Nilfisk FOOD

Software Manual
Control Panel for Hybrid Units

Models: **MU421**
MU422
BW 4
BW7

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V. 4.14

1. Description

This software manual describes the operation of the control panel of the advanced Single Booster unit (SB and SBHL).

The advanced SB unit is operated via the control panel (see below illustration).

1. OFF
   Button (1) switches OFF the unit.

2. ON/STANDBY
   Button (2) switches ON the unit.

3. ERROR
   Error light indicator (3).

4. NAVIGATION BUTTONS
   The four "arrow" navigation buttons (4) are used for navigation in the display menu. Pressing the "OK" button activates the menu and confirms any activity displayed.

5. DISPLAY

2. Display layout

Example:

(1)

```
              ER   ◆
Standard
pressure: 25 bar
```

(2)

```
             ERA ◄●► +
                    OK
                    -
Standard
pressure: 25 bar
```

(1)
When switched on the display will show an arrow symbol in the top right corner equivalent to the active navigation buttons on the control board.

The arrows illustrate that it is possible to scroll up and down between the menus. Scrolling to the right makes it possible to enter a value. Set the value scrolling up (+) or down (-) to set the value higher or lower accordingly. Confirm by pressing ok.

(2)
A letter combination for easy reference in connection with service work will appear in the top right corner of the display.

3. Modes

3.1 Power On

The very first time the unit is switched on, we recommend setting date and time in the Setup menu, settings, display EP. If date and time is not set, date and time will count from the pre-set default date and time.

```
              EP      ⬧
 Date & time
 2006-01-01        12:00

```

Set date and time using navigation buttons.

```

 Set date & time
 2006-01-01 12:00

```

Confirm by pressing OK button.

3.2 Standby

The start up display will look as the one below.

```
                    ▲ HP
 Nilfisk            ▼ LP
 FOOD
 Hybrid        12:00:00
```

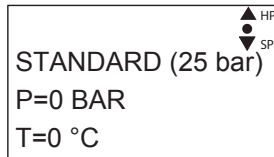Display for SB model with High- and Low pressure - Select either HP or LP using arrows up & down.

3.3.1 Single Booster with high and low pressure

The following screen displays will appear when the unit is in Run Mode.

```
                    ▼ SP
HIGH (25 bar)
P=0 BAR
T=0 °C
```

Screen display for High pressure unit in Run Mode.
Scroll down to return to STANDARD pressure.

```
                    ▲ HP
                    ● 
                    ▼ SP
STANDARD (25 bar)
P=0 BAR
T=0 °C
```

Screen display STANDARD pressure.
Scroll up to choose HP and scroll down to choose LP.

```
                    ▲ SP
                    ● 
LOW (12 bar)
P=0 BAR
T=0 °C
```

Screen display for Low Pressure unit in Run Mode.
Scroll up to return to STANDARD pressure.

Please note that you will remain in HIGH or LOW pressure Run Mode until otherwise is selected.

3.4 Power Off

When the unit is off the display will only show a small dot in the top right corner.

In Off mode it is possible to access all menus without the pump running by pressing the OK button on the panel.

Dot is equivalent to the OK confirm button on the panel.

3.5 Error/Warning

In case of an error, " ERROR" will appear on the display screen.
Press the OFF button to switch of unit.
If the error remains when the unit is switched ON again, please Press right arrow to see current error.

In case of a warning, "WARNING" will appear on the display screen. When a warning is detected the machine will either stop or run with limited performance until the cause of the warning has been improved (eg. inlet pressure).
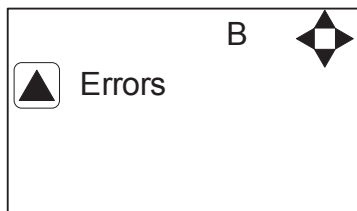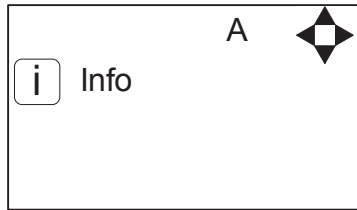
To see further error/warning list and possible cause and remedy go to section 5.2.

