

MANUAL OF THE MICROPROCESSOR CONTROLLER "MIKSTER MCC 051 FUTURE"

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1. INTRODUCTION

The Mikster MCC 051 FUTURE microprocessor controllers are used for automatic control and supervision parameters of technological processes in apparatus first of all in meat processing and food processing industry for thermal processing of products.

In particular, the controller MCC 051 FUTURE is used for controlling boiling pots and steaming chambers.

Basic functions of S.M. Mikster MCC 051 FUTURE are:

- control and adjustment of temperature of the pot (chamber), range between -10 and $+450^{\circ}\text{C}$)
- control and adjustment of temperature growth relative to the temperature of the bar DELTA (max. 25.5°C)
- control of temperature of the "BAR" range between -10 and $+450^{\circ}\text{C}$,
- control and adjustment of the temperature of the jacket (medium) range between -10 and $+450^{\circ}\text{C}$,
- controlling executory devices, electrical valves, etc.,
- analysis and signalling emergency situations
- automatic execution of the technological program.

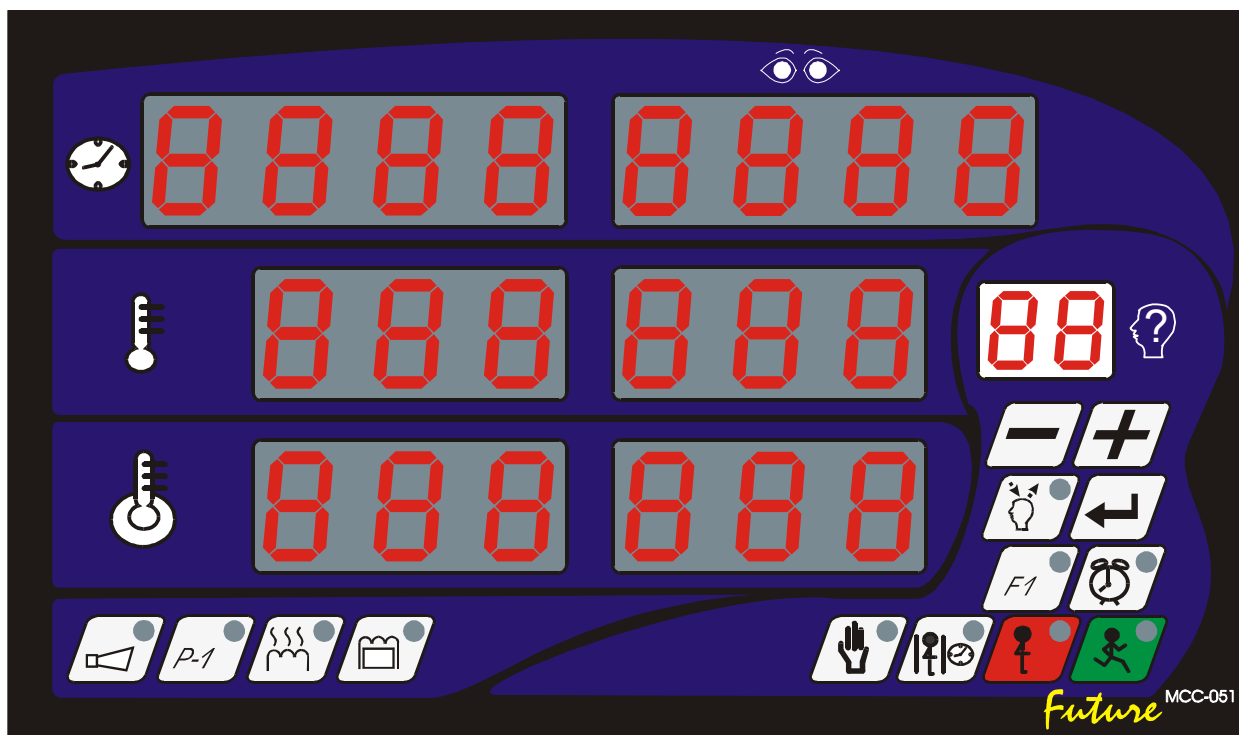
MIKSTER MCC 051 FUTURE allows for programming 50 technological programs (0 – 49), which may be freely selected by the user.

Switching off power supply does not result in erasing program memory. Execution of a program cycle allows for fully automatic thermoprocessing of products, according to technology requirements.

Manual work mode allows checking the executory device by controlling them from the controller keyboard (service work) and executing a simple technological process "out of program".

2. CONTROL PANEL OF S.M. MIKSTER MCC 051 FUTURE

All operations of starting up the controller, programming it, manual changes, etc., can be performed from the control panel (drawing 1).



