



Timer with an astronomical program



SHT-4

Contents

Alert	3
Characteristics	4
Technical parameters	5
Device description	6
Symbol, Connection, Load	8
Mode precedence, Language settings	9
Menu overview	10
Control description	11
Astro display and settings	12
Location – preset locations	14
Overview of time zones	15
Time and date setting	16
Time program	18
Setting the switching modes	22
Setting options	24
Reset	25
An example of programming	26
Replacing the battery	27

Warning



Device is constructed for connection in 1-phase main alternating current voltage and must be installed according to norms valid in the state of application. Connection according to the details in this direction. Installation, connection, setting and servicing should be installed by qualified electrician staff only, who has learnt these instruction and functions of the device. This device contains protection against overvoltage peaks and disturbances in supply. For correct function of the protection of this device there must be suitable protections of higher degree (A,B,C) installed in front of them. According to standards elimination of disturbances must be ensured. Before installation the main switch must be in position "OFF" and the device should be de-energized. Don't install the device to sources of excessive electro-magnetic interference. By correct installation ensure ideal air circulation so in case of permanent operation and higher ambient temperature the maximal operating temperature of the

device is not exceeded. For installation and setting use screw-driver cca 2 mm. The device is fully-electronic - installation should be carried out according to this fact. Non-problematic function depends also on the way of transportation, storing and handling. In case of any signs of destruction, deformation, non-function or missing part, don't install and claim at your seller it is possible to dismount the device after its lifetime, recycle, or store in protective dump.

Characteristics

The SHT-4 astronomic timer is used for the automatic real-time controlling of appliances. The timer operates all year round without the need of continuous maintenance, with minimum operating costs and maximum savings of electrical energy. (For example for turning on heating, pumps, ventilators, public lighting etc.). Appliances can be controlled in regular time cycles or based on a pre-set programme. The astronomic timer does not include any optical sensors or other external equipment. After installation, it requires no special operation or maintenance. In the case of a power supply interruption, the timer retains all set values required for its reliable activation after power is restored. The operation of the astronomic timer is based on the variations in the sunset and sunrise times throughout the year. Based on the current date (internal real-time clock), it automatically modifies the times for turning on or off e.g. public lighting. Time updates are resolved automatically for every day of the year. Using the Offset function, it is possible to modify the times for switching on or off by ± 120 minutes. The offset is fixed, i.e. the same for both channels each day.

- Switching modes:

- *AUTO* – automatic switching mode:

- *PROGRAMME* ☉ - switching based on a programme (astro or time).

- *RANDOM* ☐ - switches randomly in a 10 - 120 minute interval.

- *HOLIDAY* ■ - holiday mode - option of setting up a period for which the timer will be blocked, i.e. will not switch based on the set programmes.

- *MANUAL* ☾ - manual mode - option of controlling the individual output relays manually

- Options of the automatic switching programme:

- *ASTRO* - switches based on the time of sunset / sunrise calculated from input date and geographical location.

This time can be corrected ± 2 hours.

- *TIME PROGRAMME* - switching based on a pre-set time programme

- Memory capacity for 100 time programmes (common for both channels).

- Programming can be performed both when power is on or in backup mode.

- Output relays only operate with a supply voltage of AC 230 V.

- Menu display selection - CZ / SK / EN / RO / PL / HU / RU (default factory setting EN).

- Selection of automatic switching between summer / winter time based on location.

- Setting the geographic location (selection from predefined options).

- Exact calculation of sunrise and sunset by entering the date, time, latitude and longitude and time zone.

- Backlit LCD display.

- Simple and easy setup using 4 control buttons.

- Sealable transparent cover on the front panel.

- The timer has a backup battery that preserves data in case of a power supply failure (reserve backup time up to 3 years).

- Supply voltage: AC 230 V.

- 2-module, mounted onto a DIN rail, clamping terminals.

- After plugging the timer in for the first time, the current time, date and geographic location must be set for correct operation of the astronomical clock.

Technical parameters

Supply terminals:	A1 - A2
Supply voltage:	AC 230 V / 50 - 60 Hz
Consumption:	AC max. 14 VA / 2 W
Supply voltage tolerance:	-15 %; +10 %
Real time back-up:	yes
Summer / winter time:	automatic
<u>Output</u>	
Number of contacts:	2x changeover (AgSnO ₂)
Rated current:	16 A / AC1
Switching capacity:	4000 VA / AC1, 384 W / DC
Peak current:	30 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. switching capacity DC:	500 mW
Mechanical life:	> 3x10 ⁷
Electrical life (AC1):	> 0.7x10 ⁵
<u>Time circuit</u>	
Real time back-up:	up to 3 years
Accuracy:	max. ± 1 s / day at 23 °C
Minimum interval:	1 min.
Data stored for:	min. 10 years
<u>Program circuit</u>	
Number of memory places:	100
Program(SHT-3, SHT-3/2):	daily, yearly (up to year 2099)
Data readout:	LCD display, with back light

Other information

Operating temperature*:	-20.. +55 °C
Storage temperature:	-30.. +70 °C
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP10 terminals, IP40 from front panel
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm ²):	solid wire max. 2x 2.5 or 1x 4 with sleeve max. 1x 2.5 or 2x 1.5
Dimensions:	90 x 35.6 x 64 mm
Weight	133 g
Standards:	EN 61812-1, EN 61010-1

* With temperatures nearing -20 °C, the display quality may be compromised, which does not hamper the timer's function.