4. Content of Main- and Submenus

The control panel contains the below main menu screen displays.
Scroll between the menus using the navigation buttons.
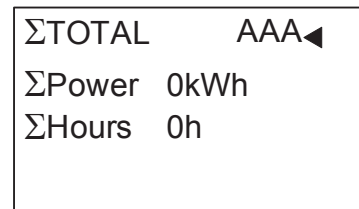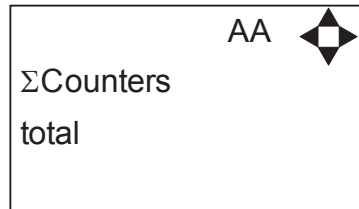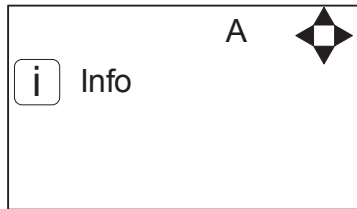Each main menu contains submenus which will be described subsequently.

```
                    A    ◆
  ┌─┐
  │i│  Info
  └─┘
```

```
                    B    ◆
  ┌─┐
  │▲│  Errors
  └─┘
```

```
                    C    ◆
  ┌─┐
  │Y│   Setup
  └─┘
```

```
                    R    ◆
  ┌──┐
  │∿ │  Readings
  └──┘
```
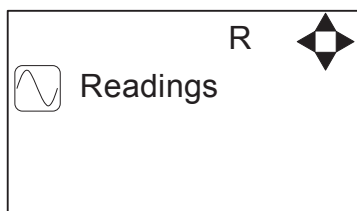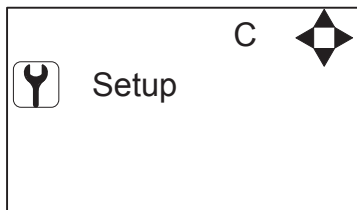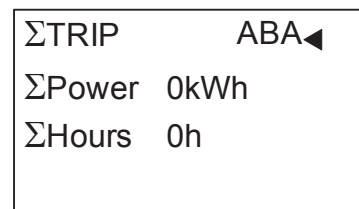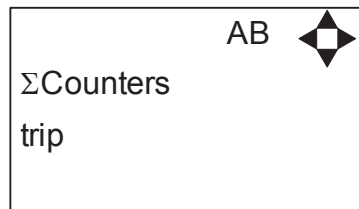
5. Overview of Main- and Sub-menus

1. Info (A)

1 Σ Counters total (AA)
2 Σ Counters trip (AB)
3 Service center(AD)
4 Machine info (AE)

2. Errors (B)
3. Setup (C) (default password 6802)

1 Password (CA)

2 Settings (E)
Post run time (ED)
Dry run level (EE)
Standard pressure (ER)
High pressure (EA)
Low pressure (EB)
Startup method (EY)
Pressure start level(EX)
Startup delay (EW)
Quick Start level (EC)
Auto block trig level (EN)
Auto off delay (EZ)
Accelleration time (EU)
Date & Time (EP)
Service text (EJ)
Inverter power (EO)
Backlight intensity (EI)
Display contrast (EV)
User password (EL)
Standard settings (EK)

3 Languages & units (F)
Language (FA)
Units (FB)

4 Supply Tank (H)
Tank control OFF (HA)
LLA Detect Delay (HB)

5 Communication (I)
Get Errorlog by cable (IA)
Get Errorlog by infrared (IB)
Firmware Upgrade by cable (IC)
Firmware Upgrade by infrared (ID)

6. I/O Settings (J)
Output 1 (JA)
Output 2 (JB)
Input (JC)

7. Installation (K)
Install password (KA)

8 Resets (D)
Reset trip counters(DA)

4. Readings (R)
Pump state (RA)
Pump-top pres. (RB)
Pump-top temp (RC)
Supply pressure (RD)
Supply temp. (RE)
Flow Status (RF)

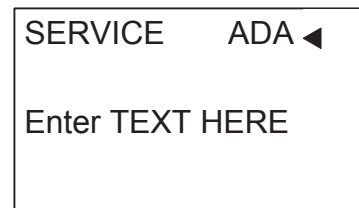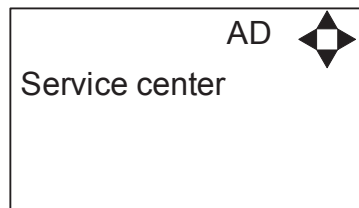## 5.1 Content of the Info menu

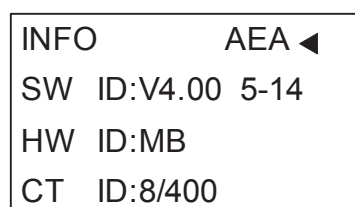**Please note that the Info menu is only for display – all data must be typed in via the setup menu!**

```
              A  ⬥
  [i]  Info
```

```
                  AA  ⬥
  ΣCounters
  total
```

```
  ΣTOTAL        AAA◄
  ΣPower   0kWh
  ΣHours   0h
```

Displays accumulated consumption of power and operation hours.

```
                  AB  ⬥
  ΣCounters
  trip
```

```
  ΣTRIP         ABA◄
  ΣPower   0kWh
  ΣHours   0h
```

Displays accumulated consumption of power and operation hours.To reset the trip counter go to the setup menu.

```
                  AD  ⬥
  Service center
```

```
  SERVICE     ADA ◄

  Enter TEXT HERE
```

Displays name and tel. no. of service technician.

```
                  AE  ⬥
  Machine info
```

```
  INFO          AEA ◄
  SW  ID:V4.00  5-14
  HW  ID:MB
  CT   ID:8/400
```
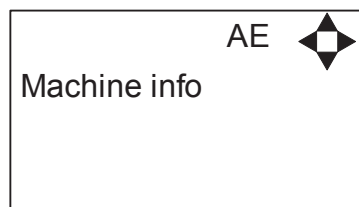
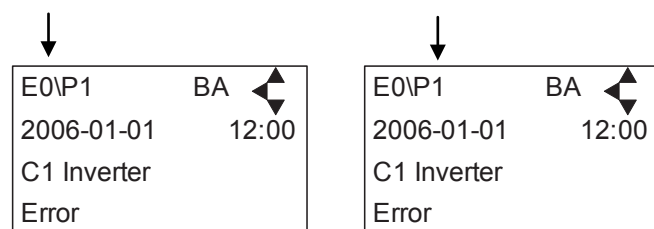This display view is only ment as an example, SW ID and CT ID shows the current SW version.