Control panel can distinguish the following function sections:

- numerical display - 1-
- signalling diodes - 2-
- function keys - 3-
- keys of state of the devices - 4-

All information concerning the current condition of the working S.M. MIKSTER MCC 051 FUTURE (work status, values of parameters programmed and measured, signalling of devices being on/off) are displayed on numerical displays and diodes. If a given device is working, or a given function is active, the diode in the particular field is lit, if a device is off or a function is not active, the specific diode is off.

Introducing data to the memory of S.M. MIKSTER MCC 051 FUTURE, correction of data, calling the particular functions of the controller, can be performed by pressing the particular function keys and keys of condition of the devices.

3. SECURITY CODE

To protect data stored in the memory of S.M. MIKSTER MCC 051 FUTURE from unauthorised access, security code is used. The controller will ask for the code to be given, when the operator tries to introduce changes to data of the technological programs. (for details see item 4.1).

4. STARTING THE WORK OF S.M. MIKSTER MCC 051 FUTURE

After switching on the power supply, all the displays of controller will lit up, and after about five seconds they go off again, stop is displayed, and real time is displayed, which confirms that the system is working correctly.


At that moment it is possible to start the following functions of S.M. MIKSTER MCC 051 FUTURE:



- programming technological processes,
- the set-up of fixed parameters (concerns service),
- manual control of the work of the chamber,
- starting up a program to be executed by S.M. MIKSTER MCC 051 FUTURE.


4.1. Programming of technological processes



In S.M. MIKSTER MCC 051 FUTURE it's possible for the user to program fifty technological programs, (numbers 0 to 49).

To put S.M. MIKSTER MCC 051 FUTURE for programming:

- press key  (inscription CODE and symbol 000 000 will be displayed)

- by pressing the keys  
- set the first digit of the security code (in the field of programmed chamber temperature)

- press the key 

- by pressing the keys  
- set the second digit of the security code in the field of the read temperature of the chamber.

After both digits of the security code have been stored correctly, press again the key



If the code is correct, the device will be ready for programming, the display will show the number of the cycle 0, and the number of the program which we want to store.

If a wrong code has been given, S.M. MIKSTER MCC 051 FUTURE returns to Stand-by mode.

- by pressing the keys



increasing the value of the display



decreasing the value of the display

introduce the number of the program 0 – 49 (the field currently adjusted will blink)

- press the key 

- by pressing the keys   

introduce parameters:

LENGTH OF THE PROGRAM (h, min)

PROGRAMMED TEMPERATURE (°C)


TEMPERATURE OF THE "BAR" (°C)

"DELTA"

- by pressing the keys of conditional devices



program the devices which are to be switched on during the execution of the program.

- to store another program press the key 
- programming will be finished and data will be stored in memory after pressing the key









The controller goes into Stand-by mode and the inscription STOP is displayed.

4.2. Immediate start of execution of a technological program S.M. MIKSTER MCC 051 FUTURE

Immediate start of an automatic cycle (starting control of temperature, count-up of the time of the cycle) may take place if S.M. MIKSTER MCC 051 FUTURE is in Stand-by mode; (inscription STOP is displayed).







In order to start the automatic cycle, do as follows:

- press the key  (the field of program number display will blink)
- by pressing keys   introduce the of a program we want to execute)
- after storing the number of a program and claiming it correct, press the key  the boiling pot/chamber start work.

Caution! Before pressing the key  it is possible to stop the apparatus by pressing the key  After pressing it S.M. MIKSTER MCC 051 FUTURE returns to Stand-by mode and STOP is displayed.

4.3. Delayed start of a program (Auto-Start)

To start the Mikster apparatus with a delay, do as follows:

- press the key 
- by pressing the keys    introduce the number of a program, the hour and the minute when the execution of the program is to begin (start of the apparatus)
- press the key  (diodes Autostart and Start will blink; the controller is in AUTOSTART (delayed start) mode. When the program time for delayed start comes, the controller will start after work of a program).
- Stopping the Autostart (delayed start) function is performed by pressing the key 

4.4. Mode of execution of the program

After starting the program S.M. MIKSTER MCC 051 FUTURE on the grounds of the parameters of the program, suitably controls the executory devices and checks the conditions of execution of the program, on the ground of which it counts up the time of the following cycles.

For S.M. MIKSTER MCC 051 FUTURE to complete execution of the program, the following conditions must be met:

Case 1.

(when temperature of the bar programmed > 0 and time of the cycle programmed > 0, the cycle will be completed when:

- *the temperature of the bar (read) > = temperature of the bar (programmed)*
- or*
- *when time of the cycle (read) > = time of cycle programmed*

Case 2.

(when the temperature of the bar programmed > 0 and the time of the cycle programmed = 0) then the cycle will be completed when:

- *the temperature of the bar (read) > = temperature of the bar programmed*


Case 3.