**When is, switched ON constantly with maximal load 16 A / AC 1 and ambient temperature 55 °C it is highly recommended by manufacturer to use conductors with temperature resistive isolation (min) from 105 °C range.

Description

Supply voltage terminal (A1)

Display with back-light

Place for seal

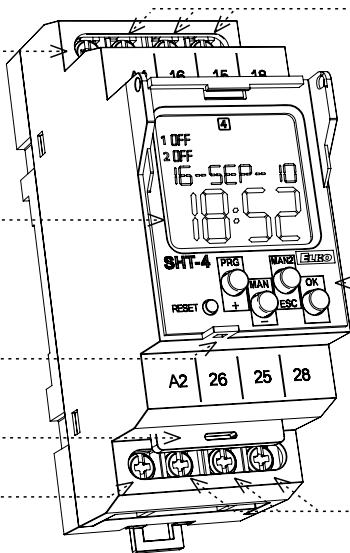
Plug-in module

Supply voltage terminal (A2)

Output - channel 1 (16-15-18)

Control buttons

Output - channel 2 (26-25-28)



Indicates the day in the week

Indication (1st channel)

Indication (2nd channel)

Indication of date / setting menu

Time display

Control button PRG / +

Reset

Control button MAN1 / -

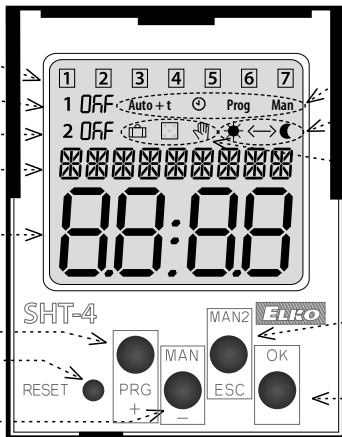
Operating modes indication

12/24 hours format /
sunset - sunrise

Indication of the switch
program

Control button MAN2 / ESC

Control button OK

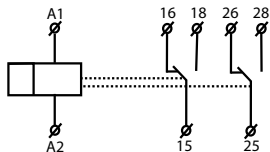


CONTROL OF A DISPLAY WITH BACKLIGHT

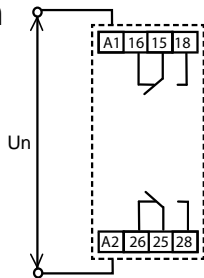
Power on: Display is illuminated with a backlight for 10 seconds from the last button press. The display continuously shows the settings - date, time, day of the week, contact state and programme. Permanent on / off is activated by simultaneous presses of the MAN, ESC, OK buttons. After activating the permanent on/off, the display will flash briefly.

Backup mode: After 2 minutes, the display switches to the sleep mode, i.e. shows no information. The display can be activated by pressing any button.

Symbol



Connection



Load

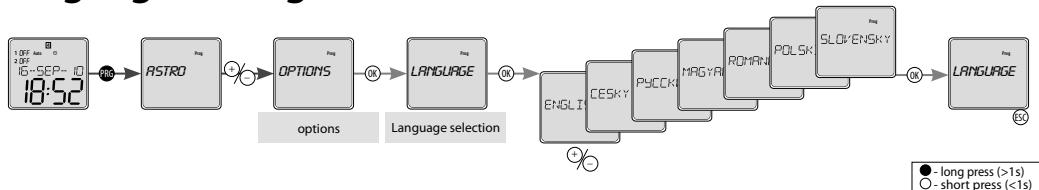
Type of load	 cos φ ≥ 0.95 AC1	 AC2	 AC3	 AC5a Uncompensated	 AC5a Compensated	 HAL.230V AC5b
Contact material AgSnO ₂ Contact 16A	250V / 16A	250V / 5A	250V / 3A	230V / 3A (690VA)	230V / 3A (690VA) max. input C=14uF	1000W
Type of load	 AC6a	 AC7b	 AC12	 AC13	 AC14	 AC15
Contact material AgSnO ₂ Contact 16A	x	250V / 3A	x	x	250V / 6A	250V / 6A
Type of load	 DC1	 DC3	 DC5	 DC12	 DC13	 DC14
Contact material AgSnO ₂ Contact 16A	24V / 10A	24V / 3A	24V / 2A	24V / 6A	24V / 2A	x

