

Industrial Microprocessor Controller



INDU-22

*Intended for;
Vacuum devices*

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1. Table of Contents

| | |
|--------------------------------------|----|
| 1. <i>Table of Contents</i> | 2 |
| 2. <i>Applications</i> | 3 |
| 3. <i>Front Panel</i> | 3 |
| 4. <i>Technical Data</i> | 4 |
| 5. <i>Controller Operation Modes</i> | 5 |
| 6. <i>Process Start</i> | 6 |
| 7. <i>Process Stop</i> | 6 |
| 8. <i>Preset Value Editing</i> | 7 |
| 9. <i>The Auto-Start Mode</i> | 8 |
| 10. <i>Info</i> | 8 |
| 11. <i>User's Settings</i> | 9 |
| 12. <i>Keyboard Interlock</i> | 9 |
| 13. <i>Setup</i> | 9 |
| 14. <i>Alarms</i> | 11 |
| 15. <i>Example Application</i> | 12 |
| 16. <i>Description of Terminals</i> | 12 |

2. Applications

Primary application of the INDU22 Controller is to control equipment according to a time algorithm through cyclic turning on and off actuators. One of typical applications of the INDU22 Controller is to supervise vacuum mass devices.

The idea of the Controller operation is cyclical repeating of the following phases:

- Phase 1: for preset time high state at the Rel2 output (e.g. revolutions left)
- Phase 2: preset pause time
- Phase 3: for preset time high state at the Rel3 output (e.g. revolutions right)
- Phase 4: preset pause time
- Shift to Phase 1

Maximum process duration: 9999 hours

Maximum phase duration: 999 hours

3. Front Panel

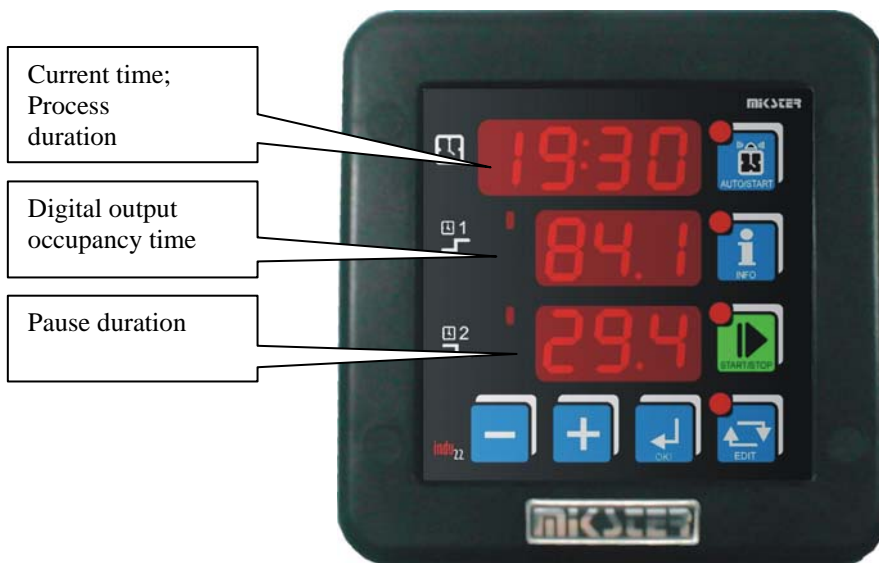


Fig.: INDU22 Controller front panel

4. Technical Data

| | |
|-------------------|--|
| Display | LED ½" x 4 digits LED ½" x 3 digits LED ½" x 3 digits |
| Power supply | 230 (optional 24,110) VAC ± 10% |
| Keyboard | 7 keys (micro switch) |
| Inputs | 2-digit, zero potential: Control inputs: closing (normally open) to system ground Maximum resistance of closed contact: 100 Ω Minimum resistance of open contact: 10000 Ω |
| Outputs | 1 relay output; normally open contactor (250 VAC/8A) 4 switching relay outputs (250 VAC/8A) |
| Protection class | IP65 (from front) |
| Power consumption | 3 W |
| Auto-start | Possibility to activate process at selected hour or after preset time |