(when the temperature of the bar programmed = 0 and the time of cycle programmed > 0 then the cycle is completed when

- *the time of the cycle (read) > = time of the cycle programmed.*

4.5. Manual changes of parameters of a technological process during the work of the apparatus S.M. MIKSTER MCC 051 FUTURE

During execution of a technological program by the apparatus it is possible to introduce manual corrections of the program. It can be achieved in the following way:


- press the key  all the programmed parameters of the program being executed are displayed
- introduce changes to the program as in item 4.1
- the operation of manual correction of data is completed after the key is pressed again




Only then the data is stored into the controller memory, and the controller will react to the changes newly introduced.

4.6. Manual operation



For manual operation of the boiler (chamber) perform the following operations,
(S.M. MIKSTER MCC 051 FUTURE should be in Stand-by mode and STOP displayed):

- press the key  (the "zero" parameters are displayed as set-up)
- by pressing the keys of condition of executory devices, for example




- set the devices, which after pressing the key  are to be switched on (a device "queued up" for being switched on is signalled by a blinding diode).



Note! The operation of devices  (water temperature controller) and  (jacket temperature controller) depends on the setting of the temperature of water jacket


- acting as in item 4.1 set up the programmed parameters of process executed. The work of the boiler (chamber) and setting the controls of executory devices takes




place after pressing the key . Conditions of completing execution of the program in manual mode as in item 4.4.

During execution of the program of manual operation it is possible to switch on the devices of the smoking chamber, as desired by the operator.




Stopping the program of automatic work takes place after pressing the key .



To continue a program which was interrupted half-way, press the key .



- leaving the manual work mode happens after pressing again a key .

5. SIGNALLING OF ERRORS AND FAILURES

Emergency situations which may happen during the work of S.M. MIKSTER MCC 051 FUTURE are signalled by a suitable communicate being displayed and generation of sound warning signal.

LIST OF ERRORS SIGNALLED

Error 17

Cause of error – signalling of control entry error

Reaction of the controller – depending on F12 (setup)

when F12 = 1 – work of the chamber is continued, error communicate is periodically displayed, and sound warning signal is generated

when F12 = 0 – work of the chamber will stop, error communicate is displayed and sound warning signal is generated.

Error 21

Cause of error – exceeding allowed temperatures

Reaction of the controller – stopping work of the chamber, displaying error communicate, sound signal is generated

Error 30

Cause of error – signalling the error of RAM control sum

Reaction of the controller – error communicate is periodically displayed; it is not possible to start automatic mode work.

Note! In case of this error, service team must be informed.

Error 40

Cause of error – signalling break in execution of automatic mode work, manual mode work or autostart, resulting from temporary lack of power supply.

When power supply reappears, the controller checks the time power supply was missing. If it is longer than the value of F23 setup, the controller stops work and returns to Stand-by mode. STOP is displayed.

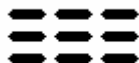
If the time of power supply cut-off than the value of F23, controller will continue work from the stage during which power supply had been interrupted.

Reaction of the controller – error communicate is periodically displayed.

Note! Clear cancelling error communicate displayed is performed by pressing a key



Faults of temperature probes are signalled by the symbol being displayed in the



field of the probe that is faulty .

6. SOUND SIGNALS

During normal work of the boiling pot (chamber) the sound signal will be heard after the execution of the program is completed (see item 4.4.). During emergency situations the interrupted sound signal of alarm is generated, until it is manually cancelled by pressing the

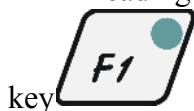


key .

7. READING THE TEMPERATURE OF THE JACKET

Note! Concerns apparatus in which probe No 3 is controlled.

Reading the temperature of additional temperature probe is performed by pressing the



The temperature value is displayed in the field of the temperature read inside the chamber symbol —tC.— is displayed.

To return to the display of the previous values press again the key



8. BREAKING EXECUTION OF A PROGRAM – PAUSE

If it is necessary to stop execution of a program for a moment, the pause option can be used, during which the work of the apparatus is interrupted, whether it was in automatic or in manual mode.

Introducing the pause mode is performed by pressing the key



Switching off the pause mode is performed by pressing the key



again.

9. FINISHING WORK OF THE CHAMBER

To stop the automatic process press the key



10. "DELTA"

The S.M. MIKSTER MCC 051 FUTURE controller allows for executions of boiling process in the function that is relative to temperature difference between the bar and the temperature of the pot (so called "Delta"). Switching on or off the boiling mode in the function of temperature differences is performed by storing the value of Delta while programming or during manual work.

