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ASTRONOMICAL PROGAMMABLE CONTROL TIMER
with night break, 2-channel

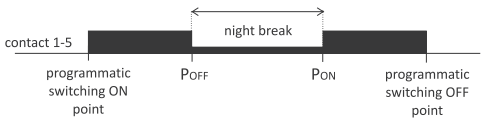
PCZ-526.3

5 908312 591405

Do not dispose of the device to a garbage bin with other unsorted waste! In accordance with the Waste Electrical and Electronic Equipment Act any household electro-waste can be turned in free of charge and in any quantity to a collection point established for this purpose, as well as to the store in the event of purchasing new equipment (as per the old for new rule, regardless of brand). Electro-waste thrown in the garbage bin or abandoned in the bosom of nature pose a threat to the environment and human health.

Purpose

Dual-channel, astronomical timer is used for switching on and off the lightning or other electrical receivers in accordance to sunset and sunrise with an option to program a night break, which means a temporary switching off of the receivers for savings purposes.



Functioning

On the basis of information about the current date and the geographical coordinates of its location, the astronomical timer automatically sets daily, scheduled points of lightning switching. The exact time of switch on and off is determined on the basis of the calculation of the position of the sun relative to the horizon and allows you to select one of the four control options (the moment the lights go on and off is set independently):

1. Astronomical sunset and sunrise;
2. Civil twilight/dawn
3. Correction – individual correction of program switch on and off points by the user: angular or time.
4. Time – setting of the "rigid" hours of switching independently from the cycle of sunrise and sunset.

Night break, which means a temporary switching off of the receivers for savings purposes, can be programmed between the programmatic points of switching.

Operating modes and functions

- AUTOMATIC MODE – automatic operation by programmatic points of contact switching [highlighted icon on the left side of the display].
- SEMI-AUTOMATIC MODE – the ability to manually close and open contact during automatic operation. The change will be effective until the switch on/off resulting from the automatic mode [flashing symbol on the display on the left side].

In semi-automatic mode the contact position is opposite to that which results from the program cycle (which means that the contact is opened at night and closed during the day). Semi-automatic operation works only until the end of the current cycle of automatic operation, for example entering semi-automatic mode during the day will turn on the lights until the time of the scheduled switch resulting from the astronomic cycle. Then, the clock returns to automatic operation (and the light is still switched on until dawn). Mode switching is done using the +/– buttons on the main level.

- MANUAL MODE – [ON] permanently closed contact (position 1-5) or [OFF] permanently open contact (position 1-6) when the AUTOMATIC MODE is off [no icon on the left side of the display].
- ASTRONOMICAL SUNRISE AND SUNSET – moments when the center of the solar disk touches the horizon (parameter h= -0.583°). Due to the simplification of calculations, the deviation of a few minutes in relation to data designated by "HM Nautical Almanac Office" is acceptable.

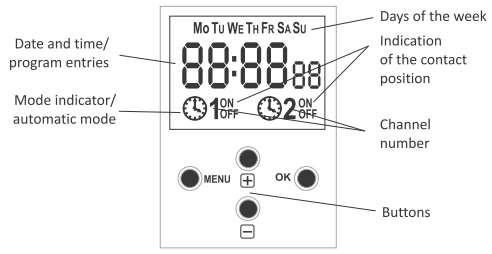
The advantage of setting the point of switch on/off as a function of the position of the sun disk is that this feature is immune to change of the duration of the dusk/dawn for the different seasons of the year, so that the switch on/off occurs always for the same level of brightness.

