

LELY NAUTILUS 2

Instructions manual

English | version 1.2



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1. Product description

Nautilus 2 is a control system for Lely's milk cooling tanks. The Nautilus 2 unit controls cooling, cleaning, and agitation, and all the functions can be customised according to your own needs. The control system also contains monitoring features that give you full control over how the tank works.

The display shows all events in plain text. Information from the tank can easily be transferred via a cable to the program Navigator. The program provides you with an overview of all events going a long way back in time. The program also allows you, for example, to change settings and add new software. If you have the optional GSM feature, you can also do this remotely via the Internet. You can also have alarms from the tank sent via SMS to a mobile phone.

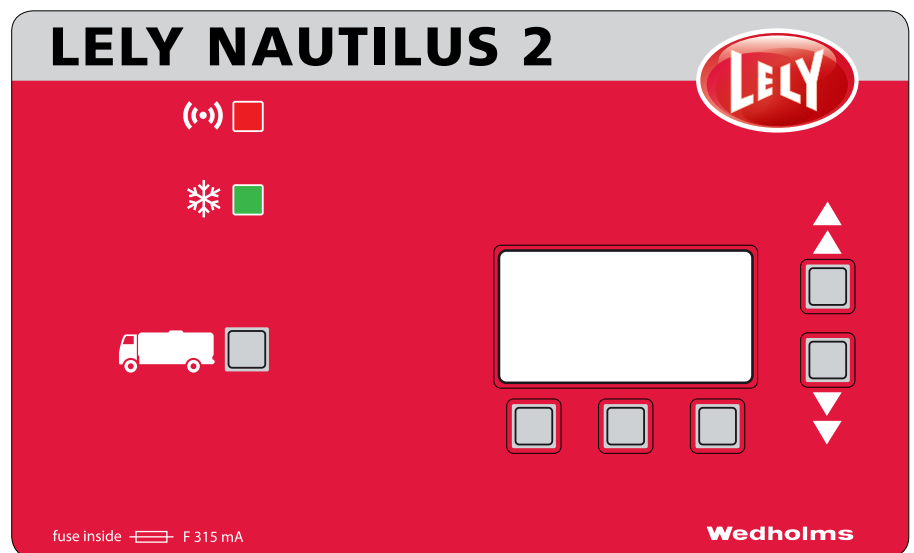


Figure 1.1

There are two LED lights on the front of the Nautilus 2 unit.

- The red LED flashes to signal when there is an alarm.
- The green LED remains lit to signal when the tank is in the cooling function.

Nautilus 2 is equipped with 6 buttons.

To the left of the unit, with a truck as a symbol, there is a button whose function is to start emptying. This button is only used during emptying, and never otherwise.

Below the display, there are three buttons, and to the right, there are two more. The buttons below the display have different meanings depending on which menu you are in. At the bottom of the display, above the different buttons, the system tells you what function the button has in the current menu. The buttons to the right are for scrolling up and down in the menus. When you change the value of a setting, the buttons are used to increase or decrease the value of the setting.

2. Menu

The menu system is composed of several levels. The top level contains those functions most often used by the user. The functions that are used less frequently are located further down in the menu system, for example, test functions and settings.

BASIC MODE

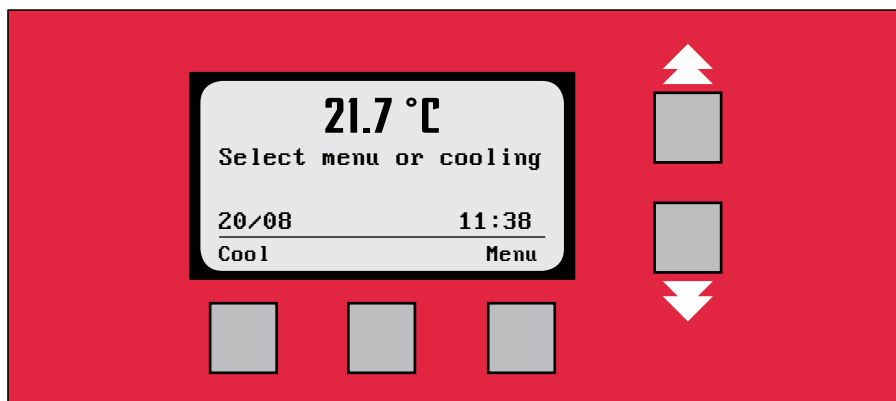


Figure 2.1

Nautilus 2 operates in basic mode. To enter the menu system, press **Menu**. If you are in the menu system, Nautilus 2 automatically returns to basic mode after 5 minutes of inactivity.

MAIN MENU

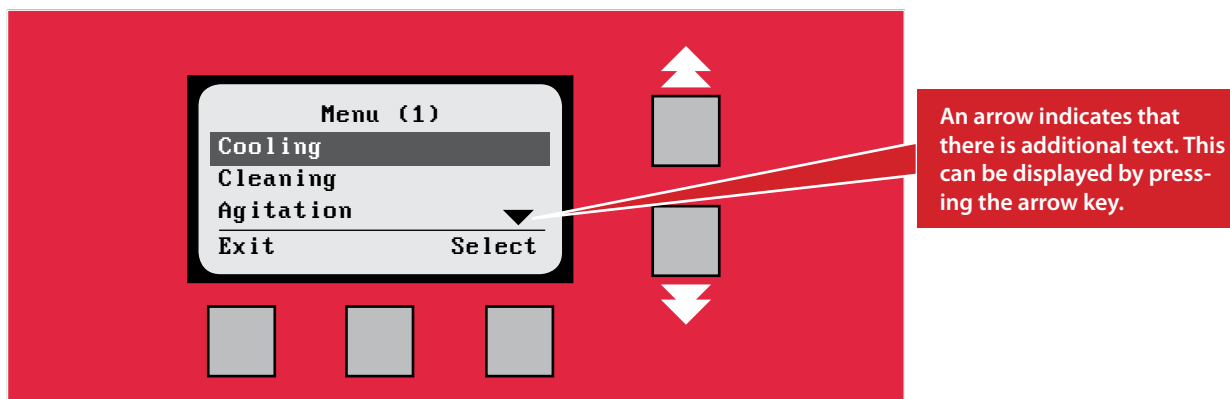


Figure 2.2

In the main menu, you can activate the tank's functions, such as cooling, cleaning and agitation. Performance is where you can see data concerning the tank's recent operation. To start a function or enter a menu, scroll using the arrow keys to highlight the desired option and press the menu button: Select. To return to basic mode, press the menu button: Exit. The top row indicates which menu you are in and a number indicates the menu position.

Cooling

Starts the cooling function, see more in the chapter *Cooling*.

Cleaning

Starts the cleaning function, see more in the chapter *Cleaning*.

Agitation

Starts the agitation function, see more in the chapter *Agitation*.

Performance

Data on the most recent cooling times, cleaning results and the most recent alarms, see more in the chapter *Performance*.

ADVANCED

Advanced allows you to go deeper in the menu system to get to the less frequently used functions.

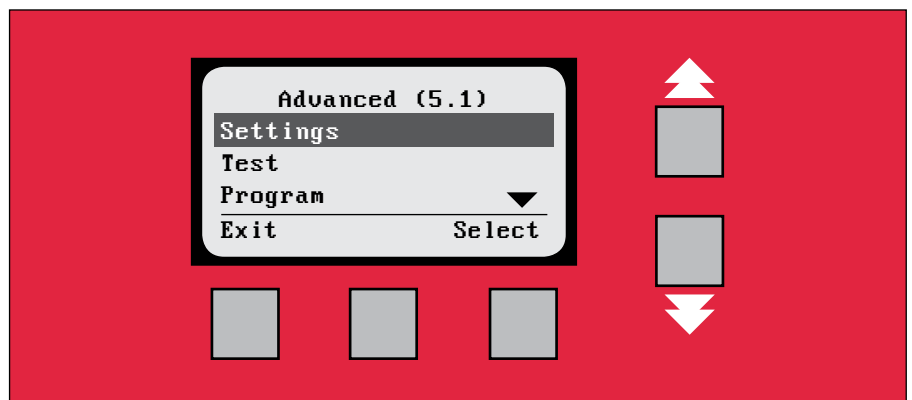


Figure 2.3

Settings

Settings is where you can program the unit according to how you want the tank to work. The settings are divided into different areas, cooling, cleaning, agitation, etc. See more in the chapter *Settings* and also the various chapters related to the settings.

Test

Test is where the system can be test-run and checked. See more in the chapter *Test*.

Program

Program is where you can check both which software version is installed and the unit's IP address. It is also where you can reboot the unit. See more in the chapter *Program*.

Options

Nautilus 2 is available in several different versions. Two features that can be purchased as options are a GSM function and an additional monitoring function called Tankvagt. See more in the chapter *Options*.

Information

Information contains contact information for Wedholms. See more in the chapter *Information*.

3. Emptying

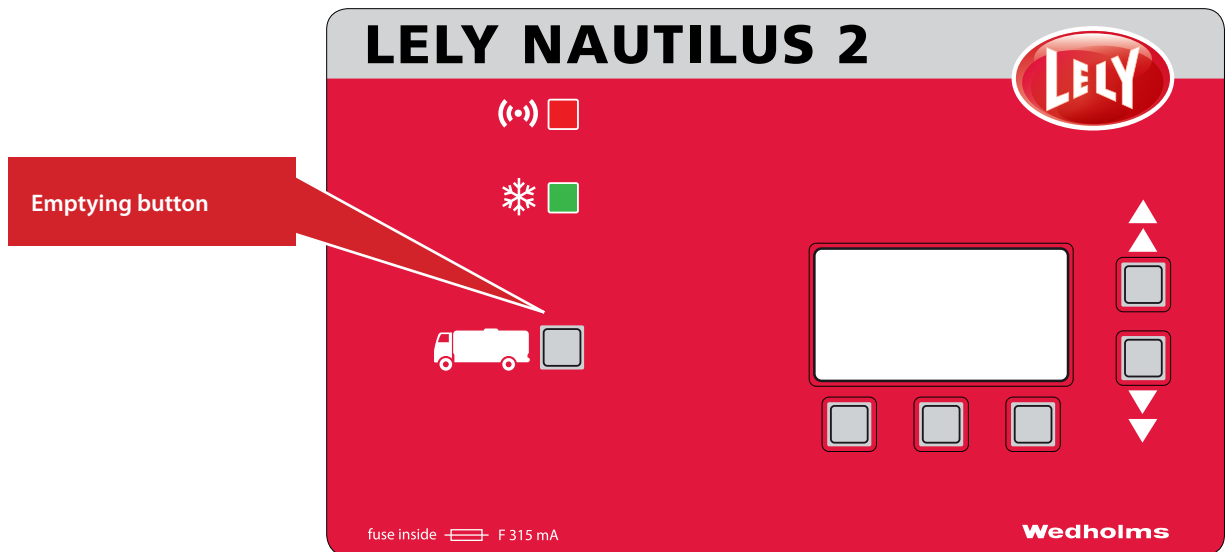


Figure 3.1

This chapter describes the emptying function. In order to make it as easy as possible for the milk truck driver, there is a specific button for emptying. If you press the emptying button, you will go directly to the emptying function regardless of what menu Nautilus is in. The exception to this is if the tank is being cleaned. To go to the emptying function during cleaning, the cleaning must first be stopped.

DIFFERENT KINDS OF EMPTYING

On tanks connected to milking robots, control of the inlet and outlet valves is automatic. The emptying procedure therefore differs somewhat depending on the system. Setting [E1] allows you to select whether you have conventional milking or you use robots. If you specify in this setting that you do not use robots, the emptying procedure for conventional milking starts. The opposite applies if you specify in the setting that robots are used.

To see how to program settings, see the chapter *Settings*.

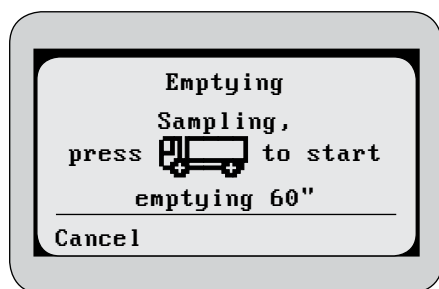


Figure 3.2

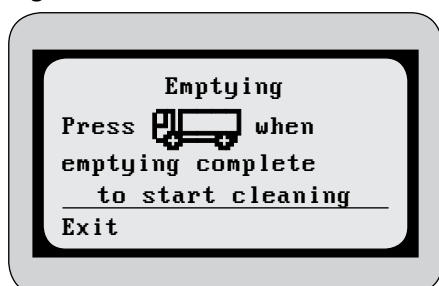


Figure 3.3

The different emptying procedures are described below.

EMPTYING TANKS NOT CONNECTED TO ROBOTS

When you press the **emptying button**, the agitator starts and the sampling mode is displayed. How long the agitator stays active is programmed in setting [C3]. To continue, press the **emptying button** again. To abort, press **Cancel**.

Open the outlet valve and empty the tank. Once emptying is complete, fit the cleaning cap on the outlet. Press the **emptying button** again to start cleaning or press **Exit** to cancel.

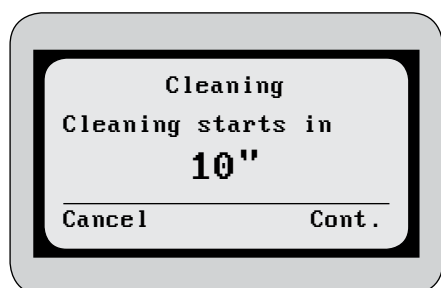


Figure 3.4

Once the **emptying button** has been pressed, the countdown to cleaning commences.

When cleaning is started after emptying, it is always the complete cleaning program that starts.

EMPTYING TANKS CONNECTED TO ROBOTS

Buffer tanks are often used in automatic milking. During the time that the main tank is being emptied and cleaned, this buffer tank is filled with milk that then runs over into the main tank. If you only want to empty part of the tank volume, you do not want the buffer tank system to be activated. You can therefore choose to do a so-called "partial emptying". During partial emptying, the robot system is not told that emptying is occurring and, after emptying, cooling is activated instead of cleaning.

