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Manual for Programming of Timers

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1. EXPLANATIONS OF TERMS AND TIMERS

1.1 Basic Function of the Application

The term application refers to the „Programming of Timers“ software. The application facilitates the creation and modification of program files for digital timers MAN and MAA.
Program files can be saved on data media. Program files can also be written to a datakey via the USB adapter for the timers named above, or read from a datakey.
Using the datakey, program files can be transferred between PC and timer. A direct connection with the timer is not possible.

1.2 Timer Types MAN and MAA

Designation in this user manual	Range [Modules]	Channels	Control input	Astro programs	Programs / Channel
One-channel weekly timer **MAN-D16-001-A230**	2	1	–	–	56
Two-channel weekly timer **MAN-D16-002-A230**	2	2	–	–	28
One-channel astro timer **MAA-D16-001-A230**	2	1	✓	✓	56
Two-channel astro timer **MAA-D16-002-A230**	2	2	–	✓	28

Table 1: Types of digital timer which can be programmed using this application

Figure 1: Two-channel weekly timer MAN-16-002-A230 and one-channel astro timer MAA-16-001-A230

1.3 Datakey OD-MA-DK

The term datakey refers to the modular memory module of a timer in which a program file is stored. Datakey is not included in the package of timer. It has to be order additionally.

Figure 2: Datakey

1. EXPLANATIONS OF TERMS AND TIMERS

1.4 Programming data

1.4.1 Program file

The term program file refers to all data which can be saved. This data consists of:

- all program lines (program overview) for every specific channel
- settings and options for the timers
- the info area, which comprises
  - Threshold value settings
  - Location information (only for timers with an astro function)
  - Program data (number of program lines, ON time / week, switching cycles / week)
  - Consumption data

1.4.2 Programs

The term program or program line refers to a single line.

Figure 3: An individual program within a program file

As a minimum, a program always contains the switch-on time, the switch-on days, the switch-off time and the switch-off days. The switching days specify the day of the week on which the respective switching time is applied.

Rules for creating a program:

1. The switch-on time must lie within the range 00:00:00 to 23:59:59.
2. The switch-off time must lie within the range 00:00:00 to 24:00:00.
3. A switch-on time and a switch-off time in the same program may not coincide on the same week day at the same time.
4. A switch-off operation must be programmed in this program between two switch-on operations in the same program. The consequence is that the same number of switch-off days as switch-on days will always need to be selected.

Programs of the same type for one channel are executed by logical OR-operation (overlaid by additive method); i.e. the resultant switching behaviour is generated by the overlaying of various programs.

Example:

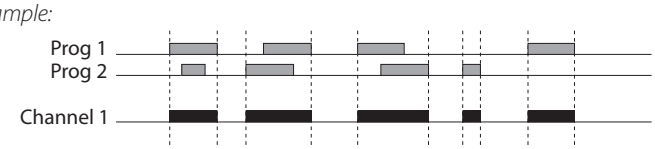


Figure 4: Overlaying of programs of the same type which affect the same channel

1.4.3 Weekly programs

Programs which should be repeated on a regular weekly basis. (e.g. light control, heating control). A weekly program consists of one switch-on/switch-off time and assigned switch-on/switch-off days. Weekly programs and annual programs are overlaid in the same way. Exception programs invalidate weekly and annual programs within their validity period.

- **MON TO SUN:** All days of the week are selected in the program line. Objective: The same program should be executed on every day of the week. All days of the week must be selected for the switching times.
- **INDIVIDUAL:** Switch-on/switch-off times can be assigned to any days of the week as required by selecting the corresponding day. Objective: The same program should only be executed on specific days of the week. Or: Different programs should be executed on any days of the week desired.

1.4.4 Program overview

The term program overview refers to the sum total of all programs for one channel within a program file.

No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	Sunset	☐	☑	☑	☐	☐	☐	☐	08:10:00	☐	☐	☑	☑	☐	☐	☐	☑
02	17:00:00	☐	☐	☐	☑	☑	☑	☐	Sunrise	☐	☐	☐	☐	☑	☑	☑	☑
03	07:10:00	☐	☑	☑	☑	☐	☐	☐	07:30:00	☐	☑	☑	☑	☐	☐	☐	☑
04	10:20:00	☐	☐	☐	☑	☐	☐	☐	11:40:00	☐	☐	☐	☑	☐	☐	☐	☑

Figure 5: Program overview consisting of four programs

2. CONTROL ELEMENTS

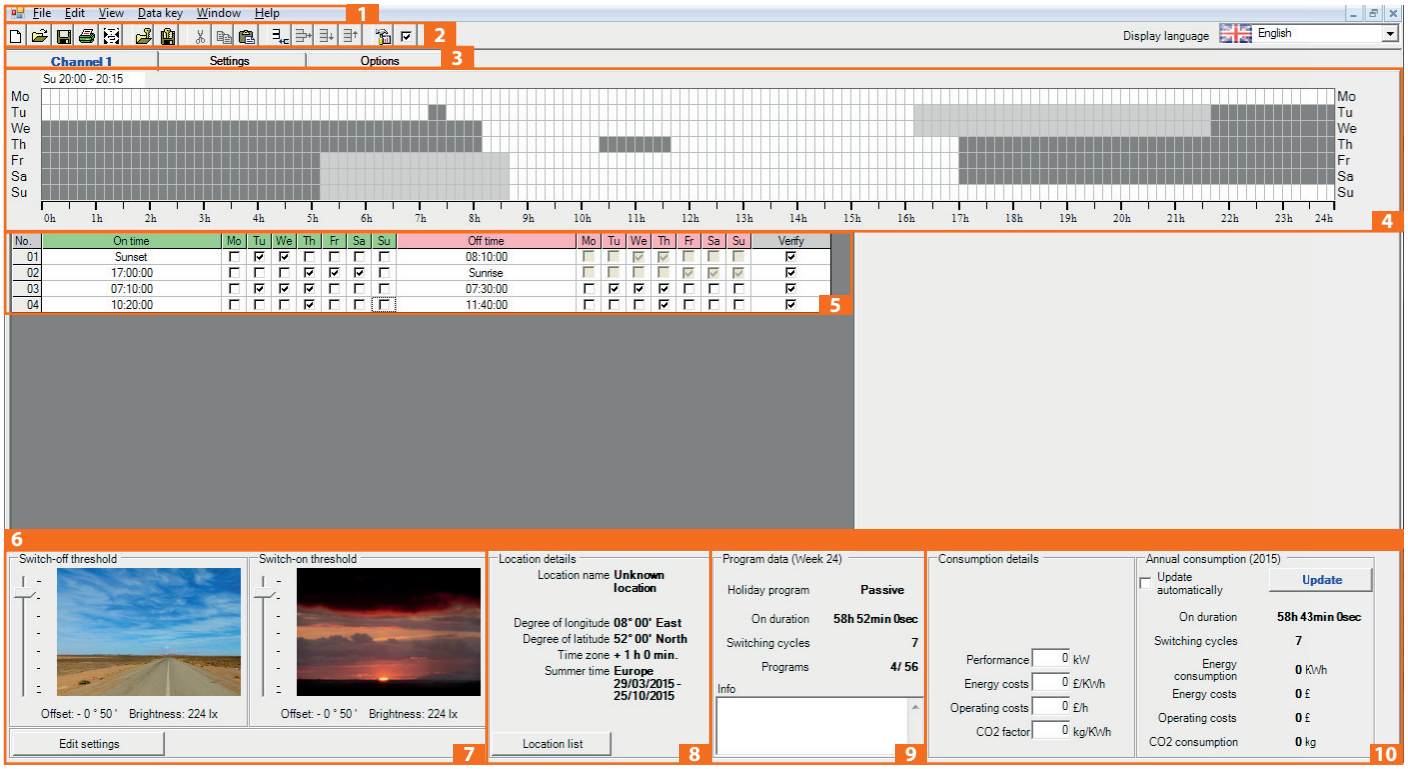


Figure 6: Names of the control elements on the user interface using the example of an astro timer

Legend
1 – Menu bar; 2 – Icon bar; 3 - Tab for channel selection, settings, options and special days; 4 - Graphical display; 5 - Program editor; 6 – Dashboard; 7 - Threshold value settings; 8 - Location information; 9 - Program data; 10 - Consumption data

2.1 Menu bar

All functions can be executed via the menu bar. Various menus are activated for the different timer types. The menus are accessed by pressing the Alt key on the keypad. Some menus can be selected directly using shortcut keys. The key combination is visible next to the menu entry. This refers only to those menus which can be accessed from the main menu.

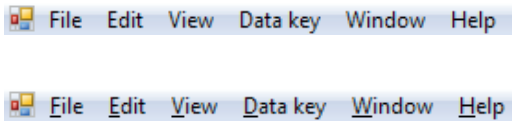


Figure 7: Menu bar with active key access

2. CONTROL ELEMENTS

2.2 Icon Bar

Figure 8: Icon bar

The most important application functions can also be accessed directly via buttons on the icon bar. A variety of different buttons are activated for the different timer types in the icon bar.
The buttons have the following function:

Buttons	Function	Menu item
	Creates a new program file	File/New
	Opens a program file from a directory	File/Open
	Saves a program file to a directory	File/Save
	Prints the program overview. The respective program overview for the current channel is printed out for multichannel timers.	File/Print current channel
	Representation of the switching chart for the current channel	File/Switching graph
	Reads a program file from a datakey	Datakey/Read key
	Writes a program file to a datakey	Datakey/write data to key
	Copies flagged program lines to the clipboard and deletes them from the program overview	Edit/Cut
	Copies flagged program lines to the clipboard	Edit/Copy
	Inserts program lines from the clipboard at the bottom of the program overview. The program lines are converted to the program type cur-rently being edited.	Edit/Insert empty row
	Inserts a new program line with the currently edited program type at the bottom of the program overview	Edit/Insert new empty line below
	Deletes flagged program lines from the program overview	Edit/Delete row
	Moves flagged program lines down by one line	Edit/Move row down
	Moves flagged program lines up by one line	Edit/Move row up
	Opens the setting dialogue box	Edit/Settings
	Checks all program lines of the currently edited type in the program overview and accepts all program lines which are error-free	Edit/Veryfy all program rows
	Opens the manual	Help/ Manual
English	Display language selection. You can change the display language dynamically using this selection box.	

2.3 Tabs

The individual channels and additional settings for a channel can be selected via tabs. The respective selected channel is displayed in blue.

Figure 9: Tab showing the example of a two-chanel timer

2. CONTROL ELEMENTS

2.4 Graphical Display

The graphical display shows the programs and the timer switching cycles generated by the programs within one week in chronological sequence. Only accepted programs are taken into account. The graphical display is dependent on the timer type.

The following applies to all timer types:

- The periods in which the timer is switched on are displayed in dark grey.
- The periods in which the timer is switched off are displayed in white.
- The periods in which the timer is switched off or switched on due to Astro settings are displayed in light gray.

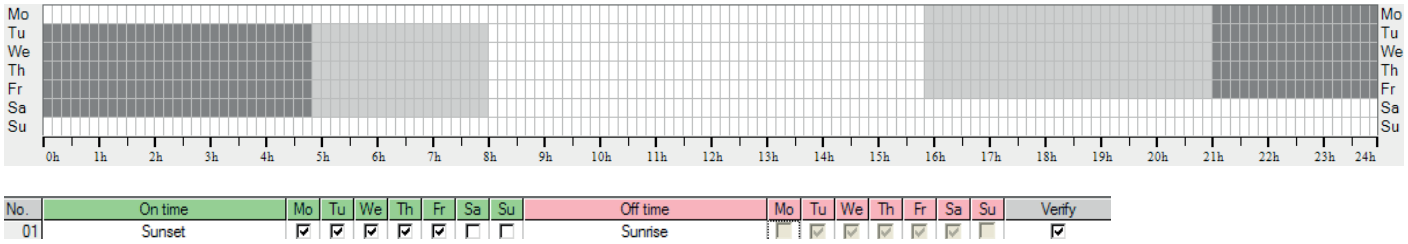


Figure 10: Graphical display using the example of an astro timer including relevant program line

These periods are dependent on the location coordinates and the respective annual time. In this example, the period from 15:50 to 21:00 is shown in light grey. This means the switching time varies between 15:50 and 21:00 throughout the year. This display is valid for all weeks.

2.4.1 Holiday program

It is possible to create holiday program. If a holiday program is programmed as „Permanently OFF“ and this holiday program is active in the current week, the graphical display for the holiday days is coloured light blue.

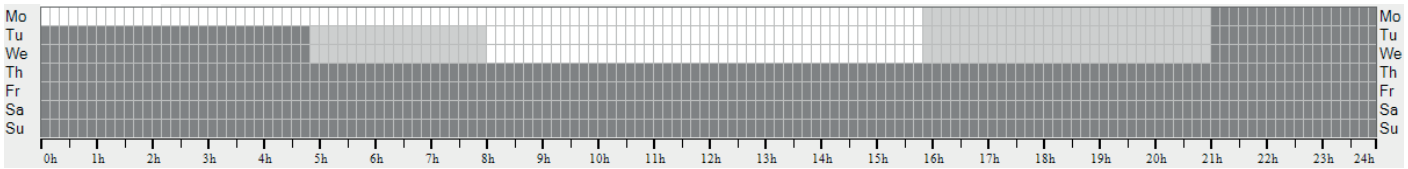


Figure 11: Graphical display of a holiday program

This example shows a holiday program which is active from Thursday to Sunday and is permanently OFF.

2.4.2 Position display

The position display is located on the left above the graphical display.

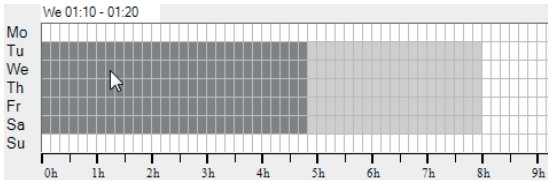


Figure 12: Position display

In the position display, the position of the mouse in the graphical display is shown as a combination of a day of the week and the time. By moving the mouse over the graphical display, the respective mouse position is shown as a combination of the day of the week and the time.

