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Universal tank control WTS-200 *Firmware V3.3*

QUICK START GUIDE

for plant engineering companies, installers and service engineers

Programmable via configuration software WELBA „KONSOFT"

Contents

Complete operating instructions

Note:

This quick start guide is not a substitute for the detailed operating instructions for the universal tank controller WTS-200.

These operating instructions include important technical and safety information. It is vital to carefully study all the complete operating instructions before the installation of the control or in case of any other work with the control!

The detailed operating instructions are available on the Internet at

https://www.welba.de/pdf-englisch/ba/105871-wts-200.pdf

Download complete operating instructions WTS-200

It is the duty of the party commissioning the system to ensure compliance with the following guidelines.

The universal tank controller may only be installed by an authorised specialist, observing all local safety requirements.

Access to the environment when connected must be restricted to specialised personnel.

Universal tank controllers contain live components. They must be built into the plant in such a way that contact with such live components is impossible.

The device must not be used if the housing or connection terminals are damaged.

No fluids must penetrate the housing.

Before connecting ensure that the mains voltage is the same as indicated on the device's type plate.

Incorrect electrical connection can cause damage to the regulator and to the equipment.

The temperature controller should be disconnected from the mains voltage while connecting plant components or the sensor.

No appliances with current levels in excess of the maximum values indicated in the technical data should be connected to the relay contacts.

No other consumers may be connected to the controller's mains terminals.

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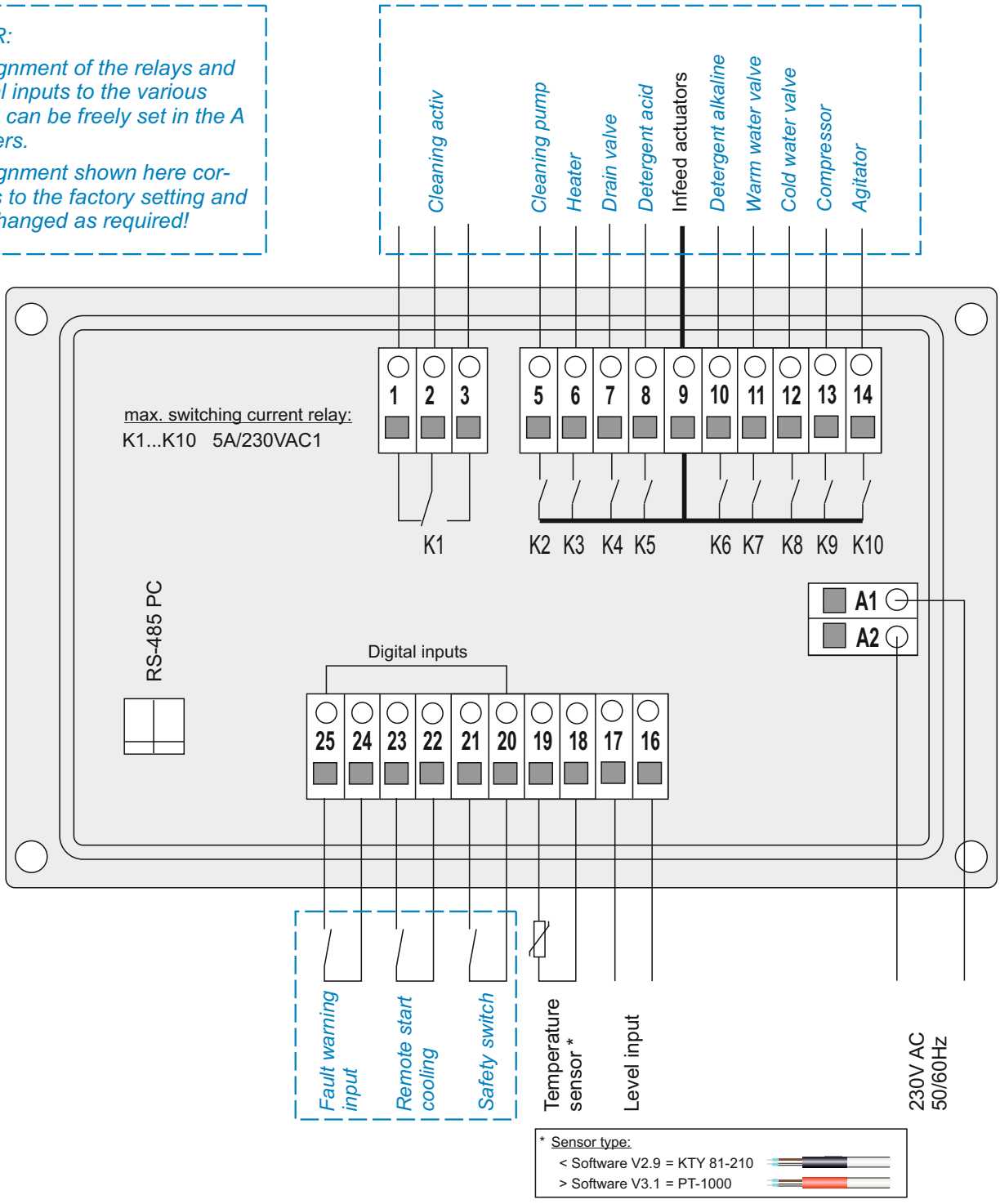
Connection diagram

- Electrical connections must be as shown in the diagram below.
- Use cable bushes.
- Make sure that cables cannot chafe.
- Observe relay current rating.
- In all cases use contactors for pump, compressor and heater.
- Do not feed digital inputs with external voltage! Use potential-free switches.

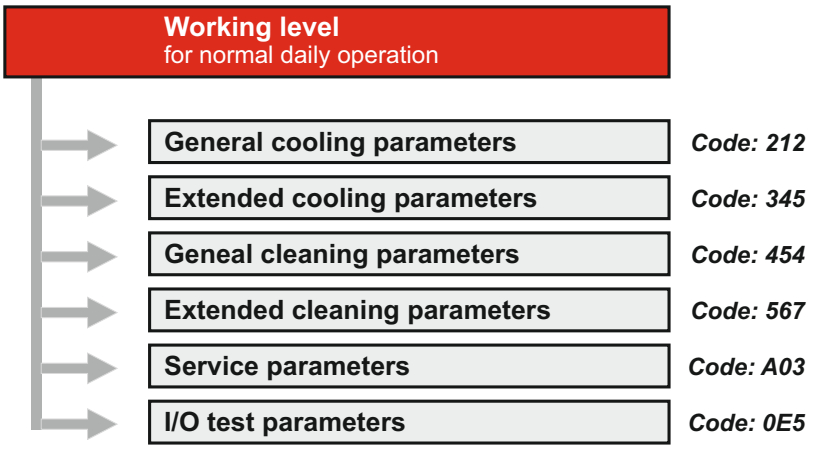
DANGER:

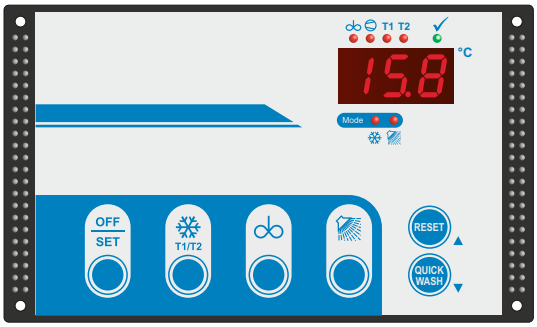
The assignment of the relays and the digital inputs to the various functions can be freely set in the A parameters.

The assignment shown here corresponds to the factory setting and can be changed as required!



The working level is for normal daily milk-cooling operation. In cooling mode, the current milk temperature as measured is permanently displayed.





Button functions

To change to a different mode always press the 'OFF/SET' button first.

