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MCH-07   MCH-07T1   MCH-07T2
U S E R   M A N U A L

1. DESCRIPTION.

The third generation of MCH-07 controller is a universal, combined controller intended for use in milking machines (devices) and milk tanks. This controller allows you to cool the milk contained in the tank and to carry out the milk tanks and milking devices washing process.

The controller is characterized by flexibility in adapting it to various requirements. It is fully programmable at the installation stage, and at the same time protected against possible interference by the user in the settings.

The controller consists of two complex segments:

– cooling segment,
– washing segment,

however, it is not possible, even accidentally, to activate the washing process during the cooling process. The washing segment is activated only when the cooling is switched off.

The MCH-07 controller has a waterproof casing (protection class IP65), adapted for built-up. On request also the following variants are available:

– **MCH-07.f** with a flange (for panel mounting), in which power as well as control inputs and outputs are led through glands placed on the back of the casing,
– **MCH-07.b** with the glands placed on the back of the casing is provided, which allows the controller to be installed in such a way that the wires are hidden.

In the set with the controller there is a temperature sensor. In version MCH-07T an additional temperature sensor is connected, which controls the heating of the water temperature during the washing process.

The temperature sensors are in the rubber cover (protection class IP68), ending with stainless steel sleeve. The controller signals the failure of the temperature sensor.
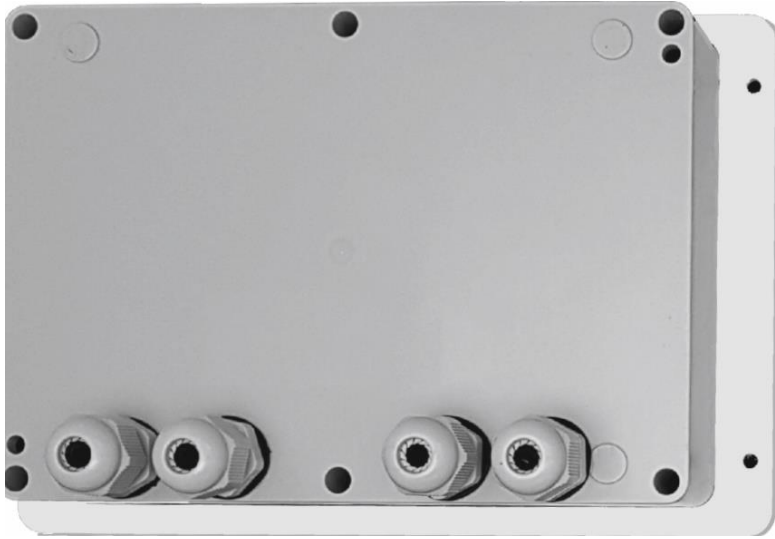
MCH-07 casing dimensions	177 x 126 x 56 mm
MCH-07.f casing dimensions	206 x 140 x 56 mm
power supply	230V AC 50/60 HZ
protection class	IP65
safety class	CE

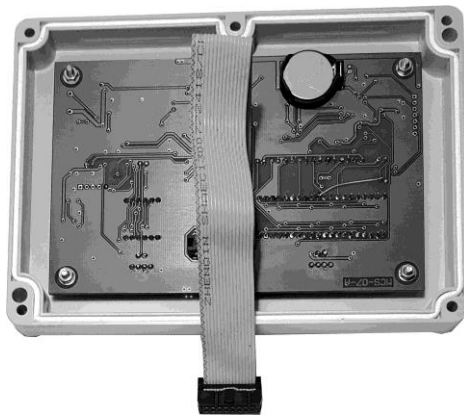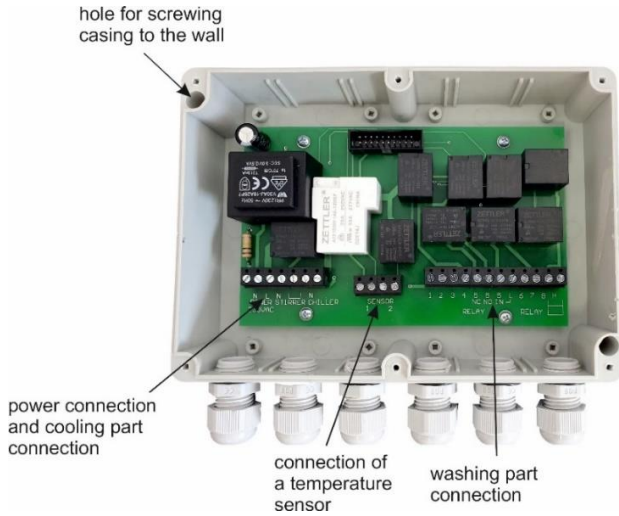*basic version of MCH-07 controller*
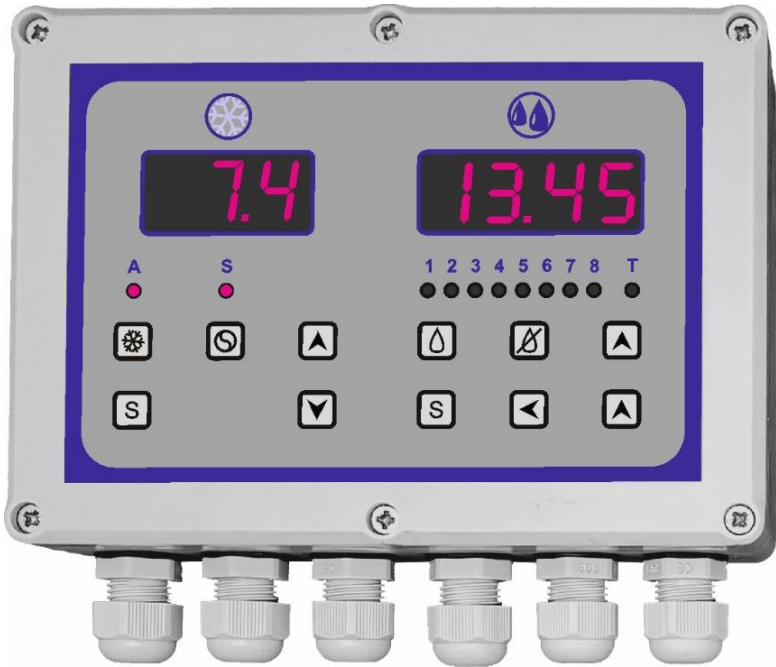
MCH-07.f variant (with flange)

2. INSTALLING AND CONNECTING THE CONTROLLER.

In order to install the controller, unscrew the six screws and swivel the front of the controller, paying attention to the cable connecting the upper PCB board with the bottom board. After opening the casing, disconnect this cable. The cable is disconnected by removing the connector plug located in the bottom plate.
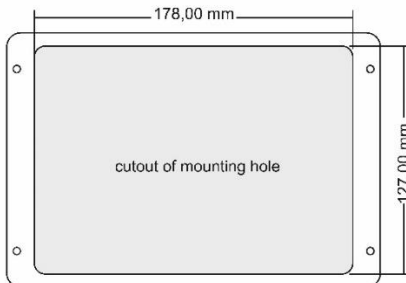
basic version of MCH-07 controller

hole for screwing
casing to the wall

power connection
and cooling part
connection

connection of
a temperature
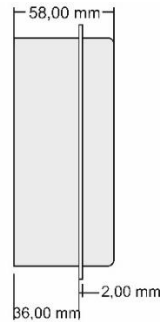sensor

washing part
connection

> **ATTENTION**
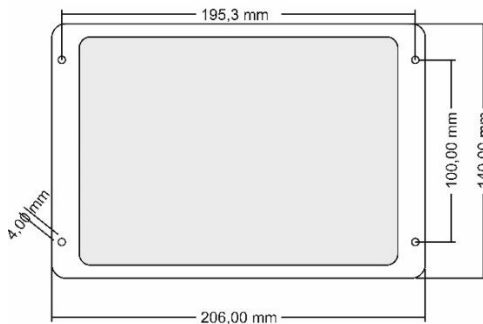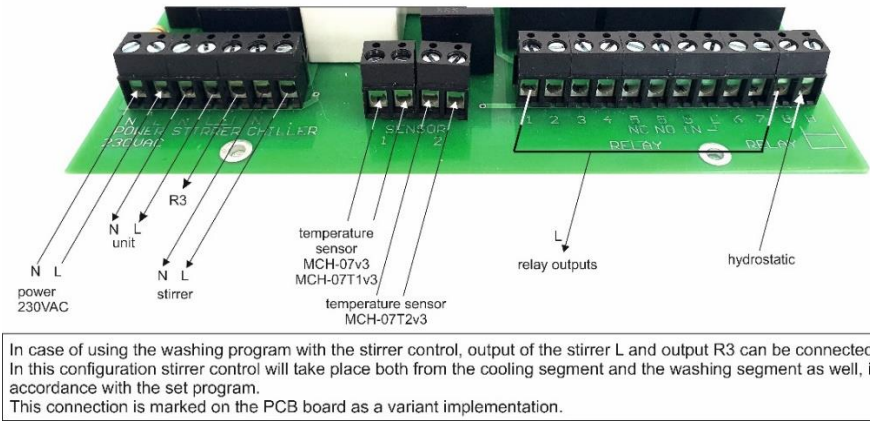> *Fixing the casing can be done only by screwing using the marked holes. It is <u>forbidden to drill the casing</u> and fix the casing through such holes, because it causes loss of tightness of the casing.*

