

Installation manual iControl 6.1x

Ref. 306390

Installation manual: iControl

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General

Overview

Introduction

This chapter provides an overview of the procedures to be followed before the cooling tank is first started with an iControl operating system.

Before you start the iControl operating system, you must read the general parts of the installation manual.

Warning

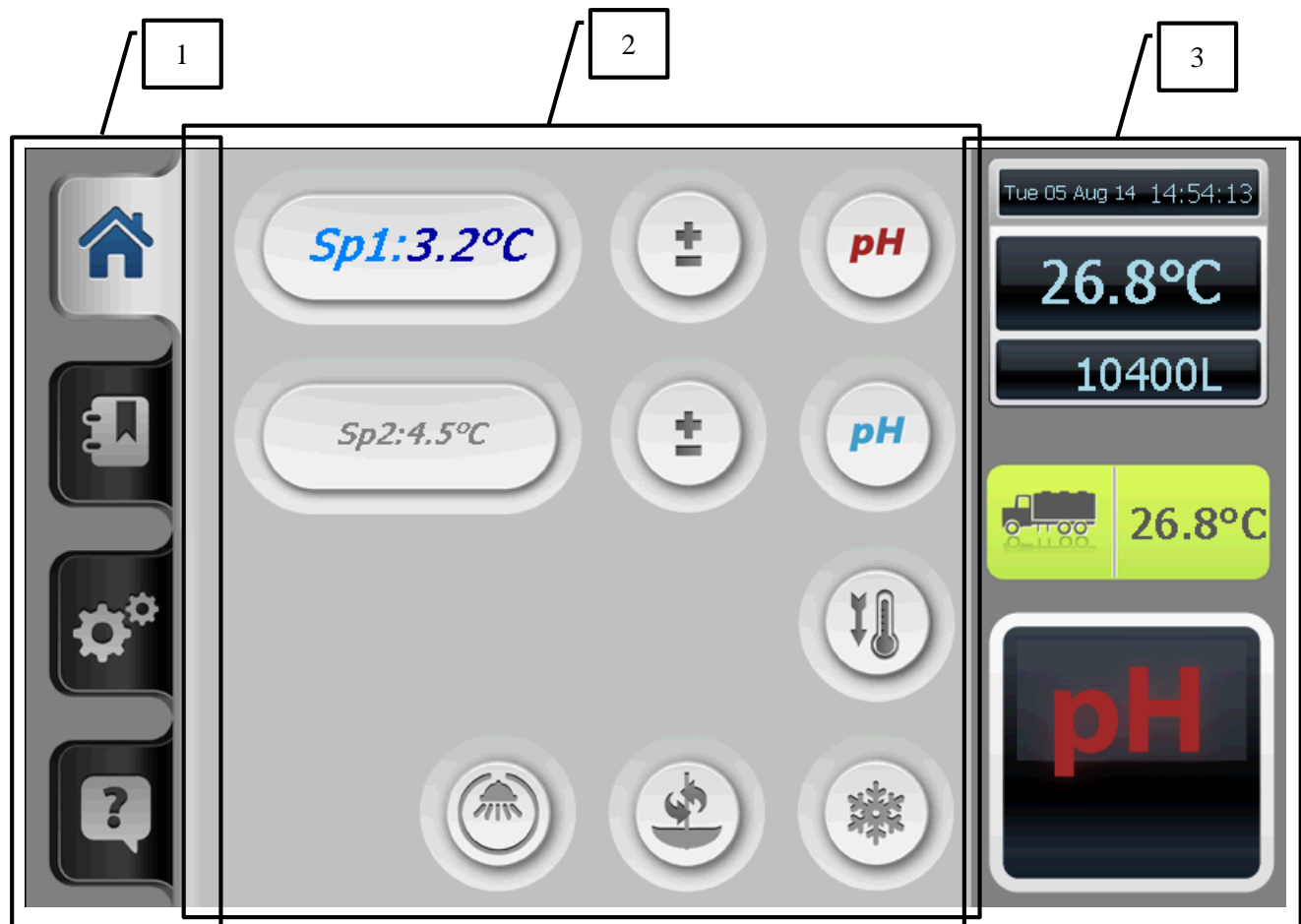


The installation may only be carried out by a qualified technician and in the sequence listed below.

The iControl control panel

You can operate all functions of the cooling tank easily via the control panel. The panel consists of a high resolution 7" touch screen.

We differentiate three areas in the screen.



- 1 Tabs: Home – Logging – Settings – Help
- 2 Function screen: this displays the active cycle; if no cycle is active then the basic screen is displayed.
- 3 Status screen: this displays the following:
 - Date and time
 - Actual temperature product sensor
 - Actual temperature Oculus sensor
 - Cleaning product to be taken or active cycle
 - In option: volume indication

Use of the keys



In order to select a function, you must always keep the relevant key pressed in for 3 seconds. This avoids a function being started up 'by accident'.

If the iControl does not display a clear, illuminated screen, briefly press a key in order allow the screen to light up, then the desired function may be selected by pressing for at least 3 seconds.

Components

Home tab



Logging tab



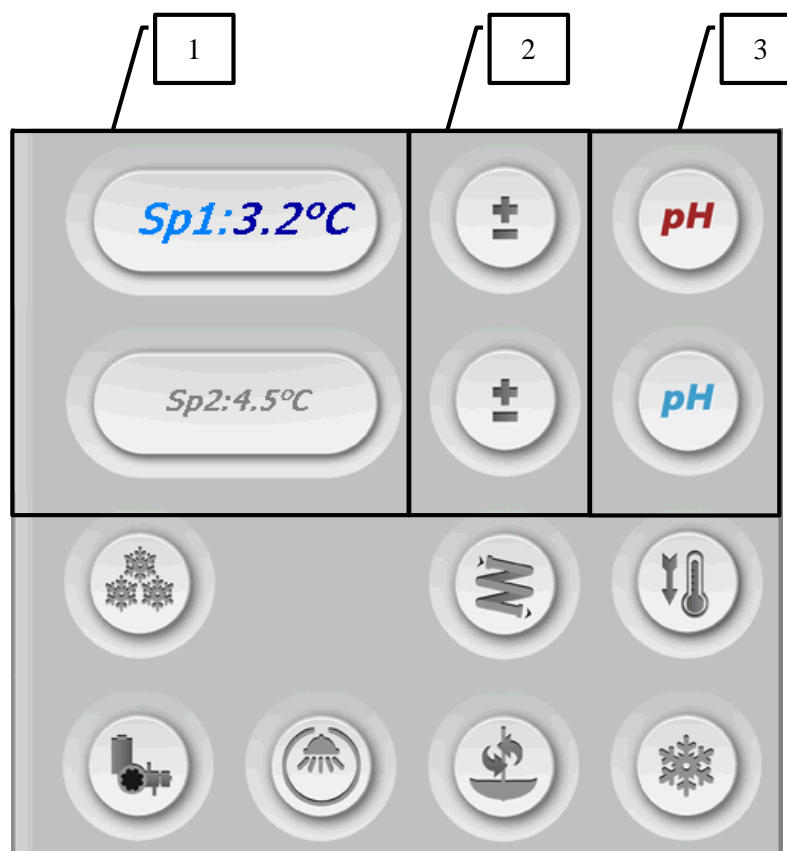
Settings tab












Help tab



The following table gives an overview of all components of the function screen:



Nr.	Component	Description
1	Sp1 Sp2	The two possible set points : Sp1/Sp2 with their value (the active set point is displayed in colour)
2		Adjustment of the set points
3	pH	Selection keys for the select of the cleaning product that will be used for the following cleaning.
4		Cooling
		Cleaning
		Stirring Pressing 1x starts the agitator for a short time. Pressing 2x starts the agitator for a long time.
		Deep cooling

Nr.	Component	Description
		Instant cooling, this key is only visible if the relevant parameters have been activated.
		Precooling, this key is only visible if the relevant parameter is activated. Not yet programmed
		Opening or closing pneumatic exhaust valve, this button is only visible if the relevant parameter is activated.
		Stopping robot and cooling, this key is only visible if the relevant parameter is activated and if the cooling is active.
		Off key, sets the control into standby. This key is only visible if a cycle is active.

The iControl parameters

Overview of the parameters.

Your cooling installation is equipped with an iControl control system, which when delivered, already has a number of settings available.

Below is an overview of the parameters and their factory settings. The settings may be changed if desired.

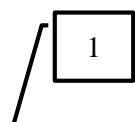


If the installer changes the settings, it is strongly recommended to make notes of this.

The iControl parameters are sub-divided into three blocks:

- General parameters (Language, Contrast, Date and Time)
- User parameters
- Installer parameters
- Packo parameters
- Start-up

When selecting the tab parameters, the following parameter screen is obtained:



General parameters

General parameters

Nr.	Description	Factory settings	Range
1	Language setting	English	
2	Contrast	150	25 - 250
3	Date		
4	Time		

User parameters

These parameters are valid As of 5.50. If they had a different number or did not exist in previous version this is mentioned in the remark.

Description	Factory settings	Range		Unit	Remark
1. Cool					
1.1 Set point T1 (SP1)	3.2	2.0	24.0	°C	
1.2 Set point T2 (SP2)	4.5	2.0	24.0	°C	
1.3 SP2 fixed?	Yes	Yes/No			
1.4 SP1 Differential	0.8	0.5	1.5	°C	
1.5 SP2 Differential	0.8	0.5	1.5	°C	
1.6 Time delay cooling	20	0	360	min	
1.7 Rest time agitation	13	0	60	min	
1.8 Agitation time	2	0	60	min	
1.9 Deep cooling time	20	0	30	min	
1.10 Time clock (IB)					
1.10.1 Active?	Off	Off	Periodic	On	
1.10.2 Period 1					
Start	22:00	0:00	23:59	hh_mm	
Stop	6:00	0:00	23:59	hh_mm	
1.10.3 Period 2					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
1.10.4 Period 3					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
1.10.5 Period 4					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
1.10.6 Period 5					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	

Description	Factory settings	Range		Unit	Remark
1.11 Check cooling					As of 5.30
1.11.1 Delay time					As of 5.30
1.11.2 Milking period 1					As of 5.30
Start	0:00	0:00	23:59	hh_mm	As of 5.30
Stop	0:00	0:00	23:59	hh_mm	As of 5.30
1.11.3 Milking period 2					As of 5.30
Start	0:00	0:00	23:59	hh_mm	As of 5.30
Stop	0:00	0:00	23:59	hh_mm	As of 5.30
1.11.4 Milking period 3					As of 5.30
Start	0:00	0:00	23:59	hh_mm	As of 5.30
Stop	0:00	0:00	23:59	hh_mm	As of 5.30
1.11.5 Milking period 4					As of 5.30
Start	0:00	0:00	23:59	hh_mm	As of 5.30
Stop	0:00	0:00	23:59	hh_mm	As of 5.30
1.11.6 Milking period 5					As of 5.30
Start	0:00	0:00	23:59	hh_mm	As of 5.30
Stop	0:00	0:00	23:59	hh_mm	As of 5.30
2. Mix					
2.1 Manual agitation t1	2	0	30	min	
2.2 Manual agitation t2	30	0	30	min	
2.3 Opt. agitation clock (DK)					
2.3.1 Agitation time	120	1	120	min	
2.3.2 Agitation clock - flow					
Active?	No	Yes/No			
3. Clean					
3.1 Clean rest time	0	0	990	min	
3.2 Sequention clean prod. acid/alkaline	1/1	0/1-1/1 to 4/1-1/4			
3.3 Percent acid	0.6	0.1	4.0	%	
3.4 Percent alkaline	0.6	0.1	4.0	%	
3.5 Percent disinfectant	0.1	0.1	4.0	%	
3.6 Cleaning waiting period					As of 5.10
3.6.1 Cleaning: waiting period 1					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
3.6.2 Cleaning: waiting period 2					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
3.6.3 Cleaning: waiting period 3					
Start	0:00	0:00	23:59	hh_mm	

Description	Factory settings	Range		Unit	Remark
Stop	0:00	0:00	23:59	hh_mm	
3.6.4 Cleaning: waiting period 4					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
3.6.5 Cleaning: waiting period 5					
Start	0:00	0:00	23:59	hh_mm	
Stop	0:00	0:00	23:59	hh_mm	
4. Extra					
4.1 Flow - lock					
Lock active?	No	Yes/No			
4.2 GSM menu					
4.2.1 Flow - GSM					
4.2.2 Test SMS	No	Yes/No			
4.2.3 Follow sequence	0				
4.2.4 Tank number					
4.2.5 Signal quality, OK if > 13					As of 5.50
4.2.6 Baudrate	9600				From 6.02 onwards
4.3 Extra GSM messages					
4.3.1 Cleaning finished SMS	No	Yes/No			
4.3.2 SMS temperature end of cooling	No	Yes/No			
4.3.3 SMS Max. temp. cleaning SMS	No	Yes/No			
4.3.4 SMS Cooling active	No	Yes/No			
4.4 Reset Robot					
4.5 Autostart after clean	No	Yes/No			
4.6 SW version					
4.7 SW power print					
4.8 SW power print Boot					
4.9 SW version Pacap					
4.10 S/N Volume indicator/Pacap					
4.11 Switch volume over to another tank	OFF	0	50,000	L	As of 5.60
4.12 Active tank	Tank 1	Tank 1	Tank 2		As of 5.60

Password

A password (PW) is required in order to change the installer parameters. The password (DDMM) remains valid for 10 minutes.

Entry of the password is done in the following screen:



After confirmation and if the password is correct, you see the installer parameter. If the password is incorrect, you are returned to the parameter screen.

Installer parameters

These parameters are valid As of 5.50. If they had a different number or did not exist in previous version this is mentioned in the remark.

Description	Factory settings	Range		Unit	Remark
A. Cool and mix					
A.1 Type product temp. sensor	NTC	PT1000	PT100		
A.2 Temp. calibration product sensor	0	-3.0	3.0	°C	
A.3 Type Oculus sensor	NTC	PT1000	PT100		
A.4 Temperature calibration Oculus sensor	0	-3.0	3.0	°C	
A.5 Tripping safety	6 min. (DX)	6 min. (DX)	0 min. (DX)	Off (IB)	
A.6 Opt. instant cooling	No	Yes/No			
A.7 Opt. second icewaterpump	No	Yes/No			
A.8 Opt. alarm cooling	4:00	0:00	23:59	hh:mm	
A.9 Set minimum	1.5	0	10	°C	
A.10 Delay start cooling unit	90	0	420	min	
A.11 Number of compressors	1	1/>1			
A.12 Number of agitators	1	1	3		
A.13 Pre cool active?	No	Yes/No			
A.14 SSC					
A.14.1 SSC active?	No	No; SSC only on bottom evaporator; SSC only on top evaporator; SSC on bottom and top evaporator			
A.14.2 Time compressor on	0:21	0:00:00	00:59:59	mm:ss	A.14.3 in previous versions
A.14.3 Time compressor off	0:06	0:00	23:59	hh:mm	A.14.4 in previous versions
A.14.4 Delay second cool unit	0:20	0:00:00	00:59:59	mm:ss	A.14.5 in previous versions
A.14.5 Service	No	Yes/No			A.14.6 in previous versions
A.15 Mix when cooling stops?	No	Yes/No			As of 5.10
B. Clean					
B.1 Service	No	Yes/No			
B.2 Flow - select program	Clean. with 2 pumps (acid/alkaline)				
Options	Clean. with 2 pumps (acid/alkaline); ECO-WASH 3 pumps; ECO-WASH 2 pumps (acid/alkaline); Clean. with 3 pumps				

Description	Factory settings	Range		Unit	Remark
B.3 Flow - select volume					
B.4 Flow - select times					
B.5 Change min. temp.	40	5	65	°C	
B.6 Min. time above B.5	5	0	50	min	
B.7 Alarm unable to fill the tank	Yes	Yes/No			
B.8 Conductivity NIV1	500	100	950		
B.9 Act. conductivity NIV1					
B.10 Conductivity NIV2	500	100	950		
B.11 Act. conductivity NIV2					
B.12 Conductivity NIV3	500	100	950		
B.13 Act. conductivity NIV3					
B.14 Conductivity NIV4	500	100	950		
B.15 Act. conductivity NIV4					
B.16 Opt. 2nd drain	No	Yes/No			
B.17 Opt. heat clean water					
B.17.1 Activate heating	No	Yes/No			
B.17.2 Heating temperature	40	0	60	°C	
B.17.3 Heating differential	5	5	10	°C	
B.18 Flow rate dosage pumps					
B.18.1 Flow rate alkaline	280	0	1000	ml	
B.18.2 Flow rate acid	280	0	1000	ml	
B.18.3 Flow rate disinfectant	280	0	1000	ml	
B.19 Std: extra pre rinse?	No	Yes/No			As of 5.11
B.20 Chloroform reduction active?	No	Yes	No		as of 5.60
B.20.a Final temperature	10	0	40	°C	as of 5.60
B.21 Lukewarm pre-rinse active?	No	Yes	No		as of 5.60
B.21.a Cold water percentage	0	0	100	%	as of 5.60
C. Extra					
C.1 Load factory settings					
C.2 Debug Menu					
C.2.1 Read Inputs					
C.2.2 Write Outputs					
C.3 Tank					
C.3.1 Tank number					
C.3.2 Tank Type	LEM/DX				
Options	LEM/DX;LEM/DIB;LS/DX;LS/DIB;REM/DX;REM/DIB;RS/DX;RS/DIB;VM/DX;VM/DIB;RM/IB				
C.3.3 Tank Volume	10000	0	50000	L	
C.3.4 Number of agitators	1	1	3		
C.3.5 Username					
C.3.6 Country code					As of 5.50