Mode precedence

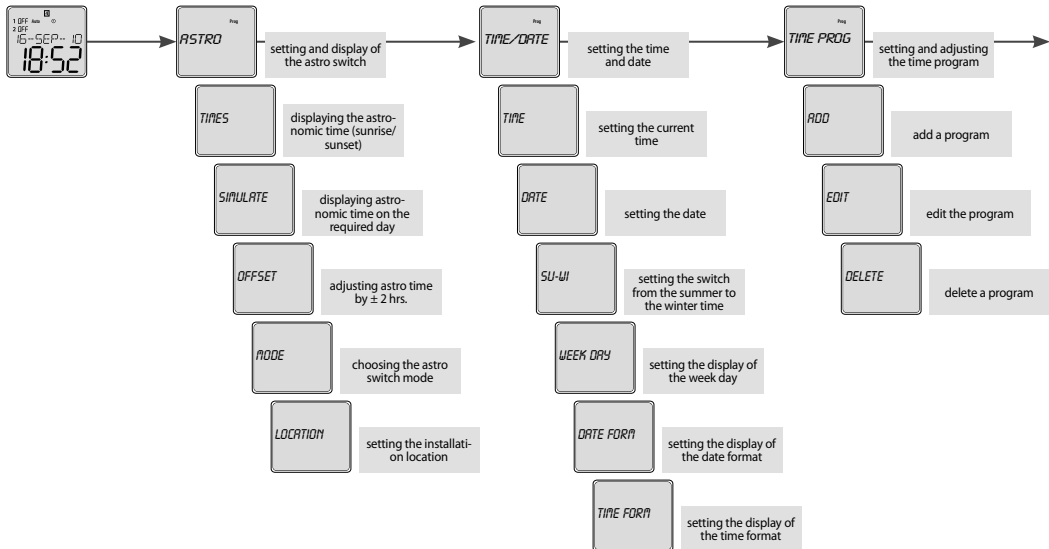
mode precedence	display	output mode
mode with the highest priority >>>	ON / OFF	manual control
>>>	ON / OFF	holiday mode
>	ON / OFF	time program Prog
	ASTRO	astro

ASTRO and TIME PROGRAM can work at the same time on a single channel.

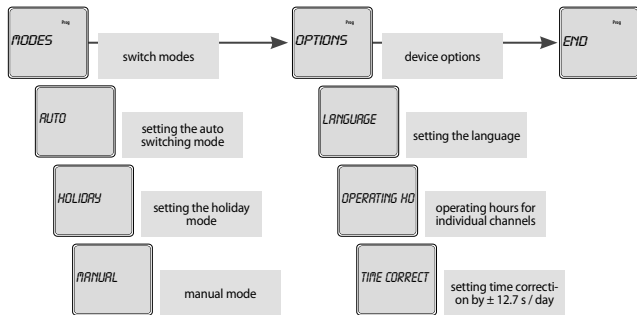
Language settings



Menu overview



Control



Device differs short and long button press. In the manual marked as:

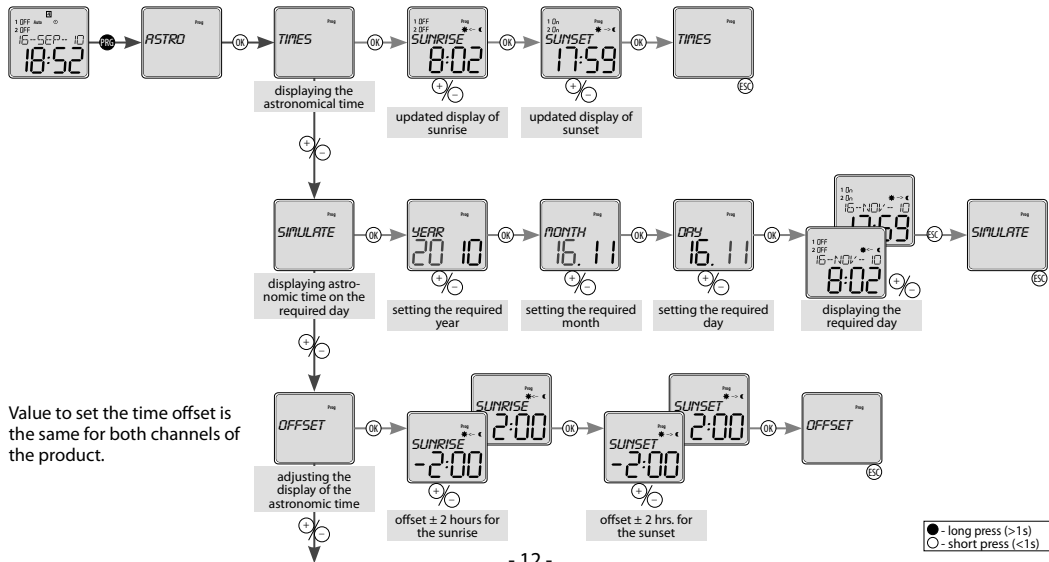
○ - short button press (< 1s)