Displays Software version and Pump size, machine configuration and controller software version/ID.

5.2 Content of the Errors menu – CAUSE & REMEDY

Example of Error log screen display:

All error occurrences will be stamped with date and time.
E indicates Error number.   P indicates Pump number.

```
E0\P1        BA  ◄►
2006-01-01      12:00
C1 Inverter
Error
```

```
E0\P1        BA  ◄►
2006-01-01      12:00
C1 Inverter
Error
```

The error log stores up to 1000 occurrences. When max. memory is reached, the errors will be deleted according to "First in" First out" principle.
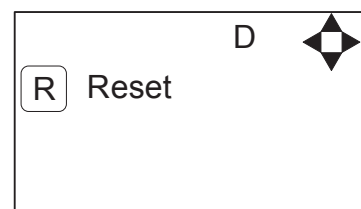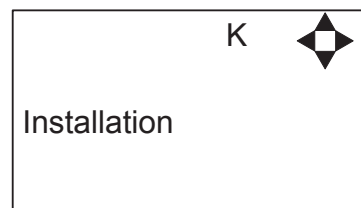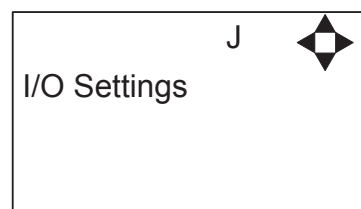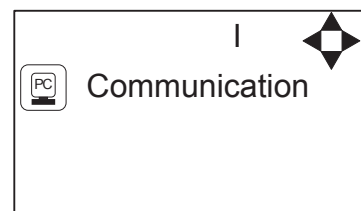
5.2.1 Error List

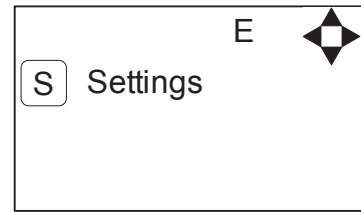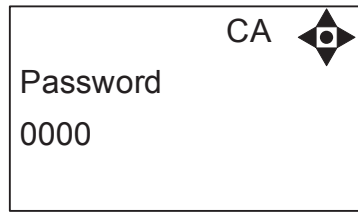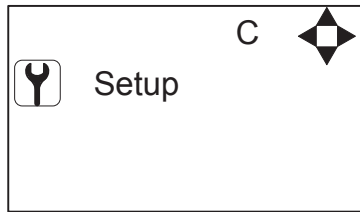| Error	Cause	Remedy
C1 Inverter Error	1. Frequency inverter in error state	1. Switch off the power on the service switch. Wait 180 sec. Switch on the unit again. If error still occurs, please contact your local service technician.
C2 Low Supply Pressure	1. Insufficient water supply	1. Secure sufficient water supply pressure. 2. Check inlet filter for impurities/rinse filter 3. Contact your local service technician.
C3 High Water Temp.	1. Water pump top temperature is above 80° 2. Water consumption is too low (pump column has been overheated)	1. Lower the inlet water temp. (max 70°C) 2. Secure sufficient water consumption 3. Contact your local service technician.
C4 High Motor Temp.	1. Insufficient cooling of motor 2. The ambient temperature is above 40°	1. Secure that all air channels are open and not blocked by impurities 2. Lower ambient temperature
C5 High Supply Temp.	1. Water inlet temperature is above 70°	1. Lower the water temp. (max 70°C) 2. Contact your local service technician.
C6 Low Sensor Supply Voltage	1. Voltage supply for sensors too low	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C7 No Response Error	1. No communication between display and control board	1. Contact your local service technician.
C8 Low Tank Level	1. Insufficient water supply 2. Water supply valve not open	1. Check correct water supply 2. Secure suffcient air supply to valve 3. Contact your local service technician.
C9 High Tank Level	1. Water supply valve not closed	1. Secure sufficient air supply to the valve. 2. Contact your local service technician.
C11 Warning Cri. Inlet press.	1. Insufficient water supply 2. Booster will return to standby mode after 20 sec. If this error occurs 3 times within 20 min. Error C2 occurs.	1. Secure suffcient water supply or reduce consumption 2. Check inlet filter for impurities/rinse filter 3. Contact your local service technician.
C13 Warning Low inlet press.	1. Insufficient water supply. The machine will keep on working as always, but the maximum speed of the pump will be reduced until sufficient inlet pressure is present.	1. Secure sufficient water supply or reduce consuption 2. Check inelt filter for impurities/Rinse filter

