Pulsar®

AWZ516
v.2.1

PC1
Time relay module.

Edition: 4 from 15.01.2015
Supersedes the edition: 3 from 22.06.2012

EN*

Features:

- 10 ÷ 16V DC power supply
- 18 time-logic programs
- The range of measured times: up to 100 hours
- High precision time measurements
- High load capacity of relay contacts
- LED display
- Three function buttons
- Activated by plus "S +" or mass "S-"
- Reset input activated by mass "R-"
- Optical indication of power supply and relay output status
- The possibility of implementing additional time-logic programs
- Warranty - 2 year from the production date

TABLE OF CONTENTS.

The time module is factory set to PR0 program mode with active REL relay.

1. General description.

The PC1 time module is a transceiver allowing execution of time-logic programs. The device is characterized by versatility, high accuracy of the measured time based on the crystal oscillator and the possibility of its precise and repeatable adjustment. The relay can be used to extend short control impulses, e.g. controlling the operation locks, electromagnetic jumpers, bistable control, etc. The relay is used in automation and control circuits and access control projects, with logical dependencies on the state of: the controller, door opening sensor (reed switch), exit button, etc.

2. Components arrangement.

The figure below shows the arrangement of the most important components and connectors of the relay module.
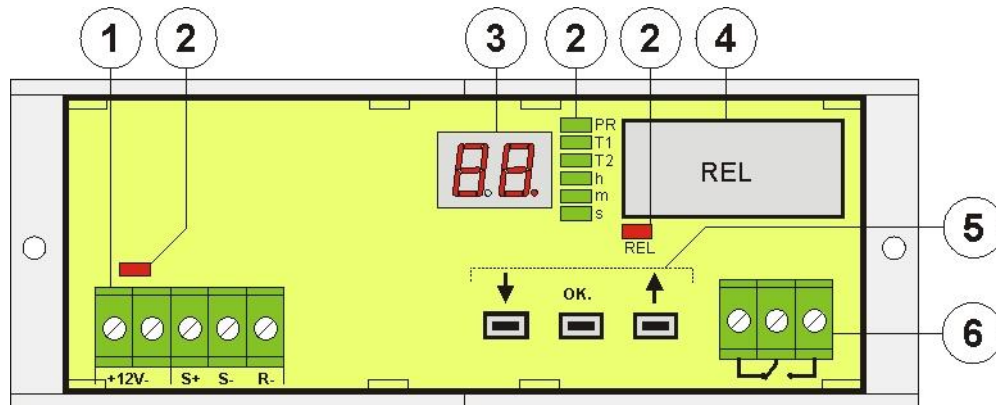

Fig. 1. The module's view.

Table 1. The description of components and connectors of the module.

Number [Fig. 1]	Description
①	**Connector:** **+12V-** - the module's power supply, DC voltage **S+** - control input supplied by the positive power supply **S-** - control input activated by negative power supply (ground) **R-** - reset input activated by negative power supply (ground)
②	**LEDs** – optical indication **red** – supply voltage **REL** – ON, relay on **PR** – blinking – programming mode, ON – previewing the current mode **T1** – time indication T1 **T2** – time indication T2 **h** – hours indication (0-99h) **m** – minutes indication (0-59m) **s** – seconds indication (0-59s)
③	**LED display.**
④	**Relay**
⑤	**Buttons** ↓ - Decreasing the parameter, move down one level in the menu ↑ - Increasing the parameter, move up one level in the menu **OK.** - Confirm the settings
⑥	**The REL relay connector** CAUTION! Connector pin-out in the figure 1 shows the potential-free status of the relay.

3. Programming the time module.

i If there is no action for more than 30 seconds when changing the parameters settings, the module automatically exits the programming mode without saving the changes.

1) Press the ▼ and ▲ buttons simultaneously for 5 seconds to enter the programming mode.
The „PR" LED will blink and the number of currently saved program will be displayed.
2) Use the ▼ or ▲ buttons to select the desired program number. Confirm by pressing "OK." button.

▲ + ▼ ← 5s

3) Use the ▼ or ▲ buttons to set the „T1" time (hours). (when required).
The „T1" and „h" LEDs are ON.
Confirm by pressing „OK." button.

4) Use the ▼ or ▲ buttons to set the „T1" time (minutes).
The „T1" and „m" LEDs are ON.
Confirm by pressing „OK." button.

5) Use the ▼ or ▲ buttons to set the „T1" time (seconds).
The „T1" and „s" LEDs are ON.
Confirm by pressing „OK." button.