<u>dimensioning for assembly MCH-07.f variant (with flange)</u>

195,3 mm
100,00 mm
140,00 mm
4,00 mm
206,00 mm

58,00 mm
2,00 mm
36,00 mm

178,00 mm
127,00 mm
cutout of mounting hole

connection diagram

In case of using the washing program with the stirrer control, output of the stirrer L and output R3 can be connected. In this configuration stirrer control will take place both from the cooling segment and the washing segment as well, in accordance with the set program.
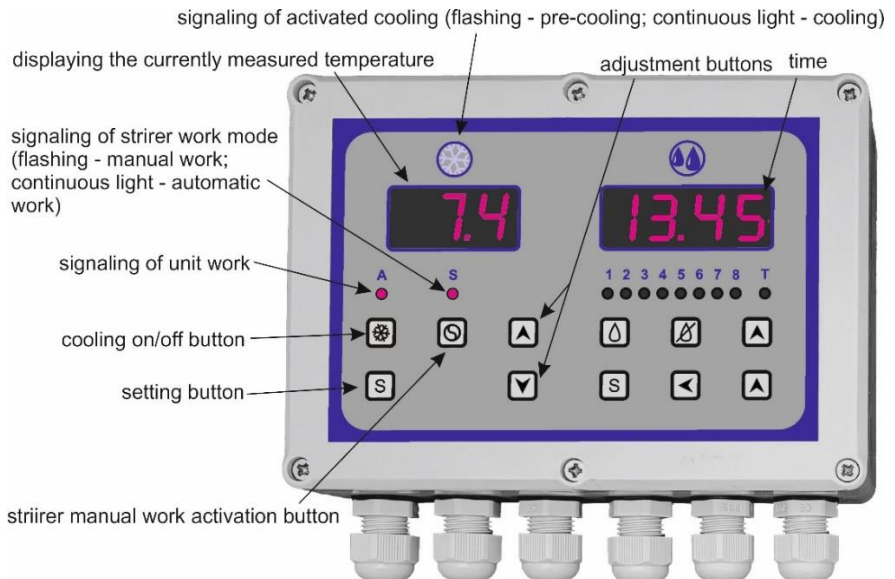This connection is marked on the PCB board as a variant implementation.

3. COOLING SEGMENT.

Activation of the cooling process by the user blocks the possibility of switching on the washing process, which results in the total turning off of the washing segment display.

view of the controller with the cooling process on

> **ATTENTION**
>
> *Within approx. 2 min. after connecting the controller to the supply voltage, it is possible to turn on the cooling segment and the washing segment at the same time. After this time has elapsed, the washing process is blocked during cooling.*

3.1. Technical data of the cooling segment.

temperature measuring range	from -40,0 $^{\circ}$C to +120,0 $^{\circ}$C
control temperature range	from -40,0 $^{\circ}$C to +120,0 $^{\circ}$C (decreased by a set hysteresis)
measuring resolution of the temperature measurer (resolution of control temperature settings)	• 1 $^{\circ}$C in the scope under -9,9 $^{\circ}$C and over +100 $^{\circ}$C • 0,2 $^{\circ}$C in the scope from -10 $^{\circ}$C to +100 $^{\circ}$C
control hysteresis	• from 0,2 $^{\circ}$C to 10 $^{\circ}$C in the scope from -10 $^{\circ}$C to +100 $^{\circ}$C • from 1 $^{\circ}$C to 10 $^{\circ}$C in the scope <-10 $^{\circ}$C and >+100 $^{\circ}$C
stirrer / ventilator operation time	from 1 min. to 60 min.
stirrer / ventilator standstill time	from 1 min. to 60 min.
stirrer / ventilator temporary operation time	from 1 min. to 60 min.
delay time for switching on the chiller (unit) / stirrer after the controller is turned on or the power supply is lost	from 1 s. to 999 s.
length of temperature sensors	5 m
type of temperature sensor	thermistor NTC
type of temperature meter	digital LED
load capacity of the relay contacts, controlling the chiller (unit) / heating system	30A 250V AC
load capacity of the relay contacts controlling the stirrer / heating system	10A 250V AC

3.2. Controller functions in the cooling mode.

The cooling segment of the MCH-07 controller is equipped with the functions described below.

1. **Continuous temperature measurement function**, regardless of whether the controller is on (must be connected to the power supply) – parameter **d1** is set to **1**.

2. **Function of setting two different cooling temperatures, depending on the time elapsed since cooling was turned on** – parameter **FC** is set to **1**; possibility of setting the temperatures:
   a) **t1** (pre-cooling temperature) – factory set to 15°C,
   b) **t2** (target cooling temperature) – factory set to 5°C.
3. **Function of delaying the activation of cooling for the time of milking** – parameter **0d** is set to **1**.
4. **Control function of the refrigeration system (chiller)**, depending on the measured temperature – parameter **C9** is set to **0**.
5. **Light signaling function for switching on the cooling (heating) process** – blue diode.
6. **Control function of the heating system**, depending on the measured temperature – parameter **C9** is set to **1**.
7. **The stirrer or ventilator control function**, enabling the implementation of the following variants of this control – depending on the **F0** parameter settings:
   a) automatic operation:
      – cyclic operation of the stirrer / ventilator, independent of the operating condition of the chiller / heating system;
      – the stirrer works continuously during the operation of the chiller and when the chiller is switched off, the stirrer switches to cyclical operation;
      – stirrer / ventilator works only when the chiller / heating system is switched on;
      – continuous operation of the stirrer / ventilator;
   b) manually triggered operation:
      – switching on the continuous operation of the stirrer / ventilator, regardless of whether the control work of the controller is switched on; in order to end the stirrer / ventilator operation, press the button **[3]**;
      – switching on the stirrer / ventilator operation for a strictly defined time, independently whether the control work of the controller is switched on.
8. **The chiller (unit) operation supervision function**, consisting in the possibility of setting the maximum and the minimum operation time of the chiller, as well as the minimum standstill time of the chiller – parameters **E1** and **E2**.
9. **Registering the maximum and minimum temperature values in the whole cycle of the controller's operation**. This function is connected with the possibility of delaying the saving of temperature data to the controller's memory since its activation – parameter **AA**.
10. **The function of alarm signaling (visual and audible) of exceeding the set temperature range** – parameters **HA** and **HE**. This function is connected with the possibility of delaying the time of switching on the alarm system of the controller from the moment of its activation.
11. **Temperature monitoring and signaling function of the temperature sensor** – in this case, the letters **ACU** appear on the display.
12. The function of the adjustable delay time for switching on the chiller (unit) and stirrer after the loss and re-supplying of the voltage – parameter **dE**.
13. **Real-time clock**.
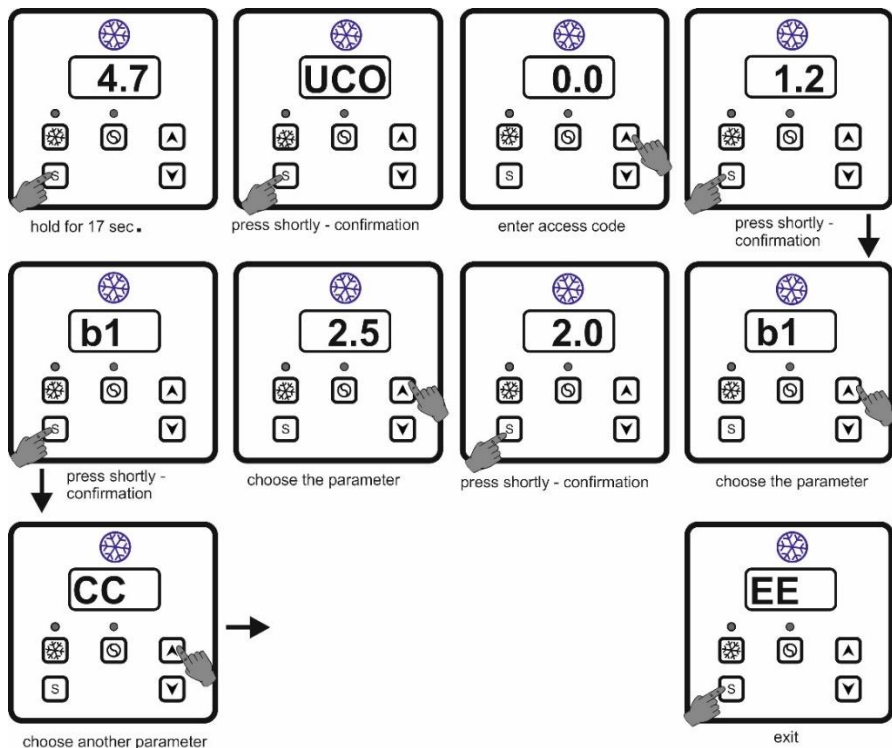
3.3. Programming for the cooling segment.