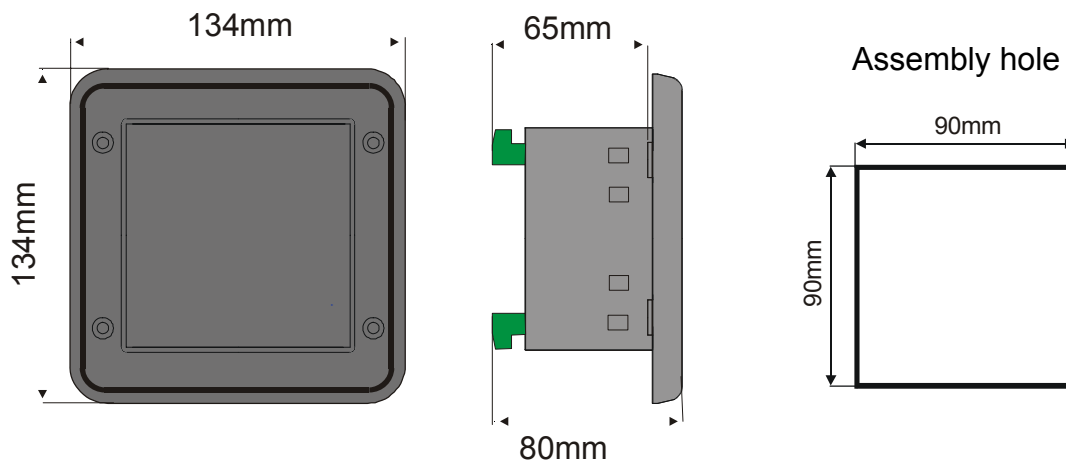
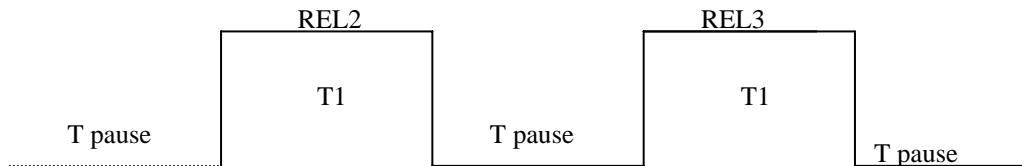


Fig. Casing – overall dimensions

5. Controller Operation Modes

The Controller may operate in one of the following modes:

- **START Mode:** When in the Start Mode, the Controller cyclically switches over the REL2 and REL3 relay outputs according to the following illustration:



Time parameters T1, T pause may be set in the Edit Mode, providing possibility to make corrections during the process.