2.4.3 Unit settings for graphical display

The resolution of the graphical display can be selected using the “View/Time scale unit in graph” menu item for each channel (independently of the others):

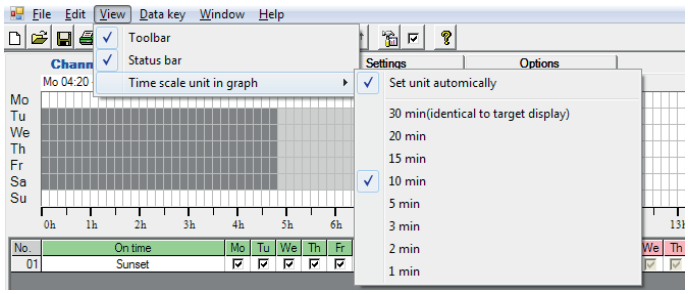


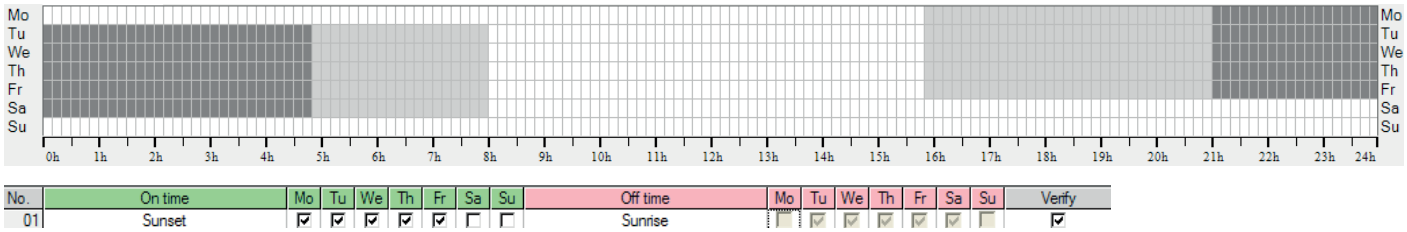
Figure 13: Units in the graphical display

If the entry „Set unit automatically“ is activated, the graphical display adjusts automatically to the width of the window. If the window is reduced, for example, so that it is impossible to show the entire graphical display in the window, a resolution is selected automatically which allows for its full display. The largest selectable unit is 30 minutes. Thus the display corresponds to the unit display on the timer. The resolution setting selected is also saved in document files. It cannot be transferred to the datakey.

2. CONTROL ELEMENTS

2.5 Switching Chart

The astro program file below is used as an example for the following sample description of the switching charts:



No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	Sunset	☑	☑	☑	☑	☑	☐	☐	Sunrise	☐	☑	☑	☑	☑	☑	☐	☑

Figure 14: Astro program and the associated weekly graphical representation of an astro timer as an example

2.5.1 Display switching chart

The switching chart displays the switching behaviour of the timer for a selectable period in a graphical format. A switching chart can be created for the current channel using the „Update switch graphics" button or the menu item File/Switching Chart. A window opens for the switching chart

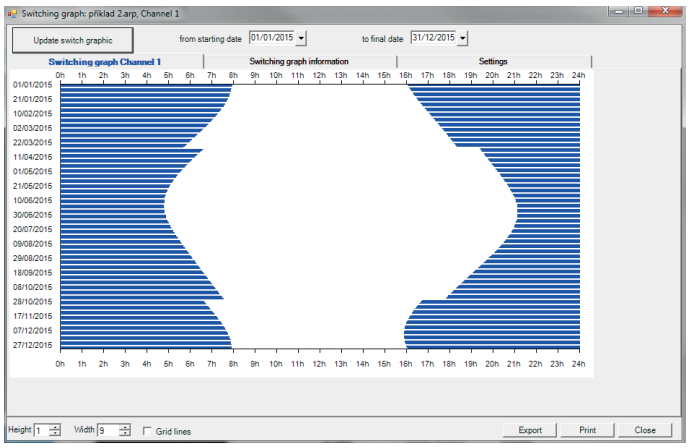


Figure 15: Switching chart

The switching chart on the left clearly shows the different switching times of the astro program throughout the year. The swit-ching curve runs over the year in a more or less cosine shape according to the sunset and sunrise. The start and the end of summer time can be seen as a stage within the movement of the switching curve.

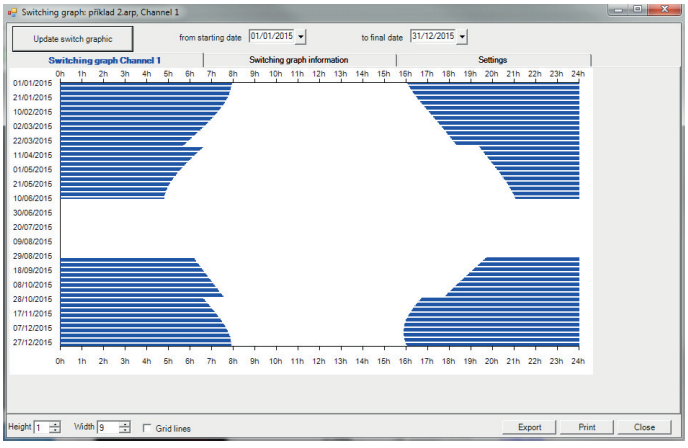


Figure 16: Switching chart with active holiday program

The switching chart on the right shows an active holiday program "Permanently OFF". The timer remains off during the holiday period.

2.5.1.1 Enlarge switching chart

Use„Height" to change the height of a day. (1 … 20)
Use„Width" to modify the width of the switching time. (1 … 10)
Use„Grid lines" to overlay grid lines

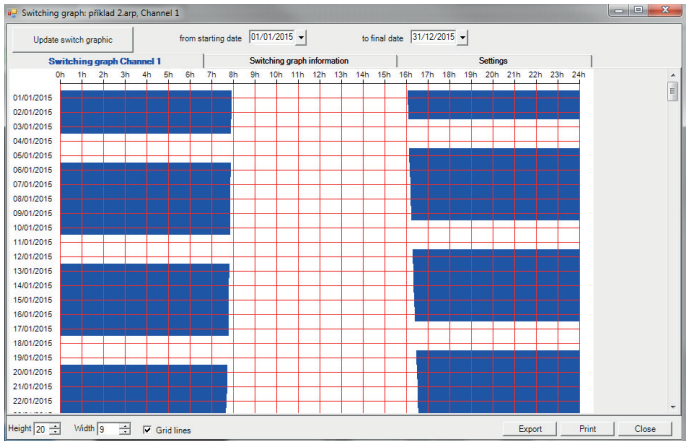


Figure 17: Enlarged switching chart with grid lines (section)

By setting the height of a day to 20, an enlarged section is created in this case. Grid lines are also overlaid.

2. CONTROL ELEMENTS

2.5.2 Switching chart for a specific date range

The date range which should be displayed in the switching chart is set using "from starting date" and "to final date".
After changing the "from starting date" and "to final date", the switching chart must be updated using the button.

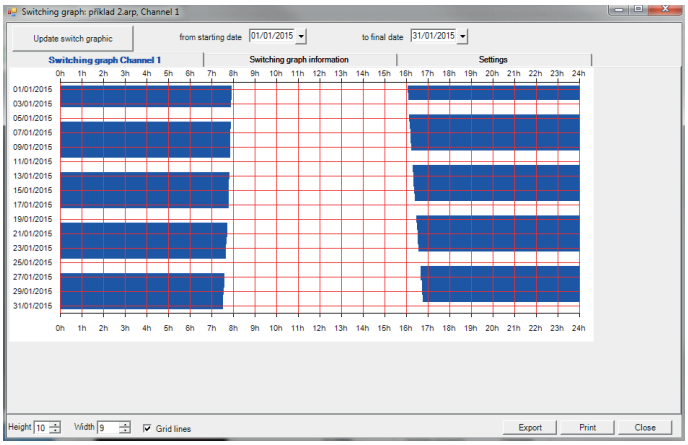


Figure 18: Switching chart for a specific date range

2.5.3 Switching chart info

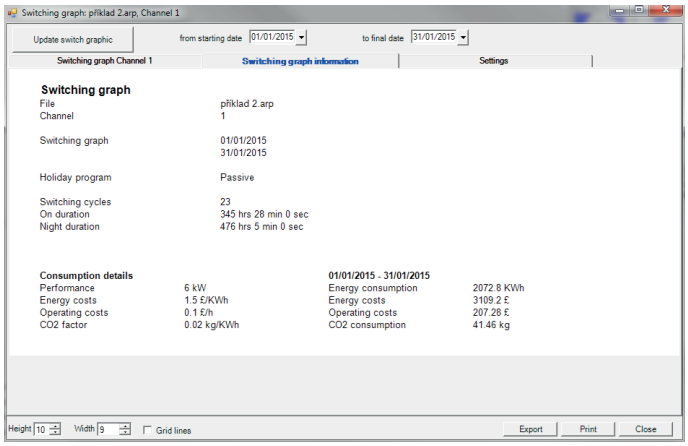


Figure 19: Switching chart info

Additional key figures and consumption data on the current switching chart is displayed on the switching chart info page.

2.5.4 Settings

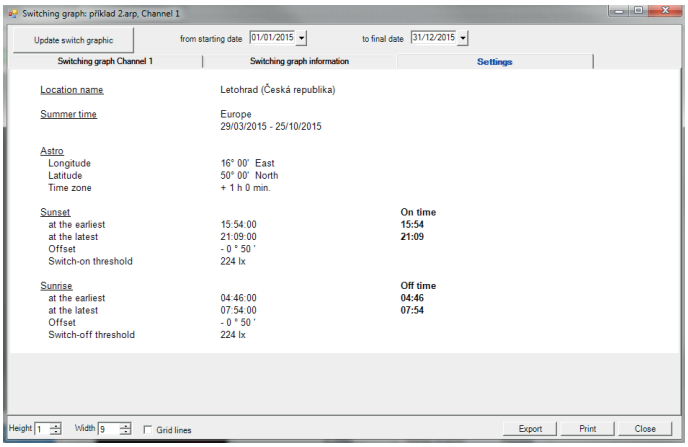


Figure 20: Switching chart settings

All settings for the current file are displayed on the Settings page.

2.5.5 Print switch graph

The current switch chart including the switching chart info and settings can be printed out via the „Print" button.
A dialogue box appears in which you can select a printer and adjust the print margins. The page margins must be adjusted to match the printer capabilities, to allow the full image to be printed. If the margins are too small, parts of the print image may lie outside the range which the printer is capable of printing.
If the full image is not printed out, although the page margins were set large enough, the width of the image must be adapted using the control element „Width".

2.5.6 Export switching time points

Using the „Export" button, switching data can be exported to a .csv format file. A dialogue box opens to save the file. The current file name with the channel number added to it is suggested as the file name.
CSV format files (comma separated values) are formatted in text format. In this case, ";" is used as a separator, as several applications can work better with this separator to visualise the data.
One line with all switch-on and switch-off points for the corresponding day is created for each day. The date of the affected day is shown at the start of the line. Switch-on and switch-off times then follow in a respective alternating order.
If switching on does not take place on a specific day (because switching on already took place on the previous day, for example), the first field "Switch-on time" is left empty.
If switching off does not take place on a specific day (because switching on already took place on the previous day, for example), the last field "Switch-off time" is left empty.

As the file is a pure text file, its content can be viewed in a standard text editor:

	A	B	C	D	E
1	Date	On time	Off time	On time	Off time
2	1.1.2015	0:00:00	7:55:00	16:05:00	
3	2.1.2015		7:55:00	16:06:00	
4	3.1.2015		7:54:00		
5	5.1.2015	16:09:00			
6	6.1.2015		7:54:00	16:10:00	
7	7.1.2015		7:53:00	16:11:00	
8	8.1.2015		7:53:00	16:13:00	
9	9.1.2015		7:52:00	16:14:00	
10	10.1.2015		7:52:00		
11	12.1.2015	16:18:00			
12	13.1.2015		7:50:00	16:19:00	
13	14.1.2015		7:49:00	16:21:00	
14	15.1.2015		7:49:00	16:22:00	

Figure 21: Section of an export file in text format

The file can also be opened using Excel, to obtain a formatted representation in the easiest way. In Excel, it is possible that the character ";" must be specified as a separator for the fields.

2. CONTROL ELEMENTS

2.6 Program Editor

In the program editor, you can create and modify the individual programs in a program file. A number of different program editors are available depending on the timer type.

The appearance of the program editor is adapted to the program type, as different data must be entered depending on the program type.

No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	Sunset	☐	☑	☑	☐	☐	☐	☐	08:10:00	☐	☐	☑	☑	☐	☐	☐	☑
02	17:00:00	☐	☐	☐	☑	☑	☑	☐	Sunrise	☐	☐	☐	☐	☑	☑	☑	☑
03	07:10:00	☐	☑	☑	☑	☐	☐	☐	07:30:00	☐	☑	☑	☑	☐	☐	☐	☑
04	10:20:00	☐	☐	☐	☑	☐	☐	☐	11:40:00	☐	☐	☐	☑	☐	☐	☐	☑

Figure 22: Program editor using the example of an astro timer

2.6.1 Define switching times

Figure 23: Text field for entry of switching times

Various rocker switches are available for the entry of time data. These switches can be used to specify the hour, minutes and seconds. For this purpose, a text field is displayed in which it is possible to enter the time manually. The astro button is available for the astro timers.

It is used to specify that the switching time should be calculated as the time of sunrise or sunset. Depending on what can be entered, the corresponding input options are either visible or hidden.

2.6.2 Select days of the week

On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su
Sunset	☐	☑	☑	☐	☐	☐	☐	08:10:00	☐	☐	☑	☑	☐	☐	☐
00:00:00	☐	☐	☐	☑	☑	☑	☐	Sunrise	☐	☐	☐	☑	☑	☑	☐
07:10:00	☐	☐	☐	☑	☐	☐	☐	07:30:00	☐	☐	☑	☐	☐	☐	☐
10:20:00	☐	☐	☐	☑	☐	☐	☐	11:40:00	☐	☐	☐	☐	☐	☐	☑

Figure 24: Select days of the week

The days of the week on which the timer should switch can be selected for both switch-on and the switch-off operations. Make sure that a switch-off day is also defined for each switch-on day. An error message will appear if not.

If astro switching must take place (e.g. switch-on time after sunset), the switch-off day is always on the following day and the switch-off days cannot be specified separately.

2.6.3 Edit program lines

2.6.3.1 Program lines

No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	00:00:00	☐	☑	☑	☐	☐	☐	☐	08:10:00	☐	☑	☑	☐	☐	☐	☐	☑

Figure 25: Program lines for weekly timers

Programs for weekly timers are repeated on a weekly basis without any time restrictions. The following entries are possible for a program line for weekly timers:

Switch-on time: If the insertion marker is set in the field for the switch-on time, the control elements for editing of the switching time will appear. Times ranging between 00:00:00 to 23:59:59 may be entered.

Switch-off time: Times ranging between 00:00:00 to 24:00:00 may be entered here.

Mon-Sun: Flagging the days of the week on which the timer should switch on or off.

Verify: Accepts the current line after the settings have been checked.

2.6.3.2 Insert new program lines

A new program line can be inserted via the menu item "Edit/Insert empty row" or using the button in icon bar. In the example below, empty program line no. 05 is created:

No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	Sunset	☐	☑	☑	☐	☐	☐	☐	08:10:00	☐	☐	☑	☑	☐	☐	☐	☑
02	00:00:00	☐	☐	☐	☑	☑	☑	☐	Sunrise	☐	☐	☐	☑	☑	☑	☐	☐
03	07:10:00	☐	☑	☑	☑	☐	☐	☐	07:30:00	☐	☑	☑	☑	☐	☐	☐	☑
04	10:20:00	☐	☐	☐	☑	☐	☐	☐	11:40:00	☐	☐	☐	☑	☐	☐	☐	☑
05	00:00:00	☐	☐	☐	☐	☐	☐	☐	00:00:00	☐	☐	☐	☐	☐	☐	☐	☐

Figure 26: Empty program line for weekly timers

The switch-on time, switch-off time and the days on which switching on and off should take place are entered in this program line.

