. If it was a random error (due to pulses induced from long cables) and sensor continues normal operations, heater will be enabled again.
- Controls feeding mechanism operated from 12V. User can set how many times feeder will be activated (“CNT”) during one feeding cycle and also the time of one “impulse” (“TAU” - seconds).
- Follows state of tank cover (raised or not). Corresponding icon will be (or not) displayed on status line. Each output could be set to switch of when tank cover is raised (maintenance/cleaning mode);
- If enabled, water levels below about 78% will trigger the buzzer and screen backlight, disable heater and a blinking message apperars on display. Buzzer sounds without attention (keypress) for about 1h, error message will remain on display until some key is pressed;
- Each device could be instructed to follow water overtemperature: MAX PWR./OFF/dont care). E.g. Vents could be switched to max. power in case of too hot water;
- Controller has a built-in clock chip powered from a lithium battery. Failure and correctness of time will be checked on every start-up. In case time is not correct all timer – based activities will be disabled and alarm will be generated. Clock knows the meaning of meaning of summer-/winter time.Feature could be disabled. If clock chip responds somewhat later, preporgrammed actions will be resumed.
- Each device can have up to 4 different ON/OFF times(NB! Only one power level for dimmable devices, will be changed in future versions!);
- Keylock could be enabled via techomenu to prevent cats sleeping on buttons switching ligts off etc. Unlock code is fixed to 4 2 3 1. (Key 4 is the leftmost button)
- While on main screen and unlocked keyboard key SEL selects between main-, auxiliary-, red LED and blue LED light quick control modes. Power (brightness) of light whose name is displayed could be increased (key “+”) or decreased (key “-”). In this version main and aux. Lights could not be dimmed, will be switched on or off only although power % is displayed. Brightness adjusting will start from 0% if selected light was OFF or, if it was ON, from present level.
  Adjusted lights will stay as desired for 1h or until user enters menu system. At this point timer controll over those lights will be restored automaticall
- After waiting 30s for user response in any manu, controller will resume in main screen. Keys will be locked if this feature is enabled.

Main screen (level 0)
Time, date and temperature are displayed. In shortcut menu selected light source and it's brighness is displayed as well. Rightmost number on 5-th row shows water level (in %).
Errors, if any are detected, will be printed on the 4. row in blinking text.

Level 0, keyboard locked. Error message about low temperature on screen.

In case of malfunctions name(s) of device(s) that have failed are displayed one after another after pressing any key. After user has confirmed (by pressing some key) all errors, beeper goes silent and screen backlight will be switched off. If there's nobody reading error messages, beeper will sound for 1h. Screen backlight stays on together with error message(s).
5-th row is status bar. An icon is displayed for each activated device. Last number shows approximate water level in % (if enabled from technomenu).
In case of unlocked keyboard last row shows functions of keys (up, down...). Otherwise word LOCKED! Is printed. Unlocking sequence is hardcoded to numbers 4 2 3 1 (key 4 is leftmost).

Level 1
A shortcut menu is displayed on last row if keyboard lock is disabled (from techomenu) or keys are unlocked: **SEL + - ENTER**.



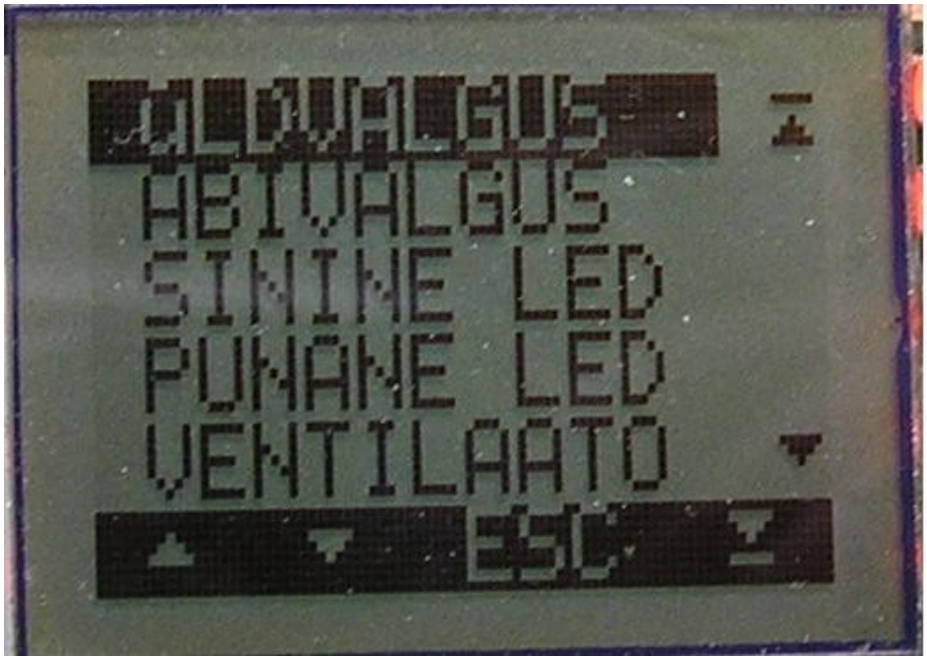
Level 1, Keys unlocked, shortcut menu displayed..Auxiliary light is adjusted on this photo.