- CIVIL TWILIGHT AND DAWN (including the calendar) – the phase of the sunset, in which the center of the solar disk will be no more than 6 angular degrees below the horizon (solar disk viewed from Earth has a diameter of approximately half a degree). During this time brightest stars and planets ("Evening star", "first star" on Christmas Eve) appear in the sky (with good air clarity). Due to the scattering of light in the atmosphere there is still generally sufficient sunlight for normal operation in the open space without artificial light sources. Civil dawn (and calendar) – the time before sunrise, when the center of the solar disk is already higher than 6° below the horizon line.
- SCHEDULED POINT OF SWITCH ON/OFF – times of contact switching on (position 1-5) and off (position 1-6) determined based on the selected control option: astronomical sunrise/sunset or civil twilight/dusk and location.
- NIGHT BREAK – user-settable temporary switching between the program points of switching on and off.
- CONFIGURATION – designation of the LOCATION and setting the SCHEDULED POINTS OF SWITCH ON/OFF.
- LOCATION – the geographical coordinates and time zone of a place relatively close to the place of the timer installation. Locations and time zones of approx. 1500 cities from 51 countries of the world are defined in the memory of the device. You can enter your personal settings as geographical location and time zone (UTC).
- COORDINATE CODE – geographical coordinates assigned for specified cities to help provide the location (cities and their associated codes are shown in the table).
- CORRECTION – acceleration or deceleration of the switch on/off times in relation to astronomical time points of sunrise and sunset:
  - » ± 15° – angular correction for the point of switching relative to the position of the center the sun disk to the horizon;
  - » ± 180 min. – time correction for the point of switching as a shift of time relative to sunrise/sunset.
- DST (Daylight Saving Time) – international name of summer time (free translation: the sunlight acquisition time). Disables automatic time changes.
- AUTOMATIC TIME CHANGE – change from winter to summer time. It can be set to work with or without automatic change. The controller is equipped with a function to select the time zone so that the switching time is consistent with the local time.
- DATE PREVIEW – preview of the set date (OK).
- PREVIEW OF THE SCHEDULED POINT OF SWITCH ON/OFF and LOCATION – the ability to view the current time of switch the contact open and close and the set locations (geographic coordinates are displayed) and the UTC time zone (subsequent pressing of the +/– buttons in the date preview mode).
- NFC WIRELESS COMMUNICATION – wirelessly read and write timer configuration from an Android phone equipped with the NFC module.
- PCZ CONFIGURATOR APP – free application for Android mobile phones and tablets equipped with the NFC module for wireless communication.
  Features:
  - » timer configuration in offline mode (without the connection with the timer);
  - » coordinates settings by selecting the preset location (code coordinates), a direct indication of the location on a map on your phone or copying the current position recorded by the GPS in your phone;
  - » read and write the configuration of the controller;
  - » quick programming of multiple controllers using a single configuration;
  - » read and write the configuration from and to a file;
  - » sharing the configuration via e-mail, Bluetooth, network drives;
  - » identification of the connected timer and the ability to name individual devices;
  - » automatic backups of the configuration. Along with a unique identifier for each timer, user can easily restore previous configuration;
  - » set the time and date according to the clock in mobile phone.

The app is available on Google Play!

- CLOCK TIME CORRECTION – set monthly adjustment of the seconds of the system clock.
- BATTERY INDICATOR – the controller comes with built-in control system of the backup timer battery used in case of main power supply failure. If the battery is low, user will receive information that the battery needs to be replaced.
- LCD BRIGHTNESS ADJUSTMENT – change the contrast of the display to get a clear LCD read-out from different viewing angles.
- RELAY STATE MEMORY – set relay state in manual mode is remembered and restored when the power returns.

Display and control panel description



MO – Monday; TU – Tuesday; WE – Wednesday; TH – Thursday; FR – Friday; SA – Saturady; SU – Sunday.

Function keys description

- MENU
  - » enter the program menu
  - » return to the previous position (back)
- OK
  - » move to the next setting
  - » accept setting
  - » preview of the date
- "+" [plus]
  - » change the setting by one position up (+1) for the selected programming option (holding down the button continuously changes the setting by one position up in a loop)
  - » in MANUAL MODE: permanent ON and OFF contact switching
  - » switching the SEMI-AUTOMATIC operation mode ON or OFF/ON the main level
- "–" [minus]
  - » change in the setting by one position down for the selected programming option (holding down the button continuously changes the setting by one position down in a loop)
  - » in MANUAL MODE: permanent ON and OFF contact switching
  - » switching the SEMI-AUTOMATIC operation mode ON or OFF/ON the main level

Programming

1. START
Connect the power supply.
The timer will start at the root level and the display will show selected hour.

In the absence of any program entries, timer will automatically run in manual mode.
Set individual timer program with internal configuration menu or by using the PCZ CONFIGURATOR app for mobile devices.

