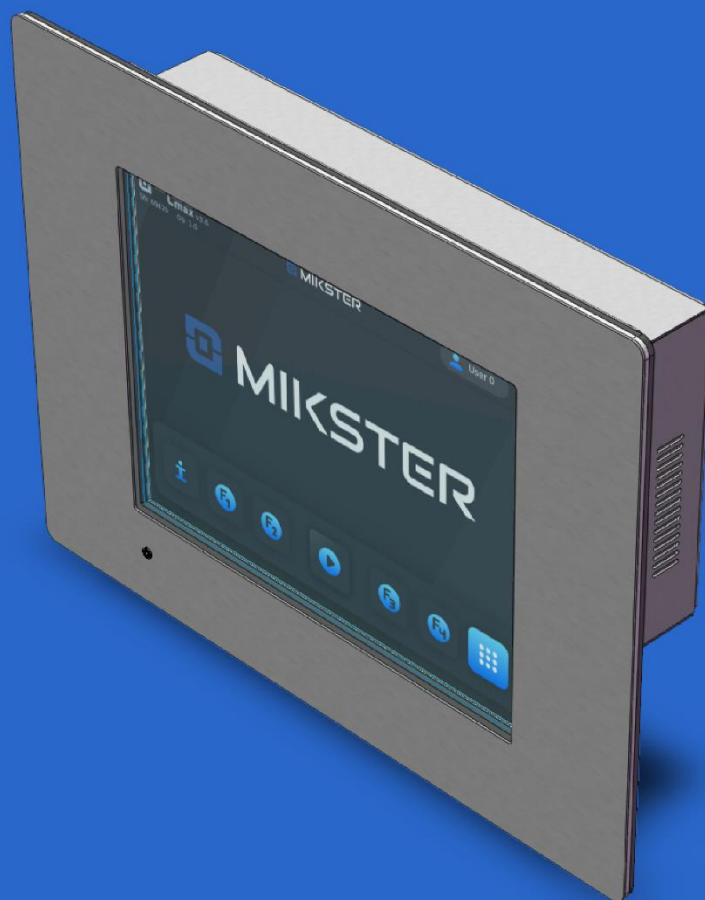


# INDU iMAX 1000-TC-LX

## USER MANUAL v1.2(5.0)EN



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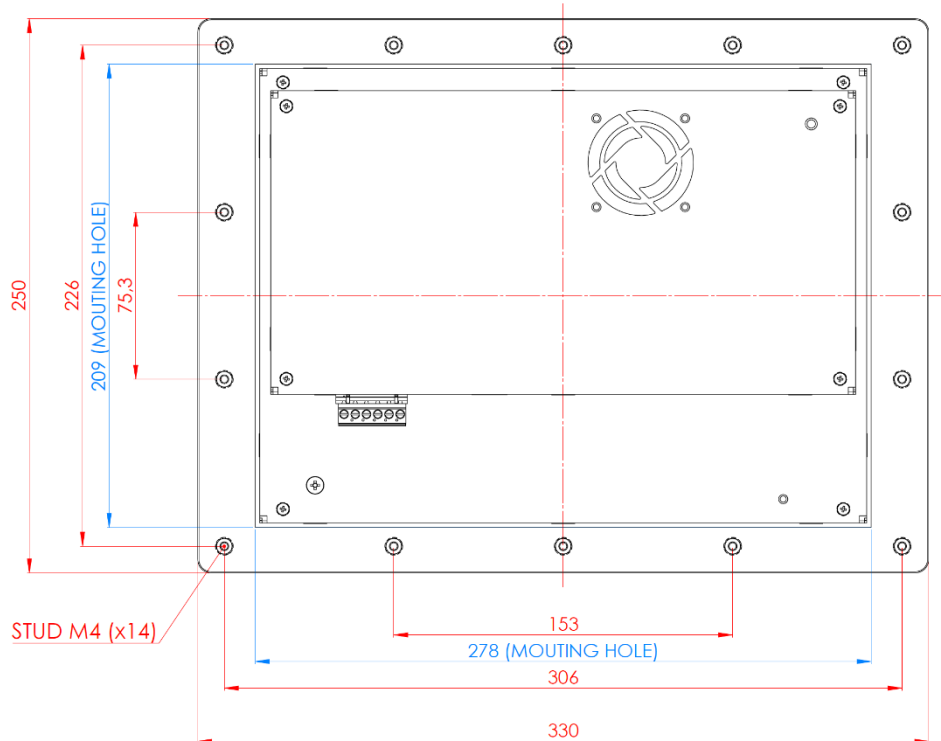
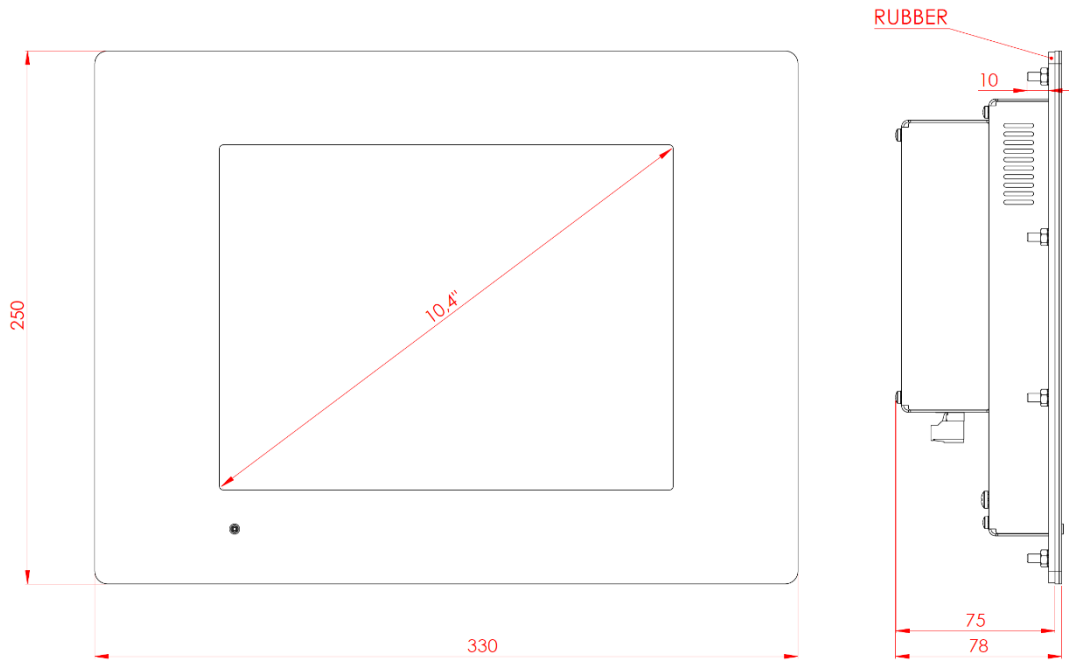
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## 1. TECHNICAL SPECIFICATIONS

<b>Power supply:</b>	24V DC $\pm$ 10% <ul style="list-style-type: none"> <li>• INDU WRC COMBO - compatible;</li> <li>• WRC CPPS-01 - external 24V DC power source <b>required</b></li> </ul>
<b>Power consumption:</b>	7 W (max 500mA)
<b>Housing:</b>	One-piece Front Panel
<b>Dimensions (WxHxD):</b>	330x250x78mm
<b>Weight:</b>	3000g
<b>Display:</b>	LCD 10,4" TFT SVGA 800x600pixels (262K colours)
<b>Touchscreen:</b>	Capacitive (PCAP)
<b>IP rating:</b>	IP65 (Front) IP20 (Rear)
<b>Real time clock:</b>	Yes
<b>OS:</b>	LINUX
<b>Memory:</b>	RAM 256MB FLASH 256MB
<b>Communication ports:</b>	1xRS485 1xUSB 1xLAN (SERVICE)
<b>Operating conditions:</b>	Temperature: 0..+55°C Temperature: -20..+65°C Humidity: 5%RH $\div$ 90%RH (no condensation)
<b>Other features:</b>	Functionally fully compatible with INDU iMAX1000-TC-512MB

## 2. INSTALLATION DATA



### 3. PRINCIPLE OF OPERATION OF THE INDU iMAX 1000-TC-LX PANEL

The iNDU iMAX 1000-TC-LX panel is adapted to work with a set of WRC modules and with the iNDU WRC COMBO module.

Communication between the executive set and the panel takes place via the RS485 line.

The main purpose of the panel is to execute technological programs implemented through configured digital and analog inputs and outputs of the modules connected to the panel.

The modules can be configured directly through the panel or using dedicated PC software.

On the panel screen, all critical parameters necessary to control the programs are displayed, such as program names, cycle names, time, temperature, etc.

The panel is operated using a touch screen.

#### The method of execution of the technological program.

The technology program consists of up to 30 sequential steps.

Each step is assigned an appropriate technological cycle (selected from a previously defined pool of up to 16 cycles). In addition, the step time and setpoints are given for the step.

Module outputs are defined for the selected cycle. The panel program controls the outputs defined for the selected cycle.

Technological cycles - up to 16 cycles - are defined at a higher access level. For the cycle, we define what devices / relay (regulator, pulse generator, always on ...) are to work in a given cycle and the condition for ending a given cycle (set time reached, preset temperature reached, etc.).

In the definition of cycles, the values of set parameters are not given, because they are defined when programming steps. In the Indu iMAX 1000-TC-LX panel, the mode of operation of the device/relay (controller, pulse generator, always on) is defined by the chamber manufacturer, therefore when defining technological cycles, only whether a given device/relay is to be active or inactive is selected, without the need to determining how it works.

#### In summary, the controller configuration can be divided into 3 stages:

1. Definition of specific outputs of the controller - here it is defined whether the output works as a regulator, encoder, etc. This is the definition at the highest access level and it is customary to set it once at the beginning by the manufacturer of the machine controlled by the iMAX. In the course of normal operation, these definitions should not be changed.
2. Definitions of technological cycles - definition at a lower level than the definition of outputs. In technological cycles, it is specified which devices are to work (predefined outputs in step 1 are used here) and the cycle end condition. This definition can be set by the machine manufacturer or technologist. During normal operation, these settings can be modified, but there is no need to change them frequently.
3. Program definition - this definition consists in programming 30 steps. This is the final setting already available to the end user. In the step, the technological cycle is selected and the set values are given.

This definition is often modified by the end user. When programming steps, the user uses previously defined technological cycles.

Such a division of configuration allows the end user to quickly program technological processes without the need to know how the machine and controlled devices work, as well as the relationships between them. This not only simplifies process programming but also ensures work safety.

In the following, a detailed description of the configuration at each stage will be described.



**ATTENTION! The names of programs, measuring channels and relays used are exemplary, it is possible to change the naming.**

## 4. STARTING THE INDU iMAX 1000

After turning on the power supply, the controller goes into standby mode in STOP mode. Will appear on the display a large, distinct logo with cons appears (MAIN SCREEN):



**INFO** - when pressed, it shows the current date and time as well as the measurements of analog inputs.

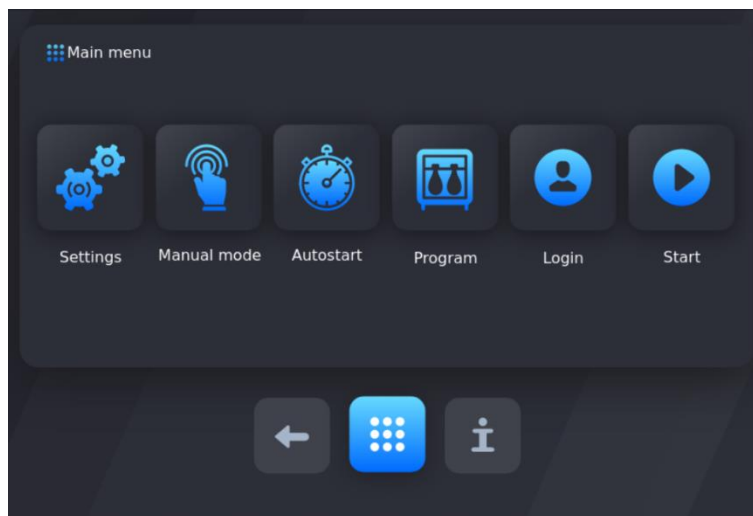


01.09.2023 08:10			
CHAMBER TEMP.	23.8	CH4 (PLATE)	---
CORE TEMP.	34.1	CH5 (SMOKE)	45.7
HUMIDITY	50 (17.1)	CHANNEL 6	---
CHANNEL 7	0	CHANNEL 8	0
CHANNEL 9	0	CHANNEL 10	0
CHANNEL 11	0	CHANNEL 12	0

**START** - after pressing the icon, you can go straight to the selection of the program you want to run.



**MAIN MENU** - after pressing the icon, the main menu appears.

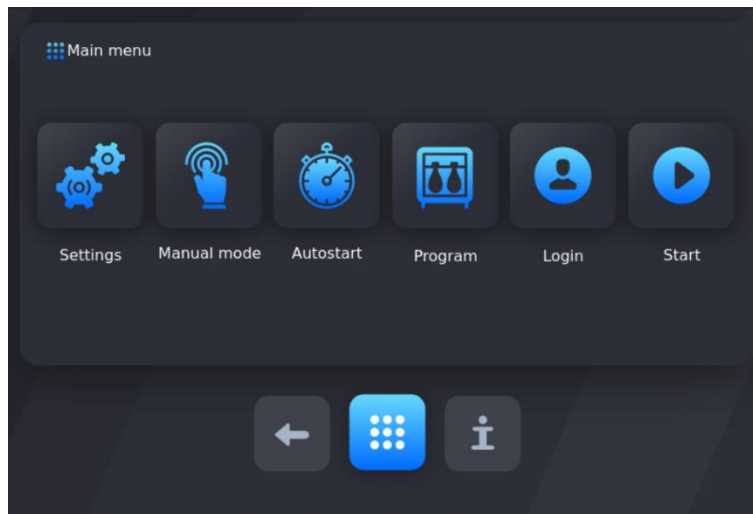


**FUNCTION BUTTONS F1-F4** – after pressing one of the four icons, the outputs previously assigned to a given state are activated.