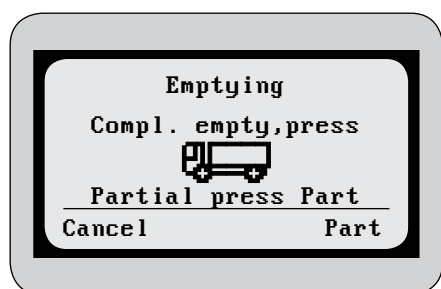


Figure 3.5

After the first press of the **emptying button**, you must specify either full or partial emptying. Press **Part** for partial emptying and press the **emptying button** for complete emptying. To abort, press **Cancel**. If you know that you will always require complete emptying to be carried out, deactivate the partial emptying function in setting [E2].

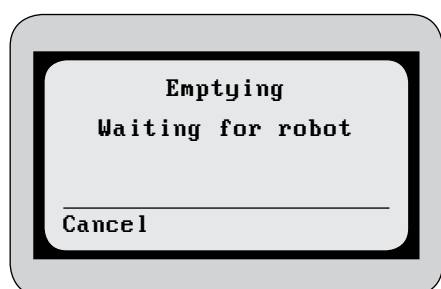


Figure 3.6

COMPLETE EMPTYING

Once complete emptying has been selected, the emptying signal is sent to the robot and the agitator starts. To abort, press **Cancel**.

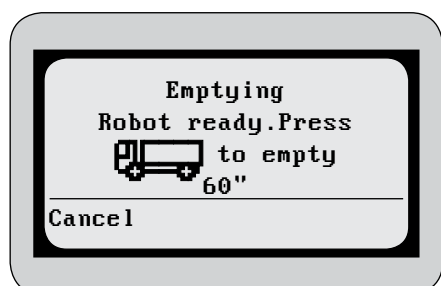


Figure 3.7

When the robot approves the emptying, the sampling mode is displayed. How long the agitator stays active is programmed in setting [C3]. To open the emptying valve and start emptying, press the **emptying button**. To abort, press **Cancel**.



Figure 3.8

Once emptying is complete, fit the cleaning cap on the outlet. Press the **emptying button** again to start cleaning or press **Exit** to cancel.

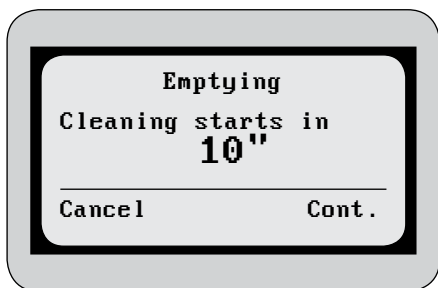


Figure 3.9

Once the **emptying button** has been pressed, the countdown to cleaning commences.

If complete emptying is aborted, the cooling function must be started for the robot to get permission to send milk to the tank again.

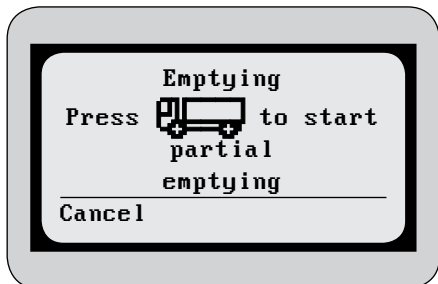


Figure 3.10

PARTIAL EMPTYING

Once partial emptying has been selected, the emptying valve is opened by pressing the **emptying button**. To abort, press **Cancel**.

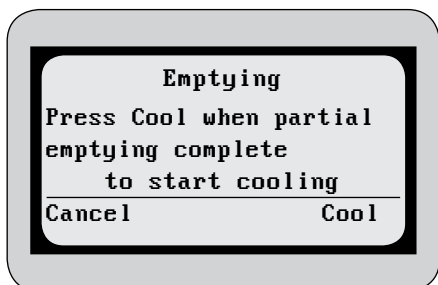


Figure 3.11

Once partial emptying is complete, press **Cool** to return to the cooling mode. To abort, press **Cancel**.

4. Starting cooling

COOLING CAN BE STARTED IN SEVERAL DIFFERENT WAYS.

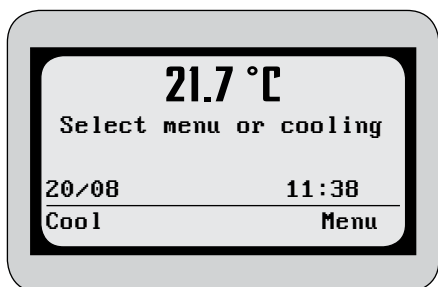


Figure 4.1

From basic mode.

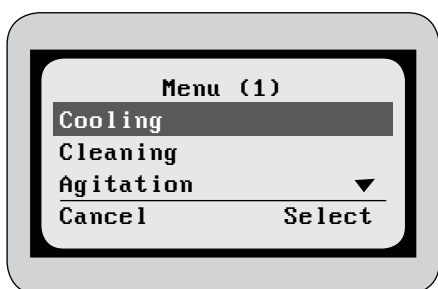


Figure 4.2

From the main menu.

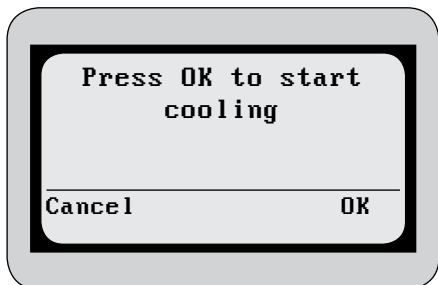


Figure 4.3

After cleaning.

If robot is selected in setting E1, cooling starts automatically after cleaning.



Figure 4.4

When the **cooling function** is activated, the cooling LED remains lit. It is also possible to connect an external light to the unit, which lights when cooling is activated.

THE COOLING PROCESS

A more detailed explanation of how the settings work can be found later in this chapter and also in the chapter *Settings*.

The cooling process consists of 4 steps.

Pre-cooling

When cooling starts, so called “pre-cooling” takes place. This happens in order to cool the tank after cleaning, as the tank may still be warm shortly after cleaning has finished. Once the programmed duration for the pre-cooling has elapsed, the tank goes on to the next step.

› To skip the pre-cooling and the delay, press **Cool**.

If the time set for pre-cooling is too long a period, ice will build up in the tank.

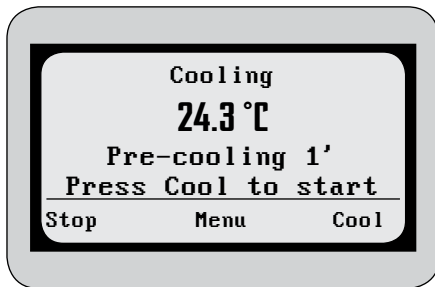


Figure 4.4

Delay

Before the milk reaches the agitator blades, the cooling of the milk is not effective. There is therefore a delay so that the compressors do not start too soon.

Once the programmed time delay has elapsed, the cooling automatically goes on to the next step.

› To skip the pre-cooling and the delay, press **Cool**.

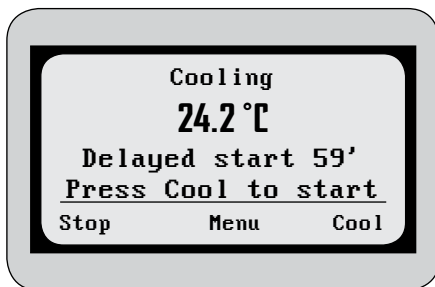


Figure 4.5

Cooling to setpoint 1

After the delay, the tank cools to the first of two setpoints. When the programmed time for Setpoint 1 has elapsed, the tank cools to Setpoint 2.

› To skip to the second setpoint, press **Setpoint2**.

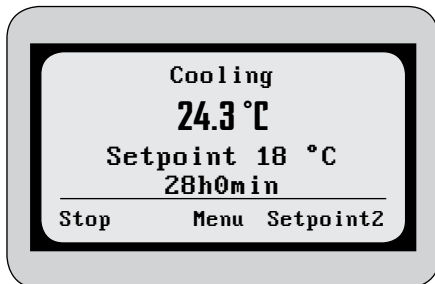


Figure 4.6

Cooling to setpoint 2

After setpoint 1, the tank cools to setpoint 2.

To abort cooling, press **Stop**, and when when you are asked if you wish to abort cooling, press **Yes**.

During cooling, it is possible to move around in the menu system while cooling continues. However, you cannot start cleaning or restart cooling without aborting the cooling first. You also cannot activate functions in the menu Test. Press **Menu** to go to the main menu.

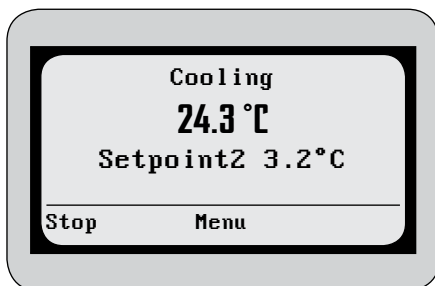


Figure 4.7

If you do not press any buttons for 5 minutes, the size of the temperature in the display changes.

Press **Exit** to go back to the previous mode, or **Menu** to go to the main menu.

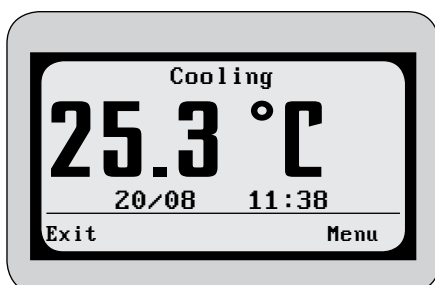


Figure 4.8

Starting cooling externally

Cooling can also be started using an external signal. Cooling starts with the first signal. If there is a second signal, pre-cooling and the delay are skipped. See the Connection diagram menu for where the function that starts cooling is connected in the unit.

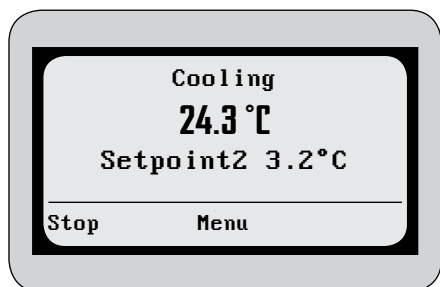


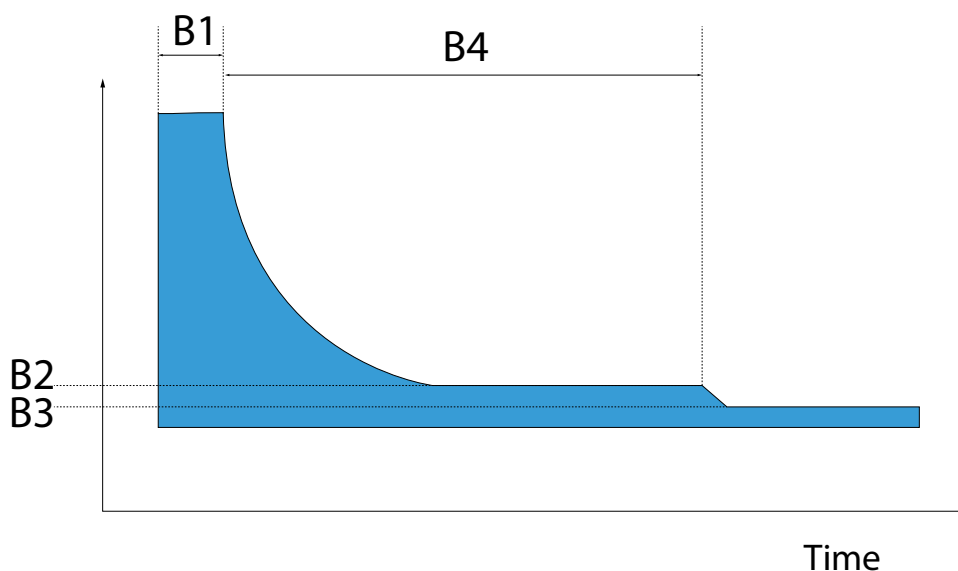
Figure 4.9

Aborting cooling

To stop cooling, press **Stop**.

PROGRAMMING COOLING

Cooling in Nautilus can be programmed according to how you want the tank cool. This is done in Settings. See the Chapter Settings to read how. The settings for cooling can be found in menu B Cooling in Settings.



The figure above describes the cooling process. The codes B1-B4 are the settings that control the various parts of the cooling process.

SETTINGS

B1 Delay cooling

This setting programs in minutes how long the delay should be before the compressors start. The delay must at least be long enough for the milk to reach the agitator.

B2, B3 and B4, Temperature setpoints

In settings **B2** and **B3**, setpoints are set. These are the temperatures to which the tank cools. Setting **B4** sets the time in which the tank cools to **setpoint 1** before the tank begins to cool to **setpoint 2**.

Cooling works such that the compressors operate until the correct temperature is reached. When the temperature rises in the tank, the compressors start again. But, so that the compressors do not start and stop too often, a temperature difference is programmed between on and off. This difference is set in setting **G1**. The compressors stop at the setpoint temperature and start again at the setpoint plus the temperature of the difference.

B5 Compressor 2 delay [Optional feature]

On large tanks, it may be undesirable to delay starting the compressors that are connected to evaporators farther back and higher up in the tank, since they are covered with milk later. In this setting, the time difference between starting the compressors is set.

For the setting to work, the tank's compressors should be connected as Compressor 1 and Compressor 2. On a tank with four compressors, two compressors are connected as Compressor 1 and the other two as Compressor 2.

Even if no delay is programmed, there is a time difference of 10 seconds between the two compressor groups starting. This is to reduce the power load, since the compressors use a lot of power when starting.

B6 Capacity regulator [Optional feature]

On tanks for robot milking, cooling starts when large parts of the evaporators are not covered in milk. To avoid the build-up of ice in the tank, the capacity regulator regulates the cooling. When the tank has a sufficient quantity of milk to cool without limitation, the capacity regulator can be disconnected. This setting programs how long the capacity regulator should be connected, calculated from when the compressors start.

