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Universal tank control WTS-300 *Firmware V4.6*

Quick start for the farmer



ATTENTION: All safety instructions from the complete operating manual must be observed at all times!



WTS-300 G1

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1.1 Information about this quick start

This quick start is for the operator of the WTS-300 Universal tank control. The document comprises all instructions and information for the operation of the tank control.

Read this document carefully and follow the instructions provided to ensure a smooth operation of the tank control. In addition, the local accident prevention regulations and general safety regulations for the application area of the tank control must be observed.

1.2 Limitation of liability



The proper function of the WTS-300 depends on many external factors on which the manufacturer has no influence. The manufacturer accepts no liability for any damages on the milk cooling tank, the connected components or the milk. The integrated tank monitor supports only the control of the milk quality and does neither absolve the farmer (as operator of the milk tank) nor the driver of the milk collecting truck from the duty of care. Both parties have to ensure that the milk is transportable before it is removed from the tank.

2. Operation

2.1 Setting the date and time



In the event of a power cut, the date and time are retained for up to 5 days. After that they must be re-entered.

When the power is connected ...

... there are two possible displays:



1.) Time is lost: 4 dashes are shown:

The date and time must be re-entered. Proceed as follows:

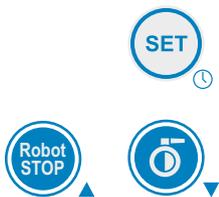
- Press one of the arrow keys: the year appears, flashing.
- Set the time as described below.

2.) Time is still preserved:

During initialisation, 4 rotating bars are shown, then the current firmware appears briefly, then the time is displayed. If it is not correct, adjust it as follows.

Setting the time during normal operation

- Press the OFF button: a time is displayed.
- Hold the SET button down until the year appears, flashing. (in between, the tank temperature is shown briefly)
- Use the arrow keys to set the correct year
- Press the SET button: the month appears, flashing.
- Use the arrow keys to set the correct month.
- Press the SET button: the day appears, flashing.
- Use the arrow keys to set the correct day.
- Then set the hour and minute displays in the same way.
- When finished press the SET button. Setting is completed, and the actual time is displayed.



2.2 Button functions



„OFF“ button

Active modes are closed down when the OFF button is pressed.

- Switch control unit to STAND-BY
- Close down cleaning mode or continuous stirring mode prematurely
- Acknowledge error



„SET“ button

in OFF mode = press briefly: display critical faults (if any)
Hold down for 3 seconds: set date and time

in cleaning mode = “Cleaning stage” or “Tank temperature” is displayed
(Depending on the setting)
and current error

Parameter setting = the current value entered is displayed

in cooling mode = Display various information such as time, faults, litre eg.



“COOL” button

in OFF mode = start cooling

press 2x = bypass the cooling start delay (if set)

press long = new start of the cooling-start-delay

in cooling mode = change target temperature T1 / T2



„AGITATOR“ button

in OFF mode = start continuous stirring mode

in cooling mode = press for 1 second: "Intermediate stirring SHORT"
press for 3 seconds: "Intermediate stirring LONG"



“WASHING” button

in OFF mode = start cleaning

Operation by the driver of the milk truck



„RESET“ button

press briefly = Confirmation of the message “do not load”.
hold 5 seconds = Test of the red alarm-LED



„ROBOT STOP“ button (if parameterized)

Starts or stops both the robot and the cooling mode as well.

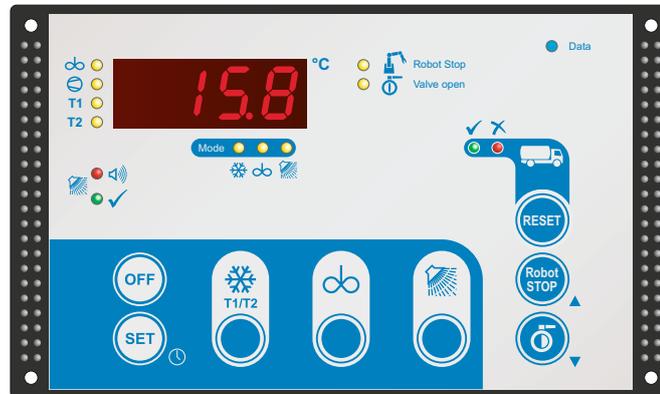


„PNEUMATIC OUTLET VALVE“ button (if parameterized)

Opens / closes the pneumatic outlet valve.