Active modes are closed down by pressing the 'OFF' button.

OFF / Set button

- Switch regulator to OFF mode.
- Switch off continuous stirring
- Switch to programming mode (press button for 3 seconds)
- Stop of the milk decanting function

COOLING button

in OFF mode	=	Start cooling
press twice	=	Bypass coolingstart delay.
in cooling mode	=	Switch between target temperatures T1/T2
Sensor fault	=	Activate EMERGENCY-cooling

AGITATOR button

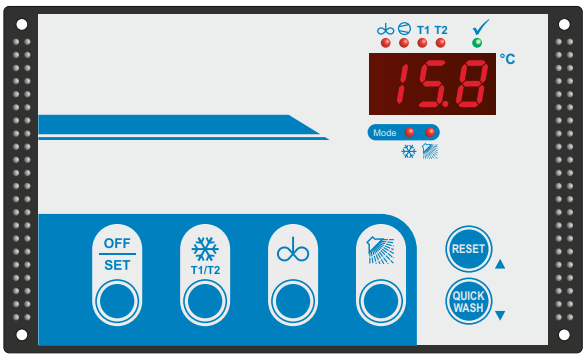
in OFF mode =	Continuous stirring
in cooling mode (press 1 sec.)	'Intermediate stirring SHORT'
in cooling mode (press 3 sec.)	'Intermediate stirring LONG'

WASHING button

in OFF mode =

- short pressing: Start Cleaning
- longer pressing: Start of the cleaning with the desired rinsing cycle (if parameterised)

During cleaning process = Special function when commissioning / Service



Meaning of LEDs

LED "AGITATOR"

in all mode	Agitator is switched on

LED "COMPRESSOR"

continuous	Compressor contactor is switched on
blinking	Minimum switch-off time (swing protection) is still active

T1 **LED "T1"** Target temperature 'T1' active

T2 **LED "T2"** Target temperature 'T2' active

LED "WASH END" continuous cleaning is completed

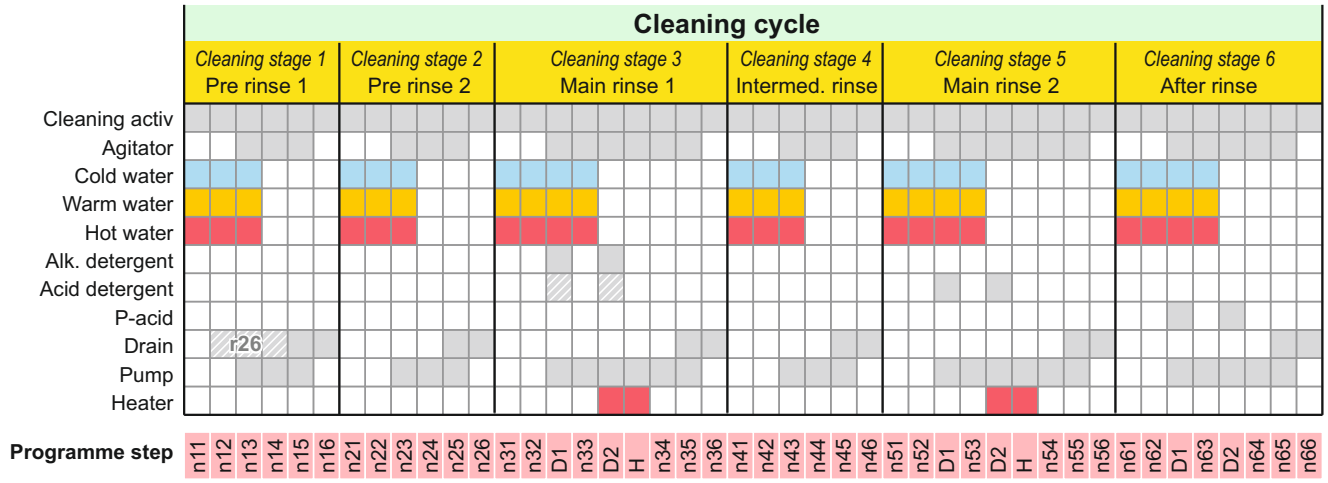
LED "COOLING MODE"

blinking	Cooling start delay is activ
continuous	"Cooling mode" is activ

LED "CLEANING MODE"

continuous	"Cleaning mode" is activ

Cleaning programme diagram



broken lines: only applicable if activated through parameters.
The “n” designations represent the parameters which can be used to adjust the corresponding times.
See page 13 for adjustment of n-parameters.

Information regarding relay "Cleaning activ".

The relay serves to cancel milking authorisation for milking robots that are connected.

When cleaning starts (regardless of the stage), relay "Cleaning activ" is switched on and remains activated until the end of the cleaning programme.

The relay also remains activated if the control system switches to error mode. Only when the error is acknowledged manually does the relay switch off.

Cleaning cycle

A cleaning cycle consists of up to six different cleaning stages. The frequency of each stage during a cycle can be set by the user. See parameter [r41 to r46].

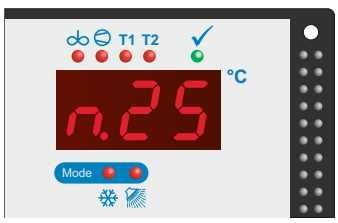
Cleaning stage

Each cleaning cycle consist of up to 6 programme steps which are running subsequently.

Programme step

Each programme step has a parameter with the same name with which different functions / times can be determined.

Each programme step can be deactivated via set-value ‚0'.



During the cleaning process, the currently executed program step or the current temperature is shown in the display depending on the setting in parameter [r97].

Exception:

- 'ALC' (alkaline) or 'ACI' (acidic) is displayed during detergent dosing
- during the heating phase, a '-H-' is displayed alternating with the current temperature - depending on the setting in parameter [r97].

alkaline Detergent *acid dtergent*

Cleaning with alkaline or acid detergent

If main rinse 2 is activated, both alkaline detergent in the main rinse 1 and acid detergent in the main rinse 2 are used for each cleaning cycle.

If main wash 2 is deactivated, it is possible to programme the cleaning sequence so that

- **always alkaline detergents** or
- **alkaline and acid detergent in alternation**

are dosed in main rinse 1.

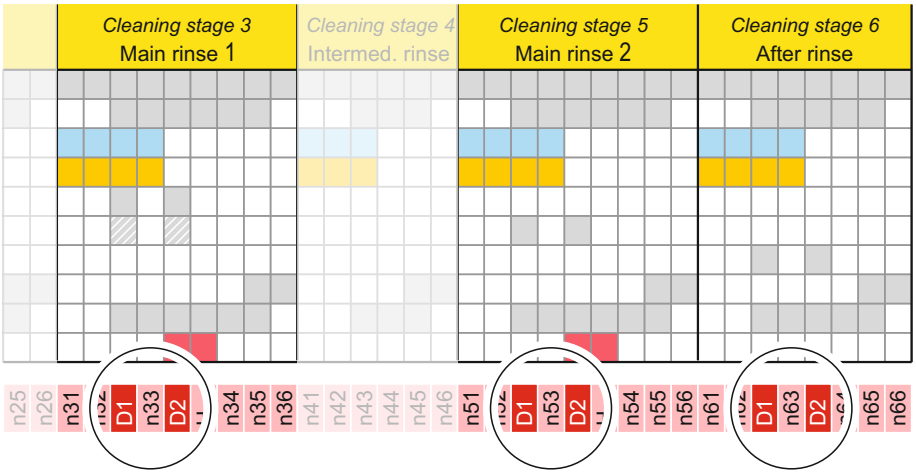
The setting is made in parameter [r21]. Here is also set after how many alkaline cleaning cycles an acid cleaning cycle shall take place automatically.