6) Use the ▼ or ▲ buttons to set the „T2" time (hours) (when required).
The „T2" and „h" LEDs are ON.
Confirm by pressing „OK." button.

7) Use the ▼ or ▲ buttons to set the „T2" time (minutes).
The „T2" and „m" LEDs are ON.
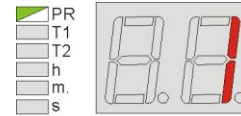Confirm by pressing „OK." button.

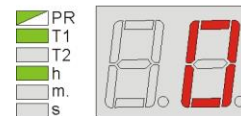8) Use the ▼ or ▲ buttons to set the „T2" time (seconds).
The „T2" and „s" LEDs are ON.
Confirm by pressing „OK." button.

9) The scrolling message „ready" - indicating readiness for operation of the module according to the selected mode and preset times – will be displayed
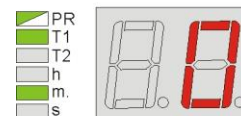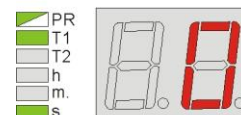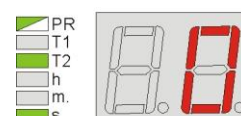
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4. Preview - the parameters of currently set program.

The program number and time module parameters can be checked by pressing the OK button for 3 seconds. The "PR" LED will light up and the number of the currently set program will be displayed.

Use the ↓ or ↑ buttons. The information about the current time parameters of the program - according to the diagram in Chapter 3: "Programming the time module" – will be displayed.

The Preview Mode is disabled once the OK button is pressed again or after 5 seconds of inactivity.

5. Previewing the status.

During normal operation, it is possible to preview the time module operating status. Press the ↓ or ↑ button; the following information is displayed as follows:

Countdown timer - hours
The "h" and "T1" or "T2" LED is ON
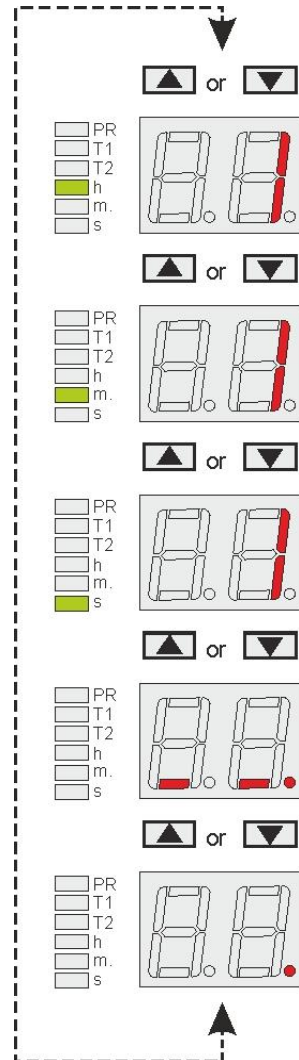
Countdown timer - minutes
The "m" and "T1" or "T2" LED is ON

Countdown timer - seconds
The "s" and "T1" or "T2" LED is ON

Preview of the status of R and S inputs

A blinking dot indicates the time measurement
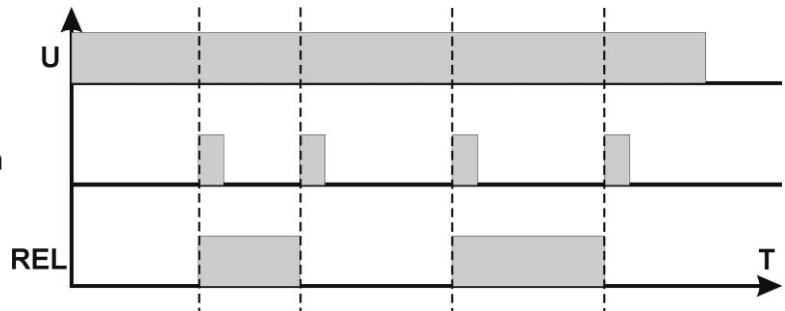of operating module

6. Timer programs.

PR0 - Permanent on or off.

In this mode, press the "OK" button to permanently switch on or off the relay.

