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SHT-4

Timer with an astronomical program



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.

- The 2-channel design (with the option of assigning separate programmes and modes to each channel) allows controlling two independent circuits.

- Switching modes:

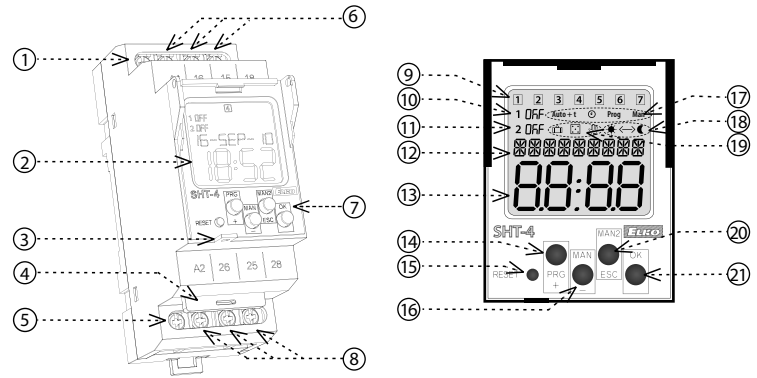
- **AUTO** - automatic switching mode:
 - **PROGRAMME** - switching based on a programme (astro or time).
 - **RANDOM** - switches randomly in a 10 - 120 minute interval.
 - **HOLIDAYS** - holiday mode - option of setting up a period for which the timer will be blocked, i.e. will not switch based on 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 / ES / 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.

Description



1. Supply voltage terminal (A1)
2. Display with back-light
3. Place for seal
4. Plug-in module
5. Supply voltage terminal (A2)
6. Output - channel 1 (16-15-18)
7. Control buttons
8. Output - channel 2 (26-25-28)
9. Indicates the day in the week
10. Indication (1st channel)
11. Indication (2nd channel)
12. Indication of date / setting menu
13. Time display
14. Control button PRG / +
15. Reset
16. Control button MAN1 / -
17. Operating modes indication
18. 12/24 hours format / sunset - sunrise
19. Indication of the switch program
20. Control button MAN2 / ESC
21. Control button OK

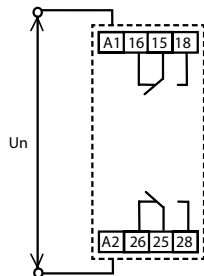
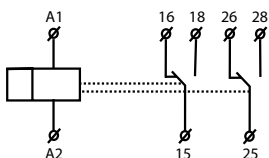
CONTROL OF A DISPLAY WITH BACKLIGHT

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

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.

Type of load	$\cos \varphi \geq 0.95$	AC2	AC3	AC5a uncompensated	AC5a compensated	AC5b	AC6a	AC7b	AC12
Mat. contacts AgSnO ₂ contact 16A	250V / 16A	250V / 5A	250V / 3A	230V / 3A (690VA)	230V / 3A (690VA) to max. input C=14uF	1000W	x	250V / 3A	x
Type of load	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
Mat. contacts AgSnO ₂ contact 16A	x	250V / 6A	250V / 6A	24V / 10A	24V / 3A	24V / 2A	24V / 6A	24V / 2A	x

SHT-4

Supply terminals:	A1 - A2
Supply voltage:	AC 230 V / 50 - 60 Hz
Consumption:	AC max. 14 VA / 2 W
Max. dissipated power (Un + terminals):	5 W
Supply voltage tolerance:	-15 %; +10 %
Real time back-up:	yes
Summer / winter time:	automatic

Output

Number of contacts:	2x changeover / SPDT (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 AC / 24 V DC
Mechanical life:	> 3x10 ⁷
Electrical life (AC1):	> 0.7x10 ⁵

Time circuit

Real time back-up:	up to 3 years
Accuracy:	max. ±1 s per day, at 23 °C (73 °F)
Minimum interval:	1 minute
Data stored for:	10 years at minimum

Program circuit

Number of memory places:	100
Program:	daily, yearly (up to year 2099)
Data readout:	LCD display, with back light