2. CONTROL ELEMENTS

2.6.3.3 Create program line from the graphical display

Program lines can also be created directly from the graphical display. In this case, the program line is already filled with data automatically when it is created. To do this, click on the graphical representation and drag the cursor, keeping the mouse button depressed, over the range which you wish to create as the program line.
The corresponding range is shown in blue and a yellow field also shows the selected range with days of the week and time.

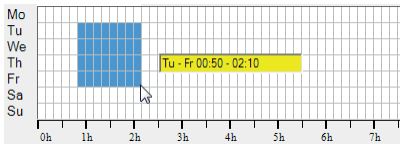


Figure 27: Select range

After selecting a range, a button also appears which is used to create a new program row directly from the selection.
Click on "Create line from graphics selection" to accept the corresponding program lines. The insertion marker is set in the field for the switch-on time. Here you can also adjust the switching time more precisely as required.

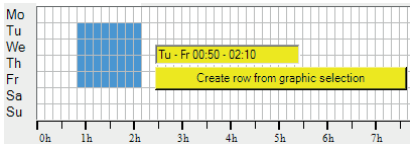


Figure 28: Create selected range

Figure 29: Acceptance of the selected .graphical display area in a new program line

2.6.3.4 Accept program line

When a program has been entered, it can be accepted via "Verify" button in the graphical display. Before the program line is accepted, the program line is checked for errors. If the program line contains errors, a corresponding error message is displayed and the respective errors marked in red.

If the program line is error-free, it is accepted and the graphical display is updated. Another mouse click the on "Verify" button will remove the program line from the graphical display.

2.6.3.5 Accept all program lines

By clicking on the "Verify" button in the icon bar, all program lines in the current program overview are checked and accepted. If errors are found in the program lines, these lines are coloured red accordingly (see "Accept program lines") and are not acceped. All other program lines are accepted. The graphical display is updated.

2.6.3.6 Flag program lines

Clicking on the line number of a program line (left column) flags this program line. The corresponding program line is displayed in yellow. The associated range is also coloured yellow in the graphical display.

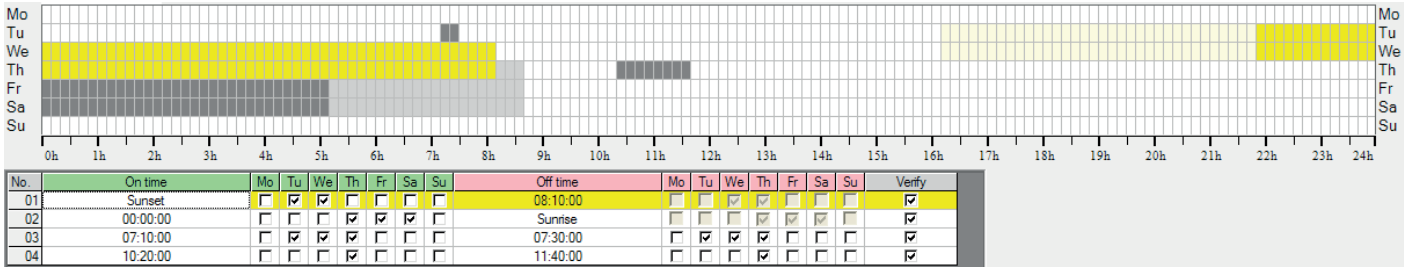


Figure 30: Flagged program line

Move the cursor with the mouse button depressed over several line numbers to select all these program lines together.

2.6.3.7 Delete program lines

To delete one or several program lines, the corresponding lines must be flagged first. Flagged program lines are deleted using the menu item "Edit/Delete row" or the „Delete" button in the icon bar.
To prevent the accidental deletion of program lines, this process must also be confirmed.

2.6.3.8 Move program lines

To move one or several program lines, the corresponding lines must be flagged first. Highlighted program lines are moved using the menu items "Edit/Move row down", "Edit/Move row up" or via the buttons "Move down" and "Move up" in the icon bar. The selected lines are moved up or down by one line respectively.

2.6.3.9 Cut program lines

To cut one or several program lines, the corresponding lines must be flagged first. Highlighted program lines are cut using the menu item "Edit/Cut" or the "Cut" button in the icon bar.

The corresponding program lines are removed without confirmation and copied to the clipboard. The graphical display is updated.

2. CONTROL ELEMENTS

2.6.3.10 Copy program lines
To copy one or several program lines, the corresponding lines must be flagged first.

Flagged program lines are copied using the menu item "Edit/Copy" or the "Copy" button in the icon bar. The corresponding program lines are copied to the clipboard.

2.6.3.11 Paste program lines
Program lines are pasted at the end using the menu item "Edit/Paste" (at the end) or via the „Insert"button in the icon bar.
All program lines which were previously copied to the clipboard using "Cut program lines" or "Copy program lines" are inserted at the end of the program overview. A check is performed first to establish whether a valid format for program lines is available in the clipboard. If a valid format is not available (if the clipboard has been used by other programs such as Word, for example), a line is not inserted.

If a valid format is available, a check is first performed to establish whether sufficient space is available in the program overview for the program lines to be added. If sufficient space is available, the program lines are inserted. If there is insufficient space for the program lines to be inserted, a corresponding message appears:

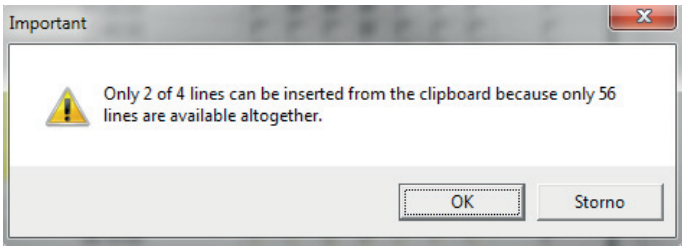


Figure 31: Warning that not all program lines can be inserted

The pasted program lines are not accepted initially.

2.6.4 Print program overview
The program overview can be printed out by selecting the "Print" button in the icon bar or the File/Print menu item. A dialogue box appears in which you can select a printer and adjust the print margins.

The page margins must be adjusted to match the printer capabilities, to allow the full image to be printed. If the margins are too small, parts of the print image may lie outside the range which the printer is capable of printing.

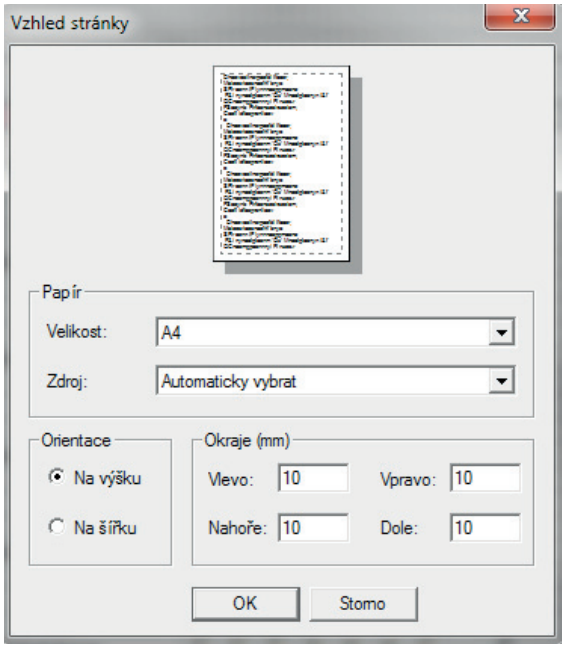


Figure 32: Print settings

Printing is started by clicking on OK.

No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Accepted
01	Sunset	-	X	X	-	-	-	-	08:10:00	-	-	X	X	-	-	-	X
02	00:00:00	-	-	-	X	X	X	-	Sunrise	-	-	-	X	X	X	-	X
03	07:10:00	-	X	X	X	-	-	-	07:30:00	-	X	X	X	-	-	-	X
04	10:20:00	-	-	-	X	-	-	-	11:40:00	-	-	-	X	-	-	-	X

Figure 33: Print out a program overview

2. CONTROL ELEMENTS

2.7 Dashboard

The dashboard offers both simplified operation and an overview of program data and consumption data.

The display of the dashboard depends on the timer type which was selected initially.

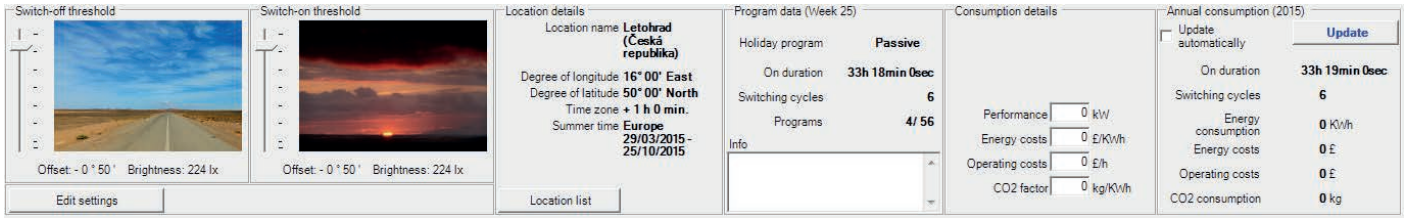


Figure 34: Dashboard

2.7.1 Threshold value settings

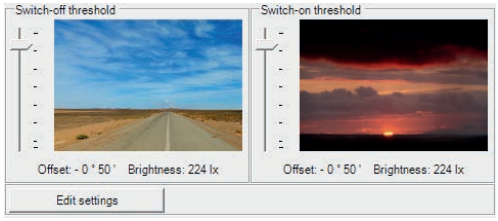


Figure 35: Threshold value settings for astro timer

For astro timers the precise adaptation of the switch-on and switch-off time to the brightness during the twilight period is calculated by entering an offset angle. The offset angle is the angle position of sun above (+) or below (-) the horizon. If the sun reaches the specified angle positions in the evenings (switch-on threshold) or in the mornings (switch-off threshold), then the timer will switch on or off accordingly.

The setting controls can be used to directly set an angle range of 0° (sun on the horizon) to -6° (end of civil twilight). Based on the angles set, mean brightness values are also calculated in Lux (400 lx at 0° to 1.2 lx at -6°) - these are used for guidance only and are displayed on the bottom right in the setting controls. The effect of changes to the switching thresholds is also displayed visually by the images next to the slide controls.

The offset angle can also be set via the "Edit settings" button. The settings window for entry of the offset angle permit angles within a range of +12° (above the horizon) to -12° (below horizon, end of nautical twilight). The angle range is larger than the direct entry via the settings controller (0° to -6°) and is intended for special applications. The angles selected in the settings window are accepted after confirming via the "OK" button in the threshold settings area of the dashboard. However, as soon as a change is made to a setting control, the input possibility for the corresponding setting control will once again be limited to the civil twilight range (0°, 400 lx to -6°, 1.2 lx).

Warning: Calculation of the mean brightness based on an offset angle is only possible with sufficient accuracy up to max. 0° (approx. 400 lx). Consequently, for offset angles larger than 0° to +12°, the "Brightness > 400 lx" information is displayed in the setting controls.

2.7.2 Location information

The location information shows all information on the currently selected location. All timers with the astro function need the location coordinates to determine the switching times.

The location can be edited via the "Location List" button.

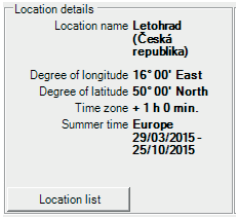


Figure 36: Location information

2.7.3 Program data

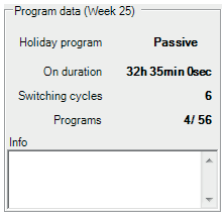


Figure 37: Program data without holiday program

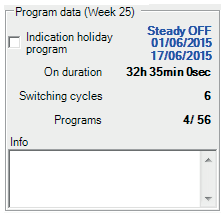


Figure 38: Program data with holiday program not displayed

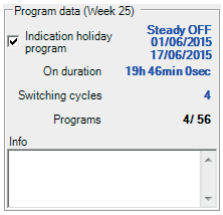


Figure 39: Program data with holiday program displayed

The program data displays the number of programs, the switch-on period and the number of switching cycles within the current week. The program data also shows whether a holiday program is active.

2. CONTROL ELEMENTS

2.7.3.1 Holiday programs

A holiday program is executed during a specified period (holiday period) and independently of the program settings. You can select between "Steady ON" (the timer is permanently switched on during the holiday period) and "Steady OFF" (the timer is permanently switched off during the holiday period).

If a holiday program is active during the current week, the holiday data is displayed in blue.

With "Indication holiday program", the holiday program can be displayed in the graphical display, as holiday programs are not usually displayed here.

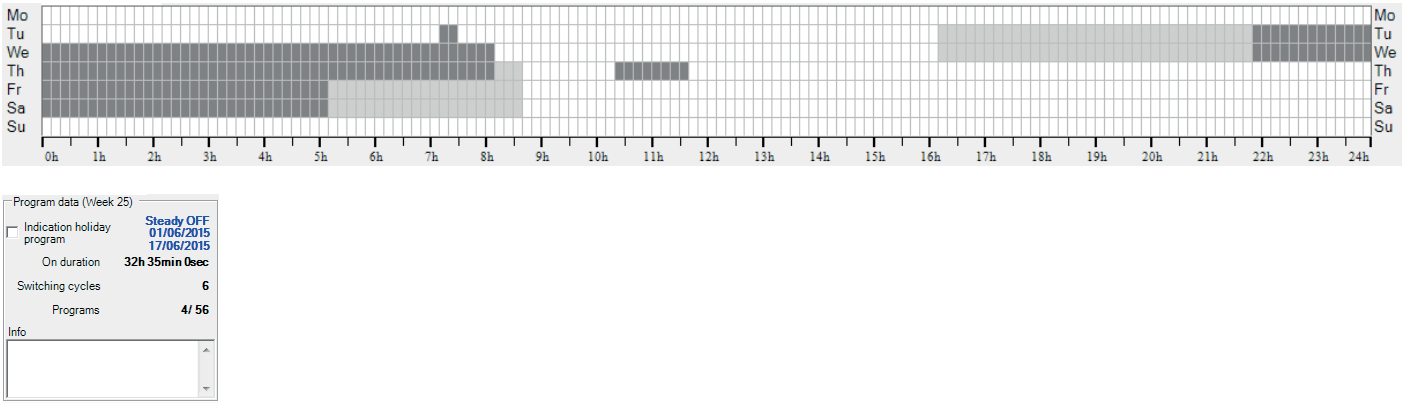


Figure 40: Holiday program - not displayed

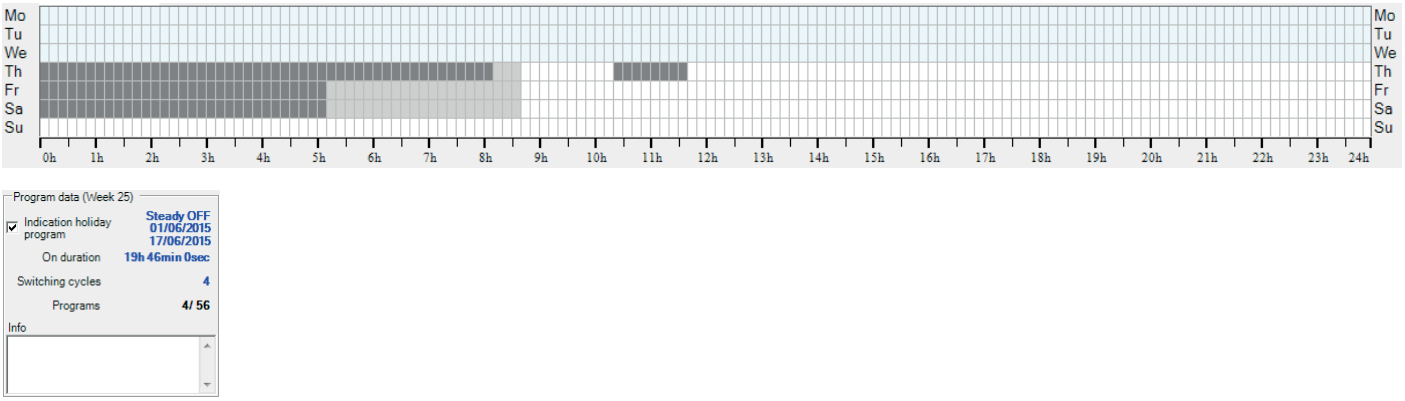


Figure 41: Holiday program - displayed

The holiday program is specified in the options. For further information, please see section Holiday period and holiday program.