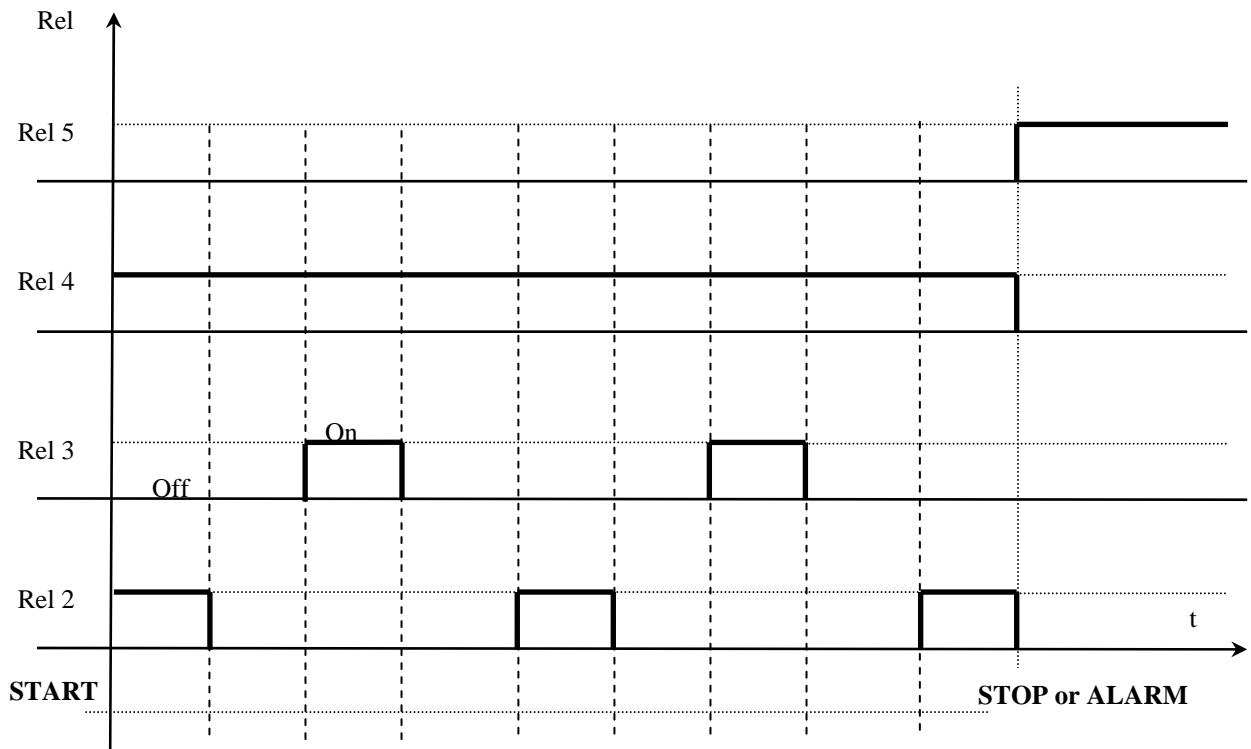
START Mode is announced by blinking diode at the START button.

- **STOP Mode:** after termination of the START Mode word STOP appears on upper display and sound signal is generated. Press the STOP key in order to switch to the STAND-BY Mode.
- **STAND-BY Mode:** when in this Mode, the Controller waits for restart of the START Mode. Current hour and minute is shown on upper display.
- **AUTOSTART Mode:** allows to program activation of the START Mode at given hour or after preset time. The AUTOSTART Mode is signalled by blinking of diodes located at the START and AUTOSTART keys.

6. Process Start

Press the START key in order to activate the process. Activation of the START Mode is announced by blinking of diode in the START key.

All the time when in the START Mode, the REL4 output is busy and time remaining until the end of the START Mode is displayed on upper LED display.



7. Process Stop

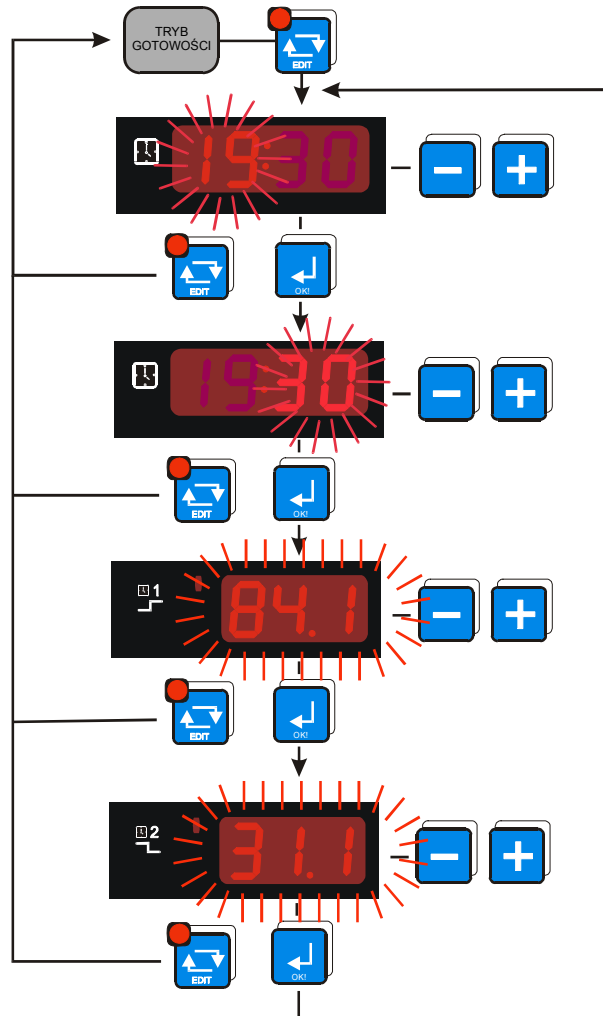
It is possible to interrupt the START Mode at any time by pressing the STOP key.

