PPH MAKOT
ul. Ochota 15F | 32-020 Wieliczka | Poland
Support: email dt@makot.pl
Sales: email biuro@makot.pl
mob. + 48 537 872 522

# CONTROLLERS OF UMS (v. 5) SERIES
## User manual

### *1. DESCRIPTION.*

The fifth generation of UMS series controllers are programmable time controllers with universal use. They were created with the purpose of controlling external devices in the process of washing milk coolers and milking devices. However, they also find application in other processes, i.e. wherever it is necessary to control several different external devices in time.

The controllers are available in the following types of casings:

- **UMS-02** – in an enclosure intended for building,
- **UMS-02H** – in an enclosure intended for building, with an increased protection class (IP52),
- **UMS-04** – in a rail enclosure,
- **UMS-05** – in a hermetic enclosure (protection class IP65)

UMS series controllers work in an automatic cycle, according to one of four factory (default) washing programs (with the option of their modification) or according to a program created by the user. It is also possible to manually start the vacuum pump or the stirrer.

The **UMS-T** version of the controllers allows user to additionally control the heating of water in two independent cycles:

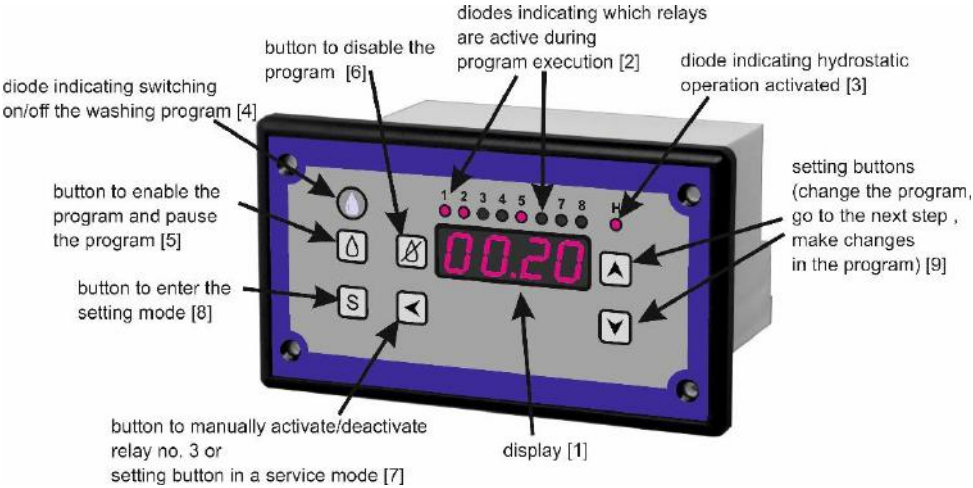
- heating the water (or other) to the desired temperature;
- thermostatic maintenance of the desired temperature of water (or other) for a specified time.

## *2. TECHNICAL DATA.*

| | |
|---|---|
| power supply | 230 V AC 50 Hz |
| protection class: - UMS-02<br>- UMS-02H<br>- UMS-04<br>- UMS-05 | IP 20<br>IP 52<br>IP 20<br>IP 65 |
| range of external temperature of operation | from -10 $^{O}$C to +50 $^{O}$C |
| number of relay outputs | 8 |
| load capacity of the relay contacts | 10A 250V AC |
| number of control inputs | 2<br>(hydrostatic and external start button of the program) |
| type of display | LED |
| range of setting the control temperature *(UMS-T version only)* | from 20 $^{O}$C to 80 $^{O}$C, every 0,5 $^{O}$C |
| range of setting hysteresis of thermostatic control *(UMS-T version only)* | from 1 $^{O}$C to 20 $^{O}$C, every 1 $^{O}$C |
| number of avaiable programs | 8 |
| number of factory (default) programs | 4 |
| maximum number of steps (sequences) in each program (maximum number of successive turns of various relays) | 100 |
| minimum duration of a step (sequence) | 1 s. |
| maximum duration of a step (sequence) | 99 min. |
| range of time changes with pulsation dosing | 1-59 s. |

## *3. CONSTRUCTION OF THE CONTROLLERS.*

***actual appearance of the UMS-02 controller***




***actual appearance of the UMS-04 controller***

***actual appearance of the UMS-05 controller***


The UMS controller is equipped with:

- ✓ LED display indicating:
  - with the washing program off – current time (clock)

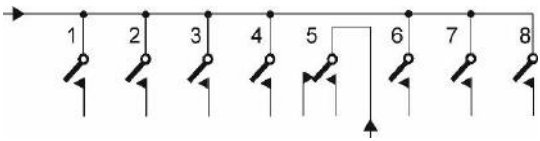

  - with the washing program on – time remaining until its completion (without taking into account the time of pouring water when using the hydrostatic)


  - in the UMS-T version – user has an option to set the controller to indicate the current temperature measured by the temperature sensor **[1]**


- ✓ diodes indicating which relays are active during program execution **[2]**
- ✓ diode indicating hydrostatic operation activated **[3]**
- ✓ diode indicating switching on/off the washing program **[4]**
- ✓ button to enable the program; this is also used to manually pause the program **[5]**
- ✓ button to disable the program **[6]**
- ✓ button to manually activate/deactivate relay no. 3 operation, as well as setting button in a service mode (changing settings of the controller) **[7]**
- ✓ button to enter the setting mode **[8]**
- ✓ setting buttons, allowing the user to: (i) change the program, (ii) go to the next step (sequence) or (iii) moving back to the previous one – while program is on, as well as (iv) make changes in the program (activated in the setting mode) **[9]**.