2. DATE
Press MENU. The timer will enter program menu.
Using the +/– buttons select the date setting mode DATE.

Confirm with OK.
Timer will show settings for the next parameters: year, month, and day. Use the +/– keys to set the parameters; move to the next parameter with the OK button. Go back to the previous item by pressing MENU.

Press OK to accept date setting. The timer will automatically exit from the date setting mode and go to the program menu.
The date setting is tantamount to time determination: winter or summer.
In Poland, the time change from winter to summer is done automatically at night, **on the last Sunday of March** at 2.00 AM (by adding one hour to the current time). Time change from summer to winter is done automatically at night, **on the last Sunday of October** at 3.00 AM (by subtracting one hour from the current time).

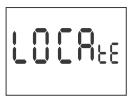
The automatic time change can be turned off (see section 6.1).

3. HOUR
Press MENU. The timer will enter the program menu.
Using the +/– buttons select the mode for time setting HOUR.

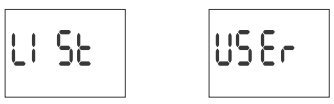
Timer will show settings for the next parameters: hour and minutes. Set the parameters with the +/– buttons. Move to the next parameter with the OK button. Go back to the previous item by pressing MENU.

Press OK to accept time entry. The timer will automatically exit from the date setting mode and go to the program menu.

4. LOCATION
Press MENU. The timer will enter program menu.
Using the +/– buttons select the mode for time setting LOCATE.



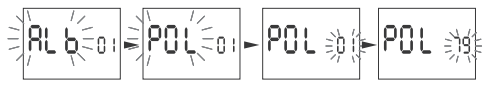
Press OK to accept. The timer will enter to the location settings menu LIST/ USER. Select mode using the +/– buttons:



- LIST – select location from the list of coordinate codes;
- USER – manual setting of the user geographical position.

Press OK to accept.

4.1 COORDINATE CODES
Check the table of coordinate codes located at the diagram of programming. Find the country and the city closest to your location and the corresponding code.
The timer will enter country selection menu. Using the +/– buttons select the country. Accept by pressing OK. The timer will enter the coordinate code selection. Using the +/– buttons select desired code from the list. Press OK.



The timer will automatically go to the location settings menu. Pressing the MENU button will move you to a higher level.

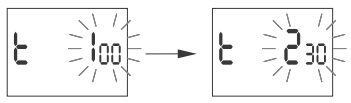
4.2 THE GEOGRAPHICAL COORDINATES OF THE USER
The timer will enter the geographical coordinates and time zone setting mode. The timer will automatically set latitude marking:
- N – North
- S – South

Set the degrees using the +/– buttons. Accept by pressing OK.
Then select theminutes. Accept by pressing OK.

The timer will enter the longitude setting mode.
Longitude marking:
- E – East
- W – West
- length in degrees and arc minutes

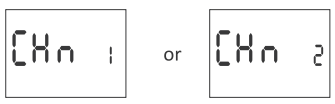
Set the degrees using the +/– buttons. Accept by pressing OK.
Then select the minutes. Accept by pressing OK.

The timer will enter the time zone (t) setting mode. Time zone for Poland +1.
Set the time zone using the +/– buttons. Large digits indicate hours, the small digits: minutes. Single pressing of the button moves the zone by 30 minutes.



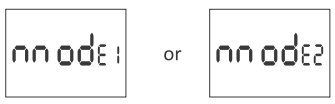
Press OK to accept. The timer will automatically enter the root menu.
Pressing MENU will move to a higher level.