Key “SEL” selects between 4 lights: main, auxiliary, RED LED, BLUE LED. Keys “+” and “–“

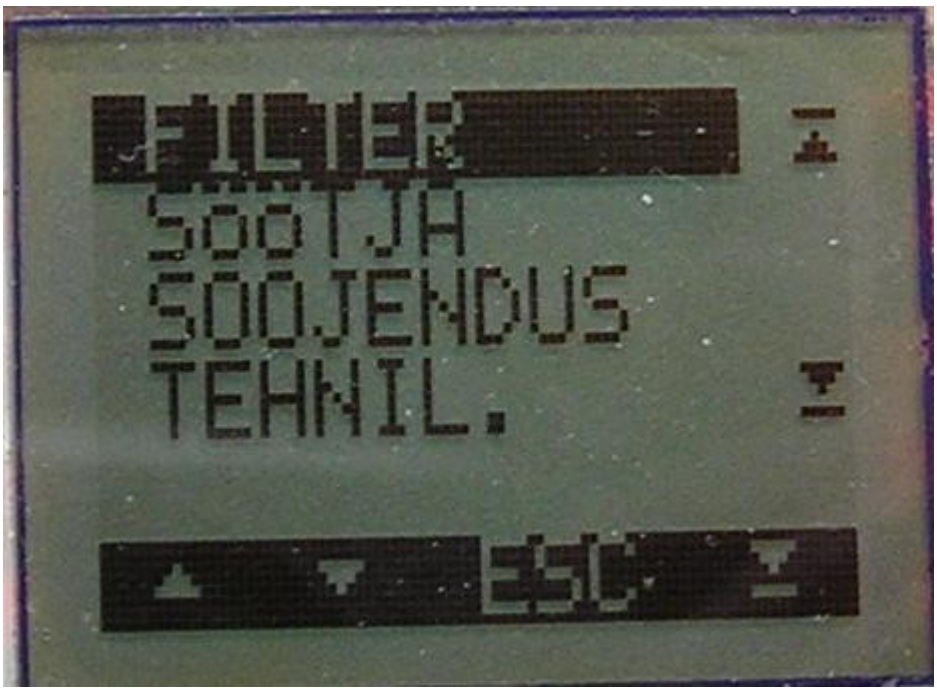
change brightness (main and aux. Lights will not be dimmed, ON/OFF only even though power % is shown!). In order not to distress fish adjusting will start from 0% if timer says, light must be off. Otherwise present brightness level is the starting point. Shortcut menu settings have higher priority than timer. If user adjusts, say, blue LED to 50% but according to clock it should be off then 50% it will be. Adjustments will last for 1h, then timer controll will be restored (all swtich ON/OFF delays will be used).
Entering menu system cancels all shortcut adjustments and timer controll is resumed, like described earlier.

Devices menu (level 3).

Sceens will be lighted and list of controllable devices will be displayed (two screens !) **Up/down** keys navigate cursor (inverted text row), **ECS** returns to main screen and **ENTER** (underlined triangle symbol) shows settings for selected device.



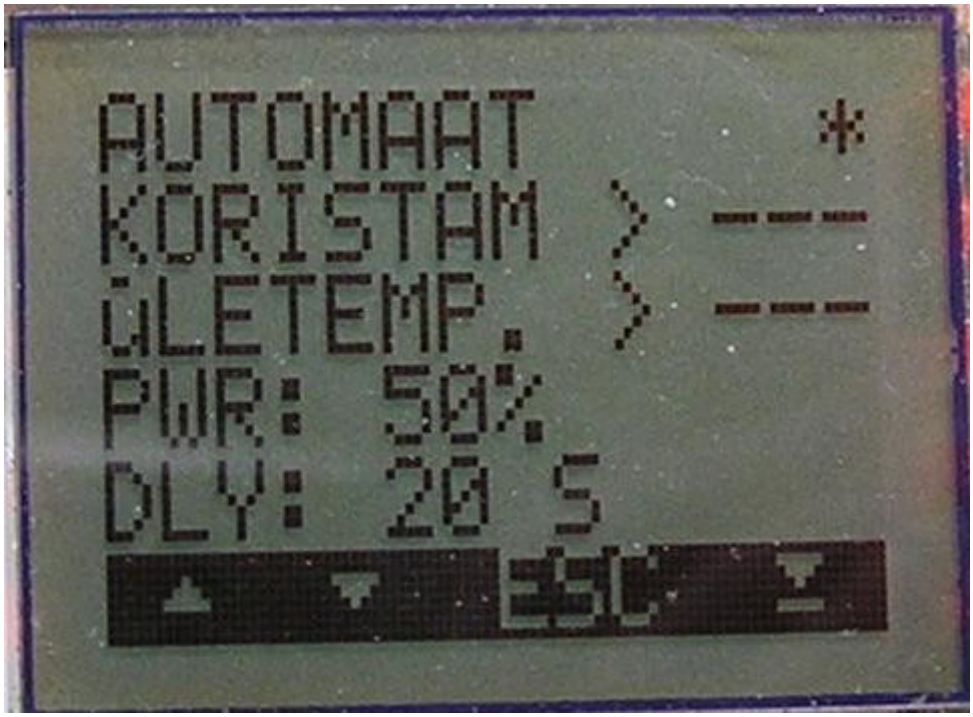
Device list (level 3). Enter selects. Triangle with line in upper right corner shows that it's first line Similar triangle on 5-th row shows that listing is continued on next screen.