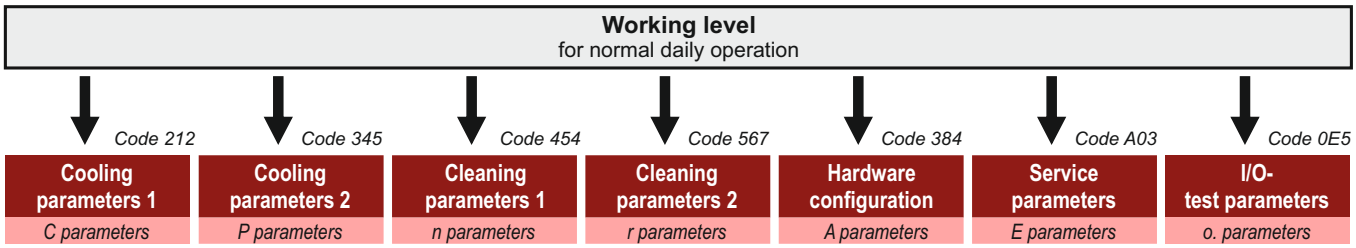
If a changing detergent was parameterized, the display shows the current detergent during the dosing process.

ALC = alcaline
ACI = acid

Time of dosing D1 - D2

Selection whether the cleaning agent or P-acid in the respective main wash shall be dosed in programme step D1 or D2.
Setting in parameter [r20].





Enter level codes:

In order to change parameters in one of the lower levels enter the appropriate level code.

Cooling parameters 1 . . . . . Code 212
Cooling parameters 2 . . . . . Code 345
Cleaning parameters 1 . . . . . Code 454
Cleaning parameters 2 . . . . . Code 567
Hardware configuration . . . . . Code 384
Service parameters . . . . . Code A03
I/O test parameters . . . . . Code 0E5

Proceed as follows (control unit must be in OFF mode):

- Press 'OFF' button for 3 seconds:
  '000' appears in the display - the first '0' blinks.
- Use the arrows buttons to select the first digit of the required code.
- Confirm the correct digit by pressing 'SET'.
  The digit is accepted and the second '0' blinks.
- Use the arrow buttons to set the second digit.
- Confirm the correct digit by pressing 'SET'.
  The third '0' blinks.
- Use the arrow buttons to set the third digit.
- Confirm the correct digit by pressing 'SET'.
  The first parameter of the selected level now appears.

If an incorrect code is entered the control unit switches back into OFF mode.

Display parameter value:

- Use the arrow buttons to select the desired parameter.
- Press the 'SET' button: the parameter value is displayed.

Change parameter value:

- Use the arrow buttons to select the desired parameter.
- Hold down the 'SET' button and use the arrow buttons to select the desired value. (Hold down the arrow buttons to move more quickly).

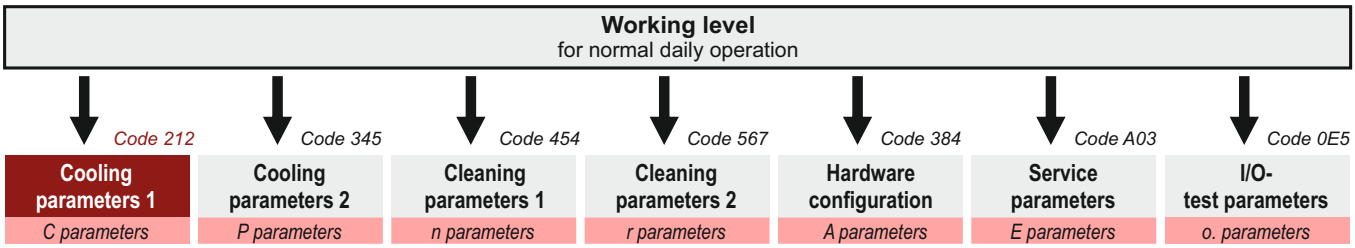
Note:
If no buttons are pressed for 60 seconds the control auto-matically switches back to the working level.
Attention: Any changes will not be accepted!

Saving the changed parameters and switching back to the working level:

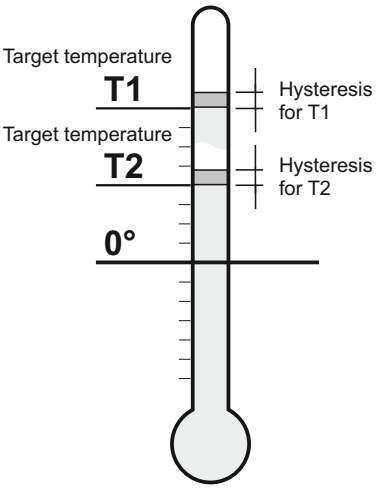
(possible from any parameter)

- Press UP and DOWN buttons simultaneously for approx. 5 seconds.
  The device switches to the OFF mode.

Operation of 'Cooling parameters 1' level



Switch to 'General cooling parameters' level
See page 9.



Temperature settings

C1 **target temperature for T1** (default 4°C)
C2 **target temperature for T2** (default 4°C)

The target temperature is the temperature to which the milk is to be cooled down. When the target temperature is reached the compressor switches off. See diagram.

Range in each case 0 to 50.0˚C

C10 **Hysteresis for target temperature 1** (default 0,7 K)
C11 **Hysteresis for target temperature 2** (default 0,7 K)

The hysteresis determines the amount by which the milk temperature is allowed to differ from target temperature T1 or T2 before the cooling compressor is switched on again. See diagram.

Range in each case 0.1 to 30K

Agitator run time settings

C20 **Duration of after-stirring** (default 120 seconds)

Period in seconds for which the agitator continues to operate after the compressor is switched off.

Range 0 to 999 seconds.

C21 **Pause duration** (default 20 minutes)

Period in minutes between agitator switching off and switching on again (for the duration of the after-stirring period selected).

Range 0 to 999 minutes.

C23 **Duration of 'intermediate stirring SHORT'** (default 2 minutes)

Period in minutes during which the agitator operates if the AGITATOR button is pressed for approx. 1 second during a cooling pause.

Range 1 to 999 minutes.

C24 **Duration of 'intermediate stirring LONG'** (default 10 minutes)

Period in minutes during which the agitator operates if the AGITATOR button is pressed for approx. 3 seconds during a cooling pause.

Range 1 to 999 minutes.

C25 Maximum continuous stirring time in OFF mode
(default 30 min.)

Setting the maximum continuous stirring time.

0: unlimited stirring (press the OFF button to exit)

1..999: maximum stirring time in minutes

Range 0 to 999 minutes.

C79 Changeover delayed start cooling switch for remote start:
(default 0)

0 = without delayed start cooling
1 = with delayed start cooling

C81 Maximum cooling time for first milking (default 0 minutes)

A timer starts each time the compressor starts. If the compressor run time exceeds the value entered here, the fault message 'F20' appears on the display.

Set to '0' to deactivate this function.

Range 0 to 999 minutes.

Sensor correction settings

C90 Display actual temperature

The present actual value measured by the sensor is shown.

C91 Sensor correction

A correction can be applied to the value measured by the sensor. Then applies it cumulatively throughout the entire measurement range.

See page 64.

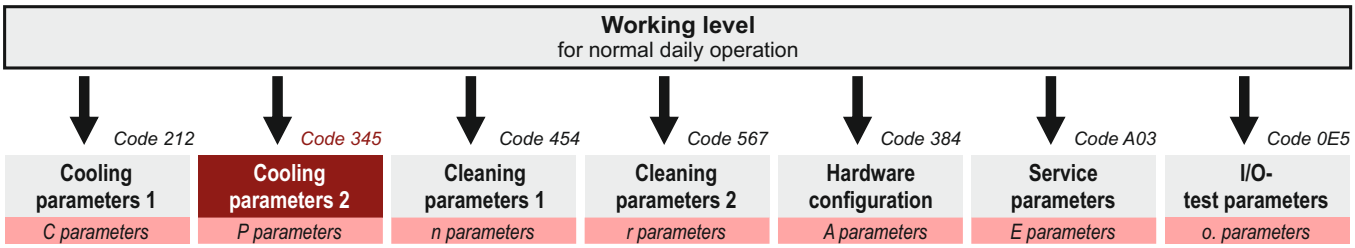
Range -10 to 10K

Softwareversion

C98 Installed software version

The software version installed is shown to help service technicians.