2.7.4 Consumption data

In the consumption data, you can enter the connected power, the energy and operating costs and the CO_2 factor. The annual energy consumption, the energy and operating costs and the CO_2 consumption can be calculated using the data. This data always refers to the actual status of the programs and settings. If a program or settings have changed, the annual consumption data must be updated. "Update automatically" is the default setting. **Warning:** Calculation of consumption data is an extremely CPU-intensive process. If the annual consumption is calculated automatically, this can cause delays in the display if a large number of program lines have already been created.

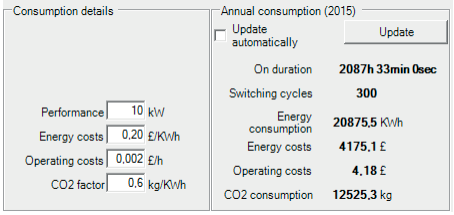


Figure 15: Consumption data

2.7.4.1 ON time calculation

The ON duration is calculated using the offset angle and must always be determined precisely. Additional information on this program file can also be entered in the info field.

3. SETTINGS

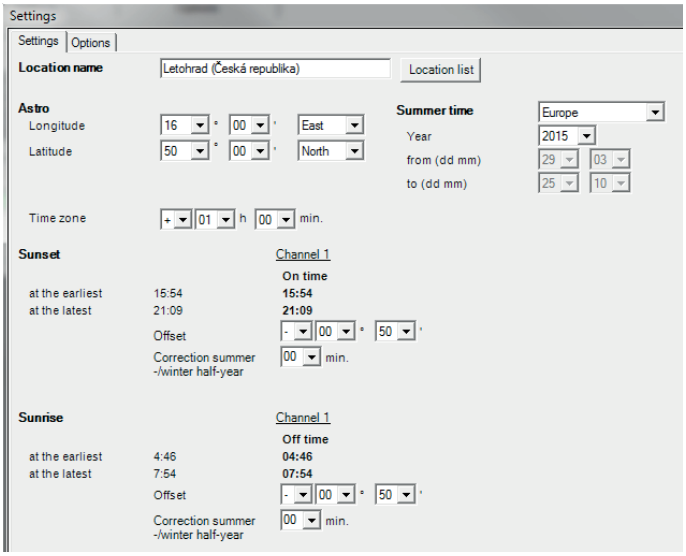


Figure 43: Settings using the example of an annual timer

The settings depend on the timer type. Not all settings are available for every timer type. All settings are described here.

3.1 Edit settings

The settings can be adapted by clicking on the „Edit settings" button. Alternatively, you can jump directly to the „Edit" dialogue box via the Edit/Edit settings menu item or the „Edit settings" button.
The number of setting possibilities varies according to the timer type (see overview below):

All timers have two operating modes, depending on whether or not "Expert Mode" is activated. Without activation, only a basic parameter set will actually be accessible „✓" and only after activation of Expert Mode in the Options dialogue box will the user be able to modify the parameters marked „✓".

	Product types			
Settings	**MAN-D16-001-A230**	**MAN-D16-002-A230**	**MAA-D16-001-A230**	**MAA-D16-002-A230**
Location name	✓	✓	✓	✓
Summer time	✓	✓	✓	✓
Astro location coordinates	–	–	✓	✓
Astro location coordinates in degrees° min'	–	–	✓	✓
Astro time zone	–	–	✓	✓
Astro offset	–	–	✓	✓
Astro summer/winter half-year correction	–	–	✓	✓

Table 2: Settings in Standard/Expert Mode

3.2 Define settings as standard

Specific values are already preassigned for the settings (and options) when the timer is delivered. It is possible to specify your own standards. Use the "Define as standard" button to define revised settings as standard settings. After confirming, the current settings and options are set as the standard. All new program files for the same timer type will then use these standard settings.

Warning:
- Both the settings and the options are accepted as standard.
- The standards are specific to the timer. This means that standards which have been defined for a one-channel astro timer, for example, do not apply to the two-channel astro timers. You can define your own standards for each timer type.

3.3 Location name

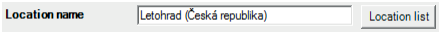


Figure 44: Location name

The location name may be entered manually. It is better to select the location name from the location list. To determine the location from the location list, click on the „Location List" button.
For further information, please see section 5.

If the location is determined using the Location List, all location parameters (summer time, location coordinates, time zone) are accepted so that these settings no longer need to be adapted.

3. SETTINGS

3.4 Summer time

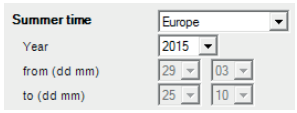


Figure 45: Summer time

There are four summer time settings:

A. Europe
Summer time is determined according to the European system. Summer time always starts on the last Sunday in March and always ends on the last Sunday in October. As the date for summer time is already a fixed setting, the setting options for the date are deactivated.

B. USA
Summer time is determined according to the American system. Summer time always starts on the second Sunday in March and always ends on the first Sunday in November. As the date for summer time is already a fixed setting, the setting options for the date are deactivated.

C. none
Summer time is not used.

D. special
The date for the start and end of summer time is set manually.

3.4.1 First year summer time

In the summer time year field, you can select the year from which point onwards summer time will be applied. Summer time is ignored for the previous years.

If the year is changed, the date calculations (start and end) are performed automatically as follows:

- Summer time according to the European and American systems: the start and the end of summer time is calculated as described above.
- Summer time special: The day of the week and the number of days per week in the month on which the change takes place for the first time is included. The day of the week is retained for the subsequent years. If the last day of the week falls in the given month, in the subsequent years the change will always take place on the same day which falls on the last day of the month. If this is a day other than the last day of the week, in subsequent years the change will always take place on the day of the month which has the same number of days of the week preceding it, as was the case in the first year.
  Example 1: If the change takes place on the last Saturday in April, then the change will also always take place on the last Saturday in April in the subsequent years, irrespective of how many Saturdays occur in the April.
  Example 2: In the first year, if the date falls on the second Thursday in April, then in the subsequent years this will also always be the second Thursday in April.
- No summer time: no calculations are performed

3.4.2 Summer time in the northern or southern hemisphere

In the southern hemisphere, the end of summer time within one calendar year always precedes the start of the next summer time period. If this is not taken into account accordingly for the given latitude (see longitude and latitude, the following warnings will be overlaid:

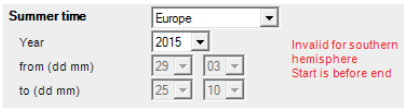


Figure 46: Invalid summer time setting for the southern hemisphere

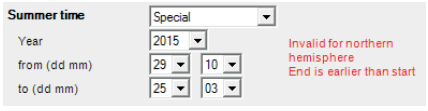


Figure 47: Invalid summer time setting for the northern hemisphere

3. SETTINGS

3.5 Astro

The sunset / sunrise times are calculated daily based on the saved geographical position and the current date. The switching behaviour is defined as follows:

Sunset = Switch on
Sunrise = Switch off.

3.5.1 Location coordinates

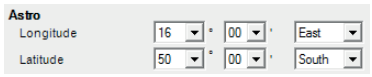


Figure 48: Longitude and latitude

Depending on the activation of Expert Mode, the fields for the entry of arcminutes can be modified or remain inactive.

The geographical position can be entered in two different ways:

- **Directly** by entering the geographical coordinates in precise degrees or also in precise arcminutes (if Expert Mode is active)
  Degree of longitude: Input range West 180° 00′ to East 180° 00′
  Degree of latitude: Input range North 90° 00′ to South 90° 00′
- **Alternatively** the position of the place of use can be determined from the location list. For further information, please see section 5.

3.5.2 Time zone

Figure 49: Time zone

The time zone may be entered manually. Alternatively, the time zone can be determined using the location list. For further information, please see section 5. The time zone affects the calculations for sunset and sunrise.

The time difference is set using the Greenwich Meridian. The time zone is dependent on the longitude and the political national boundaries.

3.5.3 Sunset, sunrise, switching times and offset

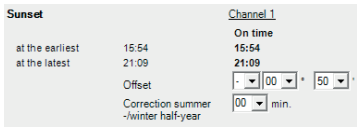


Figure 50: Sunset and switch-on time at an offset of -0° 50′

Figure 51: Sunrise and switch-off time at an offset of -0° 50′

Here, the earliest and latest sunset and sunrise are displayed for one year. The calculation is performed based on the data on the summer time, the time zone, the geographical longitude and the geographical latitude.
The astro timer is switched on respectively at sunset and sunrise times. Here the offset is taken into account, to allow the switching times to deviate from the sunset time and sunrise time.

The following can be entered as an offset value:

- Arc value in arcminutes within the range of max. +/- 12° 00′
  (The basic setting is 00° 00′ = Geometric centre of the sun is located on the horizon).
  The calculated sunrise/sunset takes place at 00° 50′. The upper edge of the sun is just touching the horizon, i.e. the sun's disc is therefore no longer visible.
- Time value in minute increments up to max. +/- 2 h 00 min.

The selection between the angle offset or time offset is performed in the Options menu. The setting in degrees always refers to the angle between the centre of the sun and the horizon.

Warning: An angle offset directly influences the threshold values in the dashboard due to a direct correlation between the angle and brightness.

The angle offset function is intended for professional applications, e.g. street lighting. The setting of an angle offset means that the illuminance fluctuates only slightly in relative terms at the switching point during the course of the year.
Setting a time offset leads to a significant fluctuation in the illuminance at the switching point throughout the year, as a result of the twilight duration which is dependent on the annual time and the latitude. In Fig. 51, the switch-off time correlates exactly with the calculated sunrise, as the offset setting is set to -00° 50′ (i.e. the upper edge of the sun is touching the horizon and the sun is about to rise).
The offset setting is performed separately for sunrise and sunset.

Summer/winter half-year correction (only in Expert Mode)
Correction facilitates an additional adjustment of the varying atmospheric aerosol turbidity during the summer and winter half-year. For this purpose, a sinusoidal time correction with an adjustable correction factor (0 min, 1 min … 30 min) is subtracted from/added to the calculated switching times (including offsets) throughout the entire year. The correction value setting causes an extension of the daily ON time in the middle of the winter half-year by up to 60 minutes (in the mornings, OFF is up to 30 minutes later and in the evenings, ON is up to 30 minutes earlier).
In the middle of the summer half-year, the correction setting shortens the daily ON time by as much as 60 minutes (in the mornings, OFF is up to 30 minutes earlier, and in the evenings, ON is up to 30 minutes later).
The transitions between both extreme values are fluid. A neutral behaviour is produced with respect to the entire ON time within one year.

3. SETTINGS

3.5.3.1 Special case switching time

This special case can occur in the Polar regions (latitude greater than 65 degrees north/south), or in the case of an incorrect combination of time zone and longitude information. Here, the calculations can be too imprecise or illogical and then no longer correspond exactly to the local conditions. Consequently in such cases, the switch-on time is set to 23:59 and the switch-off time to 00:00. A warning is also displayed in blue text.

This special case applies only to switching times calculated according to the sunset and sunrise and not to permanently set switching times in the program editor.

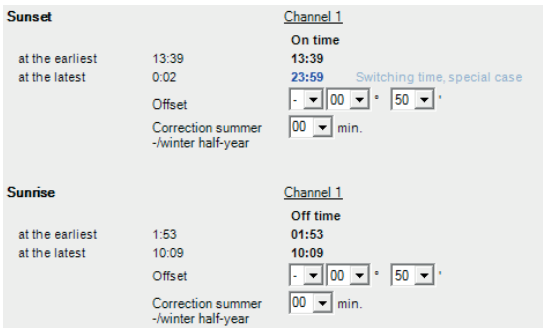


Figure 52: Warning message - special case switching time

3.5.3.2 No sunrise, no sunset

In polar regions (latitude greater than 65 degrees), there are days when the sun does not rise (polar winter) or on which the sun does not set (polar summer). For these cases, a corresponding message is displayed in blue text as a warning.

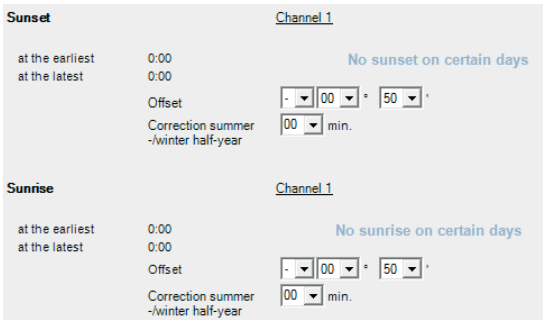


Figure 53: Warning message - no sunrise, no sunset

4. OPTIONS

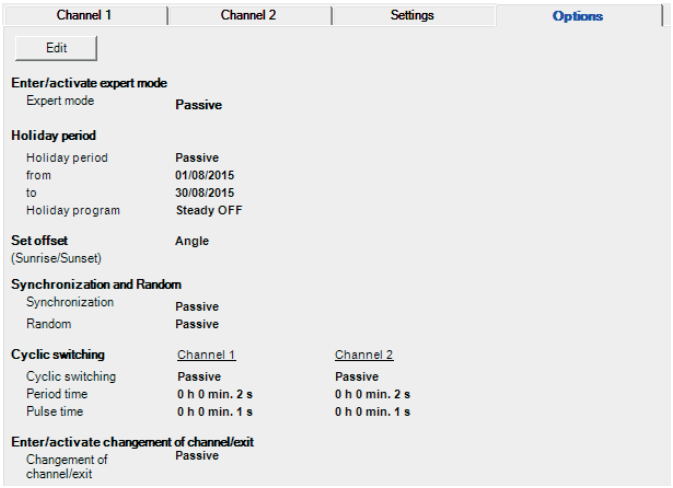


Figure 54: Options using the example of a two-channel astro timer

Figure 55: Options using the example of a one-channel week timer

The options depend on the timer type. Not all options are available for every timer type. All options are described here.