Level 3, screen 2. Upper right triangle should be without a line (error in code fixed already).

Settings menu for selected device (level 4)
Up/down arrows for navigation, ESC retuns main screen and ENTER selects the device- Possible selections are:

- device constantly ON or OFF or on timer controll. Press Enter, cursor vanishes and an asterisk is displayed in the end of the row. Arrows changed text (ON/OFF/TIMER). ESC cancels changes, ENTER saves them and restores cursor.
- Device OFF or no change (text "---") when cover is raised (maintenance!).Changing modes like described earlier.
- Device OFF/ on MAX power or no change if overtemeprature.Changing modes like described earlier.
- Desired power (brightness or speed) of device in %.
- Delay for aquiring desired power in seconds. Adjustable in range 0..100.
- Time for switching device on. Days of week could also be used. Additionally one can select odd days, ewen days, workdays, free days (saturday, sunday) and all weekdays.



Settings on level 4, Presently timer mode is chosen but not yet saved.

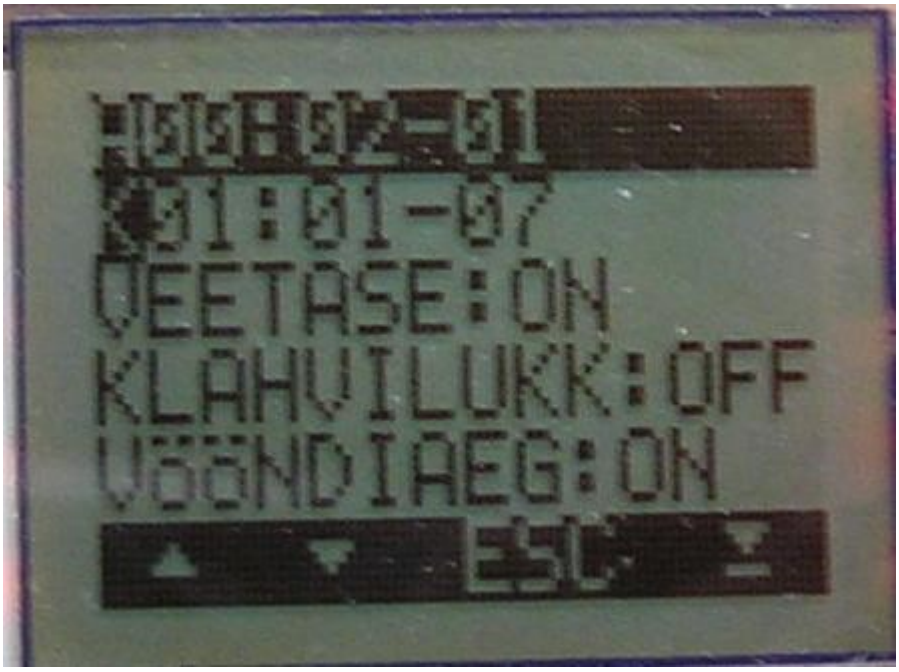
- Time for switching device off. Selections like in previous menu line. NB!! Week day will for ON or OFF times will always be the same. Last change takes priority.
- **Next time**. Each device can have upp to 4 onoff time pairs. If time is not yet set, "---" will be displayed.

Settings menu (level 4), screen 2. On/off times for device.

- **Delete time**. Seleted time will be deleted.

- Two devices, namely heater and feeding mechanism, have a little bit different menus. Same logic is used for them as well but instead of power, desired temperature is displayed for heater. Delay is replaced by temp. range: +/- how many degrees of wrong temp. will NOT generate alarm.
- Autofeeder has number of pulses (power on and then off for one cycle (CNT) and duration of one pulse (DUR) in seconds.
- NB! OFF-time for feeder could be changed but **will be ignored** by controller.

- Last special case is the **Technomenu**



Tecnomenu

Settings are:

- internal clock **time (**first row): weekdays are given in numbers where monday =1 and sunday=7;
- nternal clock **date (**second row)
- water level control ON/OFF. Selecting OFF clears level dislay from main screen and alarms for it will not be generated If ON,and level falls below about 70% alarm is generated and **heater is switched OFF!**
- Keyboard lock ON/OFF
- Automatic correction for summertime ON/OFF.

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Related web page (in estonian) http://parsek.yf.ttu.ee/~felc/index_files/Page625.htm

Text on photos is in estonian but code gives english language menus!