Other information

Operating temperature:	-20 to +55 °C (-4 °F to 131 °F) **
Storage temperature:	-30 to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (power 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):	max. 2x 2.5, max. 1x 4 with sleeve max. 1x 2.5, max. 2x 1.5 (AWG 12)
Dimensions:	90 x 35 x 64 mm (3.5" x 1.4" x 2.5")
Weight	128 g (4.5 oz.) - without battery
Standards:	EN 61812-1, EN 61010-1

* When is, switched ON constantly with maximal load 16 A / AC1 and ambient temperature 55 °C (131 °F) it is highly recommended by manufacturer to use conductors with temperature resistive isolation (min) from 105 °C (221 °F) range.

** With temperatures nearing -20 °C (-4 °F), the display quality may be compromised, which does not hamper the timer's function.

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.

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

Device differs short and long button press.

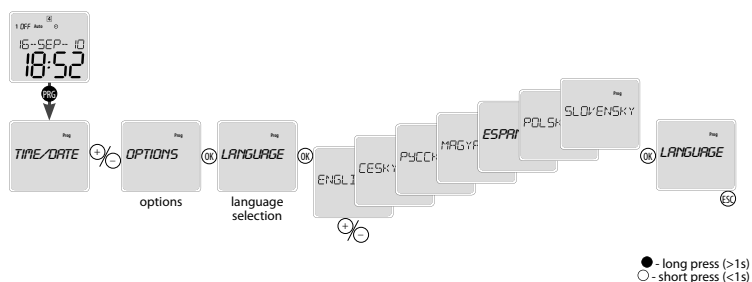
In the manual marked as:

○ - short button press (< 1s)

● - long button press (> 1s)

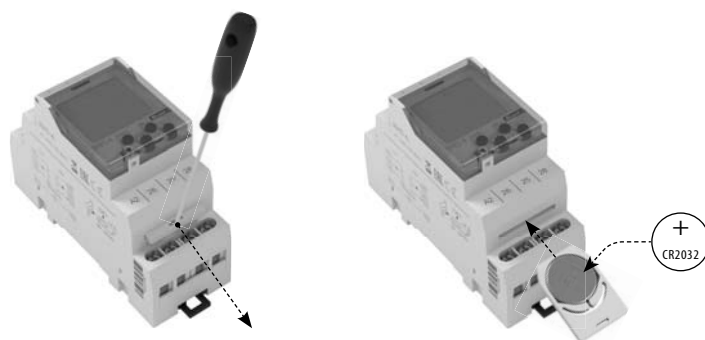
After 30s of inactivity (from the last press of any button) will device automatically returns into starting menu.