C14 Warning leakage start	1. Booster start condition changed to flow, due to leakage in pipe	1. Check for leakage in pipe system. 2. Press "off" button 3. If error reoccurs, contact your local service technician.
C20 Low Sensor Signal P-Pump-top	1. Pressure signal from pumptop sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C21 Low Sensor Signal T-Pump-top	1. Temparature signal from pumptop, sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C22 Low Sensor Signal P-Inlet	1. Pressure signal form inlet sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C23 Low Sensor Signal T-Inlet	1. Temperature signal from inlet sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C24 Low Sensor Signal block	1. Signal from block sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C25 Low Sensor Signal flow	1. Signal from flow sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C30 High Sensor Signal P-Puump-top	1. Pressure signal from pumptop sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C31 High Sensor Signal T-Pump-top	1. Temperature signal from pumptop sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C32 High Sensor Signal P-Inlet	1. Pressure signal from inlet sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C33 High Sensor Signal T-Inlet	1. Temperature signal from inlet sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C34 High Sensor Signal block	1. Signal from block sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C35 High Sensor Signal flow	1. Signal from flow sensor, out of range	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C40 Sensor Load Pumptop Sensor	1. Supply voltage for pumptop sensor too low. 2. Pumptop sensor using too much current	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C41 Sensor Load Inlet sensor	1. Supply voltage for inlet sensor too low 2. Inlet sensor using too much current	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C42 Sensor Load Block sensor	1. Supply voltage for block sensor too low 2. Block sensor using too much current	1. Press "off" button 2. If error reoccurs, contact your local service technician.
C43 Sensor Load Flow sensor	1. Supply voltage for flow sensor too low 2. Flow sensor using too much current	1. Press "off" button 2. If error reoccurs, contact your local service technician.

5.3 Content of the Setup sub menu Settings

The Setup Main menu contains the below submenus, which will be described subsequently.

C ⬥ 🔧 Setup	**CA** ◈ Password 0000	**E** ⬥ S Settings

F ⬥ L Languages & units

H ⬥ 🔲 Supply tank

I ⬥ PC Communication

J ⬥ I/O Settings

K ⬥ Installation

D ⬥ R Reset
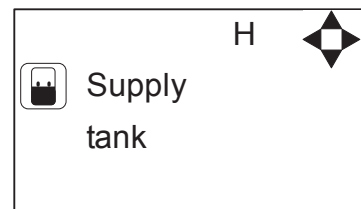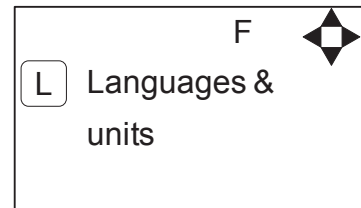
5.4 Content of Setup menu

```
              CA  ⬦
Password
0000
```

```
S  Settings       E  ⬦
```

Password Note: Default user password is 6802. Enter the settings menu to change the default password. To avoid unintended access to the system the your local service technician. can insert a blocking preventing access to the password controlled menus.

```
              ED  ⬦
Post run
Time: 20 sec.
```

```
             EDA  ⬦ OK
Post run
Time: 20 sec.
```

Set Post run time.

```
              EE  ⬦
Dry run
level: 0.5 bar
```

```
             EEA  ⬦ OK
Dry run
level: 0.5 bar
```

Set dry run level.

```
              ER  ⬦
Standard
pressure: 25 bar
```

```
             ERA  ⬦ OK
Standard
pressure: 25 bar
```

```
              EA  ⬦
High
pressure: 25 bar
```

```
             EAA  ⬦ OK
High
pressure: 25 bar
```

Set high pressure.

```
              EB  ⬦
Low
pressure: 12 bar
```

```
             EBA  ⬦ OK
Low
pressure: 12 bar
```

Set low pressure.

```
              EY  ⬦
Startup
Method: Pressure
```

```
             EYA  ⬦ OK
Set Startup
Method: Pressure
```

```
              EX  ⬦
Pressure Start
Level: 8 bar
```

```
             EXA  ⬦ OK
Set Pres. Start
Level:  8 bar
```

```
              EW  ⬦
Startup
Delay:10 sec
```

```
             EWA  ⬦ OK
Set Startup
Delay:  10 sec.
```

```
              EC  ⬦
Quick start
level: Off
```

```
             ECA  ⬦ OK
Quick start
level: Off
```

Set Quick start level.

```
              EN  ⬦
Autoblock trig
Level: 50 l/min
```

```
             ENA  ⬦ OK
Autoblock trig
Level: 50 l/min
```

Set trigger level for automatic block

```
              EZ   ◆                         EZA ◆⬡+ OK
                                                    -
Autooff                         Set auto off
Delay:OFF                       Delay:  OFF
```

Set standard pressure.

```
              EU   ◆                         EUA ◆⬡+ OK
                                                    -
Accelleration                   Set Acc.
Ramp: 3 sec                     Ramp: 3 sec
```

```
              EP   ◆                              ◆⬡◆
Date & time                     Set date & time
2006-01-01        12:00         2006-01-01 12:00
```

Set date and time

```
SERVICE        EJ  ◆            SERVICE      EJA ◆⬡+ OK
                                                    -
Enter TEXT HERE                 Enter TEXT HERE
```

Enter name and tel. no of Your local service technician.

```
              EO   ◆                         EOA ◆⬡+ OK
                                                    -
Inverter                        Inverter
power: 11000W                   power: 11000W
```

Set rated power of frequency inverter

```
              EI   ◆                         EIA  ◆⬡+ OK
                                                    -
Backlight                       Backlight
intensity: 75 %                 intensity: 75 %
```

Set the backlight intensity.

```
              EV   ◆                         EVA ◆⬡+ OK
                                                    -
Display                         Set display
Contrast:8                      Contrast: 8
```

```
              EL   ◆                         ELA  ◆⬡◆
User                            Password
Password: 6802                  6802
```

Create new user password (default 6802).

```
              EK   ◆                         EKA ◄⬡● OK
Standard                        Reset?
settings
```

Reset to standard factory settings.