Description	Factory settings	Range		Unit	Remark
C.3.7 CHR number ARLA					As of 5.50
C.3.8 SN Oculus (MAC address)					As of 5.50
C.4 Robot Menu					
C.4.1 Opt Robot	No	Yes/No			
C.4.2 Opt. integrated interface	Yes	Yes/No			
C.4.3 Interface: delay	2	2	60	min	
C.4.4 Service	No	Yes/No			
C.4.5 Robot relay contact	NC	NO/NC			C9 in 5.00-5.11
C.4.6 Robot contact cleaning	No	Yes/No			C12 in 5.00-5.11
C.4.7 Cooling after cleaning	Automatic	Manual	Automatic		As of 5.60
C.5 Frequention	50	50	60	Hz	
C.6 SW Update					
C.7 Region settings	+01:00				
C.8 Overrule daylight setting	No	Yes/No			
C.9 Autostart after clean	No	Yes/No			C10 in 5.00-5.11
C.10 Export logging to USB/SD					C11 in 5.00-5.11
C.11 Level indicator/Pacap					C13 in 5.00-5.11
C.11.1 Pacap active?	No	Yes/No			
C.11.2 Actual gross value					
C.11.3 Actual nett value	0	0	5000		
C.11.4 Calibration	0	-2500	2500		
C.11.5 Calibration in litre	0	0	10000		As of 5.50
C.11.6 Zero value	0	0	5000		C.11.5 in previous versions
C.11.7 Coefficient A	A				C.11.6 in previous versions
C.11.8 Coefficient B	B				C.11.7 in previous versions
C.11.9 Coefficient C	C				C.11.8 in previous versions
C.11.10 Coefficient D	D				C.11.9 in previous versions
C.11.11 Check measuring table					As of 5.50
C.11.12 Maximum value	50000	0	50000		From 6.02 onwards
C.12 Temperature sensor menu*					C14 in 5.00-5.11











Description	Factory settings	Range		Unit	Remark
C.12.1 Sensor operation	Normal	Normal; Oculus sensor is main sens.; Product sensor is main sens.			
C.12.2 Max temp difference	1	0	5	°C	
C.12.3 Max time difference	30	0	60	min	
C.13 Save installer parameters					
C.14 Load installer parameters					
C.15 External memory for back-up of parameters and logging	SD card	Nought	USB stick; SD card		
C.16 Buffer tank					As of 5.60
C.16.1 Buffer tank active?	No	Yes	No		As of 5.60
C.16.2 Type	1 milk line system	1 milk line system 2 milk lines system 2-tank system			As of 5.60
C.16.3 Extra pumping time	60	0	300	s	As of 5.60
C.17 Internet connectivity option					From 6.02 onwards
C.17.1 Internet connectivity active?	No	Yes/No			From 6.02 onwards
C.17.2 Test connection					From 6.02 onwards
C.17.3 Status					From 6.02 onwards
C.17.4 IP address					From 6.02 onwards
D. Oculus					
D.1 Full oculus active?	No	Full Light Arla			
D.2 Username					
D.3 Do not load limit 1					
D.3.1 Lim 1 - type	Maximum	Minimum; Maximum; Off			
D.3.2 Lim 1 - temperature	13	0.0	50.0	°C	
D.3.3 Lim 1 - max time	10:00	0:00	23:59	hh:mm	
D.4 Do not load limit 2					
D.4.1 Lim 2 - type	Maximum	Minimum; Maximum; Off			
D.4.2 Lim 2 - temperature	16	0.0	50.0	°C	
D.4.3 Lim 2 - max time	6:00	0:00	23:59	hh:mm	
D.5 Do not load limit 3					
D.5.1 Lim 3 - type	Maximum	Minimum; Maximum; Off			
D.5.2 Lim 3 - temperature	28	0.0	50.0	°C	
D.5.3 Lim 3 - max time	5:00	0:00	23:59	hh:mm	
D.6 Do not load limit 4					

Description	Factory settings	Range		Unit	Remark
D.6.1 Lim 4 - type	Off	Minimum; Maximum; Off			
D.6.2 Lim 4 - temperature	0	0.0	50.0	°C	
D.6.3 Lim 4 - max time	0:00	0:00	23:59	hh:mm	
D.7 Do not load limit 5					
D.7.1 Lim 5 - type	Off	Minimum; Maximum; Off			
D.7.2 Lim 5 - temperature	0	0.0	50.0	°C	
D.7.3 Lim 5 - max time	0:00	0:00	23:59	hh:mm	
D.8 Max power interr. time	5:00	0:00	23:59	hh:mm	
D.9 Max clean delay	12:00	0:00	23:59	hh:mm	
D.10 Max temp from second cool	10	5.0	50.0	°C	
D.11 Max time for D.10	1:00	0:00	23:59	hh:mm	
D.12 Max temp during cool	5.5	0.0	50.0	°C	
D.13 Max. time for D.12	3:00	0:00	23:59	hh:mm	
D.14 Min. temp. during cooling	0.5	0.0	50.0	°C	
D.15 Max. time for D.14	0:00	0:00	23:59	hh:mm	
D.16 Max. time without stirring	0:50	0:00	23:59	hh:mm	
D.17 Min. cleaning temperature	40	0.0	50.0	°C	
D.18 Min. cleaning time	0:05	0:00	23:59	hh:mm	
D.19 Reminder to wash	0:05	0:00	23:59	hh:mm	
D.20 Oculus Alarm active?	Yes	Yes/No			
D.21 Delay Oculus alarm at stop cooling	1:00	0:00	23:59	hh/mm	As of 5.30

Setting iControl parameters

Setting the parameters

Follow these steps to set the parameters:

Step	Action
1	Press the  key in order to open the parameter screen.
2	Press the key of the desired parameter menu, General - User - Installer - Packo. Select an underlying menu.
3	Select the parameter that you want to change. Go to the following or previous parameter by using  or 
4	Change the value if necessary using the keys  or 
5	Press the key  to confirm the new value, or press the key  to return to the menu.
6	Press on  to go to the following parameter.
7	Repeat steps 2 to 5 until all parameters are set.
8	Press the key  in order to exit the menu.
9	Press  in order to exit the parameter screen.

Description of the iControl parameters

Parameters overview

The parameters are sub-divided into 4 groups:

General parameters: Language setting, contrast, date and time

User parameters: 1 - 4

Installer parameters: A – D

Packo parameters

General parameters

The general parameters may be changed without password.

Language setting	In the iControl software different languages may be selected.
Contrast	Changing the screen contrast
Changing the date	Changing the date, entering the present date
Changing the time	Changing the time, entering the present time

User parameters

The user parameters are sub-divided into three blocks:

1. Cool
2. Mix
3. Clean
4. Extra

These parameters may be changed without password.

1. Cool	
1.1 Set point T1 (SP1)	Set point temperature T1
1.2 Set point T2 (SP2)	Set point temperature T2
1.3 SP2 fixed?	If this parameter is set to YES then for each cooling cycle stops the cooling at the set temperature If this parameter is set to NO then after starting the cooling cycle, the cooling stops at the set temperature of SP2, if the temperature rises above SP2 + Differential SP2 then the setting of SP1 automatically switches to SP1
1.4 SP1 Differential	SP1 Differential
1.5 SP2 Differential	SP2 Differential
1.6 Time delay cooling	Delayed start of first cooling, can be set between 0 and 360 minutes
1.7 Rest time agitation	Stir periodically: x minutes stirring (adjustable in menu 1.8) + x minutes rest (adjustable in menu 1.7)
1.8 Agitation time	Stir periodically: x minutes stirring (adjustable in menu 1.8) + x minutes rest (adjustable in menu 1.7)

1. Cool	
1.9 Deep cooling time	The setting procedure for deep cooling is as follows: Using this parameter, you can change the time for deep cooling (in minutes). The set temperature for deep cooling is 1.9°C. The temperature is programmed in the Packo parameter menu. If the temperature of 1.9°C is not reached after the specified period in 1.9, the automatic cooling is activated.
1.10 Time clock (IB)	Use with IB tanks, See chapter: 1.10 Time clock (IB)
1.11 Check cooling	See section: 1.11 Check cooling (As of 5.30)
1.12 Starting cooling automatically	See section: 1.12 Starting cooling automatically (As of 5.30)

2. Mix	
2.1 Manual agitation t1	Manual agitation time 1 (press agitation key 1x)
2.2 Manual agitation t2	Manual agitation time 2 (press agitation key 2x)
2.3 Opt. agitation clock (DK)	Clock option for the purpose of activating the agitator at a specific time of day. See chapter Opt. Agitator clock (DK) 2.10.

3. Clean	
3.1 Clean rest time	The Time that the cleaning stops following the first pre-rinse. This allows the boiler heat up the water if there is not enough hot water available.
3.2 Sequention clean prod. acid/alkaline	Changing the sequence of the cleaning product in accordance with acid/alkali base
3.3 Percent acid	Acid percentage (see sticker on the vessel containing the cleaning product).
3.4 Percent alkaline	Alkali percentage (see sticker on the vessel containing the cleaning product).
3.5 Percent disinfectant	Disinfectant percentage (see sticker on the vessel containing the cleaning product).
3.6 Cleaning waiting period	The Period that the cleaning stops following the first pre-rinse. This allows the boiler heat up the water if there is not enough hot water available.

4. Extra	
4.1 Flow - lock	Additional protection of keys against accidental use. See chapter Blocking 4.1.
4.2 GSM menu	
4.2.1 Flow - GSM	Sends messages to a GSM. See chapter 4.2 GSM menu
4.2.2 Test SMS	Test off SMS function, after installation of all parameters
4.2.3 Follow sequence	Sequence, code indicating the status off the module: If SMS function is ready, message "Waiting for message to send" is shown
4.2.4 Tank number	Reference number of the tank
4.2.5 Signal strength, OK if > 13	Check the signal strength, if value > 13 then reception is good
4.2.6 Baud rate	Displays the connection speed, which will be automatically detected when the GSM module starts up

4. Extra	
4.3 Extra GSM messages	Sends extra messages to a GSM. See chapter GSM module 4.2.
4.4 Reset Robot	This parameter takes care of resetting the robot function
4.5 Autostart after clean	By activating this parameter, the automatic start-up of the cooling after the cleaning does not take place. This gives the customer the opportunity to check whether the tank has been properly cleaned.
4.6 SW version	Here, the software version of the display print can be requested
4.7 SW power print	Here, the software version of the power print can be requested
4.8 SW power print Boot	Here, the boot version of the power print can be requested
4.9 SW version Pacap	Here, the software version of the Level indicator/Pacap can be requested
4.10 S/N Volume indicator/Pacap	Here, the serial number of the Level indicator/Pacap can be requested
4.11 Switch volume over to another tank	Enter the volume for when the tank must switch over to the other tank (or generate stop signal)
4.12 Active tank	Enter the active tank; the selected tank will be filled

1.10 Time clock (IB)

This parameter is used with IB tanks. The time switch allows the cooling unit to be activated during certain periods. The cooling unit only starts when there is insufficient ice. This parameter is used to prevent blocking. The first period is always set by Packo (22:00 - 6:00); the following periods should be set depending on the quantity, (adjustable in intervals of 10 minutes).

Programming method

Step	Action	Parameter
1	Activate the option	1.10.1 Active?
2	Check if Period 1 is set	1.10.2 Period 1
3	Enter Period 2	1.10.3 Period 2
4	Enter all required periods	1.10.4 Period 3 1.10.5 Period 4 1.10.6 Period 5

1.11 Check cooling (As of 5.30)

This parameter checks if the cooling is active. Enter the milking times for this. After the set time the iControl checks if the cooling is active. If not an error message is displayed: "Cooling not active after milking!"

Programming procedure:

Step	Action	Parameter
1	Set the delay time	1.11.1 Delay time?

Step	Action	Parameter
2	Enter milking time 1	1.11.2 Milking time 1
3	Enter the 2 nd milking time	1.11.3 Milking time 2
4	Enter all required milking times	1.11.4 Milking time 3 1.11.5 Milking time 4 1.11.6 Milking time 5

1.12 Starting cooling automatically (As of 5.30)

This parameter offers the option of having the cooling start automatically if:

- There is a certain volume in the tank
 - o Enter as a per cent or in litres
- A level sensor is activated, choice between
 - o Inlet product supply
 - o NIV4

Programming procedure:

1	Enter the delay time			
2	Select the automatic starting option and choose between Percentage/Volume or sensor			
3	Percentage/Volume: choose Volume or Per cent		Sensor: select the type of sensor	
4	Volume	Per cent	NIV4	Supply product
5	Enter the volume	Enter the percentage		

2.3 Opt. agitation clock (DK)



Clock for the purpose of activating the agitator at a determined time. Two possibilities:

At fixed time intervals: start the agitation process at fixed time intervals at the same time of day

On fixed days: start the agitation process on fixed days, the point in time can be adjusted daily.

Programming method

Step	Action	Parameter
1	Enter the agitation time	2.3.1 Agitation time
2	Follow the flow	2.3.2 Agitation clock - flow
3	Activate the option	Active?
4	Select 1 of the 2 types.	Type? Fixed days ➔ Go to step 5 ➔ Fixed intervals Fixed intervals ➔ Go to step 6
5	Fixed days	
5a	Enter the current day of the week	Day of the week

Step	Action	Parameter
5b	Enter the start time for each day of the week	Monday ... Sunday
6	Fixed intervals	
6a	Enter the start day	
6b	Enter the start time	
6c	Enter the frequency	Daily Every other day Every third day

4.1 Flow - blocking

There are three ways to avoid inadvertent use of the keys.


The keys must be pressed for more than 3 seconds before a function is activated

Password lock: the screen can only be released with a password



Key lock: the screen can only be released with a combination of keys

Programming method

Step	Action	Parameter
1	Activate the option	Lock active?

Step	Action	Parameter
2	Select 1 of the 2 types.	Type Lock? Key lock Lock password? → Go to 3
3	Password	
3a	Enter the password	

In order to release the screen

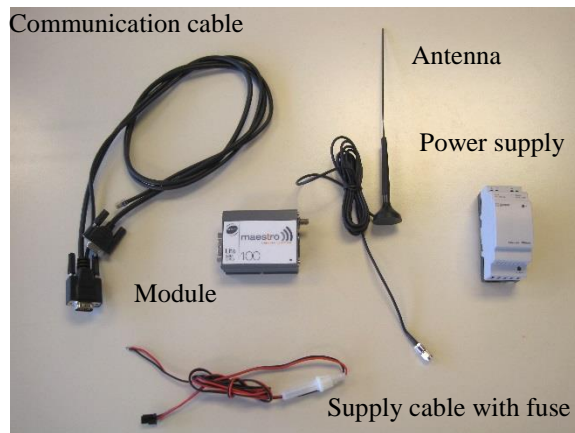
Step	Action	
1	Press in a key	
	Password lock	Key lock
2	Enter the password (left to right)	Then press on 
3	Press the key  to confirm the new value	



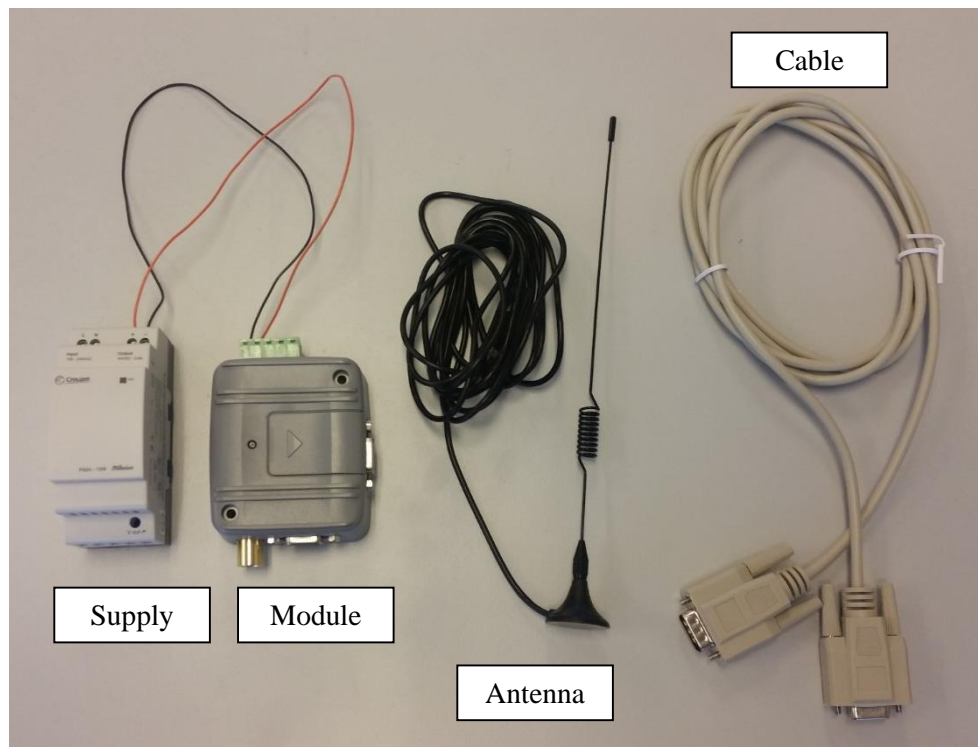
The installer can use the special password (same as for loading the factory parameters) to unlock the screen if the user forgets the password.

4.2 GSM menu

Parts of the GSM module (Maestro)



Parts of the GSM module (MTX)



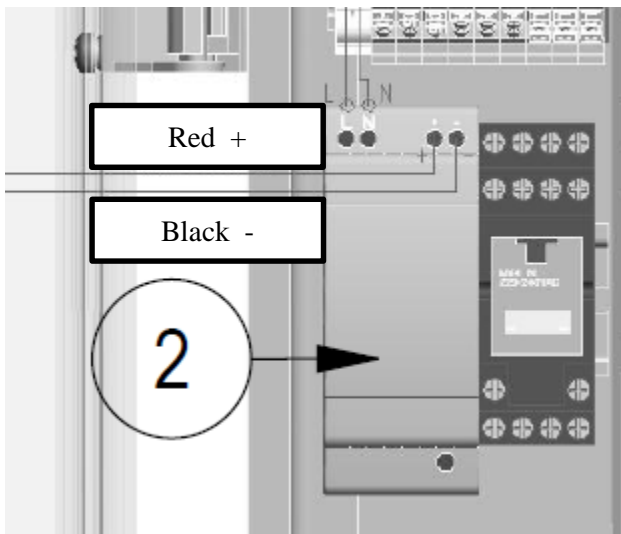
Built-in GSM module



Connection supply voltage through 24V power supply

Mount the 24V power supply (2) in the electrical box.

Connect the L1.1 and N to the L and N on the 24V power supply.
Connect the red wire to the “+”.
Connect the black wire to the “-”.



Connection communication cable on power print



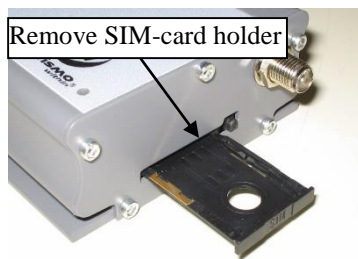
Communication power print, see picture.