The relay state is remembered when power is disconnected and it is immediately restored when switched on.
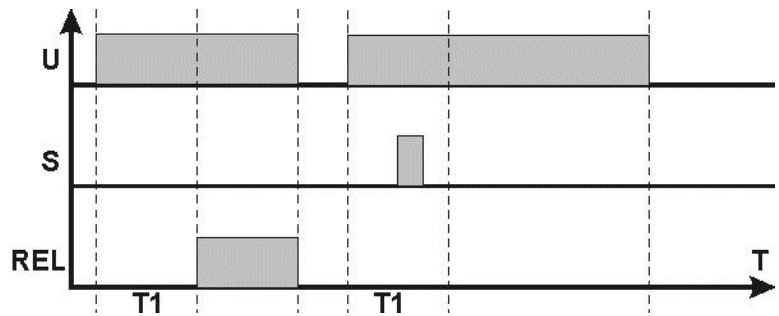
PR1 - T1 time activation delay with locking option – single cycle.

The countdown of the T1 time takes place automatically after switching on the power. Then, the "REL" relay is activated. This mode is maintained until the power is disconnected.
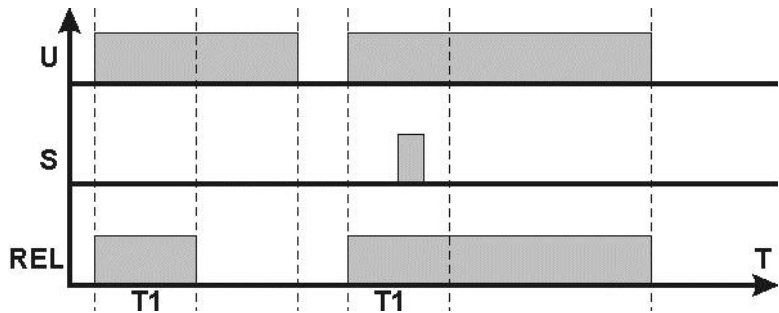
In the case of the „S" triggering signal (rising edge) during the countdown of the T1 time, the module will lock and the relay will not be activated.

PR2 - T1 time deactivation delay with locking option – single cycle.

The "REL" relay is activated automatically after switching on the power for the T1 time period. Once the countdown of the T1 time is finished, the "REL" relay is disconnected. This mode is maintained until the power is disconnected.
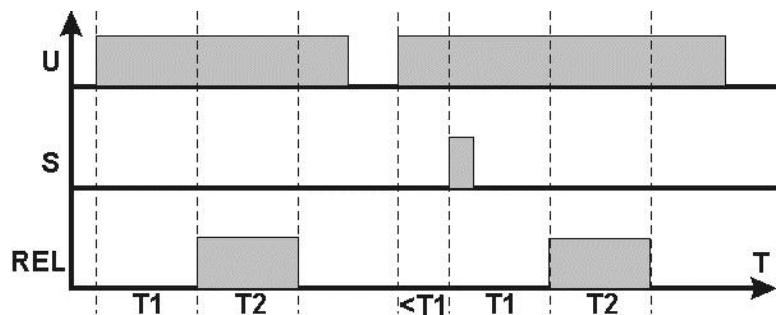
In case of the „S" triggering signal (rising edge) during the countdown of the T1 time, the module will lock and the relay will not be deactivated.

PR3 - T1 to T2 time activation delay with resetting T1 time– single cycle.

The countdown of the T1 time takes place automatically after switching on the power. Then, the "REL" relay is activated for the T2 time period. Once the countdown of the T2 time is finished, the "REL" relay is disconnected. This mode is maintained until the power is disconnected.

The „S" triggering signal (rising edge) during the countdown of the T1 time resets and restarts the T1 countdown process.

PR4 - T1 to T2 time deactivation delay with resetting T1 time– single cycle.

The "REL" relay is activated automatically after switching on the power for the T1 time period. Then, the "REL" relay is deactivated for the T2 time period. Once the countdown of the T2 time is finished, the "REL" relay is activated again. This mode is maintained until the power is disconnected.

The „S" triggering signal (rising edge) during the countdown of the T1 time resets and restarts the T1 countdown process.
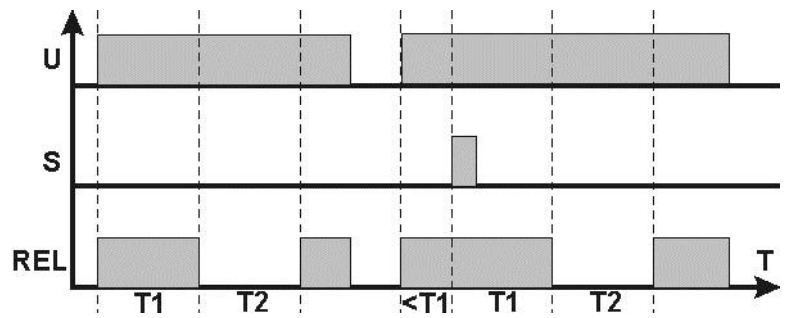
PR5 - Activation delay with increasing T2 activation time with Ts time – cyclic.