5.4.1 Submenu Language & Units

F L Languages & units	FA Language: English	FAA Language: English
	FB Units: Metric	FBA Units: Imperial

5.4.2 Submenu Supply tank

H Supply tank	HA Tank Control: OFF	HAA Tank Control: OFF
	HB LLA Detect Delay: 3 sec	HBA LLA Detect Delay: 3 sec
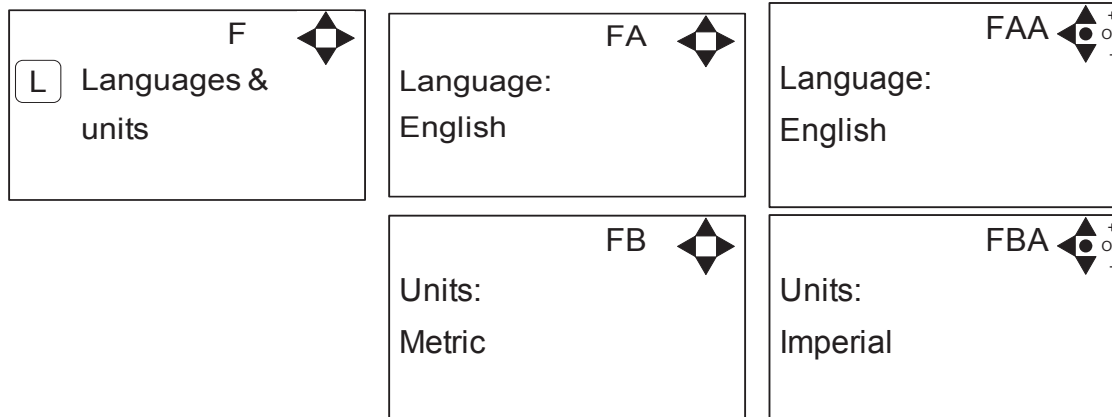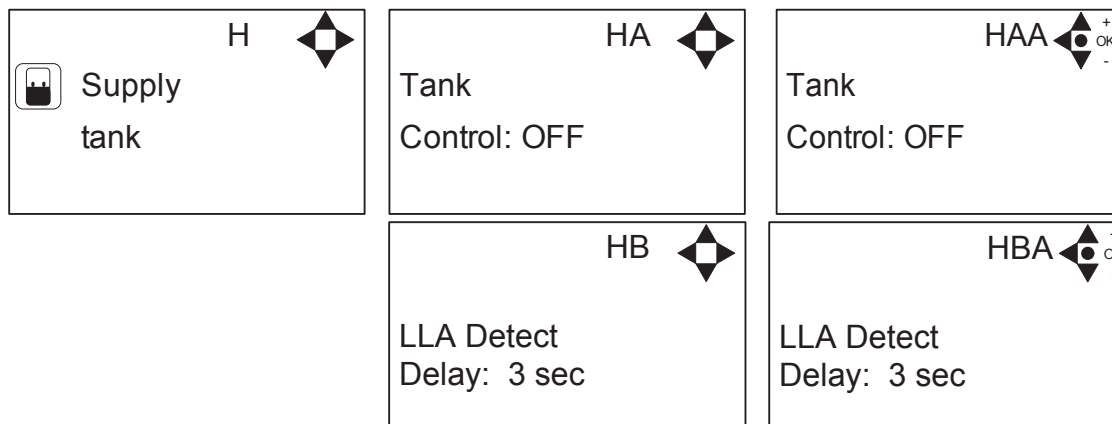
5.4.3 Submenu Communication*

I PC Communication	IA Get Errorlog by cable	IAA Confirm Cable Transfer ?	Transfer Ready Start PC App.
	IB Get Errorlog by Infrared	IBA Confirm IR Transfer ?	Transfer Ready Start PC App.
	IC Firmware upgrade by cable	ICA Confirm Firmware Upgrade ?	Upgrade Ready Power Cycle and Start PC App.
	ID Firmware upgrade by infrared	IDA Confirm Firmware Upgrade ?	Upgrade Ready Power Cycle and Start PC App.

*For the use of authorized Your local service technician only.