Connect the cable to the module at the intended connection.

Installation SIM card

If you have a mini or micro SIM card, use the adapters.

Maestro

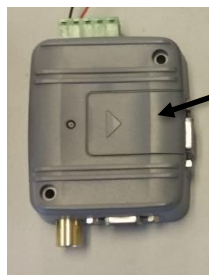


Remove SIM-card holder



Place SIM-card and mount SIM-card holder again

MTX



SIM

4.2.1 Flow – GSM

Programming method

Step	Action	Parameter
1	Enter the first gsm number If you want to send a message to the following number: 0479458522 in Belgium, you must enter the following: 0032479458522 32 is the country code for Belgium 479458522 is the mobile number (without the “0”)	GSM number 1
2	Select if you want to send an answer If no go to step 6	Expected answer?
3	Enter the number of attempts resend	Number of retries?
4	Enter the time between the SMS before, without reply, it is resent. (Preferably 15 minutes – can be less for demo)	Time-out
5	Enter the GSM number2: (preceded by the country code) Emergency number in case the farmer doesn’t send back a confirmation.	GSM number 2
6	Enter the pin code	Pin code
7	Activate the SMS	SMS active?

How does it work in case an error occurs:

Step	Action
1	The iControl sends a message to the first GSM number, if there isn't expected an answer, nothing happens.
2	If there is expected answer, the receiver has 15 minutes to send back an "OK" message.
3	If the receiver doesn't respond, there will be sent, depending of the number of attempts, several messages with the text: confirm with 'OK'.
4	If there still doesn't come an answer, a last message will be sent, this time to the second GSM number.
5	If no answer is received from one of the GSM numbers, the error message 'GSM: No answer received' is shown on the display.

Installer parameters


The installer parameters are sub-divided into 4 blocks:

- A. Cool and mix
- B. Clean
- C. Extra
- D. Oculus

A password (PW) is required in order to change these parameters. The password (DDMM) remains valid for 10 minutes.

A. Cool and mix	
A.1 Type product temp. sensor	Select the type of temperature sensor <ul style="list-style-type: none"> - NTC (10kΩ) - PT100 - PT1000 - None The standard type is NTC
A.2 Temp. calibration product sensor	Calibration display: check the current temperature of the product with a calibrated thermometer on SP and change the temperature of the iControl to the measured value.
A.3 Type Oculus sensor	Select the type of Oculus temperature sensor <ul style="list-style-type: none"> - NTC (10kΩ) - PT100 - PT1000 - None The standard type is NTC
A.4 Temperature calibration Oculus sensor	Calibration display: check the current temperature of the product with a calibrated thermometer on SP and change the temperature of the iControl to the measured value.
A.5 Tripping safety	Three possibilities: <ul style="list-style-type: none"> - 6 minutes delay (DX) - 0 minutes delay (DX), only intended for maintenance, should be set at 6 after start-up. - OFF (IB)
A.6 Opt. instant cooling	Start/stop function for the ice water pump with IB systems
A.7 Opt. second icewaterpump	Controlled via instant cooling
A.8 Opt. alarm cooling	If the cooling takes longer than the set time, an alarm is given
A.9 Set minimum	Entering the minimum cooling temperature.
A.10 Delay start cooling unit	See chapter: A.10 Delay cooling unit start
A.11 Number of compressors	Enter the number of compressors
A.12 Number of agitators	Enter the number of agitators
A.13 Pre cool active?	Pre-cooling controlled from iControl, not yet programmed

A. Cool and mix	
A.14 SSC	See chapter: A.14 SSC
A.15 Mix when cooling stops?	Starts agitation when OFF is pressed during cooling

B. Clean	
B.1 Service	<p>This parameter gives the possibility of quickly checking all steps of the cleaning cycle. When this parameter is set to "YES", you can quickly run through each step of the cleaning cycle using the  key. As soon as the check has been completed, you must reset this Parameter back to "NO".</p>
B.2 Flow - select program	See chapter: B.2 Flow - select program
B.3 Flow - select volume	See chapter: B.3 Flow - select volume
B.4 Flow - select times	See chapter: B.4 Flow - select times
B.5 Change min. temp.	<p>Adjustment of the required minimum temperature of the cleaning water during the main rinse.</p> <p>See chapter: B.2 Flow - select program</p>
B.6 Min. time above B.5	<p>Minimum time that the cleaning water should remain above the minimum temperature during the main cleaning.</p> <p>See chapter: B.2 Flow - select program</p>
B.7 Alarm unable to fill the tank	Additional control as to whether water is filled during the filling on time.
B.8 Conductivity NIV1	<p>If the level sensor (RN) is in the air, the value of the conductivity limit should be greater than the value of the actual conductivity. If the sensor is in water, (fill the tank until the sensor is submerged) the value of the actual conductivity should be less than the value of the conductivity limit. Conclusion: the value of the conductivity limit should be between the two registrations of the current conductivity.</p>
B.9 Act. conductivity NIV1	Gives the present conductivity of level sensor 1. (NIV1 = standard level sensor)
B.10 Conductivity NIV2	Explanation, see: B.8 Conductivity NIV1

B. Clean	
B.11 Act. conductivity NIV2	Gives the present conductivity of level sensor 2. (NIV2 =residual water detection cleaning sensor)
B.12 Conductivity NIV3	For more details see: B.12 Conductivity limit NIV1 As of 5.30: 250 = standard value for VM/DX and VM/DIB
B.13 Act. conductivity NIV3	Gives the present conductivity of level sensor 3. (NIV3 = Oculus sensor)
B.14 Conductivity NIV4	Explanation, see: B.8 Conductivity limit NIV1
B.15 Act. conductivity NIV4	Gives the present conductivity of level sensor 4. (NIV4 = SSC sensor)
B.16 Opt. 2nd drain	Must be activated if a second drain valve is installed
B.17 Opt. heat clean water	See chapter: B.17 Opt. heat clean water
B.18 Flow rate dosage pumps	Possibility of entering the flow rate of the dosing pumps. Enter the flow rate at 50 Hz. The flow rate is automatically adjusted as a function of the frequency in: C.5 Frequention
B.19 Std: extra pre rinse?	This activates a pre rinse before filling the tank on level (not in combination with ECO-WASH)
B.20 Chloroform reduction active?	Option that reduces the final temperature of the tank to reduce the chloroform in the tank
B.21 Lukewarm pre-rinse active?	Use of lukewarm water during the pre-rinsing to reduce the consumption of hot water.

C. Extra	
C.1 Load factory settings	The factory parameters can be loaded using this parameter. In order to load the factory parameters, a new, special password has to be entered. The special password is the opposite of the usual password. Standard password: DDMM; special password: MMDD
C.2 Debug Menu	Using this parameter, you have the opportunity of testing each electrical component that is connected to the iControl. When you leave this parameter, everything is put back to its original position.
C.3 Tank	Volume of the cooling tank in litres.
C.4 Robot Menu	See chapter: C.4 Robot Menu
C.5 Frequention	Frequency of the feed only influences the speed of the dosing pumps. This parameter is used to adjust the flow rate of the dosing pumps.
C.6 SW Update	Allows you to update the control software. See chapter: C.6 SW Update
C.7 Region settings	This parameter ensures automatic switching from summer to winter time.
C.8 Overrule daylight setting	If the automatic switch over is not necessary, then this parameter should be set to YES.
C.9 Autostart after clean	Possibility to activate Autostart after cleaning, yes/no. If set to YES cooling will always start, even when there was a problem during cleaning.
C.10 Export logging to USB/SD	This parameter allows you to export log files to USB or SD card

C. Extra	
C.11 Level indicator/Pacap	See chapter C.11
C.12 Temperature sensor menu	More info, see chapter C.12
C.12.1 Sensor operation	Here you can chose which sensor is main sensor, if NORMAL, both temperature sensors will be shown.
C.12.2 Max temp difference	Here you can select the maximum temperature difference there needs to be between the 2 temperature sensors before an error is generated (in combination with C.12.3)
C.12.3 Max time difference	Here you can select the maximum time difference there needs to be between the 2 temperature sensors before an error is generated (in combination with C.12.2)
C.13 Save installer parameters	The parameters of the installer will be saved
C.14 Load installer parameters	The parameters of the installer will be saved
C.15 External memory for back-up of parameters and logging	Select the external memory where the back-up and log data will be saved
C.16 Buffer tank	Activate the buffer tank option
C.17 Internet connectivity option	Activate the internet connectivity option

A.10 Delay start cooling unit

Delay cooling unit start: This parameter is used in combination with an IB tank. After starting the cooling, the time in this parameter counts down. If the time is equal to 0, the output time-switch is activated. If there is insufficient ice, start the cooling unit. The time entered is dependent on the cooling time. General rule: setting = cooling time – 30 minutes

A.14 SSC (soft start cooling)

SSC ensures that small amounts of product can be cooled without the risk of freezing.

Description	Factory setting	Range	Unit
A.14 SSC			
A.14.1 SSC active?	No	No; SSC only on bottom evaporator; SSC only on top evaporator;	

		SSC on bottom and top evaporator		
A.14.2 Time compressor on	0:21	0:00:00	00:59:59	mm:ss
A.14.3 Time compressor off	0:06	0:00	23:59	hh:mm
A.14.4 Delay second cool unit	0:20	0:00:00	00:59:59	mm:ss
A.14.5 Service	No	Yes/No		

Programming

Step	Action	Parameter
1	Activate the SSC, select on which cooling unit there is SSC installed SSC only on bottom evaporator SSC only on top evaporator SSC on bottom and top evaporator	A.14.1 SSC active
2	Set the compressor active time	A.14.2 time compressor on
3	Set the compressor inactive time	A.14.3 time compressor off
4	If number of cooling groups > 1, set the delay of cooling group 2	A.14.4 Delay second cool unit
5	The service option may be activated for service reasons	A.14.5 Service

Construction

The SSC consists of following components:

- Level sensor,
 - o connected to input L4
- Extra low pressure switch
 - o placed on cooling unit
 - o connected to input I6 for the 1st cooling unit
 - o connected to input I7 for the 2nd cooling unit
 - o set point = -3°C; differential = minimum

Operation

A/Level: L4 not reached

The fans on the cooling unit are always switched to the fan speed control at that moment.

A.14.1 Option 1: SSC only on bottom evaporator

If the level probe is not reached, the control activates output O5* and O15 with pulses. If this is the case “compr. active” will appear on the display. In other words (see also schematic representation on next page):

1/ With the start of the cooling cycle and after the end of the cooling delay time liquid valve O5 is opened. The pressure increases with the opening of the liquid valve.

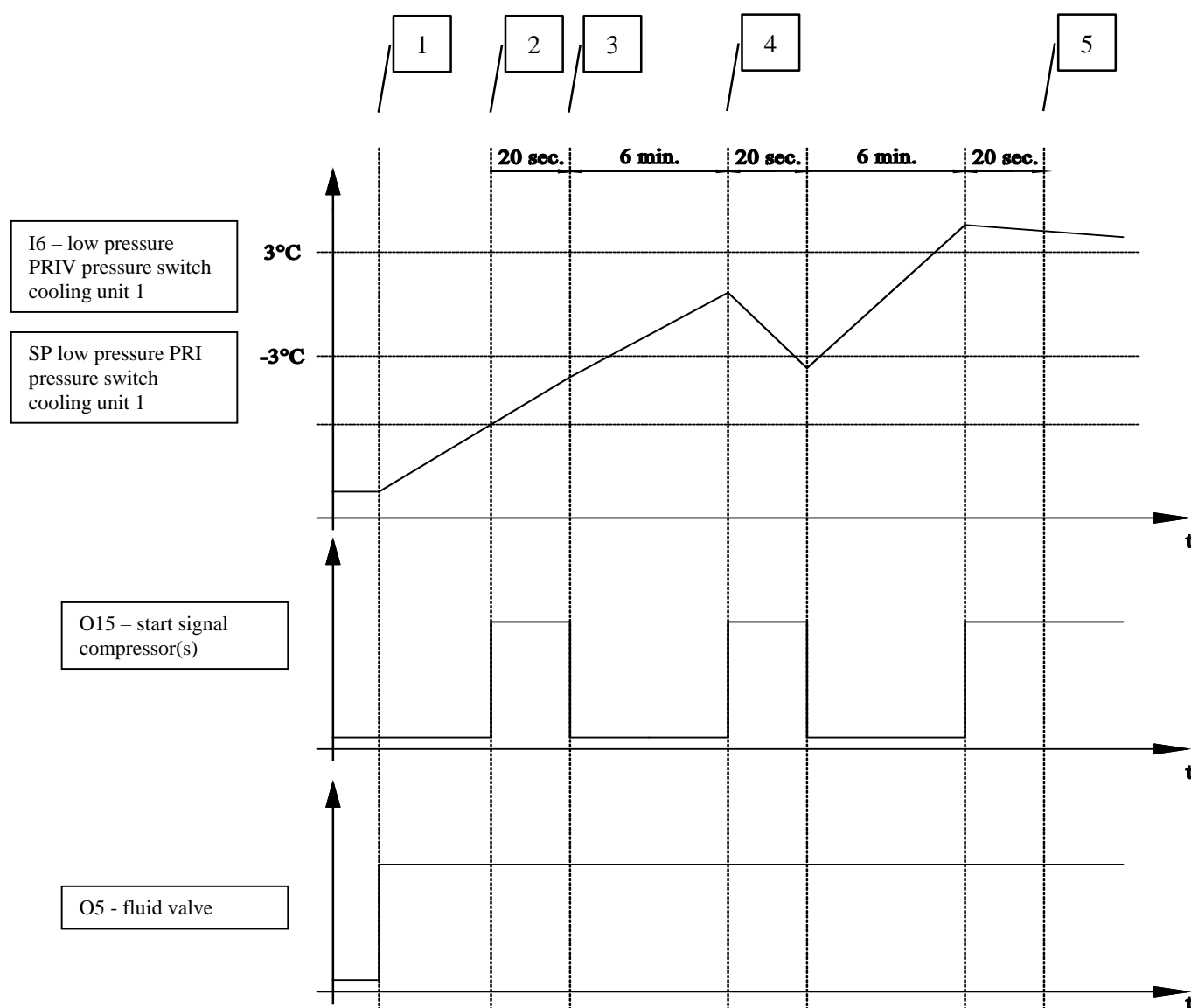
2/ If the pressure rises to above the set value of the pump-down pressostat, output O15 is switched on (compressor starts).

3/ Output O5* and O15 remain activated during the time set in A.14.2. If the pressure at the end of this time is lower than the set value (no signal on input I6) outputs O5* and O15 are switched off.

4/ Output O5* and O15 remain switched off during the time set in A.14.3. After this time the output is switched on again.

5/ If the pressure after the time in A.14.2 is higher than the set value (signal on input I6) outputs O5* and O15 remain switched on.

* = As of 5.30



The fans on the cooling unit are always switched to the fan speed control at that moment.

A.14.1 Option 2: SSC only on top evaporator

For the cooling unit on the bottom evaporator the O5 is activated when cooling is demanded.

For the cooling unit on the top evaporator (or side evaporator in case of a silo tank) and if the level probe is not reached, the control activates output O8 and O19 with pulses. If this is the case “compr. active” will appear on the display. In other words:

1/ With the start of the cooling cycle and after the end of the cooling delay time liquid valve O8 is opened. The pressure increases with the opening of the liquid valve.

2/ If the pressure rises to above the set value of the pump-down pressostat, output O19 is switched on (compressor starts).

3/ Output O8 and O19 remain activated during the time set in A.14.4. If the pressure at the end of this time is lower than the set value (no signal on input I7) outputs O8 and O19 are switched off.

4/ Output O8 and O19 remain switched off during the time set in A.14.3. After this time the output is switched on again.

5/ If the pressure after the time in A.14.4 is higher than the set value (signal on input I7) outputs O8 and O19 remain switched on.

A.14.1 Option 3: SSC on bottom and top evaporator

If the option SSC on bottom and top evaporator is selected you have the working principle as explained in option 1 and 2 combined.

B/ Level L4 attained

When reaching the level, the O15 and/or O18 output is always enabled irrespective of the pressure in the evaporator and depending on the setting in A.14.1

B.2 Flow - select program

In order to set the cleaning programme, a flow should be gone through.

The cleaning cycle can be set fully customized to the application. The number of flushes before/after, cold/hot can be chosen freely. As well as the number hot/cold pre- and post-rinses. Only the main cleaning, cleaning with product, is a fixed step.

This results in a cleaning program which can consist of both 4 and of 60 steps.

Programming method

Step	Action	Parameter
1	Select the desired cleaning program.	Select clean. Program Clean. with 2 pumps (acid/alkaline) Clean. with 3 pumps ECO-WASH 2 pumps (acid/alkaline) ECO-WASH 3 pumps
2	Select the number of cold flushes (only ECO-WASH)	# pre flush cold
3	Select the number of cold pre-rinses	# pre rinse cold
4	Select the number of warm flushes (only ECO-WASH)	# pre flush warm
5	Select the number of warm pre-rinses	# pre rinse warm
6	Change the minimum temperature necessary for a proper cleaning (see cleaning product)	B.5 Change min. temp.
7	Change the time required for a proper cleaning (see cleaning product)	B.6 Min. time above B.5
8	Select the percentage acid that must be taken.	3.3 Percent acid
9	Select the percentage alkaline that must be taken.	3.4 Percent alkaline
10	Selected the sequence of the cleaning product	3.2 Sequention clean prod. acid/alkaline
11	Select the number of warm flushes for the post rinse (only ECO-WASH)	# post flush warm
12	Select the number of warm post-rinses	# post rinse warm
13	Select the number of cold flushes for the post rinse (only ECO-WASH)	# post flush cold
14	Select the number of cold post-rinses	# post rinse cold
15	Select if disinfection is needed	disinfection?
16	In the event of disinfection → select the percentage of disinfectant that has to be selected	3.5 Percent disinfectant



If no water is filled after 30 minutes, an alarm is given (value is adjustable, see Packo parameters).