The controller also has:

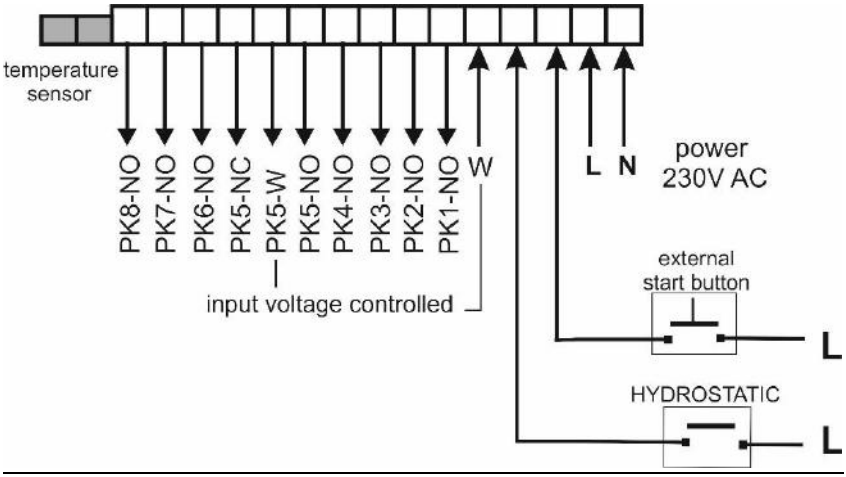
- ✓ 8 control outputs: in relays 1-4 and 6-8, the outputs have normally open contacts, while relay 5 has short-circuited normal contacts and normally open and the input of the switched voltage, which can have a different value than other relays



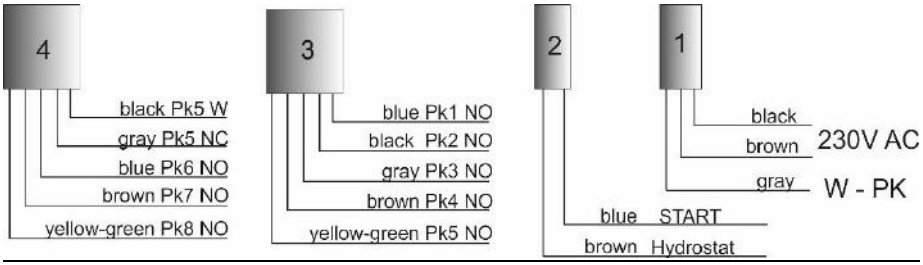

- ✓ switching voltage input for relays 1-4 and 6-8, led out to enable connecting any voltage level from 6V to 380 V, the same for all above relays
- ✓ switching voltage input for relay 5, any of the range from 6V to 380V, which can be different from the voltage connected to relays 1-4 and 6-8
- ✓ input for hydrostatic connection,
- ✓ input for connecting an external button that activates the program,
- ✓ input for connecting the temperature sensor – only in **UMS-T** version.

## *4. SCHEME OF CONNECTION OF THE CONTROLLER.*

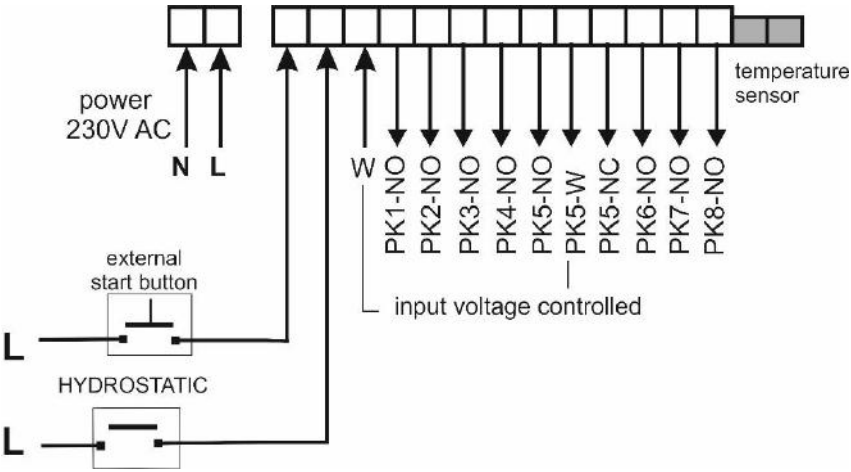
**UMS-02T**



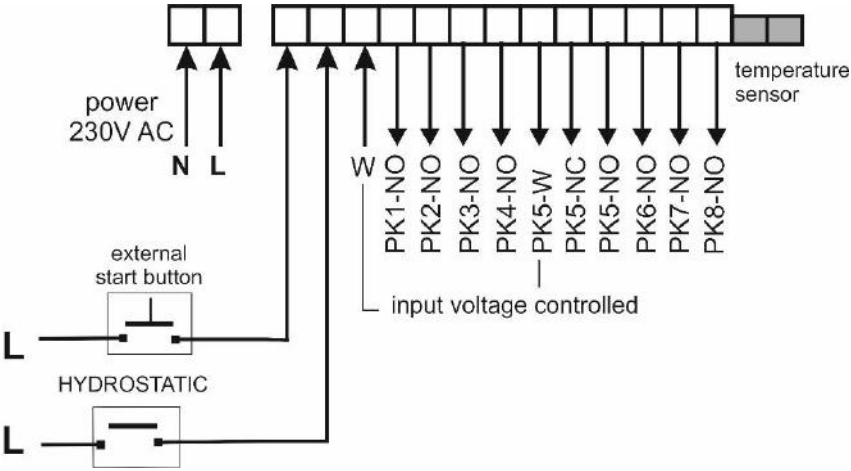

**UMS-02H**



**UMS-04T**




**UMS-05T**




***ATTENTION***

*On the external start button and the hydrostatic input, the power suply 230 V AC signal L should be given.*

*Relay 5 has normally closed (NC) and normally open (NO) inputs and an input for switching voltage marked with W.*

## *5. CONTROLLER FUNCTIONS.*

### *5.1. Basic functions in all versions of the controller.*

The controller is equipped with a number of functions that, together with the option of creating your own program, allows user to adapt the controller to individual needs (see section 7).

1. **Washing programs.** The controller has 8 programs; 3 factory programs are for washing milking machines and 1 factory program is for washing milk coolers. Factory programs can be freely modified and deleted. The remaining 4 places in the controller's memory enable creating programs according to the individual needs of the user.
2. **Modification and creation of programs** (function symbol in the table of settings: **EdPr**). The controllers allows the user to create a control program. Each program can have a maximum of 100 steps (sequences), with duration from 1 to 99 min. each. The programming method has been described in detail in the instruction, in iconographic form. Factory programs can also be modified according to the needs of the user.
3. **Manual activation of the vacuum pump or the stirrer** (function symbols: **UPP** and **UPt**). This function is active only when the washing process is not running. Depending on the settings made, the function is deactivated by pressing again the button that activates is or automatically after the time set in the setting.
4. **Protection function in case of power supply failure** (function symbol: **UAP**). Loss of power supply interrupts the execution of the activated washing program. After returning the correct supply voltage, depending on the settings made, the program execution remains off or starts in the same place where it was stopped. The return time after voltage decay can be limited in the settings of this function (in the range from 1 h to 9 h).
5. **Functions related to the clock** (functions symbols: **CL0**, **CL5**, **PA** and **Pb**). The controller is equipped with a real-time clock. The purpose of this clock is the ability to determine the time (limit hour), separating the two seasons of the day (e.g. morning and afternoon). Depending on the settings, the following can be set to activate the functions related to the clock:
   - possibility of dispensing various detergents depending on the time of day, by switching on relay 6 in the “morning” (before the set limit hour) and switching on relay 7 in the “afternoon” (after the limit hour);
   - work of two different programs, depending on the time of day.