5. CHOOSE CHANNEL AND SCHEDULED POINTS OF SWITCH ON/OFF AND NIGHT BREAK
Press MENU. The clock will enter the program menu.
Using +/– buttons select the mode for the date setting: CHN 1 or CHN 2.



Press OK to accept. The timer will enter to the switch option the channel selection. Using the +/– buttons select set parameters:

5.1. OPERATION MODE
Using the +/– buttons select the mode for time setting MODE1 or MODE2.



Press OK to accept. The timer will enter auto operation mode (AUTO/HAND). Select operation mode using the +/– buttons:

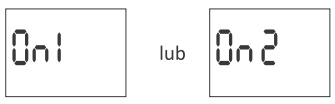
- HAND – manual mode
- AUTO – automatic mode

Press OK to accept. The timer will automatically exit from the date setting mode and go to the program menu. Pressing MENU again will bring you to the root level.

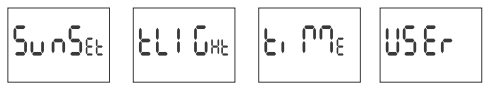
Changes to the contact position in MANUAL OPERATION mode are done using the +/– buttons at the root level.

- SEMI-AUTOMATIC OPERATION – switching on or off is done using the +/– buttons on the main level.

5.2 SWITCH [ON] – SUNSET
Press MENU. The timer will enter program menu.
Using the +/– buttons select the mode for time setting ON1 or ON2.



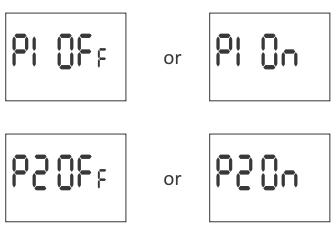
Press OK to accept.
The timer will enter to the switch option selection (SUNSET/TLIGHT/TIME/ USER).
Use the +/– buttons to select the correct moment of activation:



- SUNSET – astronomical sunset
- TLIGHT – civil twilight
- TIME – setting of the "rigid" hour of the switching on that is independent from the sunset
- USER (time correction setting) – accelerating or delaying the switching time in relation to the time point of astronomical sunset:
  - » ± 15° – for the point of switching relative to the position of the center of the sun disk to the horizon. PLUS value speeds up the switching, MINUS value delays switching.
  - » ± 180 min. – time correction for the point of switching as a shift of time relative to sunrise/sunset. PLUS value speeds up the switching, MINUS value delays switching.

Select the switching option using +/– buttons. Accept by pressing OK.
If you select TIME feature, set the hour and minutes in accordance with paragraph 3 (HOUR).
If you select USER feature, set the adjustment in accordance with the paragraph 5.5.

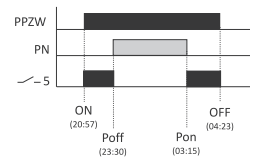
5.3 NIGHT BREAK – SWITCHING [P OFF] AND SWITCHING ON [P ON]
Press MENU. The timer will enter program menu.
Using the +/– buttons select the night break mode P OFF and P ON.

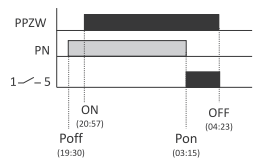


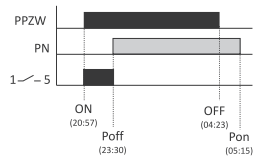
Set the hour and minutes of switching on or off in accordance with the paragraph 3 (HOUR).

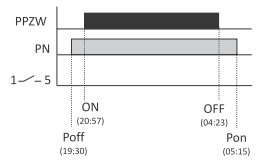
Typed in NIGHT BREAK times constitutes a solid pair that performs switching on and off of the contact. They are treated as a single commands and performed in accordance with the preset time.