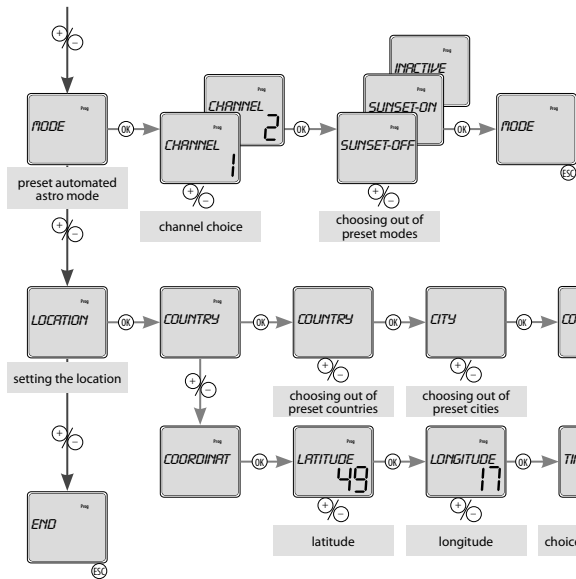
● - long button press (> 1s)

After 30s of inactivity (from the last press of any button) will device automatically returns into starting menu.

	PRG	- entrance into programming menu
	OK	- browsing in menu
		- setting of values
	OK	- quick shifting during setting of values
	PRG +	- entrance into required menu
		- confirmation
	ESC	- one level up
		- a step back
	ESC	- back to the starting menu

ASTRO Astro display and settings





SUNSET-OFF - SUNRISE-ON

- The relay of the selected channel will turn off with sunset, on with sunrise

SUNSET-ON - SUNRISE-OFF

- The relay of the selected channel will turn on with sunset, off with sunrise

NOT ACTIVE

- Astro switching turned off

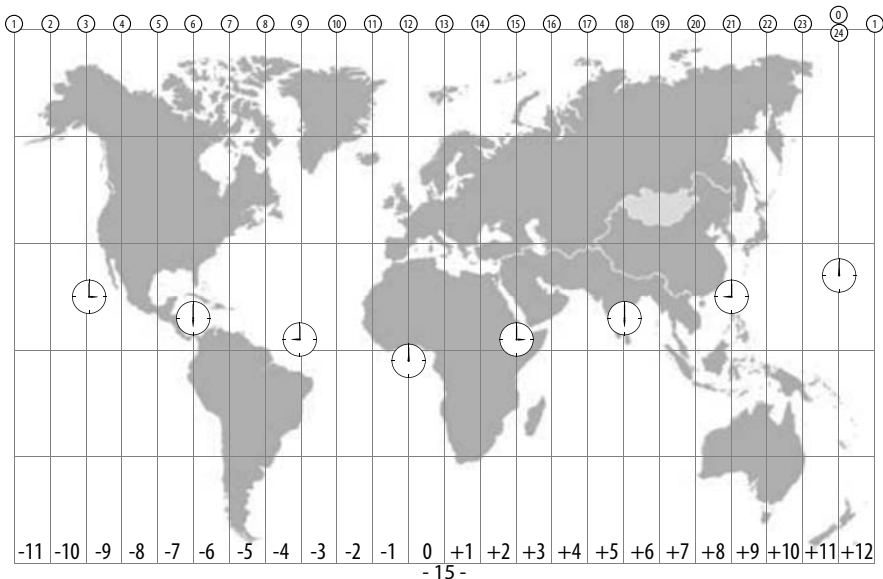
- if the astro function is active on at least one channel, the Auto symbol is displayed
 - if the astronomical time switching offset is set for at least one channel, the symbol Auto+t is displayed

When entering coordinates manually, you have to enter all the parameters (latitude, longitude, time zone).