4.1 Edit options

The options can be adjusted by clicking on the „Edit settings“ button. Alternatively, you can jump directly to the „Edit“ dialogue box via the Edit/Edit settings menu item or the “Edit” button.
The number of setting possibilities varies according to the timer type (see overview below):

All timers have two operating modes, depending on whether or not Expert Mode is activated. Without activation, only a basic set of options will actually be accessible „✓“ and only after activation of Expert Mode in the Options dialogue box will the user be able to modify the parameters marked „✓“.

	Product types			
Options	**MAN-D16-001-A230**	**MAN-D16-002-A230**	**MAA-D16-001-A230**	**MAA-D16-002-A230**
Adjustable Expert Mode	✓	✓	✓	✓
Holiday program	✓	✓	✓	✓
Offset settings (time or angle)	–	–	✓	✓
After-run control input	✓	–	✓	–
Extra control input	✓	–	✓	–
Control input OFF	✓	–	✓	–
Synchronisation 50/60 Hz	✓	✓	✓	✓
Randomisation function	✓	✓	✓	✓
Cycle function	✓	✓	✓	✓
Channel change 1<>2	–	✓	–	✓

Table 3: Options in Standard/Expert Mode

4. OPTIONS

4.2 Define options as standard

Specific values are already preassigned for the options (and settings) when the timer is delivered. It is possible to specify your own standards. Use the "Define as standard" button to define revised options as the standard options. After confirming, the current options and settings are set as the standard. All new program files for the same timer type will then use these standard settings.

Warning: Both the options and the settings are accepted as standard.

4.3 Expert Mode

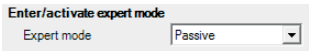


Figure 56: Expert Mode

All timers have two different operating modes: Expert Mode Active and Expert Mode Passive. Expert Mode can be activated at this point in order to make all functions available.

4.4 Holiday period and holiday program

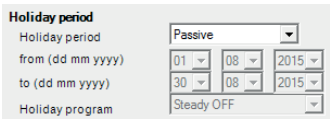


Figure 57: Holiday period and holiday program

A holiday period can be set at this point. The timer remains permanently ON or OFF for the holiday period. The programs are not taken into account during holiday periods.

Passive Default; An activated holiday program switches to passive automatically when the end date 24:00 hours is reached. However, this can be disabled during the elapsed time by selecting PASSIVE.

Active Activates the holiday program at 00:00 hours on the start date

Activation of the holiday period opens the input field with default settings

from 01.08.20yy of current year

to 31.08.20yy of current year

Holiday period program

Steady ON - The selection causes permanent activation of the outputs within the date range

Steady OFF - The selection causes permanent deactivation of the outputs within the date range

In the event that the end date precedes the start date, an error message is overlaid and it is not possible to save the settings. In the example shown in Fig. 57, the time is permanently switched off from 01.08.2014 00:00 to 30.08.2014 24:00, irrespective of the programs.

4.5 Offset settings

Figure 58: Offset settings

For astro programs, the timer switches to sunset and sunrise respectively. If you wish to move the switching operation (e.g. in the evenings, the timer should switch later during the twilight phase after sunset, or in the mornings, earlier during the twilight phase before sunrise), you can set the movement of the switching point under "Offset" in the "Settings" dialogue box.
The offset settings contain two different methods to perform the settings. For further information, please see section Sunset, sunrise, switching times and offset.

A distinction is made between:

- **Angle:** "Offset" is set in degrees and minutes
  The timer switches when the sun reaches the set angle position. In order to switch within the twilight range in both the mornings and the evenings, negative offset angles (sign -) must be entered for sunset and sunrise.
- **Time:** "Offset" is set in hours and minutes
  The timer switches with a time lag with respect to sunset and sunrise according to the time values which have been set.
  In order to switch within the twilight range in both the mornings and the evenings, positive offset times must be entered for sunset and negative offset times for sunrise.

Warning: The threshold value settings can only be used for angle offsets as the threshold values are based on the sun's arc above (+) and below (-) the astronomical horizon.

4. OPTIONS

4.6 Control input

The control input is an additional timer input. The control input is only available for the one-channel astro time. You can enter additional timer functions via this input independently of the programs.

4.6.1 After-run

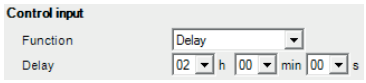


Figure 59: Control input with after-run time

The control input is connected logically to the output of channel 1 via an OR-operation, i.e. during the control input activation period, the relay switches on independently of the set programs.
If the control input becomes inactive again, the timer will continue to remain ON for the duration of the set after-run time.
After-run time setting range 0 h:00 min:00 s ... 23 h:59 min:59 s
The control input can be retriggered within the after-run time.

4.6.2 Extra (in Expert Mode only)

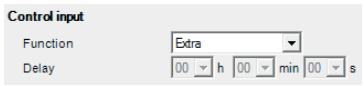


Figure 60: Extra control input

This selection in Expert Mode reconfigures the control output to the EXTRA function.
Activation of the control input then triggers the same function as would the selection of EXTRA in the timer FUNCTION menu (switching preset).

4.6.3 OFF (in Expert Mode only)

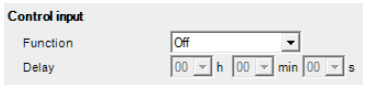


Figure 61: Control input OFF

Selection in Expert Mode reconfigures the control output to the OFF function.
Thus the timer switches off when the control input is actuated if the internal status "ON" is detected.

4.7 Synchronisation and Randomisation

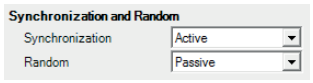


Figure 19: Synchronisation and Randomisation

4.7.1 Synchronisation (in Expert Mode only)

Activation causes synchronisation of the time basis to a network frequency of 50 Hz or 60 Hz. Thus the chronometric precision of the timer corresponds to the precision of the network frequency in the long term.

4.7.2 Randomisation

Function for presence simulation. If the randomisation option is activated, then the programmed switching-on times and switching-off times are randomly shifted within the range by +/- 15 minutes for each switching cycle.

4.8 Cyclic Switching

Figure 63: Cyclic Switching

Cyclic switching refers to channel 1 and/or 2. It can be activated or passivated individually for each channel. As a result of activation of the cycle function, the time segments of the normally uninterrupted activation are replaced by a cyclic sequence of periods within which a switch-off period follows a switch-on pulse. (Switch-off duration = Period time – Pulse time)

The cycle function always starts with the switch-on pulse. It is possible to specify the period time and the pulse time independently of one another.

Period time: Minimum 0 h : 00 min : 02 s, Maximum 2 h : 00 min : 00 s
Pulse time: Minimum 0 h : 00 min : 01 s, Maximum 1 h : 59 min : 59 s

The pulse duration must be at least one second shorter than the period duration. The last running activation period can be cut off at any position desired. If invalid values have been set, the corresponding error messages are overlaid:
Warning: Cyclic switching is not taken into account in der graphical representation or the switching graph!

4.9 Channel change

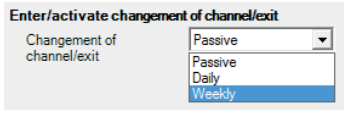


Figure 64: Channel change

With two-channel timers, to both conserve and simultaneously use connected operating equipment such as lamps and lights, a regular change of the outputs assigned to the channels can be activated.

Thus it is possible, for example, to use one of two light groups for an entire night and the other for part of the night only. Never-theless, via a regular exchange of the outputs, it is possible to achieve a lifetime which is of identical length on average. Following activation of the channel change option, the outputs are exchanged according to the selection once a day (12:00 midday) or once a week (Sundays at 12:00 midday).
Warning: The channel change is not taken into account in the graphical representation!

5. LOCATION LIST

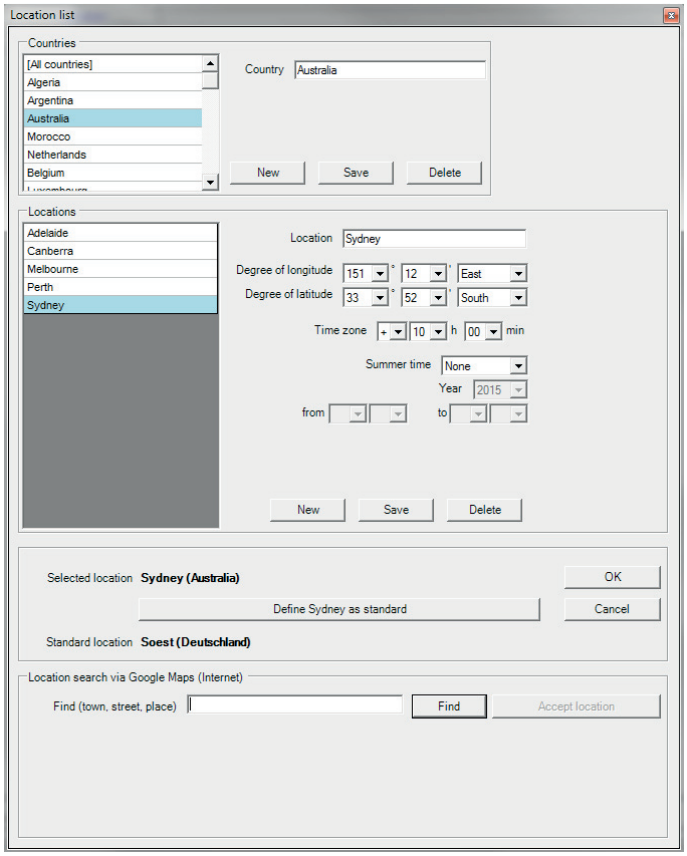


Figure 65: Location List

The location list is used to simplify entry of location-related data. By selecting a location from this list, summer time, time zone, latitude and longitude for this location can be accepted in the settings for the timer.

The settings (latitude, longitude, time zone and summer time) correspond to the setting options described in detail earlier.

The respective locations are assigned to a country. By clicking on a country, all locations assigned to this country are displayed. Clicking on a location will show the settings for the corresponding location.

5.1 Location search and add location

The easiest way to find a location including all data is the location search. The location search uses Google Maps.
Warning: An existing internet connection must be available so that the search can be performed.
You can enter city/town names, street names, place names and building names etc. in the location search. In this example, a search is performed for Venceslav Square without additional information.

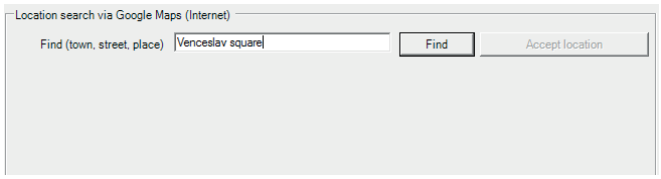


Figure 66: Location search

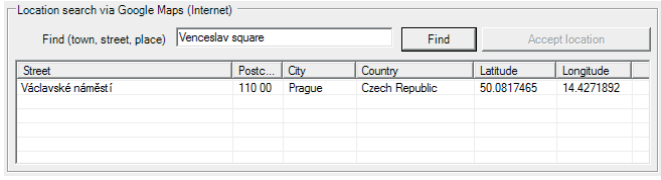


Figure 67: Location search – Search results

All Venceslav Square are returned as the result.

A location can be used by double-clicking on it. This will set all location coordinates, time zone and summer time. If the associated country is not yet available, it is added.

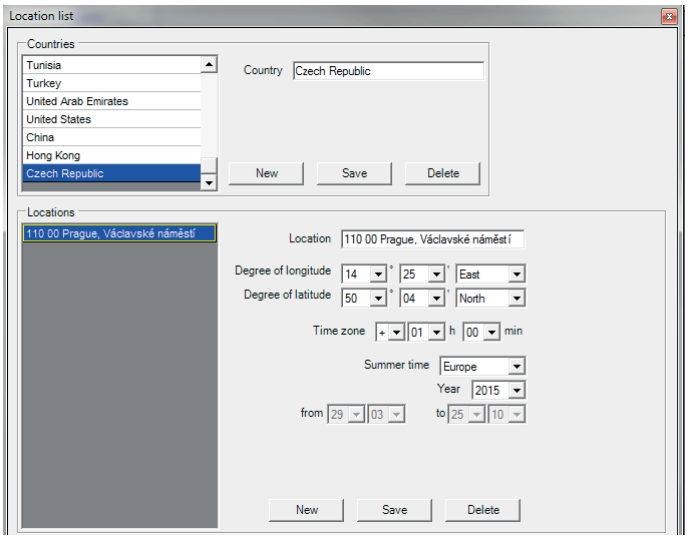


Figure 68: Newly added location

5. LOCATION LIST

5.2 Specify a location as the standard location

The location coordinates are essential for all astro timers for calculation of the switching times. Consequently, you must set these location coordinates in every program file.
To avoid the need to perform this step for every new program file, you can define a standard location. New program files will then take all location coordinates from the standard location. Click on the button to specify the currently selected location (here Prague, Václavské náměstí) as the standard location.

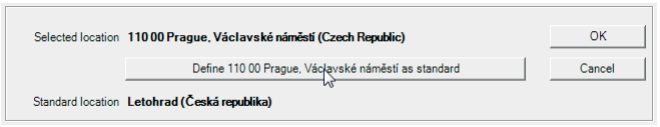


Figure 69: Specify a location as the standard location

5.3 Edit country

Additional countries can be added manually to the existing countries. Countries can also be deleted or country names changed.

5.3.1 Add a country

A new country can be added by clicking on "New" button. The wording "New record" appears. You can enter the country name in the country name field. Click on "Save" button to save the country.
Any number of countries desired can be entered.

5.3.2 Edit a country

If you need to change the country name (e.g. Germany), simply enter the new name in the country name field. The wording "Germany changed" appears for the corresponding country. Save the change using "Save" button. The wording "Germany saved" appears.

5.3.3 Delete a country

Click on "Delete" button to delete a country. Before deleting the country, a confirmation prompt appears asking if you really want to delete the country. If you confirm the confirmation prompt, a check is performed to confirm whether towns have been entered for this country. If this is the case, a second confirmation prompt will appear. The country and all towns assigned to the country will only be deleted after this confirmation prompt has been confirmed.
Warning: The country and towns will be deleted permanently!

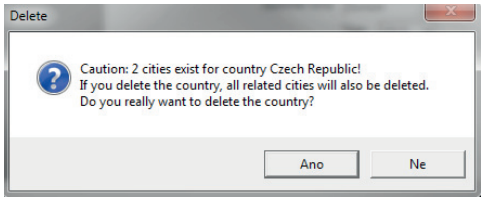


Figure 70: Confirmation prompt for deletion of a country

5.4 Edit locations

You can also manually add, edit and delete any number of locations as desired for each country.

5.4.1 Add a location

Click on "New" button to add a new location. The wording "New record" appears. You can enter the location name in the location name field. All other setting options are already described in detail above. Click on "Save" button to save the location.
You can enter as many locations as you wish for each country.

5.4.2 Edit a location

If you wish to make changes to the settings for a location, the wording "London changed" will appear for the corresponding location. Click on "Save" button to save the location. The wording "London saved" appears.

5.4.3 Delete a location

Click on "Delete" button to delete a location. Before deleting the location, a confirmation prompt appears asking if you really want to delete the location. If the confirmation prompt is confirmed, the location will be deleted from the list.

6. TIME SWITCH TYPES

6.1 Weekly timer

Two different timer types are supported by this application.