Language settings



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

Battery replacement

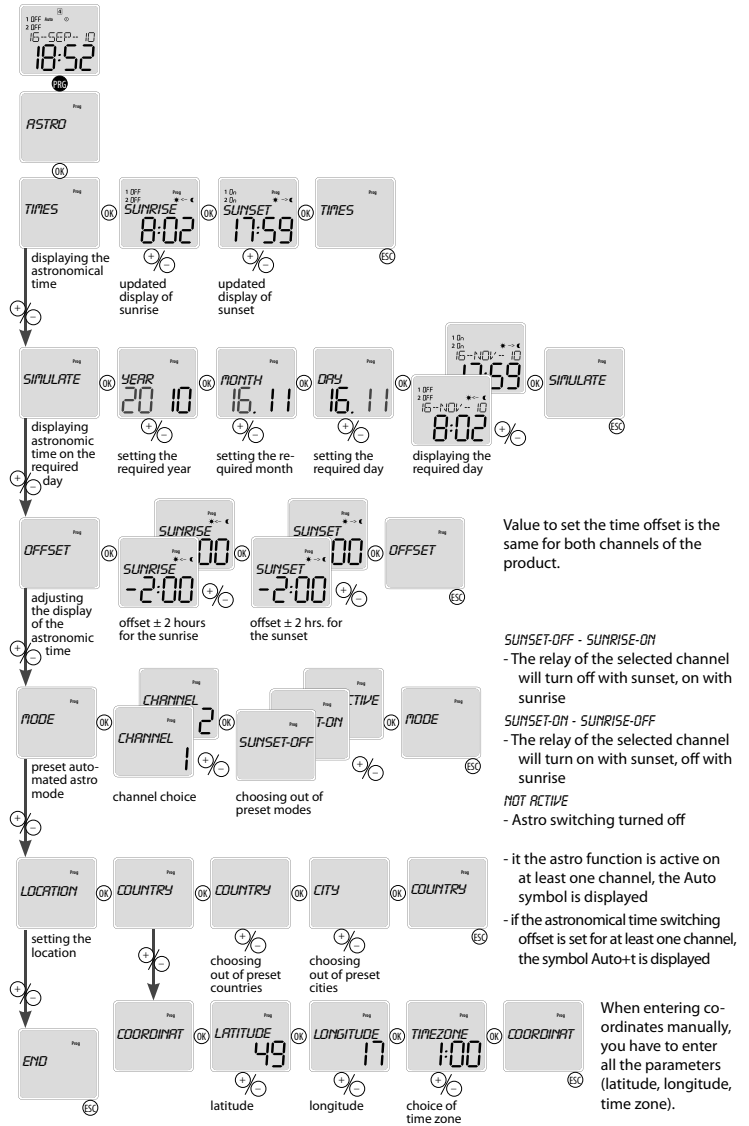
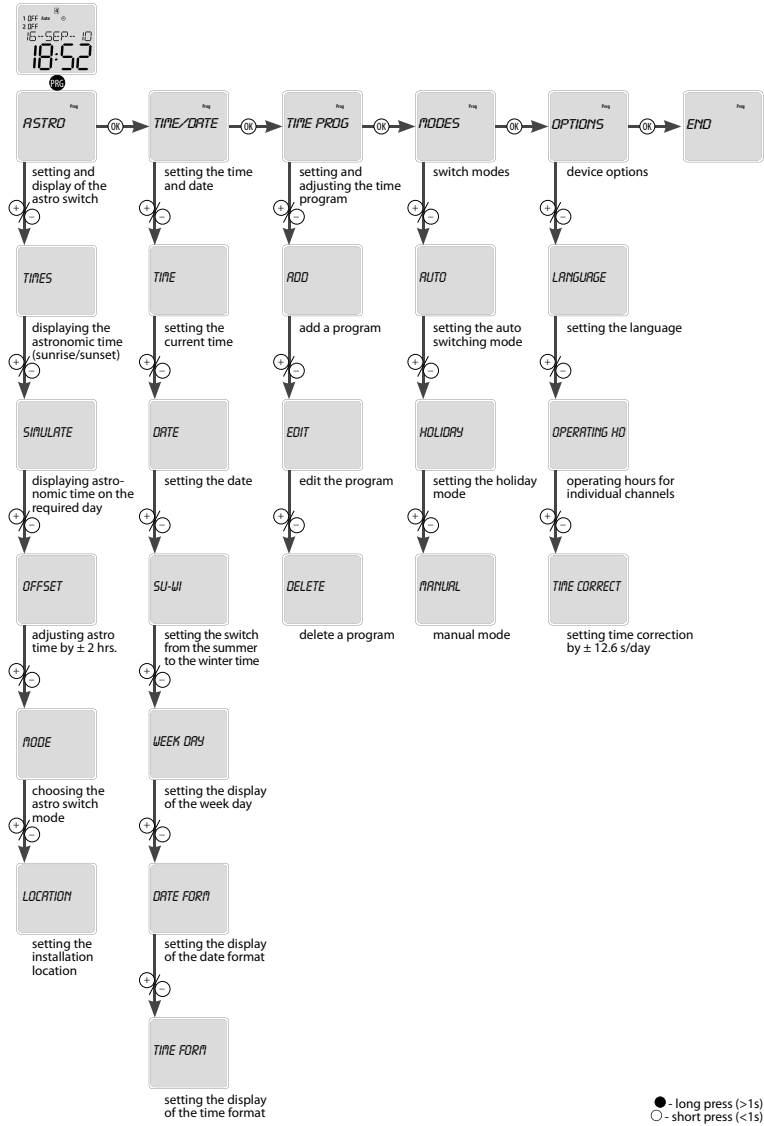


You can change the battery without disassembling the device.