B7 Pre-cooling

This setting programs how long pre-cooling should last. Read more on *pre-cooling* earlier in this chapter.

B8 and B9 Temperature alarms

These two settings program the values for alarm **A13 Warm milk**. Setting **B8** programs a temperature and **B9** programs a time. If the temperature in the tank is higher than the temperature set in **B8** in the time set in **B9**, the alarm is activated. Read more in the chapter *Alarms*.

B10 Time to alarm

The first sign that a problem has occurred in a tank's cooling system is often that the compressors run for longer than normal. If the compressors continually run for longer than the time programmed in this setting, the alarm **A12 Slow cooling** is activated. Read more in the chapter *Alarms*.

5. Cleaning

There are four different programs for cleaning the tank. These programs contain one or more cleaning phases of the total 8 available.

CLEANING PROGRAMS

Complete clean

The phases included in Complete clean are selected in the settings. See more under *Programming cleaning* later in this chapter.

Short clean

Short clean includes phases 2, 4 and 5.

Cold rinse

Cold rinse includes phase 7.

Hot rinse

Warm rinse includes phase 3.

CLEANING PHASES

1 Pre-rinse

Rinses out milk residue. If an extra drain valve is installed, draining occurs through this.

2 Pre-clean 1

Rinses with a mixture of hot and cold water. If an extra drain valve is installed, draining occurs through this.

3 Pre-clean 2

Rinses with hot water. If an extra drain valve is installed, draining occurs through this.

4 Clean

Main cleaning with hot water and detergent. If detergent and acid are used in the same cleaning cycle, detergent is dosed in this phase and acid in phase 6. If there is a heater in the tank, it is used in this phase.

5 Rinse 1

Pre-rinse with a mixture of hot and cold water.

6 Rinse 2

Rinses with cold or hot water. If detergent and acid are used in the same cleaning cycle, acid is dosed in this phase.

7 Rinse 3

Rinses with hot or cold water.

8 Drain

Extra drainage time.

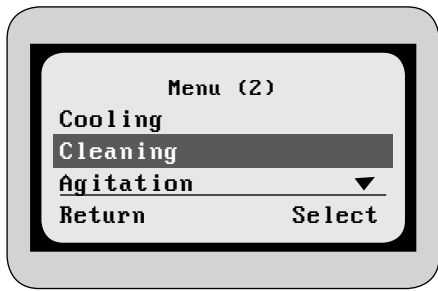


Figure 5.1

Cleaning can be started either after emptying (see the chapter *Emptying*) or from the main menu.

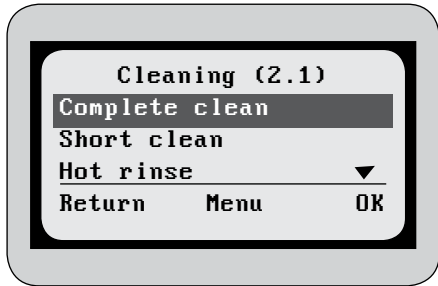


Figure 5.2

You are asked in the cleaning menu which of the cleaning programs you wish to use.

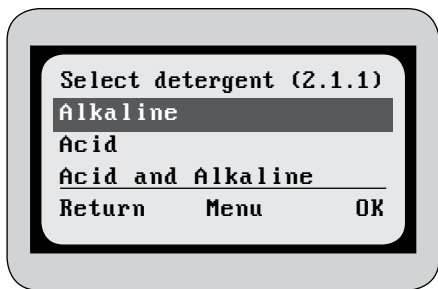


Figure 5.3

Once the cleaning program has been selected, you are asked which detergent you wish to use.

If hot or cold rinse is selected, you are not asked about detergent, as no detergent is used in those two cleaning programs. If short clean is selected, it is not possible for both detergent and acid to be selected.

When cleaning is started in connection with emptying, it is always Complete clean that starts, and detergent is selected based on the logic programmed into the settings. See more under Programming cleaning later in this chapter.

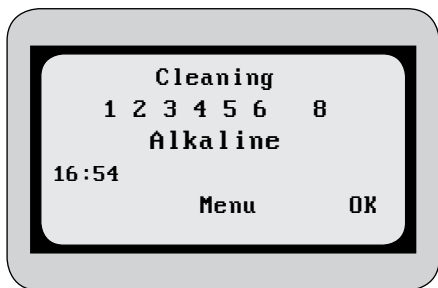


Figure 5.4

During cleaning, the display switches between two information windows every five seconds.

The cleaning phases that will be run in the selected cleaning program are shown towards the top of the display. The current phases flashes. The detergent that will be used during cleaning is shown below this.

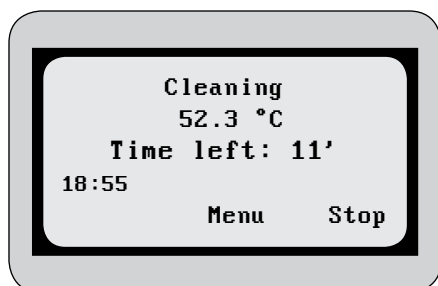


Figure 5.5

The other information window shows the temperature in the tank and the time remaining for cleaning.

The cleaning time is calculated as the average time of the last last five cleaning cycles.

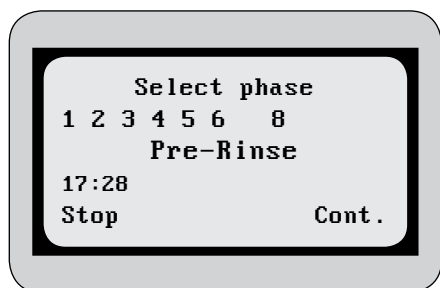


Figure 5.6

CANCELLING AND STEPS IN THE CLEANING CYCLE

To stop cleaning, press **Stop**.

To abort cleaning completely, press **Stop** again.

To continue the cleaning, press **Cont.** The phase that you are in flashes. To change the cleaning phase, press the arrow keys to the right of the display. When the selected phase is highlighted, press **Cont.** to restart cleaning.

The phases following the selected phase will also be run. The phases skipped will not be run.



Figure 5.7

When the cleaning program is complete, the temperature reached at the end of cleaning phase 4 is displayed.

After the cleaning program, you can select whether you want to go directly to cooling or back to basic mode.

If robot is selected in setting E1, cooling starts automatically after cleaning.

PROGRAMMING CLEANING

The cleaning function in the unit can be programmed according to how you want the tank to be cleaned. This is done in Settings. See the chapter *Settings* to read how. The settings for cleaning are in menu D Cleaning in *Settings*.

D1 Filling alarm

When the tank is filled with water during cleaning, filling is stopped using a level sensor. If the level sensor does not give a signal before the time programmed in this setting elapses, the alarm **A17 Level sensor err** is activated. Cleaning will then continue.

D2 and D3 Circulation time

These settings control how long the cleaning pump circulates the water during the cleaning phases. **D2** controls phases 2-3 and 5-7, while setting **D3** controls phase 4. It is not possible to program how long the pump runs in phase 1. (The pump does not run at all in phase 8).

D4 and D5 Drainage time

These settings control how long the drain valve stays open, **D4** in phases 2-7 and **D5** in phase 8.

D6 AND D7 HOT WATER MIXTURE IN PHASES 2 AND 5

These settings set the proportion of hot water that will be filled in phases 2 and 5. 0% means cold water only and 100% means hot water only. The percentage is not exact, but specifies how long the hot and cold water valves should be open. If there are widely different pressures in the cold and hot water system, this should be kept in mind when adjusting this setting.

The water temperature in phase 2 must not exceed 36 degrees, as milk deposits may occur.

If the cleaning temperature in phase 4 is high, cold water must be mixed in in phase 5 to prevent the pressure in the tank dropping so low that the cleaning pump runs poorly.

D8 Extra drain valve Option

An extra drain valve can be used to drain the water to a different drain.

If this setting is activated, the rinse water in phases 1-3 will be drained through the extra drain valve. The other phases are drained through the regular drain valve.

D9 Pause after phase 2

If a lot of hot water is used on the farm at the same time as the tank is being cleaned, it is possible to pause cleaning until there is sufficient hot water available. If a pause is programmed in this setting, the first two cleaning phases will be carried out so that the milk residues are rinsed. Cleaning will then be paused for the time programmed in the setting before the remaining cleaning phases are performed.

D10 and D11 Detergent selection

The tank can be cleaned both with alkaline detergent and disinfecting detergent, acid, (referred to as detergent and acid respectively in this manual). Both detergent and acid can be used in the same or in different cleaning cycles.

When cleaning is started from the main menu, the type of detergent can be selected. When cleaning is started after emptying, the cleaning selection logic below is used.

See the example below for how parameters **D10** and **D11** are programmed. The option that should be chosen depends on which type of detergent and acid are used, and the water quality.

Example: (D10, D11 => event)

0,0 => both detergent and acid are used in the same cleaning cycle every time.

1,1 => first cleaning cycle with detergent, second cleaning cycle with acid.

2,1 => first two cleaning cycles with detergent, third cleaning cycle with acid.

1,2 => first cleaning cycle with detergent, second and third cleaning cycles with acid.

When detergent and acid are used in the same cleaning cycle (0,0), the detergent is used in phase 4 and the acid in phase 6. When detergent and acid are not used in the same cleaning cycle, the acid is used in phase 4.

It is not possible to program the settings so that either D10 or D11 are set to 0, but the other one is not. If D10 or D11 are set to a value greater than 1, the other setting must be 1.

D12 and D13 Dosing of detergent

This setting programs how long the dosing pumps should run.

The pumps fill to around 1 decilitre in 15 seconds (when the hoses of the dosing pumps get old, the rate of filling decreases somewhat).. Which dosage is used depends on the detergent. Normal concentration is 0.5 to 1.0 % of the amount of water.

If too strong a detergent solution is used, the life of the valve diaphragm and hoses in the cleaning system will be reduced.

D14 Conductivity sensor Option

The conductivity sensor has two functions. It controls whether there is water in the tank during cleaning and it measures whether there is sufficient detergent. This function activates the use of the conductivity sensor. See also the settings **D14** and **D15** and alarms **A25** and **A26**.

How high the conductivity in the cleaning water is depends on a number of factors, for example, the type of detergent, the temperature of the water and purity of the water.

D15 and D16 Alarm for low dosage of detergent Option

The more detergent in the cleaning water, the higher conductivity it has. The conductivity sensor measures this conductivity and alerts if the conductivity is too low (alarms **A19** and **A20**). These settings program which conductivity values activate an alarm. In order to know what value should be programmed, it is recommended that a couple of cleaning cycles are run and the conductivity value then checked under the menu *Performance*.

D17 Heater temperature Option

In order to ensure that the temperature during phase 4 in the cleaning cycle is sufficient, a heater can be used. The heater sits in the circulation system and heats the water as it flows through the heater. This setting programs the temperature to which

The heater is only intended to raise the temperature of the water by 5-10 degrees and not to heat cold water to the desired temperature.

you want to heat the water. When the desired temperature is reached, the phase ends. If the temperature is reached before the time programmed for the pump's circulation, **D3**, the heater is shut off, but the phase continues for the programmed time.

This only applies during cleaning phase 4.

D18 and D19 Alarm, short time with hot water

These two settings program the values for alarm **A21 Cleaning temperature** time. Setting **D18** programs a temperature and **D19** programs a time. If the temperature in the tank is lower than the temperature set in **D18** during the time set in **D19**, the alarm is activated. Read more in the chapter *Alarms*.

In order for cleaning to produce a satisfactory result, the temperature at the end of phase 4 should not be less than 43 degrees. The setting for this alarm should therefore be at least 43 degrees.

D20 Alarm temperature

This setting programs the temperature for the alarm **A22 Cleaning temperature**. If the cleaning temperature at the end of phase 4 is lower than this temperature, the alarm is activated.

If both detergent and acid are used in the same cleaning cycle, phase 7 should be used.

D21, D22, D23, D24 and D25 Phase selection

In Complete clean, you can select the phases to be run. At least three phases are always used (phases 2, 4 and 5). Otherwise you are free to choose which phases are and are not used.

D26 Rinse with hot water

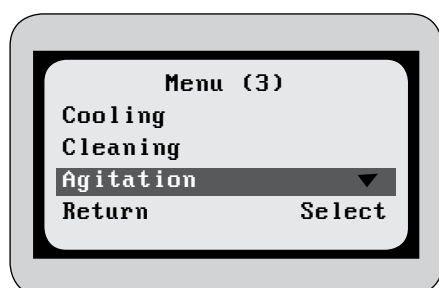
If this setting is activated, hot rather than cold water will be used in the rinses in phases 6 and 7. If a heater is used and this setting is activated, it is used in phase 7.

6. Agitation

THE AGITATOR IS ACTIVE IN THE FOLLOWING CASES

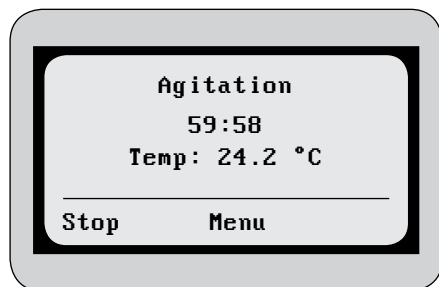
- When the compressor is running during cooling
- When the cleaning pump is running during cleaning
- At the beginning of emptying
- At an adjustable interval during cooling (see more under programming agitation later in this chapter)

Agitation can also be started manually. Agitation then occurs for the time programmed in the settings. This manual agitation can also take place when cooling is active.



Agitation is started from the main menu.

Figure 6.1



During agitation, the temperature in the tank and a countdown of the time for which the agitator is active are displayed.

To abort agitation, press **Stop**, and then when you are asked if you wish to abort agitation, press **Yes**.