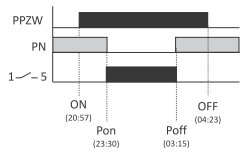
The following diagrams illustrates the cases of possible time settings for switching the contacts on and off in accordance with the PROGRAM POINTS OF SWITCHING ON AND OFF and with NIGHT BREAK times:



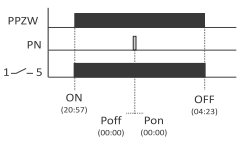








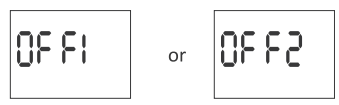
a case of setting the time of the end of the break before the time of the beginning of the break



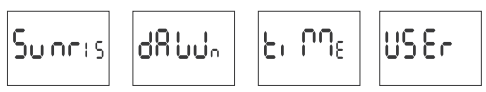
a case of setting the same times of the beginning and end of the break. NO NIGHT BREAK.

PPZW – program points of switching on and off
PN – night break

5.4 SWITCH [OFF] – SUNRISE
Press MENU. The timer will enter program menu.
Using the +/– buttons select the mode for time setting OFF1 or OFF2.



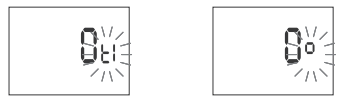
Press OK to accept. The timer will enter to the switch option selection (SUNRIS/DAWN/TIME/USER).



Using the +/– buttons select the setting mode:
- SUNRIS – astronomical sunrise
- DAWN – civil twilight
- TIME – setting of the "rigid" hour of the switching on that is independent from the sunset
- USER (time correction setting) – accelerating or delaying the switching time in relation to the time point of astronomical sunrise:
  - » ± 15° – for the point of switching relative to the position of the center of the sun disk to the horizon. PLUS value speeds up the switching, MINUS value delays switching.
  - » ± 180 min. – time correction for the point of switching as a shift of time relative to sunrise/sunset. PLUS value speeds up the switching, MINUS value delays switching.

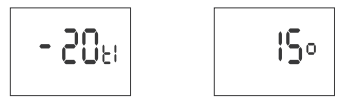
Select the switching option using +/– buttons. Accept by pressing OK.
If you select USER, set compensation in accordance with section 5.5.

5.5 SETTING THE TIME CORRECTION
The setting for the USER switching.
Select USER. Accept by pressing OK.
The timer will enter the angular or time offset selection mode (**° – ti**).



Select option using +/– buttons:
- ti – time offset
- ° – angular offset

Accept by pressing OK. The timer will enter the correction value setting mode. Set the value using +/– buttons:
- » ± 15° – for the point of switching relative to the position of the center of the sun disk to the horizon. PLUS value speeds up the switching, MINUS value delays switching.
- » ± 180 min. – time correction for the point of switching as a shift of time relative to sunrise/sunset. PLUS value speeds up the switching, MINUS value delays switching.



Confirm by pressing OK. The timer automatically exits the correction setting function and enters the program menu. Pressing MENU will bring you to the main level.

6. SYSTEM SETTINGS
Press MENU. The timer will enter the program menu.
Using the +/– keys select system settings SYST.

Confirm by pressing OK. The timer will enter the system settings submenu (DST/UTC/BATT/CAL/LCD/CLEAR/INFO).
Select the parameter with the +/– keys and confirm with OK.
Pressing MENU will take you to the upper level.

6.1. AUTOMATIC TIME CHANGE (DST)

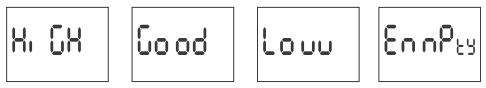
DST (Daylight Saving Time) – international name of summer time.
Confirm by pressing OK. The timer will enter the menu with the option to disable automatic time change (AUTO/OFF).
With +/– keys select desired mode:

- AUTO – with automatic time change
- OFF – without automatic time change

Confirm selected option by pressing OK.
To exit the parameter without saving the changes, press the MENU button.

6.2. BATTERY CHARGE INDICATOR (BATT)

Confirm by pressing OK.
The clock will display information about battery charge level.