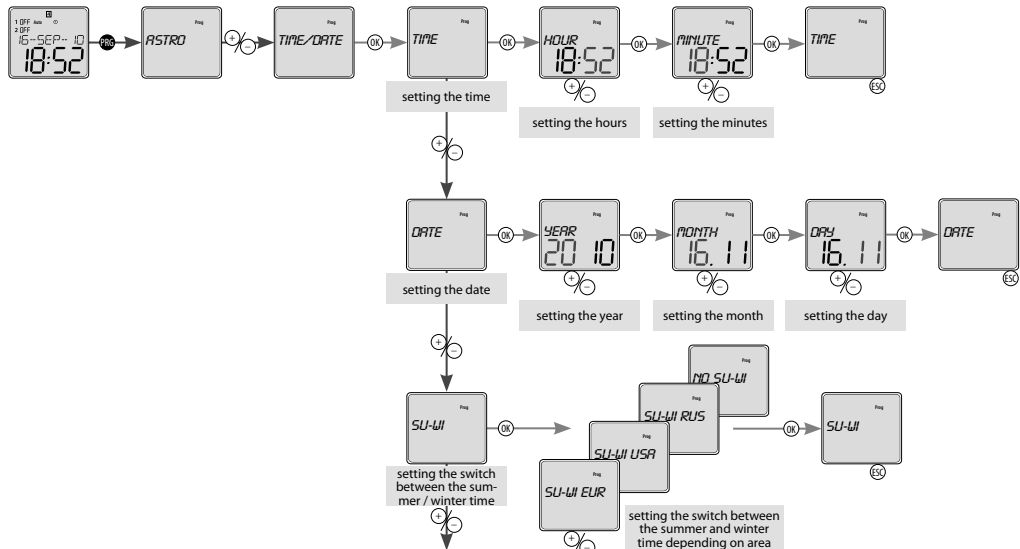
Location - preset locations:

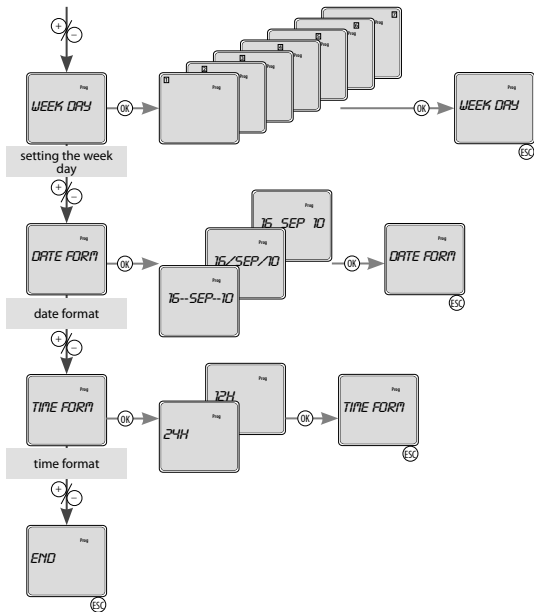
AUSTRIA	INNSBRUCK WIEN	HOLLAND	AMSTERDAM	ROMANIA	ARAD BUCHAREST
BELARUS	MINSK	HUNGARY	BUDAPEST DEBRECEN PECS	RUSSIA	MAGADAN MOSCOW NOWOSIBIRSK ST-PETERSBURG SOCHI
ČESKÁ REPUBLIKA	PRAHA BRNO OSTRAVA HRADEC KRÁLOVÉ ČESKÉ BUĎEJOVICE	IRELAND	DUBLIN	SLOVENSKO	BANSKÁ BYSTRICA BRATISLAVA KOSICE
ESTONIA	TALLINN	ITALY	ROMA	SPAIN	MADRID
FRANCE	PARIS	LATVIA	RIGA	SWITZERLAND	ZURICH
GERMANY	BERLIN MUNICH	LITHUANIA	VILNIUS	UKRAINE	DONETSK KIEV ODESSA
GREAT BRITAIN	EDINBURGH LONDON	NORWAY	OSLO		
		POLAND	GDAŃSK KRAKÓW WARSZAWA		