Operation of 'Cooling parameters 2' level



Switch to 'Cooling parameters 2' level
See page 9.

EMERGENCY cooling, behavior in the event of a sensor fault

P4 **Manual start of the compressor for x minutes in the event of a sensor error** (default 0 min.)

Function see page 63

Limit settings for setpoints and hystereses

P10 **Limit for target temperature T1 below** (default 2°C)
P11 **Limit for target temperature T1 above** (default 8°C)
P12 **Limit for target temperature T2 below** (default 2°C)
P13 **Limit for target temperature T2 above** (default 8°C)

Definition of the input limit for setpoints.

Range 0 to 50.0°C

P15 **Limit for hysteresis T1 below** (default 0,1 K)
P16 **Limit for hysteresis T1 above** (default 2 K)
P17 **Limit for hysteresis T2 below** (default 0,1 K)
P18 **Limit for hysteresis T2 above** (default 2 K)

Definition of the input limit for hysteresis.

Range 0.1 to 30.0 K

Agitator settings

P22 **'Intermediate stirring' function** (default 1)

Setting of 'intermediate stirring' function.

0 = Intermediate stirring not possible

1 = Standard setting
(Switch on intermediate stirring 'short' or 'long' using buttons)

2 = Continuous stirring ON/OFF
(press the button once to switch the agitator on, press again to switch it off)

Milk transfer function buffer tank

P36 Setting milk transfer functions (default 0)

With the transfer function, it is possible to use the rinsing pump (at the same time the milk pump) to fill milk into another tank. Transferring can only be started in OFF mode via a signal at the digital input (from a robot or an external button).

The pump or, alternatively, the switch valve are controlled via the transfer function.

START transfer function: The signal at the digital input must be present for approx. 5 seconds

Setting:

- Assign the start signal to one of the digital inputs [A21..A23 = 9]
- Setting the end of the transfer function:
  - via external float switch — parameter [A21..A23 = 10] parameter [P36 = 1 or 2]
  - or time-controlled — parameter [P36 = 3]
  - or via internal level input — parameter [P36 = 4]

0 = deactivated
1* = end level-controlled „high-active" via external float switch at digital input (if this signal appears, the transfer is stopped)
2* = end level-controlled "low-active" via external float switch at digital input (if there is no signal transfer is stopped)
3 = end time-controlled (pumping time = [P37])
4* = end via level-input (when electrode no longer "detects" milk, the transfer is finished)

** with timeout [P37]*

P37 Pump down time or timeout (default 10,0 min.)

If the 'time-out' time is exceeded, error (F50) appears and the cleaning does not start automatically

Setting range 1,0 .. 50,0 min.

P38 possibilities premature stop decanting function and AUTOSTART cleaning (default 0)

DANGER!

So that cleaning cannot be started remotely when a person is in the tank, the "remote start cleaning" function must be secured by a safety switch on the manhole.

Note:
Independently of the setting of [P38] a stop of the decanting function is possible at any time via the OFF-button.
There is no Autostart of the cleaning

with premature stop option

0 = · premature stop possible by repeated pressing of the external button
· no Autostart of the cleaning after successful decanting

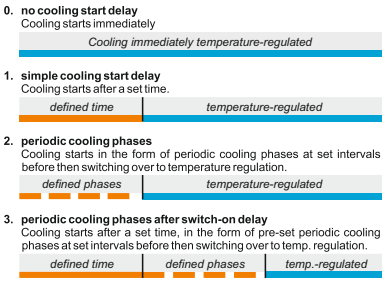
1 = · premature stop possible by repeated pressing of the external button
· Autostart of the cleaning (after successful decanting)

without premature stop option

2 = · no premature stop possible
· no Autostart of the cleaning after successful decanting

3 = · no premature stop possible
· Autostart of the cleaning (after successful decanting)

Operation of 'Cooling parameters 2' level



Cool start settings

P61 Variations of the cooling start delay (default 1)

0 = Cooling starts immediately - without a cooling start delay
1 = simple cooling start delay
2 = Interval cooling thrusts (power reduction through clocking)
3 = Interval cooling draws after switch-on delay

P**62 Duration of cooling start delay first milking** (default 0 min.)

Time (min.) with which the compressor starts with a delay after pressing the button „cooling“. During the start delay the mode-LED flashes. All other cooling cycles do not start with a delay.

Range 0,0 .. 999 min.

P63* „ON“-time cooling start (default 5 min.)

Setting range 1 .. 30 min.

P64* “OFF”-time cooling start (default 20 min)

Setting range 5 .. 60 min.

P65* number cooling starts (default 5)

Setting range 1 .. 50

** not activated with [P61 selection 0 and 1]*

Settings for the compressor

P71 Minimum pause time for compressor (default 120 sec.)

Definition of the minimum pause time for the refrigeration compressor.

Serves to reduce the switching frequency (oscillation protection) of the compressor. Should also prevent the compressor from starting against pressure.

During the pause the compressor LED flashes

Range 0 to 999 sec.

P72 Fault monitoring compressor (F53) (default 0)

The fault monitoring is used to indicate problems during the proper operation of the compressor.

The fault message occurs depending on the parameterisation

- *by evaluation of the potential-free auxiliary contact of the motor protection switch (setting 1, 2),*
- *by evaluation of the potential-free auxiliary contact of the compressor contactor (setting 3, 4),*

The fault monitoring is only possible if the digital input - parameter [A21] - is set to '5'.

The following settings for fault monitoring are possible:

Parameter [P72] is at 0

Fault monitoring is deactivated

Parameter [P72] is at 1

The auxiliary contact of the motor protection relay or of the motor protection switch is queried.

Is this auxiliary contact opened = fault "F53" is displayed.

Parameter [P72] is at 2

The auxiliary contact of the motor protection relay or of the motor protection switch is queried.

IIs this auxiliary contact opened = fault "F53" is displayed.

Parameter [P72] is at 3 *

Fault monitoring via switch-on feedback from the compressor contactor-auxiliary contact (N/O contact).

Parameter [P72] is at 4 *

As selection 3, but switch-on feedback from the compressor contactor-auxiliary contact (N/C contact).

** Settings 3 and 4:*

When the compressor is switched on, feedback is expected at the digital input of the controller after 60 seconds at the latest. If this feedback is not received, fault "F53" is triggered.

Settings for target temperature switchover T1 / T2

P80 Settings for target temperature switchover T1 to T2 (default 0)

Definition of the "Switch target temperature" function

0 = deactivated (always T1 active)

1 = only manual switchover T1 / T2 via button
Press button "T1/T2" in cooling mode to change to the other target temperature.
- the corresponding LED switches over,
- the preset target temperature is briefly shown in the display, then the current milk temperature

2* = manual switchover to T2 with switch-back after a period
Press the "T1/T2" button in cooling mode:
The regulator switches to "T2" for a period of [P81] and then back to "T1". As long as "T2" is active, the "T2" LED flashes“

3* = automatic switchover to "T2" at cooling start, with automatic switch back to "T1" after time [P81]
(note the setting of the cooling start delay)

4 = Switchover T1 / T2 externally (via digital input)
NOTE: When the contact is closed, "T2" is active
NOTE: Parameter [A21] must be set to 2!