In order to ensure the correct cycle of the controller's operation, it is necessary to program its operating parameters accordingly. By default, the controller is programmed for standard operating conditions for the purpose of controlling the milk cooler.

In order to change the default programming, enter the setting mode. Entering the setting mode is possible only when the cooling process is on; interrupts the current operation of the cooling process. Entering is done by holding the button marked with the letter **S** for approx. 17 seconds. After entering the setting mode, **UCO** appears on the controller's display. The next pressing of the **S** button confirms the willingness to make changes. Then press the ▲ key to enter the access code and confirm with the **S** button.

After correct entry into the setting mode, the symbol of the required parameter is selected using the ▲ and ▼ buttons. The entry to the parameter settings is made by pressing the **S** button. The change of the parameter value is made using the ▲ and ▼ buttons; for the change to be saved, confirm with the **S** button.

The exit from the setting mode is made by setting the **EE** parameter and confirming with the **S** button or automatically after 17 seconds of inactivity.

The following figure illustrates the programming procedure:

| 4.7 | UCO | 0.0 | 1.2 |
| hold for 17 sec. | press shortly - confirmation | enter access code | press shortly - confirmation |

| b1 | 2.5 | 2.0 | b1 |
| press shortly - confirmation | choose the parameter | press shortly - confirmation | choose the parameter |

| CC | | | EE |
| choose another parameter | | | exit |

3.4. Table of settings for the cooling segment.

> **ATTENTION**
> The parameters from the table below, which are marked in gray, **must not be changed**. The warranty granted by the manufacturer **does not cover damage to the controller** due to the change of these parameters.

description of the function	*symbol*	*range of the settings*	*factory setting*
entry in the setting mode	UC0	access code	1.2
controller operation mode	C9	**0** – cooling mode **1** – heating mode	0
limitation of the lower value for the control temperature range [1]	b1	setting the temperature value from -40 $^{\circ}$C to +120 $^{\circ}$C, every 1,0 $^{\circ}$C	2 ($^{\circ}$C)
limitation of the upper value for the control temperature range [1]	b2	setting the temperature value from -40 $^{\circ}$C to +120 $^{\circ}$C, every 1,0 $^{\circ}$C	10 ($^{\circ}$C)
control hysteresis	HI	setting the temperature value: • from 0,2 $^{\circ}$C to 10 $^{\circ}$C, every 0,2 $^{\circ}$C – in the scope from -10 $^{\circ}$C to +100 $^{\circ}$C • from 1,0 $^{\circ}$C to 10 $^{\circ}$C, every 1,0 $^{\circ}$C – in the scope <-10 $^{\circ}$C and >+100 $^{\circ}$C	2 ($^{\circ}$C)
minimum operation time of the chiller (unit)	CA	**0** – inactive **1** – active; setting the time from 1 min. to 60 min., every 1 min.	0
maximum operation time of the chiller (unit) [2]	CC	**0** – inactive **1** – active; setting the time from 0,5 h to 9,5 h, every 0,5 h	0
minimum standstill time of the chiller (unit)	CF	**0** – inactive **1** – active; setting the time from 1 min. to 60 min., every 1 min.	0
	AF	*function not available to the installer / user* [3]	
stirrer operation mode	F0	**0** – operation according to the times set in **E1** and **E2**, independent of the operation of the chiller (unit) **1** – continuous operation during the chiller (unit) operation, while during the standstill of the chiller (unit), the stirrer works according to times set in **E1** and **E2** **2** – *unavailable* [3] **3** – *unavailable* [3] **4** – continuous operation, independent of the chiller operation and times set in **E1** and **E2**	1

stirrer standstill time	E1	setting the time from 1 min. to 60 min., every 1 min.	15 (min.)
stirrer operation time	E2	setting the time from 1 min. to 60 min., every 1 min.	2 (min.)
stirrer manual operation [4]	CP	**0** – continuous operation **>0** –operation for a specified time from 1 min. to 60 min., every 1 min.	5 (min.)
delay time of registering the maximum and minimum temperatures and delay time of switching on the temperature alarm	AA	setting the time from 0 h to 24 h, every 0,1 h	2 (h)
lower alarm temperature	A1	setting the temperature from -40 ^{O}C to +98 ^{O}C	2 (^{O}C)
upper alarm temperature	A2	setting the temperature from -40 ^{O}C to +98 ^{O}C	12 (^{O}C)
	HE	*function not available to the installer / user [5]*	0
alarm system (visual and audible) of exceeding the set temperature range (**A1** and **A2**)	HA	**0** – **active** **1** – inactive	0
scaling the temperature sensor[6]	CU	every 0,2 ^{O}C	scalable value
	UU	*function not available to the installer / user[3]*	
delay of starting the chiller (unit) and the stirrer after pressing on/off button or when power supply decay occurs	dE	setting the time from 1 s. to 999 s., every 1 s.	5 (s.)
display status with control disabled[7]	d1	**0** – the dot is displayed **1** – current measured temperature is displayed	0
cooling temperatures (pre-cooling and target)[8]	FC	**0** – inactive; the controller cools down to the target temperature **>0** – active; setting the time after which the controller will start cooling down to the target temperature – in the range from 0.5 h to 18.0 h, every 0.5 h possibility to set temperatures: • t1 [pre-cooling temperature] – factory setting is 15°C, • t2 [temperature of target cooling] – factory setting is 5°C	0
cooling start delay[9]	0d	**0** – inactive **>0** – active; cooling will be switched on after the time set in this parameter in the range from 1 min. to 999 min., every 1 min.	0
return to the factory settings	FA	**0** – inactive	0

		1 – active; after setting to 1 and disconnecting the controller from the power supply, switching it back on restores the factory settings and the function value is reset to 0	
exit from the setting mode	EE		

[1] *Adjustments must be made so that **the condition b1<b2 is always met**. The values of parameters b1 and b2 **are not control temperature settings**; these are the temperature values between which the control temperature can be set (a section from the entire control temperature range of the controller).*

[2] *This function is active only when the minimum standstill time of the chiller has been set (CF).*

[3] ***Changing the parameter value is not recommended, because it can lead to incorrect operation of the controller, and even its damage.***

[4] *The manual stirrer operation, depending on the washing program set, can be associated with the washing segment.*

[5] ***Changing the parameter value is not recommended***.

[6] *Set up during the production phase – do not change without a clear need.*

[7] *A newly installed controller is set to value 1 (the current measured temperature is displayed). **However, when returning to the factory settings, this parameter is set to 0** (i.e. a dot is displayed).*

[8] *After milking, the milk is pre-cooled to a specific temperature (t1), and then (after the set time has elapsed) the controller automatically switches to the control according to the set second temperature (t2), which is the target control temperature. The user can stop the pre-cooling operation at any time and go to the target cooling by pressing the up and down buttons simultaneously.*

During pre-cooling, the LED indicating cooling is flashing; after the time set in the FC parameter has elapsed, the LED indicating that the cooling is on is permanently lit, as before during cooling.

If FC> 0 then:

− *pressing the up arrow button causes the display of the parameter t1, and pressing the button S then means entering the settings of this parameter and displaying the factory value of the temperature t1 ($15^{O}C$); change of this value to another is made with arrows and confirmed with the S button,*

− *pressing the down arrow button causes the display of the t2 parameter, and then pressing the S button means entering the settings of this parameter and displaying the factory value of the temperature t1 ($5^{O}C$); change of this value to another is made with arrows and confirmed with the S button.*

The controller's temperature memory <u>does not take into account the pre-cooling time</u>. Only after the pre-cooling time has elapsed, <u>the delay time for saving the temperature values is taken into account</u> (as if the controller had just been turned on.