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



Value to set the time offset is the same for both channels of the product.

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

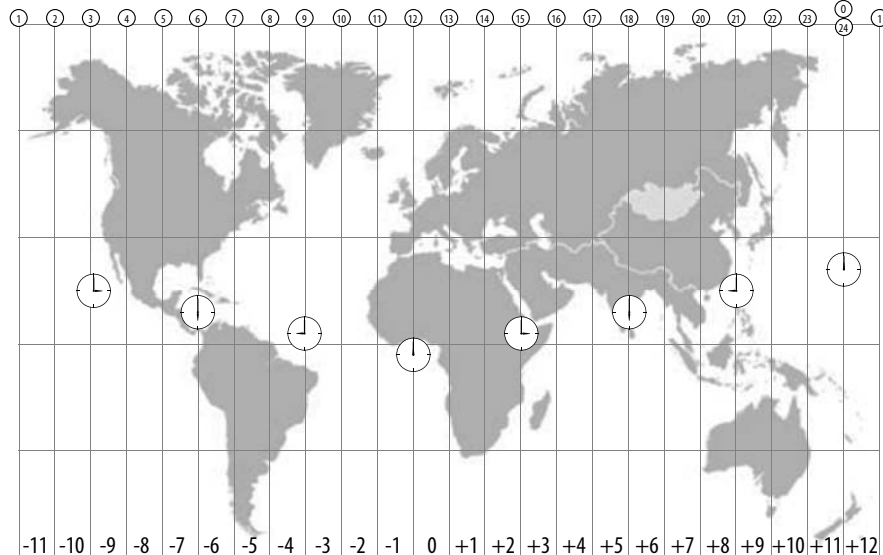
- if the astro function is active on at least one channel, the Auto symbol is displayed

- 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).