5.4.4 Submenu I/O Settings

```
┌─────────────────────┐      ┌─────────────────────┐      ┌─────────────────────┐
│              J  ◆    │      │            JA  ◆    │      │          JAA ◆ +    │
│                      │      │                     │      │              OK     │
│ I/O Settings         │      │ Output 1            │      │ Output 1      -     │
│                      │      │ Cfg: None           │      │ Cfg: None           │
│                      │      │                     │      │                     │
└─────────────────────┘      └─────────────────────┘      └─────────────────────┘

                             ┌─────────────────────┐      ┌─────────────────────┐
                             │            JB  ◆    │      │          JBA ◆ +    │
                             │                     │      │              OK     │
                             │ Output 2            │      │ Set Output 2  -     │
                             │ Cfg: None           │      │ Cfg: None           │
                             │                     │      │                     │
                             └─────────────────────┘      └─────────────────────┘

                             ┌─────────────────────┐      ┌─────────────────────┐
                             │            JC  ◆    │      │          JCA ◆ +    │
                             │                     │      │              OK     │
                             │ Input               │      │ Set Input     -     │
                             │ Cfg:None            │      │ Cfg: None           │
                             │                     │      │                     │
                             └─────────────────────┘      └─────────────────────┘
```
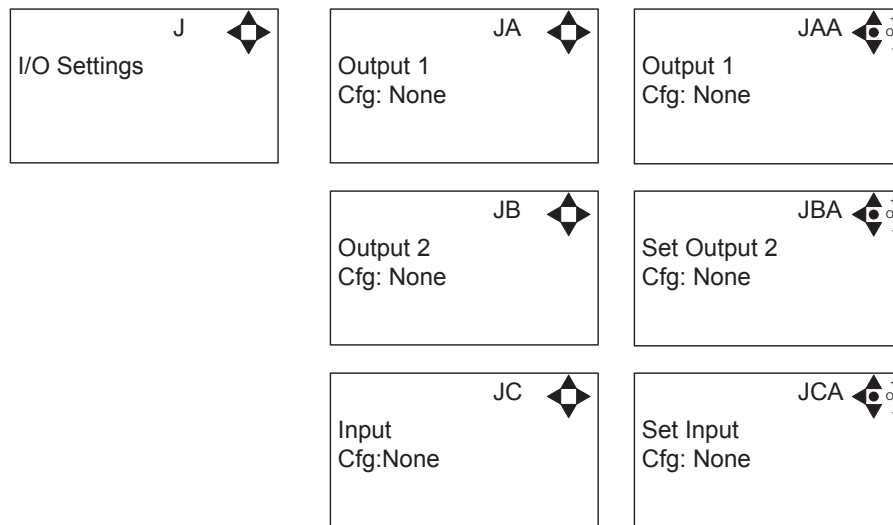
Output 1 options:
- None – No function
- Error – Active if an error are detected
- Run/Stop – Active if booster is running and not active when it is stopped.
- Standby /off - active if booster is running or in standby.

Output 2 options:
- None – No function
- Delay start – Gives a signal at this port, before starting the pump.
  The length of the delay is set in the settings menu, startup delay.
  This function could for instance be used to secure start up of prepressure pump before starting the unit.

Input
- None – No function
- Release – unit unable to start before this signal is present.
- Setpoint – Output pressure is controlled by external voltage source.
- Chem. Low - Low level in chemistry can

Maximum ratings:

Out 1			
Blocking voltage	VDC	40	*
Load current	mA	250	*
Out 2			
Blocking Voltage	VDC	350	*
Load current	mA	100	*
Input Port (IN)			
Input voltage	Volt	12	
Release signal enable	Volt	>5	

*Controller version V6B or higher

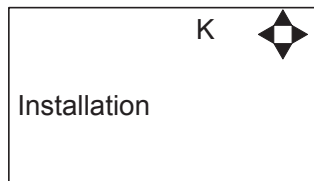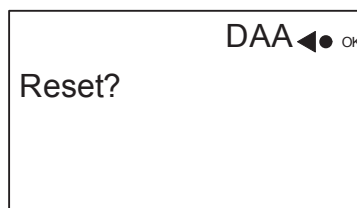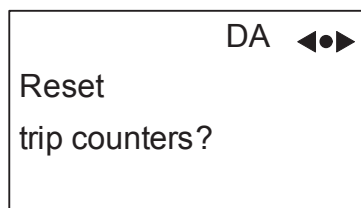## 5.4.5 Submenu Installation

```
                K
                    ◆

 Installation
```
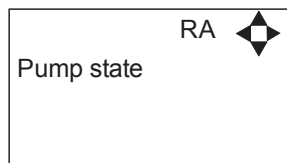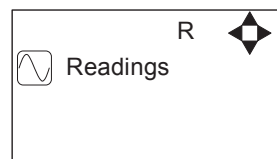
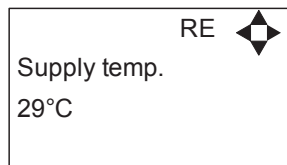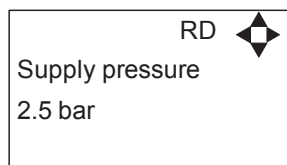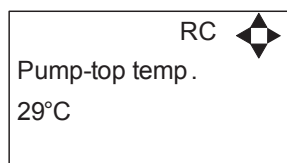* For the use of authorised Your local service technician only.

5.4.6 Submenu Reset

```
                D
                   ◆

 R   Reset
```

```
                DA   ◀●▶

 Reset

 trip counters?
```

```
                DAA ◀● OK

 Reset?
```
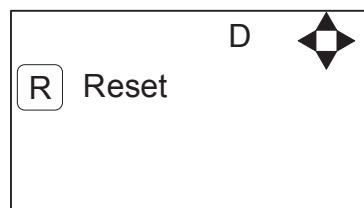
5.5 Content of Readings

```
           R
             ◆
 ∿  Readings
```

```
              RA
                 ◆
 Pump state
```

Output frequency of
frequency inverter.

```
              RB
                 ◆
 Pump-top pres.
 24 bar
```

```
              RC
                 ◆
 Pump-top temp.
 29°C
```

```
              RD
                 ◆
 Supply pressure
 2.5 bar
```

```
              RE
                 ◆
 Supply temp.
 29°C
```

```
              RF
                 ◆
 Flow status
 No Flow
```
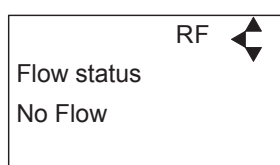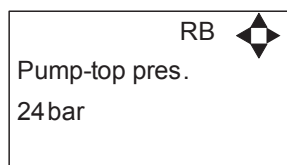
6. Upgrade Firmware

Upgrading from software version 4.10 or higher

6.1 Upgrade using USB Cable

1. Connect USB cable (Item No. 110001526) to PC USB port (Remove other USB cables connected to PC)
2. Connect Display cable to USB cable
3. In the menu go to, Setup->"password"->Communication-> Firmware upgrade by cable->Confirm Firmware upgrade and press "OK"
4. Display should now be looking like this:

Upgrade Ready
Power Cycle and
Start PC App.