2. Operation

2.3 Meaning of the LED's



LEDs in cooling mode

	LED "AGITATOR" during cooling mode	Agitator is switched on
	LED "COMPRESSOR" permanently on off flashing slowly flashes fast in case of a fault	Compressor contactor is switched on Compressor contactor is switched off - Pause time compressor (pendulum protection) - Compressor delay / pre-stirring active - Anti-freezing protection active - Compressor blocked via digital input - Fault thermal protection / fault contact - Phase fault (opt. in connection with ESVAW 003)
	LED "T1" or „T2" T1 on T2 on T2 flashing	Set target temperature for "T1" is active Set target temperature for "T2" is active automatic switching back to T1 active, see [P80]

LEDs in cleaning mode

	LED "ERROR" flashing	The control is in error mode and must be acknowledged with the "OFF" button.
	LED "END OF CLEANING / TANK EMPTY" permanent	Cleaning successfully finished - tank is ready for further filling.

Display of operation mode

	LED operating mode "COOLING"	flashing „cooling start delay“ is active permanent „cooling mode“ is active
	LED operating mode "AGITATING"	permanent „continuous stirring“ is active
	LED operating mode "CLEANING"	permanent „cleaning mode“ is active flashing no cleaning release from the robot

Robot / Drain valve

	LED "ROBOTER STOP"	permanent Roboter is stopped flashing "CLEANING" button was pressed before the robot was stopped
	LED "PNEUMATIC OUTLET VALVE" opened	permanent pneumatic outlet valve is open flashing "CLEANING" button has been pressed before the pneumatic outlet valve has been opened

Tank monitoring

	LED (green) "MILK COLLECTION OK"	permanent everything ok - milk can be loaded. flashing informative alarm is on
	LED (red) "DON'T ADD MILK !"	flashing critical alarm is on. permanent critical alarm is on - has already been acknowledged off everything ok - milk can be loaded.
	LED (blue) "Data"	flashing Tank monitor data are stored on the USB stick 5 sec. permanent, then off Saving finished, stick can be removed

2. Operation

2.4 Operation modes



OFF mode



The current time is displayed.
The control unit is on stand-by

- All mode LEDs are out.
- All output relays are deactivated
(Exceptions: robot, butterfly valve and tank monitor alarms may be active)

CAUTION: The control unit is live even when switched off.

Cooling mode



Cooling mode is started from the OFF or from the continuous stirring mode.

- MANUALLY by pressing the COOL button
- DIGITALLY via digital input "Remote start to cooling"
(by robot or external button)
- AUTOMATICALLY following cleaning (if programmed)

Subject: Cooling start delay.

If "Cooling start delay" is programmed, the compressor starts after a delay, in order to prevent a small amount of milk in the tank from freezing. During the cooling-start-delay LED "operation mode "COOLING" is blinking.

This delay applies only for the first milking after cleaning.

Note: If you push the button "COOLING" twice (double click), cooling will start immediately without a delay - the LED will be lit continuously.

There are various cooling start delay options.



After the start of the cooling mode

- The COOLING mode LED is lit
- The robot is enabled (LED off).
- The butterfly valve is closed (LED off).



- The “Agitator” LED lights up
- The “Compressor” LED lights up only when the compressor is actually running.
 - it is not lit if the milk temperature is lower than the target value
 - it flashes for the duration of the min. pause time for the compressor
- The “T1” or “T2” LED (for target temperature 1 or 2) lights up.
- The pre-set target temperature T1 or T2 flashes three times in the display, then the current temperature of the milk is shown.
If you wish to change to the other target temperature: press the COOL button again. (Switching over from T1 to T2 may be blocked).

The milk is now cooled down to the set target temperature, and the agitator runs continuously during cooling. If the milk temperature is already below the target, just the agitator runs for the time being.

- When the target temperature is reached, the compressor switches off.
- At the end of the set “after-stirring” period, the agitator also switches off.
- During cooling breaks the agitator switches on periodically, in line with the set “pause time” for the “after-stirring” period, in order to ensure an even temperature throughout the milk.
- If the milk temperature rises again, and exceeds the selected target temperature by the hysteresis value, the compressor and agitator are switched on again automatically.



Stirring in cooling mode = INTERMEDIATE STIRRING

Depending on the setting

- In cooling mode, briefly press the AGITATOR button:
A “short intermediate stirring” is triggered.
The indication “Sho” is displayed.
- In cooling mode, press the AGITATOR button for 5 seconds:
A “long intermediate stirring” is triggered.
The indication “Lon” is displayed.