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

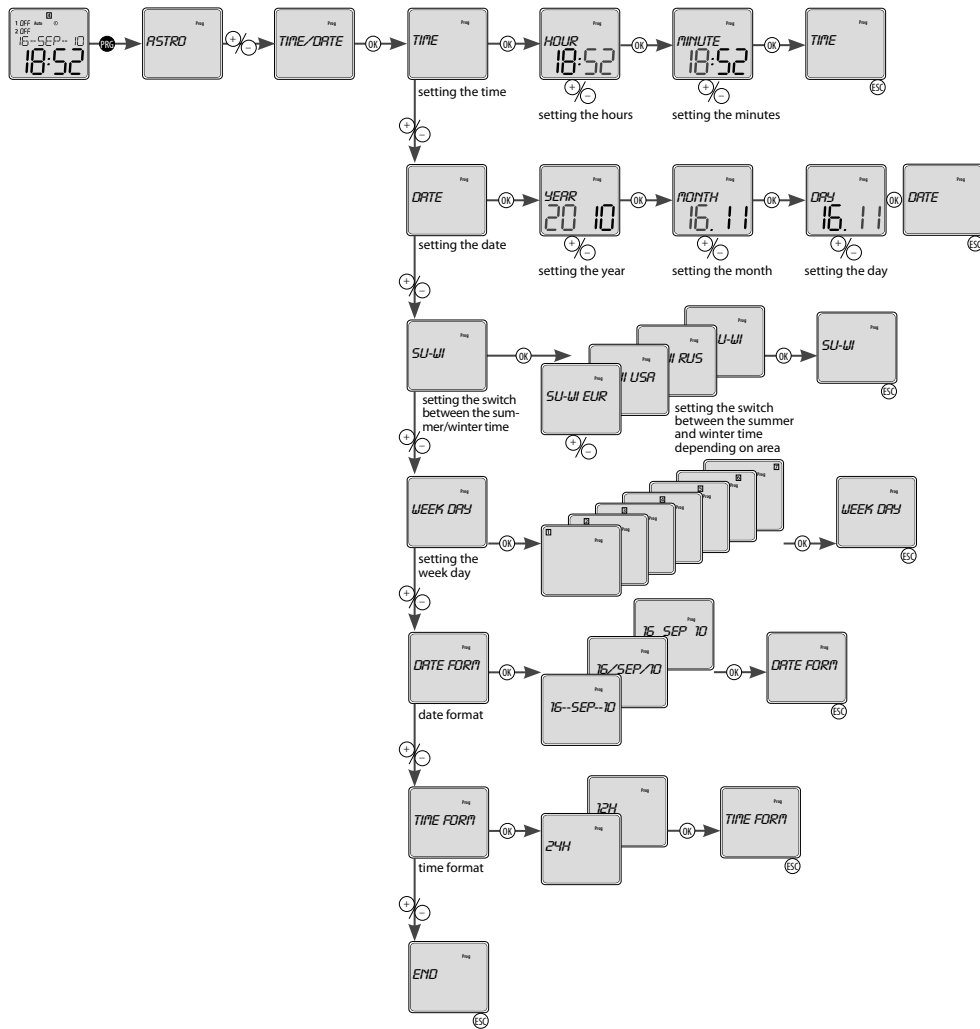
Overview of time zones



Location - preset locations

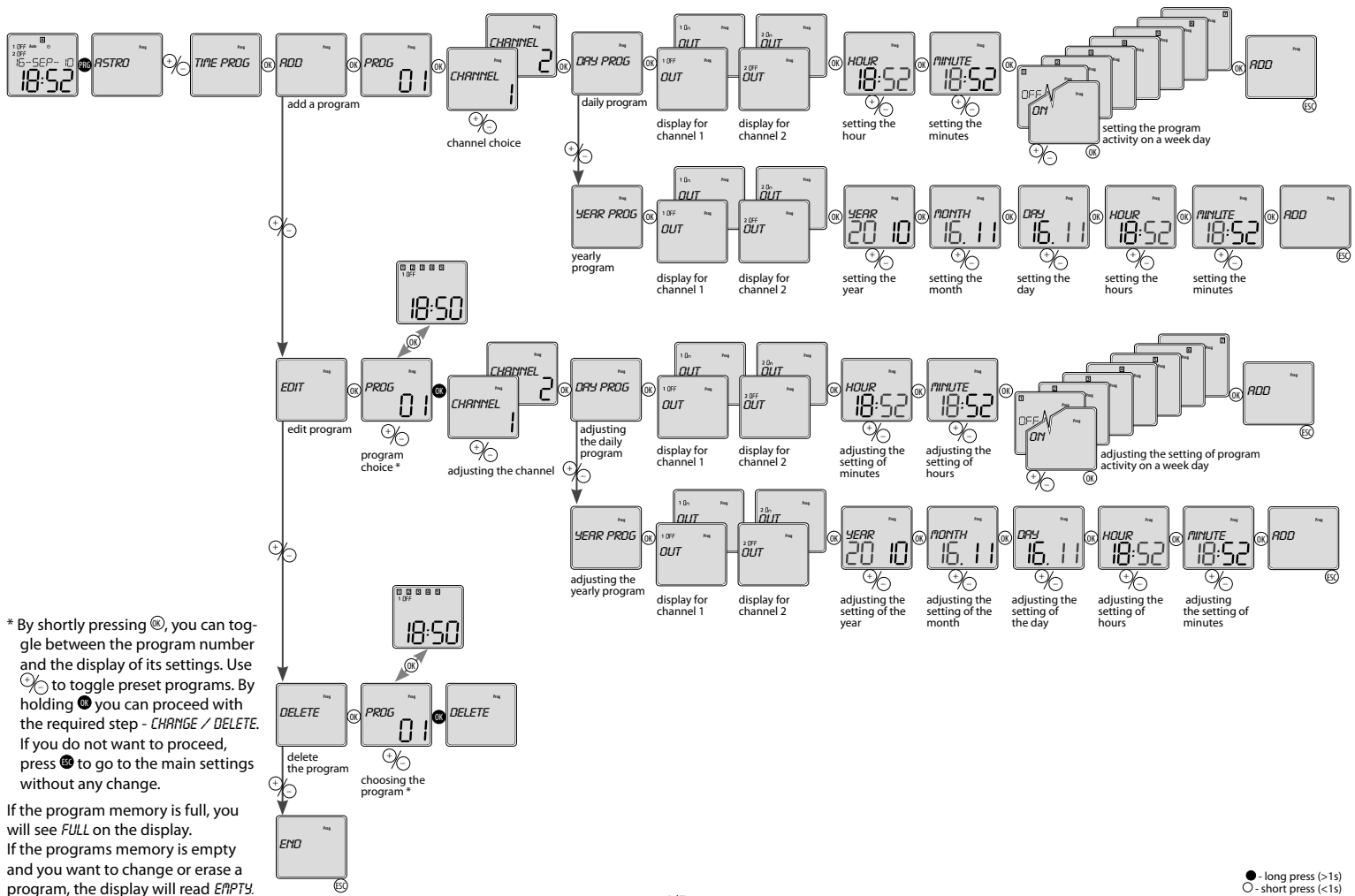
AUSTRIA	INNSBRUCK	LATVIA	RIGA
	WIEN	LITHUANIA	VILNIUS
BELARUS	MINSK	NORWAY	OSLO
CESKA REPUBLIKA	PRAHA	POLAND	GDANSK
	BRNO		KRAKOW
	OSTRAVA		WARSAWA
	HRADEC KRALOVE	ROMANIA	ARAD
	CESKE BUDEJOVICE		BUCHAREST
ESTONIA	TALLINN	RUSSIA	MAGADAN
FRANCE	PARIS		MOSCOW
GERMANY	BERLIN		NOVOSIBIRSK
	MUNICH		ST-PETERSBURG
GREAT BRITAIN	EDINBURGH		SOCHI
	LONDON	SLOVENSKO	BANSKA BYSTRICA
			BRATISLAVA
HOLLAND	AMSTERDAM		KOSICE
HUNGARY	BUDAPEST	SPAIN	MADRID
	DEBRECEN	SWITZERLAND	ZURICH
	PECS	UKRAINE	DNYPETSK
IRELAND	DUBLIN		KIEV
ITALY	ROMA		ODESSA