B.3 Flow - select volume

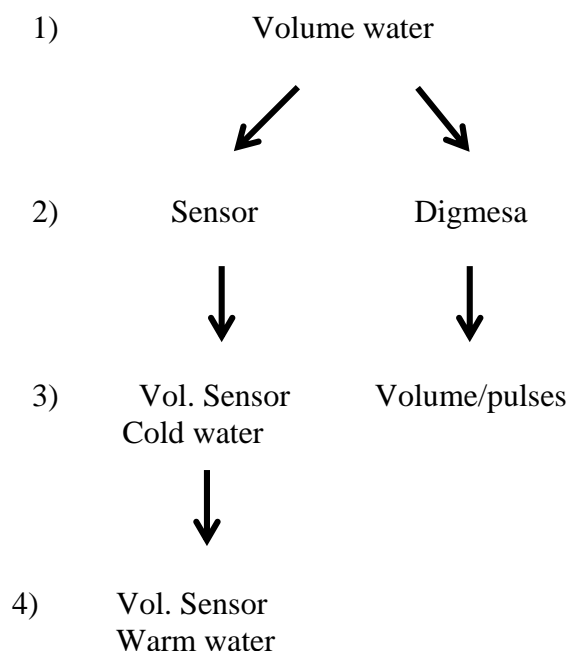
Detection of water can be done in various ways; these are set via a flow:

Sensor

Digmesa -> not yet active!

Programming method

Step	Action	Parameter
1	Select the volume water that has to be filled	
2	Select the way in which detection is done	Fill type? Sensor -> always take sensor
3	Specify the volume that is filled until the sensor detects, for cold water	Volume till sensor COLD? (L)
4	Specify the volume that is filled until the sensor detects, for warm water	Volume till sensor WARM?(L)



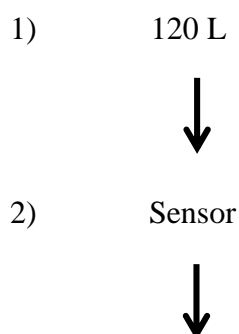
For example:

The volume of the tank is 12000L

1% of 12000 = 120L

Volume cold water till sensor = 70L

Volume warm water till sensor = 50L



3) 70L



4) 50L

B.4 Flow - select times

After running through the above flows, the times per cleaning step may now be set. Depending on the selected cycle (standard or ECO-WASH) and the number of pre/post rinses, more or fewer steps will need to be set.

Below is an overview of all steps.

Standard cleaning:

Standard cycle:

Pre-rinse cold (KV)	Pre-rinse warm (WV)	Main wash (H)	Post rinse warm (WN)	Post rinse cold (KN)
1	1	1	1	1

Empty

If option B19, Std: extra pre rinse? is selected

Pre-rinse

Pre-rinse: Drain

KV Fill with cold water

KV Rinse cold

KV Pump to drain

KV Drain rinse

Clean Rest Time

WV Fill with warm water

WV Rinse hot

WV Pump to drain

WV Drain rinse

H Fill with warm water + detergent

H Circulate warm water + detergent
 H Pump to drain
 H Drain warm water + detergent

WN Fill with warm water
 WN Rinse warm
 WN Pump to drain
 WN Drain warm

KN Fill with cold water
 KN Rinse cold
 KN Pump to drain
 KN Drain cold

ECO-WASH

Flush cold (KF)	Pre-rinse cold (KV)	Flush warm (WF)	Pre-rinse warm (WV)	Main wash (H)	Post rinse warm (WN)	Flush warm (WF)	Post rinse cold (KN)	Flush cold (KF)
2	0	0	1	1	0	0	0	3

Empty

KF Drain + fill with cold water
 KF Rinse cold

Clean Rest Time

KV Drain + fill with cold water
 KV Fill with cold water
 KV Rinse cold
 KV Pump to drain
 KV Drain + fill cold or warm

WF Drain + fill with warm water
 WF Rinse warm

WV Drain + fill with warm water
 WV Fill with warm water
 WV Rinse warm water
 WV Circulate + pump to drain
 WV Drain + fill with warm water

If no warm pre rinse: H Drain + fill with warm water (As of 5.11)
 H Fill with warm water + detergent
 H Circulate with warm water + detergent
 H Pump to drain

H Drain + fill with cold or warm water

WF Drain + fill with warm water

WF Rinse: warm

WN Drain + fill with warm water

WN Fill with warm water

WN Rinse warm

WN Pump to drain

WN Drain + fill with cold or warm water

KF Drain + fill with cold water

KF Rinse cold

KN Drain + fill with cold or warm water

KN Fill with cold water

KN Rinse

KN Pump to drain

KN Drain + fill with cold water

B.17 Heat cleaning water

Programming method

Step	Action	Parameter
1	Activate the heat cleaning water option	B.17.1 Activate heating
2	Enter the heating temperature	B.17.2 Heating temperature
3	Enter the heating differential	B.17.3 Heating differential

During the main wash cycle, as soon as the hot water and the chemicals are filled in the tank and the cleaning pump has been started, the heating element is activated and the water heated up until the heating temperature is reached. As soon as the water has been heated, the cleaning cycle is continued. If the temperature drops below the heating temperature, the heating is switched on again. The cleaning time is not interrupted. If the cleaning water is not heated within a certain time (depending on the volume of the tank), an alarm is given, but the cycle continues. The maximum time for the heating of the water in the tank can be calculated on the basis of the following formula:

$$\frac{Volume\ tank \times 60 \times 1.163 \times 60}{7500 \times 100} \quad [min]$$

Tank volume [litres]

$\Delta t = 60\ ^\circ C$

Heating element capacity= 7500 W

The thermostat on the heating element must be set to 80°C. If the temperature is set, the key must be removed.



C.4 Robot Menu

If a robot (AMS) has been connected, the robot option must be activated.

Programming method

Step	Action	Parameter
1	Activate the robot option	C.4.1 Opt Robot
2	Select the integrated interface option	C.4.2 Opt. integrated interface
3	Select the time that is waited before the cooling cycle starts after ending the cleaning cycle	C.4.3 Interface: delay

By activating the robot option, the control buttons for the robot are added.

	Opening or closing pneumatic valve, this key is only visible if the relevant parameter is activated.
	Stopping robot and cooling, this key is only visible if the relevant parameter is activated and if the cooling is active.

When stopping the cooling and during cleaning, the iControl sends a signal to the robot indicating that the cooling tank is not ready.


For version 5.00 – 5.10, C.4.5 = C.9; C.4.6 = C.12

Possibility 1:

C.4.5 Robot relais contact = NC (Normally closed)

C.4.6 Robot contact cleaning = NO

Relay Q23 is enabled during the cooling → contact between Q23COM and Q23NO is closed

When stop cooling/robot  is pressed this relay is disabled → contact between Q23COM and Q23NO is open.


With cleaning, the relay is/remains disabled → contact between Q23COM and Q23NO is open.

Possibility 2:

C.4.5 Robot relais contact = NO (Normally open)

C.4.6 Robot contact cleaning = NO

Relay Q23 is disabled during the cooling → contact between Q23COM and Q23NO is open.

When stop cooling/robot  is pressed this relay is enabled → contact between Q23COM and Q23NO is closed.


With cleaning, the relay is/remains enabled → contact between Q23COM and Q23NO is closed.

Possibility 3:

C.4.5 Robot relais contact = NO (Normally open)

C.4.6 Robot contact cleaning = YES

Relay Q23 is disabled during the cooling → contact between Q23COM and Q23NO is open.

When stop cooling/robot  is pressed this relay is disabled → contact between Q23COM and Q23NO is open.


With cleaning, the relay is/remains enabled → contact between Q23COM and Q23NO is closed.

Possibility 4:

C.4.5 Robot relais contact = NC (Normally closed)

C.4.6 Robot contact cleaning = YES

Relay Q23 is enabled during the cooling → contact between Q23COM and Q23NO is closed.

When stop cooling/robot  is pressed this relay is enabled → contact between Q23COM and Q23NO is closed.

With cleaning, the relay is/remains disabled → contact between Q23COM and Q23NO is broken.



In combination with an AMS-milking system (milking robot), the farmer has the possibility to switch off the automatic transition to the filling in the main tank as soon as the tank cleaning cycle is complete. This gives the farmer the opportunity to check whether the cooling tank has been properly cleaned. This function is activated in parameter:

4.5 Autostart after cleaning → No

C.6 SW Update

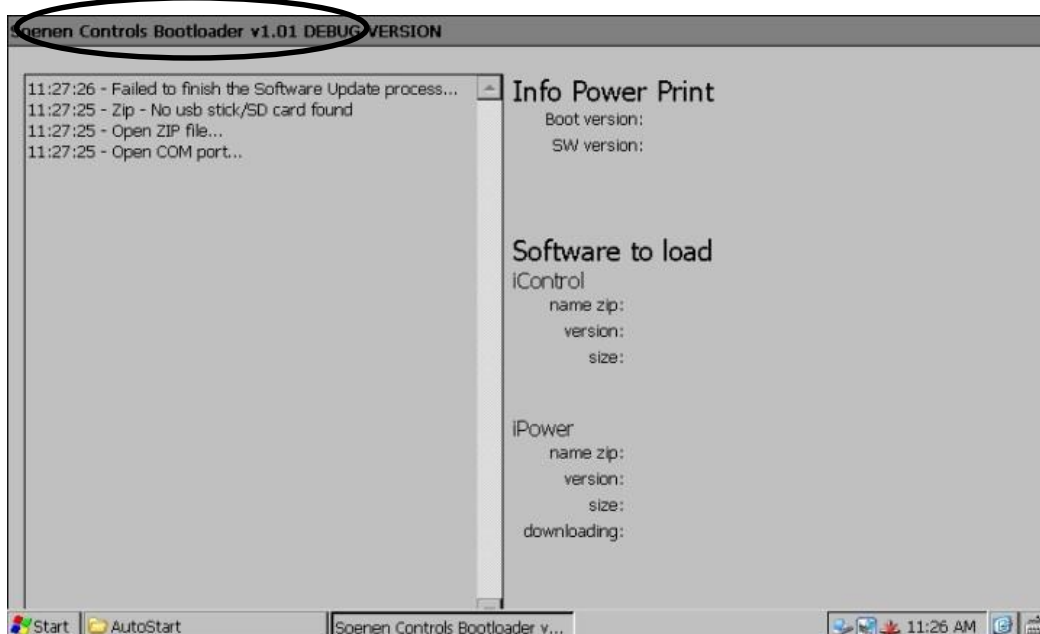
Before you do a software update, do your best to note all parameters. All old parameters are kept, new parameters get the factory settings.

A software update is done by attaching a USB stick or SD card by the iControl display.

The software is always sent as a .zip File.

Before you install the software you should check that the bootloader version is 1.03 or higher.

In order to check the version of the software, start the software update (this parameter is found under: Installer – Extra – C6 software Update).



If the version of the bootloader software is higher than or the same as 1.03 then you must take the following steps. If not, contact your after sales department.

1/ Insert the USB or SD card with the new software in the iControl display. NOTE: Only the .ZIP file should be on the USB or SD card

2/ If the bootloader software has not yet started, start the software update (parameter C6 Software Update), the software update will start immediately

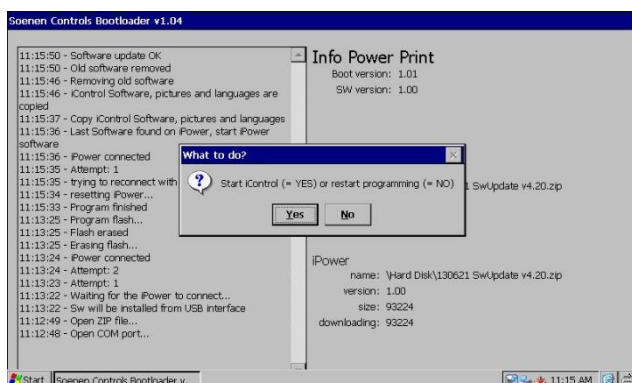
3/ If the bootloader software has already started, press "NO" to start programming.

4/ Follow the instructions on the screen.

5/ Check if you see “**Software update OK**” in the display

If OK, go to step 6.

If not OK, restart iControl and go to step 1, if you still have the same problem, contact your after sales department.



6/ Press on “YES” in order to start the iControl program. The iControl program starts up. Go now to the Programming/Controlling of all parameters

7/ During start up, check the software version



8/ After start up the following alarm messages can be shown



C.11 Level indicator/Pacap

The level indicator/Pacap can be installed on horizontal and vertical tanks. To use the level indicator/Pacap option you need 2 extra files. It is also advised to update to version 5.20.

The files you need are:

- Pacapaddresses.txt
- Pacap.txt

The first file includes the addresses of the level indicator/Pacap. The second file includes the measuring table. This makes it possible to show the liter value in the display. If these files are not available please contact Packo to get them.

Level indicator/Pacap on horizontal tanks

Positioning of the float: make sure the magnet is facing upwards. On the inside of the float you see a line where the magnet is positioned.

Programming method

Step	Action	Parameter
1	Update the iControl to a version 5.20 or higher	C.6 Software update

Step	Action	Parameter
2	Activate the Level indicator/Pacap option. If the option is activated the volume indication can be seen on the display.	C.11.1 Pacap active?
3	Check the coefficients A, B, C, D on the “Final test certificate”* of the sensor and if necessary program them	C.11.7 Coefficient A C.11.8 Coefficient B C.11.9 Coefficient C C.11.10 Coefficient D Remark : Multiply coefficient A by 10 e.g. Coefficient on final test certificate = 1400,0 ➔ enter in C.11.7 14000
4	Take the measurement on the dipstick and enter this value, make sure the product stands still and the float is floating	C.11.3 Actual nett value
5	Empty the tank, if the display is not showing “0” check the value in C.11.3 and enter this in the “Zero value”	C.11.6 Zero value

*Example final test certificate

FINAL TEST CERTIFICATE

S/N: 7289

Inspector: DiEurope	Previous test
Test date: 22/10/2014 08:53:40	
Model: PCS-S-1-1500-A-SS-N-N-C	
Revision: 9	
Test code: 144010532208	
Digital output RS422: TESTED	
Tested each millimeter: TESTED	

Start length: 5.20uS	
Coil length pick amplitude: OK	
Step length: OK	
Coefficient A: 1400,0mm	Coefficient B: 2038 (Piagara 110 = 3670)
Coefficient C: 0mm	Coefficient D: 20738 (Piagara 110 = 37328)
Temperature during test: SENSOR NOT PRESENT	

Level indicator/Pacap on vertical tanks

On vertical tanks the Level indicator/Pacap is done using a pressure sensor.

Programming method

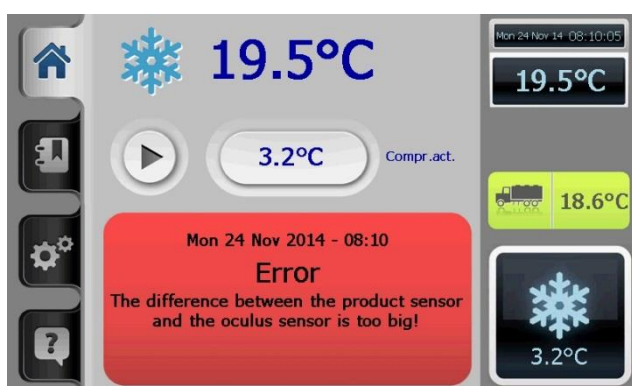
Step	Action	Parameter
1	Update the iControl to a version 5.20 or higher	C.6 Software update
2	Activate the Level indicator/Pacap option. If the option is activated the volume indication can be seen on the display.	C.11.1 Pacap active?
3	Check the coefficients A, B, C, D Coefficient A = Coefficient B = Coefficient C = Coefficient D = If necessary change them.	C.11.7 Coefficient A C.11.8 Coefficient B C.11.9 Coefficient C C.11.10 Coefficient D

Step	Action	Parameter
4	Fill the tank with minimum 1500l of water using a volume measuring device. Enter the volume you filled.	C.11.5 Calibration in liter
5	Empty the tank, if the display is not showing “0” check the value in C.11.3 and enter this in the “Zero value”	C.11.6 Zero value

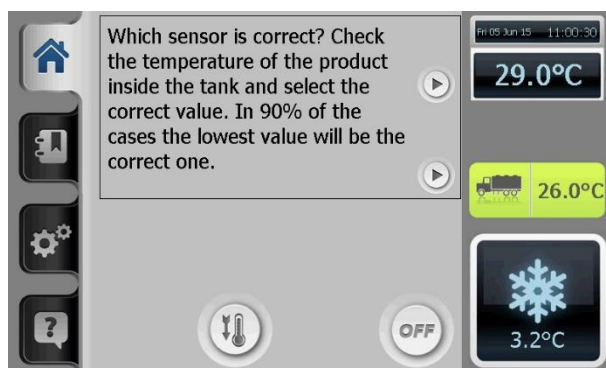
C.12 Temperature sensor menu

Error message is shown when:

- During cooling mode
 - o Difference between the 2 temperature sensors becomes too big during the set time
 - o Or sensor breaks down



After this error message the user is asked which sensor is correct.



If the user selects the highest value, extra confirmation is requested.



After the user has chosen the correct sensor, then an error message is shown to change the faulty sensor. This message is first in red and then remains on the display in green till the sensor is replaced and the mode is set back to NORMAL.



C.15 External memory

As of 5.30 the parameters are saved in 2 difference places.

- Control
- File BackupParams

If option C. 15 External memory is activated you will find these files on the external memory you chose. This can be an SD card or USB stick.

Depending on the setting in C.15 the preference is specified for an SD card or a USB stick.

The parameters are each time saved after a change to the parameters has been made and one goes back to the main screen.

The installer's parameters can also be saved. This is done by activating parameter C.13 Save installer's parameters.

The same applies for the Packo parameters. These can also be saved separately. This is done with parameter XIX. Save Packo parameters.

All parameters are given a time/date stamp on saving.

With the start-up of the control the last parameter file of the selected external memory is loaded. If there is no external memory the file from the control itself is loaded.

If there are errors in this list of parameters, one can return to the installer's parameters. These are loaded with C.14 Load installer's parameters.

If there are also many errors in these parameters the Packo parameters can be loaded. These are loaded using XX. Load Packo parameters.

If there are also many errors in these parameters the manufacturer's parameters can be loaded with C.1 Load factory settings.

If no parameter file is found, the installer's parameters are loaded.

If there are no installer's parameters the Packo parameters are loaded.

If there are also no Packo parameters the manufacturer's parameters are loaded.

C.16 Option buffer vessel actif?

The option buffer vessel is activated in parameter C.16.