Continuous stirring mode



Depending on the setting

- Press the “AGITATOR” button: (from OFF mode)
Switches on continuous stirring mode (revolving bar in the display).
- Press “OFF” button:
Switches off continuous stirring mode.

or

- Press the “AGITATOR” button: (from OFF mode)
The agitator runs at the push of a button for the pre-set minutes.
- Press “OFF” button:
Switches off continuous stirring mode prematurely.

2. Operation

to 2.4 Operation mode

Cleaning mode



- Press the “WASH” button: *(NOT possible from cooling mode)*
Cleaning proceeds automatically in line with your settings.
Depending on the setting, the display indicates the current cleaning stage or the temperature.
Exception: During the heating stages the current water temperature is displayed.



- **Run a short rinsing cycle** (if in [r28] parameterized)
 - Hold SET-button and then press button CLEANING immediately.

To stop cleaning manually

- Press OFF button for 3 seconds: The cleaning programme switches to the stop phase. “ABL” and “F43” flash alternately in the display, indicating “outlet valve open”.
 - All currently active relays are de-energised (apart from “Cleaning active” and “Robot stop”)
 - The outlet valve opens for a pre-set time and then closes again.
 - The red “WASHING” LED blinks - code F43 flashes in the display.
 - The control unit switches to OFF mode only when the OFF button is pressed again.

Cleaning does not start

There are various possible causes – depending on parameter settings:

- The robot has not been stopped -> Stop.
- The butterfly valve is still closed -> Open.
- The safety switch is in the wrong position.
- No cleaning release from the robot

Displays during main wash

- during intake of alkaline detergent: "ALC"
- during intake of acidic detergent: "ACI"
- during disinfecting: "dESI"
- during heating the temperature alternates with "HEAt"

Robot operation

only if the robot is configured



Robot Stop

Valve open

Using the ROBOT STOP button, the operation of a connected robot is either stopped or enabled.

With the start / stop of the robot, the cooling mode of the milk tank is simultaneously started / stopped.

- Hold down the ROBOT STOP button for approx. 3 seconds: robot operation is either enabled or stopped (Toggle function)
The current switching status is indicated by LED.

to 2.4 Operation mode

Milk collection



Robot Stop

Valve open



Complete emptying of tank into collection tanker

- Ensure that the green LED of the tank monitor indicator is lit
- Press the OFF button
- To stir the milk for a short period: briefly press the AGITATOR button. After the desired stirring time, stop the agitator by pressing the OFF button.
- Connect the milk pipe from the tanker.
- Open the tank outlet. (depending on the system, either manually or by means of the BUTTERFLY VALVE button)

If the tank has a pneumatic butterfly valve:

- Press the “BUTTERFLY VALVE” button for approx. 3 seconds:
The butterfly valve opens – the milk is transferred to the tanker.
The “Valve open” LED is lit.

When the tank is empty

- Disconnect the tanker's milk pipe .
- Connected the cleaning hose to the tank outlet.
- Press the WASH button.

To draw off a small quantity of milk (*tanks with pneumatic butterfly valve*)

If milk is to be taken from the tank while cooling mode is running, proceed as follows.

Depending on the setting

- **Button function**
The butterfly valve opens immediately and remains open for as long as the button is held down.
When the button is released, the valve closes immediately.
- **Toggle function**
Press the BUTTERFLY VALVE button for 3 seconds - Outlet opens.
Briefly press the button again - Outlet immediately closes.

Observe the tank monitor



The “Tank monitor” function indicates whether the milk quality is guaranteed or whether a fault has occurred during cleaning.

- LED shows green: milk can be taken out.
- LED shows red: DO NOT LOAD MILK!
The fault is indicated in the display.

3. Tank monitor and general fault handling

7.1 Description of tank monitor operation

IMPORTANT: *After the initial installation the tank monitor works reliably only after one or two cooling cycles (learning of the tank processes).
Trouble-free operations during this time are important!*

During the entire cooling and cleaning process, the built-in tank monitor keeps check on the correct operation of all processes, in order to guarantee the perfect state of the milk. Faults are displayed flashing in the display via corresponding fault codes. Depending on the type of alarm, two LEDs (red and green) are flashing or lit.

In the case of errors which may jeopardise the milk quality, the problem is indicated by a red LED as a "critical alarm". In this case milk must not be added to the tank before a careful check has been carried out.