## 5. MAIN MENU

In the Menu, we will have (from the left): Settings, Manual mode, Autostart, Program, Login, Start.

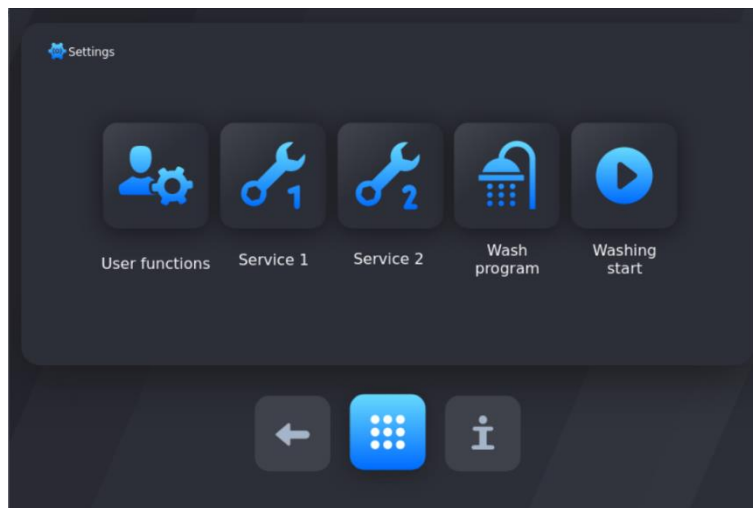


### 5.1. SETTINGS

The controller has very extensive configuration functions that allow you to adjust its parameters and the way it works to the individual needs of the user. Appropriate settings made through the configuration menu are remembered by the controller and used during operation.

The controller configuration has been divided into the following functions:

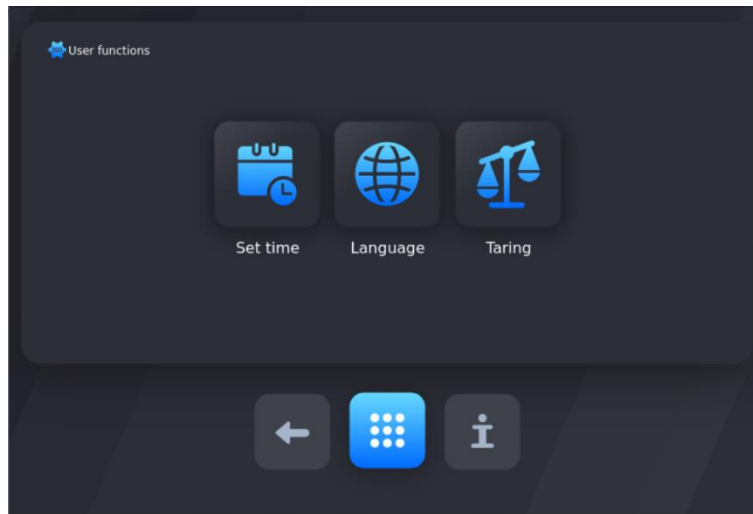
- **User functions**
- **Service 1**
- **Service 2**
- **Wash program**
- **Washing start**





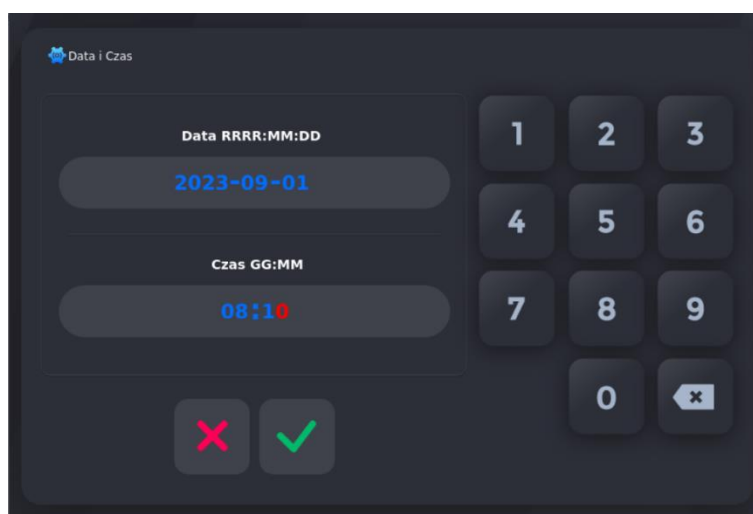
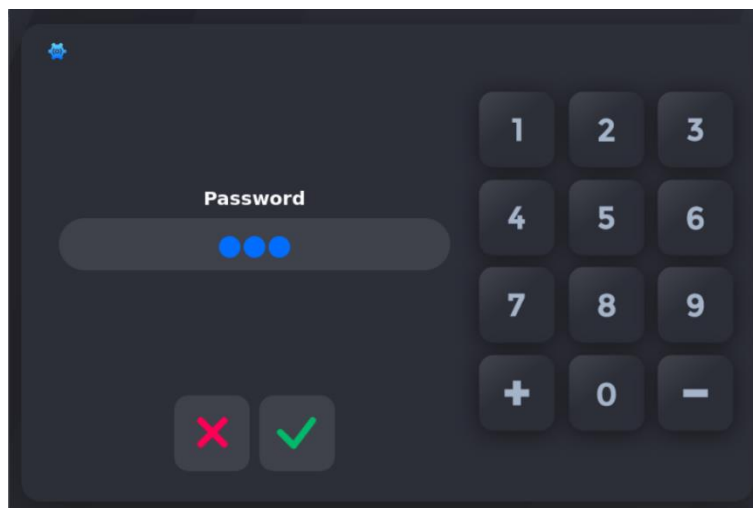
### 5.1.1. USER FUNCTIONS

In these functions, we can set: time and date, menu language, taring.



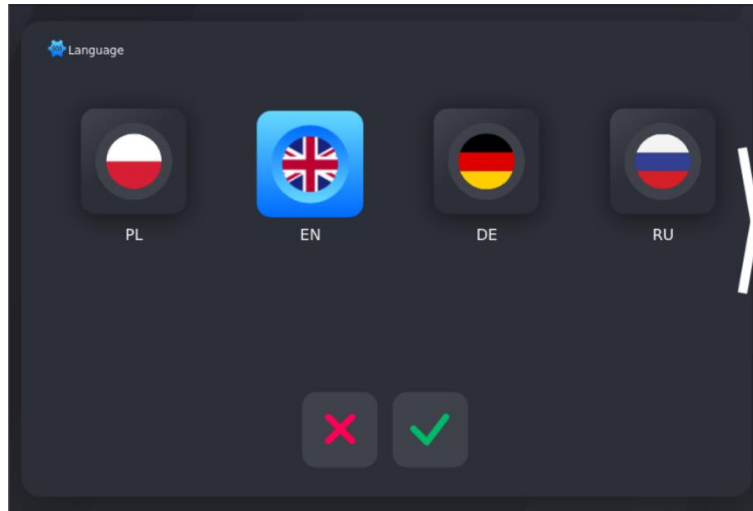
#### 5.1.1.1. TIME AND DATE SETTING

To set the time and date, select a function „Set time” (password required, default password: 123)



### 5.1.1.2. LANGUAGE SELECTION

To set the language, select the "Language" function. The selection is made by pressing the flag symbol of a given country.



### 5.1.2. SERVICE 1 (SERVICE FUNCTIONS 1)

In these functions we can set:

- Controller setup
- Step setup
- Alarms
- STOP/PAUSE - parameters of STOP and PAUSE states, and parameters of key functions F1..F4
- Output setup
- Washing steps

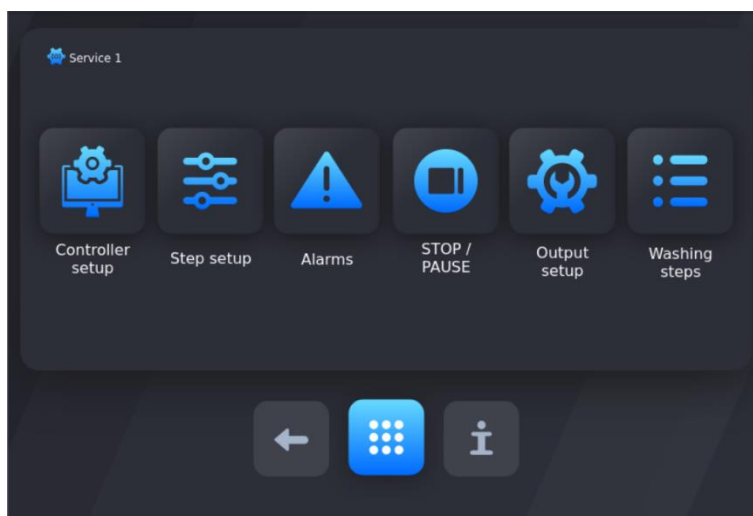
To enter the service functions (Service 1, Service 2, Washing Program) enter the code.

The access code protects against unauthorized access to service functions and change of controller settings.

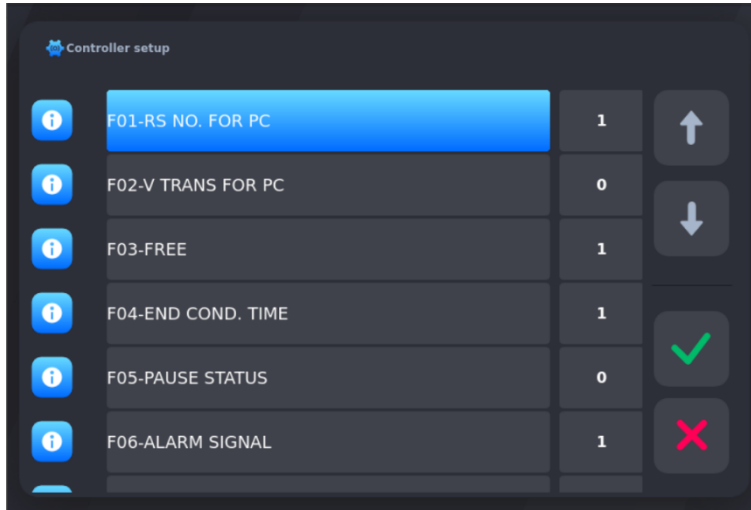
By default, the input code is a sequence of digits: 123.

#### 5.1.2.1. CONTROLLER SETUP

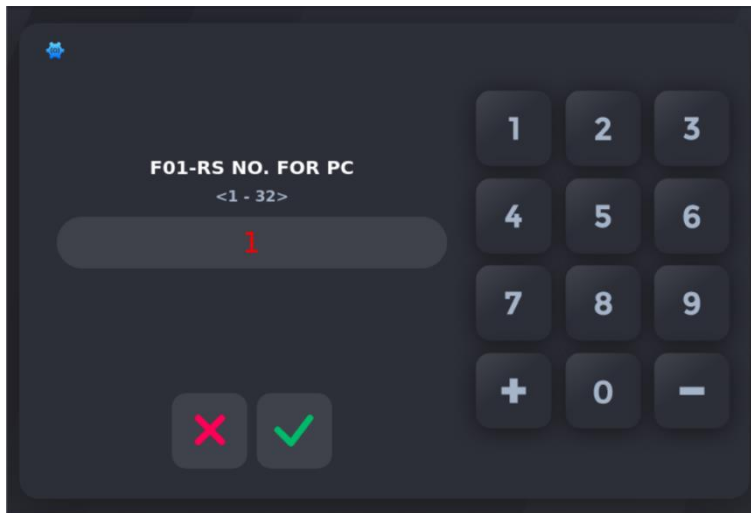
To set the parameters of the controller, select the "SETUP" function




You can scroll through the list using the arrows or a gesture. To select a cell for editing, click on its name.



After selecting the name, a window appears where you can change the value of the cell.



To confirm changes in a given "SETUP" cell, press the "OK" button .