   The clock has no time stamp, so settings related to the days of the week or dates are not possible.
6. **Pulsation dosing** (function symbol: **PUL5**). This function allows user to set the relay 7 in such a way that it will be cycled on and off during the step in which this function will be activated. This function can be activated in any steps during the washing program. Duration of switching on and off can be set in the range of 1 to 59 s.

> ***ATTENTION***
> *If this function is activated, it is performed only by the relay 7. In this case, setting the function of turning on the relay 7 in the ”afternoon” (also assigned to the clock function) will activate pulsing dosing instead of dispensing detergent.*

*If it is necessary to use both pulsation dosing and dosing of various detergents depending on the time of day, you should use the option of setting two different programs on, depending on the time of day.*

7. **Test / service function**. Allows to go sequentially to the next steps (sequences) of the program, without waiting for the duration of the step to expire. The transition is made by pressing the appropriate button. This function can be used by the user: (i) to skip any step or (ii) to go back to the previous steps during the washing program, as well as (iii) to test the correct operation of the system.
8. **Return to factory settings** (function symbol: **Pd0d**). If an error occurs while setting the controller operation, it is always possible to return to the factory settings.
9. **Program start function**. The program is started by manually pressing the button located on the front of the controller or by pressing the external button. It is also possible to trigger the start of the program in an automatic manner, carried out by an external device connected to the external button input.
10. **Pausing (suspending) the implementation of the program during its execution**. This function allows to interrupt the program at any time, and then resume its implementation, which takes place exactly in the same place (step), where the program was interrupted. Pausing is carried out using the button located on the front of the controller or by pressing the external button.
11. **Disabling the program**. The controller is equipped with a button that disables the program, without the possibility of resuming it. Restarting the program's work will start the program from the beginning.
12. **Displaying the time until the end of the program**. During program execution, the controller's display shows the time to complete the entire program. The time indicated by the display does not take into account the time of pouring water when using a hydrostat.
13. **Function of ending the process of pouring water depending on the signal from the hydrostatic**.

### *5.2. Additional functions in UMS-T version.*

All additional functions of the controller in the UMS-T version are set from the programming level of the given program **EdPr** (see section 7.2.), with the exception of the scaling adjustment – **oFF** parameter.

The heater control function is implemented via relay 8. It can not be used in this controller for other purposes, unless it is not used to control the heaters at all (despite having the UMS-T version).

1. **Displaying the current temperature** (function symbol in the table of settings: **di**). The UMS-T controller can be programmed so that at any step (sequence), instead of displaying the time until the end of the washing program, it displays the current temperature (**di = 1**). The temperature will be displayed only in the steps in which the function has been activated.
2. **Setting the temperature, after reaching which the heater is turned off** (function symbol: **--$^{O}$C**).
3. **Function defining further controller operations after reaching the set temperature** (function symbol: **Hi**):

- **Hi** parameter set to **0** means that after reaching the set temperature the heater will turn off and the controller will proceed to the next step (sequence);
- **Hi** parameter set to a value in the range from 1 to 20 means that after reaching the set temperature the controller will go to the thermostatic control, keeping the temperature during the step in the range determined by the set temperature, minus the set hysteresis.

4. **Temperature sensor failure monitoring function**. If the controller detects damage to the temperature sensor, the controller's operation is switched off and the **Err** symbol appears on the display.

> ***ATTENTION***
> *The **UMS-T** controller must have working temperature sensor connected. Otherwise, the controller can not be switched on or settings can not be made. The lack of a sensor is signaled by displaying the **Err** symbol.*

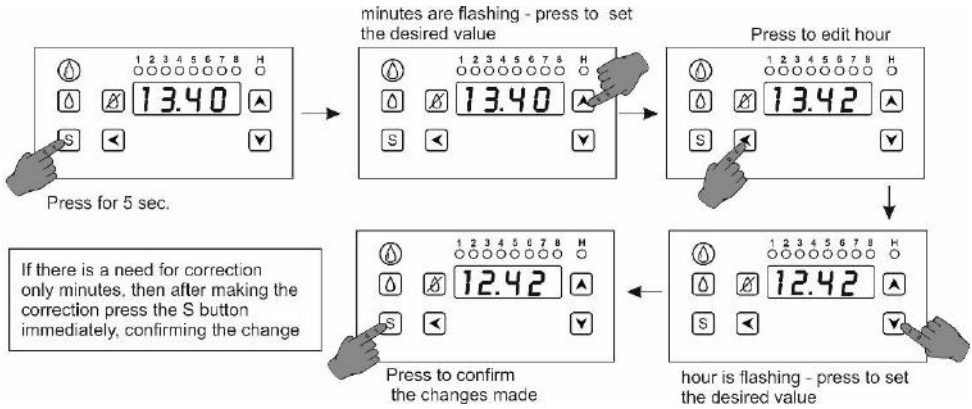
5. **Temperature correction function** (function symbol: **oFF**). Correction is possible in the range of +/- 10 $^{O}$C, every 0.5 $^{O}$C, where 0.5 $^{O}$C is indicated by lighting up a dot by digit of temperature. Corrections of the readings should be made only after the actual confirmation of false controller's readings, by comparing the temperature measured by the calibrated meter and the controller.