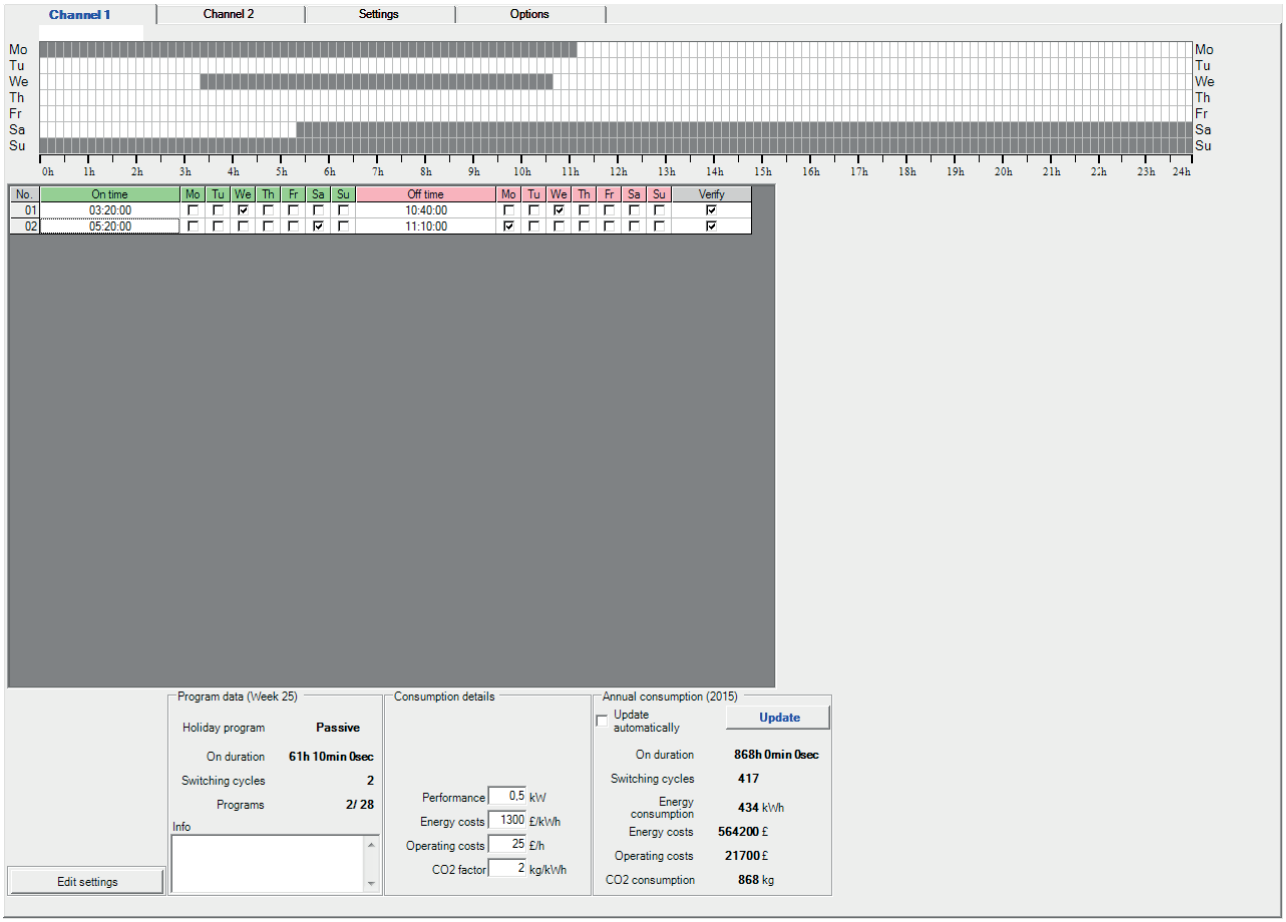


Figure 71: Weekly timer

Programs which should be repeated on a regular weekly basis can be programmed in the weekly timer. A switch-off point must be available for every switch-on point. For further information, please see section 1.4.2.

6.1.1 Edit program lines

6.1.2 Switching ON and OFF on the same switch-on and switch-off days

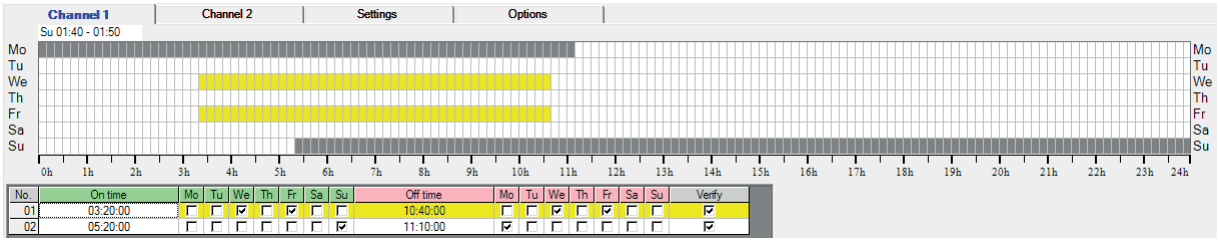


Figure 72: Switching ON and OFF on the same switch-on and switch-off days (yellow marked)

In this example, the timer switches ON at 3:20:00 and switches OFF at 10:40:00 every week on Wednesdays and Fridays respectively.

6.1.3 Switching ON and OFF on different switch-on and switch-off days

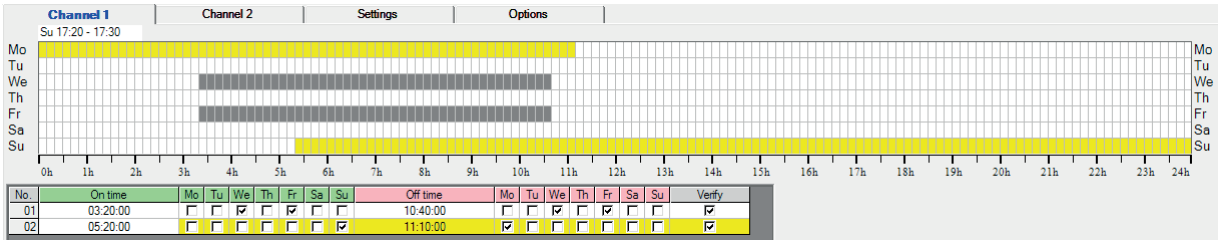


Figure 23: Switching ON and OFF on different switch-on and switch-off days (yellow marked)

In this example, the timer switches ON on Sundays at 5:20 and OFF again on Mondays at 11:10 every week.

6. TIME SWITCH TYPES

6.1.4 Accept a program

When a program has been entered, it can be accepted via "Verify" in the graphical display. Before the program line is accepted, a check is performed to make sure this program line is error-free. If the program line contains errors, an appropriate error message is output and the respective errors marked in red.

6.1.5 Error messages

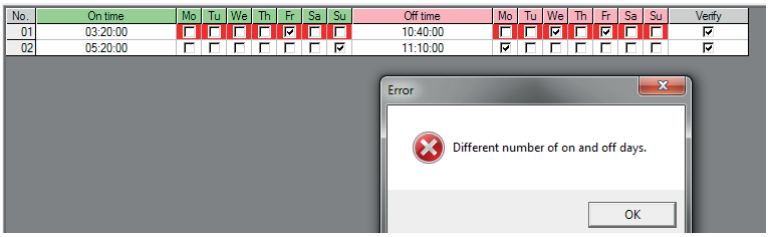


Figure 74: Error message "Different number of on and off days"

In this program line, more switch-off days (2) than switch-on days (1) are set.

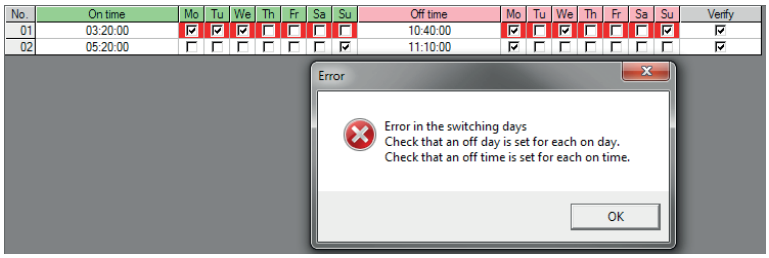


Figure 75: Error message "Error in the switching days"

In this program line, the switch-off days have not been set in agreement with the switch-on days. The timer switches ON and OFF on a Monday. The timer switches ON on a Tuesday but is no longer switched OFF.
The timer should be switched ON on a Wednesday, without having been switched off previously. However, switching ON is only possible if the timer was switched off previously.

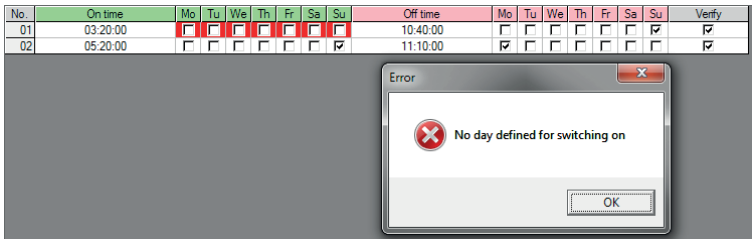


Figure 76: Error message "No day defined for switching on"

No switch-on day has been set.

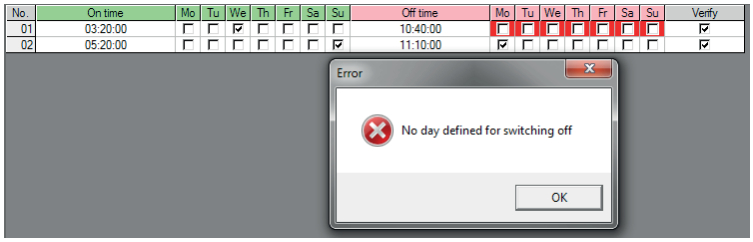


Figure 77: Error message "No day defined for switching off"

No day for switching off has been set.

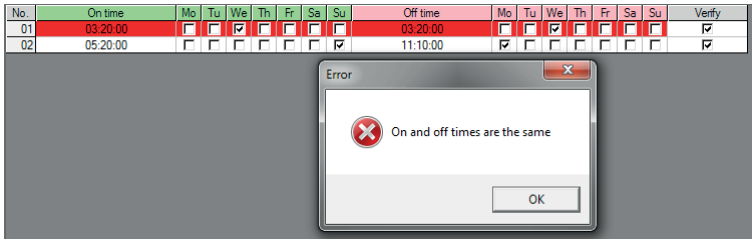


Figure 78: Identical switching ON and OFF times

The timer should be switched both ON and OFF on a Monday at 03:20.

6. TIME SWITCH TYPES

6.2 Astro timer

Astro timers are an extension to weekly timers. Here it is also possible to select switching times according to astro, i.e. depending on the sunset (switch-on time) and the sunrise (switch-off time).You can change the switching time of the timer within the twilight phase using the threshold value slide controls.These slide controls have a direct effect on the offset settings for sunset and sunrise.

All programs in Section 6.2 are based on the following parameters:
- Location: Letohrad (Czech Republic)
- Summer time: Europe
- Offset: Sunset: -03° 00'
  Sunrise: -03° 00'

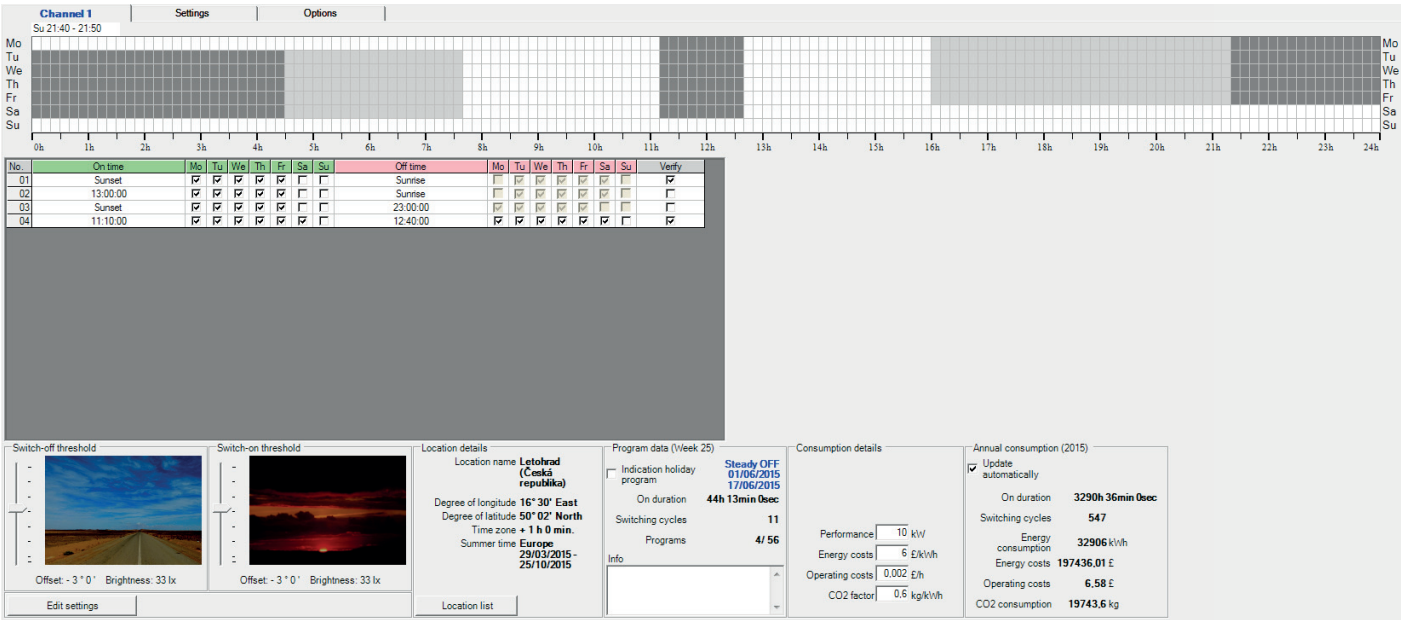


Figure 79: Astro timer

6.2.1 Astronomical calculation of the switching times

The switching times which depend on the sunrise or sunset change with:
- the summer time settings
- the time zone
- the longitude
- the latitude
- the offset to the sunrise and sunset
- the correction for the summer/winter half-year
- the current date.

Sunrise and sunset take place when the sun's centre is positioned exactly -0° 50' below the horizon. In this angle position, the upper edge of the sun's disc touches the horizon line, i.e. in this position the sun has just set in the evenings, or is just about to rise in the mornings and is therefore visible in both cases. The angle of -0° 50' corresponds to the offset default setting when a new file is opened. The timer always switches in this status when the sun's centre point is -0° 50' below the horizon.

You can influence this switching time via the offset settings. If for example the offset is set to -3° for both sunset and sunrise, then the timer will switch in the evenings and mornings when the sun's centre point -3° lies below the horizon, i.e. in the respective twilight phase.

The sun's position can be calculated very precisely, which then allows for the highly precise calculation of the cycle times. These values are saved with the exception of the current date. You can view the settings via the "Settings" tab.