Figure 6.2

During agitation, it is possible to move around in the menu system while agitation continues. However, you cannot start cleaning or cooling without aborting agitation first. You also cannot activate functions in the menu Test. Press **Menu** to go to the main menu.

PROGRAMMING AGITATION

The agitation function in Nautilus can be programmed according to how you want agitation in the tank to be performed. This is done in Settings. See the chapter *Settings* to read how. The settings for agitation can be found in menu C Agitation in settings.

C1 and C2 Cyclic agitation

During those periods when the compressors are not running (i.e. when the temperature of the milk has reached the setpoint), the agitator runs at a programmable interval. Setting **C1** controls how long the agitator will be active and setting **C2** controls how long the pause is until the next agitation period. If, for example, **C1** is set to 2 minutes and **C2** to 13 minutes, the agitator runs for 2 minutes, then stops for 13 minutes before it runs for 2 minutes again, etc.

C3 Agitation during emptying

This setting programs how long agitation stays active during emptying.

C4 Agitation before the compressors start

If this setting is activated, the agitator always starts 30 seconds before the compressors do.

C5 Agitation delay

Agitation can be delayed at the start of cooling. This setting programs how long the delay will be. (Only used on tanks where agitation also occurs in other ways).

C6 and C7 Slow agitation

The agitator can be programmed to run at a lower speed during the initial period, when the milk level in the tank is low. Setting **C6** programs how long from the start of cooling the compressors run with slow agitation. Setting **C7** programs the desired speed. The normal speed is 100 %.

C8 and C9 Manual agitation

Setting **C8** programs how long agitation will run when it is started from the main menu. Setting **C9** programs the desired speed. The normal speed is 100 %.

7. Performance

CHECKING THE TANK'S PERFORMANCE

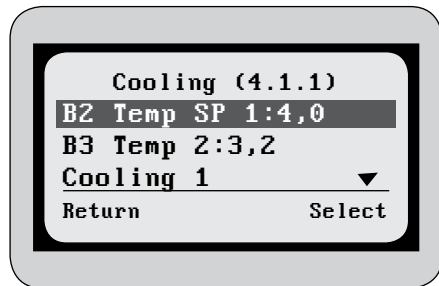


Figure 7.1

COOLING

During cooling, the current setpoints can be seen. See more in the chapter *Cooling*.

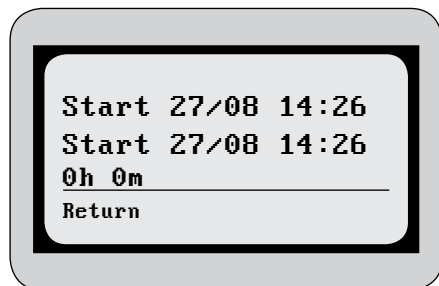


Figure 7.2

The following information is available for each cleaning cycle listed:

- The time the compressor started
- The time the compressor stopped
- The time for which the compressor was active.

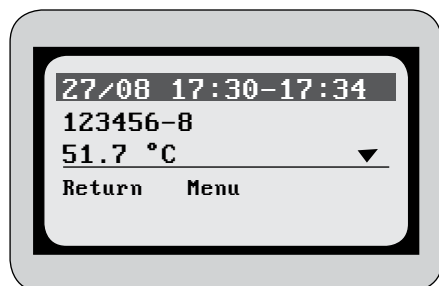


Figure 7.3

MOST RECENT CLEANING CYCLES

The following information is available under cleaning:

- The date and time the cleaning cycle was performed
- Which cleaning phases were performed
- The temperature at the end of phase 4
- The conductivity value at the end of phase 4 (Option)
- What type of detergent was used
- How long the cleaning cycle ran for

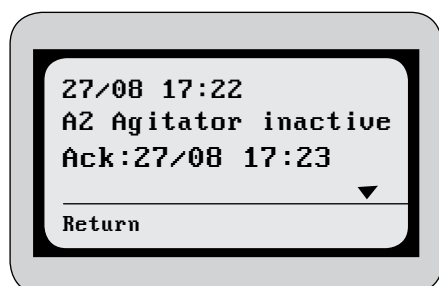


Figure 7.4

MOST RECENT ALARMS

The following information is available under most recent alarms:

- The time the alarm was activated
- The name of the alarm
- The time the alarm was acknowledged

8. Settings

The settings to suit the individual tank are programmed under the menu *Settings*. The settings are divided into groups depending on what they control.

A	Alarm
B	Cooling
C	Agitation
D	Cleaning
E	Robot
F	Time/Log
G	Temp/Level
H	Language

All the settings are described later in this chapter. There are 3 further functions under the menu *Settings*.

CALIBRATION

The temperature sensor and conductivity sensor (Option) are calibrated under this menu. Two values should be set for both sensors. One for the high temperature/ conductivity value, and the other for the low value. The reason for setting two values is that the accuracy will be better.

SAVE AS DEFAULT

By activating save as default, the current settings will be saved. If you then wish to go back to these settings, go to factory reset.

FACTORY RESET

By activating factory reset, all settings return to those that were last saved in Save as default. The log will also be reset. See more about the log in the chapter *Navigator*.

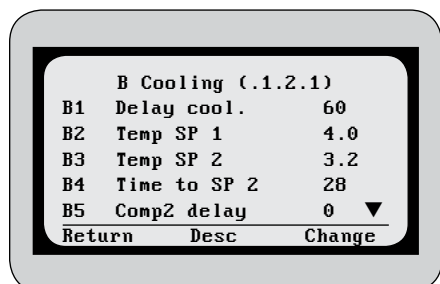


Figure 8.1

CHANGING SETTINGS

To change a setting, highlight the desired setting and press **Change**. The next value that should be changed will then be highlighted. Increase or decrease the value using the arrow keys.

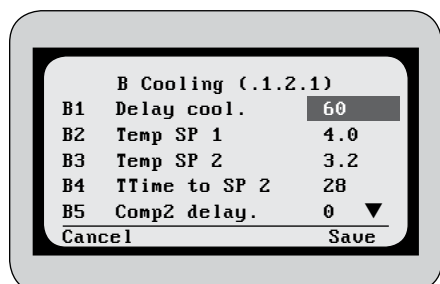


Figure 8.2

Once the desired value is set, press Save. To cancel without saving, press **Cancel**.

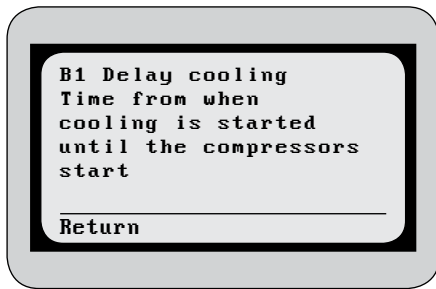


Figure 8.3

When a setting is highlighted, a description of how the setting works can be seen by pressing **Return**.

When you wish to exit the menu, a confirmation question will ask if you wish to save the changes that you have made.

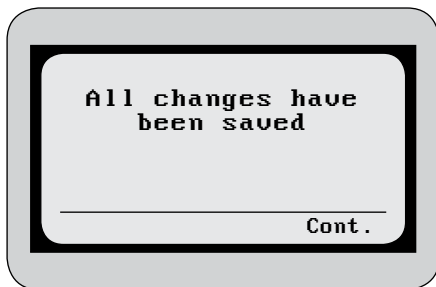


Figure 8.4

If you press **Cont.** the changes will be saved.

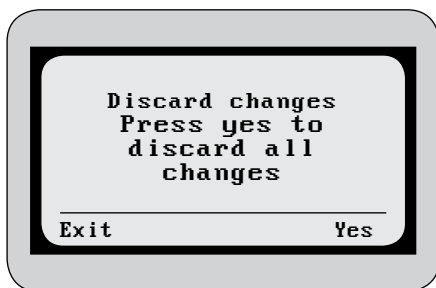


Figure 8.5

If you press **Exit**, you will be asked if you wish to discard the changes.



Figure 8.6

If you press **Yes**, no changes will be saved.

DESCRIPTION OF SETTINGS

Alarms

There are two types of alarm:

Crit = Critical alarm. When a critical alarm begins, the red light on the unit flashes. The signal is also sent to the robot or external alarm system, if these are available.

Inst = Instructive alarm. When an instructive alarm begins, the alarm light flashes, but no alarm signal is sent externally.

The alarm can also be stopped by being set to **Off**.

If GSM is used (Option), only critical alarms will be sent as SMS text messages.

SETTING	UNIT
A Alarm	
A1 Temperature sensor Temperature sensor broken or not connected	Crit/Inst/Off
A2 Agitation inactive Agitator inactive, no feedback	Crit/Inst/Off
A3 Agitation active Agitator incorrectly active	Crit/Inst/Off
A4 Comp. 1 inactive Compressor 1 inactive	Crit/Inst/Off
A5 Comp. 1 active Compressor 1 incorrectly active, or incorrect feedback	Crit/Inst/Off
A6 Comp. 2 inactive Compressor 2 inactive	Crit/Inst/Off
A7 Comp. 2 active Compressor 2 incorrectly active, or incorrect feedback	Crit/Inst/Off
A8 Milk pump inactive Milk pump inactive	Crit/Inst/Off
A9 Milk pump active Milk pump incorrectly active, or incorrect feedback	Crit/Inst/Off
A10 Outlet closed Outlet closed	Crit/Inst/Off
A11 Outlet open Outlet open	Crit/Inst/Off
A12 Slow cooling Slow cooling, the compressor has been active longer than the time set in B10	Crit/Inst/Off
A13 Warm milk Milk warmer than the temperature set in B8 in the time set in B9	Crit/Inst/Off
A14 No cooling Milk allowed in tank but cooling not activated	Crit/Inst/Off
A15 Clean. pump inact Cleaning pump inactive	Crit/Inst/Off
A16 Clean. pump act. Cleaning pump incorrectly active, or incorrect feedback	Crit/Inst/Off
A17 Level sensor Correct water level not reached in the time set in D1, or broken sensor	Crit/Inst/Off
A18 Container empty Container for alkali or acid empty	Crit/Inst/Off
A19 Low dose alkali Low amount of alkaline detergent during cleaning	Crit/Inst/Off

A20 Low dose acid Low amount of acid during cleaning	Crit/Inst/Off
A21 Cleaning time Cleaning temperature set in D19 not reached in the time set in D18	Crit/Inst/Off
A22 Cleaning temp. Cleaning temperature set in D20 not reached	Crit/Inst/Off
A23 Heater inactive Heater inactive	Crit/Inst/Off
A24 Heater active Heater incorrectly active, or incorrect feedback	Crit/Inst/Off
A25 Water left Water left in tank after cleaning	Crit/Inst/Off
A26 No water in clean No water filled during cleaning	Crit/Inst/Off
A27 Power failure A power failure has occurred	Crit/Inst/Off
A28 High box temp. The temperature of the unit is too high, leading to a system shutdown	Crit/Inst/Off
A29 Modem error Modem error, check antenna connection and SIM card	Crit/Inst/Off
A30 Software error Software reverted to earlier version because of instability	Crit/Inst/Off
A31 Connection error No connection between the display and the I/O card	Crit/Inst/Off
A32 Program error Invalid upgrade which could not be installed	Crit/Inst/Off
A33 Replace battery Alarm for battery replacement. Occurs every three years	Crit/Inst/Off

SETTING

UNIT

B Cooling

B1 Delay cooling Time from when cooling is started until the compressors start	Minutes'
B2 Temperature SP 1 Cooling to this temperature during setpoint 1	°C
B3 Temperature SP 2 Cooling to this temperature during setpoint 2	°C
B4 Time to SP 2 Time for cooling to setpoint 1. After this time, cooling to setpoint 2	Hours

B5 Compressor 2 delay	Hours
Time delay until compressor 2 starts	
B6 Capacity reg time	Minutes'
Time for which the capacity regulator is active	
B7 Time for pre-cool	Minutes' Seconds"
Time for which the compressors are active at cooling start	
B8 Warm milk temp	°C
Temperature that must be reached within the time set in B9 for alarm A13 not to be activated	
B9 Warm milk time	Minutes'
Time in which the temperature set in B8 must be reached for alarm A13 not to be activated	
B10 Time to alarm	Minutes'
Time for the compressors to work continuously until alarm A12 is activated	

SETTING**UNIT****C Agitation**

C1 Time cyc on	Minutes'
Time for which agitation is active during cyclic agitation	
C1 Time cyc off	Minutes'
Time for which agitation is inactive during cyclic agitation	
C3 Emptying agit time	Minutes'
Time for which the agitator is active during emptying	
C4 Agit before cool	On/Off
Activates the agitator 30 seconds before the compressors start. This agitation takes place every time the compressors are about to start.	
C5 Agitation delay	Minutes'
Time until the agitator starts once cooling has started (Only used on tanks where agitation occurs in other way)	
C6 Slow agit time	Minutes'
Time for which slow agitation is active	
C7 Slow agitation %	%
Speed of the agitator during slow agitation. The normal speed is 100%. The percentage refers to the power delivered to the agitator.	
C8 Manual agit time	Minutes'
Time for which the agitator is active during manual agitation	
C9 Manual agitation %	%
Speed of the agitator during manual agitation. The normal speed is 100%. The percentage	

refers to the power delivered to the agitator.