## *6. OPERATION OF THE CONTROLLER BY THE DIRECT USER.*

### *6.1. Starting the controller.*

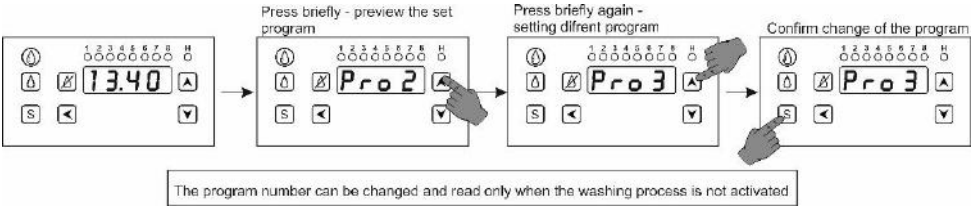
After connecting the supply voltage, the controller remains in a ready state.
The current time (clock) is shown on the display. The correction of the time displayed or its setting should be carried out according to the following diagram.

***ATTENTION***
*The controller's clock does not change automatically for daylight saving time.*




### *6.2. Setting the washing program .*

At any time, user can read the set washing program by briefly pressing the ▲ or ▼ button. The symbol of currently set program is then shown on the display, e.g. Pro2. If you want to change the program, press the ▲ or ▼ button again and confirm the change by pressing the **S** button. This way, the newly set program will be stored in memory and if there is no need to change it again, then this program will be carried out all the time.
The reading and change of the currently set program is only carried out with the washing process switched off.

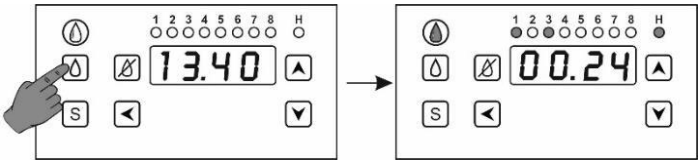


### *6.3. Enabling and pausing the program.*

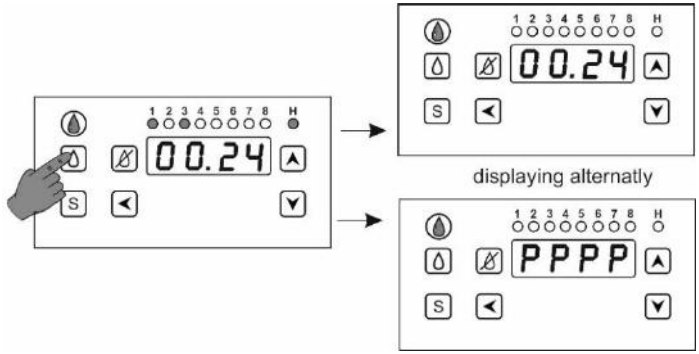
By pressing the start button of the program marked with the symbol **[5]**, the previously set or programmed program is executed.

The display shows the time to complete the washing process (instead of the current time). The displayed time does not take into account the time needed to pour water. In the UMS-T version, depending on the settings made, the display may show the current temperature (instead of time). This function can be assigned to only one or more of any steps, and in the remaining steps the time to finish the washing process can still be displayed.

Activation of the washing process is also signaled by the blue diode, highlighting the symbol **[4]**.

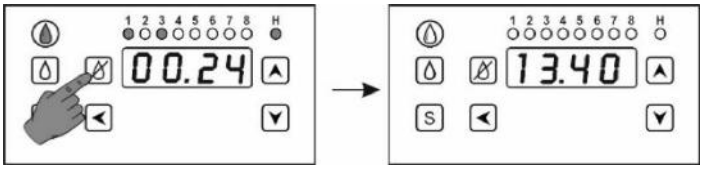



During the program execution, user can pause at any time by pressing the **[5]** button again. If the program is paused, all active relays will be switched off, and the **PPPP** symbol and the time remaining until the end of the program are displayed alternately. The program is resumed by pressing the **[5]** button. The program will be continued from the step (sequence) where it was paused.




### *6.4. Disabling the program.*

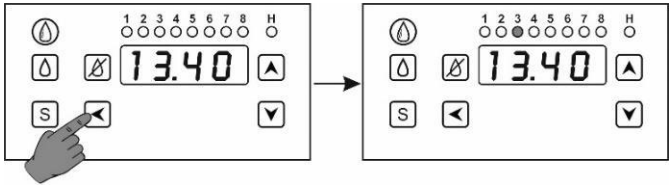
If the need arises, user can deactivate the currently executed program at any time. This is done by pressing the button marked with the symbol **[6]**. The program execution is switched off and the controller goes into the ready state.




***ATTENTION***
*Restarting the program will in this case implement it from the beginning.*

### *6.5. Manual switching on the vacuum pump or the stirrer.*

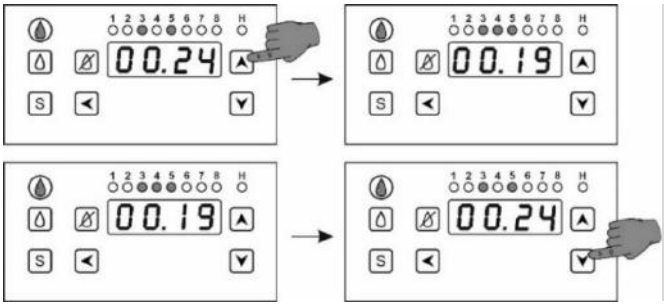
If this function is activated (by making appropriate adjustments by the installer), the user has the option of manually switching the vacuum pump or the stirrer on or off; the ◄ **[7]** button is used for this purpose. Manual switching on is only possible when the controller does not carry out the washing program; while the program is running, the manual start button is inactive. Depending on the connections to the relay 3, made by the installer, either the vacuum pump (**PP**) or the stirrer (**PPR**) can be switched on manually.
Switching off occurs by pressing the ◄ button again or automatically after the time set by the installer has elapsed.




### *6.6. Accelerating the next step or moving back to the previous step.*

**The steps** are factory preset or set by the user time intervals (sequences) of the program implemented by the controller, in which also active and inactive relays and additional functions are defined.
The controller has the ability to accelerate (eliminate) by the user the implementation of any step. User can also move back to the previous step. This function is performed by holding the ▲ or ▼ buttons; going to the next step or moving back to the previous one happens after 10 sec. or immediately if the current step lasts already for at least 10 sec.