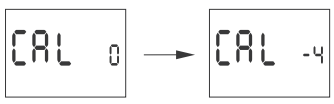


- HIGH – fully charged, new battery
- GOOD – in good condition, provides long-term operation
- LOW – low battery level, recommended replacement
- EMPTY – discharged, it must be replaced immediately

6.3. SYSTEM CLOCK TIME ADJUSTMENT (CAL)

Time adjustment is the number of seconds by which the system clock is adjusted per month. Setting range: +/– 300 seconds.
For example:
If the clock is fast 4 seconds per month, set the parameter value -4.

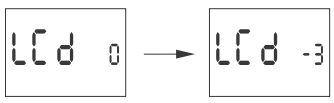
Confirm by pressing OK. The timer will display current parameter of time adjustment. Press +/– keys to set desired number of seconds. Confirm by pressing OK.



6.4. DISPLAY CONTRAST (LCD)

Setting the display contrast. Range: -3 (lowest) ... + 3 (highest).

Confirm by pressing OK. The timer will display the current contrast parameter. Using +/– select contrast parameter.
Confirm OK.

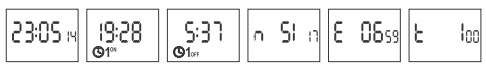


5.7. SYSTEM INFORMATION (INFO)

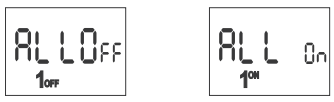
Confirm by pressing OK. The timer will display information menu.
Use the +/– keys to browse the information:
- timer type
- software version

Preview of the settings and the scheduled points of switch on/off

At the root level of the timer (showing the current time), press OK button. Current date (day-month-year) will be displayed. Subsequent pressings of the + button show the scheduled switch on time, scheduled switch off channel 1 and channel 2 time, set latitude, set longitude and set time zone.



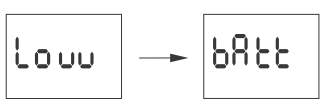
If the timer settings cause a permanent closing or opening of the contact 24 hours a day, the following messages will be displayed:



- ALL OFF – switched off 24 hours a day
- ALL ON – switched on 24 hours a day

Information about polar day and polar night may be displayed instead of the times of switch on and off for some locations.

Low battery



The LOW BATT message indicates that the battery backup clock is too low after a power outage. In this case, battery replacement is recommended. The user can replace the battery by himself with a new, type 2032 lithium coin cell battery.
A film demonstrating how to replace the battery is shown below the product code (scan the QR code):

The low battery level is no obstacle during normal clock operation. However, if the clock is not powered, it may result in loss of date and time settings.

All settings, except for time and date, are saved in non-volatile memory and are not lost in the event of a power outage and low battery.

Under proper operating conditions, a new, charged battery is sufficient for approx. 6 years of operation. Low temperatures or long periods of operation without AC power can shorten this period.

Technical data

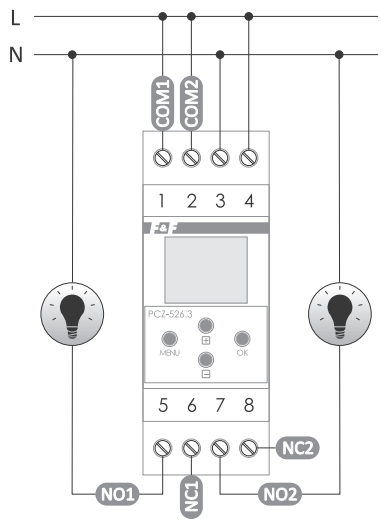
power supply	24÷264 V AC/DC
maximum load current (AC-1)	2×16 A
contact	separated 2×NO/NC
backup time clock operation	6 years*
battery type	2032 (lithium)
backup time display operation	none
accuracy of the clock	1 s
error time	±1 s/ 24 h
power consumption	1.5 W
terminal	2.5 mm² screw terminals (cord) 4.0 mm² screw terminals (wire)
tightening torque	0.5 Nm
working temperature	-20÷50°C
dimensions	2 modules (35 mm)
mounting	on TH-35 rail
protection level	IP20

* battery life addicted to weather coditions and frequency of mains failure

Installtaion

1) Turn off the power.
2) Mount the timer on the TH-rail in the distribution box.
3) Connect wires according to the diagram.
4) Connect receivers according to the diagram.
5) Set the correct date (see section 2) and time (see section 3).
6) Set individual switch-on time programs for receivers.