[9] *Possibility to set a delay for the activation of the cooling mode during the time of milking. If this function has been activated, the time left until the cooling process begins will appear on the display by pressing the cooling button. After the set delay time has elapsed, the current temperature appears and the controller is activated, taking into account other settings made earlier according to table. If the cooling start button is pressed again during the countdown, <u>the delay is interrupted and the cooling process is started immediately</u>. The delay time <u>is ignored</u> in the data recording function and all other times are counted as if the regulator was turned on just now.*

4. DESCRIPTION OF THE COOLING SEGMENT OPERATION CYCLE.

At the moment of connecting to the mains and starting with the ❄ button, the controller – after the delay set in the **dE** parameter – goes to the control phase.

The controller controls two control circuits:

- control circuit for the chiller unit or heating circuit;
- control circuit for motoreducer of the stirrer or ventilator.

The work for the control settings of the refrigeration system will be discussed below.

> **ATTENTION**
> *The **dE** parameter is the delay of switching on the chiller and the stirrer after switching on the controller or after power supply failure – factory setting is 5 s.*

4.1. Control of the chiller unit.

The control temperature value (in the range specified in the parameters **b1** and **b2**) is set by pressing the buttons marked with the symbols ▲ and ▼. A short press of any of these buttons displays the currently set value, while the next pressing causes the change of this value. Moving from reading the measured temperature to the reading of the set control temperature is signaled by the flashing of digits / numbers.

The chiller control in the cooling phase takes place depending on the temperature present in a refrigeration chamber. The controller can control the cooling temperature in the range of -40 ^{O}C up to +120 ^{O}C. In order to limit the range of control so as to prevent the user of the refrigeration device from setting the temperature outside this range, the following parameters must be set in the right ranges: **b1** (limitation of the lower control temperature range) and **b2** (limitation of the upper control temperature range).

> **ATTENTION**
> *Temperatures specified in parameters **b1** and **b2** <u>are not</u> control points for switching off and switching on the operation of the chiller.*
> *Setting **b1**=**b2** blocks the possibility of changing the programmed temperature by pressing the ▲ and ▼ buttons.*
> <u>*It is not allowed to set **b1**>**b2**.*</u>
> *The change in the value of **b1** or **b2** can be blocked by the currently set control temperature. In the event of such a situation, change the control temperature settings and then change the parameters **b1** and/or **b2**.*

It is also important to set the control hysteresis correctly – parameter **HI**. The control hysteresis is a parameter that determines the temperature difference at which the switching off occurs and then the chiller is switched on. For example, if the control temperature is set to +4 ^{O}C, and the hysteresis at 2 ^{O}C, then switching off of the chiller will occur after reaching 4 ^{O}C, while its re-activation will occur after the temperature has risen to 4+2=6 ^{O}C.

The controller makes it possible to set the hysteresis of the control in the range from 0.2 ^{O}C to 10 ^{O}C, every 0.2 ^{O}C.

4.2. Control of the stirrer motoreducer.

The operation status of the stirrer is indicated by a red diode (*see section 3.*).

The controller has two modes of stirrer operation (automatic or manual), which are described in detail below.

4.2.1. Automatic operation of the stirrer.

In this mode, depending on the settings of parameters **F0**, **E1** and **E2**, the stirrer may be connected to the operation of the chiller or completely independent of it (*see section 3.4*).

The stirrer operation setting in the automatic mode is signaled by a continuous lighting of the stirrer operation red diode.

4.2.2. Manually triggered operation of the stirrer.

The manual stirrer operation can be initiated by pressing the button marked with the symbol $\circleddash$ (*seesection 3.*); at this point, the automatic stirrer operation is stopped and the manual operation is switched over. Manual mode is signaled by a blinking of th stirrer operation red diode.

Manual operation of the stirrer is possible when the controller is turned off, as well as when the washing process is switched on – depending on the washing program set up and the configuration made.

The stirrer operation in this mode can be interrupted at any time by pressing the button $\circleddash$ again.

The manual stirrer operation can take place in two variants, depending on the **CP** parameter settings:
   − setting the value **0** means continuous operation of the stirrer,
   − setting the value **>0** means that the stirrer operates for the set number of minutes; after the set time elapses, the manual operation of the agitator is automatically switched off.

5. DESCRIPTION OF THE CONTROLLER FUNCTIONS.

Below, some specific controller functions will be discussed, enabling the controller to be used for various applications.

5.1. Registering the minimum and maximum temperatures.

The MCH-07 controller has the function of recording in the internal memory the values of maximum and minimum temperatures that occur throughout the controller's entire cycle. This function makes it possible to check if the milk is stored under the correct temperature conditions. When the device

is switched on, after the set delay elapses (parameter **AA** – *see section 3.4.*), the temperature values are stored in the controller's memory. The programmable delay time of this function allows not to take into account the maximum temperature when the controller is started and thus to pre-cool the milk. <u>This time should be selected by the user for the type of tank and the actual operating conditions of the device</u>.

At any time, you can read the maximum values presently available and minimum temperature values. The following figure illustrates the reading:

Maximum/Minimum temperature reading
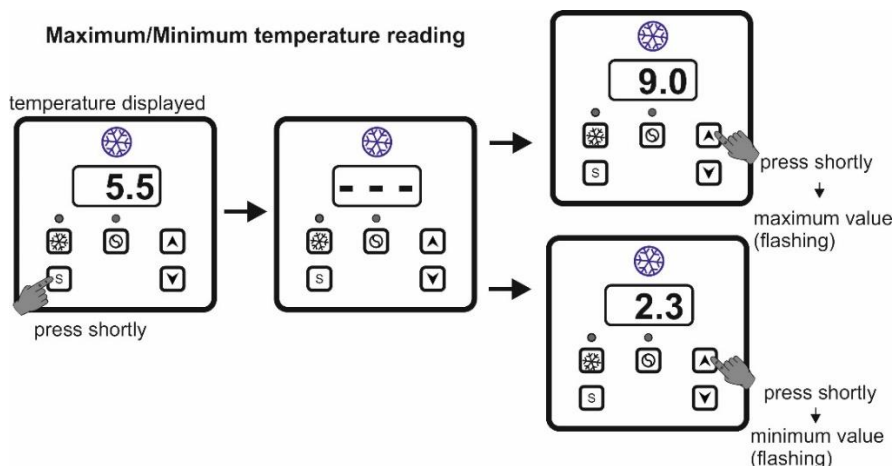
ATTENTION
1. If there are no entries of maximum and minimum temperatures in the controller's memory, the symbol --- is displayed.
2. The loss of the supply voltage will erase the controller's memory.


At any time, you can manually delete the current maximum and minimum values by pressing the **S** button when the maximum or minimum temperature is displayed.

5.2. Alarming the exceeding of the correct temperature range.

The controller has the function of signaling the exceeding of the set temperature range. In order for the function to work properly, the appropriate temperature range must first be programmed, that is: parameter **A1** – temperature below which the alarm will be activated, and parameter **A2** – temperature above which the alarm will be activated (*see section 3.4.*).

The third parameter to be defined is the time delay of switching on the alarm function from the moment the controller is switched on – parameter **AA**. This delay eliminates the triggering of an alarm in the initial cooling phase.

Exceeding the set temperature range is signaled visually and audibly. In the event of an alarm, the buzzer is triggered cyclically every 1 min. for 5 sec., and alternately: **PPP** letters and temperature value are displayed.
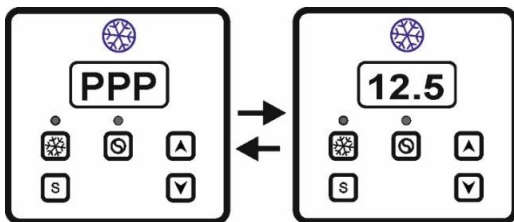
The audible alarm can be turned off by setting the **HE** parameter to **1** (*see section 3.4.*). In this case, exceeding the set temperature range is signaled only visually, as shown in the figure above. The alarm system (audible and visual) can also be turned off completely by changing the **HA** parameter to **1** (*see section 3.4*).

5.3. Temperature sensor damage indication.

If the controller detects damage to the sensor, the letters **ACU** appear on the display and at the same time the audible alarm is activated. The operation of the chiller and the stirrer is interrupted until the failure is removed.

5.4. Delay of switching on the chiller and the stirrer's motoreducer after voltage decay.

Controller has the ability to protect the chiller and motoreducer in the event of momentary decays and the appearance of the supply voltage – this is done by setting the **dE** parameter (*see section 3.4.*).

5.5. Real-time clock.

From the moment the MCH-07 controller is switched on to the power supply, yet the washing process is not activated, the current time is displayed.