Writing the value 0.0 in the Delta field switches off the mode of boiling in the function (related to) of temperature differences. Introducing a different value switches on the mode of boiling in the function (relative to) temperature differences.


Note! "Delta" may be blocked by the service workers in setup memory.


11. REACTING TO ALLOWED TEMPERATURES BEING EXCEEDED

The controller checks the appearance of too high temperature, after which the Error 21 is signalled. The temperature limit is stored by the service in setup memory.

12. REACTION OF THE CONTROLLER TO POWER SUPPLY CUT-OFF DURING A TECHNOLOGICAL PROCESS


If power supply gets cut-off while the controller is in the automatic work mode, after the power supply is restarted the controller, depending on the parameters set up in its memory, either continue or stop automatic or manual work execution (see item 5).

In each case error communicate Error 40 is displayed. If we want to return to execution of the program interrupted by the power supply cut-off, we press the key .


The controller returns to the interrupted cycle and continues the program. If we want to restart the program from the beginning, we press the key .

13. SETTING UP THE REAL TIME CLOCK

- Press the key  diode is blinking

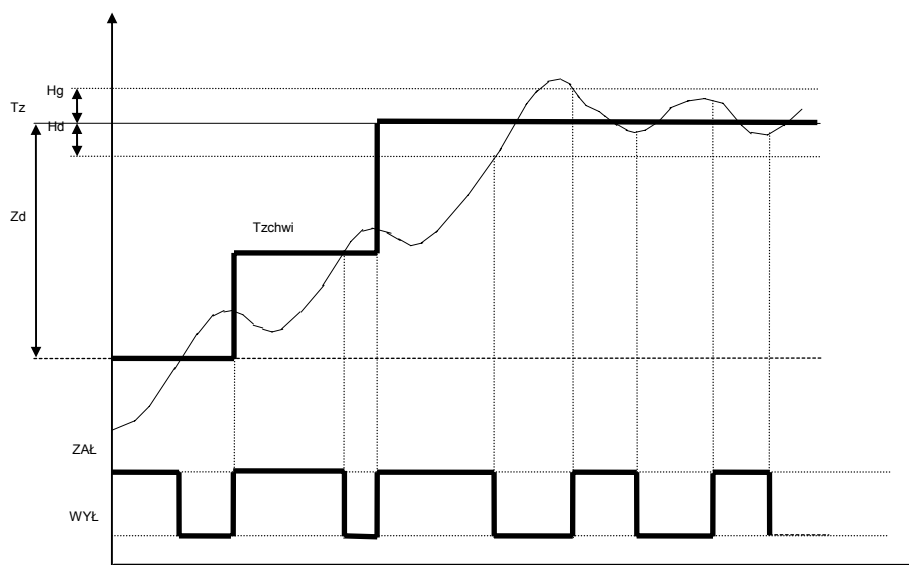
- press the key  the controller is switched into real clock setup mode

- by pressing the keys    set the current time in minute

- setting the time of real time clock is completed by pressing the key .

DESCRIPTION OF ALGORITHMS OF DOUBLE SET CONTROLLER

Type 1



Description of meanings

Hg (Uh) – upper hysteresis of temperature controller (F26 setup)

Hd (Lh) – lower hysteresis of temperature controller (F25 setup)

Zd (OR) – operating range of the "pull up" algorithm (F23 setup)

Tz (Ts) – temperature set of the controller

ZAL (On) – controller output on

WYL (Off) – controller output off

Tzchwil (Ts mom) – temperature set momentary, relative to which temperature control is performed

Description of operation

Tod (Tr) – temperature read (momentary)

Rout – temperature controller output

Case 1.

When $Tod (Tr) < Zd (Or)$ then $Rout = ZAL (On)$

Case 2.

When $Tod (Tr) \geq Zd (On)$ and $Tod (Tr) < [Tz(Ts) - Hd(Lh)]$ the algorithm of "pulling up" the set temperature is executed; it looks as follows: switching off $Rout = WYL (Off)$ of the controller output takes place when the momentary set temperature $Tzchwi (Ts mom)$ is exceeded, the output $Rout = ZAL(Off)$ is switched on again after a fall of temperature is observed. At the same time new momentary set temperature $Tzchw(Tz - Tod)/2$ is set.

In case of establishing the set temperature $Tzchwi \geq (Tz - Hd)$ then $Tzchwi = Tz$.

Case 3.

When $(Tz + Hg) \geq Tod > (Tz - Hd)$ in this case switching off ($Rout = WYL$) takes place when temperature growth was noted, while switching on ($Rout = ZAL$) takes place when a fall of temperature is noted, (change of the Rout condition is delayed by the time stored in F24)

Case 4.

When $Tod > (Tz + Hg)$ the output of controller is off, ($Rout = WYL$).