***ATTENTION***
*This function also allows the user to check the correct operation of the washing installation after installing the controller, as well as during servicing of the washing installation.*


1 2 3 4 5 6 7 8 H
00.24
S
1 2 3 4 5 6 7 8 H
00.19
S
1 2 3 4 5 6 7 8 H
00.19
S
1 2 3 4 5 6 7 8 H
00.24
S

## *7. PROGRAMMING.*

The controller is factory-programmed for standard operating conditions, intended for controlling the milk cooler washing (one program) and the milking machines washing (three programs). Nevertheless, in order to ensure correct operation of the controller under specific conditions, it is possible to make appropriate adjustments to the operating parameters (including selecting the appropriate program) or to create your own program.

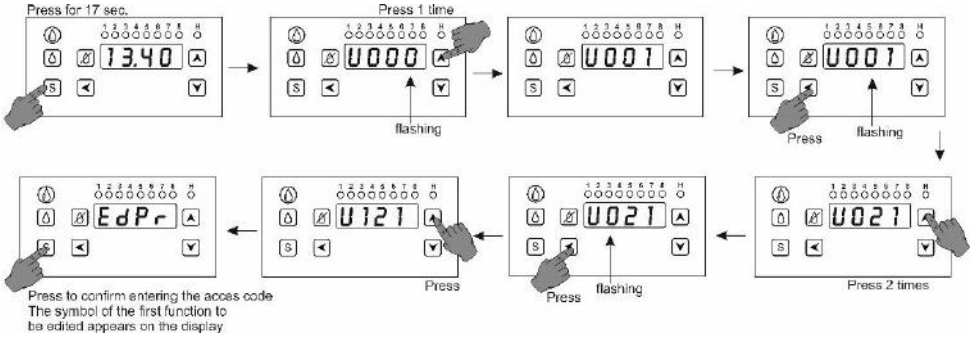
After installing the controller, it is also possible to check the correct operation of the entire washing system (see section 4.6).

The controller is protected against accidentally entering the service settings mode, available only for the installer or service technician. These protections include:

- the necessity to press and hold the enter button in setting mode **[8]** for approx. 15 sec.,
- the necessity to enter the access code, which is given in the table of settings.

***ATTENTION***
*Please do not provide access code directly to users.*

The graphical procedure for entering the access code, allowing entry into the settings and programming mode is shown below:




### *7.1. Description of buttons when setting / editing.*

| | |
|---|---|
| S | – entering the setting mode<br>– confirmation of changes made (without it no changes will be saved) |
| ⌀ | – going back to the previous status (without saving changes)<br>– exiting from the settings mode; it may be necessary to press this button several times (depending where the change was made) |
| ◄ | – moving from right to left on the display - to edit the duration of the step<br>– switching between diodes - to determine the status of the relay (signaled by a diode)<br>– going to the settings related to temperature functions (UMS-T version only) |
| ▲ | – selection of program |

| | |
|---|---|
| | – selection of parameter (function) to be edited<br>– selection of step (sequence) to be edited<br>– editing the duration of the step<br>– relay activation (diode is on) |
|  | – selection of program<br>– selection of parameter (function) to be edited<br>– selection of step (sequence) to be edited<br>– editing the duration of the step<br>– relay deactivation (diode is off) |
| flashing digit / diode – indication of readiness for editing | |
| 30 sec. of inactivity – exiting the setting mode without any changes saved | |

### *7.2. Table of settings.*

In the table of settings, all available parameters (functions) are given along with their description and possible values to be set. If it is necessary to change any parameter, enter the setting mode and then select the parameter that will be subject to change.

| *description of function* | *symbol* | *range of settings* | *factory setting* |
|---|---|---|---|
| entry in the setting mode | **U000** | access code | 121 |
| edition of program | **EdPr** | edition of factory programs and creation of own programs – see section 7.4. | 8 programs – see section 7.6. |
| setting of manual activation of the vacuum pump or stirrer (when the washing program is disabled) | **UPP** | **0** – inactive<br>**1** – active, no time limit<br>**2** – active, with a time limit (function UPt) | 1 |
| time limit for manual activation of the vacuum pump or stirrer (when the washing program is disabled) | **UPt** | from 00.01 min. up to 99.59 min. | 01.00 (min.) |
| setting the maximum power supply decay time, after which the program will be resumed | **UAP** | **0** – no time limit; the program will be always resumed after the power supply is restored<br>**1** – time limit; the program will only be resumed if the power supply is restored during the set time (by default within 9 hours) | 9 (h) |
| setting the clock function | **CL0** | **0** – inactive<br>**1** – activation of relay 6 or relay 7, depending on the time of day; **disables the possibility of setting the program manually**<br>**2** – switching the active washing program, depending on the time of the day; **disables the possibility of setting the program manually** | 0 |

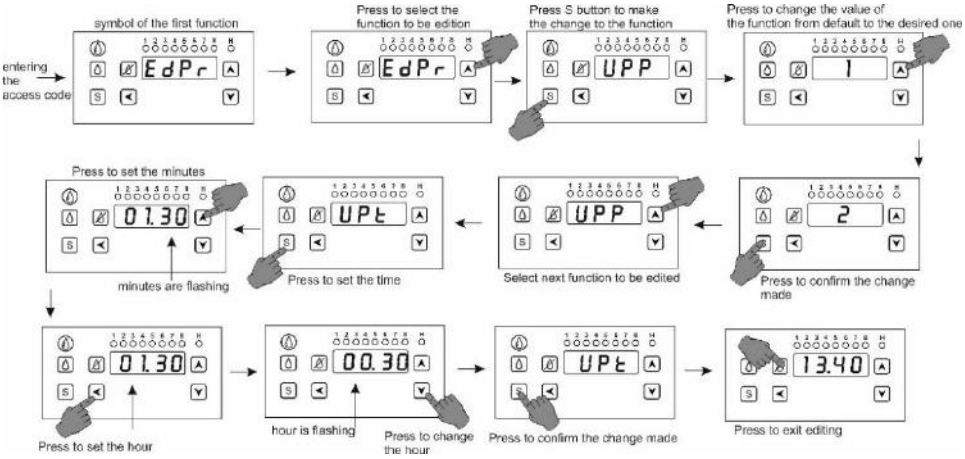
| | | | |
|---|---|---|---|
| setting the limit hour between "morning" and "afternoon" | **CL5** | setting a hour delimiting "morning" from "afternoon" | |
| setting the program active in the "morning" (**only if CL0=2**) | **PA** | number of program (1-8) | 1 |
| setting the program active in the "afternoon" (**only if CL0=2**) | **Pb** | number of program (1-8) | 1 |
| correction of the temperature sensor scaling (**only in UMS-T**) | **oFF** | correction of the current temperature indication +/- 10 $^{O}$C, every 0.5 $^{O}$C<br>0.5 $^{O}$C is indicated by a dot lighting up on the set digit | no correction |
| return to factory settings (**only after restarting the controller**) | **Pd0d** | **0** – inactive<br>**1** – active; return to factory settings, **after turning the controller power off and on again** | 0 |
| setting of the pulsating operation of relay 7 | **PUL5** | **0** – inactive<br>**1** – active; pulsating operation of relay 7 is switched on | 0 |
| time for which relay 7 is active (**only if PUL5=1**) | **PHi** | setting the time for which relay 7 will be active – from 1 sec. to 59 sec. | 1 (s.) |
| time for which relay 7 is inactive (**only if PUL5=1**) | **PHo** | setting the time for which relay 7 will be inactive – from 1 sec. to 59 sec. | 1 (s.) |