STOP will appear on the display and the REL5 output will be busy.

Press the OK key for confirmation. The Controller automatically quits the STOP Mode when time preset in the F12 SETUP cell passes. Time is expressed in minutes.

8. Preset Value Editing

EDIT Mode permits to edit preset values. Press the EDIT key in order to enter the EDIT Mode. Change settings using the PLUS / MINUS keys. Move to the next parameter using the OK key. When the EDIT key is pressed again, the unit quits EDIT Mode.



Preset values:

- Step duration
- Digital output occupancy time
- Pause duration

Preset values may have the following formats:

Step duration:

- hours (range from 0 to 9999)
- hours : minutes (range: 99:59)
- minutes : seconds (range: 99:59)

Digital output occupancy time and pause duration

- hours (range from 0 to 999)
- minutes (range from 0 to 999)
- seconds (range from 0 to 999)

It is also possible to change preset values while the process is running (if cell no. 11 is set at 1 in the Setup).

Original values are edited and the Controller updates changes as they come.

As soon as the START Mode is finished, all settings will be reset to their original values (set prior to activation of the START Mode).

COMMENT: Access code to editing is the same as for user's settings.

9. The Auto-Start Mode

The Controller permits to activate the START Mode with a delay. In order to do so press the AUTOSTART key (diode located at the key blinks). Depending on the Setup SF2 cell – format of the AUTOSTART Mode parameters, enter the Auto-Start Mode parameters. Edit parameters using the PLUS / MINUS keys, switch to the next parameter by pressing the OK key.

Press the START key in order to activate the Auto-Start Mode (it is indicated by simultaneous blinking of the AUTOSTART and START diodes).

It is possible to move immediately from the Auto-Start Mode to the Start Mode by pressing the START key, or to interrupt the Auto-Start Mode by pressing the AUTOSTART key.

10. Info

Press the INFO key to display information, which depends on current Controller operation mode:

For the Start and Stand-by Modes: preset parameters are displayed;

For the Auto-start Mode: depending on the Setup SF2 cell:

if SF2=HM – number of hours and minutes to the Start Mode

if SF2=HMD – preset hour, minute (twenty-four hour delay), at which the Start Mode will be activated

Press INFO key to leave the Info Mode.

11. User's Settings

In order to enter user's settings press and hold the MINUS key, and then press PLUS. UF x will appear on the display, which informs about cell number. Press the PLUS / MINUS keys to change cell. Enter Edit by pressing the OK key.

Available cells:

UF 0 – real time clock setting: press the PLUS / MINUS keys to change value,
Press the OK key to switch to the next clock parameter.
Press the EDIT key in order to quit editing.

Description of clock parameters:

Ho – hour
Mi – minute
Ye – year
Mo – month
dA – day

UF 1 – change of access code to user's settings: 0 off, range: 1..9999

UF 2 – information on current software version

UF 3 – keyboard click on / off

UF 3=0 - off
UF 3=1 - on

12. Keyboard Interlock

When configuring one control input as keyboard interlock (cell no. 5 and 6 in the Setup), it is possible to preclude access to equipment settings to unauthorized persons. This increases safety of work, especially in case of long-term processes.