5. Disconnect display from usb cable and connect it again (Power cycle)
6. Make sure the Green "ON" led and the red "OFF" led at the display is both on, display is blank
7. Startup PC program FWU200.exe (can be downloaded from Nilfisk Food website)
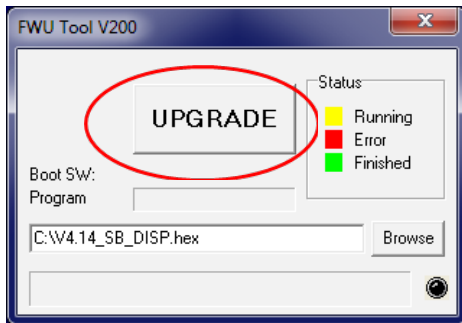8. Window should be looking like this
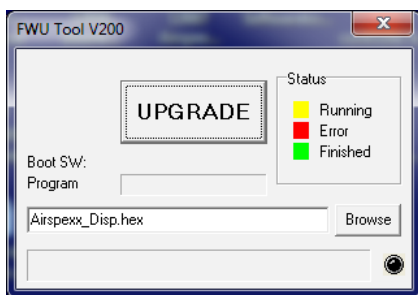

9. Press "Browse" button
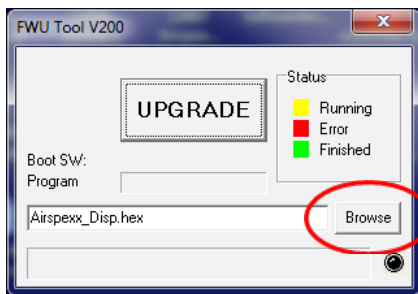
10. Select the file you will use for upgrade. Software File can be downloaded from Nilfisk Food website. The name of the file should end with ".hex". Ex V4.14_SB_DISP.hex
11. When the file is located press "Open" in browser window
12. The file name will now be written in file text line
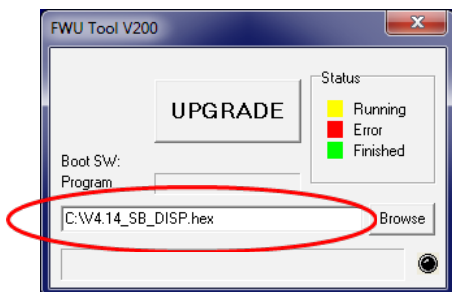
13. Press UPGRADE button in FWU 200 tool

14. After a short while the FWU tool should start upgrading, the upgrade button should turn Yellow and change to "RUNNING"
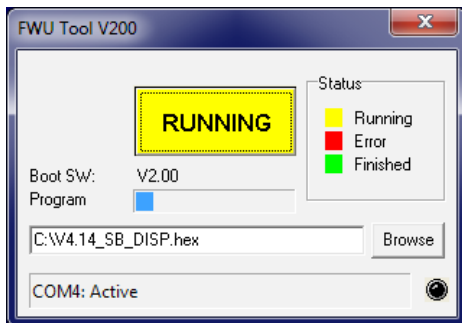
15. The progress bar "Program" must go to the end before the upgrade is complete (less than 1 minute)
16. When the upgrade is complete the FWU tool should be looking like this, Button turns Green and text changes to "DONE/NEW"
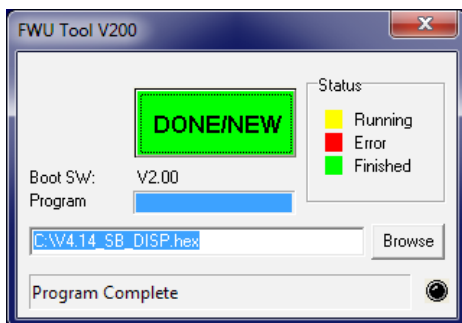
17. Now the display is upgraded
18. To verify software version in display, in the menu go to, Info->Machine info
19. Here you will find display software version and control software version. SW ID "Display software", HW ID "type of device", CT ID Controller board software(if display is not connected to a control board, control software will be 0/300)

6.2 Upgrade using IrDA Cable

1. Connect power to equipment
2. In the menu go to, Setup->"password"->Communication-> Firmware upgrade by Infrared->Confirm Firmware upgrade and press "OK"
3. Display should now be looking like this:

Upgrade Ready
Power Cycle and
Start PC App.