Connection scheme



3-4	timer power supply
Channel 1	
1	COM contact input
5	NO contact output (“standard open” position)
6	NC contact output (“standard closed” position)
Channel 2	
2	COM contact input
7	NO contact output (“standard open” position)
8	NC contact output (“standard closed” position)

Table of location codes

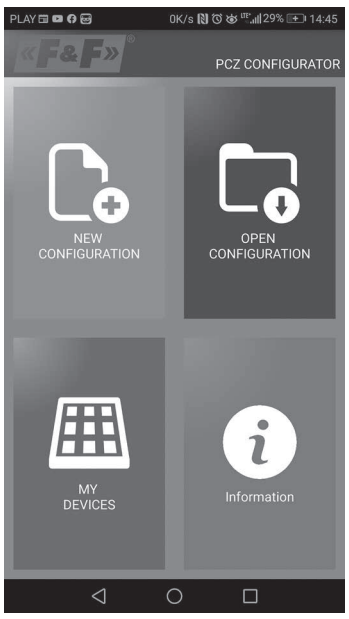
1	Albania	27	Italy
2	Armenia	28	Lichtenstein
3	Austria	29	Lithuania
4	Azerbaijan	30	Luxembourg
5	Belgium	31	Latvia
6	Bulgaria	32	Macedonia
7	Bosnia and Hercegovina	33	Monaco
8	Belarus	34	Moldova
9	Kazakhstan	35	Malta
10	Kyrgyzstan	36	Mongolia
11	Switzerland	37	Holland
12	Cyprus	38	Norway
13	Czech Republic	39	Poland
14	Danmark	40	Portugal
15	Germany	41	Romania
16	Spain	42	Russia
17	Estonia	43	San Marino
18	Finland	44	Serbia
19	France	45	Slovakia
20	Great Britain	46	Slovenia
21	Georgia	47	–
22	Greece	48	Sweden
23	Croatia	49	Tajikistan
24	Hungary	50	Turkmenistan
25	Ireland	51	Ukraine
26	Iceland	52	Uzbekistan

CE declaration

A copy of the CE declaration is available to download from the website: www.fif.com.pl from product subpage

PCZ Configurator app

Main window
- New configuration – opens window creation configuration.
- Open configuration – opens window for loading the program configuration stored as a file in the phone memory.
- My device – gives access and support for all backup copies of configurations assigned to specific devices.
- Information – application user guide.



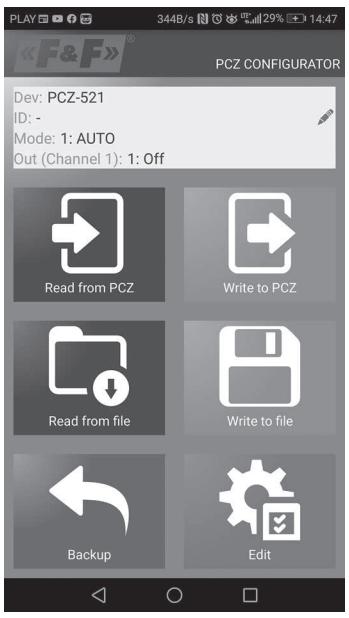
New configuration
- New – creates new, empty configuration file (without any programs).
- Load from PC – new configuration is created based on a program saved in the PCZ controller. Select this option and bring the phone closer to the timer to load the program phone.
- Load from file – new configuration is created based on a files saved by the user. Opens a window with a list of files previously saved by the user.
- Restore – a new configuration is created based on a backup copy of one of the previous configuration. Tapping this icon opens window with a list of backups split into controllers in which they were written.