To be able to use this option extra equipment is needed, see also on the P&ID:

Valves:

- 3-2 way valve for milk line 1 for
 - o tank 1
 - o tank 2
- 3-2 way valve on pump outlet of tank 2
- Valve water inlet
- Pneumatic valve on tank outlet
 - o tank 1
 - o tank 2
- Connection box 1 milking line

In case there are 2 milking lines you need:

- 3-2 way valve for milk line 1 for
 - o tank 1
 - o tank 2
- Connection box 2 milking lines

To control the valves you need extra information on the status of the tanks. You also need to know if milk or cleaning water is coming. For this you need:

- Status of tank 1
 - o Tank available, for this we use the stop robot signal (for iControl = Q23)
 - o Tank 1 full, for this we add an extra level sensor
- Status of tank 2
 - o Tank 2 full, for this we add an extra level sensor
- Status of milking line 1
 - o milk
 - o cleaning water

In case there are 2 milking lines you need:

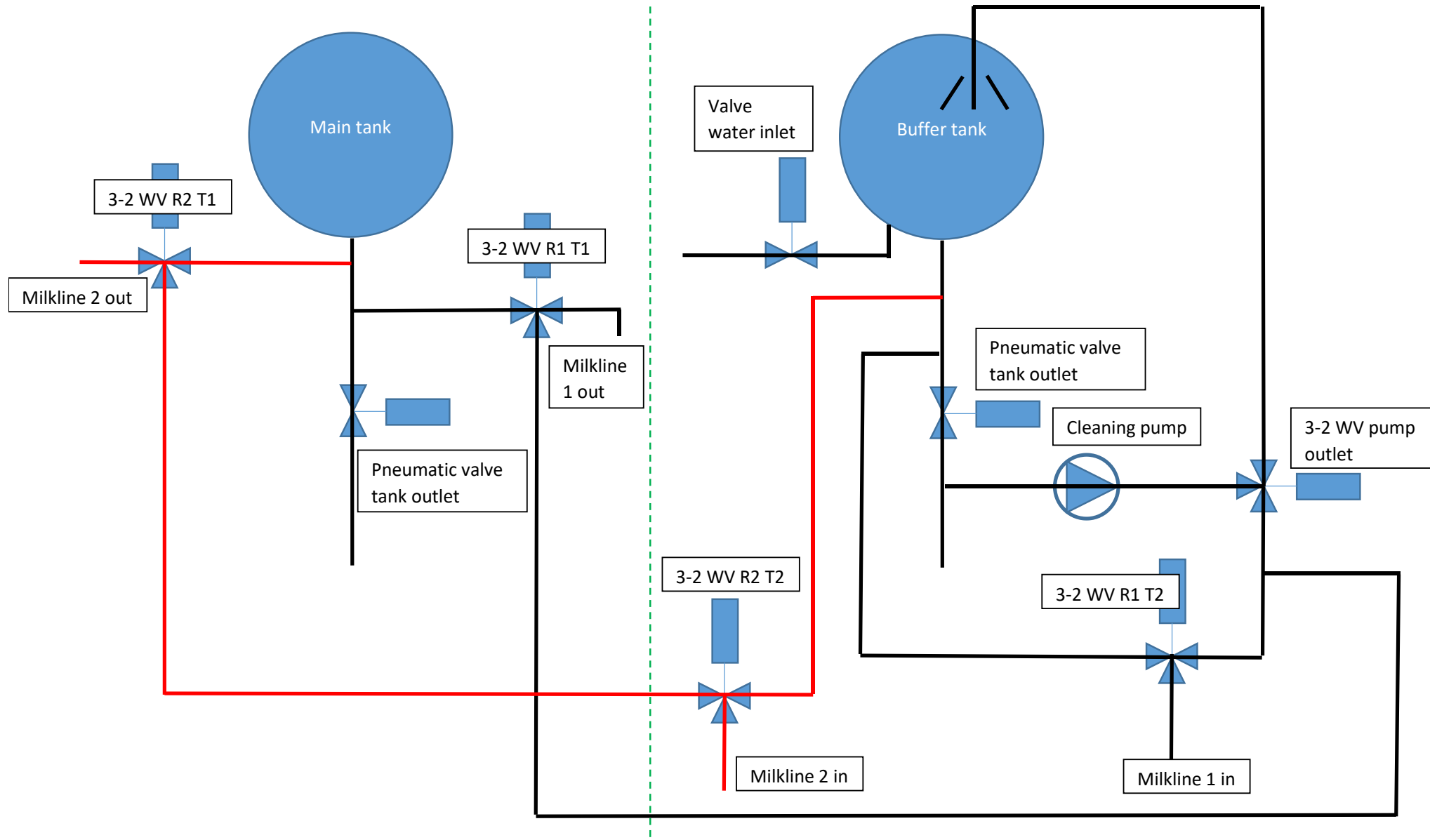
- Status of milking line 2
 - o milk
 - o cleaning water

The valves are switched according following flows:

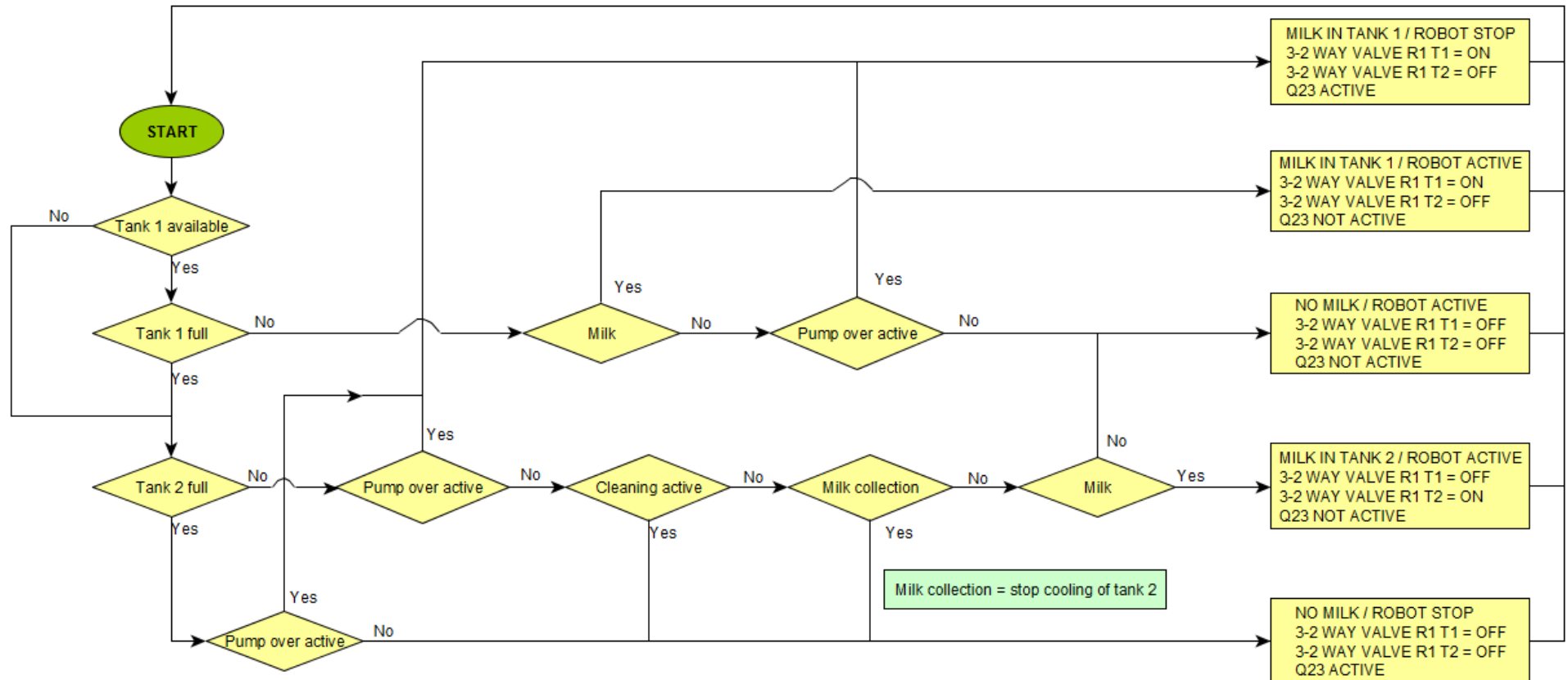
1/ 3-2 way valves milking line 1

2/ 3-2 way valves milking line 2

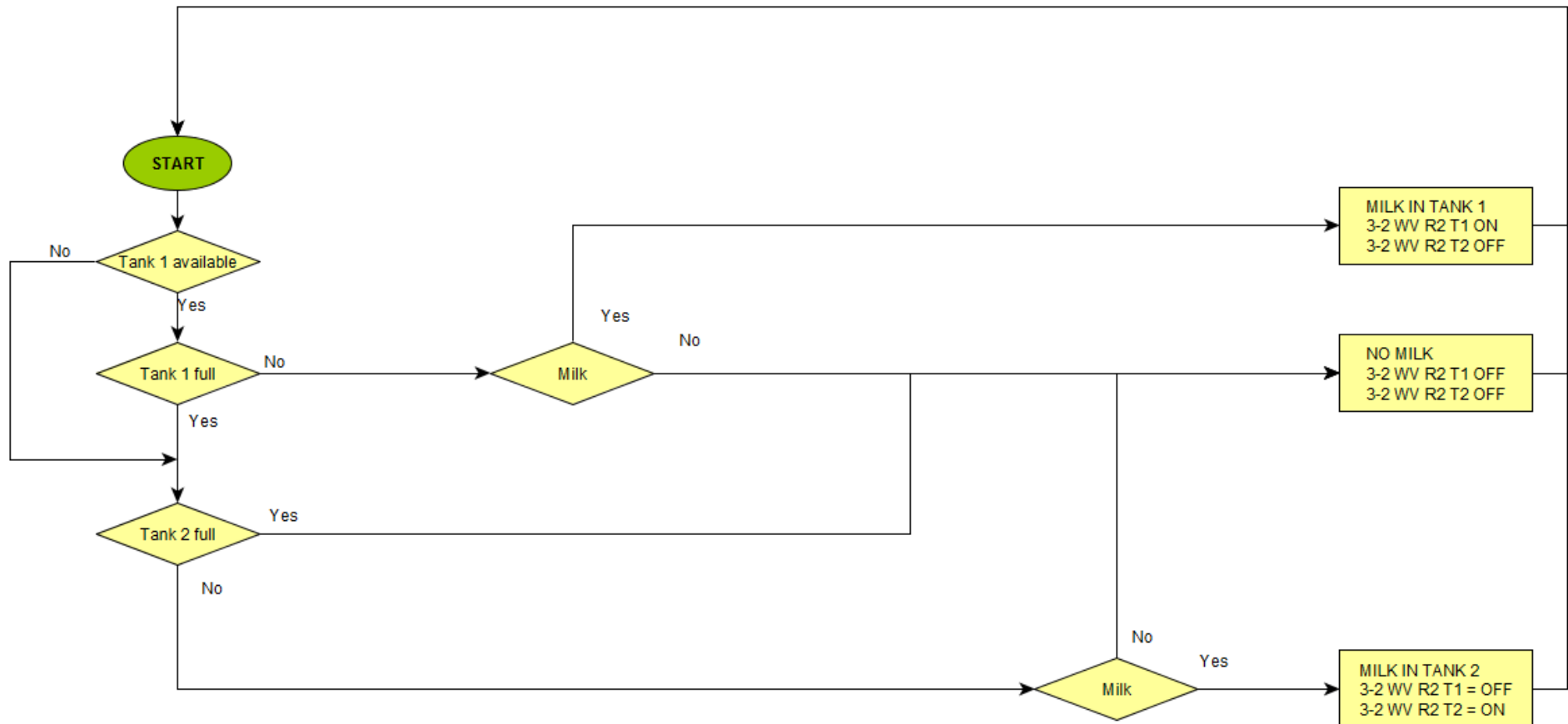
Remark: the stop milking signal is also given in flow 1/



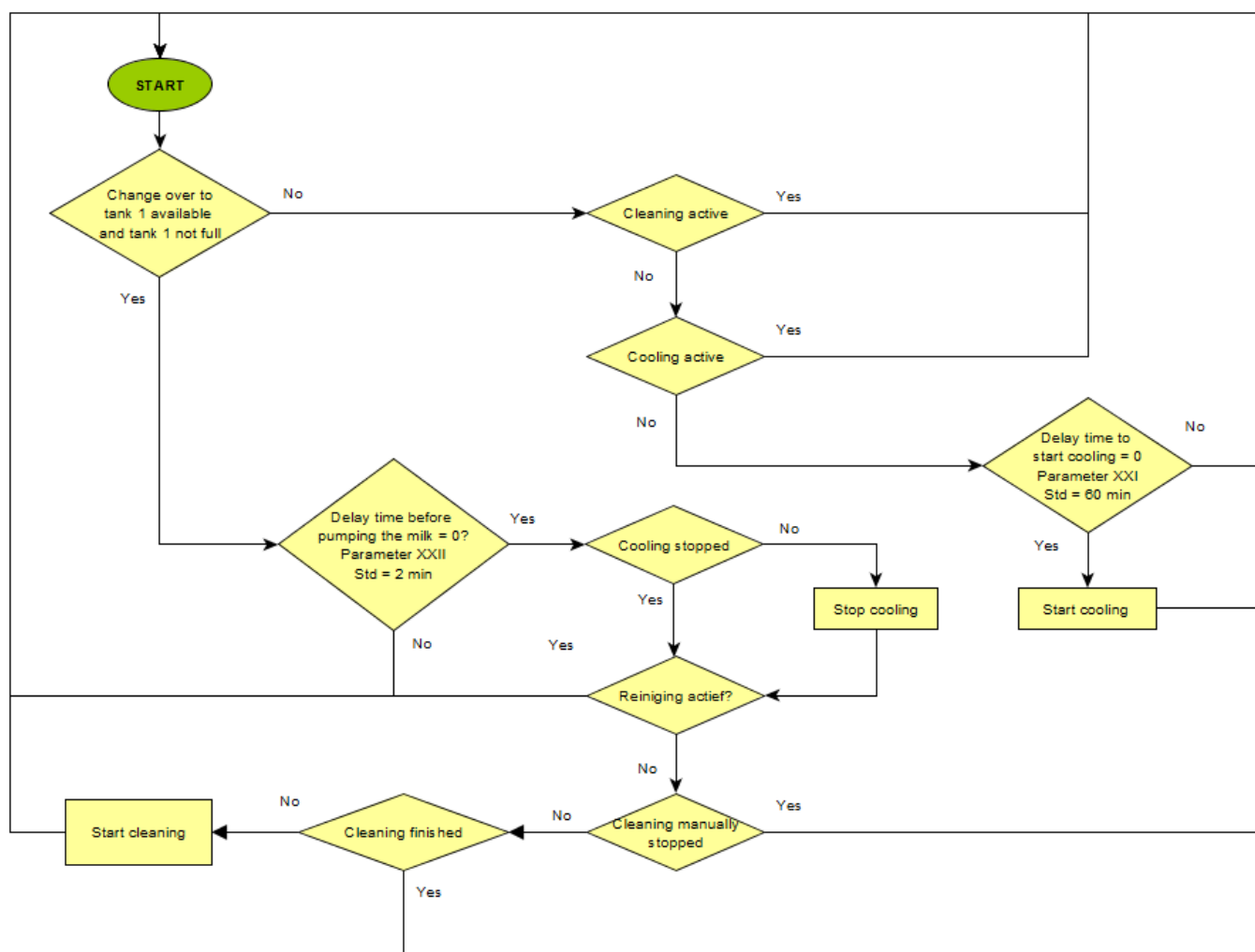
3-2 WAY VALVES MILKING LINE 1



3-2 WAY VALVES MILKING LINE 2



How it works, for tank 2:



When changing over from buffer vessel to main tank the milk in the buffer vessel is pumped over to the main tank. The pumping over is the 1st step of the cleaning cycle. Before the pumping over starts there is a delay time, parameter XXII. Delay time before pumping over the milk, Std = 2 min, setting 0-60 min.

To pump over the milk we use the cleaning pump which is constructed to pump over milk.

There is a fixed pump over time of 40 seconds. This allows the milk to flow from the tank to the pump.

When the buffer vessel is empty, NIV1 and NIV2 do no longer detect milk, the pump is kept running for the set time in parameter “C.17 Extra pump over time after tank detects it is empty”. Std = 60 s, setting 0 – 300 s.

Below you find the valves that are controlled during pumping over and cleaning.

	Pneumatic valve tank outlet buffer vessel	Valve water inlet	3-2 way valve pump outlet
Pumping over	Open	Closed	Not activated, milk to main tank
Cleaning	Open	Open	Activated, cleaning water to tank

If the cleaning of the buffer vessel is finished correctly the iControl goes to standby.

If there was a problem during cleaning, there is an error message shown “Cleaning not OK, restart?”. As long as this message is in the display the iControl is in cleaning. If you press “validate”, the cleaning restarts. If you press “x” the iControl goes to standby.

The pumping over and cleaning can also be activated manually. For this you press the button “Pump”. As long as the main tank is full the pump will not start.

Before pumping over and cleaning manually you are asked if the tank is empty. If you confirm, the cleaning starts with the 40 seconds pump over.

If the cooling of the buffer vessel is stopped manually, it will restart after the set time in parameter XXI. Delay time to restart of cooling after milk collection. Std = 60 minutes, setting 0 – 300 min.

Option 3: “2-tank” system

The “2-tank” system automatically switches over between the two tanks.

Requirements:

- Tank 1, main tank:
 - o 3-/2-way valve
 - o Pneumatic cylinder on tank outlet
 - o Volume measurement system
- Tank 2, buffer tank:
 - o 3-/2-way valve
 - o Pneumatic cylinder on tank outlet
 - o Volume measurement system

Parameter settings

Parameter/flow	Parameter in the flow	Tank 1 (main tank)	Tank 2 (buffer tank)
C.11.1 PACAP active?		YES	YES
1.12 Automatic starting of the cooling	Sensor delay	60 min.	60 min.
	1.12 Automatic starting of the cooling	Volume/Percentage	Volume/Percentage
	Volume or percentage	Percentage	Percentage
	Enter percentage	10%	10%
4.12 Active tank		-	Tank 1
C.4.1 Opt. Robot		YES	YES
C.4.7 Cooling after cleaning		NO	NO
C.16.1 Buffer tank active?		NO	YES
C.16.2 Type		-	2-tank system
XXVIII. Delay before starting command (two-tank system)		0 s	60 s

Input and output connection

Diagram of tank 1: in accordance with the tank design

Diagram of tank 2: 333834

Input	Tank 1	Tank 2 (diagram 333834)
I8	-	Q23 tank 1, tank 1 available signal
I9	-	Milking machine, signal whether milk is sent

Output	Tank 1	Tank 2
O7	Pneumatic cylinder outlet	Pneumatic cylinder outlet
O12	-	3-/2-way valve tank 1
O18	-	3-/2-way valve tank 2
Q23	I8 tank 2, tank 1 not available signal	Milking machine, machine cannot receive milk signal

Operation:

The buffer tank controls the two extra 3-/2-way valves.