Overview of time zones



TIME/DATE Date and time setting

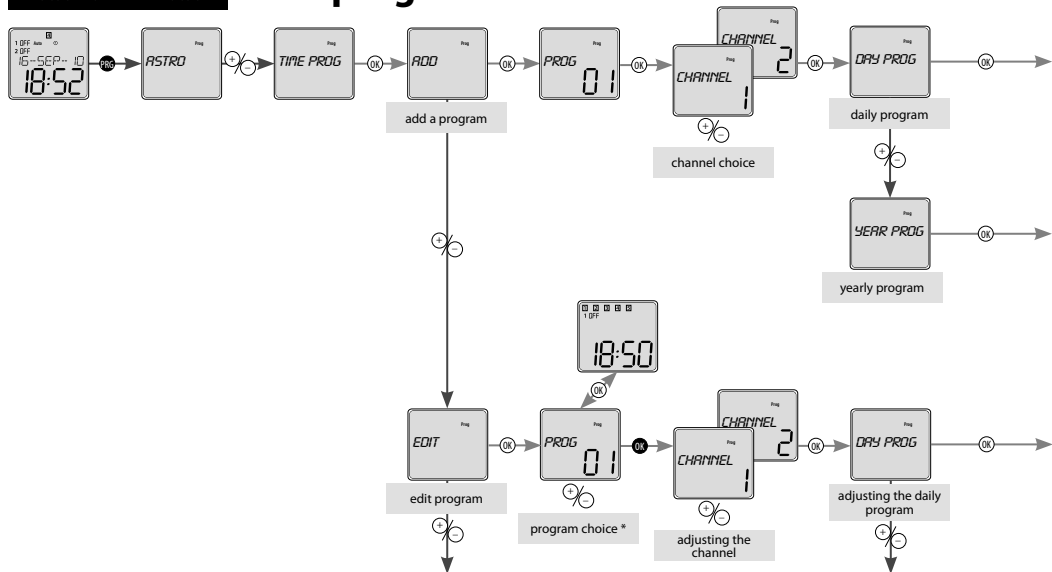


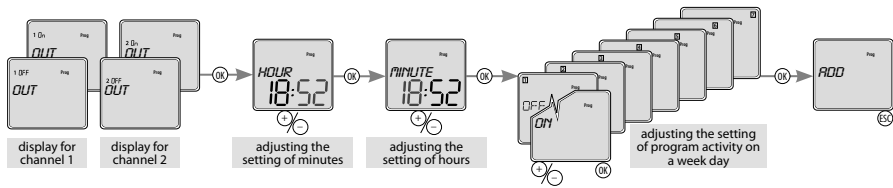
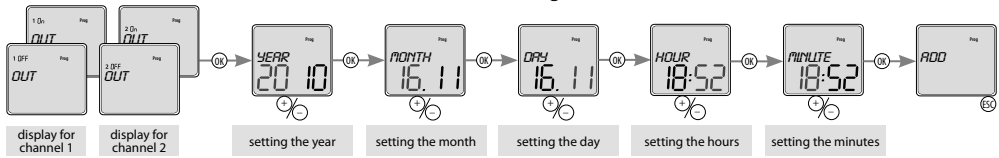
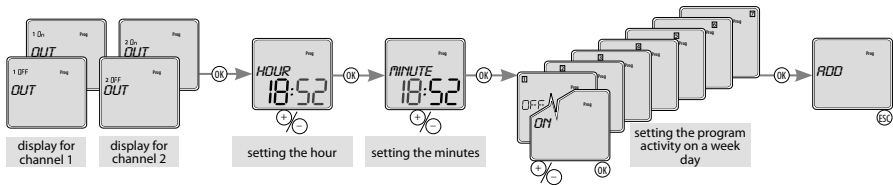


● - long press (>1s)
○ - short press (<1s)

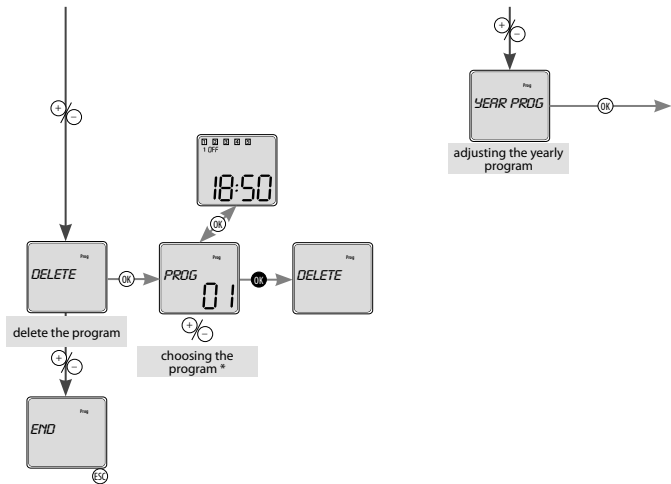
TIME PROGRAM

Time program





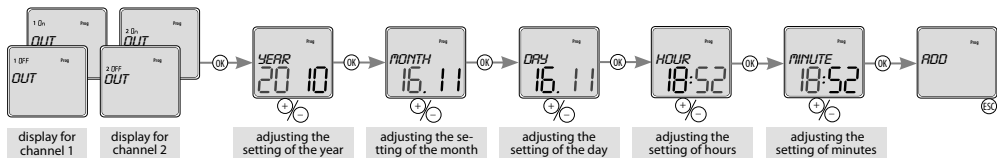
● - long press (>1s)
○ - short press (<1s)



* By shortly pressing **OK**, you can toggle between the program number and the display of its settings. Use **+/-** to toggle preset programs. By holding **OK** you can proceed with the required step - *CHANGE / DELETE*. If you do not want to proceed, press **ESC** to go to the main settings without any change.

If the program memory is full, you will see *FULL* on the display.