The countdown of the T1 time takes place automatically after switching on the power. Then, the "REL" relay is activated for the T2 time period. This mode is repeated cyclically.

In case of the „S" signal (level) during the countdown of the T2 time, the countdown is extended by the duration of the „S" signal.

The countdown is extended only during the countdown of the T2 time.
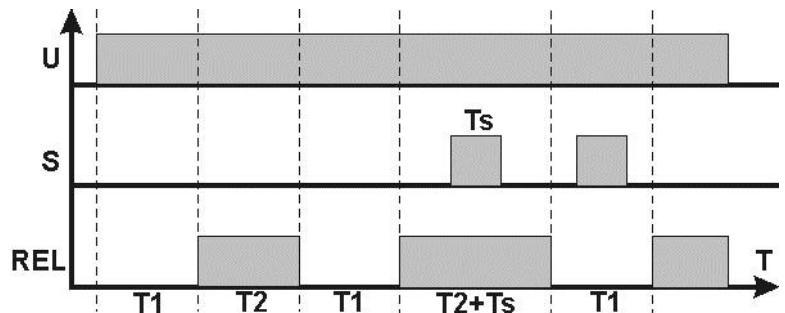
PR6 - Deactivation delay with increasing T2 deactivation time with Ts time – cyclic.

The countdown of the T1 time takes place automatically after switching on the power. Then, the "REL" relay is deactivated for the T2 time period. This mode is repeated cyclically.

In case of the „S" signal (level) during the countdown of the T2 time, the countdown is extended by the duration of the „S" signal.

The countdown is extended only during the countdown of the T2 time.
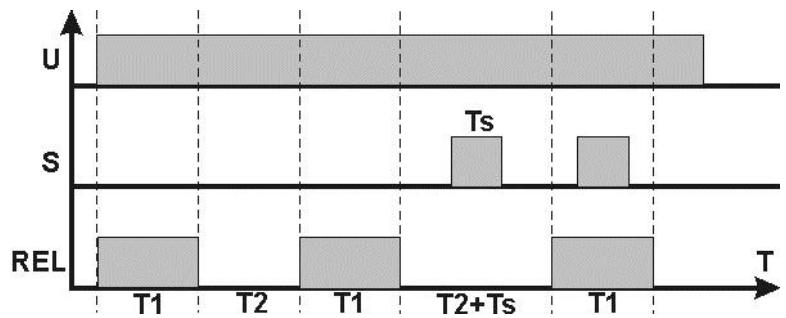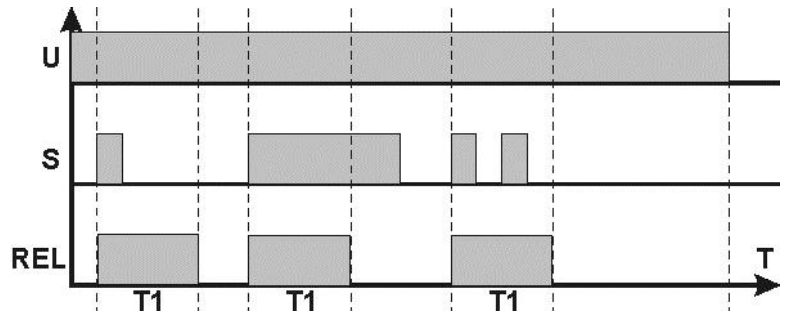
PR7 – Bistable mode.

In case of the „S" triggering signal (rising edge), the REL relay is immediately switched into opposite state.
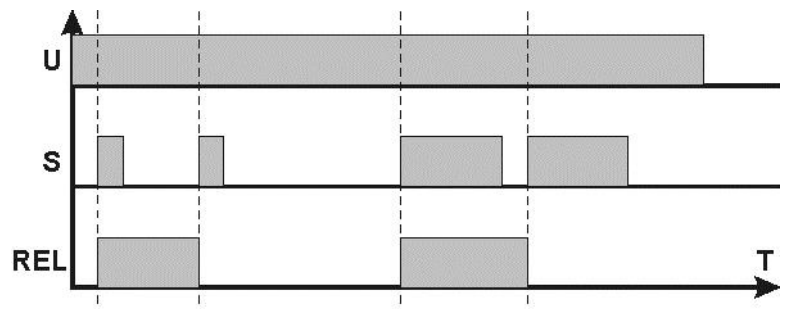
PR8 – Increasing the impulse to T1 time – from rising edge.