### *7.3. Selection and setting of the exemplary function.*

The following is a graphical representation of making the change in the factory setting on the example of the manual activation of the vacuum pump (**PP**).

By default, this function is set without the automatic switching off of the vacuum pump (stirrer), which was manually switched on. The change will consist in turning on the automatic switching off of the vacuum pump after the set time. As a reminder – the function of manual switching on of the vacuum pump (stirrer) is active only when the washing process is not implemented.

The method of changing or activating other functions will be similar to the example shown.



### *7.4. Editing programs – EdPr parameter.*

The controller has 4 washing programs that can be edited, depending on the user's needs.
The remaining 4 places in the controller's memory are designated for the programs to be created by the installer; they are empty by default (they do not contain any steps). Each program can contain up to 100 steps (sequences), lasting from 1 sec. to 99 min. Each step is assigned with:

a) status of 8 relay outputs – relay is active (red diodes marked 1-8 are on) or inactive (diode assigned to a given relay is off),
b) status of hydrostatic input – active (red diode marked H is on) or inactive (diode is off),
c) the duration of the step (sequence); in the case of a step with a hydrostatic active, this is a protection, in the event of a mechanical suspension of the hydrostatic.

Additionally, for the controller in UMS-T version, optionally you can assign to any of the steps:

d) displaying the temperature;
e) the value of temperature to which the heater is to be turned on;
f) maintaining the set temperature for a specified time.

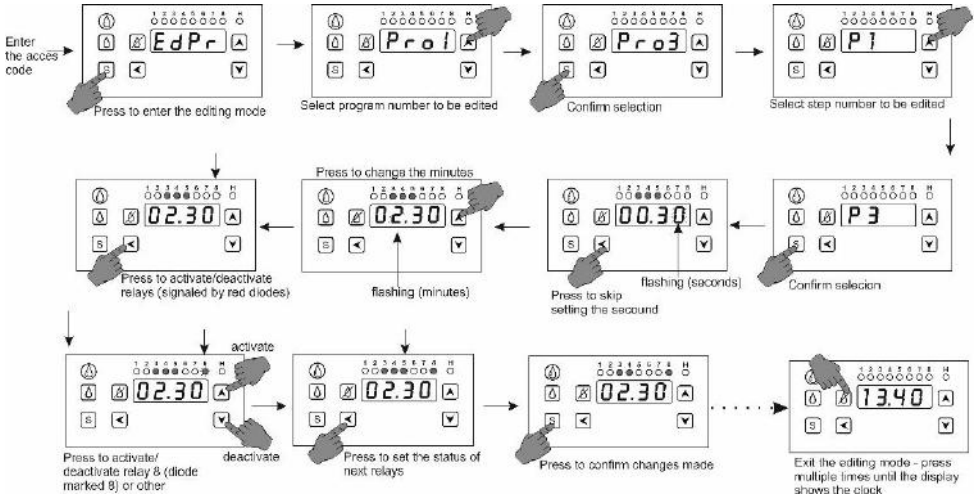
***ATTENTION***
*If the clock function is set CL0=1 (indicating the dispensing of different detergents depending on the time of day), when setting in the appropriate step, activate relay 6.*
*Relay 7, dispensing detergent in the "afternoon", will automatically turn itself on, changing with relay 6.*

***ATTENTION***
*When editing a program or creating a new program, the necessary condition for creating a step (sequence) is to determine its duration. Failure to specify a time of the step will skip this step during program execution.*

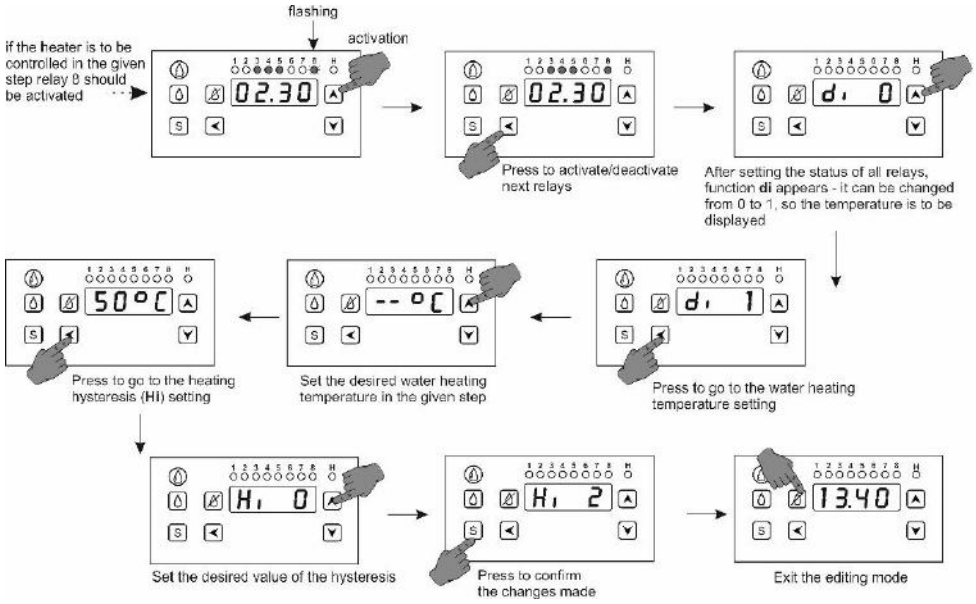
***Recommendation***

*Before you start creating a new program or making a significant modification to an existing program, it is recommended to create a table with a new/modified program beforehand.*
*For convenience the table should look similar to the tables of the factory programs.*
*It should be remembered that after 30 sec. without any related activities with programming of the controller, it automatically exits the setting mode and the already created steps (changes made)* ***will not be saved****.*

The program edition cycle is shown below graphically.