4. Turn Off equipment and turn it on again (Power cycle)
5. Make sure the All three led's are on (Green "ON", red "ERROR" and red "OFF") and the display is blank
6. Connect Irda module (Item No. 110001558) to PC USB port
7. Place Irda module on display module like this

8. Startup PC program FWU200.exe (can be downloaded from Nilfisk Food website)
9. Window should be looking like this
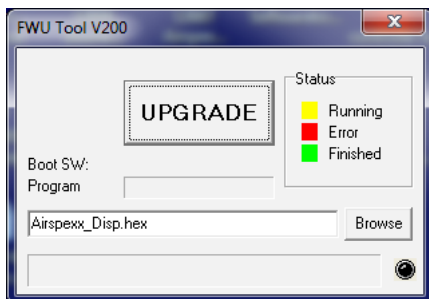


10. Press "Browse" button
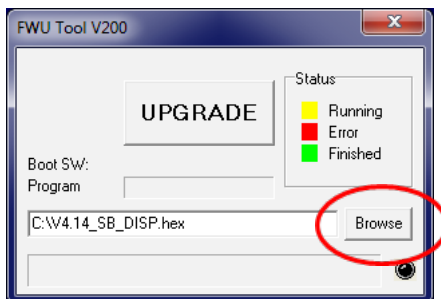
11. Select the file you will use for upgrade. Software File can be downloaded from Nilfisk Food website. The name of the file should end with ".hex". Ex V4.14_SB_DISP.hex
12. When the file is located press "Open" in browser window
13. The file name will now be written in file text line
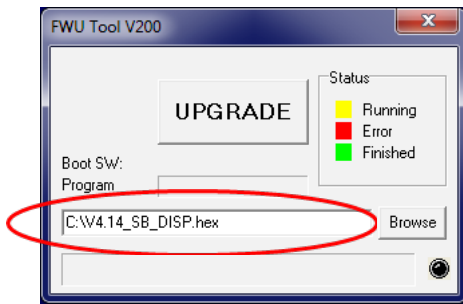
14. Press UPGRADE button in FWU 200 tool
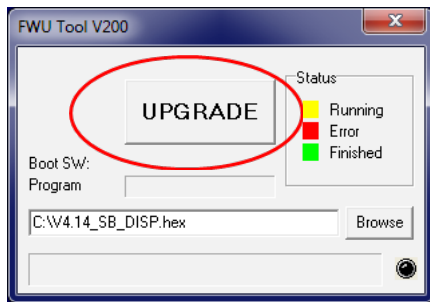
15. After a short while the FWU tool should start upgrading, the upgrade button should turn Yellow and change to "RUNNING"
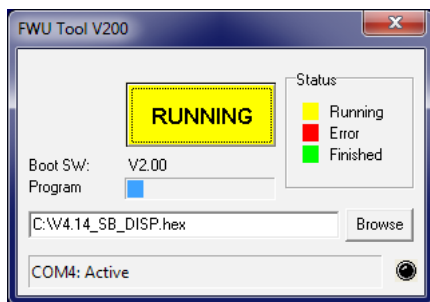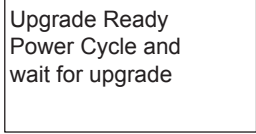
16. The progress bar "Program" must go to the end before the upgrade is complete (less than 1 minute)
17. When the upgrade is complete the FWU tool should be looking like this, Button turns Green and text changes to "DONE/NEW"
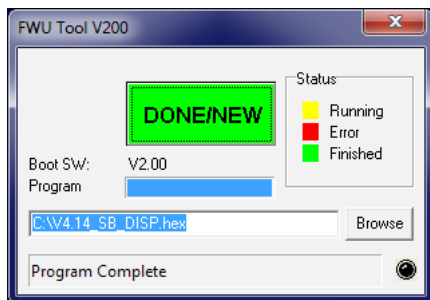
18. Now the display is upgraded
19. To verify software version in display, in the menu go to, Info->Machine info
20. Here you will find display software version and control software version. SW ID "Display software", HW ID "type of device", CT ID Controller board software(if display is not connected to a control board, control software will be 0/300)
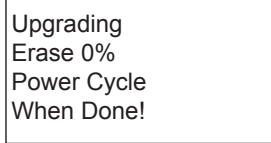
6.3 Upgrade Controller Board

1.   Make sure display is connected to controller
2.   Power up equipment
3.   In the menu go to, Setup->"password"->Communication-> Upgrade Controller->Confirm upgrade and press "OK"
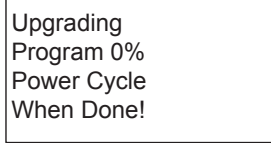4.   Display will now look like this:

```
Upgrade Ready
Power Cycle and
wait for upgrade
```

5.   Turn off power to equipment and turn it back on (Power cycle)
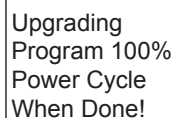6.   After power on display will look like this:

```
Upgrading
Erase 0%
Power Cycle
When Done!
```

7.   When Erasing reaches 100%, the display will automatically start to program control board "Erase" is changed to "Program"

```
Upgrading
Program 0%
Power Cycle
When Done!
```

8.   Program will now start to count from 0% to 100%
9.   When program reaches 100%, the programming is complete
10.   The display will be looking like this

```
Upgrading
Program 100%
Power Cycle
When Done!
```

11.   Turn Off equipment and turn it on again (Power cycle)
12.   Now the control PCB is upgraded
13.   To verify software version in display, in the menu go to, Info->Machine info
14.   Here you will find display software version and control software version. SW ID "Display software", HW ID "type of device", CT ID Controller board software

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