The „S" triggering signal (rising edge) immediately activates the "REL" relay for the T1 time period. Once the countdown of the T1 time is finished, the "REL" relay is deactivated.
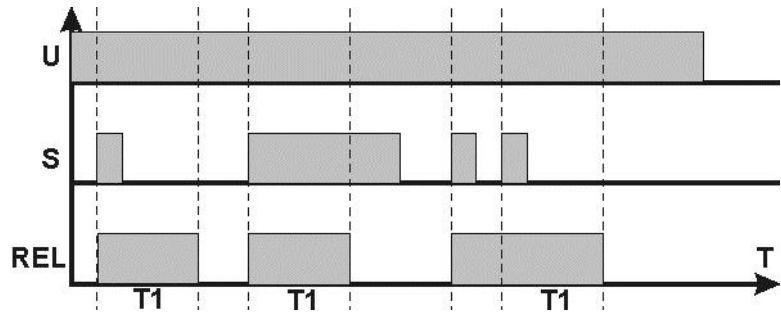
Another „S" triggering signal during the countdown of the T1 time will not affect the countdown until activation of the „REL" relay.

PR9 - Increasing the impulse to T1 time – from rising edge with resetting T1 time.

The „S" triggering signal (rising edge) immediately activates the "REL" relay for the T1 time period. Once the countdown of the T1 time is finished, the "REL" relay is deactivated.
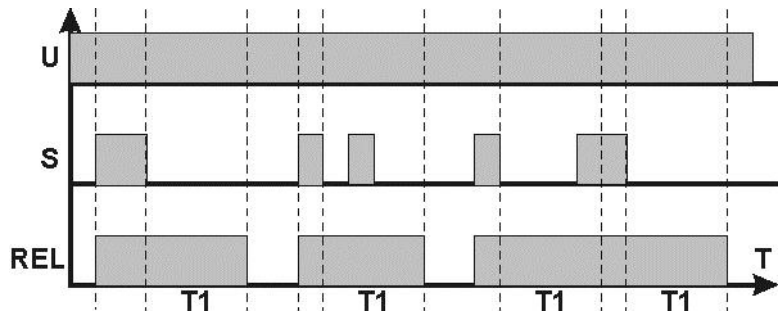
Another „S" triggering signal during the countdown of the T1 time (rising edge) resets and restarts the T1 countdown process.

PR10 - Increasing the impulse to T1 time – from falling edge.

The „S" triggering signal (rising edge) immediately activates the "REL" relay. After a loss of the „S" signal (falling edge), the „REL" relay stays activated for the T1 time.
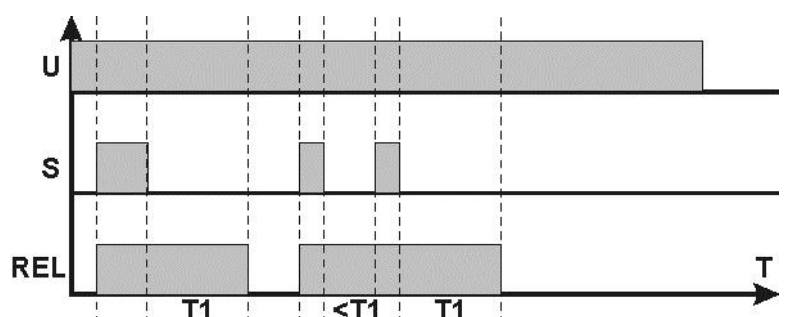
Another „S" triggering signal during the countdown of the T1 time will not affect the countdown until activation of the „REL" relay.

PR11 - Increasing the impulse to T1 time – from falling edge with resetting T1 time.

The „S" triggering signal (rising edge) immediately activates the "REL" relay. After a loss of the „S" signal (falling edge), the „REL" relay stays activated for the T1 time.

Another „S" triggering signal during the countdown of the T1 time (rising edge) resets and restarts the T1 countdown process after a loss of the „S" signal.
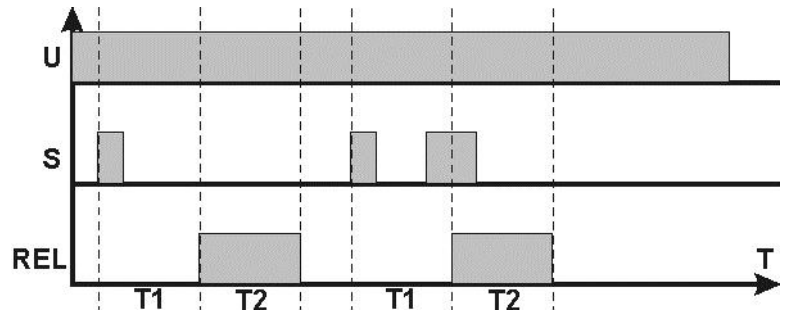
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PR12 – Delaying the impulse - the T1 to T2 time.