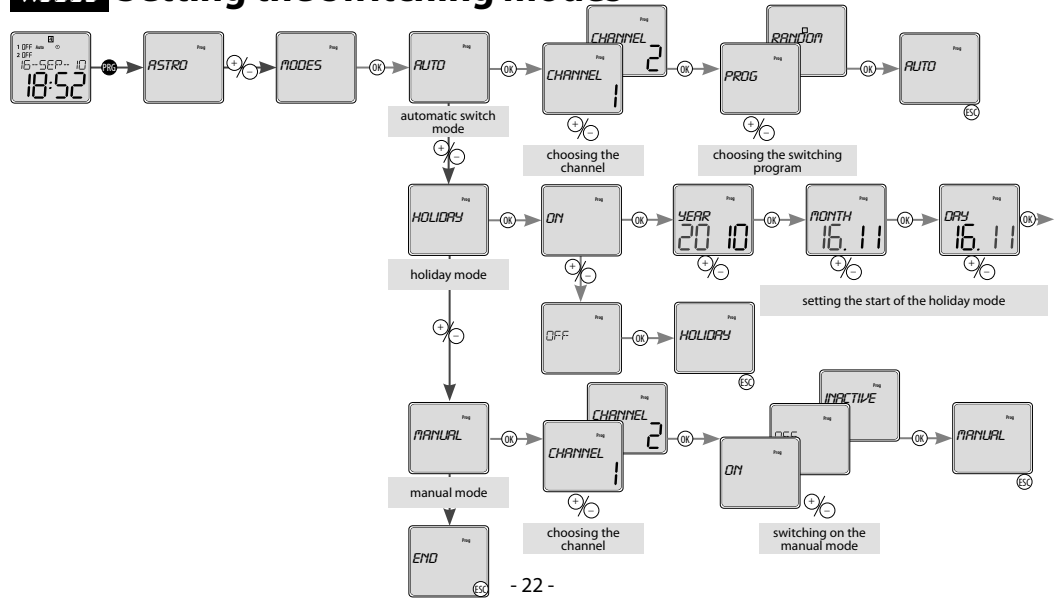
If the programs memory is empty and you want to change or erase a program, the display will read *EMPTY*.

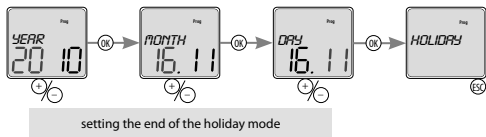


E
N






● - long press (>1s)
○ - short press (<1s)

MODES Setting the switching modes



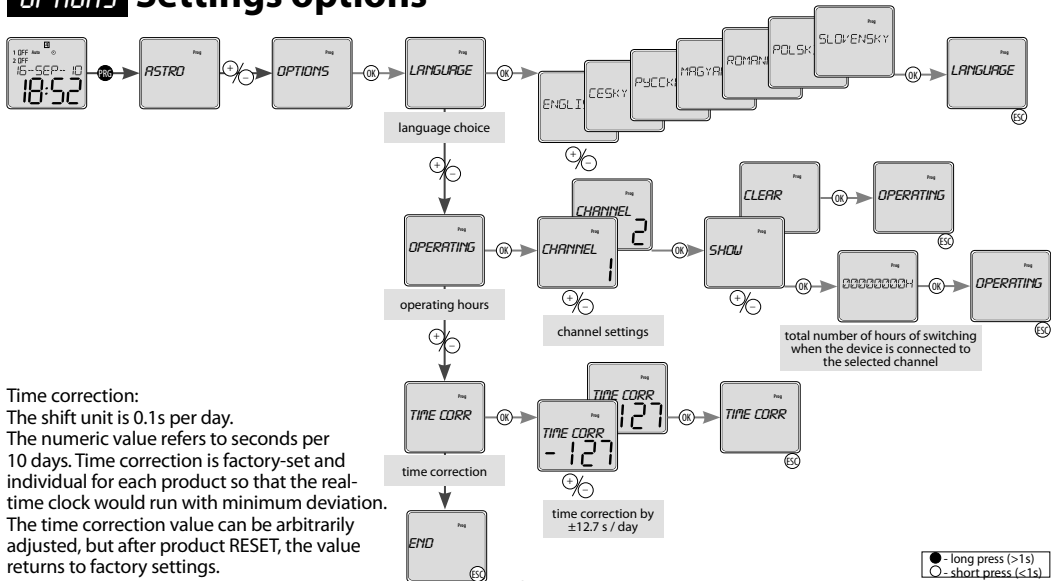


What you see on the display:

- when a random mode is activated - *RANDOM* - the symbol is lit .
- vacation mode *HOLIDAY*: - the illuminated symbol  indicates the vacation mode.
 - the flashing symbol  indicates the vacation mode.
 - the symbol  is not illuminated if the vacation mode is not set or has.
- when the manual mode is activated, the symbol is lit  and the manually controlled channel is flashing.