If any key is pressed when keyboard interlock is on, the display will show BLOC. In order to unlock keyboard (depending on selection made in the Setup) it is necessary to close or open given control input.

13. Setup

In order to enter the Controller Setup settings press and hold the MINUS key, and then press EDIT. The display will show message Fx informing about the Setup cell number. Change cell number using the PLUS / MINUS keys. Press the OK key to edit given cell. Press EDIT to quit editing.

Description of Setup cells:

| Cell number | Default value | Range | Description |
|-------------|---------------|-------------|--|
| F0 | 1 | 0..247 | Address in the MODBUS network |
| F1 | 0 | 0..4 | Transmission speed: 0 – 9600 1 – 19200 2 – 38400 3 – 57600 4 – 115200 |
| F2 | HMD | HMD / HM | Format of the AUTOSTART Mode parameters HMD – hour, minute and twenty-four hour time-lag, when START HM – number of hours and minutes until the START Mode |
| F3 | 5 | 0..10 hours | Maximum time in hours, after which (past power stoppage) the Controller does not return to the START Mode |
| F4 | 0 | 0..9999 | Access code to the SETUP settings 0 – off |
| F5 | 0 | 0..4 | Servicing of control input 1: 0 – servicing off 1 – alarm when closed 2 – alarm when open 3 – keyboard interlock when closed 4 – keyboard interlock when open |
| F6 | 0 | 0..4 | Servicing of control input 2: 0 – servicing off 1 – alarm when closed 2 – alarm when open 3 – keyboard interlock when closed 4 – keyboard interlock when open |
| F7 | 1 | 0..2 | Time base for parameter: Process duration 0 – HHHH 1 – HH:MM 2 – MM:SS |
| F8 | 0.2 | 0..2 | Time base for parameter: Relay occupancy time 0 – seconds 1 – minutes |

| | | | |
|-----|-----|--------|--|
| | | | 2 – hours |
| F9 | 0.2 | 0..2 | Time base for parameter: Pause duration 0 – seconds 1 – minutes 2 – hours |
| F10 | 0 | 0..1 | Phase, at which the START Mode will activate: 0 – pause phase 1 – relay occupancy phase |
| F11 | 1 | 0..1 | Permission to edit in the START Mode 0 – no permission 1 – editing permitted |
| F12 | 30 | 0..255 | Time in minutes, after which the Controller will automatically switch from the STOP Mode to the Stand-by Mode 0 – quitting the STOP Mode after confirmation with the OK key |