Select a new configuration option opens another window.

The function window allows to edit program as well as to load and save configuration to a PCZ controller. It appears automatically when we bring the phone closer to the controller, or when we create a new configuration. In the upper part of the screen the application displays a frame with following information:
- Dev – supported controller type.
- ID – unique identifier of connected controller (appears only when the application is connected with the controller. In the Offline mode that field remains empty). Icon of a pencil on the right-hand side allows you to enter your own name for the controller.
- Operating mode – displays the current operating mode for the controller (manual or automatic). Applies only to operating in Online Out mode – Output relay status (enabled or disabled).

Applies only in online mode.
Keys:
1) Read the timer configuration.
2) Save the current configuration to the timer.
3) Load configuration from file.
4) Save the current configuration to file.
5) Restore configuration from backup copies.
6) Edit the current configuration.

Edit
Editing window allows you to edit current configuration (new, loaded from file or from PCZ)
Editing window consists of three tabs:
- List – a list of all programs (in the order in which they are stored in the memory).
- Filter – a list of programs that will be executed on the selected day (in chronological order by program execution).
- Settings – system settings configuration



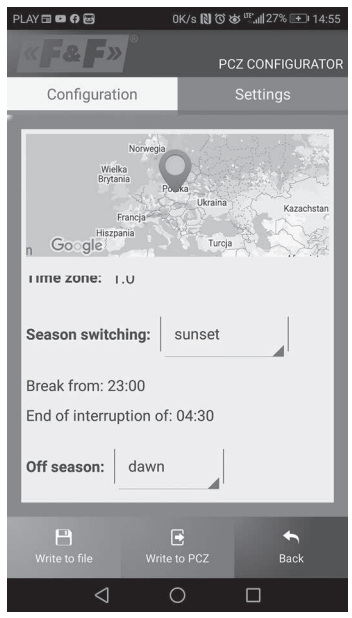
Configuration
Setting the scheduled points of lightning on and off switching:
- Civil twilight and sunset
- User settings – correction for astronomical sunrise and sunset: acceleration or delay of the on/off switching times in relation to astronomical points.

The three icons at the bottom of the screen allow you to:
- Save to file – saves the current configuration to a file
- Save to PCZ – saves the configuration to a timer
- Back – return to a function window

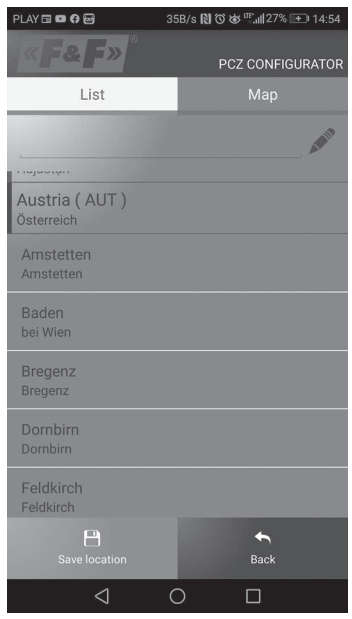
In case of a going back to the function window the current configuration is constantly stored in the application memory.

Settings
Info tab. Displays data from the timer:
- Software version
- Date of manufacture
- Channel status (on/off)

Timer system settings: operation modes for each channel (auto/manual), contrast, time correction, current date.



Location: city list
Selecting a city relatively close to the place of installation of the timer. Locations and time zones of approx. 1500 citiees from 51 countries of the world are defined in the memory.



Location: GPS
Entering custom settings as a geographical location and time zone (UTC) using the GPS location of the user’s phone.

Application available on:
ANDROID APP ON Google play
https://play.google.com/store/apps/details?id=pl.com.fif.clockprogramer

Programming scheme

The programming scheme for the timer is available for download on the product’s subpage. Website address: www.fif.com.pl.