6. WASHING SEGMENT.

The washing segment in the MCH-07 controller can only be started with the cooling off.
This segment may vary depending on the version of the controller:
- basic version (MCH-07),
- MCH-07T1 – version with the possibility of water heating control and thermostatic control, equipped with one sensor common with the cooling segment,
- MCH-07T2 – version with the possibility of water heating control and thermostatic control equipped with two sensors, a sensor for the cooling segment and a sensor for the washing segment.

The washing segment is equipped with:
- ✓ LED type display, indicating:
  - with the washing process off – current time (clock)
  - during implementation of a washing program – time remaining until its completion (without taking into account the time of pouring water, when using the hydrostatic)
  - in MCH-07T version, it is possible to set the controller to indicate the current temperature measured by the temperature sensor
- ✓ LED diodes marked with numbers 1-8, indicating which relays are active during the program execution
- ✓ LED diode with the **T** symbol, indicating the hydrostatic operation
- ✓ LED diode with 🌢 symbol, indicating the switching on/off of the washing process
- ✓ button with the ⬭ symbol that activates the program; this button is also used to manually stop the program
- ✓ button with the ⬰ symbol, that disables the program
- ✓ button with the ◁ symbol, used for manual switching on and off the operation of relay 3, and as a setting button in the service mode (changing settings of the controller)
- ✓ button with the Ⓢ symbol, that allows you to enter the setting mode
- ✓ setting buttons with the ▼▲ symbols, enabling: program change, transition to the next step or going back to the previous one during program execution and making changes in the program (activated in setting mode)
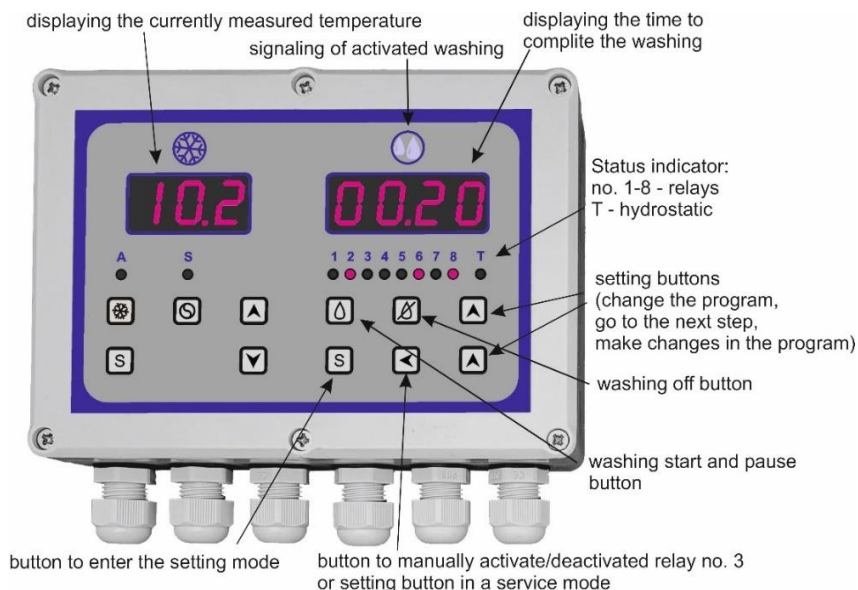
The controller also has:

- ✓ 8 control outputs: in relays 1-4 and 6-8, the outputs have normally open contacts, while relay 5 has normally short-circuited contacts and normally open and the input of the switched voltage, which can have a different value than other relays
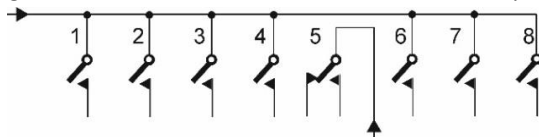
- ✓ switching voltage input for relays 1-4 and 6-8, permanently connected to the L signal of the 230 VAC supply voltage
- ✓ switching voltage input for relay 5, any of the range from 6V to 380V, which can be different from the voltage connected to relays 1-4 and 6-8
- ✓ input for hydrostatic connection,
- ✓ input for connecting an additional temperature sensor (version **MCH-07T2**).

view of the MCH-7 controller with the washing process on

displaying the currently measured temperature

signaling of activated washing

displaying the time to complite the washing

Status indicator:
no. 1-8 - relays
T - hydrostatic

setting buttons
(change the program,
go to the next step,
make changes in the program)

washing off button

washing start and pause button

button to enter the setting mode

button to manually activate/deactivated relay no. 3 or setting button in a service mode

---

ATTENTION
Within approx. 2 min. after connecting the controller to the supply voltage, it is possible to turn on the cooling segment and the washing segment at the same time. After this time has elapsed, the cooling process is blocked during washing.

displaying the dot (signaling the deactivated cooling segment)

6.1. Technical data of the washing segment.

range of the external temperature of operation	from -10 $^{\mathrm{O}}$C to +50 $^{\mathrm{O}}$C
number of relay outputs	8
load capacity of the relay contacts	10A 250V AC
number of control inputs	1 (hydrostatic)
type of display	LED
range of control temperature setting *(MCH-07T version only)*	from 20 $^{\mathrm{O}}$C to 80 $^{\mathrm{O}}$C, every 0,5 $^{\mathrm{O}}$C
hysteresis range of thermostatic control *(MCH-07T version only)*	from 1 $^{\mathrm{O}}$C to 20 $^{\mathrm{O}}$C, every 1 $^{\mathrm{O}}$C
number of programs available	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.

6.2. Controller functions in the washing mode.

The controller is equipped with a number of functions that, together with the option to create your own program, allows to adapt the controller to the individual needs (*see section 6.4*).

1. **Washing programs**. The controller has 8 programs; three programs for washing the milking machines (devices) and one program for washing milk coolers are pre-programmed. Factory programs can be freely modified and deleted. The remaining four places in the controller's memory enable creating control programs according to the individual needs of the user.

2. **Modification and creation of programs** (function symbol in the table of settings: **EdPr**). The controller 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 the function or automatically after the time set in the settings.

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. You can limit the return time in the settings of this function for interrupted operation after voltage decay (in the range from 1 h to 9 h).

5. **Functions related to the clock** (function 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. **Programming the periodicity of washing detergent dosing changes** (relays No. 6 and No. 7) in successive washing processes (function symbols: **Cdd**, **d7** and **d7**). This function consists in determining the number of successive washing processes with active relay No. 6 and then with active relay No. 7. After changing the **Cdd** parameter from 0 to **1**, additional parameters **d6** and **d7** appear – enabling setting the number of relay activations, respectively No. 6 and No. 7, in subsequent washing cycles. By default, parameters d6 and d7 are set to 1. The first activation of the controller to start counts the number of activations from relay no. 6. Parameters Cdd, d6 and d7 are to be set jointly for all washing programs.

7. **Washing program change lock** (function symbol: **bAP**).This function allows the installer to block the user from changing the previously set (active) washing program. To use this feature: (i) set the desired washing program, which will be implemented <u>as the only one</u> after activating the function, (ii) set the **bAP** parameter from the factory value of 0 to the value of **1**.

8. **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.

9. **Automatic start of cooling after completion of the washing program** (function symbol: **ASC**). If this function is activated then after completing the set washing program, the controller automatically turns on the cooling.

10. **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.

11. **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.

12. **Program start function**. The program is started by manually pressing the button located on the front of the controller.

13. **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.

14. **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.

15. **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 <u>does not</u> take into account the time of pouring water (when using a hydrostatic), as well as the time needed to heat water in the MCH-07T version.

16. **Function of ending the process of pouring water, depending on the signal from the hydrostatic**.

6.3. Additional functions in MCH-07T version.

The washing segment in the MCH-07T version can occur in two subtypes:
- MCH-07T1, which is equipped with one temperature sensor common for the cooling and washing segments,
- MCH-07T2, which has two separate temperature sensors for the cooling and washing segments.

Besides to the number of sensors (which can be installed in different places), these subtypes do not differ from each other functionally. All additional functions of the controller in the MCH-07T version are set from the programming level of the given program – **EdPr** parameter (*see section 6.6.*), except for 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 for heater control at all (despite having the controller in MCH-07T version).

1. **Displaying the current temperature** (function symbol in the table of settings: **di**). The 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: **--ᵒC**).

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, <u>minus the set hysteresis</u>.

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 <u>must</u> have working temperature sensor connected. Otherwise, <u>the controller can not be switched on or settings can not be made</u>. 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 $^{\circ}$C, every 0.5 $^{\circ}$C, where 0.5 $^{\circ}$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.

6.4. Washing segment operation by the installer.

The controller is factory-programmed for standard operating conditions, intended for the control of the milk cooler washing (one program) and the milking devices control (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 program your own program.