SETTING	UNIT
D Cleaning	
D1 Filling time Maximum filling time before cleaning continues. The alarm A17 is activated at the maximum time.	Minutes' Seconds"
D2 Rinse circ time Time for which the water circulates during phases 2-3, 5-7	Minutes' Seconds"
D3 Phase 4 circ time Time for which the water circulates during phase 4	Minutes' Seconds"
D4 Drain time ph 2-7 Time for which the drain is open in phases 2-7	Minutes' Seconds"
D5 Drain time phase 8 Time for which the drain is open in phase 8	Minutes' Seconds"
D6 % H.water ph 2 Proportion of hot water in the total amount of water filled in phase 2	%
D7 % H.water ph 5 Proportion of hot water in the total amount of water filled in phase 5	%
D8 Extra drain Time for which cleaning pauses after phase 2. When an extra drain valve is used, drainage in phases 1-3 occurs through the extra drain valve. Drainage in phases 4-8 occurs through the regular drain valve.	Minutes' Seconds"
D9 Pause after ph 2 Time for which cleaning pauses after phase 2	Minuter'
D10 Dose alkali Dosage of alkaline detergent. 0 for both alkaline and acid in the same cleaning. 1-5 for number of cleanings with alkaline until next cleaning with acid	0-5
D11 Dose acid Dosage of acid. 0 for both alkaline and acid in the same cleaning. 1-5 for number of cleanings with acid until next cleaning with alkaline	0-5
D12 Time alkali Dosage time for alkaline detergent	Minutes' Seconds"
D13 Time acid Dosage time for acid	Minutes' Seconds"
D14 Conduct. sensor Activates use of conductivity sensor to control drainage time	On/Off
D15 Low dose alkali Conductivity value for alkaline that must be exceeded for alarm A15 not to be activated	mS

D16 Low dose acid Conductivity value for acid that must be exceeded for alarm A16 not to be activated	mS
D17 Heater temp Temperature that the heater must reach before cleaning continues. If the set cleaning temperature is not reached within 30 minutes, the cleaning program will continue.	°C
D18 Clean. alarm time Time in which the temperature set in D19 must be exceeded for alarm A21 not to be activated	Minutes'
D19 Clean. alarm temp Temperature in phase 4 that must be exceeded in the time set in D18 for alarm A21 not to be activated	°C
D20 Alarm temperature Temperature that must be exceeded at the end of phase 4 for alarm A22 not to be activated	°C
D21 Select phase 1 Activates phase 1 in the complete cleaning program	On/Off
D22 Select phase 3 Activates phase 3 in the complete cleaning program	On/Off
D23 Select phase 6 Activates phase 6 in the complete cleaning program	On/Off
D24 Select phase 7 Activates phase 7 in the complete cleaning program	On/Off
D25 Select phase 8 Activates phase 8 in the complete cleaning program	On/Off
D26 Hot water ph 6-7 Activates the use of hot water in phases 6-7	On/Off

SETTING**UNIT****E Robots**

E1 Robot type Selects type of robot used, if any	None/Lely/Type1/Type2
E2 Part empty Activates the option for partial emptying	On/Off
E3 Nautilus address E3 Nautilus address	
E4 T4C address E4 T4C address	
E5 RAS address E5 RAS address	

SETTING	UNIT
F Time/Log	
F1 Year Time setting year	Year
F2 Month Time setting month	Month number
F3 Day Time setting day	Day
F4 Hour Time setting hour	Hours
F5 Minute Time setting minute	Minutes
F6 Log period Sets how often data from the tank is logged	Minutes
F7 ID number Identification number of the tank	Number

SETTING	UNIT
G Temp/Level	
G1 Temp diff on-off Temperature difference between the compressors starting and stopping	°C
G2 Fahrenheit Use Fahrenheit as temperature unit	On/Off
G3 Level activation Show tank level settings	On/Off
G4 Low level Level that is to be considered as low (in litres)	Litre
G5 High level Total tank volume (in litres)	Litre
G6 Level offset Not used	Number
G7 Level gain Gain for conversion of pressure sensor value to level	Number
G8 H12 Tank level fill height at 12 %	Centimeter
G9 H50 Tank level fill height at 50 %	Centimeter
G10 H75 Tank level fill height at 75 %	Centimeter
G11 H100 Tank level fill height at 100 %	Centimeter

SETTING	UNIT
H Language	
H1 Language Language selection	Language

CONVENTIONAL MILKING

A Alarm	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
A1 Temperature sensor	Crit	Crit	Crit	Crit	Crit	Crit
A2 Agitation inactive	Crit	Crit	Crit	Crit	Crit	Crit
A3 Agitation active	Crit	Crit	Crit	Crit	Crit	Crit
A4 Comp. 1 inactive	Crit	Crit	Crit	Crit	Crit	Crit
A5 Comp. 1 active	Crit	Crit	Crit	Crit	Crit	Crit
A6 Comp. 2 inactive	Inst	Inst	Inst	Inst	Crit	Crit
A7 Comp. 2 active	Inst	Inst	Inst	Inst	Crit	Crit
A8 Milk pump inactive	Off	Off	Off	Off	Off	Off
A9 Milk pump active	Off	Off	Off	Off	Off	Off
A10 Outlet closed	Off	Off	Off	Off	Off	Off
A11 Outlet open	Off	Off	Off	Off	Off	Off
A12 Slow cooling	Crit	Crit	Crit	Crit	Crit	Crit
A13 Warm milk	Crit	Crit	Crit	Crit	Crit	Crit
A14 No cooling	Crit	Crit	Crit	Crit	Crit	Crit
A15 Clean. pump inact	Inst	Inst	Inst	Inst	Inst	Inst
A16 Clean. pump act.	Inst	Inst	Inst	Inst	Inst	Inst
A17 Level sensor	Inst	Inst	Inst	Inst	Inst	Inst
A18 Container empty	Inst	Inst	Inst	Inst	Inst	Inst
A19 Low dose alkali	Off	Off	Off	Off	Off	Off
A20 Low dose acid	Off	Off	Off	Off	Off	Off
A21 Cleaning time	Inst	Inst	Inst	Inst	Inst	Inst
A22 Cleaning temp.	Inst	Inst	Inst	Inst	Inst	Inst
A23 Heater inactive	Off	Off	Off	Off	Off	Off
A24 Heater active	Off	Off	Off	Off	Off	Off
A25 Water left	Off	Off	Off	Off	Off	Off
A26 No water in clean	Off	Off	Off	Off	Off	Off
A27 Power failure	Inst	Inst	Inst	Inst	Inst	Inst
A28 High box temp.	Crit	Crit	Crit	Crit	Crit	Crit
A29 Modem error	Off	Off	Off	Off	Off	Off
A30 Software error	Inst	Inst	Inst	Inst	Inst	Inst
A31 Connection error	Crit	Crit	Crit	Crit	Crit	Crit
A32 Program error	Inst	Inst	Inst	Inst	Inst	Inst
A33 Replace battery	Inst	Inst	Inst	Inst	Inst	Inst

B Cooling	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
B1 Delay cooling	35	35	35	35	35	35
B2 Temperature SP 1	3.5	3.5	3.5	3.5	3.5	3.5
B3 Temperature SP 2	3.2	3.2	3.2	3.2	3.2	3.2
B4 Time to SP 2	28	28	28	28	28	28
B5 Compressor 2 delay	0	0	0	0	0	0
B6 Capacity reg time	205	205	205	205	205	205
B7 Time for pre-cool	0'00	0'00	0'00	0'00	0'00	0'00
B8 Warm milk temp	9.0	9.0	9.0	9.0	9.0	9.0
B9 Warm milk time	180	180	180	180	180	180
B10 Time to alarm	210	210	210	210	210	210

C Agitation	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
C1 Time cycl agit on	2	2	2	2	2	2
C2 Time cyclic agit off	13	13	13	13	13	13
C3 Emptying agit time	2	2	2	2	2	2
C4 Agit before cool	Off	Off	Off	Off	Off	Off
C5 Agitation delay	0	0	0	0	0	0
C6 Slow agit time	0	0	0	0	0	0
C7 Slow agitation %	100	100	100	100	100	100
C8 Manual agit time	60	60	60	60	60	60
C9 Manual agitation %	100	100	100	100	100	100

D Cleaning	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
D1 Filling time	3'30"	5'00"	8'00"	11'00"	16'00"	18'00"
D2 Rinse circ time	3'00"	3'00"	3'00"	3'00"	3'00"	3'00"
D3 Phase 4 circ time	8'00"	8'00"	8'00"	8'00"	8'00"	8'00"
D4 Drain time ph 2-7	0'50"	1'10"	2'00"	2'20"	2'45"	3'10"
D5 Drain time phase 8	2'00"	2'00"	2'00"	2'00"	2'00"	2'00"
D6 % H.water ph2	60 %	60 %	60 %	60 %	60 %	60 %
D7 % H.water ph5	30 %	30 %	30 %	30 %	30 %	30 %
D8 Extra drain	Off	Off	Off	Off	Off	Off
D9 Pause after ph 2	0	0	0	0	0	0
D10 Dose alkali	1	1	1	1	1	1
D11 Dose acid	1	1	1	1	1	1
D12 Time alkali	0'30"	0'45"	1'00"	1'20"	1'45"	2'10"
D13 Time acid	0'30"	0'45"	1'00"	1'20"	1'45"	2'10"
D14 Conduct. sensor	Off	Off	Off	Off	Off	Off
D15 Low dose alkali	5.0	5.0	5.0	5.0	5.0	5.0
D16 Low dose acid	5.0	5.0	5.0	5.0	5.0	5.0
D17 Heater temp	60	60	60	60	60	60
D18 Clean. alarm time	4	4	4	4	4	4
D19 Clean. alarm temp	38	38	38	38	38	38
D20 Alarm temperature	43	43	43	43	43	43
D21 Select phase 1	On	On	On	On	On	On
D22 Select phase 3	On	On	On	On	On	On
D23 Select phase 6	On	On	On	On	On	On
D24 Select phase 7	Off	Off	Off	Off	Off	Off
D25 Select phase 8	Off	Off	Off	Off	Off	Off
D26 Hot water ph 6-7	Off	Off	Off	Off	Off	Off

For silo only

D Cleaning	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
D6 % H.water ph2	0 %	0 %	0 %	0 %	0 %	0 %
D21 Select phase 1	Off	Off	Off	Off	Off	Off

E Robot	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
E1 Robot type	No	No	No	No	No	No
E2 Partial emptying	Off	Off	Off	Off	Off	Off
E3 Nautilus address						
E4 T4C address						
E5 RAS address						

F Time/Log	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
F1 Year						
F2 Month						
F3 Day						
F4 Hour						
F5 Minute						
F6 Log period	7	7	7	7	7	7
F7 ID number						

G Temp/Level	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
G1 Temp diff on-off	0.6	0.6	0.6	0.6	0.6	0.6
G2 Fahrenheit	Off	Off	Off	Off	Off	Off
G3 Level activation	Off	Off	Off	Off	Off	Off
G4 Low level						
G5 High level						
G6 Level offset						
G7 Level gain						
G8 H12						
G9 H50						
G10 H75						
G11 H100						

H Language	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
H1 Language						

ROBOTIC MILKING

A Alarm	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
A1 Temperature sensor	Crit	Crit	Crit	Crit	Crit	Crit
A2 Agitation inactive	Crit	Crit	Crit	Crit	Crit	Crit
A3 Agitation active	Crit	Crit	Crit	Crit	Crit	Crit
A4 Comp. 1 inactive	Crit	Crit	Crit	Crit	Crit	Crit
A5 Comp. 1 active	Crit	Crit	Crit	Crit	Crit	Crit
A6 Comp. 2 inactive	Inst	Inst	Inst	Inst	Crit	Crit
A7 Comp. 2 active	Inst	Inst	Inst	Inst	Crit	Crit
A8 Milk pump inactive	Off	Off	Off	Off	Off	Off
A9 Milk pump active	Off	Off	Off	Off	Off	Off
A10 Outlet closed	Off	Off	Off	Off	Off	Off
A11 Outlet open	Off	Off	Off	Off	Off	Off
A12 Slow cooling	Inst	Inst	Inst	Inst	Inst	Inst
A13 Warm milk	Crit	Crit	Crit	Crit	Crit	Crit
A14 No cooling	Crit	Crit	Crit	Crit	Crit	Crit
A15 Clean. pump inact	Inst	Inst	Inst	Inst	Inst	Inst
A16 Clean. pump act.	Inst	Inst	Inst	Inst	Inst	Inst
A17 Level sensor	Inst	Inst	Inst	Inst	Inst	Inst
A18 Container empty	Inst	Inst	Inst	Inst	Inst	Inst
A19 Low dose alkali	Off	Off	Off	Off	Off	Off
A20 Low dose acid	Off	Off	Off	Off	Off	Off
A21 Cleaning time	Inst	Inst	Inst	Inst	Inst	Inst
A22 Cleaning temp.	Inst	Inst	Inst	Inst	Inst	Inst
A23 Heater inactive	Off	Off	Off	Off	Off	Off
A24 Heater active	Off	Off	Off	Off	Off	Off
A25 Water left	Off	Off	Off	Off	Off	Off
A26 No water in clean	Off	Off	Off	Off	Off	Off
A27 Power failure	Inst	Inst	Inst	Inst	Inst	Inst
A28 High box temp.	Crit	Crit	Crit	Crit	Crit	Crit
A29 Modem error	Off	Off	Off	Off	Off	Off
A30 Software error	Inst	Inst	Inst	Inst	Inst	Inst
A31 Connection error	Crit	Crit	Crit	Crit	Crit	Crit
A32 Program error	Inst	Inst	Inst	Inst	Inst	Inst
A33 Replace battery	Inst	Inst	Inst	Inst	Inst	Inst

B Cooling	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
B1 Delay cooling	45	45	45	45	45	45
B2 Temperature SP 1	4.0	4.0	4.0	4.0	4.0	4.0
B3 Temperature SP 2	3.2	3.2	3.2	3.2	3.2	3.2
B4 Time to SP 2	4	4	6	7	8	8
B5 Compressor 2 delay	0	0	0	0	0	0
B6 Capacity reg time	205	205	360	360	420	420
B7 Time for pre-cool	0'20	0'20	0'20	0'20	0'20	0'20
B8 Warm milk temp	9.0	9.0	9.0	9.0	9.0	9.0
B9 Warm milk time	180	180	180	180	180	180
B10 Time to alarm	360	360	600	600	700	700

C Agitation	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
C1 T. cyclic agit on	2	2	2	2	2	2
C2 T. cyclic agit off	13	13	13	13	13	13
C3 Emptying agit time	2	2	2	2	2	2
C4 Agit before cool	On	On	On	On	On	On
C5 Agitation delay	0	0	0	0	0	0
C6 Slow agit time	0	0	0	0	0	0
C7 Slow agitation %	100	100	100	100	100	100
C8 Manual agit time	60	60	60	60	60	60
C9 Manual agitation %	100	100	100	100	100	100