- -

** In the case of 2 and 3:*

- If T1 is active, the LED for T1 is permanently on.

- If T2 is active, the LED for T2 flashes and shows that switch-back to T2 will happen automatically.

P81 Duration until switch-back to T1 (default 120 min.)

Enter the switch-back time to the target temperature T1

Range 1 .. 999 min.

Freezing protection by low pressure monitoring

(can only be used if a digital input [A21… A23 = 4] is set)

P84 Type of low pressure switch (default 0)

0 = deactivated
1 = Compressor off when digital input is closed
2 = Compressor off when digital input is open

P87 Suppression of querying the low pressure switch after the compressor has started (def. 120 sek.)

Range 10 .. 999 sec.

P88 Minimum compressor switch-off time if the pressure in the evaporator is not reached (default 10 min)

Range 1 .. 15 min.

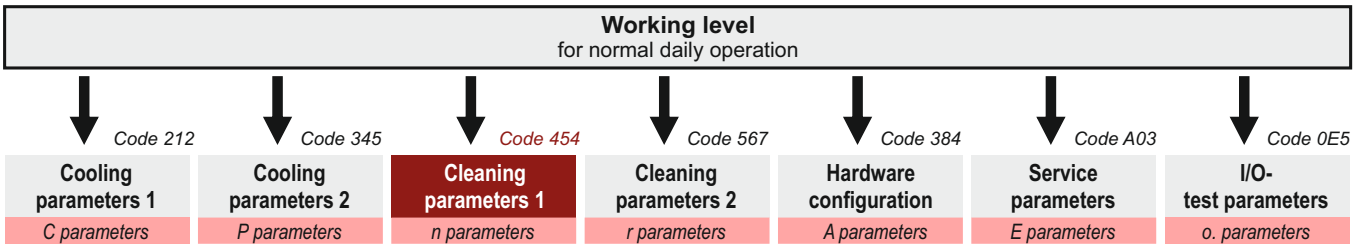
P89 Monitoring time from the start of cooling (default 300 min)

0 = no time limit

1..600 = minutes after starting the cooling, the low pressure monitoring switches itself off until the next cooling activation.

Range 0 .. 600 min.

Operation of 'Cleaning parameters 1' level



Switch to 'Cleaning parameters 1' level
See page 9.

Run times cleaning stage 1 -> Pre rinse 1

		Range	*default*
n11	**Water intake up to level**	0 ... 1	*0*
n12	**Water intake according time**	0 - 999 sec.	*90 sec.*
n13	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n14	**Circulation time**	0 - 999 sec.	*30 sec.*
n15	**Washout time**	0 - 999 sec.	*0 sec.*
n16	**Drain time**	0 - 999 sec.	*60 sec.*

Run times cleaning stage 2 -> Pre rinse 2

		Range	*default*
n21	**Water intake up to level**	0 ... 1	*0*
n22	**Water intake according time**	0 - 999 sec.	*90 sec.*
n23	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n24	**Circulation time**	0 - 999 sec.	*30 sec.*
n25	**Washout time**	0 - 999 sec.	*0 sec.*
n26	**Drain time**	0 - 999 sec.	*60 sec.*

Run times cleaning stage 3 -> Main rinse 1

		Range	*default*
n31	**Water intake up to level**	0 ... 1	*0*
n32	**Water intake according time**	0 - 999 sec.	*120 sec.*
n33	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n34	**Circulation time**	0 - 999 sec.	*150 sec.*
n35	**Washout time**	0 - 999 sec.	*0 sec.*
n36	**Drain time**	0 - 999 sec.	*90 sec.*

Run times cleaning stage 4 -> Intermediate rinse

		Range	*default*
n41	**Water intake up to level**	0 ... 1	*0*
n42	**Water intake according time**	0 - 999 sec.	*90 sec.*
n43	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n44	**Circulation time**	0 - 999 sec.	*30 sec.*
n45	**Washout time**	0 - 999 sec.	*0 sec.*
n46	**Drain time**	0 - 999 sec.	*60 sec.*

Run times cleaning stage 5 -> Main rinse 2

		Range	default
n51	**Water intake up to level**	0 ... 1	*0*
n52	**Water intake according time**	0 - 999 sec.	*120 sec.*
n53	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n54	**Circulation time**	0 - 999 sec.	*150 sec.*
n55	**Washout time**	0 - 999 sec.	*0 sec.*
n56	**Drain time**	0 - 999 sec.	*90 sec.*

Run times cleaning stage 6 -> After rinse

		Range	default
n61	**Water intake up to level**	0 ... 1	*0*
n62	**Water intake according time**	0 - 999 sec.	*90 sec.*
n63	**Circulation with water refill**	0 - 999 sec.	*0 sec.*
n64	**Circulation time**	0 - 999 sec.	*30 sec.*
n65	**Washout time**	0 - 999 sec.	*0 sec.*
n66	**Drain time**	0 - 999 sec.	*120 sec.*

Runtime termination for all rinses

		Range	default
n70	**Drain time in case of a stop**	0 - 999 sec.	*120 sec.*

Durations for detergent dosing

		Range	default
n81	**Intake time for alkaline detergent** *(or activation of pinch / clamb valve)*	0 - 999 sec.	*30 sec.*
n82	**Intake time for acidic detergent**	0 - 999 sec.	*30 sec.*
n83	**Dosing time P-ACID in the after-rinse**	0 - 999 sec.	*0 sec.*

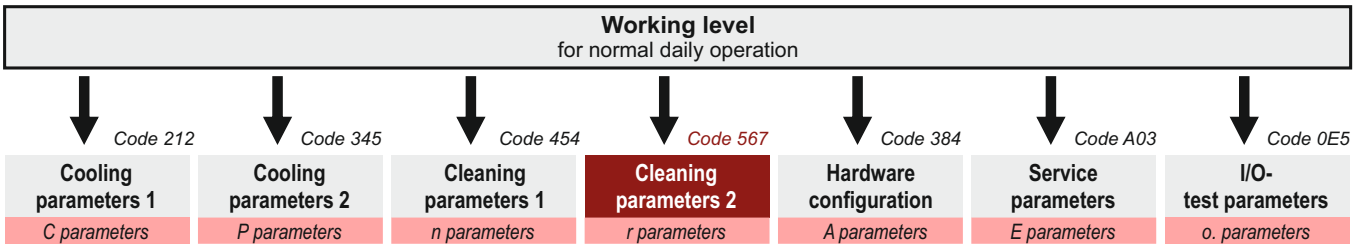
What is P-ACID:

In contrast to the acidic and alkaline detergents (which are dosed in the main rinse), the disinfectant 'P-ACID' is ONLY added in the after rinse on request.

Temperature settings

		Range	default
n91	**Heating temperature main rinse 1**	0 - 80°	*45°*
n92	**Heating temperature main rinse 2**	0 - 80°	*45°*

Operation of 'Cleaning parameters 2' level



Switch to 'Cleaning parameters 2' level
See page 9.

Activation "Remote start cleaning"

DANGER!

So that cleaning cannot be started remotely when a person is in the tank, the "remote start cleaning" function must be secured by a safety switch on the manhole.

r8 Activation "Remote start cleaning" *default 0*

0 = deactivated
1 = activated *
(Assign input function "remote start cleaning".)