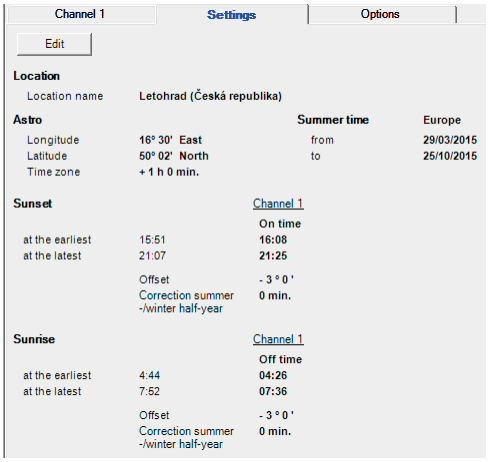
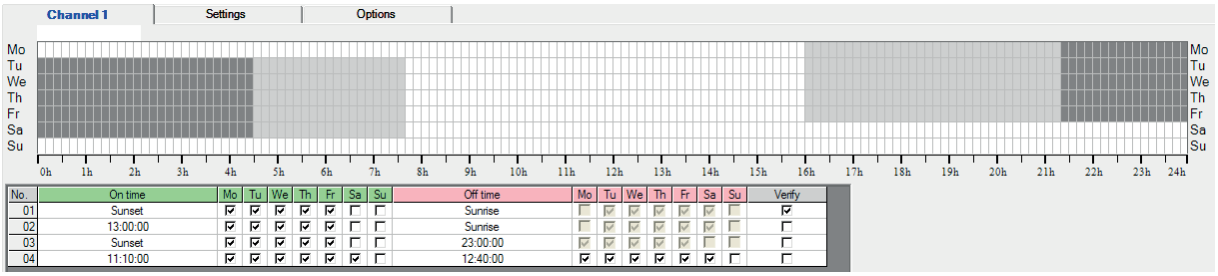


Figure 80: Settings for an astro timer

In this example, the earliest sunset is at 15:51, however the earliest switch-on time is 16:08 as an offset of -3° to the sunset is still set. The earliest sunrise is at 4:44 and the earliest switching-off time is 04:26, as an offset of -3° to the sunrise has been selected.
For a combination of settings, the switching times can vary throughout the year depending on the current date. Therefore there are times at which the timer can switch on or off according to the date in the year. These annual time-dependent fluctuation ranges are coloured light blue in the graphical display. The ranges in which the timer is always switched on are coloured dark grey in the graphical display.
Figure 81: Example of usage light/dark gray

6. TIME SWITCH TYPES



6.2.2 Edit program lines

Figure 82: Program lines for an astro timer

Programs for astro timers are repeated on a weekly basis without any time restrictions. The following entries are possible for a program line for astro timers:

Switch-on time: If the insertion marker is set in the field for the switch-on time, the control elements for editing of the switching time will appear. Times ranging between 00:00:00 to 23:59:59 may be entered. The astro button can also be used to determine the switching-on time according to the sunset.

Switch-off time: Times ranging between 00:00:00 to 24:00:00 may be entered here. The astro button can also be used to determine the switching-off time according to the sunrise.

Mon-Sun: The days of the week on which the timer should switch ON or OFF.

Warning: If the switching-off time should follow an astro program, it will not be possible to edit the switching-off days. The switching-off days are calculated using the switching-on time and the switching-on days. If the switching-on time < 12:00, the switching-off day will be set on the switching-on day (switching ON and switching OFF on the same days of the week). If the switching-on time > 12:00, the switching-off day will be set on the day following switching-on day (switching ON and switching OFF on the following days).

Verify: Accepts the current line after the settings have been checked.

6.2.3 Switching ON at sunset, switching OFF according to clock time

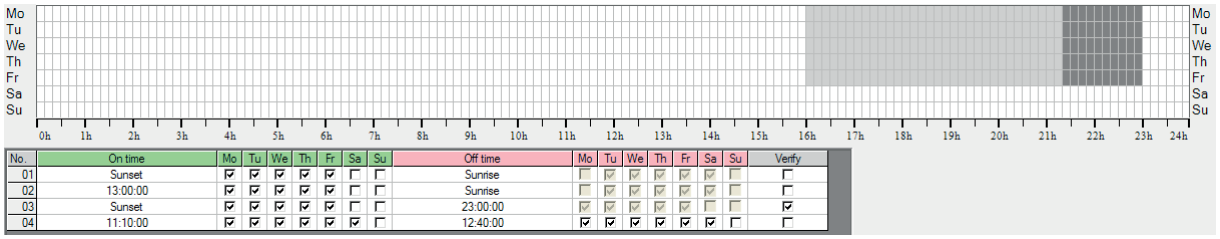


Figure 83: Switching ON at sunset, switching OFF according to clock time

In the figure above, a program line is created in which the astro timer is switched on from Monday to Friday respectively at sunset and switched off no later than 23:00. Conditions: Offset sunset and sunrise -03° 00', European summer time, location Letohrad (Czech Republic).

The graphical display shows a light grey area from 16:00 to 21:20 respectively. This is the range from the earliest switching-on time to the latest switching-on time throughout a year. A dark grey area is visible between 21:20 and 23:00. This is the range in which the timer is always switched on.

It is clear from the program lines that the days for the switching-off time are deactivated. The days for the switching-off time are set automatically and cannot be modified. They are set as follows.

6.2.3.1 Switching ON at sunset, switching OFF on the next day

If the switching-off time is set as earlier than 12:00, the switching-off days are set on the following day.

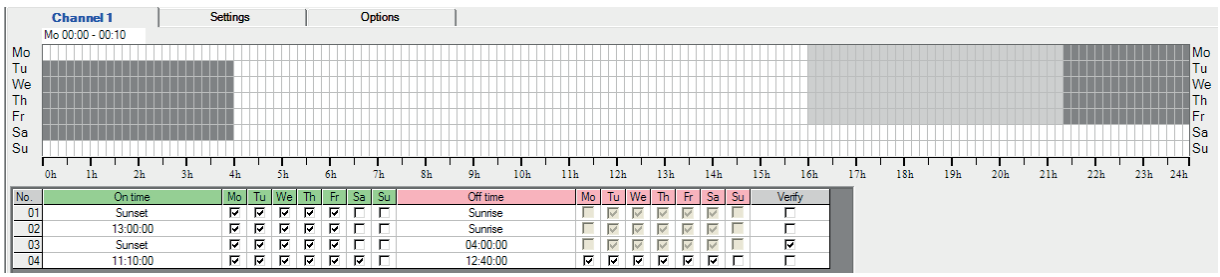


Figure 84: Switching-ON time at sunset, switching OFF on the next day

6. TIME SWITCH TYPES

6.2.3.2 Switching ON at sunset, switching OFF on the same day

If the switching-off time is greater than or equal to 12:00, the switching-off days are set on the same day as the switching-on days if the switching-off time is greater than the earliest switching-on time throughout the year, otherwise a message will appear that no switching is taking place.

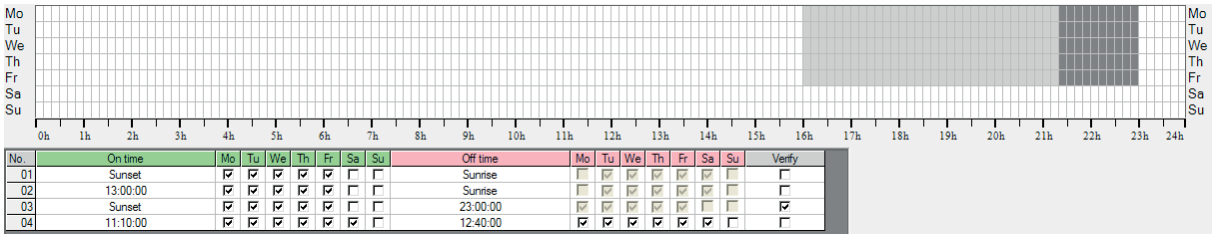


Figure 85: Switching-ON time at sunset, switching OFF on the same day

When calculating the switching-off time on the current date, the timer checks whether the switching-off time precedes the associated switching-on time. If this is the case, the timer will not switch on.
If the switching-off time (in this example 19:00) precedes the latest possible switching-on time (in this example 22:08 astro offset -3° 00'), this may prevent the device from switching on on several days. The entire range is then coloured light grey.

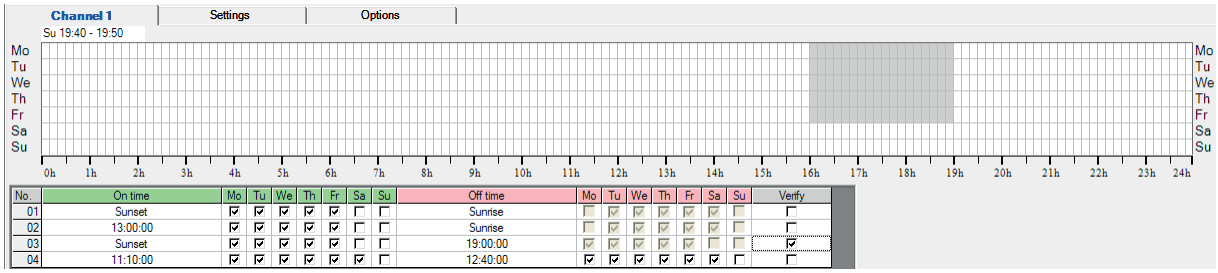


Figure 86: Switching-on time at sunset, switching-off before the latest switching-on time

6.2.3.3 Invalid switching time points

If the switching-off time (in this example 13:00) precedes the earliest possible switching-on time (in this example 16:08, the timer will not switch on on any day throughout the year. In this case, a warning message is displayed and the switching-off time is coloured blue.

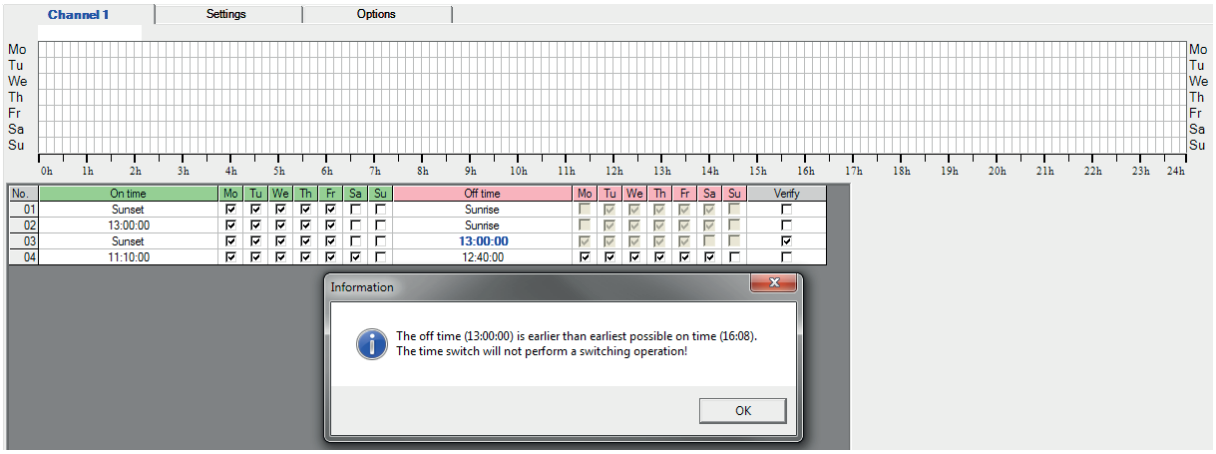


Figure 87: Warning message: Switching-on time at sunset, switching-off time precedes the earliest possible switching-on time

6. TIME SWITCH TYPES

6.2.4 Switching ON according to clock time, switching OFF at sunrise

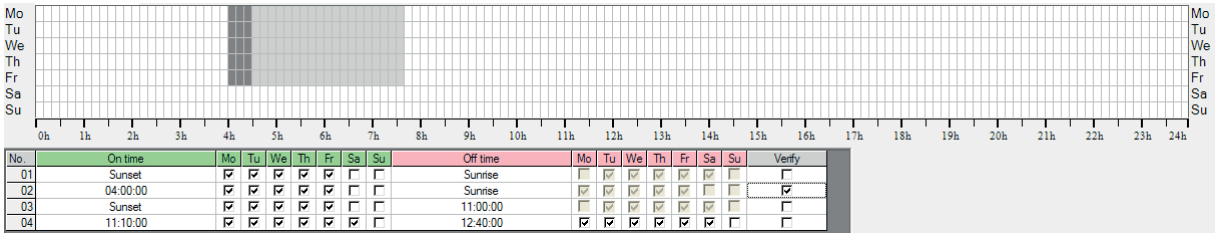


Figure 88: Switching ON according to clock time, switching OFF at sunrise

In the figure above, a program line is created in which the astro timer is switched on at 04:00 respectively and switched off again at sunrise. The graphical display shows a light grey area from 04:30:00 to 07:40:00 respectively. This is the range from the earliest switching-off time to the latest switching-off time throughout a year. A dark grey area is visible between 04:00:00 and 04:30:00. This is the range in which the timer is always switched on. It is clear from the program lines that the days for the switching-off time are deactivated. The days for the switching-off time are set automatically and cannot be modified. They are set as follows:

6.2.4.1 Switching ON according to clock time, switching OFF on the next day

If the switching-on time is greater than or equal to 12:00, the switching-off days are set for the respective following days.

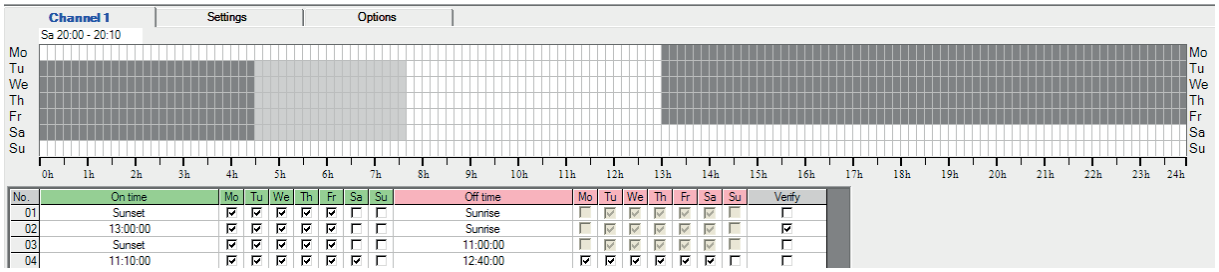


Figure 89: Switching ON according to clock time – Switching OFF at sunrise and on the respective following day

6.2.4.2 Switching ON according to clock time, switching OFF on the same day

If the switching-on time is set earlier than 12:00, the switching-off days are set on the same day.

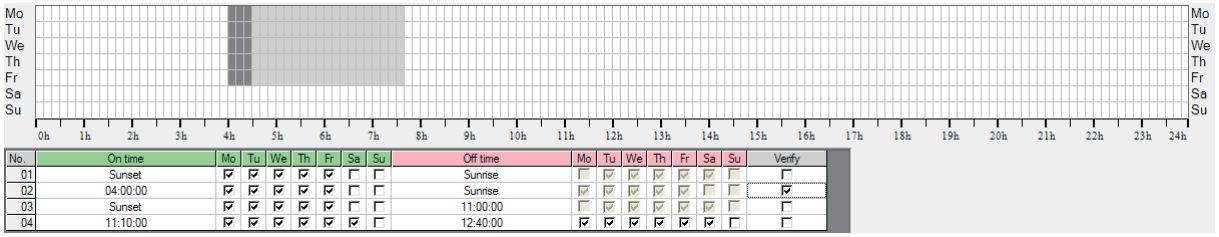


Figure 90: Switching ON according to clock time – Switching OFF at sunrise and on the same day

6.2.4.3 Invalid switching time points

During calculation of the switching-off times, a check is performed on whether the switching-on time lies after the latest switching-off time. If the switching-on time (in this example 10:00) lies after the latest switching-off time (in this example 07:36), the timer cannot perform a switching cycle. A warning message is displayed and the switching-on time is displayed in blue.