The „S" triggering signal (rising edge) activates the countdown of the T1 time, followed by the activation of the "REL" relay for the T2 time period.

Another „S" triggering signal during the countdown of the T1 or T2 time will not affect the operation in this cycle.

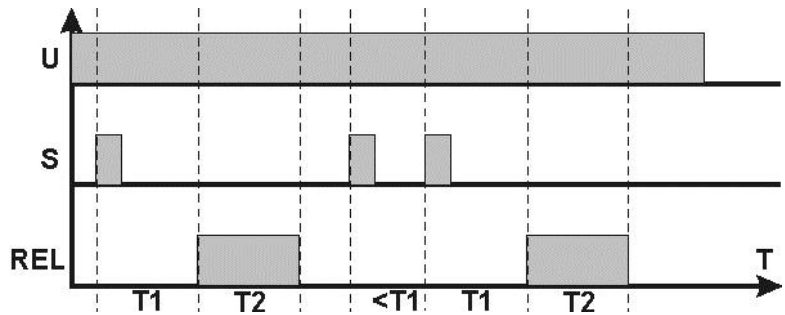Every next cycle can begin only after the completion of the T2 countdown.

PR13 - Delaying the impulse - the T1 to T2 time with resetting the T1 time.

The „S" triggering signal (rising edge) activates the countdown of the T1 time, followed by the activation of the "REL" relay for the T2 time period.
Another „S" triggering signal during the countdown of the T1 time (rising edge) resets and restarts the T1 countdown process.

Another „S" triggering signal during the countdown of the T2 time will not affect the countdown until activation of the „REL" relay.

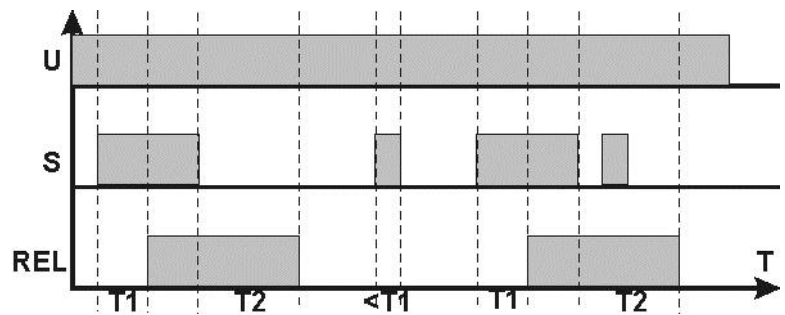Every next cycle can begin only after the completion of the T2 countdown.

PR14 - T1 time activation delay and T2 time deactivation delay.

The „S" triggering signal (rising edge) activates the countdown of the T1 time, followed by the activation of the "REL" relay if the „S" signal is still on. The relay stays activated for the entire duration of the „S" signal. A loss of the „S" signal (falling edge) activates the countdown of the T2 time, followed by deactivation of the "REL" relay.

If the triggering signal is shorter than the T1 time, then the REL relay is not activated.

Another „S" triggering signal during the countdown of the T2 time will not affect the operation in this cycle.
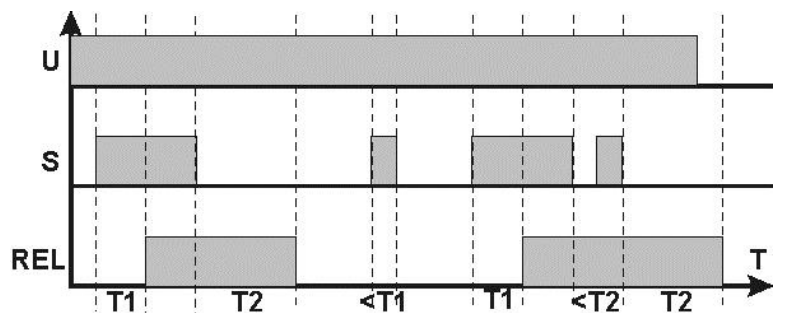
Every next cycle can begin only after the completion of the T2 countdown.