** additionally one of the dig. inputs A21..A23 must be assigned the input function '7'!*

Activation safety elements

r10 Safety switch *default 0*

0: no safety switch
1: prevents the start of cooling / cleaning, when switch is not in proper position
2: as 1 + abort of cleaning when switch in the wrong position

Note Safety switch
Cooling = switch open
Cleaning = switch closed

r12 Fault indicator *default 0*

0 = deactivated
1 = fault indicator high-active (fault „F42" when opened)
2 = fault indicator low-active (fault „F42" when closed)

Detergent options

r20 Dosing position (see page 8) default 2

1 = Position D1 in cleaning diagramm
2 = Position D2 in cleaning diagramm

r21 Detergent sequence in case of 3-cycles default 3
(if second main cleaning stage is deactivated)
0: only alkaline
1..10: x times alkaline, before one time acid

Setting drain valve

r24 **Switch mode drain valve 1** default 0
r25 **Switch mode drain valve 2** default 0

Choice of whether the drain valve used should be closed or open when de-energised. The control unit acts according to the setting

0 = de-energised: closed
1 = de-energised: open

r26 **Open drain valve prematurely in pre-rinse 1 (optional)**
default 0

The position in the cleaning process from when the drain valve is opened is defined here. See page 7.

0 = Drain opens from program step n15
1 = Drain opens from program step n13
2 = Drain opens from program step n12

Quick Wash

Start Quick-Wash (1..5):

- *Hold down the DOWN ARROW key in OFF mode for approx. 4 seconds.*

r28 **Activation quick cleaning programme via button** *default 0*

0 = deactivated
1 = 1 x pre-rinse 1
2 = 1 x pre-rinse 2
3 = 1 x after-rinse
4 = je 1 x pre-rinse 1 + after-rinse
5 = je 1 x pre-rinse 2 + after-rinse

Settings for level detection

r30 **Sensitivity level input** *default 0*

-10 = less sensitive
+10 = more sensitive

r32 **Timeout water intake by level** *default 5*

Maximum time to cleaning abort: 1 .. 60 min.

Heating settings

r35 **Heater activation** *default 1*

0 = no heater
1 = only in main cleaning stage 1
2 = in both main cleaning stages 1+2

r37 **Max. heating time** (timeout programme step “H”) *default 60*

Range: 10 .. 999 min.

Number of passes of individual rinses

	Number of passes	*Range*	*default*
r41	**Cleaning stage 1 -> Pre rinse 1**	*0 .. 5*	*1*
r42	**Cleaning stage 2 -> Pre rinse 2**	*0 .. 5*	*0*
r43	**Cleaning stage 3 -> Main rinse 1**	*- - -*	*1*
r44	**Cleaning stage 4 -> Intermediate rinse**	*0 .. 5*	*0*
r45	**Cleaning stage 5 -> Main rinse 2**	*0 .. 1*	*0*
r46	**Cleaning stage 6 -> After rinse**	*0 .. 5*	*1*

Selection of water valve (cold / warm water)

	Selection of water valve	*Range*	*default*
r51	**Cleaning stage 1 -> Pre rinse 1**	*1 .. 7*	*1*
r52	**Cleaning stage 2 -> Pre rinse 2**	*1 .. 7*	*2*
r53	**Cleaning stage 3 -> Main rinse 1**	*1 .. 7*	*2*
r54	**Cleaning stage 4 -> Intermediate rinse**	*1 .. 7*	*1*
r55	**Cleaning stage 5 -> Main rinse 2**	*1 .. 7*	*1*
r56	**Cleaning stage 6 -> After rinse**	*1 .. 7*	*1*

1 = Cold water
2 = Warm water
3 = Mixed water
4 = Hot water / Beaker dosing
5 = Hot water and cold water
6 = Hot water and warm water
7 = Hot water and warm water and cold water

From option 4 onwards, the function A17 (hot water valve) must additionally be assigned to one of the relays in the A parameters.

Select drain valve

r61 Select drain valve for cleaning cycle 1 (pre-rinse 1) *default 1*

1 = Drain valve 1
2 = Drain valve 2

START options / single step function / display

r92 Start cleaning at the beginning of cleaning stage "X" *default 0*

0* = deactivated

1..6* = starts once in the selected rinsing cycle "X".
(if this rinsing cycle is not activated, next one)
Resets automatically after use.

7 = the start-rinsing cycle is selectable each time the cleaning is started.
To do this, hold the CLEANING button, until the desired START-rinsing cycle is achieved.

** for installation technician only:*

r93 Activation of the step function during the cleaning cycle *default 0*

This function is used to manually advance all programme steps of the cleaning sequence. The setting 1..3 is mainly used by the service technician during commissioning, if a permanent activation is not desired.

0 = deactivated

1..3* = active in the next 1..3 cleaning cycles

4 = Step function is activated when the CLEANING button is held for 4 seconds in cleaning mode.
"StP" is displayed. By repeated pressing the CLEANING button, the cycle can now be advanced step by step.

** for the installer only*

Display during rinsing

r97 Display during rinsing *default 0*

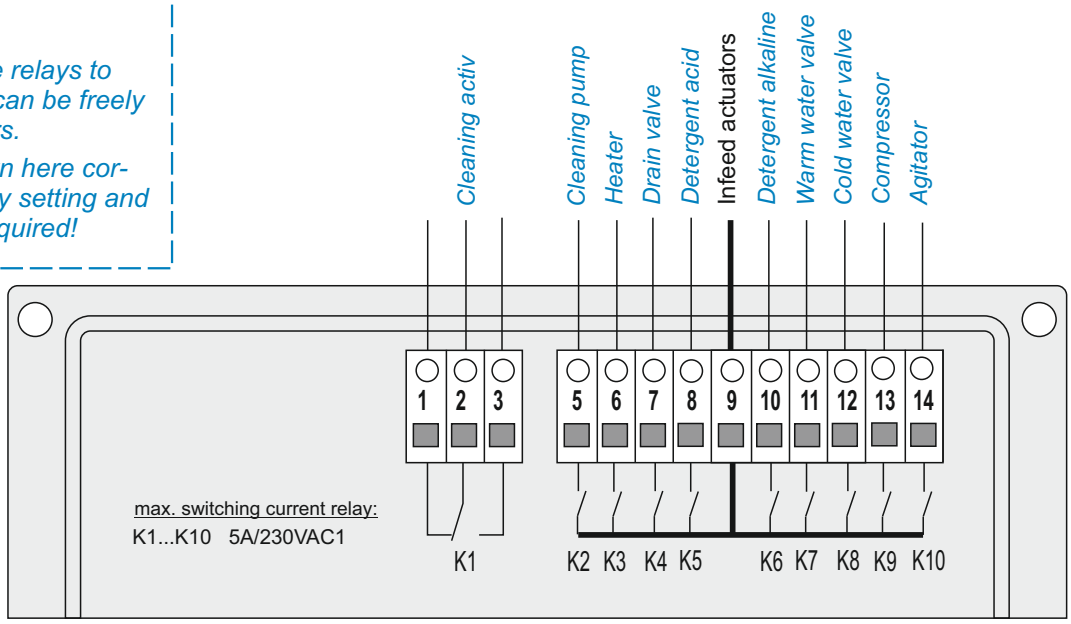
0 = Display of temperature
1 = Display of programme step
2 = Display changes between step and temperature

Operation of 'Hardware Configuration' level

Working level
for normal daily operation

Code 212	Code 345	Code 454	Code 567	Code 384	Code A03	Code 0E5
Cooling parameters 1	**Cooling parameters 2**	**Cleaning parameters 1**	**Cleaning parameters 2**	**Hardware configuration**	**Service parameters**	**I/O-test parameters**
C parameters	*P parameters*	*n parameters*	*r parameters*	*A parameters*	*E parameters*	*o. parameters*