The tank monitor of the WTS-300 has the following alarm types:



Critical tank monitor alarms (red LED + fault code in the display)

- | | |
|------------------|--|
| During cooling: | <ul style="list-style-type: none">- min. and max. milk temperature- agitator function and stirring intervals- duration of power failure- milk temperature too high for too long |
| During cleaning: | <ul style="list-style-type: none">- cleaning temperatures- wash duration |



Informative tank monitor alarms (green LED + fault code in the display)

- | | |
|------------------|--|
| During cooling: | <ul style="list-style-type: none">- milk temperature too high for too long- milk temperature too low- agitator failure and stirring times- max. time till next wash- duration of power failure |
| During cleaning: | <ul style="list-style-type: none">- cleaning temperatures- detergent injection and acting time |

Additional WTS-300 system alarms (only fault code in the display) (depending on parameter settings, may be both critical and informative)

- | | |
|------------------|---|
| During cooling: | <ul style="list-style-type: none">- cooling time for first milking- broken sensor- sensor short-circuit, etc. |
| During cleaning: | <ul style="list-style-type: none">- monitoring of butterfly valve, cleaning pump, etc.- water intake and outlet times,- heating times, etc. |

3. Tank monitor and general fault handling

Optical presentation of alarms



  No alarm

F34

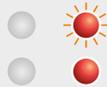
Each alarm has its own display code (see supplement)
Informative and critical alarms are also indicated by LED as follows:

Informative alarm



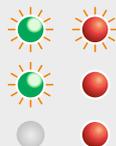
active informative alarm
(Green permanently again after RESET)

Critical alarm



active critical alarm
critical alarm after RESET
(Turns off when cleaning cycle runs for at least 10 minutes ...)

Informative and critical alarm



active critical + informative alarm
critical + informative alarm - 1x RESET
critical + informative alarm - multiple RESET
If several alarms are present, the reset button must be pressed several times. See section 3.3
(Turns off when cleaning cycle runs for at least 10 minutes ...)

System alarm

F34

Is displayed as a blinking display code only.

3. Tank monitor and general fault handling

3.2 Tank monitor: Milk removal YES or NO

Examples of use of tank monitor.

CAUTION:



Do not simply cancel a tank monitor alarm. It is essential to investigate and remedy the cause, in order to avoid a harmful effect on the milk.



Even without an alarm message, the plant operator has to convince himself of the transportability of the milk before picking up!

No alarm – Milk may be drawn off.



Green = on
Red = off

No alarm

- The driver goes to the WTS-300 and checks the tank monitor. If the green LED is on, milk may be drawn off.
- Once the milk has been taken, the driver starts the cleaning process.

Informative alarm - Milk may be drawn off.



Green = flashing
Red = off

Informative alarm
(Press RESET button)



after RESET

Green = on
Red = off

Informative alarm

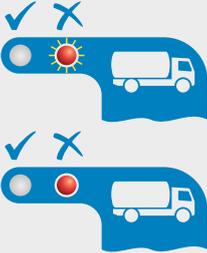
- The driver goes to the WTS-300 and checks the tank monitor. The green LED is flashing – the warn horn sounds - an error code is displayed. Milk can be drawn off -> The farmer must be informed.
- The farmer investigates (and remedies) the cause of the fault and presses the "RESET" button -> the warn horn mute.
- The farmer presses the "RESET" button again -> the green LED is now on continuously. (The informative alarm is accepted and deleted with the pushbutton.)
- Once the milk has been taken, the driver starts the cleaning process.

NB:

If the informative alarm is not reset, the green LED flashes and the error code continues to be displayed -> even after the next cleaning cycle.

3. Tank monitor and general fault handling

Critical alarm - Milk must not be taken out.



The diagram illustrates the tank monitor's status during a critical alarm and after a reset. It shows two states of the monitor, each with a green LED and a red LED, and a truck icon. In the first state, the green LED is off and the red LED is flashing. In the second state, after a reset, the green LED is off and the red LED is on. To the right, there are two 'RESET' buttons, one of which is being pressed by a red arrow.

Green = off Red = flashing	critical alarm (press RESET button)
after RESET	
Green = off Red = on	critical alarm

- The driver goes to the WTS-300 and checks the tank monitor. The red LED is lit or flashing, an error code blinks in the display and, depending on the circumstances, a horn may sound.
- The driver informs the farmer -> Farmer and driver investigate the cause of the critical alarm. (The critical alarm codes are taken from the display and identified using the fault table. See section 8.9)
- The farmer and driver then decide together whether the milk can be transferred to the tanker, despite the alarm.
- The farmer presses the RESET button to cancel the alarm -> The warn horn mute.
- The farmer presses the RESET button again -> the red LED is lit continuously.
- Once the tank is emptied the washing process must be started

It is only when the cleaning cycle is active for at least 10 minutes that the tank monitor resets all critical alarms.