After installing the controller, it is also possible to check the correct operation of the entire washing system (*see section 6.2.*).

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

   − the necessity to press and hold the enter button in setting mode **[8]** for approx. 17 s.,
   − the necessity to enter the access code, which is given in the table of settings.

> **ATTENTION**
> *Please do not provide access code to the direct users.*

The graphical procedure for entering the access code, allowing entry into the settings and programming mode is shown below:
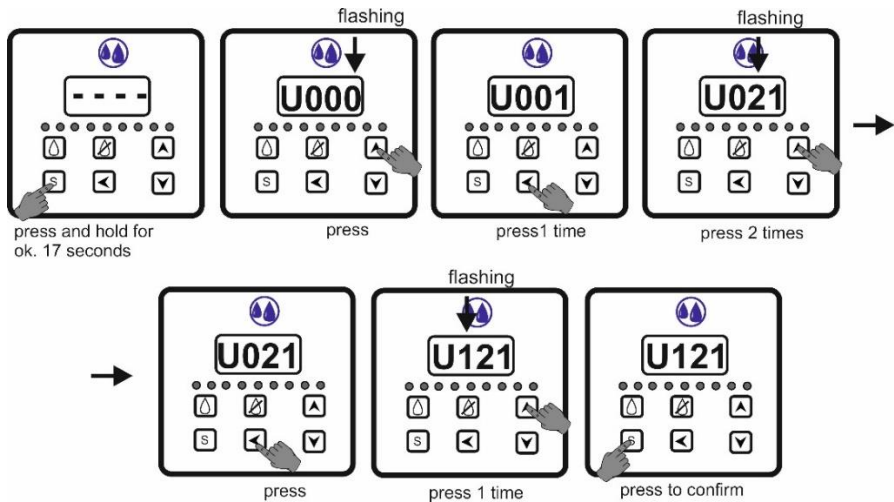
6.5. Description of the purpose of the buttons when setting/editing.

S	– entering the setting mode – confirmation of changes made (without it no changes will be saved)
⊘	– going back to the previous status (without saving changes) – exiting the setting mode; it may be necessary to press this button several times (depending on where the change was made)
◄	– move from right to left on the display - to edit the duration of the step – switching between diodes - to determine the relay status (signaled by a diode) – entering the settings related to temperature functions (MCH-07T version only)
▲	– program selection – selection of parameter (function) to be edited – selection of step (sequence) to be edited – editing the duration of the step – relay activation (diode lights up)
▼	– selection of program – selection of parameter (function) to be edited – selection of step (sequence) to be edited – editing the duration of the step – 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	

6.6. Table of setting for the washing segment.

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 programs	EdPr	edition of factory programs and creation of own programs	8 programs
setting of manual activation of the vacuum pump or stirrer (when the washing program is disabled)	UPP	**0** – inactive **1** – active; no time limit **2** – active; with a time limit set in **UPt**)	1
time limit for manual activation of the vacuum pump or stirrer (when the washing program is disabled)	UPt	setting the time limit from 00.01 min. 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 **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 **1** – activation of relay 6 or relay 7, depending on the time of day; **disables the possibility of setting the program manually** **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
cyclic change of detergent dosing (relays No. 6 and No. 7)*	Cdd	**0** – inactive **1** – active; functions CL0 and PULS are <u>inactive</u>	0

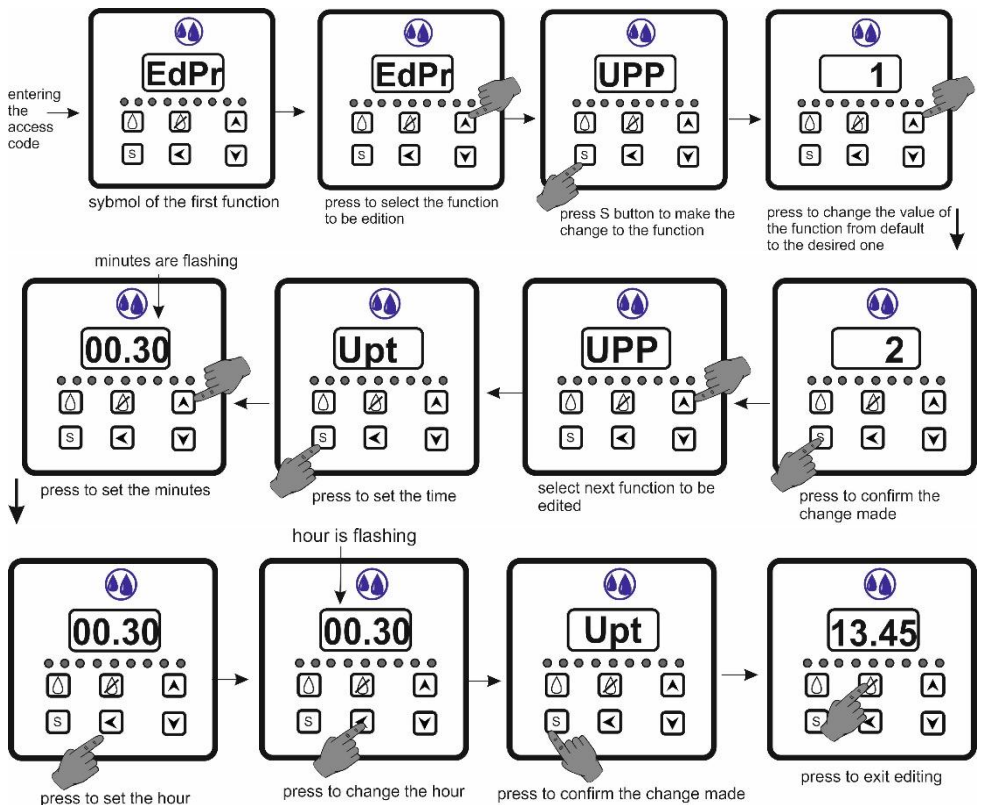|			
number of subsequent activations of relay no. 6 (**only if Cdd=1**)*	**d6**	number can be set from 1 to 10	1
number of subsequent activations of relay no. 7 (**only if Cdd=1**)*	**d7**	number can be set from 1 to 10	1
washing program change lock	**bAP**	**0** – inactive **1** – active; blocking the possibility of changing the currently set program	0
setting of the pulsating operation of relay 7	**PUL5**	**0** – inactive **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.)
automatic start of cooling after washing	**ASC**	**0** – inactive **1** – active; cooling is turned on after washing is finished	0
correction of the temperature sensor scaling (**MCH-07T version only**)	**oFF**	correction of the current temperature indication by +/- 10 ^{O}C, every 0.5 ^{O}C (0.5 ^{O}C is indicated by a dot lighting up on the set digit)	*n/a*
return to factory settings (**only after restarting the controller**)	**Pd0d**	**0** – inactive **1** – active; return to factory settings, **after turning the controller power off and on again**	0

*Relay No. 6 and relay No. 7 must be marked as active in the desired step(s) of chosen washing program. If an user activates only relay No. 6, then relay No. 7 will automatically be activated, but if only relay No. 7 is activated, then relay No. 6 **will remain inactive**.*

6.7. Selection and setting of the example function.

The following is a graphical representation of 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 shut-off of the vacuum pump after the set time. As a reminder – the manual function of the vacuum pump (stirrer) is active only when the washing process is not activated.
The method of changing or activating other functions will be similar to the example shown.

The diagram shows a program editing cycle with the following steps and captions:

- **EdPr** — sybmol of the first function
- **EdPr** — press to select the function to be edition
- **UPP** — press S button to make the change to the function
- **1** — press to change the value of the function from default to the desired one
- **2** — press to confirm the change made
- **UPP** — select next function to be edited
- **Upt** — press to set the time
- **00.30** (minutes are flashing) — press to set the minutes
- **00.30** — press to set the hour
- **00.30** (hour is flashing) — press to change the hour
- **Upt** — press to confirm the change made
- **13.45** — press to exit editing

6.8. Editing programs – EdPr parameter.

The controller is by default equipped with 4 washing programs that can be edited, depending on the user's needs. The remaining 4 places in the controller's memory are designed for creation of the programs by the installer; they are empty (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:

   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),
   a) 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 MCH-07T version, optionally you can assign to any of the steps:

   a) displaying the temperature;
   b) the temperature to which the heater is to be turned on;
   c) maintaining the set temperature for a specified time.

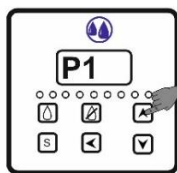The program edition cycle is shown below graphically.