All changes made in the SETUP settings are saved after confirming with the "OK" button  when exiting the settings. Pressing the

"CANCEL" key  will exit without saving - changes made in the SETUP cells will not be saved.

**SETUP CELL TABLE:**

CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F 01	RS NO. FOR PC	1	1..32	The number in the RS-485 network under which the controller is seen by the PC
F 02	V TRANS FOR PC	0	0..1	Baud rate RS-485 – connection with PC: 0 - 9600 1 - 19200
F 03	FREE	-	-	-
F 04	END COND. TIME	1	0..99	Extra time to complete the cycle
F 05	PAUSE STATUS	0	0..2	0 - key pause 1 - pause triggered cyclically according to the program cycle time stopped 2 - pause triggered cyclically according to the program cycle time not stopped
F 06	ALARM SIGNAL	1	0..1	0 - off 1 - on
F 07	TEMP. UNIT	0	0..1	Temperature measuring unit: 0 – °C 1 – °F
F 08	PLATE. TEMP	380	-99..999	Smoke generator plate temperature
F 09	SMOKE TEMP	250	-99..999	Smoke temperature
F 10	DELTA STATUS	0	0..3	0 - "Delta" off 1 - "Delta" core-chamber 2 - "Delta" temperature increase over time 3 - Not used
F 11	REC. FREQ.	1	0..99	Record write frequency
F 12	TIME FOR RESTART	40	0..200 [min]	Permissible time in minutes allowing the process to be resumed after a power failure
F 13	MAX CHAMB. SET T	200	-99..999	The maximum preset temperature of the chamber
F 14	MAX CORE SET T	200	-99..999	The maximum set temperature of the core
F 15	HUMIDITY TYPE	0	0..2	Humidity Measurement Type: 0 - by psychrometric method 1 - using a 4...20 mA current sensor 2 - Not used

CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F 16	TIME TO WASHING	40	0..999 [min]	Allowable number of minutes between the cleaning process
F 17	FREE	0	-	-
F 18	ID ON/OFF	0	0..1	Process ID 0 – off 1 – on
F 19	OPERATOR ON/OFF	0	0..1	Operator's login 0 – off 1 – on
F 20	KEY "CLICK"	1	0..1	Keyboard sound: 0 - off 1- on
F 21	MAX CHAMBER TEMP	100	-99..999	Maximum allowed chamber temperature
F 22	MAX CORE TEMP	90	-99..999	Maximum allowed core temperature
F 23	MAX PLATE TEMP	800	-99..999	Maximum allowed channel temperature 4
F 24	MAX SMOKE TEMP	800	-99..999	Maximum allowed channel temperature 5
F 25	MAX HUMIDITY	99	0..99	Maximum allowable humidity
F 26	TCH-OFFSET (D)	0	-20.0..20.0	Chamber temperature correction value - dry sensor
F 27	TCH-OFFSET (W)	0	-20.0..20.0	Chamber temperature correction value - wet sensor
F 28	TCO-OFFSET	0	-20.0..20.0	Core temperature correction value
F 29	TPL-OFFSET	0	-20.0..20.0	Smoke generator plate temperature correction value
F 30	TSM-OFFSET	0	-20.0..20.0	Smoke temperature correction value
F31	HUM. OFFSET	0	-20.0..20.0	Humidity correction
F 32	TYPE OF DIG.INP	0	0..1	Type of voltage supplied to the control inputs: 0 - DC voltage 1 - AC voltage
F 33	STAT.REL.FOR END	0	0..1	Type of input signal for the cycle end condition 0 - input signal from the control input 1 - input signal from the relay output

CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F 34	REL. NO.FOR END	0	0..32	0 - off  1..32 - number of the control input or relay for the cycle end condition
F 35	MIN CHAMB. SET T	-99	-100..999	The minimum set temperature of the chamber
F 36	MIN CORE SET T	-99	-100..999	The minimum set temperature of the core
F 37	MIN HUMIDITY SET	-9	-100..999	Minimum preset humidity
F 38	MAX HUMIDITY SET	99	-100..999	Maximum preset humidity
F 39	MIN ADDITION1SET	-99.9	-1000..9999.9	Minimum setpoint add 1
F 40	MAX ADDITION1SET	999.9	-1000..9999.9	Maximum value of add 1 (see F60)
F 41	MIN ADDITION2SET	-99.9	-100..999.9	Minimum setpoint add 2
F 42	MAX ADDITION2SET	999.9	-100..999.9	Maximum value of add 2
F43	RELAY S.G.ON	0	0..31	0 - off  1..32 - Smoking relay number - relay for counting down the time between successive chamber cleaning processes
F44	CH6 REG. SET.	0	-999..999	Channel setpoint 6
F45	CH7 REG. SET.	0	-999..999	Channel setpoint 7
F46	CH8 REG. SET.	0	-999..999	Channel setpoint 8
F47	CH9 REG. SET.	0	-999..999	Channel setpoint 9
F48	CH10 REG. SET.	0	-999..999	Channel setpoint 10
F49	CH11 REG. SET.	0	-999..999	Channel setpoint 11
F50	CH12 REG. SET.	0	-999..999	Channel setpoint 12
F51	CH6 OFFSET	0	-99.9..99.9	Channel temperature correction 6
F52	CH7 OFFSET	0	-99.9..99.9	Channel temperature correction 7
F53	CH8 OFFSET	0	-99.9..99.9	Channel temperature correction 8
F54	CH9 OFFSET	0	-99.9..99.9	Channel temperature correction 9
F55	CH10 OFFSET	0	-99.9..99.9	Channel temperature correction 10
F56	CH11 OFFSET	0	-99.9..99.9	Channel temperature correction 11
F57	CH12 OFFSET	0	-99.9..99.9	Channel temperature correction 12
F58	DISP.TIME TYPE	0	0..1	Time display (time counting):  0 - forward  1 - time until the end

CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F59	MAN.MODE ON/OFF	1	0..1	Manual operation of the controller:  0 - off  1 - on
F60	ADDITIONAL SET	0	0..1	It is possible to enter additional data, Appendix 1 and Appendix 2 during editing technological programs:  0 - off  1 - on
F61	FREE	-	-	-
F62	FREE	-	-	-
F63	CH6 AS WEIGHT	0	0..1	Assigning weight to channel 6 (scaling F39 - min, F40 - max):  0 - off  1 - on
F64	MAX CARD ERROR	2	0..9	Maximum number of program restarts (after detecting a card error). After detecting a card error, the program resumes operation a set number of times.
F65	WEIGHT TAR.	0	0..3	0 - taring off  1* - taring after pressing the F4 key * not active  2 - tare automatically at the beginning of each step  3** - tare automatically at the beginning of each step or after pressing the F4 key ** key F4 - not active
F66	FREE	-	-	-
F67	VAC. PULSE LENGTH	15	0..9999	Parameter for tumbler programs
F68	VAC. PULSE DELAY	45	0.9999	Parameter for tumbler programs
F69	COUNTER CONST.	1	0..9999	Counter-divisor constant for the pulse counter controller
F70	LOOP PROG.STEPS.	0	-1..200	-1 - program repeats in a loop  0, 1 - the program will run 1 time  2...200 - the program will run as many times as specified
F71	RH 1 FILTER	0	0..999	Humidity filter for regulator
F72	RH 2 FILTER	2	0..5	Display humidity filter

CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F73	FREE	-	-	-
F74	CHAMBER TEMP.MEAS.TYPE	0	0..1	0 - PT100 1 - as a current input scaling in cells 76 and 77
F75	CORE TEMP.MEAS.TYPE	0	0..1	0 - PT100 1 - as a current input scaling in cells 78 and 79
F76	CHAMBER TEMP.SCALING MIN	0	-99.9..999.9	Temperature value for 0/4mA current input signal
F77	CHAMBER TEMP.SCALING MAX	100	-99.9..999.9	Temperature value for 20mA current input signal
F78	CORE TEMP.SCALING MIN	0	-99.9..999.9	Temperature value for 0/4mA current input signal
F79	CORE TEMP.SCALING MAX	100	-99.9..999.9	Temperature value for 20mA current input signal
F80	CHAMBER ALARM TYPE	0	0..1	0 - absolute alarm. 1 - relative alarm (relative to the set point)
F81	CORE ALARM TYPE	0	0..1	0 - absolute alarm 1 - relative alarm (relative to the set point)
F82	HUM.ALARM TYPE	0	0..1	0 - absolute alarm 1 - relative alarm (relative to the set point)
F83	SMOKE ALARM TYPE	0	0..1	0 - absolute alarm 1 - relative alarm (relative to the set point)
F84	LOCK PROGRAMMING FROM PC	0	0..1	0 - off 1 - on
F85	ANALOG OUTPUTS IN INFO MODE	0	0..1	Analog output values are displayed in INFO MODE: Channel 9 as AO1..Channel 12 as AO4 0 - off 1 - on
F86	PLATE ALARM TYPE	0	0..1	Alarm status: 0 - absolute alarm 1 - relative alarm (relative to the set point)
F87	TEMP.DISPLAY TYPE	0	0..1	0 - temperature displayed with an accuracy of one decimal place 1 - temperature displayed as total value
F88	ALARM-TIME MEAS.FREEZE	600	0..9999 [s]	The time in seconds after which an alarm is generated if there is no change in the temperature reading during the process



CELL NR	CELL NAME	FACTORY SET VALUE	RANGE	DESCRIPTION
F89	F89-EXTERNAL DI MODULE	0	0..4	Additional DI input module:  0 - not connected  1 - connected  2..4 - not used
F90	FREE	-	-	-
F91	FREE	-	-	-
F92	FREE	-	-	-
F93	FREE	-	-	-
F94	FREE	-	-	-
F95	FREE	-	-	-
F96	FREE	-	-	-
F97	FREE	-	-	-



**ATTENTION!** Setting the same MIN and MAX values will make it impossible to edit the parameters.

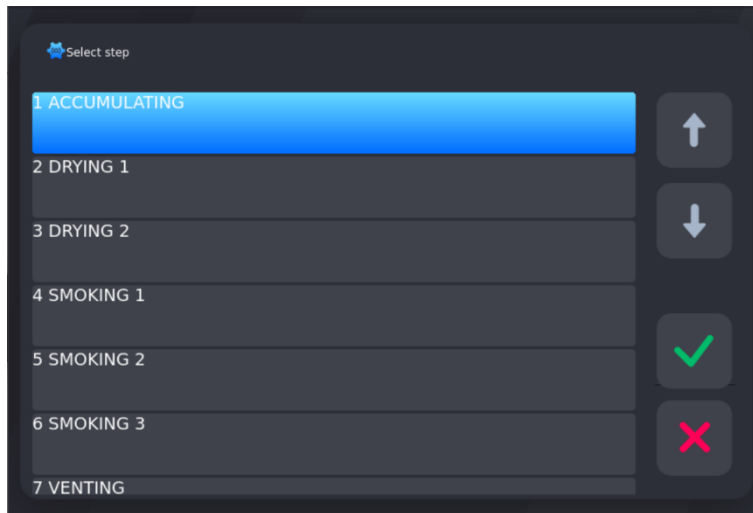
### 5.1.2.2. STEP SETUP - SETTING STEPS/CYCLES PARAMETERS

Each process controlled by INDU iMAX consists of successive steps. Each step can be assigned a running cycle. 16 cycle settings can be stored in the controller. Define for each cycle:

- name
- relay states
- step-end condition

To set these parameters:

- select the function "Step setup"
- a list of all steps will appear,



- choose the step you want to edit
- enter parameters such as: step name, end condition, select outputs that are to be active, enter set values for the selected step



## END-STEP CONDITIONS TABLE

Name	Step termination condition
TIR>TIS	cycle end after reaching preset time value
TCHR>TCHS	cycle end after exceeding preset value of temperature inside chamber
TCR>TCS	cycle end after exceeding preset value of core temperature
HUR>HUS	cycle end after exceeding preset humidity value
TIR>TIS OR TCHR>TCHS	cycle end after reaching preset time value, or after exceeding preset value of temperature inside chamber
TIR>TIS OR TCR>TCS	cycle end after reaching preset time value, or after exceeding preset value of core temperature
TIR>TIS OR HUR>HUS	cycle end after reaching preset time value, or after exceeding preset moisture value
TIR>TIS AND TCHR>TCHS	cycle end after reaching preset time value and after exceeding preset value of temperature inside chamber
TIR>TIS AND TCR>TCS	cycle end after reaching preset time value and after exceeding preset value of core temperature
TIR>TIS AND HUR>HUS	cycle end after reaching preset time value and after exceeding preset humidity value
TCHR<TCHS	cycle end after drop of temperature inside chamber below preset value
TCR<TCS	cycle end after drop of temperature in bar below preset value
HUR<HUS	cycle end after drop of humidity below preset value
TIR>TIS OR TCHR<TCHS	cycle end after reaching preset time value, or after drop of temperature inside chamber below preset value
TIR>TIS OR TCR<TCS	cycle end after reaching preset time value, or after drop of temperature in core below preset value
TIR>TIS OR HUR<HUS	cycle end after reaching preset time value, or after drop of humidity below preset value
TIR>TIS AND TCHR<TCHS	cycle end after reaching preset time value and after drop of temperature inside chamber below preset value
TIR>TIS AND TCR<TCS	cycle end after reaching preset time value and after drop of temperature in core below preset value
TIR>TIS AND HUR<HUS	cycle end after reaching preset time value and after drop of humidity below preset value
INN=1	cycle end when "end release" is on
TIR>TIS AND INN=1	cycle end after reaching preset time value, and "end release" must be on
TIR>TIS OR INN=1	cycle end after reaching preset time value, or after switching on "end release"
INN=0	cycle end when "end release" is off

Name	Step termination condition
TIR>TIS AND INN=0	cycle end after reaching preset time value, and “end release” must be off
TIR>TIS OR INN=0	cycle end after reaching preset time value, or after switching off “end release”

**Set value** – values for regulators, assigned to a specific configured step.

Step	Set value
1	2
2	10
3	25
4	50
5	100



**ATTENTION!** In each step, you can declare 5 preset values. Each preset can be used as a preset channel ZK1-ZK5 when configuring digital and analog outputs.