PR15 - T1 time activation delay and T2 time deactivation delay with resetting the T2 time.

The „S" triggering signal (rising edge) activates the countdown of the T1 time, followed by the activation of the "REL" relay if the „S" signal is still on. The relay stays activated for the entire duration of the „S" signal. A loss of the „S" signal (falling edge) activates the countdown of the T2 time, followed by the deactivation of the "REL" relay.

If the triggering signal is shorter than the T1 time, then the REL relay is not activated.

Another „S" triggering signal during the countdown of the T2 time resets and restarts the T2 countdown process.

Every next cycle can begin only after the completion of the T2 countdown.

PR16 - Random switching to T1 and T2

The "REL" relay is activated automatically for a randomly selected period in the T1 ÷ T2 range. Once the countdown is finished, the "REL" relay is disconnected for another randomly selected period in the T1 ÷ T2 range. This mode is repeated cyclically.

When the REL relay is deactivated, the „S" triggering signal (rising edge) will activate the relay for another randomly selected period in the T1 ÷ T2 range.

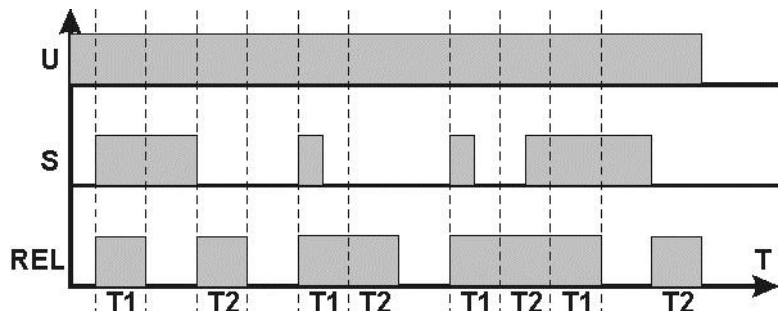When the relay is activated, the „S" triggering signal does not affect its operation.
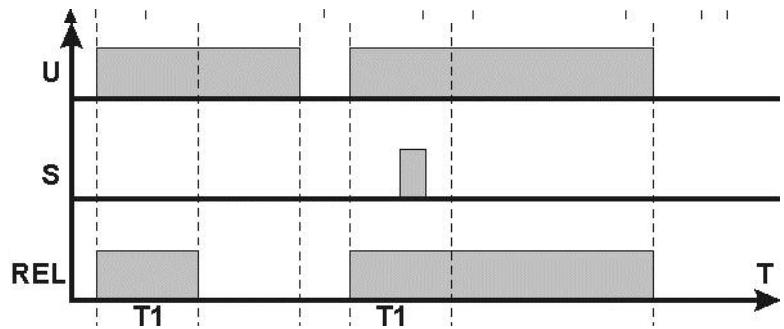
PR17 – Switching to T1 after detecting the rising edge and to T2 after detecting the falling edge.

The „S" triggering signal (rising edge) activates the countdown of the T1 time. Once the countdown of the T1 time is finished, the "REL" relay is deactivated.
A loss of the „S" signal (falling edge) activates the countdown of the T2 time, followed by deactivation of the "REL" relay.

If the triggering signal is shorter than the T1 time, then the T1 countdown is followed by the T2 countdown and only then the REL relay is deactivated.

In the case of the „S" triggering signal during the countdown of the T2 time, the T2 countdown is followed by the T1 countdown, followed by the deactivation of the REL relay.

PR18 – Cyclic mode

The „S" triggering signal (rising edge) immediately activates the "REL" relay for the T1 time period. Once the countdown of the T1 time is finished, the "REL" relay is deactivated for the T2 time period. This mode is repeated cyclically.
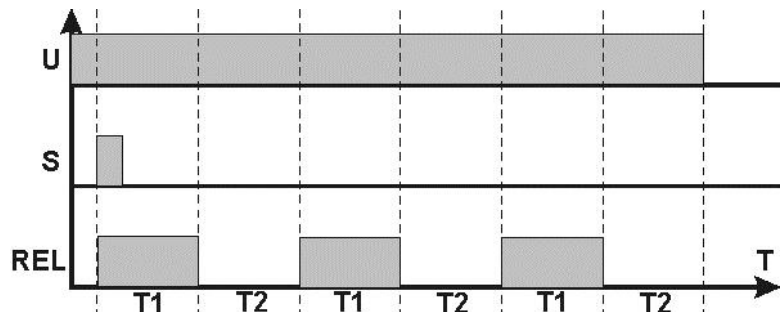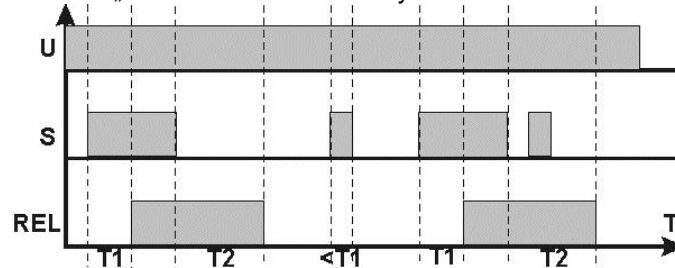
7. Programming example.