ENTER
THE
ACCES
CODE
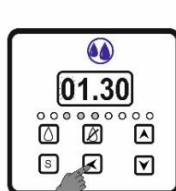
EdPr
press to enter the
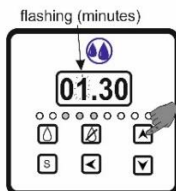editing mode

Pro1
select program number
to be edited

Pro3
confirm selection

P1
select step number to
be editied

flashing (minutes)

flashing (seconds)

01.30
press to activate/deactivate
relay (signaled by red diodes)

01.30
press to change the minutes
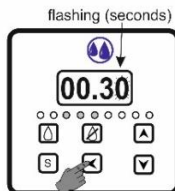
00.30
press to skip changing
the seconds
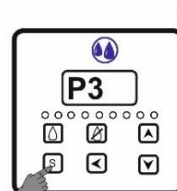
P3
confirm selection

diode marked with T
(hydrostatic) is flashing

flashing

01.30
press to skip changing
the hydrostatic status
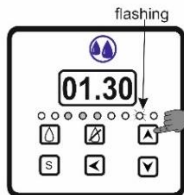
01.30
relay no. 8 activation

01.30
press to set the status of
next relays
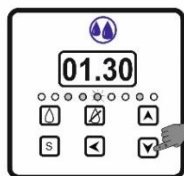
01.30
relay no. 5 deactivation
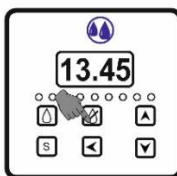
13.45
exit the editing mode
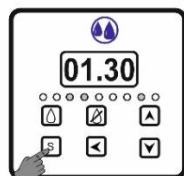
01.30
press to confirm changes made

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.

The editing of the controller program in the MCH-07T version is similar to the basic version, with the addition of editing and settings related to temperature.
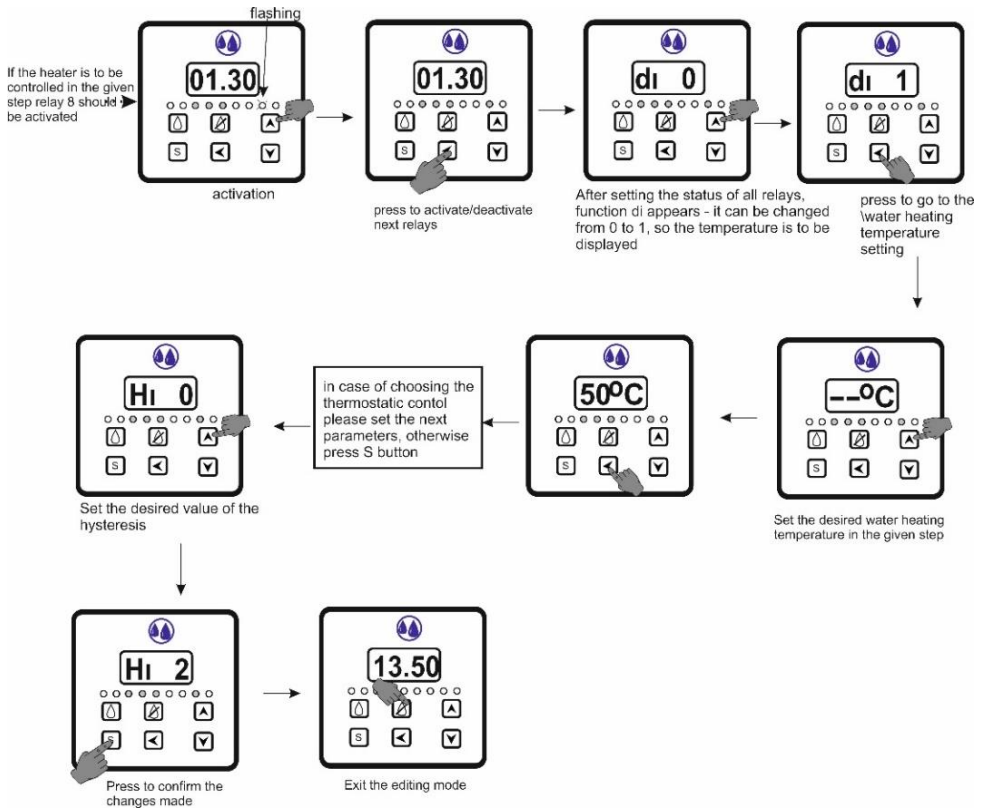
6.9. Return to factory settings.

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.

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7. WASHING SEGMENT OPERATION BY THE DIRECT USER.

7.1. Launching the controller.

After connecting the supply voltage, the controller remains in a ready state.
The current time is shown on the display of the washing segment. The correction of the clock display 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.
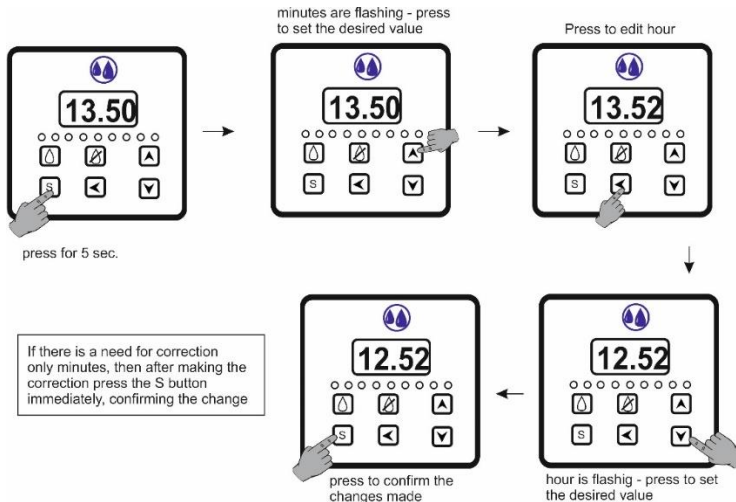
7.2. Choosing the washing program.

At any time, the user can read which washing program has been set, by briefly pressing the ▲ or ▼ button. The currently set program is displayed, 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 chosen program will be stored in memory and if there is no need to change the program again, then this program will be implemented all the time.

The reading and change of the currently set program is only carried out with the washing process switched off.

The program number can be changed and read only when the washing process is not activated
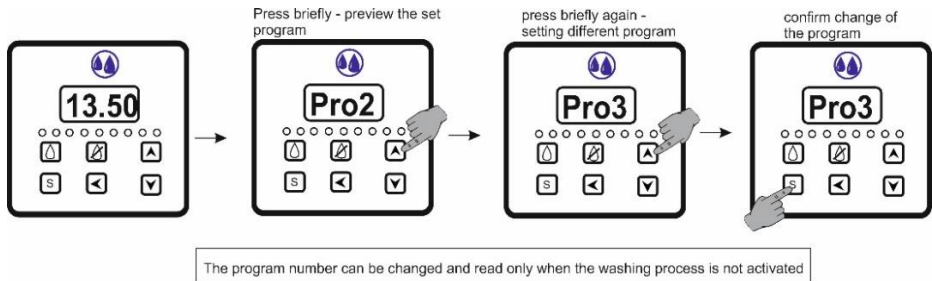
7.3. Starting and pausing the washing program.

By pressing the program start button 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 MCH-07T version, depending on the settings made, the display may show the current temperature (instead of time). This function can only be assigned to one or more steps, and in the remaining steps the time to finish the washing process can still be displayed.

Starting the washing process is also signaled by the blue diode, illuminating the symbol ⬡.
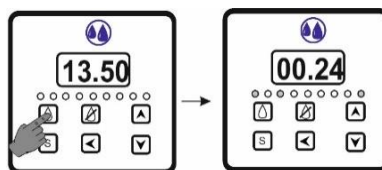
During the program implementation, user can pause it at any time by pressing the button 💧 again. If the program is stopped, all active relays will be switched off, and the **PPPP** symbol and the time remaining until the end of the program are displayed alternately. The program is resumed by pressing the button 💧 again. The program will be continued from this step (sequence), in which pausing occurred.
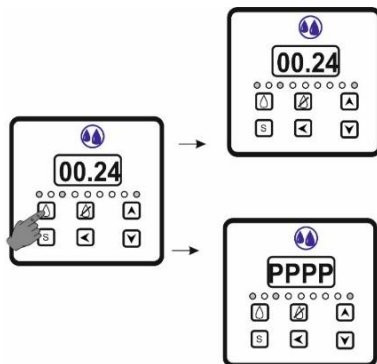
7.4. Stopping the washing program.

In the event of such a need, user can deactivate the currently running 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.
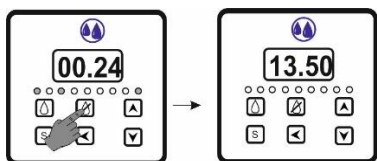
ATTENTION
Restarting the program will in this case implement it <u>from the beginning</u>.