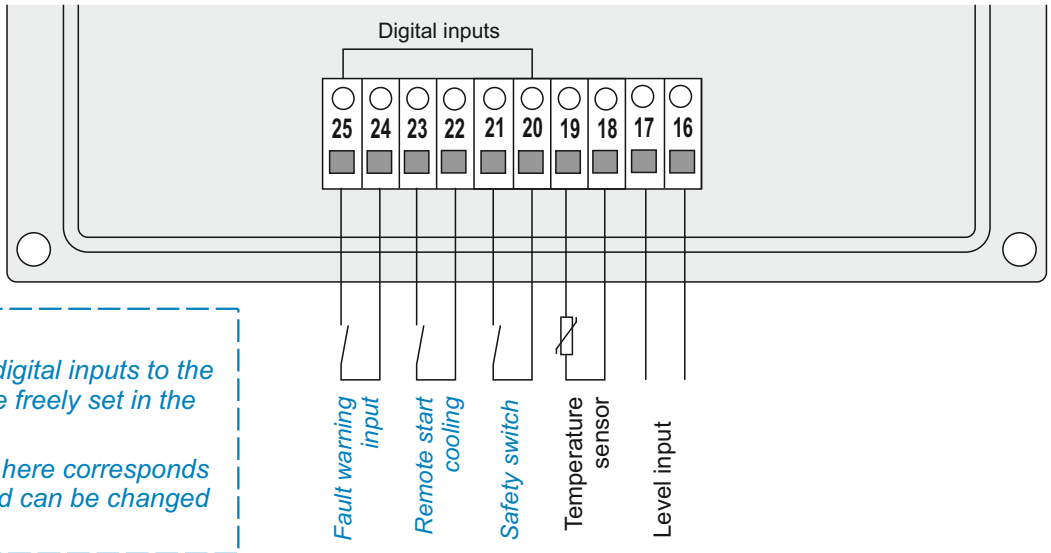
DANGER:
The assignment of the relays to the various functions can be freely set in the A parameters.
The assignment shown here corresponds to the factory setting and can be changed as required!



Assignment of output functions to relays

A1	**assignment relay 1**	*default 1*
A2	**assignment relay 2**	*default 2*
A3	**assignment relay 3**	*default 3*
A4	**assignment relay 4**	*default 4*
A5	**assignment relay 5**	*default 5*
A6	**assignment relay 6**	*default 6*
A7	**assignment relay 7**	*default 7*
A8	**assignment relay 8**	*default 8*
A9	**assignment relay 9**	*default 9*
A10	**assignment relay 10**	*default 10*

0 = deactivated
1 = cleaning active
2 = cleaning pump
3 = heater
4 = drain valve 1
5 = detergent „acid"
6 = detergent „alkaline"
7 = warm water
8 = cold water
9 = compressor
10 = agitator
11 = alarm relay (see also [A45])
12 = P-ACID
13 = Transfer valve
14 = multifunction time relay
15 = drain valve 2
16 = without function
17 = Hot water / Beaker dosing
18 = Clamp valve
19 = Flushing valve



DANGER:

The assignment of the digital inputs to the various functions can be freely set in the A parameters.

The assignment shown here corresponds to the factory setting and can be changed as required!

Assignment of output functions to digital inputs

A21 assignment digital input 1 *default 8*
A22 assignment digital input 2 *default 1*
A23 assignment digital input 3 *default 6*

0 = deactivated
1 = remote start cooling
2 = external switchover of temperature
3 = external compressor lock
4 = Low pressure switch
5 = Compressor monitoring
6 = Fault indicator in general
7 = external cleaning start
8 = safety switch (manual butterfly valve)
9 = Start button milk-decanting function
10 = Level switch milk-decanting function
11 = Signal input multi-function time relay

Relais configuration

A45 Relay configuration “Alarm“ *default 0*

0 = closing contact, alarm if closed
1 = closing contact, alarm if open (non-volatile)
2 = opening contact, alarm if closed (non-volatile)
3 = opening contact, alarm if opened

Multi-function time relay

A86 Multi function time relay function selection *default 0*

0 = deactivated
1 = ON-delay T1
2 = OFF-delay T2
3 = ON- and OFF-delay T1 and T2
4 = ON-impulse T2
5 = OFF-impulse T2
6 = Clock T1 on, T2 off
7 = delayed impulse, SWITCH ON-triggered
8 = delayed impulse, SWITSCH OFF-triggered

A87 Assignment of trigger signal *default 0*

0 = Trigger signal on digital input
[A21 or A22 or A23] must be set to 11.

1..15 = Trigger signal via function of the control:

1 = cleaning active
2 = cleaning pump
3 = heater
4 = drain valve 1
5 = detergent „acid"
6 = detergent „alkaline"
7 = warm water
8 = cold water
9 = compressor
10 = agitator
11 = alarm relay
12 = P-ACID
13 = Transfer valve
14 = multifunction time relay
15 = drain valve 2

A88 T1 (desired switching time 1) *default 30*

Range 1.. 999 sec.

A89 T2 (desired switching time 2) *default 30*

Range 1.. 999 sec.

RS485 Einstellungen

A95 Baud setting *default 3*

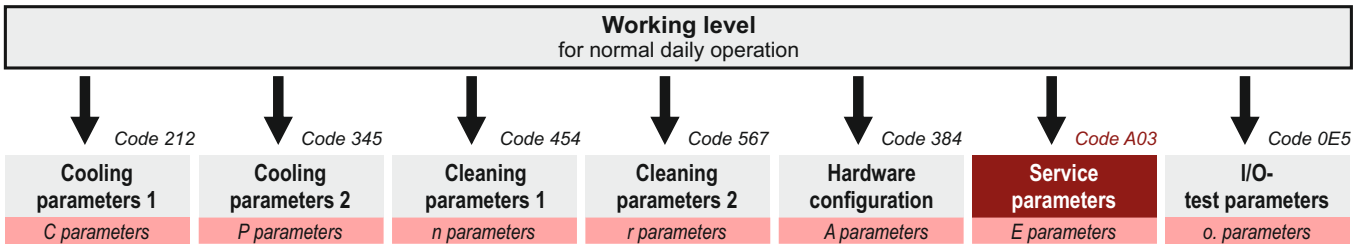
1 = 9600
2 = 19200
3 = 38400

A96 Device adress *Range 1.. 4* *default 1*

Language setting

A98 Language setting *default 0*

0 = german
1 = english

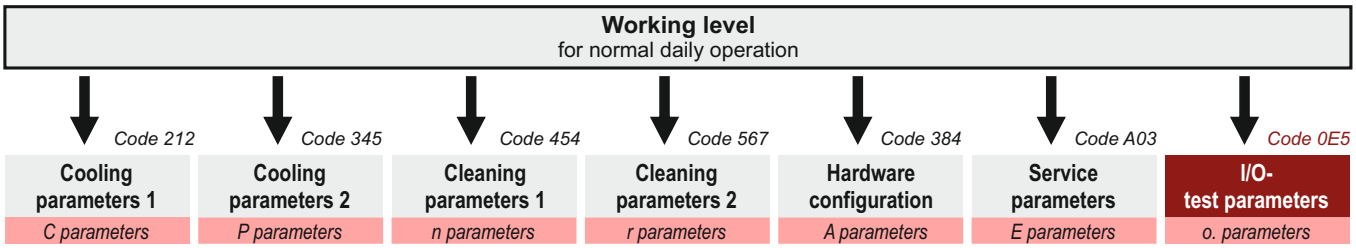


Switch to 'Service parameters' level
See page 9.

Enter the SIM PIN for ESGSM-001

		Range	*default*
E50	**SIM-PIN for ESGSM-001** (optional) -1 = deactivated 0…99 = first part of the PIN (eg. PIN = 1234)	*-1 .. 99*	*-1*
E51	**SIM-PIN for ESGSM-001** (optional) 0…99 = second part of the PIN (eg. PIN = 1234)	*0 .. 99*	*0*

Operation of “I / O test parameters”



Switch to 'I / O test parameters' level
See page 9.