This example shows how to program the time module to indicate whenever the doors in an air-conditioned room are left open. The following assumptions are made:
- Allowable time for door opening: T1 = 1min 30s
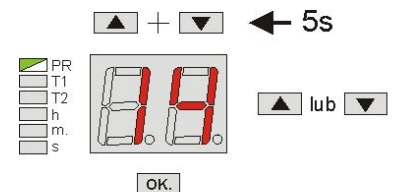- The minimum alarm time: T2 = 5s
The used program is PR14 „T1time activation delay and T2 time deactivation delay".
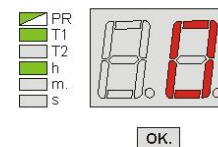

1) Press the ▼ and ▲ buttons simultaneously for 5 seconds to enter the programming mode.
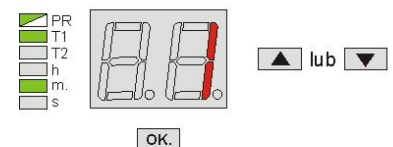The „PR" LED will blink and the number of currently saved program will be displayed.

2) Use the ▼ for ▲ buttons to select the 14 mode.
Confirm by pressing the „OK." button.
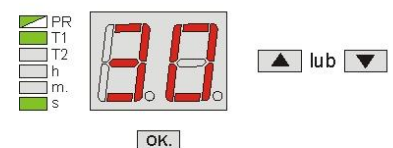
3) The „T1" and „h" LEDs are ON (time setting mode „T1").
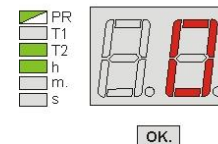Press the OK button again to leave the zero value of the number of hours.

4) The „T1" and „m" LEDs are ON.
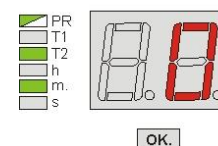Use the ▼ for ▲ buttons to set the „1".
Confirm by pressing the „OK." button.

5) The „T1" and „s" LEDs are ON.
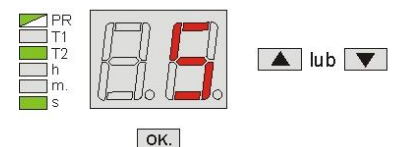Use the ▼ for ▲ buttons to set the „30".
Confirm by pressing the „OK." button"

6) The „T2" and „h" LEDs are ON (time setting mode „T2").
Press the OK button again to leave the zero value of the number of hours.

7) The „T2" and „m" LEDs are ON.
Press the OK button again to leave the zero value of the number of hours.

8) The „T2" and „s" LEDs are ON.
Use the ▼ for ▲ buttons to set the „5."
Confirm by pressing the „OK." button.

9) The scrolling message „ready" - indicating readiness for operation of the module according to the PR14 mode and preset times – will be displayed.

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Table 2. Technical parameters.

Supply voltage	10÷16V DC
Current consumption	20 mA/65 mA (inactive/ active relay) (±5%)
The S+ input	10÷16V DC control
The S input-	0V (GND) control
The R-input	0V (GND) control
The number of time-logic programs	18 (The possibility of implementing additional time-logic programs on demand)
Time ranges	0,1s ÷ 100h (stored in the EEPROM memory)
Number of relays	1
Maximum switching voltage	250V AC /30V DC
Maximum switching current	10 A
The maximum contact resistance	<100 mOhm
Optical indication	- LEDs - 7-segment, double LED display
Operating conditions	II environmental class, -10°C ÷ 40°C, relative humidity 20%...90% no condensation
Dimensions	119 x 43 x 22 (WxHxD)
Mounting	mounting tape or mounting screws x2 (holes ∅3mm)
Terminals	Φ0,51mm÷2,05mm (AWG 24-12)
Net/Gross Weight	0,060 /0,11 [kg]