● - long press (>1s)
○ - short press (<1s)

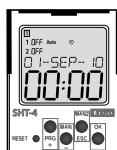
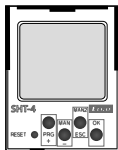
OPTIONS Settings options



Time correction:
 The shift unit is 0.1 s per day.
 The numeric value refers to seconds per 10 days. Time correction is factory-set and individual for each product so that the real-time clock would run with minimum deviation.
 The time correction value can be arbitrarily adjusted, but after product RESET, the value returns to factory settings.

● - long press (>1s)
 ○ - short press (<1s)

Reset

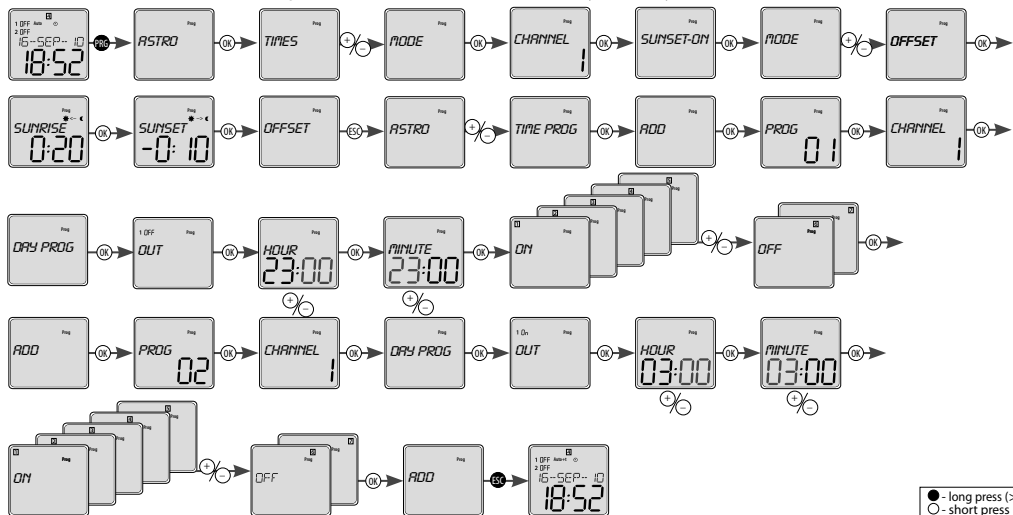


Performed by shortly pressing the hidden RESET button with a blunt-pointed object (e.g. a pencil or screw-driver with a diameter of at most 2 mm).

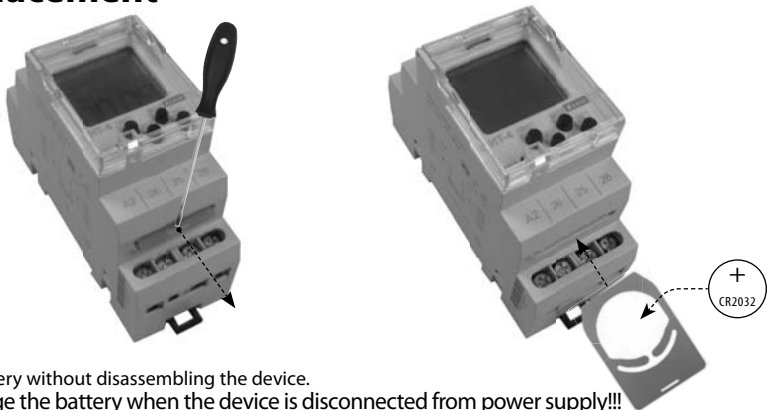
The type of device and software version will be displayed for 1 second, then the device will enter default mode. This means that the language is set to EN, all data is zeroed (thermostat function, time / date, user programs, device options function).

An example of SHT-4 programming

Setting channel 1 to switch from the sunset to the sunrise with an offset (switch shift) of 20 minutes for the sunrise and of -10 min for the sunset with undoing from 11 p.m. to 3 a.m. from Monday to Friday.



Battery replacement



You can change the battery without disassembling the device.

CAUTION - only change the battery when the device is disconnected from power supply!!!
- the date and time must be reset after changing the battery!!!

- remove the plug-in module with the battery
- replace the original battery
- enter a new battery so that its upper edge (+) lines up with the plug-in module
- slide the plug-in module in the device and pay attention to polarity (+ up) - for roughly 1 s, the display will show the name and the software version
- you can connect the device to power supply



ELKO EP, s.r.o.

Palackého 493 | 769 01 Holešov, Všetuly
Czech Republic

tel.: +420 573 514 211 | fax: +420 573 514 227
elko@elkoep.com | www.elkoep.com

4475 - 02-9/2017 Rev: 3