**Each step can have different setpoints.**

### 5.1.2.3. ALARMS

The controller can trigger 37 alarms:

- from 1 to 11 from DI control inputs
- from 12 to 16 loss of measurement from temperature sensors
- from 17 to 21 exceeding the values from the temperature and humidity sensors
- from 22 to 37 from the additional digital input module DI-16

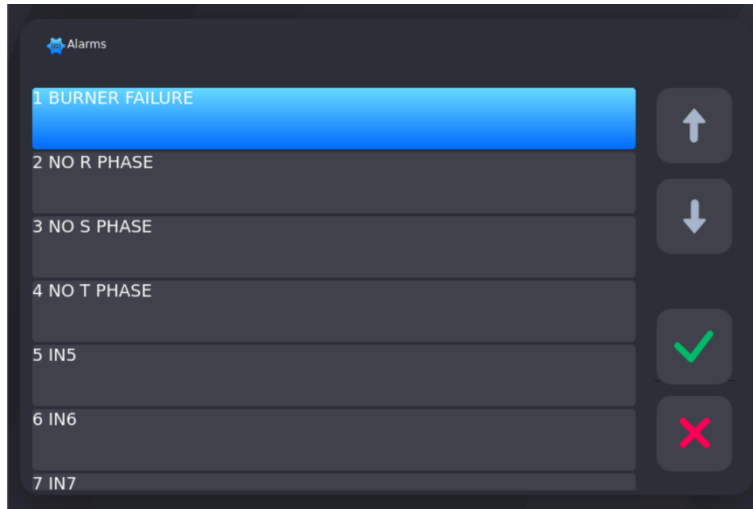
For each alarm can be defined:

- name
- status of relays
- alarm delay time – time from the alarm detection to the moment of its activation
- output logic
- alarm status

**To set the alarm parameters:**

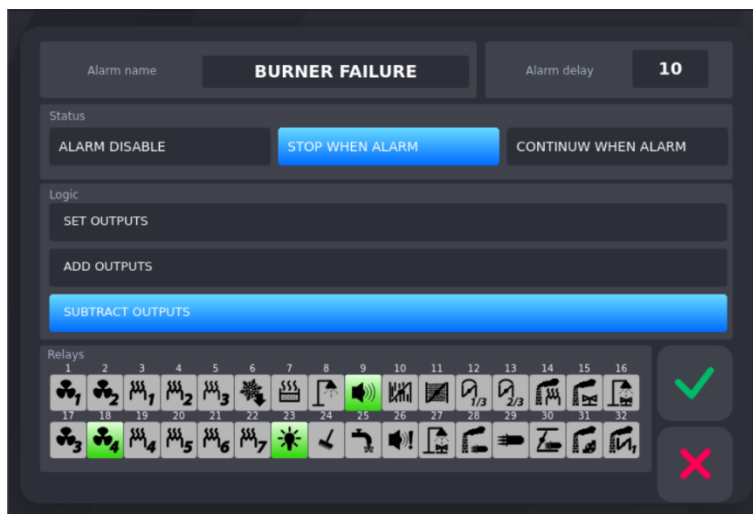


- Select the "ALARMS" function
- Select the alarm you are interested in from the list for editing.



**ATTENTION! When you start the panel for the first time, the alarm list is default, you need to enter the alarm names and their settings.**

- Configure the parameters:
  1. "Alarm name"
  2. "Alarm delay" - the time after which the controller is to react to an alarm occurrence. The time is given in seconds
  3. "Alarm status" – controller behaviour after an alarm event:
    - **ALARM DISABLE;**
    - **STOP WHEN ALARM** (Process interrupting alarm) – after an alarm occurs, the ongoing process will be interrupted and the digital outputs will be activated, in accordance with the alarm declaration and logic;
    - **CONTINUE WHEN ALARM** (Alarm not interrupting the process) – after an alarm occurs, the ongoing process will be continued, and the digital outputs will be activated, in accordance with the alarm declaration and logic
  4. "Logic" defines the behaviour of the relay outputs after an alarm condition occurs
    - **SET OUTPUTS** (Assigning a given state to outputs) – only those relays declared in the alarm state will be switched on;
    - **ADD OUTPUTS** (Logical sum of indicated relays and outputs) – in addition to the relays activated in the process, the relays declared in the alarm state will be additionally switched on;
    - **SUBTRACT OUTPUTS** (Logical product of the indicated relays and outputs) – after an alarm condition occurs, in the ongoing process, the relays declared in the alarm state will be deactivate



### 5.1.2.4. STOP/PAUSE - SETTING PARAMETERS FOR STOP, PAUSE, F1-F4

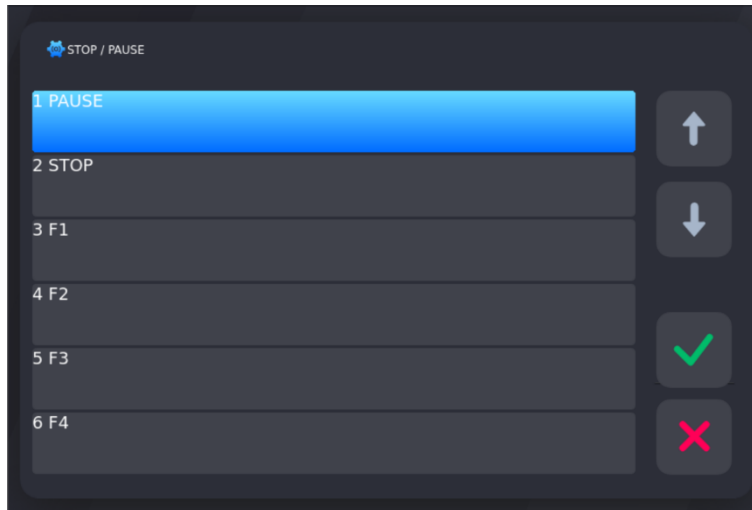
There are two special states in the controller: Stop and Pause, and four special states assigned to the F1-F4 buttons, for which we can set:

- End time - how long the state should last
- Logic – assignment, logical sum or logical product of relay outputs
- Assign relay outputs to logic

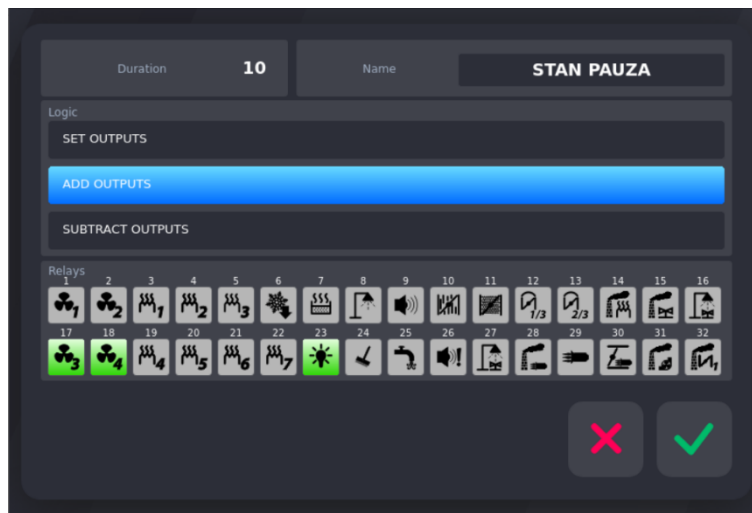
To set these parameters:



Select the "STOP/PAUSE function from MENU and special state you are interested in from the list:



Enter the parameters of its operation in the selected state:



The PAUSE and STOP states are used during the process or until its completion.

Pressing the PAUSE button interrupts the process and sets the relay outputs according to the selected logic. After the declared duration in seconds [s] has elapsed, the controller automatically returns to the interrupted process.

Pressing the STOP button interrupts the process and sets the relay outputs according to the selected logic. After the declared duration in seconds [s] has elapsed, the controller does not return to the interrupted process.

States F1-F4 are launched from the main screen of the controller, out of process.

Only one F state can be active at a given moment. Starting the next one causes the interruption of the current one.

### 5.1.2.5. OUTPUT SETUP

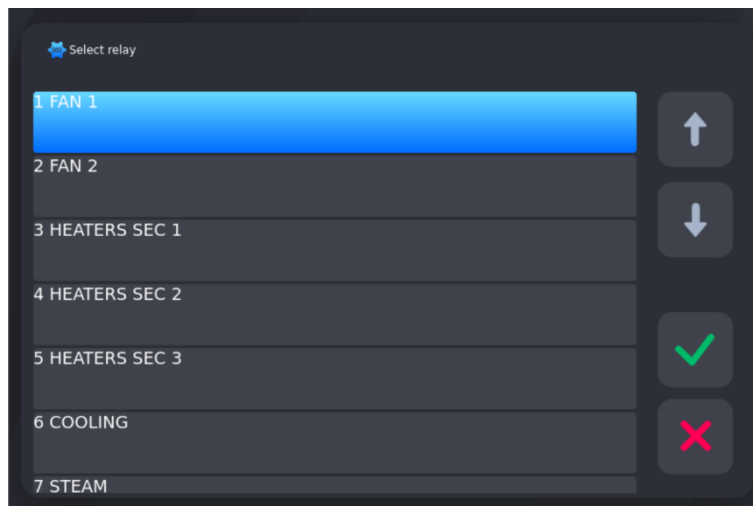
#### 5.1.2.5.1. DIGITAL OTPUTS - CONFIGURATION OF DIGITAL OUTPUTS (RELAY)

Each of the 32 relays has individually adjustable operating parameters. The operation of each relay is defined by:

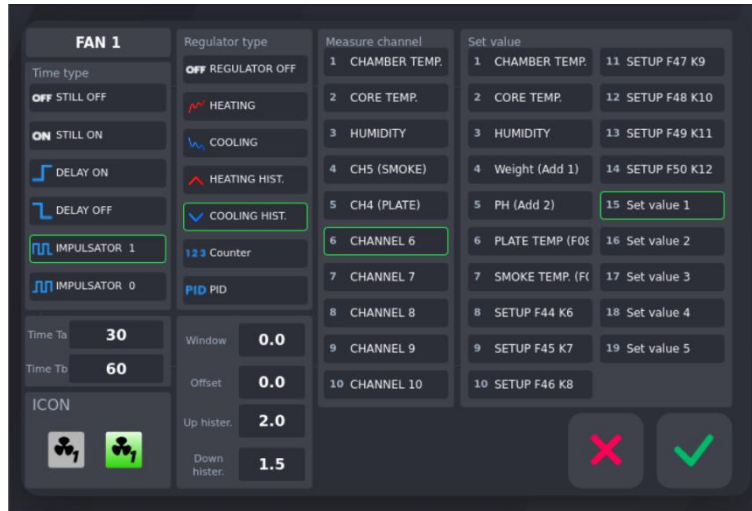
- Name
- Icon
- Time type, and times Ta, Tb
- Regulator type,
- Preset channel
- Measurement channel
- Offset - shift of the controller's set value in relation to the set value in the program
- Window - shifting the level of operation of the algorithm with a dynamic set value
- Up hysteresis
- Down hysteresis

To set these parameters:

- Select the "Outputs setup" function , then "Digital outputs" 
- Select the output you want to configure from the list:



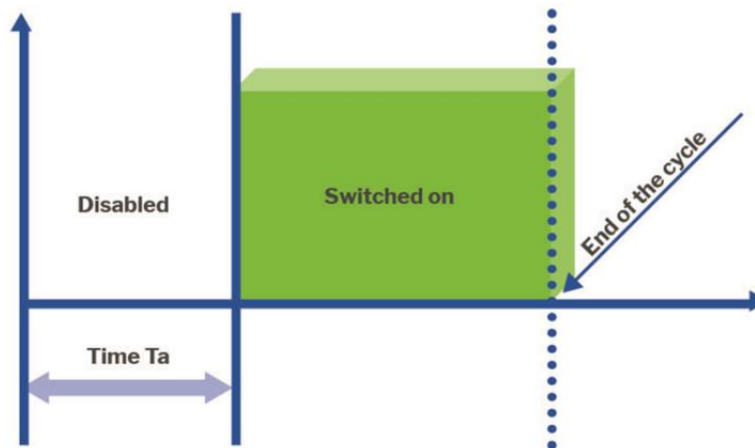
**ATTENTION!** When you start the panel for the first time, the relay list is default, you need to enter the relay names and their settings.