If neither tank is available, a stop milking signal is sent; output Q23 of the buffer tank is switched.


Status			Outputs		
Tank 1 available (*)	Tank 2 available (*)	Milk (I9)	3-/2-way valve tank 1 (O12 tank 2)	3-/2-way valve tank 2 (O18 tank 2)	Stop milking (Q23 tank 2)
YES	NO	YES	ACTIVE	INACTIVE	INACTIVE
YES	NO	NO	INACTIVE	INACTIVE	INACTIVE
NO	YES	YES	INACTIVE	ACTIVE	INACTIVE
NO	YES	NO	INACTIVE	INACTIVE	INACTIVE
NO	NO	YES	INACTIVE	INACTIVE	ACTIVE
NO	NO	NO	INACTIVE	INACTIVE	ACTIVE

(*) Tank not available if:
the volume is exceeded (4.11), or
the cooling is manually stopped, or
cleaning is active

It is also possible to manually select which tank receives milk by activating parameter 4.12 Active tank.

C.17 Internet connectivity option

C.17.1	Activate the Internet option
C.17.2	Test the connection - If everything is ok, internet connectivity OK notification, view the information on the website http://icontrol.packo.com
C.17.3	Check the status - all the 3 icons must be green  iControl has a network connection  iControl is connected to the internet

	 The Packo server is available
C.17.4	Check the IP address - it must be different to 0.0.0.0

Oculus

The Oculus is a functionality that controls and registers the proper operation of the cooling tank and integrates this in the control of the tank. This with separate sensors

- Agitation detection sensor
- Extra temperature sensor
- Level sensor

This tankguard aims mainly to draw the customer's attention to risk situations, which may lead to lower quality of the product at the level of the cooling and storage.

With the aid of the sensors, the Oculus can perform the following measurements:

- temperature control of the milk
- control on whether or not the agitator is functioning
- control on whether or not the tank is cleaning
- control on whether or not the tank is filled
- control on whether or not the tank is cleaned
- control on whether or not the tank is cleaned for long enough at a sufficiently high temperature

The control covers both the cooling, agitating and cleaning. In the event of the malfunction of any of these functions, both visual and audible signal is given.



The alarm is connected to the 230V power supply of the tank (via Q24COM and Q24NC terminals). To obtain an acoustic signal in case of power failure, an external power supply must be used so that there is still 230V of power supply. This must be provided by the dealer.

Parameters

D. Oculus	
D.1 Full oculus active?	You activate the Oculus functionality with this
D.2 Username	The user name may be entered here
D.3 Do not load limit 1	See chapter D.3 – D.7 Do not load limits
D.4 Do not load limit 2	See chapter D.3 – D.7 Do not load limits
D.5 Do not load limit 3	See chapter D.3 – D.7 Do not load limits
D.6 Do not load limit 4	See chapter D.3 – D.7 Do not load limits
D.7 Do not load limit 5	See chapter D.3 – D.7 Do not load limits
D.8 Max power interr. time	Maximum mains voltage interruption time
D.9 Max clean delay	Time within which the tank must be cleaned after collection of the product.
D.10 Max temp from second cool	Maximum temperature that may be attained after cooling of the product to below set point.
D.11 Max time for D.10	Time that the temperature may be above the set temperature.

D. Oculus	
D.12 Max temp during cool	Maximum cooling temperature (1 st cooling)
D.13 Max. time for D.12	Time within which temperature of first cooling must be attained
D.14 Min. temp. during cool	Minimum temperature that the product may have.
D.15 Max. time for D.14	Time how long the temperature may be below the minimum.
D.16 Max. time without stirring	Maximum time without agitating
D.17 Min. cleaning temp	Minimum cleaning temperature that has to be attained
D.18 Min. cleaning time	Minimum cleaning time with which the minimum temperature is attained
D.19 Reminder to wash	Cleaning reminder delay, if the tank is not cleaned within the set time, an audio signal sounds.
D.20 Oculus Alarm active?	
D.21 Delay Oculus alarm with cooling stop	Enter the delay time before an alarm is generated if the cooling cycle is stopped (As of 5.30)

If parameter D.1 is set to 'option Arla', then additional information is required

C.3.6 Country code

C.3.7 CHR number ARLA

C.3.8 SN Oculus (MAC address)

If there is a 'Do not load' indication, the Arla tankdriver needs to confirm this error message. This is logged as message: "Confirmation by Arla driver".

Do not load notification



= green

When this field lights green, the process has finished within the set values. The cooling tank may be emptied in the usual manner.



= not green

When this field lights green, there has been a problem. By pressing this field an overview of the notifications is displayed.

Do not load limits

D.3 – D.7 Do not load limits

We distinguish 2 possibilities:

1. the overrun time of maximum milk temperature > set time
2. the overrun time of minimum milk temperature > set time

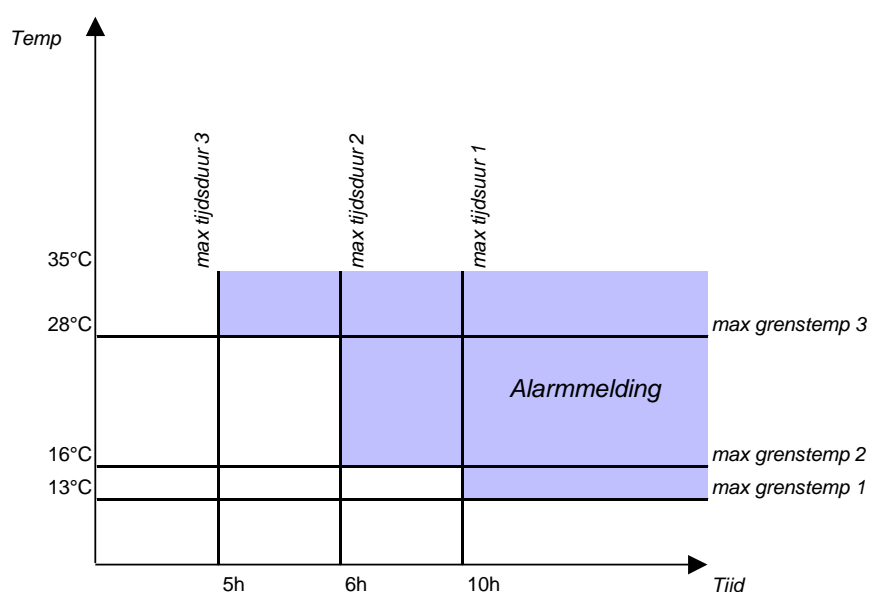
When a temperature limit is exceeded, an internal counter associated with this limit counts duration of the overrun. As soon as one of the counters exceeds the set maximum time, the notification "Do not load limit 1/2/3/4/5!" appears.

5 temperature limit values may be entered, with a maximum duration per limit value. There is one counter per limit value. The counters are set to zero when the tank is emptied.

Example - set value:

- Maximum limit temperature 1: 13°C (D3.2), maximum duration 1: 10 hrs. (D3.3)
- Maximum limit temperature 2: 16°C (D4.2), maximum duration 2: 6 hrs. (D4.3)
- Maximum limit temperature 3: 28°C (D5.2), maximum duration 3: 5 hrs. (D5.3)

Schematic representation:



If one of these limits is exceeded this leads to a 'do not load' indication.

Translation of terms in above graph: 'tijdsduur' = duration; grenstemp = temperature limit; Alarmmelding = Alarm notification; tijd = time; temp = temperature

D.8 Max power interr. time

There was a power failure that lasted longer than the set time. When the set time limit has been exceeded, then we can assume that during this period neither cooling nor agitation took place. This results in a 'do not load' indication.

D10 – D11


If, during the second and/or subsequent cooling cycles, the product goes above the maximum temperature, there will be a continuous sound signal.

iControl logging

The iControl logs all data every 15 minutes. If a cycle is active (cooling, agitating, cleaning) then the data is saved every minute.

As of 5.00 also the Level indicator/Pacap values are logged.


As of 5.30 the logging is also saved on the SD card or USB stick, depending on the setting in parameter C.15 External memory. When starting up a display with new software the logged data are copied to the control.

In order to view the iControl logging, press logging  on the desktop

This activates the log screen. Select the logging of the temperature or the volume.

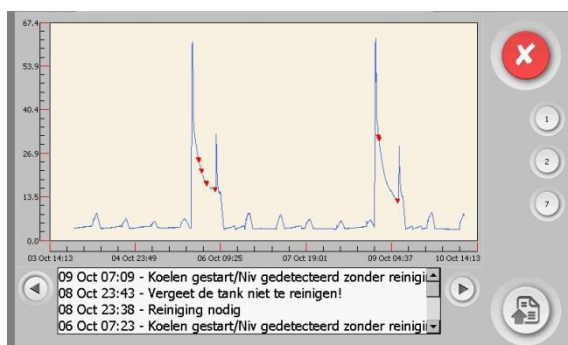


The logging may be read in graph or table form.

To activate the graph press on 

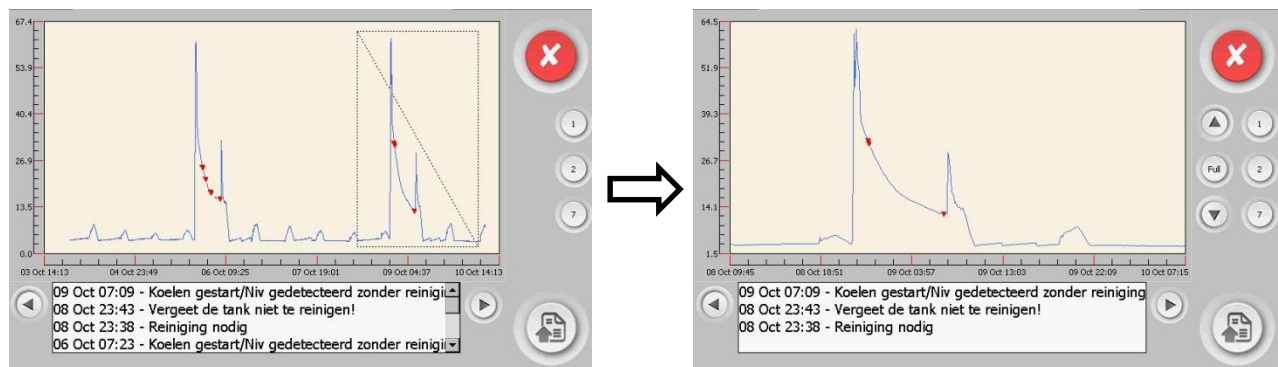
To activate the table form press on 

The following items are shown on the graphic screen:



1/ Graph

Zooming in is done by pulling a frame across that part of the graph which is to be zoomed in on.




2/ Keys , and

Using these keys, the graph may be displayed from 1, 2 or 7 days respectively.

3/ At the bottom you get a list of all notifications that are indicated on the graph in red.



Use the arrow keys to move to the previous or following day(s).

Switching to table view is done by pressing on .

The screen with the table view displays the following:



09 Oct 12		
09/10 20:29	8.8°C	COOL - 10000
09/10 20:28	8.8°C	COOL - 10000
09/10 20:27	8.7°C	COOL - 10000
09/10 20:26	8.7°C	COOL - 10000
09/10 20:25	8.6°C	COOL - 10000
09/10 20:24	8.6°C	COOL - 10000
09/10 20:23	8.6°C	COOL - 10000
09/10 20:22	8.6°C	COOL - 10000
09/10 20:21	8.6°C	COOL - 10000
09/10 20:20	8.6°C	COOL - 10000
09/10 20:19	8.6°C	COOL - 10000

By pressing on the cool, instant cooling, cleaning or alarm key, the corresponding logging is displayed.



By pressing the same key again, all values are re-displayed back. You switch between all values and the key values, e.g. start/stop cooling. Also all error messages are shown.

Use the arrow keys at the top to move to the previous or following day.

Use the arrow keys next to the display to browse through the day's data.

Following messages can be shown:

- Start cooling : indicates the cooling cycle was started pressing the cooling button
- Stop cooling : indicates the cooling cycle was stopped pressing the OFF button
- Start automatic cooling : indicates the cooling was started
- Stop automatic cooling : indicates the cooling was stopped
- Start deep cooling : indicates the deep cooling was started pressing the deep cooling button
- Stop deep cooling : indicates the deep cooling was stopped pressing the OFF button
- Start instant cooling
- Stop instant cooling
- Start cleaning
- Stop cleaning
- Cleaning: temp too low : temperature of cleaning water was too low
- Cleaning: filling failed : not possible to fill
- Cleaning: stop pressed : stopped cleaning by pressing the OFF button
- Cleaning: max heating time
- Cleaning: tank not empty
- Cleaning: temp OK
- Cleaning: Max temp : indicates the max. temp.
- Cleaning: end temp : indicates the end temp.
- Cleaning OK
- Cleaning: power interruption
- Milk Collection : there was a milk collection
- Milk collection generated : at start of the cleaning NIV3 was not yet low
- Niv 3 low : level 3 became low

Alarms

Code error	Tekst	Inputs
ERR_10	SMS will be sent!	Clicking on 4.2.2 Test SMS
ERR_100	Init failed, processes cannot start!	Error when uploading version iControl
ERR_101	I2c init error!	Contact Packo
ERR_102	I2c init error, process parameters!	Contact Packo
ERR_103	Power init error, communication problem!	Error when uploading version iControl
ERR_104	Power init error, failed reading inputs!	Error when uploading version iControl
ERR_1001	Error reading machine params!	Contact Packo
ERR_1002	Unable to save machine params!	Contact Packo
ERR_1501	Error reading params!	Contact Packo
ERR_1502	Unable to save params!	Contact Packo
ERR_1505	Factory params loaded!	When resetting the Factory settings, see C.1. Load factory settings
ERR_2001	Error reading error log!	Contact Packo
ERR_2002	Unable to save error log!	Contact Packo
ERR_2003	Unable to read/write error log!	Contact Packo
ERR_2501	Error reading clean log!	Contact Packo
ERR_2502	Unable to save clean log!	Contact Packo
ERR_3001	Error reading cool log!	Contact Packo
ERR_3002	Unable to save cool log!	Contact Packo
ERR_3501	Error reading inst cool log!	Contact Packo
ERR_3502	Unable to save inst cool log!	Contact Packo
ERR_5000	Breakdown cleaning pump!	N I4 removed
ERR_5001	Breakdown agitator 1!	N I1 removed
ERR_5002	Breakdown agitator 2!	N I2 removed
ERR_5003	Breakdown agitator 3!	N I3 removed
ERR_5004	Robot stopped!	N I8 removed
ERR_5005	Detergent almost empty!	N I12 removed
ERR_5006	Breakdown heating equipment!	N I10 removed
ERR_5007	Breakdown cooling unit/ice water pump 1!	N I5 overruled
ERR_5008	Breakdown SSC1/ ice water pump 2!	N I6 removed
ERR_5010	Alarm milk input while other process active!	N I11 removed
ERR_5011	Eco tronic input	I13 24V removed
ERR_5012	UPS input	C3 I9 24V removed
ERR_5014	Clean.program ended.	This message is shown on the screen after the ending of the cleaning program
ERR_5015	Cleaning: temp not long enough high	The cleaning temperature is not long enough above the specified temperature (D.17 + D.18)
ERR_5016	Cleaning: tank full at end cleaning! (NIV3)	The tank is still full after running the cleaning program

Code error	Tekst	Inputs
ERR_5050	Alarm cooling time!	If the cooling takes longer than the set time, an alarm is given. See A.8 Opt. alarm cooling
ERR_5051	Breakdown heating main cleaning!	If the cleaning water is not heated in a certain time, that can be calculated from the formula on p31 of the manual, this message will appear. The obtaining temperature is set in B.17.2 Heating temperature
ERR_5052	Tank not empty! (NIV1 / NIV2)	It's taken the drain valve too long to empty the fluid in the tank
ERR_5054	Unable to fill the tank!	Filling during cleaning while the tank isn't emptied. If after set time the level sensor is not reached.
ERR_5055	Tripping safety active!	Turns on when there isn't 6 min between stop and start of the cooling. See A.5. Tripping safety (6min delay, 0min delay, off)
ERR_5056	Breakdown temp. sensor 1!	
ERR_5057	Temp. too low!	Removing of the temperature or oculus sensor while cooling process is busy. Is shown when temperature becomes lower then temperature setting
ERR_5058	Level sensor drain is not detecting.	If sensor is not detecting when filling is started
ERR_7001	Comm. port power print: open failed	Contact Packo
ERR_10013	Error communication power print	Contact Packo
ERR_10020	There is a new SW version for the Power print. Please update the SW before proceeding! Parameter C.6!	Error when uploading version iControl. Stop the active cycle before updating
ERR_10041	Error communication: wrong function code - update SW iPower!	Contact Packo
ERR_10050	Error communication: iPower SW not started!	Contact Packo
ERR_20056	Clock reset: dead battery?	When there is an electricity failure and the battery is dead, the clock will be reset -> Replace the battery
ERR_20012	Processparameters cleared!	After a software update or removal of the battery.
ERR_100000	Screen XML: file not found!	Contact Packo
ERR_100001	Screen XML: read error	Contact Packo
ERR_100002	Screen XML: versionnumber NOK	Contact Packo
ERR_100003	Screen XML: write error	Contact Packo
ERR_100004	Lang XML: file format NOK	Contact Packo
ERR_100005	Electricity failure	
ERR_100006	No bootloader found - impossible to update the Software	Contact Packo