All inputs and outputs of the individual components can be tested in this parameter level. For this purpose the corresponding relays are set to 'I' or '0'.

NB: However, the two relays for the supply of acid and alkaline detergents are locked against each other since never acid and alkaline detergents may never enter the tank together!

Test of the relay outputs

o.1	**Test relay output 1**	= *cleaning activ*
o.2	**Test relay output 2**	= *cleaning pump*
o.3	**Test relay output 3**	= *heater*
o.4	**Test relay output 4**	= *drain valve*
o.5	**Test relay output 5**	= *acidic detergent*
o.6	**Test relay output 6**	= *alkaline detergent*
o.7	**Test relay output 7**	= *warm water valve*
o.8	**Test relay output 8**	= *cold water valve*
o.9	**Test relay output 9**	= *compressor*
o.10	**Test relay output 10**	= *agitator*

0 = Relay switched off
1 = Relay active

DANGER:
The assignment of the relays and the digital inputs to the various functions can be freely set in the A parameters.
The assignment shown here corresponds to the factory setting and can be changed as required!

Test of the digital inputs

o.21	**Test digital input 1**	= *Safety switch*
o.22	**Test digital input 2**	= *Remote start cooling*
o.23	**Test digital input 3**	= *free*

The SET button can be used to check the switching status of the digital inputs. No values can be entered here.

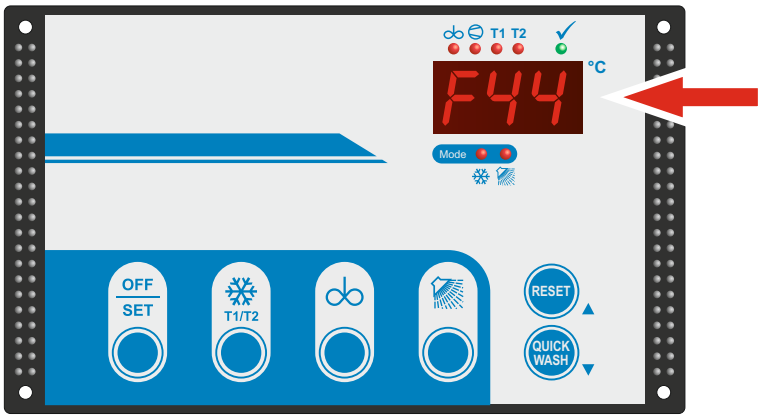
0 = input not connected
1 = input connected

Test level input

o.41 Level 1

The SET button can be used to check the switching status of the level input. No values can be entered here.

0 = input not connected
1 = input connected



Note:

With an optional Welba alarm and remote maintenance modem, all fault messages can also be sent as SMS or EMAIL to predefined addresses.

Fault messages:

- Any occurring faults appear flashing on the display.
- At the same time, the faults are reported to an optionally connected alarm and remote maintenance modem (ESGSM-001 or ESIPM-001), which sends an SMS or an EMAIL with the fault message (see the operating manual of the connected alarm and remote maintenance modem).
- If the alarm-output is parameterised [A45], the assigned relay [A1..A10] is set.

Confirm fault messages:

- Press button ARROW UP (RESET):

  The fault is confirmed. The fault message is no longer displayed and the alarm relay drops.

Fault messages that cannot be confirmed directly:

- Sensor faults [F56 + F57] can only be confirmed when they are no longer present.
- Faults “Cleaning stop” (F40 + F44) can only be confirmed, when the fault status of the cleaning has been corrected.

Meaning of the fault messages:

F20 Cooling time exceeded for first milking

The active set point temperature must be achieved within the set time [C81], otherwise fault message [F20] appears on the display.

The time starts when cooling of the first milking starts.

To reset the fault message:

- Press the UP ARROW (RESET) key: the fault is reset.

F30 Power failure during cooling or cleaning

This fault is reported if during the switching on of the control unit is found out that cooling or cleaning was active during the mains interruption.

To reset the fault message:

- Press the UP ARROW (RESET) key: the fault is reset.

F40 Safety switch drain tap

Depending on the setting, this fault is reported in parameter [r10] if:

Setting 1:

... cooling or cleaning starts the drain tap is not in its correct position. There is no notification by SMS or email.

Resetting of the fault message:

- Put the drain tap in the correct position and start the mode again.

Setting 2:

... the drain tap is not in its correct position when starting cooling or cleaning - or

... the drain tap was closed during cleaning.

This will create a direct stop of the cleaning process!

After the drain time (or if the drain time is canceled), an fault message is displayed and an SMS or email is sent. *

Resetting of the fault message:

- Eliminate the causes of the fault
- *ONLY when manually canceling the drain time during cleaning:* Press the OFF button to end the cleaning mode.
- Press the UP ARROW (RESET) button: the alarm relay is reset
- Hold down the OFF button for 4 seconds: The fault message in the display is reset
- Restart the cleaning process

** optionally*

The fault indicator works 'edge-controlled'. Only a rising or falling edge triggers a fault. See parameter [r12].

If the fault is still present after confirmation, a fault message is only generated after a change from cooling or cleaning mode into the OFF-mode.

F42 Fault indicator

This fault is reported if a fault signal is present at the fault message input. See parameter [r12]. An SMS or EMAIL will be sent. *

Resetting of the fault message:
- Determine the source of the fault and decide on how to proceed.
- Press the OFF key.
- Press the UP ARROW (RESET) key:
  the alarm relay is reset.

F44 Timeout for water intake by level

Fault occurs when the level is not reached during the set water intake time [r32].

After the drain time (or if the drain time is canceled), an fault message is displayed and an SMS or email is sent. *

Possible cause of fault:
- Water valve faulty
- Water circuit damaged / interrupted

Resetting of the fault message:
- Eliminate the causes of the fault
- *ONLY when manually canceling the drain time during cleaning:*
  Press the OFF button to end the cleaning mode.
- Press the UP ARROW (RESET) button:
  the alarm relay is reset
- Hold down the OFF button for 4 seconds:
  The fault message in the display is reset
- Restart the cleaning process

F48 Timeout for heating for washing (Heating duration too long)
- washing completed
- fault is shown on the display

During the heating phase, the preset heating temperature [n91 / n92] has not been reached within the preset time [r37].

Possible cause of fault:
- Heater faulty

To reset the fault message:
- Press the UP ARROW (RESET) key: the fault is reset.

F50 Timeout level controlled milk transfer function
- fault is shown on the display

During the milk transfer, the level was not reached within the time [P37].

Possible cause of fault:
- Pump or switching valve faulty

To reset the fault message:
- Press the UP ARROW (RESET) key: the fault is reset.

* *optionally*

The switching behaviour works 'edge-controlled'. Only a rising edge triggers a fault.

The fault message is NOT indicated again, if the fault still exists after the confirmation.

F53 Compressor failure

Compressor fault monitoring is only active in cooling mode. Depending on the configuration, the error "F53" is reported. (see parameter P72) Send an SMS or email.*

Resetting of the fault message:

- Press the OFF key. The control switches to OFF mode.
- Press the UP ARROW (RESET) key: the fault is reset.

F56 Broken sensor

The control unit is not receiving any signals from the sensor.

Possible cause of fault:

- Temperature sensor faulty
- Sensor cable damaged

Consequence:

. in OFF mode:	- fault code F56 is indicated
. in cooling mode	- fault code F56 is indicated, - compressor is switched off,
. in cleaning mode:	- fault code F56 is indicated, - heating is stopped, - cleaning continues, cleaning fault

To reset the fault message:

- Press the UP ARROW (RESET) key: the fault is reset.

F57 Sensor short circuit

as F56, but fault code F57 is displayed.

F97 Software fault

Please contact the manufacturer

EEP Memory fault

dEF Automatic factory reset after update

The controller was reset to factory settings after a software update.