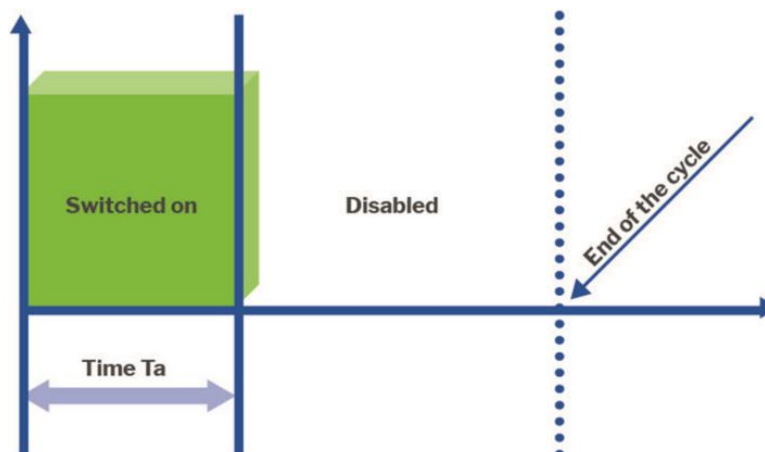
**Timing types of relays operation:**

- always off: the relay is always off
- always on: the relay is on, it works according to the declared time type:

**1. On-delayed, relay turns on after Ta time**

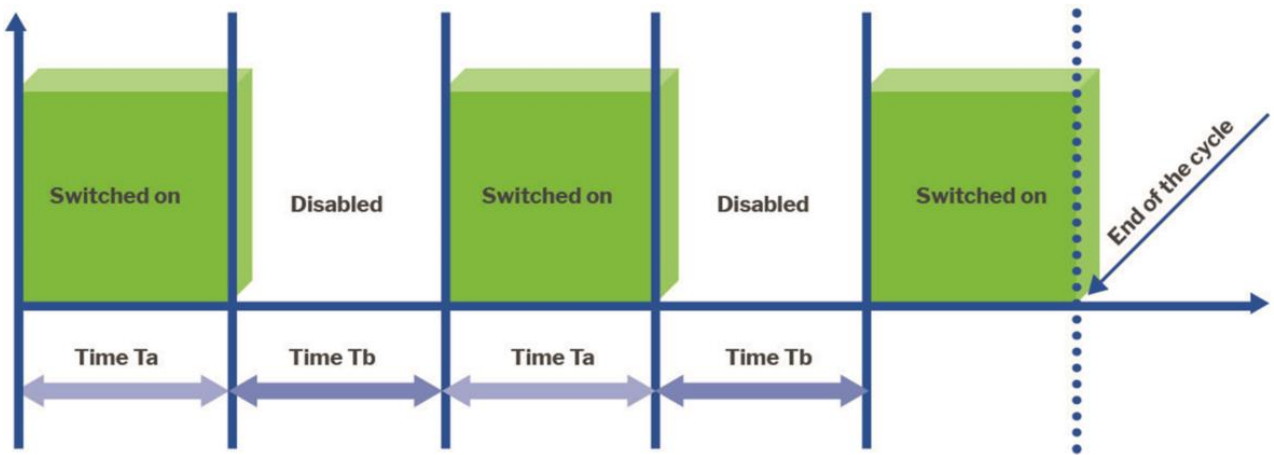


**2. Off delay, the relay turns off after Ta time**

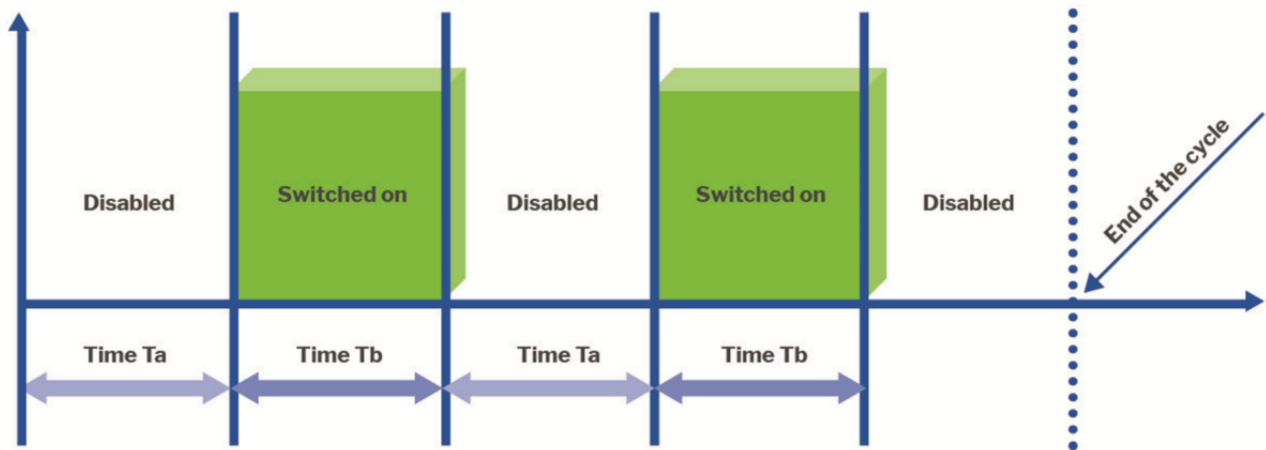


**3. Start pulses =1. The relay turns on and off according to the times Ta and Tb. It starts turned on.**



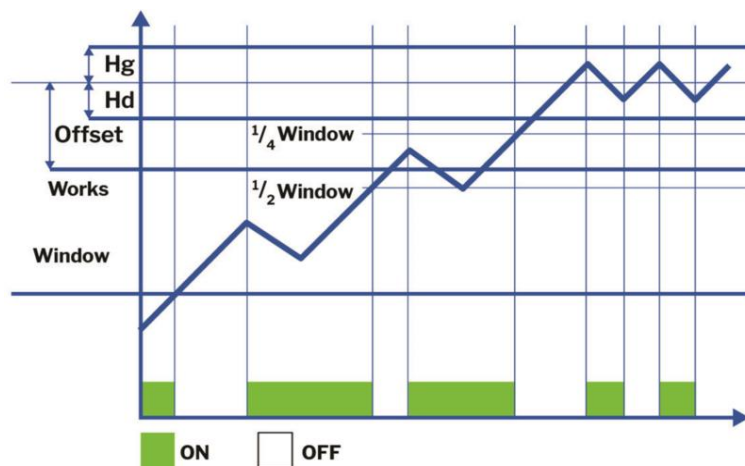


4. Start pulses =0. The relay turns on and off according to the times Ta and Tb. It starts off.

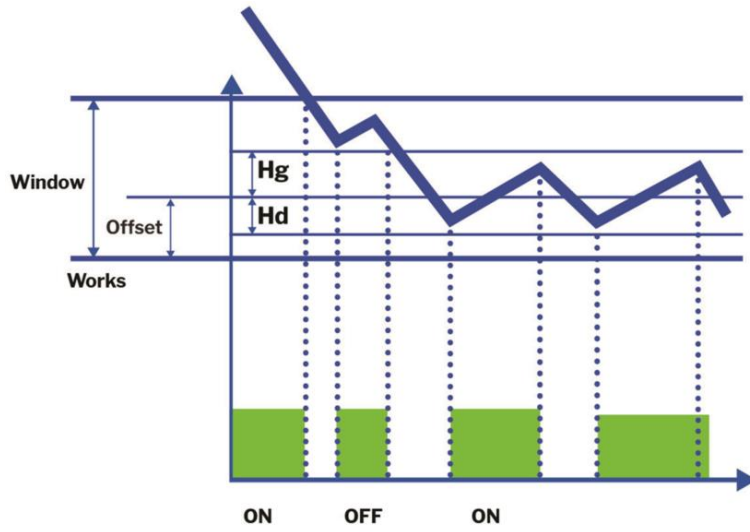


**Regulator types:**

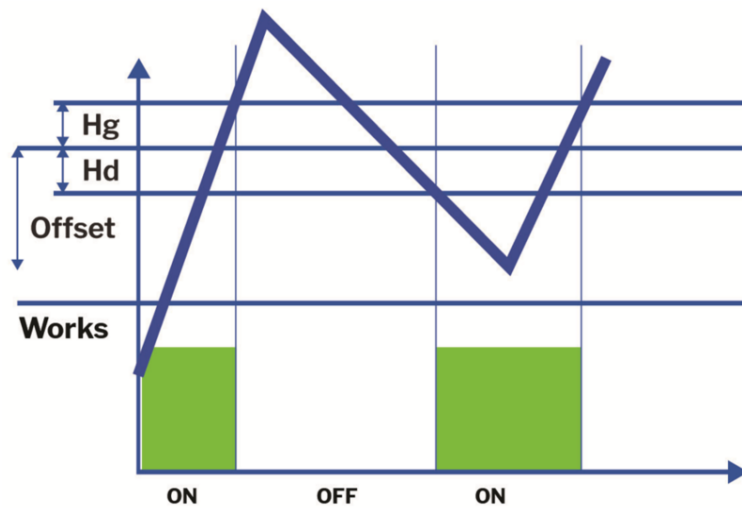
1. Heating access



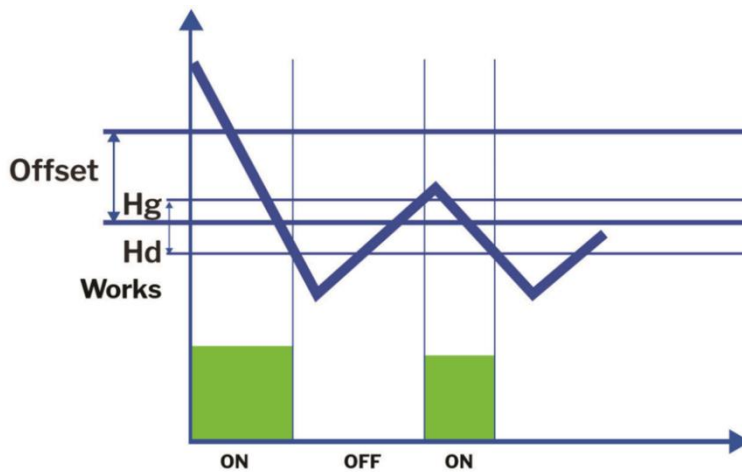
2. Cooling access



3. Heating hysteresis



4. Cooling hysteresis



**5. Pulse counter** - counts pulses from the selected control input

Selection of the number of the control input for the counter is made through the settings in the MEASURE CHANNEL column (In1 ...In10) and the SET VALUE column (1..19).

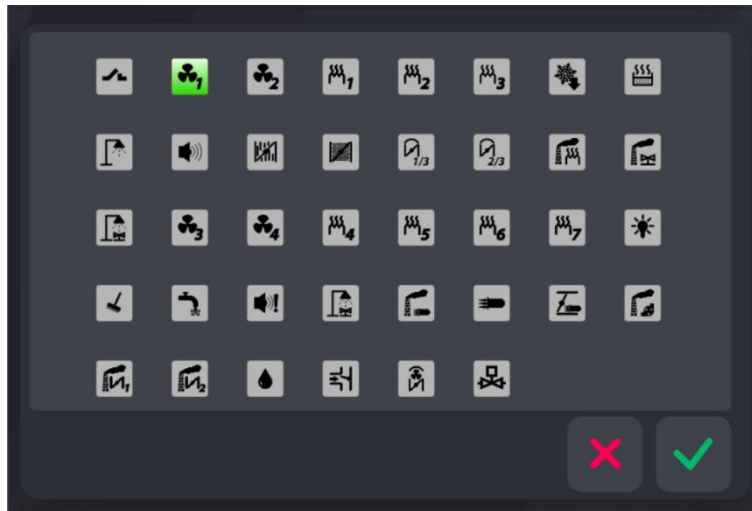
**6. PID** - the relay operates in accordance with the previously configured PID controller



**ATTENTION! In order for the relay to operate in accordance with the regulator, the time type must also be declared.**

**Icon:**

- Click on the relay icon and select the pictogram from the list:

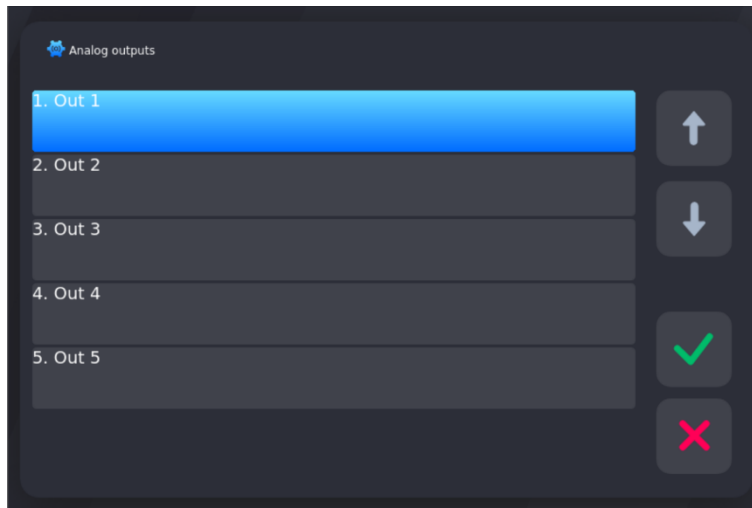


**5.1.2.5.2. ANALOG OUTPUTS**

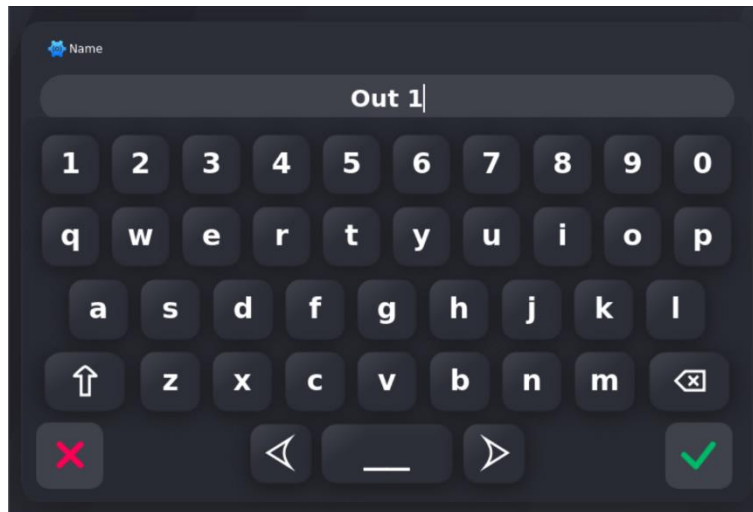
To set parameters of analog outputs:



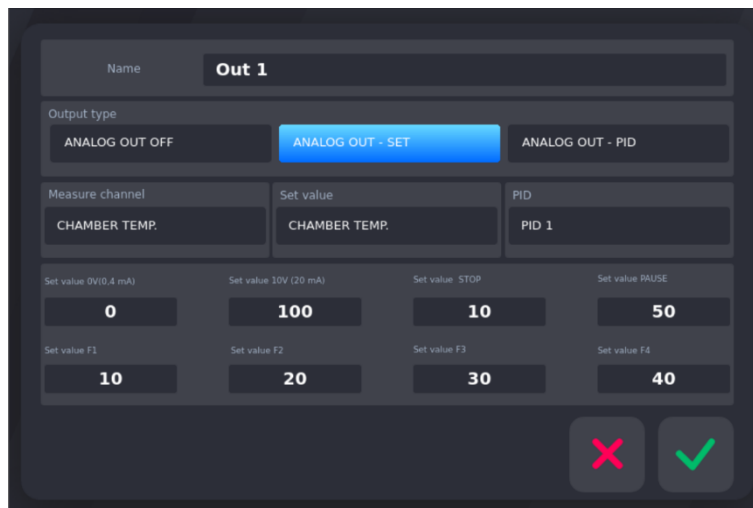
- Select the "Analog outputs" function
- Select one of the five analog outputs



- Enter a name for analog output



- Select the type of work of the analog output




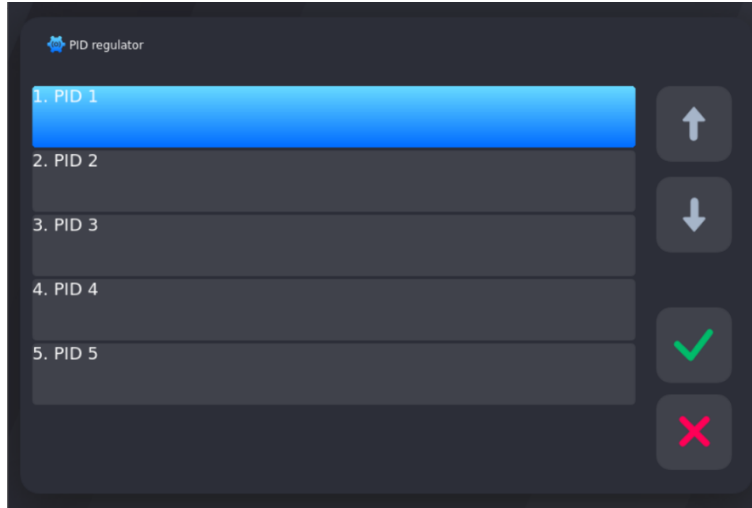
### Analog output work configuration:

1. Output type:
  - ANALOG OUT OFF (Output disabled) – the output is inoperative;
  - ANALOG OUT - SET (Output as a setter) - the adjustment is carried out in relation to the selected measurement channels and the preset channel;
  - ANALOG OUT - PID – regulation is carried out according to the selected PID controller
2. Measure channel - select an item from the list of measurement channels
3. Set value - select an item from the list of set values
4. PID - select an item from the list of defined PID controllers
5. Value for 0V/ 0-4mA point
6. Value for 10V / 20mA point
7. Output settings in special states: STOP, PAUSE
8. Set value for F1-F4 - output values to be issued during the selected special F-state

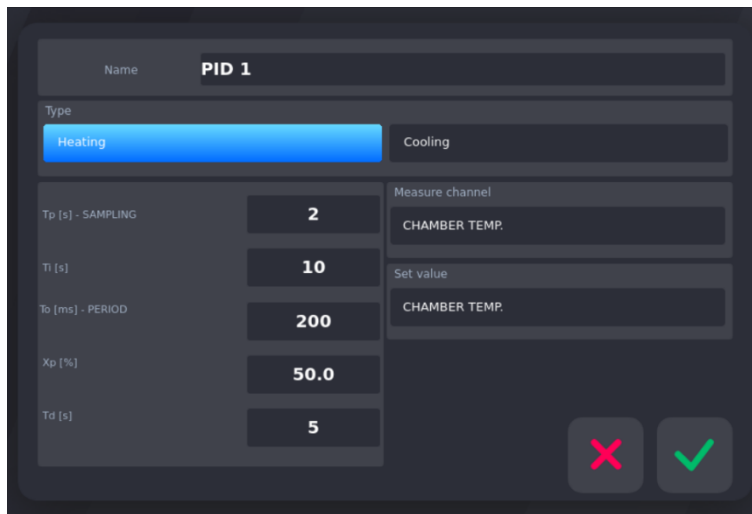
### 5.1.2.5.3. PID CONTROLLER

In INDU iMAX 1000 we can configure 5 settings of the PID controller:


- In the OUTPUTS CONFIGURATION menu, select the icon "PID regulator" . From the list, select the PID you want to configure:



- After selecting a specific PID controller from the list, we go to the configuration options:



- Name
- Type: Heating or Cooling
- Tp - sampling frequency in seconds [s]
- Xp - proportional band in percent [%]
- To - pulse period for digital outputs in milliseconds [ms]
- Ti - integration time in seconds [s]
- Td - differentiation time in seconds [s]
- Measuring channel with respect to which the adjustment will take place
- Preset channel, the value to which the regulator will strive

To confirm a change in the configuration, press the key .

### 5.1.2.5.4. ACTIVATING THE PID CONTROLLER

For the selected digital output to work, the following settings must be configured based on the PID controller:

1. Time type
2. Regulator type - set the PID
3. Measure channel - select the previously configured PID controller (own number)



To confirm a change in the configuration, press the key

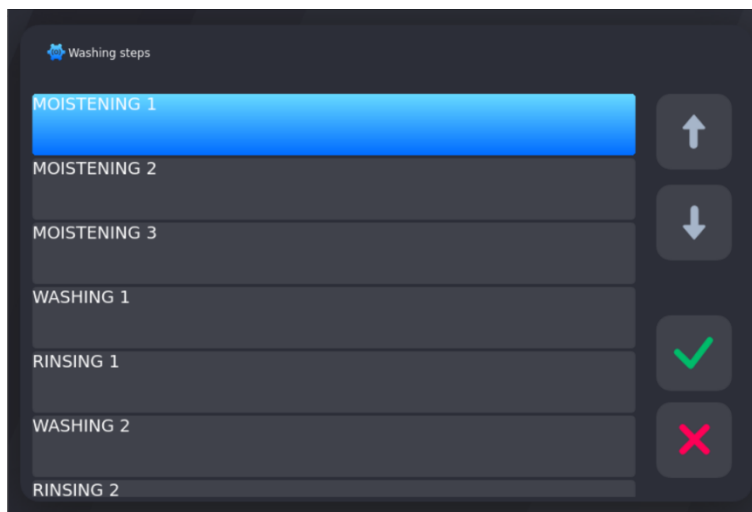
### 5.1.2.6. WASHING STEPS

The "Washing Steps" program (described below) is based on special technological steps, whose parameters are set independently of the technological steps used in normal programs.

To set the parameters of individual steps used in the "Washing" program:



select the "Washing steps" function, proceed in the same way as when programming technological steps (see section: 5.1.2.2 STEP SETUP - SETTING STEPS/CYCLES PARAMETERS).



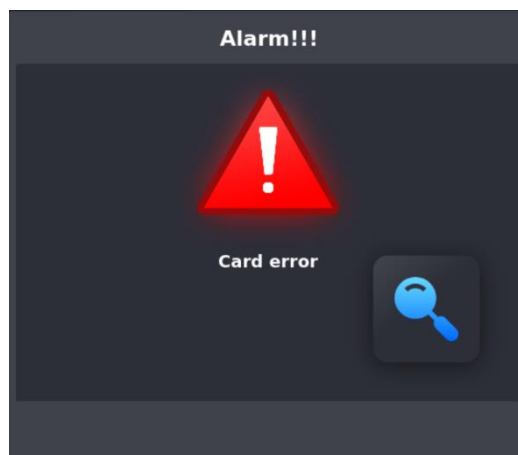
### 5.1.3. SERVICE 2 (Service function 2)

This is where you will find advanced service settings.




#### 5.1.3.1. CARD SEARCH

When starting the panel for the first time or as a result of changing the number or types of connected executive modules (COMBO, WRC) or when not all I/O modules connected to the device have been found, the "Card Error" message will be displayed:



In this case, perform the I/O card search procedure.



To do this, press the "Search for cards" button . The panel will perform a search procedure to update the current configuration of the connected I/O boards.

The card search option is available from Menu/Settings/Service 2 (password required, default password: 123) or displayed automatically after detecting changes in the I/O card configuration.

### 5.1.3.2. OUTPUT TEST - TEST OF DIGITAL OUTPUTS AND INPUTS

In order to test the digital (relay) outputs or digital inputs:



- Select the "Output test" function

Then the defined digital outputs appear on the screen:



By pressing the appropriate key, we manually turn on or turn off a given digital output. The active output is highlighted in green.



The status of the DI digital inputs is displayed at the bottom of the screen. The active input (currently supplied with voltage) is highlighted in green.

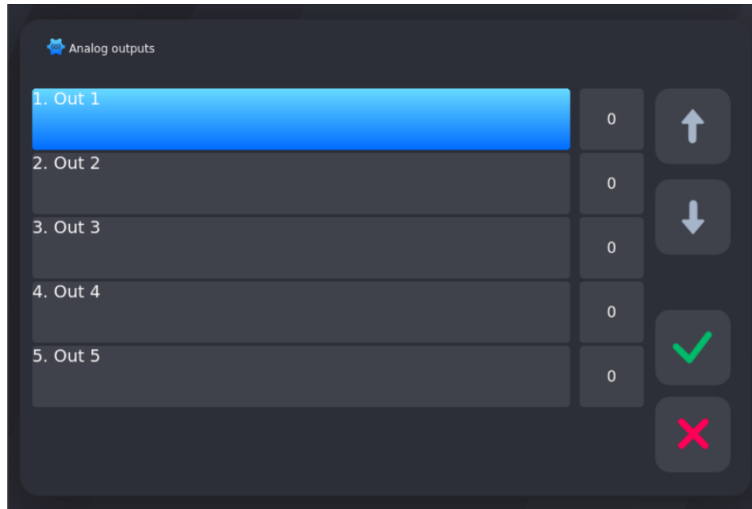
It is possible to connect an external DI-16 input module, which allows the number to be expanded by an additional 16 DI inputs. When F89=1 in the SETUP cell, an additional 16 DI input status lights will be displayed on the screen.