D Cleaning	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
D1 Filling time	3'30"	5'00"	8'00"	11'00"	16'00"	18'00"
D2 Rinse circ time	3'00"	3'00"	3'00"	3'00"	3'00"	3'00"
D3 Phase 4 circ time	8'00"	8'00"	8'00"	8'00"	8'00"	8'00"
D4 Drain time ph 2-7	0'50"	1'10"	2'00"	2'20"	2'45"	3'10"
D5 Drain time phase 8	2'00"	2'00"	2'00"	2'00"	2'00"	2'00"
D6 % H.water ph2	60 %	60 %	60 %	60 %	60 %	60 %
D7 % H.water ph5	30 %	30 %	30 %	30 %	30 %	30 %
D8 Extra drain	Off	Off	Off	Off	Off	Off
D9 Pause after ph 2	0	0	0	0	0	0
D10 Dose alkali	1	1	1	1	1	1
D11 Dose acid	1	1	1	1	1	1
D12 Time alkali	0'30"	0'45"	1'00"	1'20"	1'35"	2'10"
D13 Time acid	0'30"	0'45"	1'00"	1'20"	1'35"	2'10"
D14 Conduct. sensor	Off	Off	Off	Off	Off	Off
D15 Low dose alkali	5.0	5.0	5.0	5.0	5.0	5.0
D16 Low dose acid	5.0	5.0	5.0	5.0	5.0	5.0
D17 Heater temp	60	60	60	60	60	60
D18 Clean. alarm time	4	4	4	4	4	4
D19 Clean. alarm temp	38	38	38	38	38	38
D20 Alarm temperature	43	43	43	43	43	43
D21 Select phase 1	On	On	On	On	On	On
D22 Select phase 3	On	On	On	On	On	On
D23 Select phase 6	On	On	On	On	On	On
D24 Select phase 7	Off	Off	Off	Off	Off	Off
D25 Select phase 8	On	On	On	On	On	On
D26 Hot water ph 6-7	Off	Off	Off	Off	Off	Off

For silo only

D Cleaning	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
D6 % H.water ph2	0 %	0 %	0 %	0 %	0 %	0 %
D21 Select phase 1	Off	Off	Off	Off	Off	Off

E Robot	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
E1 Robot type	Lely, Type 1, Type 2					
E2 Partial emptying	Off	Off	Off	Off	Off	Off
E3 Nautilus address						
E4 T4C address						
E5 RAS address						

F Time/Log	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
F1 Year						
F2 Month						
F3 Day						
F4 Hour						
F5 Minute						
F6 Log period	7	7	7	7	7	7
F7 ID number						

G Temp/Level	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
G1 Temp diff on-off	0.6	0.6	0.6	0.6	0.6	0.6
G2 Fahrenheit	Off	Off	Off	Off	Off	Off
G3 Level activation	Off	Off	Off	Off	Off	Off
G4 Low level						
G5 High level						
G6 Level offset						
G7 Level gain						
G8 H12						
G9 H50						
G10 H75						
G11 H100						

H Language	1600-2500	3200-5000	6000-8000	9000-12000	14000-18000	20000-30000
H1 Language						

9. Test/testing

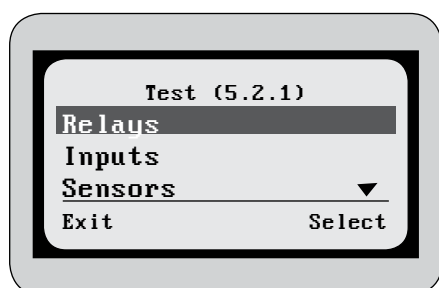


Figure 9.1

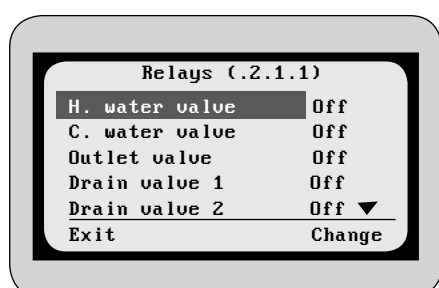


Figure 9.2

The various components of the tank can be tested in the menu **Test**.

RELAYS

All components are listed under the menu **Relays**. To test a component, highlight it and then press **Change**. To turn off the component, press **Change** again or go to another component. You can therefore only test one component at a time. It is not possible to test components while the tank is in cooling, cleaning or agitation mode.

If there is milk in the tank, be careful of which functions are tested so that you do not accidentally activate a function that can affect the milk, e.g. the outlet valve. Also be careful of how long a component is tested. If, for example, the cleaning pump is tested for a long time without water being present, it will be damaged.

Components:

- Hot water valve
- Cold water valve
- Outlet valve
- Drain valve 1
- Drain valve 2 (Option)
- Capacity regulator (Option)
- Cleaning pump
- Compressor 1
- Compressor 2
- Alarm signal
- Heater (Option)
- Emptying/cleaning signal
- Cleaning signal
- Dosing pump, acid
- Dosing pump, detergent
- Milk pump
- Signal for cooling
- Tankvagt red alarm light (Option)
- Tankvagt green alarm light (Option)

INPUTS

The signals that the unit receives can be controlled under the menu **Inputs**. When a signal is active, it is marked as On, otherwise it is marked as Off.

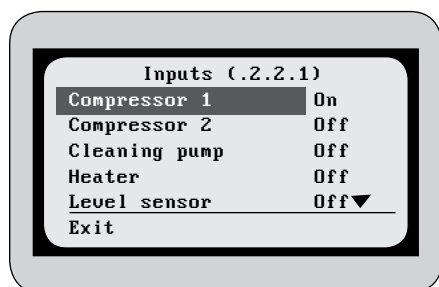
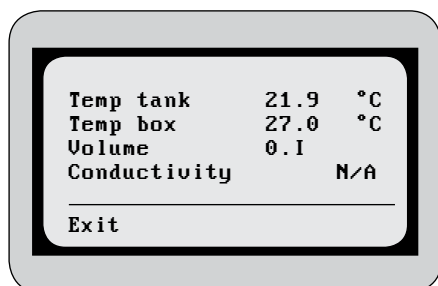


Figure 9.3

Incoming signals:

- Compressor 1
- Compressor 2
- Cleaning pump
- Heater (Option)
- Level sensor
- Outlet valve (Option)
- Agitator
- Detergent container
- Milk valve (Option)
- Milk pump (Option)
- Start cooling
- Cleaning pump alarm (if the cleaning pump draws too much current)



The image shows a rectangular control panel with a black border. Inside, there is a white area with black text. The text is arranged in a list-like format with a horizontal line at the bottom. The text reads: 'Temp tank 21.9 °C', 'Temp box 27.0 °C', 'Volume 0.1', 'Conductivity N/A', and 'Exit'.

Temp tank	21.9	°C
Temp box	27.0	°C
Volume	0.1	
Conductivity		N/A
<hr/>		
Exit		

Figure 9.4

SENSORS

The current values of the tank's various sensors are shown under Sensors.

- The temperature in the tank
- The temperature in the control unit
- The actual volume in the tank (Option)
- The conductivity in the cleaning water (Option)

AGITATOR

The agitator can be test-run and feedback checked under Agitator.

10. Program

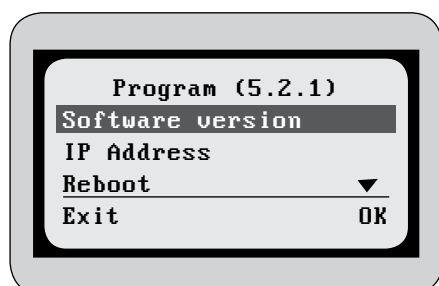


Figure 10.1

Information concerning the software version and communication is available in the Program menu.



Figure 10.2

SOFTWARE VERSION

The version of the software installed in the unit is shown under software version. When installing a new version of the software, you specify in this menu whether the version is stable by pressing Stable. See more in the chapter Navigator.

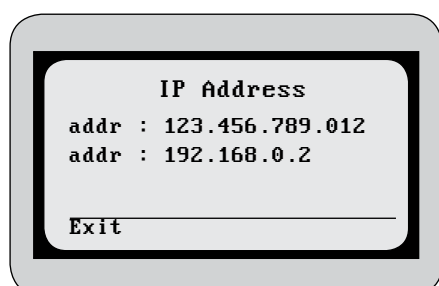


Figure 10.3

IP ADDRESS

The unit's IP address is shown under IP address. If the GSM feature is activated and a SIM card is installed, the IP address of the SIM card is also shown.

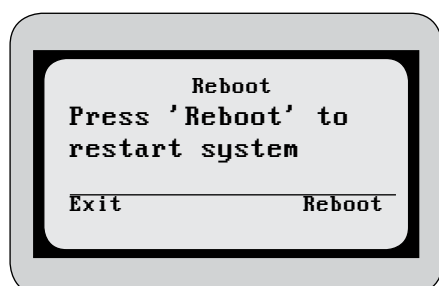


Figure 10.4

REBOOT

Reboot is where you have the option to reboot the unit. This is done when installing new software. Read more in the chapter Navigator.

11. Options

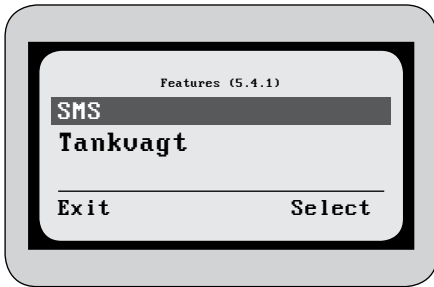


Figure 11.1

Functions that are not standard are available in the menu **Options**. These options are activated in the Navigator program. Read more in the chapter *Navigator*.

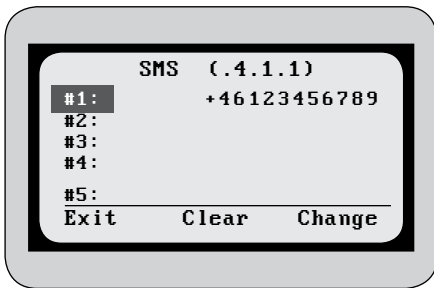


Figure 11.2

SMS

SMS is where you specify the telephone numbers to which SMS text messages should be sent when an alarm on the tank is activated. To specify a telephone number, press **Change**. Enter the telephone number using the arrow keys. Move the highlighter by pressing Next or Prev. Press Save when the telephone number has been entered.

To remove a telephone number, press Clear

Enter the telephone number using the international format.

TANKVAGT

Tankvagt supplies functions that are specific to each dairy. For more information concerning these functions, see the Tankvagt manual.

12. Information

THE CONTACT INFORMATION FOR WEDHOLMS IS LOCATED IN THE MENU INFORMATION.

Wedholms AB

Telephone number: + 46 - 155-280380

Fax number: + 46 - 155-214454

E-mail: info@wedholms.se

Web: www.wedholms.se

13. Alarms



Figure 13.1

Figure 13.1 The unit has 33 alarms. When an alarm is activated, the red alarm LED lights up.

In Settings, the alarm can be programmed as either critical or instructive. In the event of a critical alarm, the external alarm signal is activated, whereas the informative alarm is only displayed on the unit.

Read more about how alarms are programmed in the chapter *Settings*.

List of alarms

- A1 Temperature sensor error
- A2 Agitator inactive
- A3 Agitator incorrectly active
- A4 Compressor 1 inactive
- A5 Compressor 1 incorrectly active
- A6 Compressor 2 inactive
- A7 Compressor 2 incorrectly active
- A8 Milk pump inactive
- A9 Milk pump incorrectly active
- A10 Outlet closed
- A11 Outlet open
- A12 Slow cooling
- A13 Milk above x °C in y minutes
- A14 Cooling not activated
- A15 Cleaning pump inactive
- A16 Cleaning pump incorrectly active
- A17 Slow filling or sensor error
- A18 Detergent container empty
- A19 Low dosage alkaline detergent
- A20 Low dosage acid
- A21 Cleaning temp. below x °C in y minutes
- A22 Cleaning temp x °C not reached
- A23 Heater inactive
- A24 Heater incorrectly active
- A25 Water still in tank
- A26 No water after filling
- A27 Power failure
- A28 Temperature in the unit too high
- A29 Modem error
- A30 Software error
- A31 PCB lost connection
- A32 Error in loaded program update
- A33 Replace battery

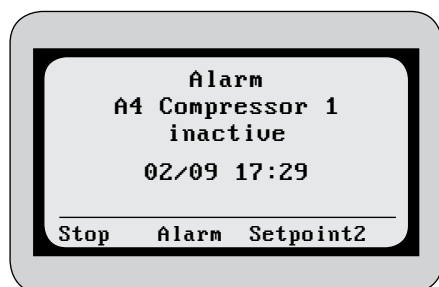


Figure 13.2

ACKNOWLEDGING ALARMS

When an alarm has been activated, the display will switch between showing the alarm and showing the current activity.

To get to alarm acknowledgement, press **Alarm**.

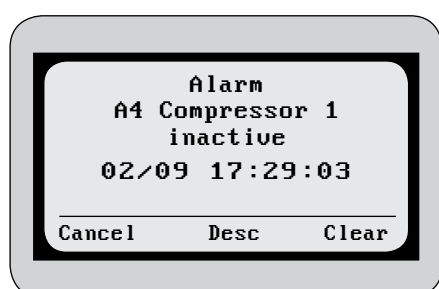


Figure 13.2

To acknowledge the alarm, press Clear. To obtain a more detailed description of the alarm, press **Desc**.