14. Alarms

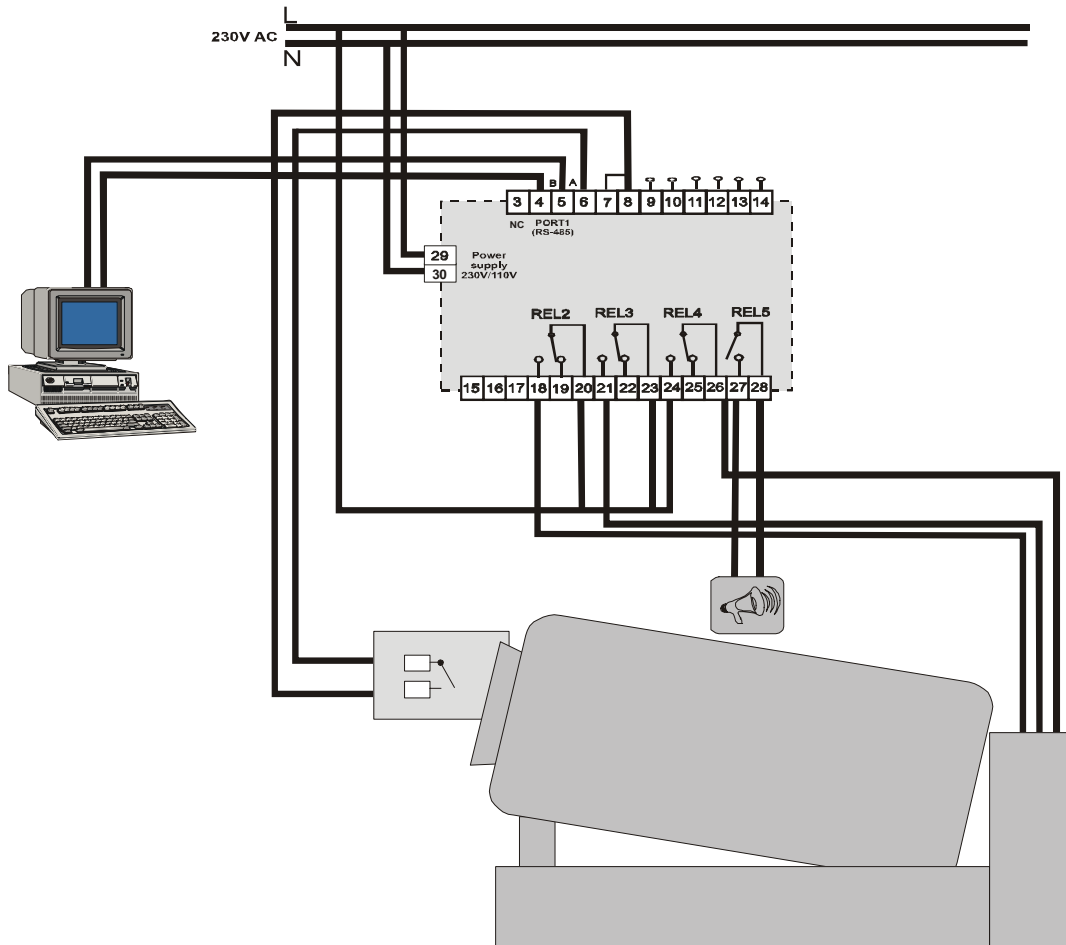
Err 1 – alarm from control input 1
Err 2 – alarm from control input 2

The Controller is equipped with two control inputs. In case of activation (in the Controller Setup) of alarm for a given input and occurrence of an alarm situation, the process will be stopped, and the display will show information concerning the event. Occurrence of an alarm situation shall be confirmed with the OK key. The Controller will signal the alarm again, unless failure cause is removed.

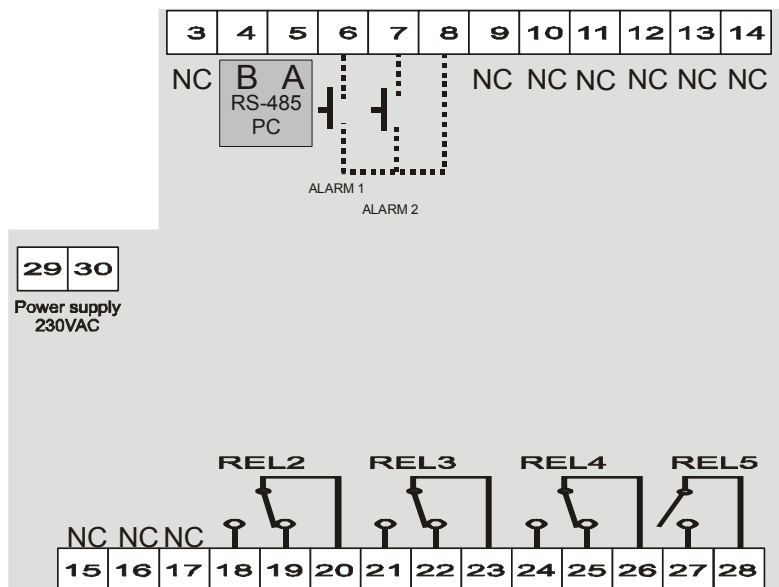
It is possible to enter the Controller Setup and turn off service of a given alarm during alarm signaling.

Configuration of alarm event servicing: in the Setup SF5 and SF6 cells.

15. Example Application



16. Description of Terminals



Notes

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