3. Tank monitor and general fault handling

Critical + informative alarm - **Milk must not be taken out.**

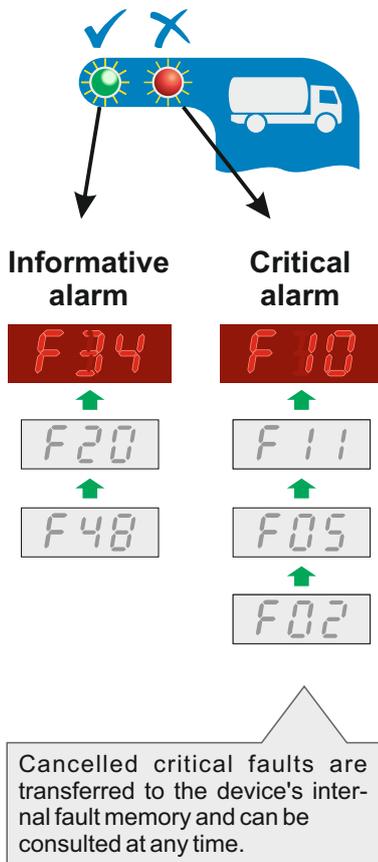
	Green = flashing Red = flashing	critical + informative alarm (press RESET button)	
after RESET	Green = flashing Red = on	critical + informative alarm (press RESET button)	
after second RESET	Green = off Red = on	critical + informative alarm	

- The driver goes to the WTS-300 and checks the tank monitor. Green and red LEDs are flashing, an error code blinks in the display and, depending on the circumstances, a horn may sound
- The driver informs the farmer -> Farmer and driver investigate the cause of the critical and informative alarms. (The critical alarm codes are taken from the display and identified using the fault table.)
- The farmer and driver then decide together whether the milk can be transferred to the tanker, despite the alarm.
- The farmer first presses the RESET button to cancel the critical alarm -> the horn switches off.
- The farmer presses the RESET button again -> the red LED is lit continuously.
- The farmer then cancels the informative alarm -> the green LED turns off.
- Once the tank is emptied the washing process must be started.

It is only when the cleaning cycle is active for at least 10 minutes that the tank monitor resets all critical alarms.

3. Tank monitor and general fault handling

7.3 Tank monitor: Handling multiple faults



For every alarm - whether informative (green) or critical (red) – an error code blinks in the display.

If several faults occur simultaneously, the code for the most recently occurring fault blinks in the display.

If both informative and critical faults occur, priority is always given to the critical error code (in the example this would be fault F10)

Exception in cooling mode: sensor faults flash alternately with critical or informative alarms.

Cancelling faults: (both LEDs flash alternately)

- The most recently occurring fault (example F10) blinks in the display. Press RESET button -> The horn switches off, the most recently occurring fault (example F10) continues to blink in the display.
- Identify the fault using the list of faults -> Press RESET button -> the red LED continues to flash in order to indicate that there are further critical faults.
- The next fault (in the example F11) blinks in the display: Identify the fault using the list of faults -> Press RESET button -> etc.

When the last critical fault (example F02) has been reset: (red LED permanently lit)

- The first informative fault (example F34) blinks in the display: Identify the fault using the list of faults -> Press RESET button -> The green LED continues to flash in order to indicate that there are further informative faults.
- The next informative fault (example F20) flashes in the display...

When the last informative fault has been reset, the green LED goes out, while the red LED stays on permanently.

It is only when the cleaning cycle is active for at least 10 minutes that the tank monitor resets all critical alarms.

7.4 Tank monitor: Display fault memory



If the tank monitor's red LED is permanently lit, it means that critical faults have already been acknowledged, but still exist. These error codes are registered in the device's internal fault memory and can be consulted as follows:

Show the last 5 critical faults from the fault memory

- SET button in OFF mode: the code for the first critical fault is displayed (in the above example F02).
- SET button again: the next error code is displayed (in the example F05).

If no button is pressed for 3 seconds, the display switches back to the time.

It is only when the cleaning cycle is active for at least 10 minutes that the tank monitor resets all critical alarms.