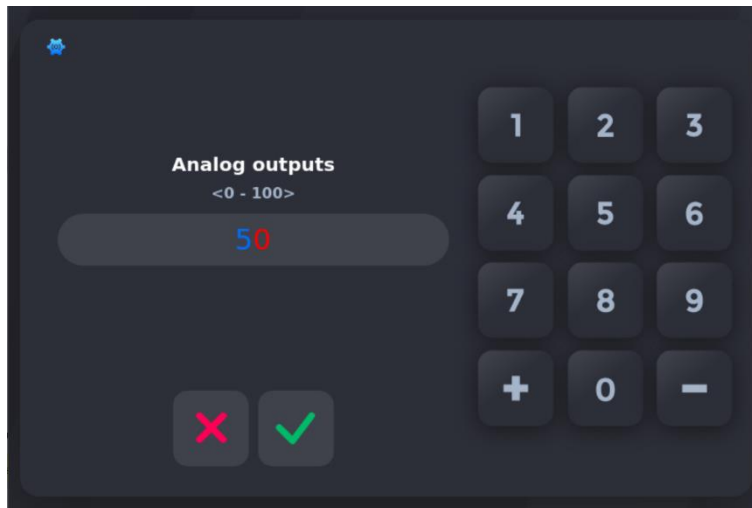
### 5.1.3.3. AOUT TEST - TEST OF ANALOG OUTPUTS

In order to test the analog outputs:

- Select the "AOut test" function 
- Select a specific item from the list and press the "OK" button 




- Set the set value using the numeric keyboard and confirm with the "OK" key 



After this operation, the selected analog output will be set to a current value corresponding to the setting.

### 5.1.3.4. UPDATE

To start updating the INDU iMAX 1000-TC-LX firmware, insert an external data carrier (properly programmed) into the USB port of the

controller and select the functions "UPDATE" .

**NOTE: If necessary, the update data package is prepared by the manufacturer.**

### 5.1.3.5. BACKUP / RESTORE

The controller has the ability to backup and restore data from a backup using a USB drive.

To make a backup copy to a USB drive:

1. Prepare an empty USB flash drive, formatted in the FAT32 file system.
2. Connect the previously prepared Pendrive to the controller's USB port.
3. Press the BACKUP button. Wait until the operation is completed. A BACKUP directory will be created on the Pendrive with a copy of all settings and the software version of the panel from which the copy was made. The backup copy made in this way can be used to transfer data: firmware and configuration to another iMAX 1000-TC-LX series device.

To restore data from a backup on a USB drive:

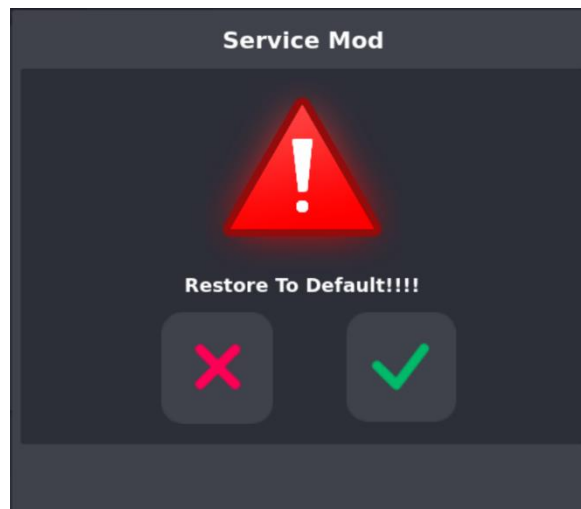
1. Connect a pendrive with a previously made backup copy from another device to the USB port of the controller.
2. Press the RESTORE button. Wait until the operation is completed. Archived data will be uploaded to the panel: software version and device configuration.

### 5.1.3.6. FACTORY RESET

This function allows you to restore the factory settings of the controller. To do this, you need to:



- Select the "Factory Reset"
- Confirmation will be displayed on the screen



- To confirm press "OK"



**ATTENTION! All changes made to the panel will be deleted. The custom start screen logo will be restored to the factory one – MIKSTER.**

### 5.1.4. WASH PROGRAM

To set the configuration of the "Wash program":



- Select the "Wash program" function. The program requires entering the input code (default code: 123).
- Proceed in the same way as when programming technological steps (see section: 5.4 PROGRAM - PROGRAMMING OF TECHNOLOGICAL PROCESSES), the only difference is the possibility to choose from technological steps intended specifically for the "Washing program" and described above.



**ATTENTION! At the first run, the list of steps is default, you need to enter the step names and their settings in the WASHING PARAMETERS section.**

### 5.1.5. START WASHING

To run the washing program:



- select the "Washing start" function



- Confirm with button „OK“

NOTE: Longer pressing the key with the icon of a relay displays his number



## 5.2. MANUAL MODE



In the Manual mode option we have the option of starting a selected step from the program.

Select the step you want to run from the list. Then we enter the values that the controller signals to us by clicking on their window.



Enter the required value, confirm with button "OK".

## 5.3. AUTOSTART - AUTOMATIC STARTING OF THE PROCESS

The INDU iMAX controller allows you to run the program at any set date and time. To set the autostart time:



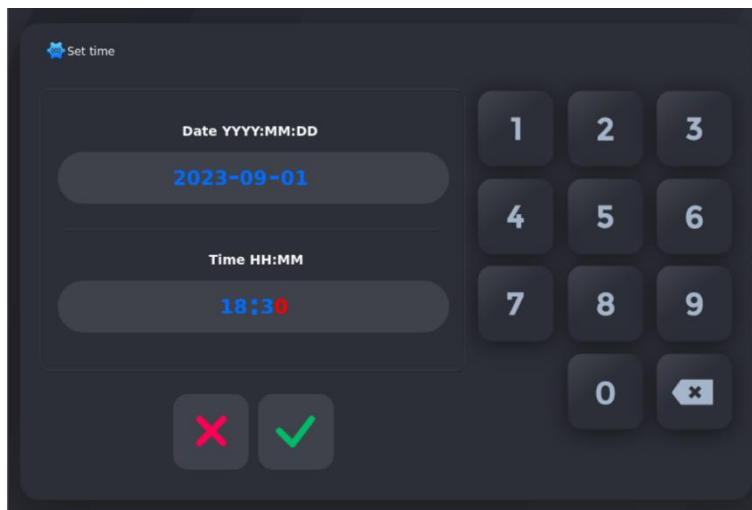
- press a key „Autostart“
- select the program to run:



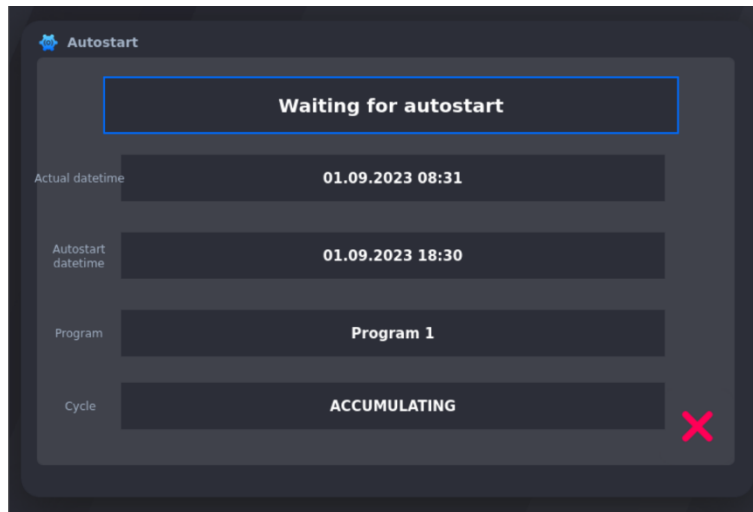
- select a step and confirm with button "OK"



- enter the date and time of the process start, then Confirm with the button „OK“



At the specified time, the controller will automatically start the execution of the appropriate program from the first step. While the controller is waiting for the process to start, no changes can be made to the settings.



You can cancel the automatic start of the process by pressing the "CANCEL" key

#### 5.4. PROGRAM - PROGRAMMING OF TECHNOLOGICAL PROCESSES

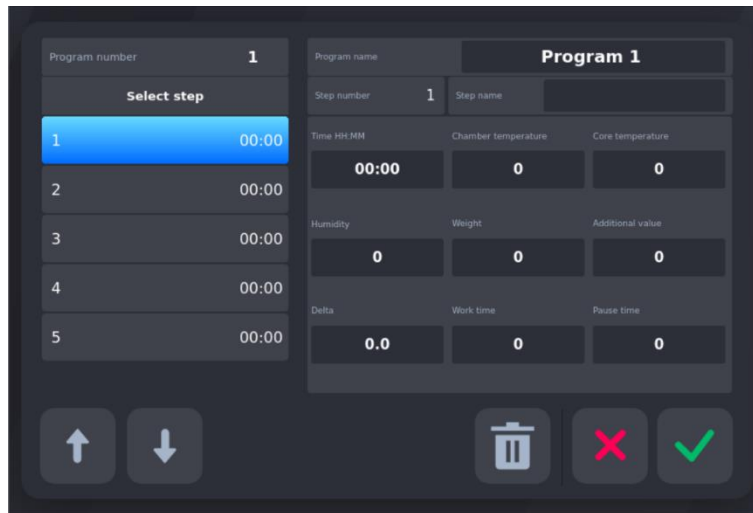
To create a new program or edit an existing one:



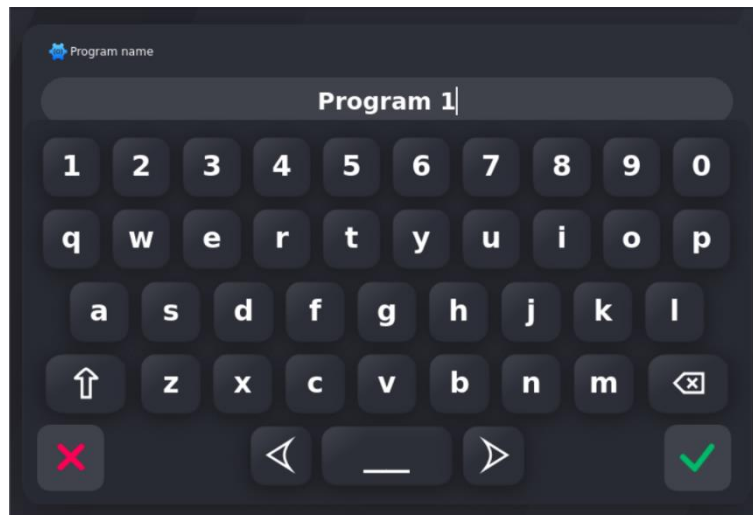
- Press the "Program" key
- A request for a password will appear, enter the password (default password: 123) and confirm with the button "OK"
- Then select the program you want to edit from the program list:



**ATTENTION!** When you start the panel for the first time, the list of programs is default, you need to enter the program names and their settings.



- First enter the name of the program (click on the current name of the program)




- Confirm with the button „OK”



#### Then edit the program:

- In the "Select step" column, select the step that will be edited.
- After pressing the "Step name" bar, select the cycle from the list that will be assigned to the edited program step:



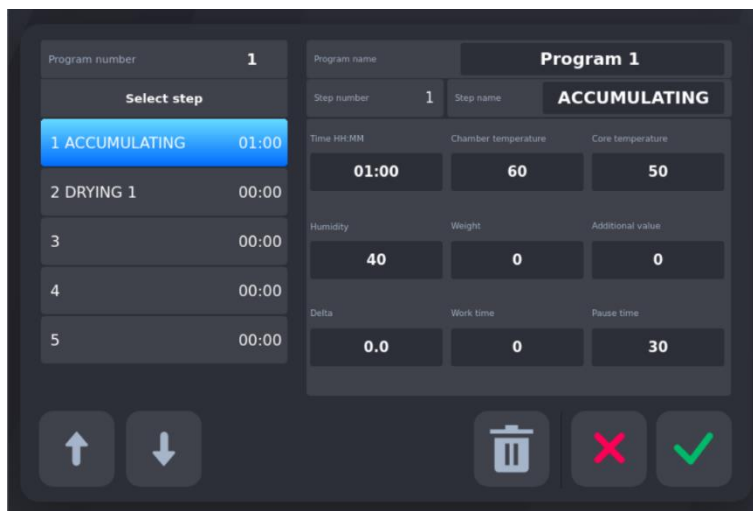
- Confirm with "OK" 


**Then enter further parameters:**


- Set step time
- Set chamber temperature
- The set temperature of the bar
- Set humidity
- "Delta" parameter  
 INDU iMAX has the ability to adjust the chamber temperature increase as a function of time [°C/min] (fish smoking technology) or the chamber temperature increase as a function of the bar temperature [Tk/Tb] (temperature difference brewing).  
 The method of implementing the temperature increase control algorithm is specified in the SETUP menu by setting cell F10 - DELTA STATUS (0 - "Delta" disabled, 1 - "Delta" bar-chamber, 2 - "Delta" temperature increase over time).  
 If "Delta" = 0.0 - no temperature increase control is performed.

If cell F60 has been set in Setup (F60-ADDITIONAL SET = 1), then the following parameters must also be set:

- Weight (Additional value 1)
- Additional value (Additional value 2)



After completing the above steps, editing a specific Step in a given Technology Program has been completed. The introduced changes should be confirmed by pressing the "OK" button . The Step parameters were saved in the edited program.