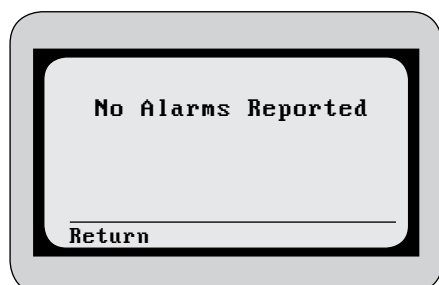


Figure 13.3

If there are more alarms, the next alarm is shown, otherwise the unit displays that no more alarms remain.

14. Robots

The unit has several functions that are specially designed for tanks connected to milking robots. The functions are slightly different depending on the manufacturer of the robot. The unit allows for three types of robot manufacturers to be programmed in setting E1.

ROBOT MANUFACTURERS:

Lely

Type 1

BouMatic
Fullwood
GEA (Westphalia)
SAC

Type 2

DeLaval

See separate electrical diagram to see the connections between the tank and the robot system.

When there is a signal from the robot that milk has been let into the tank, an R lights up in the upper left corner of the display.

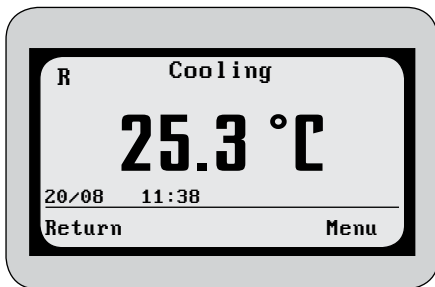


Figure 14.1

Special settings for robot tanks

Some of the settings are specifically designed for robot tanks. Many of these settings have already been described in previous chapters, but are brought together here.

A14 No cooling

Milk is allowed into the tank but no cooling is activated. This setting gives an alarm if cooling should be turned off, despite the robot sending milk to the tank. The alarm activates one minute after the signal from the robot.

B6 Capacity regulator (Option)

On tanks for robot milking, cooling starts when large parts of the evaporators are not covered in milk. To avoid the build-up of ice in the tank, the capacity regulator regulates the cooling. When the tank has a sufficient quantity of milk, the capacity regulator can be disconnected. This setting programs how long the capacity regulator should be connected, calculated from when the compressors start.

C4 Agitation before the compressors start

If this setting is activated, the agitator starts 30 seconds before the compressors start. If there are low quantities of milk and the milk is already cold, an inflow of warm milk from the robot will make the temperature sensor sitting by the inlet react so that cooling starts, which leads to increased wear on the compressors with many starts and stops. This agitation ensures that the milk is mixed together so that the compressors only start if the temperature of the mixed milk is higher than the compressor's starting temperature.

C6 and C7 Slow agitation

The agitator can be programmed to run at a lower speed during the initial period, when the milk level in the tank is low. Setting C6 programs how long from the start of cooling the compressors will run with slow agitation. Setting C7 programs the desired speed. The normal speed is 100 %.

D5 Drainage time

D5 controls the drainage time in cleaning phase 8, which is all that phase consists of. The reason for this extra drainage time is to let the rinse water that runs down the sides of the tank have sufficient time to drain out before milk enters the tank.

E2 Partial emptying

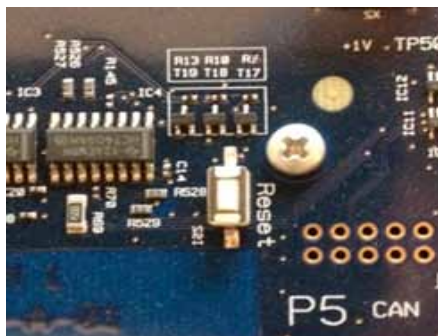
By activating setting E2 Partial emptying, emptying can be carried out without the robot going into sleep mode. See more in the chapter *Emptying*.

15. Troubleshooting

Alarm	Cause	Solution
A1 Temperature sensor error	Incorrect value, sensor.	Check the value in the menu Test. Check the sensor cable.
A2 Agitator inactive	1. Agitator motor broken. 2. Incorrect connection. 3. Overheated motor.	Check the agitator in the menu Test. 1. Check whether MA:1 (Klixon) in the agitator motor has broken. 2. No circuit between terminals 71-73. 3. -
A3 Agitator incorrectly active	1. Wrong connection. 2. Compressor and agitation controlled from the dial on the electrical box.	1. Check connection. 2. -
A4 Compressor 1 inactive	1. Contactor off. 2. Pressure switch tripped. 3. Motor protection cut out.	Check the compressor in the menu Test. Check: 1. The contactor. 2. The pressure switch setting, ambient temperature, that fans are running, that the condenser is not blocked, refrigerant leakage. 3. Motor protection.
A5 Compressor 1 incorrectly active	1. Contactor on. 2. Compressor and agitation controlled from the dial on the electrical box.	Check the compressor in the menu Test. Check: 1. The contactor. 2. -
A6 Compressor 2 inactive	1. Contactor off. 2. Pressure switch tripped. 3. Motor protection cut out.	Check the compressor in the menu Test. Check: 1. The contactor. 2. The pressure switch setting, ambient temperature, that fans are running, that the condenser is not blocked, refrigerant leakage. 3. Motor protection.
A7 Compressor 2 incorrectly active	1. Contactor on 2. Compressor and agitation controlled from the dial on the electrical box.	Check the compressor in the menu Test. Check: 1. The contactor. 2. -
A8 Milk pump inactive	1. Contactor off. 2. Motor protection cut out.	Check the milk pump in the menu Test. Check: 1. The contactor. 2. The motor protection.
A9 Milk pump incorrectly active	Contactor on.	Check the milk pump in the menu Test. The contactor. and feedback in the menu Test.
A10 Outlet closed	1. Air motor broken or no pressure in the system. 2. Incorrect feedback.	Check the outlet valve in the menu Test. Check: 1. Air motor and hoses. 2. Feedback.
A11 Outlet open	1. Incorrect feedback. 2. Valve opened manually	Check the outlet valve in the menu Test. Check: 1. The feedback in the menu Test. 2. The outlet valve.
A12 Slow cooling	Compressor running for longer than the alarm time set.	Check: The time in setting B10. The ambient temperature. The condenser/fans. Heat recovery. Refrigerant leakage.

Alarm	Cause	Solution
A13 Milk above x °C in y minutes	Milk temperature warmer than the value set.	Check: The settings B8 and B9. The ambient temperature. The condenser/fans. Heat recovery. Refrigerant leakage.
A14 Cooling not activated	The milking robots have received permission to send milk to the tank in 5 minutes, but cooling is not activated.	
A15 Cleaning pump inactive	1. Contactor off. 2. Thermal protection tripped.	Check the cleaning pump in the menu Test. Check: 1. The contactor. 2. Reset the thermal protection.
A16 Cleaning pump incorrectly active	Contactor on.	Check the cleaning pump in the menu Test. Check the contact.
A17 Slow filling or sensor error	Correct water level not reached in the time set.	Check: Setting D1. The water supply to the tank. Check feedback from the sensor in the menu Test.
A18 Detergent container empty	The sensors in one or both of the detergent containers give no feedback.	Fill with more detergent. Clean the sensor rods. Check feedback from the sensor in the menu Test.
A19 Low dosage alkaline detergent	The concentration of the alkaline detergent is lower than the alarm value set.	Check: The alarm value in setting D15. The dosage in setting D12. The dosing pump in the menu Test.
A20 Low dosage acid	The concentration of acid is lower than the alarm value set.	Check: The alarm value in setting D16. The dosage in setting D13. The dosing pump in the menu Test.
A21 Cleaning temp. below x °C in y minutes	The cleaning temperature in phase 4 is lower than the value set.	Check: The settings B18 and B19. The setting D3. The incoming flow of water and its temperature.
A22 Cleaning temp x °C not reached	The cleaning temperature at the end of phase 4 is lower than the value set.	Check the setting D20. The incoming flow of water and its temperature.
A23 Heater inactive	1. Contactor off. 2. Thermal protection cut out. 3. The temperature on the heater's thermostat has been reached.	Check the heater in the menu Test. Check: 1. The contactor. 2. The overheating protection. 3. The thermostat on the heater.
A24 Heater incorrectly active	1. Contactor on.	Check the heater in the menu Test. Check the contactor.
A25 Water still in tank	The conductivity sensor is showing that there is still water in the tank after cleaning.	Check: The drainage times in the settings D4 and D5. The drain valves in the menu Test. The conductivity sensor in the menu Test.

Alarm	Cause	Solution
A26 No water after filling	The conductivity sensor is showing that there is no water in the tank after filling with water during cleaning.	Check: The level sensor in the menu Test. The maximum time for the level sensor in setting D1. The conductivity sensor in the menu Test.
A27 Power failure	No power to the panel card, or voltage is less than 170 volts.	Check: The power to the tank. The power cable between the I/O card and panel card.
A28 Temperature in the unit too high	The temperature inside the unit is higher than the safety temperature.	Check the ambient temperature.
A29 Modem error	The modem cannot make contact.	Check: The SIM card. The antenna. The telecoms network.
A30 Software error	Error in the installed program.	Install software version again.
A31 PCB lost connection	No connection between the I/O card and display card.	Check the ribbon cable and power cable between the I/O card and the display card.
A32 Error in loaded program update	Error in the installed software version.	Install software version again.
A33 Replace battery	It is 3 years since the batteries in the unit were replaced.	Replace batteries.



RESET

If the unit should freeze, you can perform a reset by pressing the reset button on the display card. See fig. 15.1 and also the overview in chapter 16 *Connection Diagram* for the location of the button on the card.

Figure 15.1

CHANGING THE CONTRAST

To change the contrast of the display, press and hold down the middle button, then press the arrow keys to increase or decrease the contrast.

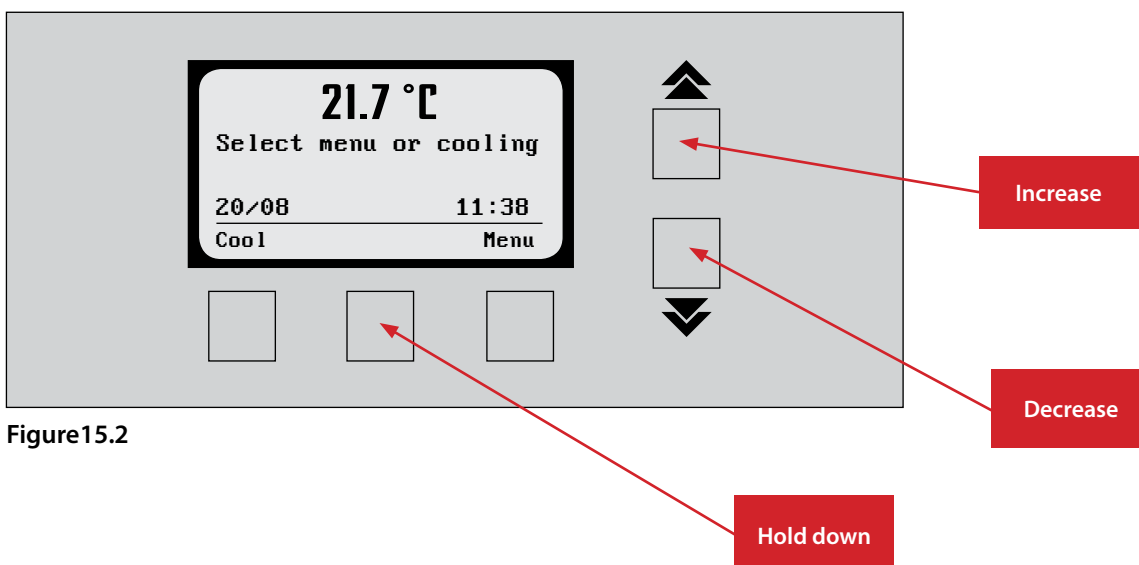
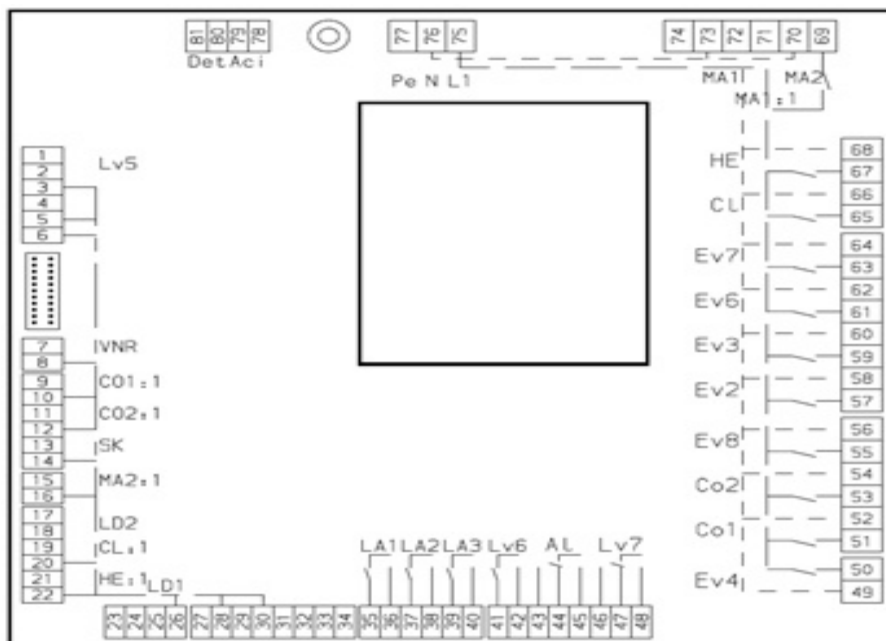