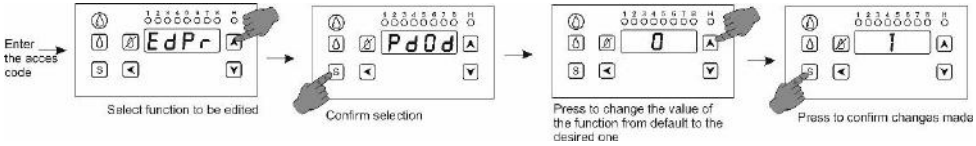

The editing of the controller program in the UMS-T version is similar to the basic version, with the addition of editing and settings related to temperature.




### *7.5. Return to factory settings .*

To return to the default settings, enter the controller settings mode. Using the ▲ and ▼ buttons select the **Pd0d** parameter, confirm the selection by pressing the **S** button and change the value of this parameter from **0** to **1**, using the ▲ button. Then confirm the changes by pressing the **S**

button again. After doing this, disconnect the power supply from the controller and switch it on again.




***ATTENTION***

*Return to the factory settings removes any settings from the controller's memory, while restoring factory settings. So use this option with caution and consciously.*

***The return to the factory settings takes place only after disconnecting and re-connecting the controller's power supply.***

### *7.6. Factory programs.*

The controller is equipped with four washing programs, which can be freely edited, depending on the user's needs. These are three programs for washing milking machines (PRO1, PRO2 and PRO3), as well as one program for washing the milk tank (PRO4). Below are the tables containing these programs.

The remaining four places in the controller memory are designed to create the program(-s) by the user – they are empty by default (they do not contain any steps).

The abbreviations used in the following program tables mean:

| | |
|---|---|
| ***CW*** *– hot water relay* | ***ZW*** *– cold water relay* |
| ***PP*** *– vacuum pump relay* | ***PML*** *– milk pump relay* |
| ***PM*** *– washing pump relay* | ***PPR*** *– stirrer relay* |
| ***ZZ*** *– dump valve relay* | ***H*** *– hydrostatic* |
| ***ZD1*** *– detergent dispensing valve 1 relay* | ***w*** *– free (unused)* |
| ***ZD2*** *– detergent dispensing valve 2 relay* | |
| ***G*** *– heater* *(only in UMS-T)* | ***$^{o}$C*** *– control temperature setting* *(only in UMS-T)* |
| ***di*** *– displaying the temperature* *(only in UMS-T)* | ***Hi*** *– hysteresis of thermostatic control* *(only in UMS-T)* |

***ATTENTION***

*The purpose of individual relays to control specific external devices is contractual; the number of the relay to control a given device can be freely changed, with the exception of:*

- *relays 6 and 7 – when using different detergents in the "morning" and in the "afternoon" (**CL0=1**);*
- *relay 8 – when using to control heaters (**only in UMS-T**).*

### *7.6.1. Factory programs for the basic version of the controller.*

**PRO1 – WASHING OF THE MILKING MACHINES**

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ⨯ | comments |
| mode | step no. | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | **ZD1** | ZD2 | w | **H** | |
| rinsing | 1 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 2 | 05:00 | | | **1** | | **1** | | | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | |
| washing | 4 | *15:00* | **1** | | | | | | | | **1** | max. time |
| | 5 | 00:20 | | | | | | **1** | | | | |
| | 6 | 08:00 | | | **1** | | | | | | | |
| | 7 | 04:00 | | | **1** | | **1** | | | | | |
| | 8 | 00:30 | | | **1** | **1** | **1** | | | | | |
| rinsing | 9 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 10 | 05:00 | | | **1** | | **1** | | | | | |
| | 11 | 00:30 | | | **1** | **1** | **1** | | | | | |
| **total time** | | **23:50** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | |

**PRO2 – WASHING OF THE MILKING MACHINES**

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ⨯ | comments |
| mode | step no. | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | **ZD1** | ZD2 | w | **H** | |
| warming | 1 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 2 | 03:00 | | | **1** | | **1** | | | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | |
| rinsing | 4 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 5 | 05:00 | | | **1** | | **1** | | | | | |
| | 6 | 00:30 | | | **1** | **1** | **1** | | | | | |
| washing | 7 | *15:00* | **1** | | | | | | | | **1** | max. time |
| | 8 | 00:20 | | | | | | **1** | | | | |
| | 9 | 08:00 | | | **1** | | | | | | | |
| | 10 | 04:00 | | | **1** | | **1** | | | | | |
| | 11 | 00:30 | | | **1** | **1** | **1** | | | | | |
| rinsing | 12 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 13 | 05:00 | | | **1** | | **1** | | | | | |
| | 14 | 00:30 | | | **1** | **1** | **1** | | | | | |
| **total time** | | **27:20** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | |

## PRO3 – WASHING OF THE MILKING MACHINES

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ⨯ | comments |
| mode | step no. | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | ZD1 | **ZD2** | w | **H** | |
| warming | 1 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 2 | 03:00 | | | **1** | | **1** | | | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | |
| rinsing | 4 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 5 | 05:00 | | | **1** | | **1** | | | | | |
| | 6 | 00:30 | | | **1** | **1** | **1** | | | | | |
| washing | 7 | *15:00* | **1** | | | | | | | | **1** | max. time |
| | 8 | 00:20 | | | | | | | **1** | | | |
| | 9 | 08:00 | | | **1** | | | | | | | |
| | 10 | 04:00 | | | **1** | | **1** | | | | | |
| | 11 | 00:30 | | | **1** | **1** | **1** | | | | | |
| rinsing | 12 | *15:00* | | **1** | | | | | | | **1** | max. time |
| | 13 | 05:00 | | | **1** | | **1** | | | | | |
| | 14 | 00:30 | | | **1** | **1** | **1** | | | | | |
| **total time** | | **27:20** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | |

## PRO4 – WASHING OF THE MILK TANKS

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ⨯ | comments |
| mode | step no. | time | **CW** | **ZW** | **PPR** | **PM** | **ZZ** | **ZD1** | ZD2 | w | w | |
| rinsing | 1 | 02:30 | | **1** | | | | | | | | |
| | 2 | 01:00 | | **1** | **1** | **1** | | | | | | |
| | 3 | 01:00 | | | **1** | **1** | | | | | | |
| | 4 | 02:30 | | | | | **1** | | | | | |
| washing | 5 | 02:30 | **1** | | | | | | | | | |
| | 6 | 00:20 | | | **1** | | | **1** | | | | |
| | 7 | 01:00 | **1** | | **1** | **1** | | | | | | |
| | 8 | 04:30 | | | **1** | **1** | | | | | | |
| | 9 | 03:00 | | | | | **1** | | | | | |
| rinsing | 10 | 02:30 | | **1** | | | | | | | | |
| | 11 | 01:00 | | **1** | **1** | **1** | | | | | | |
| | 12 | 01:00 | | | **1** | **1** | | | | | | |
| | 13 | 04:00 | | | | | **1** | | | | | |
| **total time** | | **26:50** | | | | | | | | | | |

### *7.6.2. Factory programs for the controller in UMS-T version.*

**PRO1 – WASHING OF THE MILKING MACHINES**

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | H | | | | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | |
| mode | step | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | **ZD1** | ZD2 | **G** | **H** | **di** | **°C** | Hi | |
| rinsing | 1 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 2 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| washing | 4 | *15:00* | **1** | | | | | | | | **1** | **1** | | | max. time |
| | 5 | *30:00* | | | | | | | | **1** | | **1** | ***40*** | | max. time |
| | 6 | 00:20 | | | | | | **1** | | | | **1** | | | |
| | 7 | 08:00 | | | **1** | | | | | | | **1** | | | |
| | 8 | 04:00 | | | **1** | | **1** | | | | | **1** | | | |
| | 9 | 00:30 | | | **1** | **1** | **1** | | | | | **1** | | | |
| rinsing | 10 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 11 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 12 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| **total time** | | **23:50** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | | | | |

**PRO2 – WASHING OF THE MILKING MACHINES**

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | H | | | | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | |
| mode | step no. | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | **ZD1** | ZD2 | **G** | **H** | **di** | **°C** | Hi | |
| warming | 1 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 2 | 03:00 | | | **1** | | **1** | | | | | **1** | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| rinsing | 4 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 5 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 6 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| washing | 7 | *15:00* | **1** | | | | | | | | **1** | **1** | | | |
| | 8 | *30:00* | | | | | | | | **1** | | **1** | ***70*** | | max. time |
| | 9 | 00:20 | | | | | | **1** | | | | **1** | | | |
| | 10 | 08:00 | | | **1** | | | | | | | **1** | | | max. time |
| | 11 | 04:00 | | | **1** | | **1** | | | | | **1** | | | |
| | 12 | 00:30 | | | **1** | **1** | **1** | | | | | **1** | | | |
| rinsing | 13 | *15:00* | | **1** | | | | | | | **1** | | | | |
| | 14 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 15 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| **total time** | | **27:20** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | | | | |

## PRO3 – WASHING OF THE MILKING MACHINES

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | H | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | comments |
| mode | step no. | time | **CW** | **ZW** | **PP** | **PML** | **ZZ** | ZD1 | **ZD2** | **G** | **H** | **di** | **°C** | Hi | |
| warming | 1 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 2 | 03:00 | | | **1** | | **1** | | | | | **1** | | | |
| | 3 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| rinsing | 4 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 5 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 6 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| washing | 7 | *15:00* | **1** | | | | | | | | **1** | **1** | | | max. time |
| | 8 | *30:00* | | | | | | | | **1** | | **1** | ***70*** | | max. time |
| | 9 | 00:20 | | | | | | | **1** | | | **1** | | | |
| | 10 | 08:00 | | | **1** | | | | | | | **1** | | | |
| | 11 | 04:00 | | | **1** | | **1** | | | | | **1** | | | |
| | 12 | 00:30 | | | **1** | **1** | **1** | | | | | **1** | | | |
| rinsing | 13 | *15:00* | | **1** | | | | | | | **1** | | | | max. time |
| | 14 | 05:00 | | | **1** | | **1** | | | | | | | | |
| | 15 | 00:30 | | | **1** | **1** | **1** | | | | | | | | |
| **total time** | | **27:20** | *total time **does not take into account the time of pouring water** – with the hydrostatic switched on, it is not necessary to know the time needed to pour water* | | | | | | | | | | | | |

## PRO4 – WASHING OF THE MILK TANKS

| | diode no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | H | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | relay no. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | comments |
| mode | step no. | time | **CW** | **ZW** | **PPR** | **PM** | **ZZ** | **ZD1** | ZD2 | **G** | H | **di** | **°C** | Hi | |
| rinsing | 1 | 02:30 | | **1** | | | | | | | | | | | |
| | 2 | 01:00 | | **1** | **1** | **1** | | | | | | | | | |
| | 3 | 01:00 | | | **1** | **1** | | | | | | | | | |
| | 4 | 02:30 | | | | | **1** | | | | | **1** | | | |
| washing | 5 | 02:30 | **1** | | | | | | | | | **1** | | | |
| | 6 | *30:00* | | | | | | | | **1** | | **1** | ***50*** | | max. time<br>heating up warm water |
| | 7 | 00:20 | | | **1** | | | **1** | | | | **1** | | | |
| | 8 | 01:00 | **1** | | **1** | **1** | | | | | | **1** | | | |
| | 9 | 06:30 | | | **1** | **1** | | | | **1** | | **1** | ***50*** | **2** | thermostatic work |
| | 10 | 03:00 | | | | | **1** | | | | | | | | |
| rinsing | 11 | 02:30 | | **1** | | | | | | | | | | | |
| | 12 | 01:00 | | **1** | **1** | **1** | | | | | | | | | |
| | 13 | 01:00 | | | **1** | **1** | | | | | | | | | |
| | 14 | 04:00 | | | | | **1** | | | | | | | | |
| **total time** | | **28:50** | | | | | | | | | | | | | |