Code error	Tekst	Inputs
ERR_100007	Lang XML not found	Contact Packo
ERR_100008	Lang XML English not found	Contact Packo
ERR_100009	Please stop the process before updating the software!	Clicking on the button C.6. SW Update while a process is busy.
ERR_10060	Error iPower: Watchdog reset!	Contact Packo
ERR_10061	Error iPower: I2c inputs failed to read	Contact Packo
ERR_10062	Error iPower: I2c temp failed to read	Contact Packo
ERR_10063	Error iPower: Comm CRC error	Contact Packo
ERR_10064	Error iPower: Comm unknown address	Contact Packo
ERR_10065	Error iPower: Comm wrong format	Contact Packo
ERR_10066	Error iPower: Comm wrong number of bytes	Contact Packo
ERR_10067	Error iPower: unknown error	Contact Packo
ERR_10068	EXCEPTION iPower: Take picture of these numbers!	Contact Packo
ERR_10069	Error iPower: RS485 Rx overflow	Contact Packo
ERR_10070	Error iPower: WinCE Rx overflow	Contact Packo
ERR_10071	Error iPower: EEPROM cleared	After update
ERR_5060	Robot Service active!	When activating C.4.4 Service, yes
ERR_5061	SSC Service active!	When activating A.14.5 Service, yes
ERR_6000	Do not load limit 1!	Depending on the type specified in D3.1is the time that the temperature may go under/above the min./max. exceeded. See D.3
ERR_6001	Do not load limit 2!	Depending on the type specified in D4.1is the time that the temperature may go under/above the min./max. exceeded. See D.4
ERR_6002	Do not load limit 3!	Depending on the type specified in D5.1is the time that the temperature may go under/above the min./max. exceeded. See D.5
ERR_6003	Do not load limit 4!	Depending on the type specified in D6.1is the time that the temperature may go under/above the min./max. exceeded. See D.6
ERR_6004	Do not load limit 5!	Depending on the type specified in D7.1is the time that the temperature may go under/above the min./max. exceeded. See D.7
ERR_6005	Max power interruption time passed!	During a process there is an electricity failure that takes longer than the time specified in D.8 Max power interr. time
ERR_6006	Temperature sensor broken!	0V T1 0V removed or wrong choice of sensor type in A.1 Type product temp. sensor

Code error	Tekst	Inputs
ERR_6007	Oculus temp sensor broken!	0V T2 0V removed or wrong choice of sensor type in A.3 Type Oculus sensor
ERR_6008	Max delay start cleaning passed!	This message is shown on the screen when max delay for the cleaning after milkcollect is passed
ERR_6009	Cool temp too high starting from second cool	The temperature specified in D.10 Max temp from second cool and the time specified in D.11 Max time for D.10 are exceeded. This is the maximum temperature that may be reached after cooling of the product under the setpoint
ERR_6010	Cool temp too high during first cool	The max. temp. and the max. time specified in D.12 and D.13 are exceeded
ERR_6011	Cool temp too low	The current temperature is lower than the specified temperature for the cooling in D.14
ERR_6012	Cool: agitators too long not active	The agitators have turned less than the time entered in D.16 Max time without stirring
ERR_6013	Clean temp not long enough high	During the cleaning process is the heating temperature in D.17 not long enough reached
ERR_6014	Do not forget to clean the tank!	A certain time after the collection of the product, adjustable in D.19, a reminder for cleaning the tank is sent.
ERR_6015	Cooling started/Level detected without cleaning!	After collecting of the product, the cooling is immediately started, level is detected without cleaning.
ERR_6016	Cleaning needed	After the collection of the product, this message is shown
ERR_6017	Cleaning: stop pressed!	Pressing the stop button while the process is busy
ERR_6018	Please start the cooling!	This message is shown when the tank is full and the cooling isn't started
ERR_4000	No external memory found!	By clicking on C.10 Export log files when no extern memory is present
ERR_4001	Copy to memory stick: OK	Clicking on C.10 Export log files and the copying to the memory stick is finished
ERR_4002	Copy to SD card: OK	Clicking on C.10 Export log files and the copying to the SD card is finished
ERR_4003	Failed to create the destination folder! Is the card locked?	This message is shown on the screen when the SD card is not found while the copyprocess is busy
ERR_4004	Files to copy not found!	
ERR_4005	Destination folder not found!	Removing the memory stick while copying is started, see C.10 Export log files
ERR_4006	Authentication error! Is the card locked?	This message is shown with the use of a locked SD card as extern memory

Code error	Tekst	Inputs
ERR_4007	Failed to copy files: are they already on the memory device? Is the disk full?	
ERR_4008	File transfer: unknown error	
ERR_4009	No SD card found!	No SD card found -> retry to plug in and restart if continues
ERR_4010	No Memory stick found!	No memory stick found -> retry to plug in and restart if continues
ERR_4011	Copy busy!	Multiple times in sequence pressing on C.10 Export log files
ERR_4012	Copy files started!	
ERR_10100	Error iPower: EEPROM writing failed	Contact Packo
ERR_10101	Error iPower: EEPROM reading failed	Contact Packo
ERR_4050	No Pacap address file found!	Pacap
ERR_4051	Error: Pacap address file – wrong syntax!	Pacap
ERR_4052	No Pacap volume file found!	Pacap
ERR_4053	Error: Pacap file – wrong order pacap values!	Pacap
ERR_4054	Error: Pacap file – wrong order volume values!	Pacap
ERR_4055	Error: Pacap file – wrong syntax!	Pacap
ERR_4056	Error: Pacap address file – not enough items!	Pacap
ERR_4100	Internet connectivity OK, check your data at http://icontrol.packo.com	
ERR_4101	Internet connectivity NOK, no IP address, check the cable	
ERR_4102	Internet connectivity NOK, no internet, check your internet	
ERR_4103	Internet connectivity NOK, server does not reply, contact Packo	
ERR_11013	Error: Pacap timeout	Pacap
ERR_5017	The difference between the product sensor and the oculus sensor is too big!	Temperature sensor
ERR_5018	Replace product temp. sensor and change parameter C.14.1 to NORMAL	Temperature sensor
ERR_5019	Replace oculus temp. sensor and change parameter C.14.1 to NORMAL	Temperature sensor
ERR_100010	Watchdog cannot open: restart tank!	
ERR_100011	Watchdog cannot start: restart tank!	
ERR_26001	GSM: Not enough characters in the GSM number	GSM
ERR_26002	GSM: no gsm number entered	GSM
ERR_26004	GSM: Is switched off!	GSM
ERR_26005	GSM: Is not active!	GSM
ERR_26008	GSM: Init. PIN-code failed	GSM
ERR_26017	GSM: Unable to send SMS	GSM

Code error	Tekst	Inputs
ERR_26019	GSM: No answer received	GSM
ERR_26022	GSM: Unable to send SMS due to network or lack of money	Bad reception of the gsm module or no money on the SIM card
ERR_26023	GSM: No suitable baudrate found	
ERR_26024	GSM: Something is broken	
ERROR	Error	
Error ABCDE	Error AB → if 10 → Power Print → if 11 → external modules C → if 1 → module 1 DE → if 13 → time out	e.g. 11113 means time-out external module, module 1* * Error message 11113 does not return if Pacap option was deactivated
As of 5.30		
ERR_1506	Installer's parameters loaded!	When activating parameter C.14
ERR_1507	Packo parameters loaded!	When activating parameter XX.
ERR_1508	Installer's parameters not found!	If no parameters were saved with parameter C.13
ERR_1509	Packo parameters not found	If no parameters were saved with parameter XIX.
ERR_5020	Cooling not active after milking!	Cooling is not activated after the set period(s) and time in 1.11
ERR_5021	Buffer vessel 1 is full	Message that the buffer vessel is full
ERR_5030	Parameters saved	Message that the parameters have been saved, this for both the installer's parameters and Packo parameters
ERR_5031	USB stick added	Message that the USB stick was added
ERR_5032	SD card added	Message that the SD card was added
ERR_5033	USB stick removed	Message that the USB stick was removed
ERR_5034	SD card removed	Message that the SD card was removed
ERR_6050	Last parameters not found, installer's parameters will be loaded!	
ERR_6051	Installer's parameters not found, Packo parameters will be loaded	
ERR_6052	Packo parameters not found, manufacturer's parameters will be loaded	
ERR_100012	Oculus light selected	Message that the Oculus light has been selected

Starting the installation

Overview

Introduction

Following the installation, the cooling tank will be started up for the first time. This section deals with the start-up procedures for the various types of tank.

Area instructions

It is not recommended to install the cooling tank in a salty environment e.g. sea area or salt flats.

Cooling with DX/DIB


After the installation

After the installation the installer should start the system and check the proper operation of the cooling and agitation.

The first start-up is preferably done with pure water instead of milk. If start-up is done immediately with milk out of necessity, the tank must first be thoroughly cleaned (see 'cleaning')

Start-up procedure

In order to start up the system, the installer sets to work as follows:

Step	Action
1	If present, remove the safety supports from underneath the agitator blade and the refrigerating compressor.
2	Set the master switch (provided by the customer) to Position I (or ON). The iControl indicates the temperature of the milk on the screen. The refrigerating compressor may briefly start.
3	Check the direction of rotation of all motors.
4	Press the OFF key if a cycle is active.
5	Fill the tank with pure water until the agitating blades/evaporator are/is completely submerged.
6	Press the deep cooling key in order to start the deep cooling. Start the refrigerating compressor and the agitator and the water will be cooled. At the bottom right of the screen there is the cooling symbol and the deep cooling temperature.
7	Check the setting of the thermostatic expansion valve and the sight glass (see next page).
8	Wait until the water has reached the set-point temperature The cooling process automatically stops and the agitator continues to rotate for a further 2 minutes.
9	Compare the water temperature on the screen with the current water temperature and implement changes if necessary.
10	Wait until the agitator stops
11	Press the OFF key.
12	 <p>Press the agitation key once in order to allow the agitator to operate during the pre-set time. The agitation time will be displayed on the screen. The agitation symbol appears on the bottom right of the screen</p>
13	Wait until the agitator stops
14	Open the outlet valve and allow the water to drain to the sewer.

Checks

Carry out the following checks during the cooling process:

The adjustment of thermostatic expansion valve:

As a general rule, we can say that a difference of 8 to 9°C must be achieved between the temperature of the milk in motion (on the condition that the milk completely cover the evaporator and that this already has a temperature below 10°C), and the evaporation temperature of the refrigerant.

The sight glass: if bubbles appear, refrigerant must be added, provided that the pressure in the liquid receiver is sufficiently high.



The sight glass should be clear throughout the cycle.

Check the on and off switches of the various pressure switches:

The low pressure pressure switch ('PUMP-DOWN' system)

The safety pressure switch for high pressure

Ventilator pressure switch(es) (if present)

Compare the milk temperature on the display with the actual milk temperature and adjust as necessary.

Cooling with IB

After the installation





After the installation, the installer should start the system and check the proper operation of the cooling and agitation.



The first start-up is preferably done with pure water instead of milk. If, out of necessity, start-up is done immediately with milk, the tank must first be thoroughly cleaned (see 'cleaning')

Start-up procedure

In order to start up the system, the installer sets to work as follows:

Step	Action
1	If present, remove the safety supports from underneath the agitator blade and the refrigerating compressor.
2	Set the master switch (provided by the customer) to Position I (or ON). The iControl indicates the temperature of the milk on the screen. The compressor may briefly start.
3	Check the direction of rotation of all motors.
4	Fill the water tank with water.
5	Set the timer to ON in order to start the cooling unit. The cooling unit does not start if there is insufficient ice available.
6	Press the OFF key if a cycle is active.
7	Fill the tank with pure water until the agitating blades/evaporator are/is completely submerged.
8	 <p>Press the deep cooling key  in order to start the deep cooling. Start the ice water pump and the agitator and the water will be cooled. At the bottom right of the screen there is the cooling symbol and the deep cooling temperature.</p>
9	Check the ice water sprinkler system.
10	Press the OFF key.
11	Wait until the agitator and the ice water pump have stopped.
12	 <p>Press the agitation key  once in order to allow the agitator to operate during the pre-set time. The agitation time will be displayed on the screen. The agitation symbol appears on the bottom right of the screen.</p>
13	Wait until the agitator stops
14	Compare the water temperature on the screen with the current water temperature and implement changes if necessary.
15	Open the outlet valve and allow the water to drain to the sewer.

Checks



Carry out the following checks during the cooling process:

The adjustment of thermostatic expansion valve:

It is imperative that the adjustment of the thermostatic expansion valve is controlled in order to obtain ice along the entire length of the evaporator and to cover the suction line with frost to where it comes out of the outer receptacle.



There should be no freezing on the suction line between milk cooling tank and cooling unit, as well as the compressor itself

The sight glass: if bubbles appear, refrigerant must be added, provided that the high pressure in the liquid receiver is sufficiently high.



The sight glass should be clear throughout the cycle.

Check the on and off switches of the various pressure switches:

The low pressure pressure switch ('PUMP-DOWN' system)

The safety pressure switch for high pressure



Ventilator pressure switch(es) (if present)

Compare the milk temperature on the display with the actual milk temperature and adjust as necessary.

In case of 'instant cooling': check the start-up of the ice water pump.

Check in case of 'instant cooling'

With the 'instant cooling' option, check the start-up of the ice water pump as follows:

Step	Action
1	Press the OFF key if a cycle is active.
2	Press the 'instant cooling' key  in order to start the ice water pump.
3	Check the start-up of the ice water pump.
4	Press the 'instant cooling' key  again in order to stop the ice water pump.
5	Wait until the ice water pump has completely stopped.

Cleaning

Pre-cleaning

The installer cleans the new milk cooling tank for the first time. The first cleaning should be:

in order to check the cleaning system;
in order to make the tank ready to receive milk.



If the tank has been soiled as a result of the installation (e.g. stone chips in the tank), it must first be manually cleaned. If that is not done, the automatic cleaning system may be damaged.

Cleaning product

Use an alkaline (base) cleaning product for the first cleaning. See cleaning products for more information about cleaning products.

Automatic dosing

Connect the vessels with the cleaning products as follows:

alkaline (base) cleaning product with the blue hose
acidic cleaning product with the red hose.

Dosing pumps



The dosing of the cleaning product is set in advance in the parameters. Depending on the water quality and the cleaning products used, it may be necessary to adjust the parameter settings. Check the data on the vessel to ensure the correct percentage has been set.






The standard Dosing pumps have a capacity of 280 cc/minute at 50Hz.

Pre-cleaning

In order to clean the tank for the first time, the installer follows the following steps:

Step	Action
1	Press the OFF key if a cycle is active.
2	Start the dosing pumps manually via the diagnostic menu (one at a time) together with the cold water supply and open the milk outlet cock to ensure that cleaning product is used.
3	Screw the closure cap onto the rinsing head or attach the rubber connection of the cleaning pump to the milk outlet.
4	Open the hot and cold water supply to the water valves and check for leaks.

Step	Action
5	Close the manhole cover and make sure that the seal is correctly fitted.
6	Make sure that the air vent and the rubber stopper of the milk inlet opening are mounted.
7	Open the milk outlet valve.
8	<p>Check that the selection of the cleaning product is displayed on the screen (bottom right).</p> <p>Change if necessary by pressing on  or  (minimum 3 seconds)</p> <p>Follow the instructions on the instruction leaflet of the cleaning product. Be aware that the amount of water is approximately equal to 1% of the tank volume, but with a minimum of 25 litres.</p>
9	<p></p> <p>Press the cleaning key .</p> <p>The cleaning program starts.</p>

Checks



Carry out the following checks during the cleaning cycle:

The amount water that is used per cleaning cycle: 1% of the nominal volume with a minimum of 25 litres.

The temperature of the water at the end of the main cleaning must be at least 40°C for five minutes (dependent on the cleaning product used).

The operation of the spraying ball.

If all the water is discharged at the end of each draining.


After cleaning

Attention

In order to select a function, you must always hold the relevant key pressed in for one second. This avoids a function being started up 'by accident'.

Starting a second cleaning cycle

For some reason, it may be necessary for a second cleaning cycle to be carried out. Follow the steps below:

Step	Action
1	Confirm the notification(s)
2	Press the cleaning key  .

Preparing the installation for a new milking

Prior to putting the milk into an empty and cleaned tank, follow the steps below:

Step	Action
1	Make sure the cleaning cycle has finished. If an error message appears, follow up the error message and if necessary start the cleaning all over again.
2	Confirm the notifications
3	Check that the tank is completely empty. If not, check the setting of the level sensor and the drain valve(s).
4	Check that the inside of tank is completely clean.
5	Check that the manhole cover and the seal are clean. If that is not the case, they should be manually cleaned.
6	Close the outlet cock.
7	Close the manhole cover.
8	Make sure that the air vent and the rubber stopper of the milk inlet opening are mounted.
9	Remove the large closure cap and fix the closure cap onto the milk outlet.

The system is now ready to receive new milk.

About the agitation

Why does the milk have to be stirred?

Agitation of the milk guarantees that:

there is a maximum heat transfer.

the milk does not freeze (DX).

the milk remains homogeneous and that no fat layer forms.

Operation

The agitator operates as follows:

Step	Action
1	The agitator functions when the cooling is in operation.
2	When the milk is at the right temperature and the cooling stops, the agitator continues stirring for two minutes.
3	When the milk has cooled there is a resting period of 13 minutes.
4	Next, the agitator operates for another two minutes and so on.

Duration of the agitation time and resting period

Your installer can set the duration of the resting period.

Manual agitation

You can also switch on the agitator manually. This is done in the following cases:


You take a sample of the milk.

The automatic system is defective.

You can set the agitation time via parameters. These are set by default, respectively to 2 and 30 minutes.

Procedure for manual agitation

Follow the steps below to manually switch on the agitator.