Figure15.2

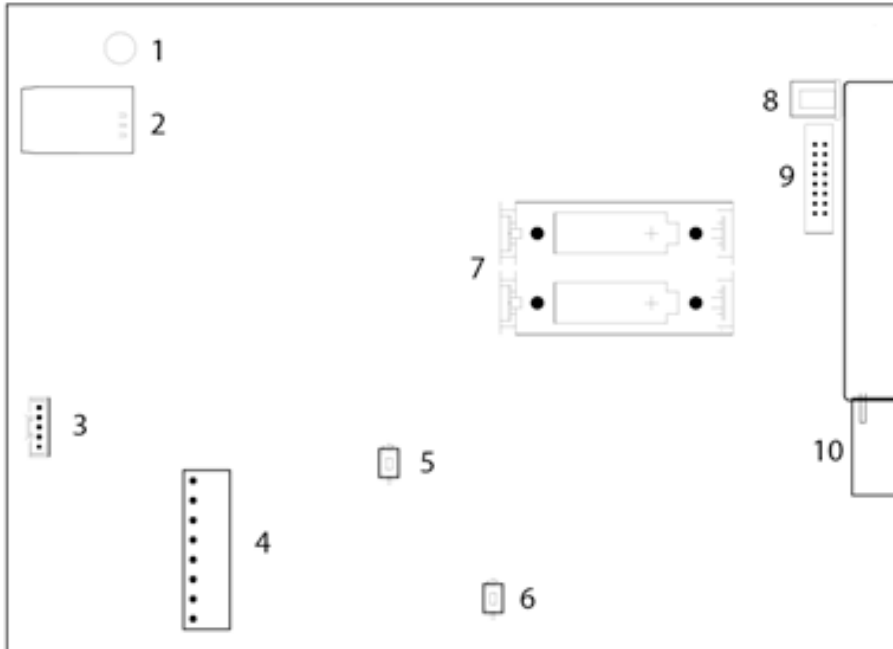
16. Connection Diagram

Main card



Outputs		Inputs	
MA1	Agitator	MA:1	Feedback, agitator
MA2	Milk pump	MA:2	Feedback, milk pump
EV2	Hot water valve	CL1:1	Feedback, cleaning pump
EV3	Cold water valve	CO1:1	Feedback, compressor group 1
EV4	Outlet valve	CO2:1	Feedback, compressor group 2
EV6	Drain valve 1	HE:1	Feedback, heater
EV7	Drain valve 2	SK	Signal to start cooling
EV8	Capacity regulator	LD1	Level sensor , water quantity
CL1	Cleaning pump	LD2	Level sensor in detergent container
CO1	Compressor group 1	LV4	Feedback, outlet valve
CO2	Compressor group 2	LV5	Signal from robot
HE	Heater		
DET	Dosing pump, alkaline detergent		
ACI	Dosing pump, acid		
LV6	Emptying/cleaning signal		
LV7	Cleaning signal		
AL1	Alarm signal		
LA1	Light for cooling on		
LA2	Tankvagt red alarm light (optional)		
LA3	Tankvagt green alarm light (optional)		

PANEL CARD



Components		Sensors	
1	GSM antenna	TS	Temperature sensor
2	SIM card holder	PLS	Pressure sensor
3	Cable for USB	CS	Conductivity sensor
4	Connection terminal, sensors		
5	ON/OFF button		
6	Reset button		
7	Battery holder		
8	Power cable		
9	Flat cable		
10	Network socket		

17. Nautilus Navigator

NAVIGATOR

The unit has an associated computer program called Nautilus Navigator. Using Navigator, information can be sent between the unit and the computer. The program is also used to analyse the tank's performance in recent months.



Figure 17.1

CONNECTION TO THE UNIT

There are two ways to connect to a tank.

USB cable

Connect a USB cable between the computer and the right-hand side of the unit, where there is a socket. Use type B cable (this cable type is often used for printers).

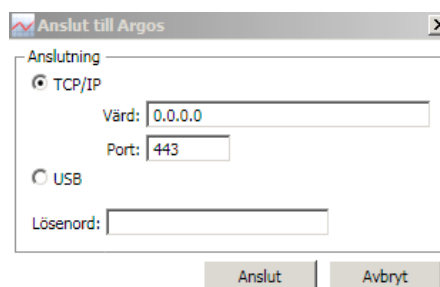


Figure 17.2

GSM (Option)

Connection to the unit can be via GSM if a SIM card with a fixed IP address is used. Insert the SIM card and antenna according to the figure below.

To connect to the tank, select Link/Connect.

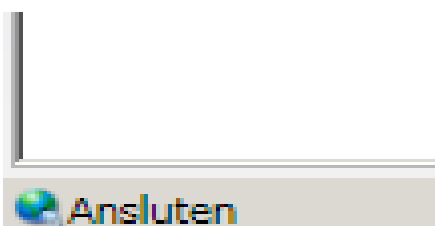


Figure 17.3

Then select the connection method and press Connect. If the connection is successfully changed, the status in the lower left corner will go from not connected to connected

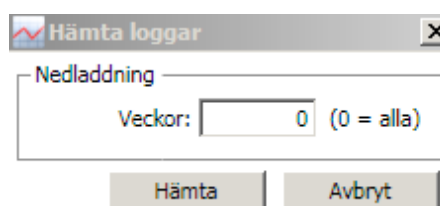


Figure 17.4

Downloading the tank log

To download the log, select Link/Tank log.

Select how many weeks are to be downloaded. Select 0 for the entire log. Navigator will then ask where on the computer the file should be saved. The suggested filename is based on the Tank's serial number-date-time, but the file can be renamed as the user wishes.

ANALYSIS OF THE TANK LOG

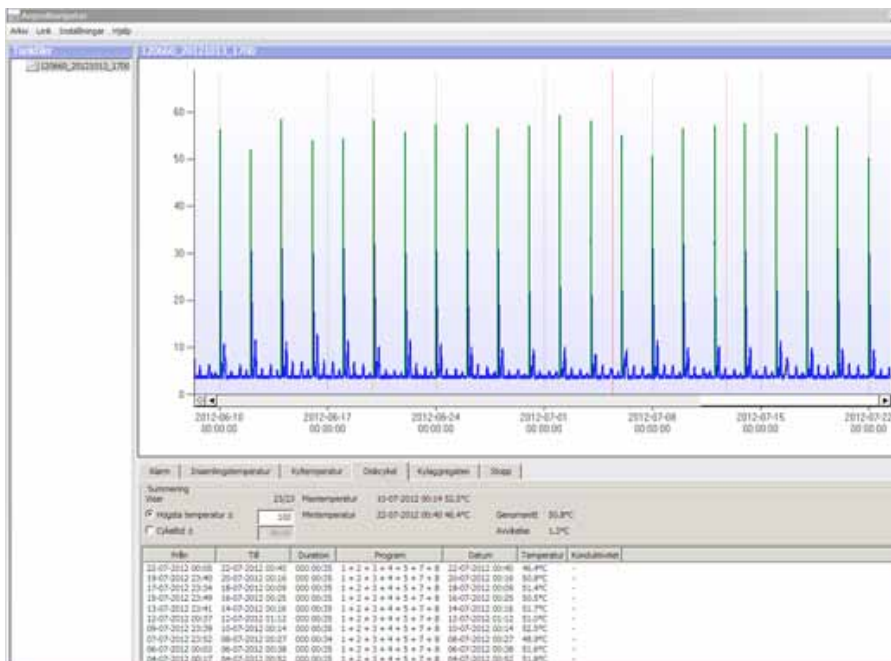


Figure 17.5 The tank’s log is displayed in two fields. The top one shows a graph and the bottom one various information in table form. The column on the left shows the current log.

GRAPH

In Settings/Display, you can select what is shown in the graph, including: temperature, alarm and volume (Option).

The time is shown on the x-axis. The left y-axis shows the temperature, and the right y-axis shows the volume. Alarms are displayed as red fields.

To zoom in: hold the left mouse button and drag a box over the area that you wish to zoom in on. To zoom out, press the minus button for the x-axis and y-axis respectively.

When the temperature is shown, the graph also shows which phase the unit is in:

- Standby mode: Black
- Cooling: Blue
- Cleaning: Green
- Emptying: Purple

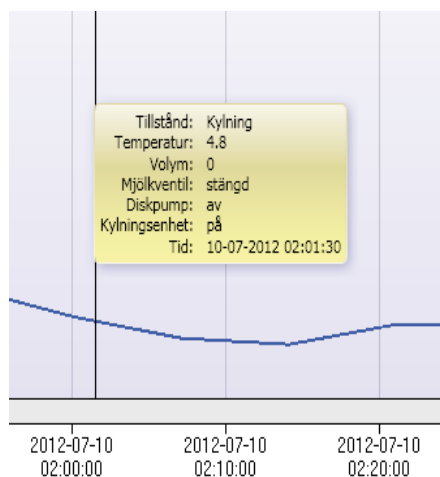


Figure 17.6

By pressing on any point on the graph, a window pops up with the tank's status at the selected point.

TABLES

In the bottom field, information is shown in table form. The fields that can be selected are:

Alarms

Alarms shows those alarms that occurred during the logging period.

Emptying temperature

Emptying temperature shows the temperature in the tank on those occasions that emptying took place.

Cooling temperature

Cooling temperature shows the highest and lowest temperatures in the tank.

Cleaning cycle

Cleaning cycle shows the various cleaning cycles that have taken place during the logging period, the cleaning phases that were used, the cleaning time, the cleaning temperature and the conductivity (Option).

Cooling unit

Cooling unit shows how long the cooling unit worked in selected intervals.

Stop

Stop shows the occasions that the tank stopped and for how long the tank stopped.

PRINT

If you wish to print out the graph or the tables, select File/Print.

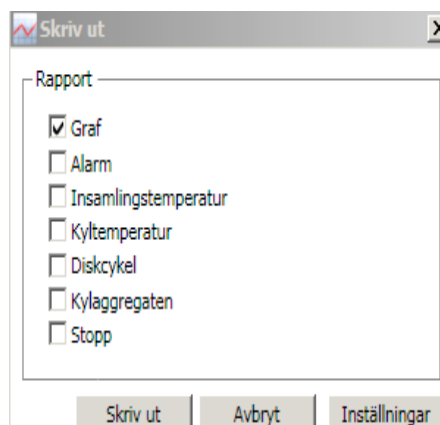


Figure 17.7

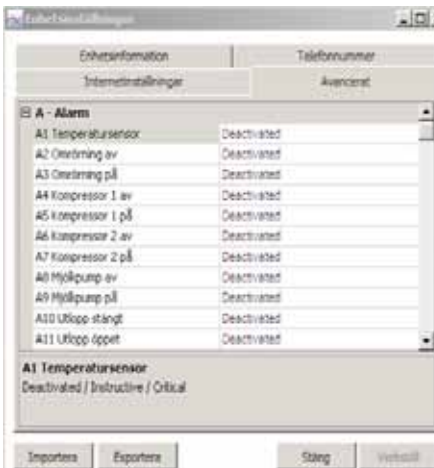


Figure 17.8

SETTINGS

The unit’s settings can be changed in Navigator by selecting Link/Unit settings. These settings are divided into four tabs:

Unit information

This is where you will find information about which software version is installed on the unit.

Telephone number (Option)

This is where the telephone number that will receive an SMS text message if there is an alarm on the tank can be programmed.

Internet settings (Option)

This is where the settings for the SIM card can be programmed.

Settings

Settings is where the settings that relate to the function of the tank are located. These are the same settings that can be found under the Settings menu on the unit.

When you are connected to a tank, the unit’s settings can be changed. When the desired changes are made, press Apply to transfer the new settings to the unit. The settings can also be saved by pressing export. Settings that have already been saved can also be imported so that they can be transferred to the tank.

This menu is also open when you are not connected to the tank. The settings made can be saved for use at a later time.

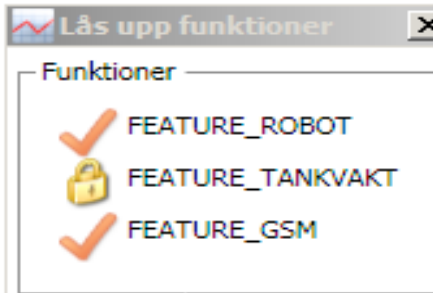


Figure 17.9

UNLOCK OPTIONAL FEATURES

The optional features that can be purchased are unlocked under Lock/Unlock features. Press the lock to enter the unlock code.

INSTALLING NEW SOFTWARE IN THE UNIT

To install a new software version in the unit, go to Link/Upgrade firmware. Select the desired version and press open.

Once the new version has been transferred to the unit, the unit must be rebooted. In order for it to be able to be used. On the unit, go to Advanced/Software/Reboot to perform the restart.

The settings are changed after a reboot. Therefore, if you wish to save the settings, they should be saved before the new version is transferred, so that they can be imported once you have started to use the new version. After the settings are imported, go to Advanced/Settings/Save as default to lock the settings.

After a new version has been installed, the old version is saved as backup until the next cleaning cycle, in case the newer version should have any problems. If you do not wish to go back to the old version in the event of any problem, you can go to Advanced/Software/Software version and press Stable. You cannot install a version again before having marked the previous version as stable.

COOLING MILK IS OUR BUSINESS

Milk should not only taste good, it should also be healthy. At Wedholms, we construct some of the world's best milk cooling tanks, characterised by high quality and efficiency. This ensures that the milk remains fresh as well as being cooled for the right length of time and to the right temperature. Thanks to our know-how, the growth of bacteria is minimised and the milk retains all its important vitamins and minerals.

All our tanks are designed and built by our own staff in our own factories, giving us full control over the manufacturing process. In addition, our tanks are based on a modular system that assures you fast and inexpensive installation on site.

At Wedholms, we have worked with milk for over 130 years. When the company was founded in 1879 we made milk churns, and we have worked hard since then to develop our products further in conjunction with our customers.

Today, the Wedholms group comprises Wedholms Sweden, Eurotanks (Poland), Skånes Kylteknik and Kylmäärki (Finland), so we cover an extensive market around the Baltic Sea. Together with our partners, we currently also supply our products to other EU countries as well as to Russia, South Korea and Japan. Wedholms' annual turnover is about SEK 100 million in the manufacture and sales of milk cooling tanks as well as associated services to the dairy industry.

WEDHOLMS

Postal address:

Box 1002, 611 29 Nyköping

Visiting address:

Wahlströms väg 5

Telephone: 0155-28 03 80

Fax: 0155-21 44 54

E-mail: info@wedholms.se

Web: www.wedholms.se