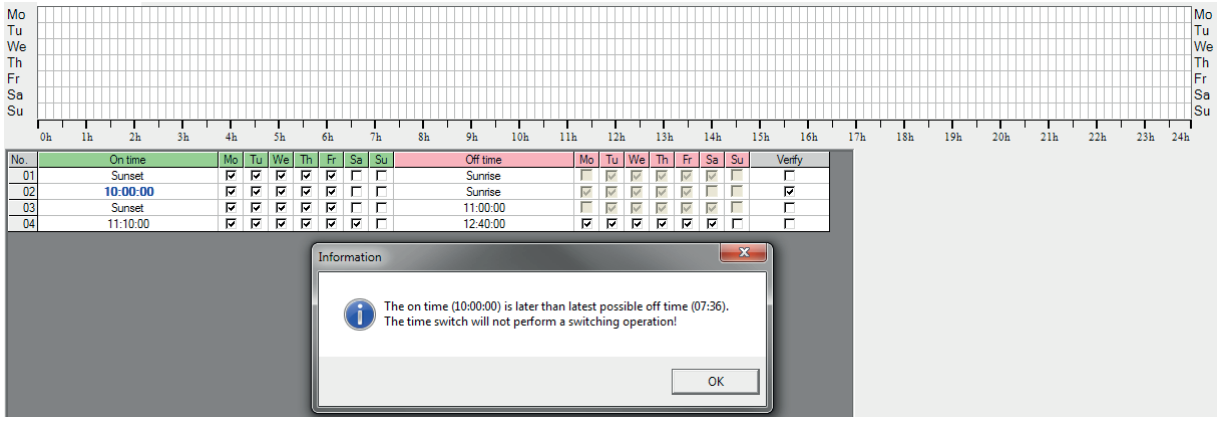


Figure 91: Warning message: Switching-off at sunrise, the switching-on time lies after the latest possible switching-off time

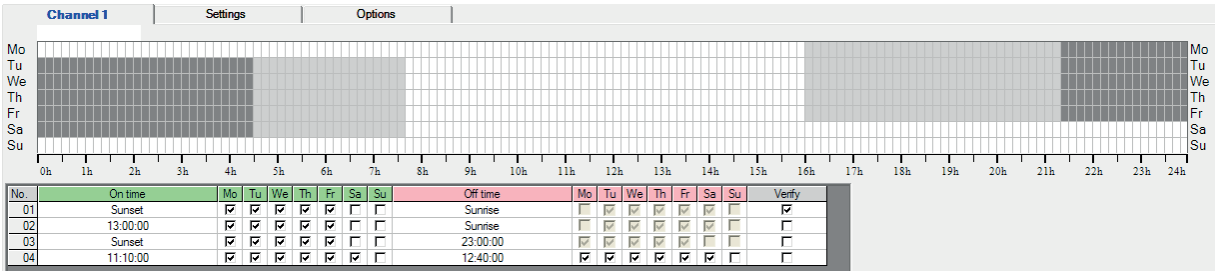
6. TIME SWITCH TYPES

6.2.5 Switching ON at sunset, switching OFF at sunrise

In the setting below, a program line is created in which the astro timer is switched at sunset respectively and switched off again at sunrise on the following day.

In the graphical display, light grey areas appear ranging from 16:00 to 21:20 and from 04:30 to 07:40 respectively. In the mornings and evenings, these are the ranges within which the switching times will vary due to the seasonal variations of the sunset and sunrise times.

It is clear from the program line that the days for the switching-off time are deactivated. The days for the switching-off time are set automatically and cannot be modified. If sunset is selected as the switching-on time and sunrise as the switching-off time, then the switching-on time refers to the evening and the switching-off time to the following morning.



No.	On time	Mo	Tu	We	Th	Fr	Sa	Su	Off time	Mo	Tu	We	Th	Fr	Sa	Su	Verify
01	Sunset	☑	☑	☑	☑	☑	☐	☐	Sunrise	☐	☑	☑	☑	☑	☑	☐	☑
02	13:00:00	☑	☑	☑	☑	☑	☐	☐	Sunrise	☐	☑	☑	☑	☑	☑	☐	☐
03	Sunset	☑	☑	☑	☑	☑	☐	☐	23:00:00	☑	☑	☑	☑	☑	☐	☐	☐
04	11:10:00	☑	☑	☑	☑	☑	☑	☐	12:40:00	☑	☑	☑	☑	☑	☑	☐	☐

Figure 92: Switching ON at sunset, switching OFF at sunrise

7. USING THE APPLICATION

7.1 Launching the Application

After the application is launched, an empty window appears.
It is possible to create a new program file (File/New and "Create new program file" icon), to load an existing program file from a file (File/Open and "Read program file from file" icon) or to load an existing program file from a datakey (Datakey/Read Data from Datakey and "Read data from the key" icon).

There are four different timer types::
- Weekly timers (one-channel or two-channel)
- Astro timers (one-channel or two-channel)

The behaviour of the application is in part dependent on the timer type for which programs are being processed.

7.2 Create New Program Files

A new program file can be created via the File/New menu item or using the "Create new program file" icon. The dialogue box opens for selection of a timer type. In this dialogue box, you can select a timer type by clicking on it.

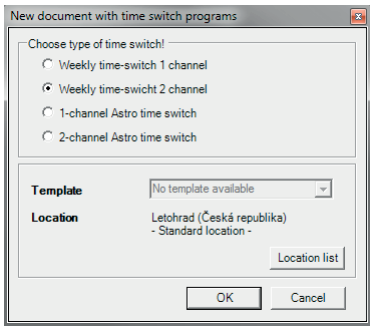


Figure 93: Select timer type

7.2.1 Select a template

If a timer type has been selected, you can create a new program file using an existing template. A template is an existing program file which contains settings as well as program files, where applicable. If you have selected a template, the location which has been defined for this template is displayed. The location can be changed immediately using the location list. The location can also be changed at a later point.

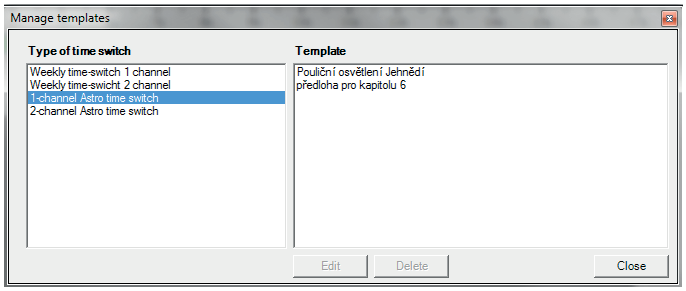


Figure 94: Select template

7.3 Open a program file

7.3.1 Last files opened

By clicking on the "File" menu item, this item is expanded. All last opened files are also offered for selection under the expanded menu items.

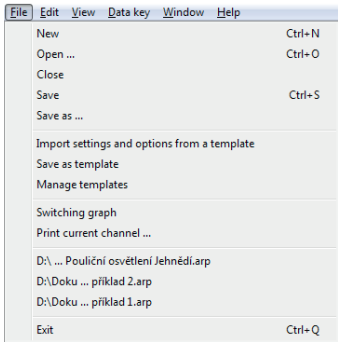


Figure 95: Last files opened

7.3.2 Open file

Via the menu item File/Open or the "Read program file from file" button on the icon bar, you can select a file specifically via the Open dialogue box.

7.3.3 Read datakey

If a valid program key is detected in the reader, you can use menu item Datakey/Read key or the "Read data from the key" button on the icon bar to read a program file from a datakey. To read data from a datakey, the connection to the reader is established first. The message appears (Figure 96). The data is then read from the datakey (Figure 97). If no reader device which can be used to read a datakey is connected, error message is output (Figure 98). If all tests are completed successfully, the program file is read from the datakey and the content displayed.

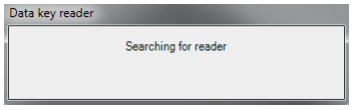


Figure 96: Message when the connection with the datakey reader is created

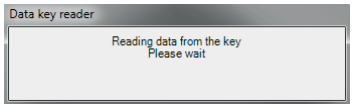


Figure 97: Message during reading out from a datakey

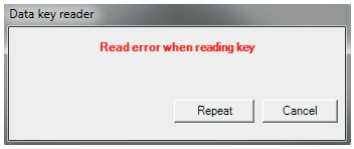


Figure 98: Error message "No reader device found for datakey"

7. USING THE APPLICATION

7.4 Save Program Files

7.4.1 Save program file to a file

You can save a program file to a folder using the menu item "File/Save" or the "Save program file in file" button.
If the program file is new (the program file has been newly created or the program file has been read from a datakey), the dialogue box "Save As ..." is called up. A file name can be created in this dialogue box and a folder selected in which the program file can be saved. An existing file can be overwritten.

7.4.2 Write program file to a datakey

You can write a program file to a datakey using the menu item "Datakey/Write Data to a key" or the "Save program file in file" button.
Only accepted program lines are written to the datakey. Program lines which are not accepted are ignored. A prompt will first appear to check whether you wish to overwrite the existing datakey:

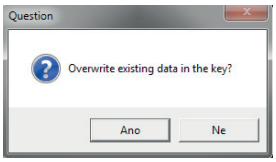


Figure 99: "Overwrite datakey" confirmation

If the question is answered with "Yes", a check is performed to determine whether all program lines have been accepted. If program lines are found which have not been accepted, the following message will appear.

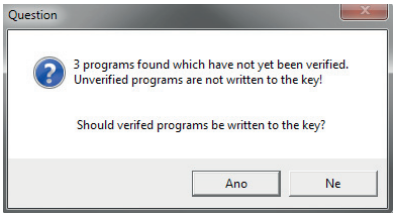


Figure 100: Unaccepted program lines

This message is for information only. The datakey can only save accepted program lines. Program lines which have not been accepted are not written to the datakey. If the question is answered with "Yes", a check is performed to establish whether a valid reader is available (see Read Program File from a Datakey).

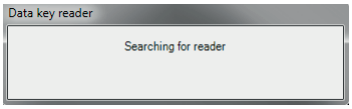


Figure 101: Find reader device

A check is then performed to determine whether a valid datakey is available in the reader. If all checks are performed successfully, the program file is written to the datakey.

The write operation may last several minutes due to the extensive test routines. During this time the program is blocked.

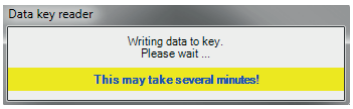


Figure 102: Display during writing of a program file to the datakey

7.4.3 Save program file as a template

Each program file can be saved as a template. For new program files, you can make a selection from the existing templates for each timer type. For further information, please see section 7.2.1.

You can save a program file as a template under the "File/Save as template" menu item. The Save As dialogue box opens in which you can specify a new name for the template.
The templates are stored in the system directory of the application.

7.5 Importing settings and options from the template

Use this menu item if you want to import only the settings and options for an existing program file without affecting the program lines. A dialogue box opens for selection of the template. The dialogue box displays all the available templates for selection which have already been created for the corresponding timer type. If a template has been selected, all settings and options for this template are accepted in the current program file.

7.6 Manage templates

Templates are normal program files which are saved in a special location. Specific settings and options and program lines can be saved in templates. Templates are used to continuously call up recurring program settings. You can access the Templates dialogue box under the File/Manage Templates menu item. You can edit or delete templates in the Templates dialogue box. If you wish to edit a template, this template is handled as per a normal program file (which is what it actually is).

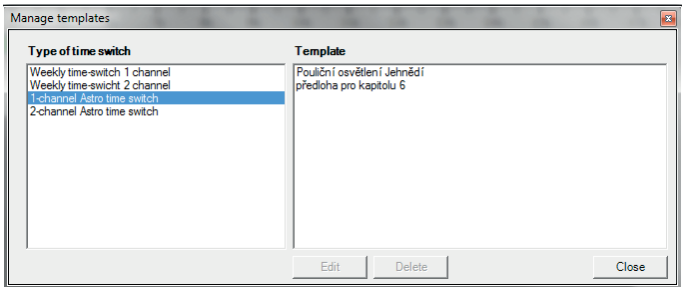


Figure 103: Templates dialogue box

8. CONNECTING THE READER DEVICE

The reader device for the data key must be connected to the computer using a free USB port. The device is detected and installed immediately. For full functionality the application „Programování spínacích hodin“ should be installed. Drivers for the reader device are installed automatically during the installation. Then the device can be used. Correctness of the driver installation can be checked in the Windows system device manager (see picture 105).
Before removing the datakey, always pull the carrier card out of the adapter first. The electronics can then detect that the key has been removed via an internal mechanical switch.

Figure 104: Reader device Identiv uTrust Smart Card Reader

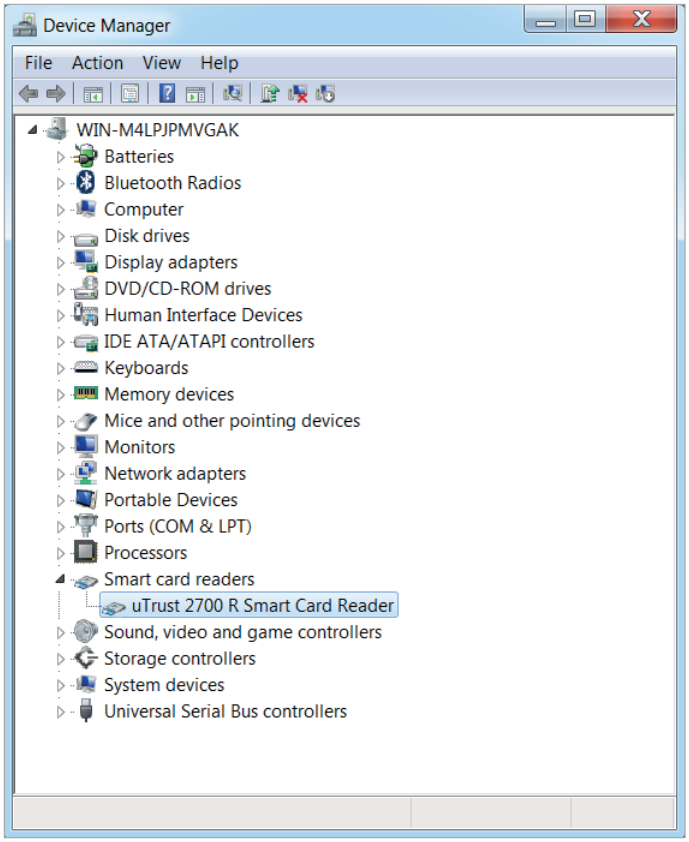


Figure 105: Reader drivers

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