Step	Action
1	<p>In order to agitate the milk for two minutes, press the 'agitator key' once .</p> <p>In order to stir the milk for 30 minutes, press the 'agitator key' twice in succession.</p>

Packo parameters

Description	Factory settings	Range		Unit	Settings
I. Clean: Auto drain act?	Automatic	Automatic or Standard times			
II. Clean: Max drain time	10	6	12	min	
III. Clean: Max fill time	30	0	60	min	
IV. Clean: Extra drain time	10	0	100	s	
V. Deep cooling temp	1.9	0	24	°C	
VI. Clean: Delay level sensor	10	5	20	s	
VII. Clean: Eco-wash Lvl Offset	20	0	50	L	
VIII. Sc Menu					
Emc					
Log					
A fine day to exit					
PP test button					
IX. Clean: Eco-wash level sensor delay	80	0	240	s	
X. Clean: Show cups	No	Yes/No			
XI. Level sensor 3 ignore time	30	1	120	min	
XII. iPower cool guard active	Yes	Yes/No			
XIII. Oculus					
Counter 1	0				
Counter 2	0				
Counter 3	0				
Timer Lim1	0				
Timer Lim2	0				
Timer Lim3	0				
Timer Lim4	0				
Timer Lim5	0				
Timer Max Time Wash	0				
Timer Cool	0				
Timer Clean	0				
XIV. PP CheckCool: delay cool still active	1	1	60	min	
XV. PP CheckCool: delay cool not starting	20	20	60	min	
XVI. Error 5053: Alarm same temperature during cool	60	10	120	min	
XVII. Show only SP1	No	Yes/No			
XVIII. Erase errors					

Description	Factory settings	Range		Unit	Settings
XIX. Save Packo par					As of 5.30
XX. Load Packo par					As of 5.30
XXI. Lag time for the restart of the cooling after the collection	60	0	300	min.	As of 5.60
XXII. Lag time for pumping the milk over	2	0	60	min.	As of 5.60
XXIII. Delay before starting cleaning pump	5	0	60	S	As of 5.60
XXIV. Cleaning pump active time	Not active	0	60	S	As of 5.60
XXV. Market software	No	Yes	No		As of 5.60
XXVI. Event hole active (buffer tank system)	2	0	60	S	As of 5.60
XXVII. Tank 2, wait time before restarting cooling	60	0	120	min.	As of 5.60
XXVIII. Delay before starting command (two-tank system)	0	0	999	s	As of 5.60
XXIX. Watchdog time out	25	0	999	S	From version 6.02 onwards
XXX. PACAP status					From version 6.02 onwards
XXXI. PACAP delay alarm	12	1	100	Hrs	From version 6.02 onwards
XXXII. Internet option: frequency of sending data	30	1	360	Min.	From version 6.02 onwards
XXXIII. Internet option: server address					From version 6.02 onwards
XXXIV. SMS – timeout thread	30	1	600	Min.	From version 6.02 onwards

Battery replacement

Step 1: Turn off the power of the iControl

Step 2: Loosen the six Philips screws of the iControl. The cover with touchscreen is now detachable.



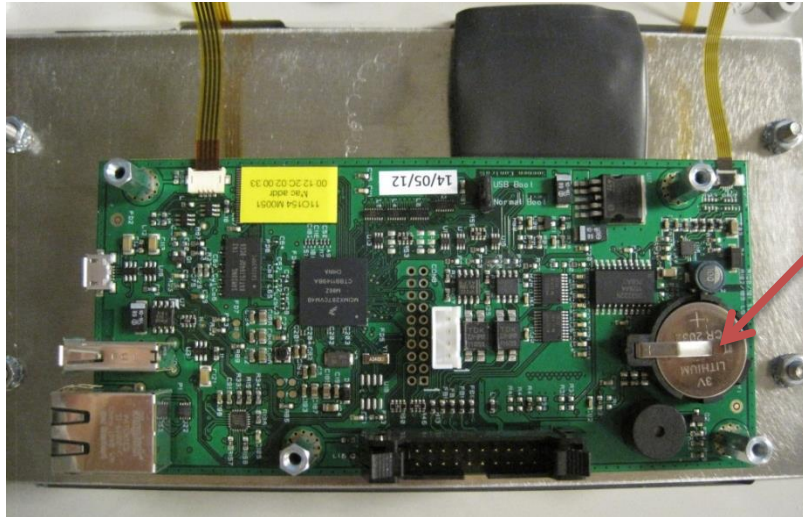
Step 3: Remove the back of the touchscreen by loosening the four hex socket screws. See picture below

Display PCB



Step 4: When the back is removed, the printboard is visible. The board is comparable with the picture below. The battery is indicated with a red arrow and is easily detachable from its holder.

Battery CR 2032 Li Mn 3V, part number 160215



Step 5: Put the new battery in the holder. When this is done, everything can be assembled. The power may now be turned on.

Overview current and power cooling tanks



Always check the type plate for the correct current and power!

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
REM/DX – RS/DX							
REM	DX	1050	30	I-CONTROL		10,35	1,81
REM	DX	1300	30	I-CONTROL		10,35	1,81
REM	DX	1700	30	I-CONTROL		10,35	1,81
REM	DX	2100	30	I-CONTROL		10,35	1,81
REM	DX	2600	30	I-CONTROL		10,35	1,81
REM	DX	3100	30	I-CONTROL		10,35	1,81
REM	DX	3800	30	I-CONTROL		10,35	1,81
REM	DX	4400	30	I-CONTROL		10,35	1,81
REM	DX	5000	30	I-CONTROL		10,35	1,81
REM	DX	6150	30	I-CONTROL		10,35	1,81
REM	DX	7200	30	I-CONTROL		10,35	1,81
REM	DX	8200	30	I-CONTROL		10,94	1,94
REM	DX	9000	30	I-CONTROL		10,94	1,94
REM	DX	10000	30	I-CONTROL		10,94	1,94
REM	DX	12000	30	I-CONTROL		10,94	1,94
REM	DX	15000	30	I-CONTROL		10,94	1,94
REM	DX	1050	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	1300	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	1700	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	2100	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	2600	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	3100	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	3800	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	4400	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	5000	21 (tem 5000L)	I-CONTROL		10,4	1,74
REM	DX	1050	30	ECO-WASH		10,83	1,92
REM	DX	1300	30	ECO-WASH		10,83	1,92
REM	DX	1700	30	ECO-WASH		10,83	1,92
REM	DX	2100	30	ECO-WASH		10,83	1,92
REM	DX	2600	30	ECO-WASH		10,83	1,92
REM	DX	3100	30	ECO-WASH		10,83	1,92
REM	DX	3800	30	ECO-WASH		10,83	1,92
REM	DX	4400	30	ECO-WASH		10,83	1,92

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
REM	DX	5000	30	ECO-WASH		10,83	1,92
REM	DX	6150	30	ECO-WASH		10,83	1,92
REM	DX	7200	30	ECO-WASH		10,83	1,92
REM	DX	8200	30	ECO-WASH		11,42	2,05
REM	DX	9000	30	ECO-WASH		11,42	2,05
REM	DX	10000	30	ECO-WASH		11,42	2,05
REM	DX	12000	30	ECO-WASH		11,42	2,05
REM	DX	15000	30	ECO-WASH		11,42	2,05
REM	DX	1050	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	1300	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	1700	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	2100	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	2600	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	3100	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	3800	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	4400	21 (tem 5000L)	ECO-WASH		10,88	1,85
REM	DX	5000	21 (tem 5000L)	ECO-WASH		10,88	1,85
RS	DX	5000	30	I-CONTROL		10,35	1,81
RS	DX	8000	30	I-CONTROL		10,35	1,81
RS	DX	5000	30	ECO-WASH		10,83	1,92
RS	DX	8000	30	ECO-WASH		10,83	1,92
REM/DIB – RS/DIB							
REM	DIB	1050	30	I-CONTROL		10,35	1,81
REM	DIB	1300	30	I-CONTROL		10,35	1,81
REM	DIB	1700	30	I-CONTROL		10,35	1,81
REM	DIB	2100	30	I-CONTROL		10,35	1,81
REM	DIB	2600	30	I-CONTROL		10,35	1,81
REM	DIB	3100	30	I-CONTROL		10,35	1,81
REM	DIB	3800	30	I-CONTROL		10,35	1,81
REM	DIB	4400	30	I-CONTROL		10,35	1,81
REM	DIB	5000	30	I-CONTROL		10,35	1,81
REM	DIB	1650	30	I-CONTROL		10,35	1,81
REM	DIB	7200	30	I-CONTROL		10,35	1,81
REM	DIB	8200	30	I-CONTROL		10,35	1,81
REM	DIB	9000	30	I-CONTROL		10,35	1,81
REM	DIB	10000	30	I-CONTROL		10,35	1,81
REM	DIB	12000	30	I-CONTROL		10,35	1,81
REM	DIB	15000	30	I-CONTROL		10,35	1,81
RS	DIB	5000	30	I-CONTROL		10,35	1,81

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
RS	DIB	8000	30	I-CONTROL		10,35	1,81
LEM/DX – LS/DX							
LEM	DX	5000	30	I-CONTROL		10,35	1,81
LEM	DX	6200	30	I-CONTROL		10,35	1,81
LEM	DX	7000	30	I-CONTROL		10,94	1,94
LEM	DX	8000	30	I-CONTROL		10,94	1,94
LEM	DX	9000	30	I-CONTROL		10,94	1,94
LEM	DX	10000	30	I-CONTROL		10,94	1,94
LEM	DX	12000	30	I-CONTROL		10,94	1,94
LEM	DX	14000	30	I-CONTROL		10,94	1,94
LEM	DX	15500	30	I-CONTROL		10,94	1,94
LEM	DX	18000	30	I-CONTROL		10,94	1,94
LEM	DX	22000	30	I-CONTROL		11,53	2,07
LEM	DX	25500	30	I-CONTROL		11,53	2,07
LEM	DX	31600	30	I-CONTROL		11,53	2,07
LEM	DX	5000	30	ECO-WASH		10,83	1,92
LEM	DX	6200	30	ECO-WASH		10,83	1,92
LEM	DX	7000	30	ECO-WASH		11,42	2,05
LEM	DX	8000	30	ECO-WASH		11,42	2,05
LEM	DX	9000	30	ECO-WASH		11,42	2,05
LEM	DX	10000	30	ECO-WASH		11,42	2,05
LEM	DX	12000	30	ECO-WASH		11,42	2,05
LEM	DX	14000	30	ECO-WASH		11,42	2,05
LEM	DX	15500	30	ECO-WASH		11,42	2,05
LEM	DX	18000	30	ECO-WASH		11,42	2,05
LEM	DX	22000	30	ECO-WASH		12,01	2,18
LEM	DX	25500	30	ECO-WASH		12,01	2,18
LEM	DX	31600	30	ECO-WASH		12,01	2,18
LS	DX	10250	30	I-CONTROL		10,94	1,94
LS	DX	13100 LONG	30	I-CONTROL		10,94	1,94
LS	DX	13100 SHORT	30	I-CONTROL		10,35	1,81
LS	DX	14500	30	I-CONTROL		10,35	1,81
LS	DX	15500	30	I-CONTROL		10,94	1,94
LS	DX	17650	30	I-CONTROL		10,94	1,94
LS	DX	21500	30	I-CONTROL		10,94	1,94
LS	DX	25500	30	I-CONTROL		10,94	1,94
LS	DX	30450	30	I-CONTROL		11,53	2,07
LS	DX	10250	30	ECO-WASH		11,42	2,05

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
LS	DX	13100 LONG	30	ECO-WASH		11,42	2,05
LS	DX	13100 SHORT	30	ECO-WASH		10,83	1,92
LS	DX	14500	30	ECO-WASH		10,83	1,92
LS	DX	15500	30	ECO-WASH		11,42	2,05
LS	DX	17650	30	ECO-WASH		11,42	2,05
LS	DX	21500	30	ECO-WASH		11,42	2,05
LS	DX	25500	30	ECO-WASH		11,42	2,05
LS	DX	30450	30	ECO-WASH		12,01	2,18
LEM/DIB – LS/DIB							
LEM	DIB	5000	30	I-CONTROL		10,35	1,81
LEM	DIB	6200	30	I-CONTROL		10,35	1,81
LEM	DIB	7000	30	I-CONTROL		10,35	1,81
LEM	DIB	8000	30	I-CONTROL		10,35	1,81
LEM	DIB	9000	30	I-CONTROL		10,35	1,81
LEM	DIB	10000	30	I-CONTROL		10,35	1,81
LEM	DIB	12000	30	I-CONTROL		10,35	1,81
LEM	DIB	14000	30	I-CONTROL		10,35	1,81
LEM	DIB	15500	30	I-CONTROL		10,35	1,81
LEM	DIB	18000	30	I-CONTROL		10,35	1,81
LEM	DIB	22000	30	I-CONTROL		10,35	1,81
LEM	DIB	25500	30	I-CONTROL		10,35	1,81
LEM	DIB	31600	30	I-CONTROL		10,35	1,81
LS	DIB	10250	30	I-CONTROL		10,35	1,81
LS	DIB	13100 LONG	30	I-CONTROL		10,35	1,81
LS	DIB	13100 SHORT	30	I-CONTROL		10,35	1,81
LS	DIB	14500	30	I-CONTROL		10,35	1,81
LS	DIB	15500	30	I-CONTROL		10,35	1,81
LS	DIB	17650	30	I-CONTROL		10,35	1,81
LS	DIB	21500	30	I-CONTROL		10,35	1,81
LS	DIB	25500	30	I-CONTROL		10,35	1,81
LS	DIB	30450	30	I-CONTROL		10,35	1,81
RM/IB							
RM	IB	1600	30	I-CONTROL		10,35	1,81
RM	IB	2200	30	I-CONTROL		10,35	1,81
RM	IB	2800	30	I-CONTROL		10,35	1,81
RM	IB	3300	30	I-CONTROL		10,35	1,81

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
RM	IB	3800	30	I-CONTROL		10,35	1,81
RM	IB	4400	30	I-CONTROL		10,35	1,81
RM	IB	5000	30	I-CONTROL		10,35	1,81
RM	IB	6000	30	I-CONTROL		10,94	1,94
RM	IB	7150	30	I-CONTROL		10,94	1,94
RM	IB	9650	30	I-CONTROL		10,94	1,94
RM	IB	12400	30	I-CONTROL		10,35	1,81
RM	IB	15400	30	I-CONTROL		10,35	1,81
RM	IB	1600	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	2200	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	2800	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	3300	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	3800	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	4400	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	5000	21 (tem 5000L)	I-CONTROL		9,76	1,68
RM	IB	1600	30	ECO-WASH		10,83	1,92
RM	IB	2200	30	ECO-WASH		10,83	1,92
RM	IB	2800	30	ECO-WASH		10,83	1,92
RM	IB	3300	30	ECO-WASH		10,83	1,92
RM	IB	3800	30	ECO-WASH		10,83	1,92
RM	IB	4400	30	ECO-WASH		10,83	1,92
RM	IB	5000	30	ECO-WASH		10,83	1,92
RM	IB	6000	30	ECO-WASH		10,83	1,92
RM	IB	7150	30	ECO-WASH		10,83	1,92
RM	IB	9650	30	ECO-WASH		10,83	1,92
RM	IB	12400	30	ECO-WASH		10,83	1,92
RM	IB	15400	30	ECO-WASH		10,83	1,92
RM	IB	1600	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	2200	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	2800	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	3300	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	3800	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	4400	21 (tem 5000L)	ECO-WASH		10,24	1,79
RM	IB	5000	21 (tem 5000L)	ECO-WASH		10,24	1,79
VM/DX							
VM	DX	12000	30	I-CONTROL		10,35	1,81
VM	DX	15500	30	I-CONTROL		10,35	1,81
VM	DX	18000	30	I-CONTROL		10,35	1,81
VM	DX	21000	30	I-CONTROL		10,35	1,81
VM	DX	25000	30	I-CONTROL		10,35	1,81
VM	DX	30000	30	I-CONTROL		10,35	1,81

Type	Type Cooling	Volume (Liter)	Engine speed Agitator	Operating system		Current (A)	Power (kW)
VM	DX	35000	30	I-CONTROL		10,35	1,81
VM	DX	12000	30	ECO-WASH		10,83	1,92
VM	DX	15500	30	ECO-WASH		10,83	1,92
VM	DX	18000	30	ECO-WASH		10,83	1,92
VM	DX	21000	30	ECO-WASH		10,83	1,92
VM	DX	25000	30	ECO-WASH		10,83	1,92
VM	DX	30000	30	ECO-WASH		10,83	1,92
VM	DX	35000	30	ECO-WASH		10,83	1,92
VM/DIB							
VM	DIB	12000	30	I-CONTROL		10,35	1,81
VM	DIB	15500	30	I-CONTROL		10,35	1,81
VM	DIB	18000	30	I-CONTROL		10,35	1,81
VM	DIB	21000	30	I-CONTROL		10,35	1,81
VM	DIB	25000	30	I-CONTROL		10,35	1,81
VM	DIB	30000	30	I-CONTROL		10,35	1,81
VM	DIB	35000	30	I-CONTROL		10,35	1,81

Overview current and power cooling units

COOLING UNITS F 1x 220-240V				
Cooling unit	Current -10 °C (A)	Power -10 °C (kW)	Current 0 °C (A)	Power 0 °C (kW)
ECO-COOL 0.5	3,23	0,610	3,72	0,736
ECO-COOL 0.6	3,92	0,798	4,67	0,961
ECO-COOL 1.0	4,74	0,960	5,69	1,165
ECO-COOL 1.1	5,67	1,127	6,92	1,415
ECO-COOL 1.2	6,32	1,378	7,67	1,688
ECO-COOL 1.5	8,28	1,858	9,97	2,226
ECO-COOL 2.0	8,45	1,976	10,40	2,421
ECO-COOL 2.5	11,50	2,618	14,20	3,222
ECO-COOL 3.0	15,90	3,382	19,10	4,159

COOLING UNITS T 3x 400V				
Cooling unit	Current -10 °C (A)	Power -10 °C (kW)	Current 0 °C (A)	Power 0 °C (kW)
ECO-COOL 0.6	1,75	0,810	1,95	0,979
ECO-COOL 1.0	1,99	0,993	2,26	1,210
ECO-COOL 1.1	2,40	1,088	2,80	1,364
ECO-COOL 1.2	2,95	1,357	3,37	1,662
ECO-COOL 1.5	3,97	1,801	4,53	2,178
ECO-COOL 2.0	3,84	1,953	4,47	2,420
ECO-COOL 2.5	4,63	2,447	5,53	3,086
ECO-COOL 3.0	5,77	3,130	6,78	3,901
ECO-COOL 4.0	5,71	3,378	6,90	4,279
ECO-COOL 4.5	6,23	3,734	7,47	4,730
ECO-COOL 5.0	7,02	4,146	8,49	5,330
ECO-COOL 6.5	8,12	5,229	10,30	6,771
ECO-COOL 7.5	12,60	6,748	15,10	8,552
ECO-COOL 9.0	12,60	7,068	15,50	9,062
ECO-COOL 10.0	15,60	8,870	18,80	11,197
ECO-COOL 12.0	17,70	10,050	21,50	12,851

Remarks:

- The temperatures shown are vaporization temperatures, ambient temperature is 32 °C