Then, edit the next steps on the list of a given Program or finish editing the Program by pressing the "CANCEL" button .

## 5.5. LOGIN - USERS

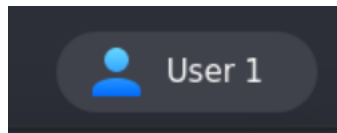
In the panel, you can activate the operator identification function.

To do this, set 1 in the setup F19 cell (OPERATOR ON/OFF)

From now on, launching processes on the panel will be possible only after the operator logs in.

In the login function, we can enter 100 users (0, 1, 2, .. , 99) and assign a separate password for each of them.

The number of the currently logged in operator can be seen in the User bar.

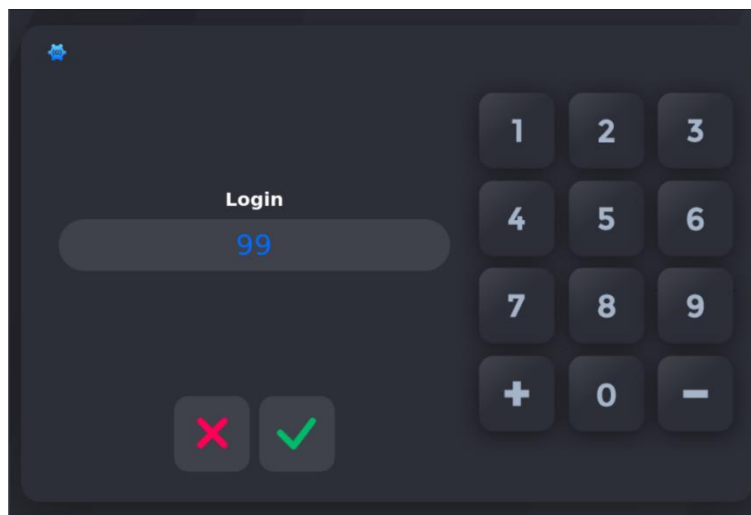


**NOTE: To log out, select operator 0.**

### Setting up a new operator:

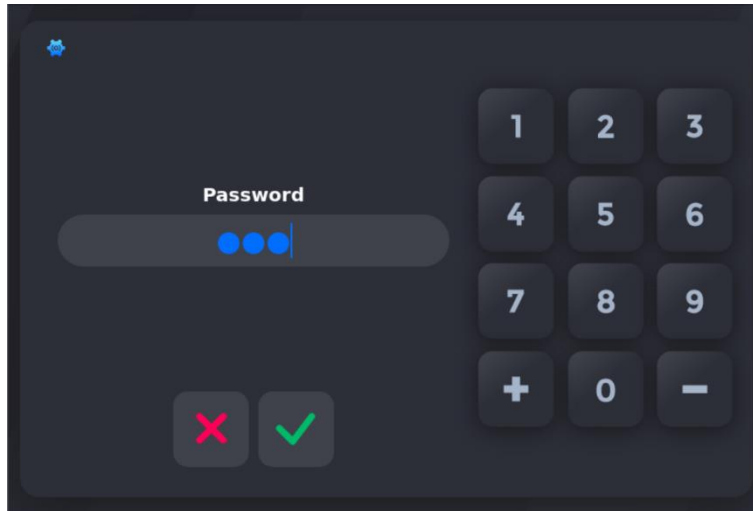


- Press the Login button
- Enter the operator number:

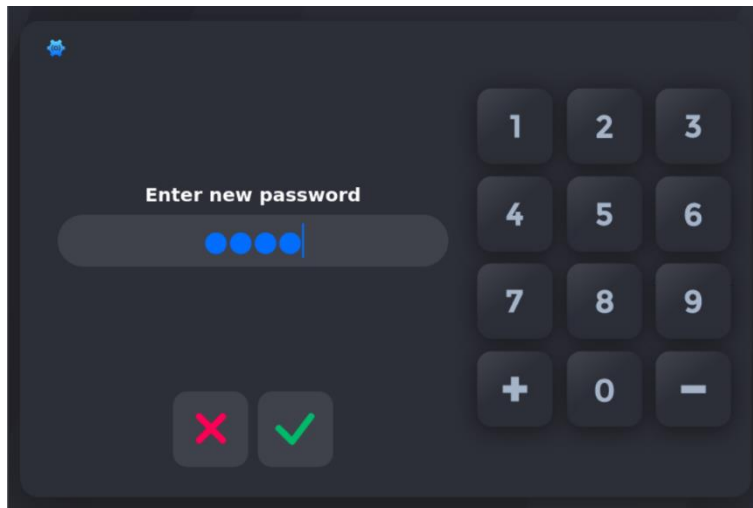


- Enter password, default password: 123  
To set a new password, enter your current password, click on "Password" to assign a new password to the operator. The password may consist of max. 4 digits.

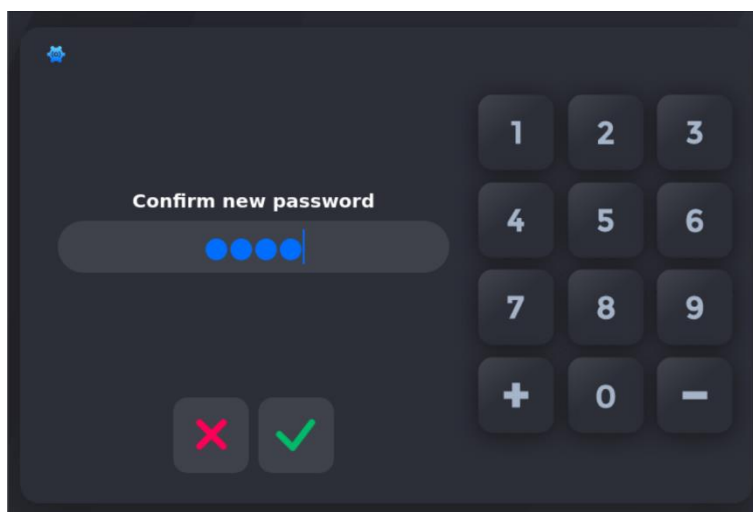




- Enter new password






- Confirm the new password:



To change the existing password, first enter the old one, then press the word Password and enter the new one, similarly as when assigning a new password.

The logged in user has the option of blocking the controller during operation so that no unauthorized changes are made.

To do this, press the open padlock icon , when we do this all buttons on the screen will be locked. To remove the lock, press the closed padlock icon again , after which you will go to the Login screen Enter the password and confirm it by key .




**ATTENTION! The lock can be removed only after entering the password of the logged-in user.**


## 6. START - EXECUTION OF THE PROGRAM STORED IN MEMORY

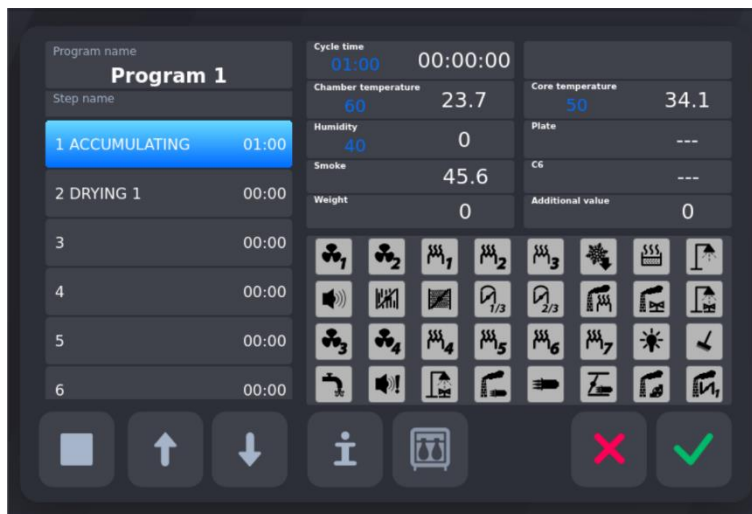
If the previous process has been completed or it is the first run, then the process is as follows:


In order to execute a program previously saved in the controller's memory, it is necessary to:

- press the "Start" key  from the MAIN SCREEN or MAIN MENU:





- Then select Program from the list and confirm with the button 



- press the "OK" key  to launch process
- By default, Step 1 in the list is selected. If necessary, select the step from which the Program should be launched. Start the program by pressing the key
- Looping.  
If a value in the range 2..200 is set in the Setup F70 cell (LOOP PROG.STEPS.), the program will be executed a specified number of times. If the value "-1" is set, the program is executed in an infinite loop. Setting the value "0" or "1" will execute the Program once.

## 6.1. EDITING THE SET PARAMETERS DURING THE CONTROLLER OPERATION


It is possible to correct previously set parameters during program execution by the controller. To do this, you should (during the implementation of the program):

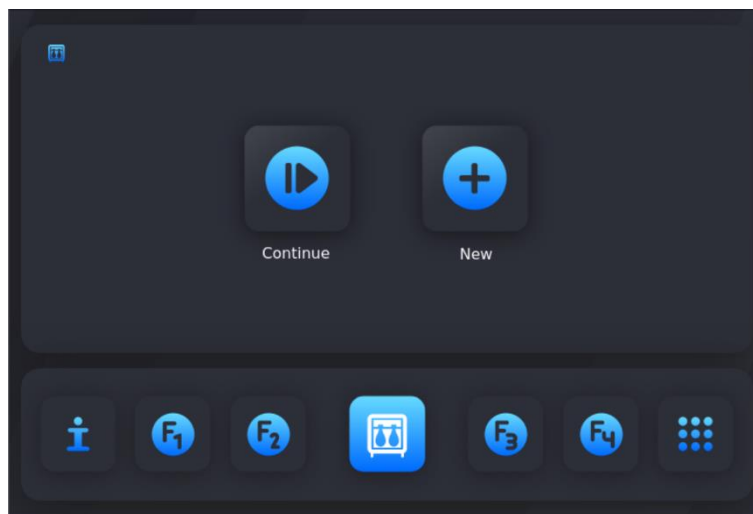
- Press the "EDIT" key 
- If necessary, change further parameters
- After making all the changes, press the "OK" button 



**ATTENTION! The changes introduced during the operation of the controller are valid only until the end of the technological process. After the program is completed, the controller "remembers" the program with the data set during the programming process. When editing the program data, the time countdown and the check of the cycle end condition are suspended. The controller automatically returns to the normal operating mode if no key is pressed for one minute.**



If the process has been interrupted (stopped with the "STOP" button ) , it can be resumed or continued, call up the panel

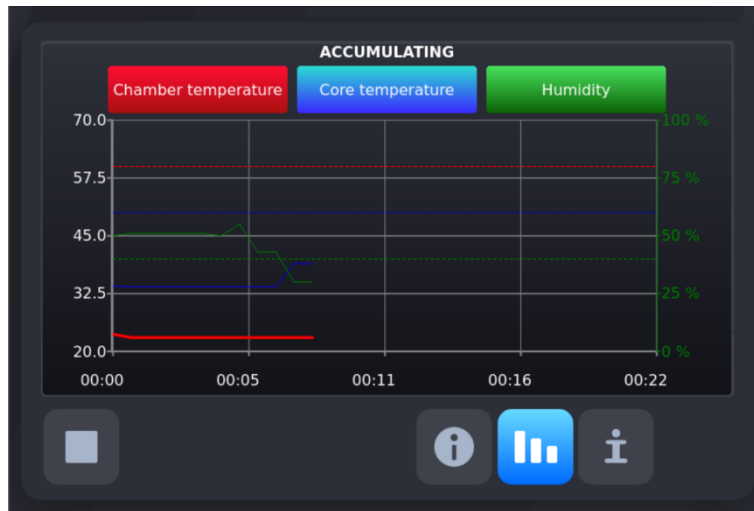
below by selecting the key "Continue"  :



If the "Continuation" of the program option is selected, the controller will automatically start the program execution from the point where it was interrupted, and if the "New" process option is selected, proceed in accordance with the point: START - EXECUTION OF THE PROGRAM STORED IN MEMORY.




During the process, the set and read parameters as well as the status of individual relays are visible on the screen. It is possible to present parameters (chamber temperature, bar temperature, humidity) graphically using a graph. To display the graph on the screen, press the

button  . To return to the screen with parameters, press the "i" button  .



## 6.2. STOP - STOPPING THE EXECUTION OF THE PROGRAM


You can also interrupt program execution temporarily:

- Press the "PAUSE" key .
- The controller stops the execution of the program and the diode next to the "PAUSE"  key lights up.
- The program is resumed by pressing the "PAUSE"  key again, or after the pause time has elapsed (set during the controller configuration - described in another part of the manual).

If the program does not end naturally, it can be continued from where it was stopped.

## 6.3. PRODUCT IDENTIFICATION

If the value 1 is set in the Setup F18 cell (ID ON/OFF), then each time the program is started, we can specify up to twelve different identifiers of the process being executed. Identifiers are managed in the MPC4 program. After entering all selected IDs, press

the "OK" button .