7.5. Manual switching on the vacuum pump or the stirrer.

If this function is activated by making the appropriate settings by the installer, the user has the option of manually switching the vacuum pump / stirrer on or off; the ◀ **[7]** button is used for this purpose. Manual activation is only possible when the controller does not carry out the washing program; while the program is running, the manual start button is <u>inactive</u>. Depending on the connections to the relay output no. 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.

7.6. Accelerating the transition to the next step or moving back to the previous step.

The steps are factory set or user preset 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) performing of any step by the user. You can also go back to the previous steps. This function is performed by holding the ▲ or ▼ button; moving to the next step or going back to the previous step occurs after 10 sec. or immediately if the current step is already done for min. 10 sec.

ATTENTION
This function also allows you to check the correct operation of the washing installation after installing the controller, as well as during servicing of the washing installation.
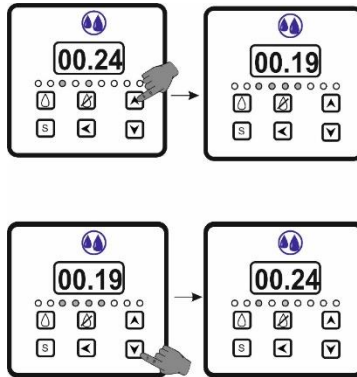
7.7. Factory programs.

The controller is factory 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**, **PRO3**) and 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 at the factory (they do not contain any steps).

abbreviations used in the following program tables:

HW – *hot water valve relay*	**CW** – *cold water relay*
VP – *vacuum pump relay*	**MP** – *milk pump relay*
WP – *washing pump relay*	**ST** – *stirrer relay*
DV – *dump valve relay*	**H** – *hydrostatic*

DD1 – detergent dispensing valve 1 relay	**f** – free	
DD2 – detergent dispensing valve 2 relay		
HT – heater *(MCH-07T version only)*	**°C** – setting of control temperature *(MCH-07T version only)*	
di – displaying the temperature *(MCH-07T version only)*	**Hi** – hysteresis of thermostatic control *(MCH-07T version only)*	

ATTENTION

The purpose of 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 & 7 – when using different detergents in the morning and afternoon (CL0=1);*
- *relay 8 – when used to control heaters (MCH-07T version only).*

7.7.1. Factory programs for basic version of the controller.

PRO1 – WASHING A MILKING DEVICE

mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	f	H	comments
diode no.			1	2	3	4	5	6	7	8	H	
relay no.			1	2	3	4	5	6	7	8	✕	comments
rinsing	1	*30:00*		1							1	max. time
rinsing	2	05:00			1		1					
rinsing	3	00:30			1	1	1					
washing	4	*30:00*	1								1	max. time
washing	5	00:20						1				
washing	6	08:00			1							
washing	7	04:00			1		1					
washing	8	00:30			1	1	1					
rinsing	9	*30:00*		1							1	max. time
rinsing	10	05:00			1		1					
rinsing	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 A MILKING DEVICE

	diode no.		1	2	3	4	5	6	7	8	H	
	relay no.		1	2	3	4	5	6	7	8	✕	comments
mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	f	H	
warming	1	*30:00*		1							1	max. time
warming	2	03:00			1		1					
warming	3	00:30			1	1	1					
rinsing	4	*30:00*		1							1	max. time
rinsing	5	05:00			1		1					
rinsing	6	00:30			1	1	1					
washing	7	*30:00*	1								1	max. time
washing	8	00:20						1				
washing	9	08:00			1							
washing	10	04:00			1		1					
washing	11	00:30			1	1	1					
rinsing	12	*30:00*		1							1	max. time
rinsing	13	05:00			1		1					
rinsing	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 A MILKING DEVICE

	diode no.		1	2	3	4	5	6	7	8	H	
	relay no.		1	2	3	4	5	6	7	8	✕	comments
mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	f	H	
warming	1	*30:00*		1							1	max. time
warming	2	03:00			1		1					
warming	3	00:30			1	1	1					
rinsing	4	*30:00*		1							1	max. time
rinsing	5	05:00			1		1					
rinsing	6	00:30			1	1	1					
washing	7	*30:00*	1								1	max. time
washing	8	00:20							1			
washing	9	08:00			1							
washing	10	04:00			1		1					
washing	11	00:30			1	1	1					
rinsing	12	*30:00*		1							1	max. time
rinsing	13	05:00			1		1					
rinsing	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.									

	diode no.		1	2	3	4	5	6	7	8	H		
	relay no.		1	2	3	4	5	6	7	8	✕		comments
mode	step	time	HW	CW	ST	WP	DV	DD1	DD2	f	f		
rinsing	1	02:30		1									
rinsing	2	01:00		1	1	1							
rinsing	3	01:00			1	1							
rinsing	4	02:30					1						
washing	5	02:30	1										
washing	6	00:20			1			1					
washing	7	01:00	1		1	1							
washing	8	04:30			1	1							
washing	9	03:00					1						
rinsing	10	02:30		1									
rinsing	11	01:00		1	1	1							
rinsing	12	01:00			1	1							
rinsing	13	04:00					1						
total time		26:50											

7.7.2. Factory programs for MCH-07T version.

PRO1 – WASHING A MILKING DEVICE

	diode no.		1	2	3	4	5	6	7	8	H				
	relay no.		1	2	3	4	5	6	7	8	✕				comments
mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	HT	H	di	ºC	Hi	
rinsing	1	*30:00*		1							1				max. time
rinsing	2	05:00			1		1								
rinsing	3	00:30			1	1	1								
washing	4	*30:00*	1							1	1				max. time
washing	5	*30:00*							1		1		*40*		max. time
washing	6	00:20					1				1				
washing	7	08:00			1						1				
washing	8	04:00			1		1				1				
washing	9	00:30			1	1	1				1				
rinsing	10	*30:00*		1							1				max. time
rinsing	11	05:00			1		1								
rinsing	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 A MILKING DEVICE

	diode no.		1	2	3	4	5	6	7	8	H				
	relay no.		1	2	3	4	5	6	7	8					comments
mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	HT	H	di	°C	Hi	
warming	1	*30:00*		1							1				max. time
warming	2	03:00			1		1					1			
warming	3	00:30			1	1	1								
rinsing	4	*30:00*		1							1				max. time
rinsing	5	05:00			1		1								
rinsing	6	00:30			1	1	1								
washing	7	*30:00*	1								1	1			
washing	8	*30:00*							1		1		70		max. time
washing	9	00:20						1			1				
washing	10	08:00			1						1				max. time
washing	11	04:00			1		1				1				
washing	12	00:30			1	1	1				1				
rinsing	13	*30:00*		1							1				
rinsing	14	05:00			1		1								
rinsing	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 A MILKING DEVICE

	diode no.		1	2	3	4	5	6	7	8	H				
	relay no.		1	2	3	4	5	6	7	8					comments
mode	step	time	HW	CW	VP	MP	DV	DD1	DD2	HT	H	di	°C	Hi	
warming	1	*30:00*		1							1				max. time
warming	2	03:00			1		1					1			
warming	3	00:30			1	1	1								
rinsing	4	*30:00*		1							1				max. time
rinsing	5	05:00			1		1								
rinsing	6	00:30			1	1	1								
washing	7	*30:00*	1								1	1			max. time
washing	8	*30:00*							1		1		70		max. time
washing	9	00:20						1			1				
washing	10	08:00			1						1				
washing	11	04:00			1		1				1				
washing	12	00:30			1	1	1				1				
rinsing	13	*30:00*		1							1				max. time
rinsing	14	05:00			1		1								
rinsing	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.
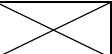
PRO4 – WASHING A MILK TANK

	diode no.		1	2	3	4	5	6	7	8	H				comments
	relay no.		1	2	3	4	5	6	7	8	✕				comments
mode	step	time	HW	CW	ST	WP	DV	DD1	DD2	HT	H	di	°C	Hi	
rinsing	1	02:30		1											
rinsing	2	01:00		1	1	1									
rinsing	3	01:00			1	1									
rinsing	4	02:30					1					1			
washing	5	02:30	1									1			
washing	6	*30:00*								1		1	*50*		max. time warm water heating up
washing	7	00:20			1			1				1			
washing	8	01:00	1		1	1						1			
washing	9	06:30			1	1				1		1	*50*	2	thermostatic work
washing	10	03:00					1								
rinsing	11	02:30		1											
rinsing	12	01:00		1	1	1									
rinsing	13	01:00			1	1									
rinsing	14	04:00					1								
total time		**28:50**													