Time and date setting



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

Time program

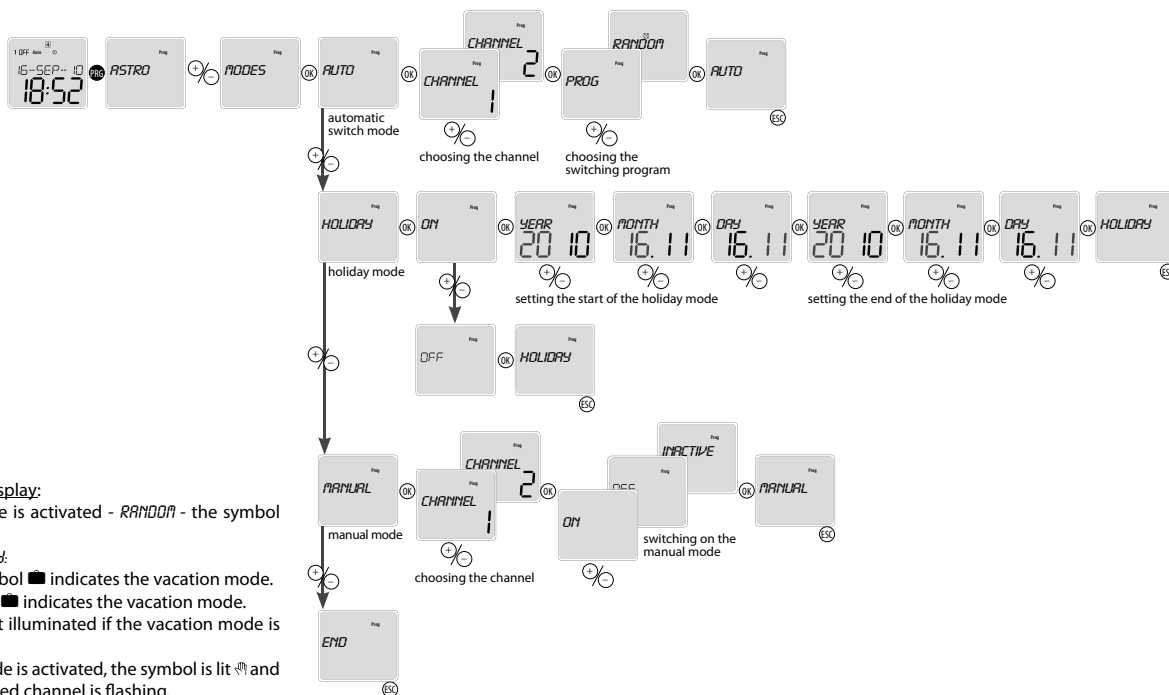


* By shortly pressing (Ⓞ), you can toggle between the program number and the display of its settings. Use (Ⓞ) to toggle preset programs. By holding (Ⓞ) you can proceed with the required step - CHANGE / DELETE. If you do not want to proceed, press (Ⓞ) to go to the main settings without any change.

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.

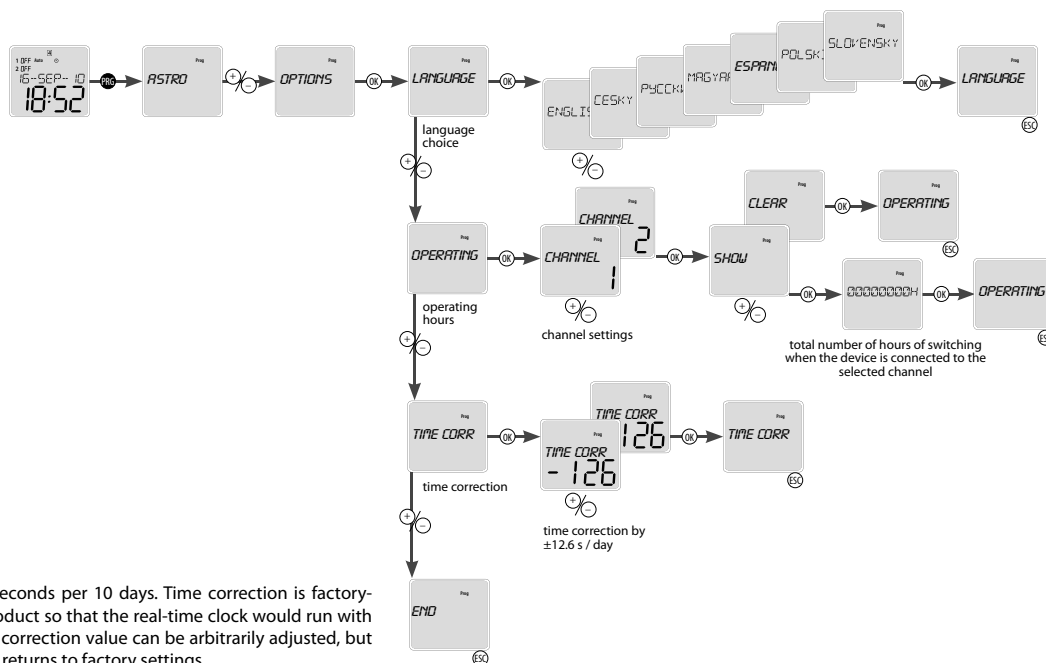
● - long press (>1s)
○ - short press (<1s)

Setting the switching modes



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

Setting options



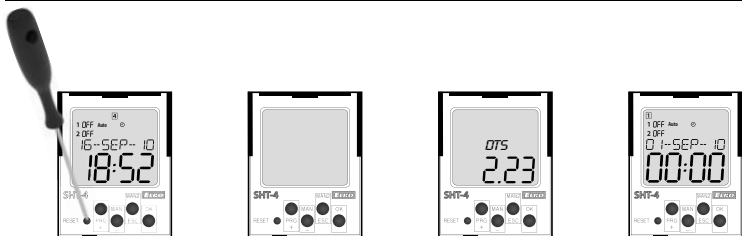
● - long press (>1s)
○ - short press (<1s)

Time correction:

The shift unit is 0.1s 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.

Reset

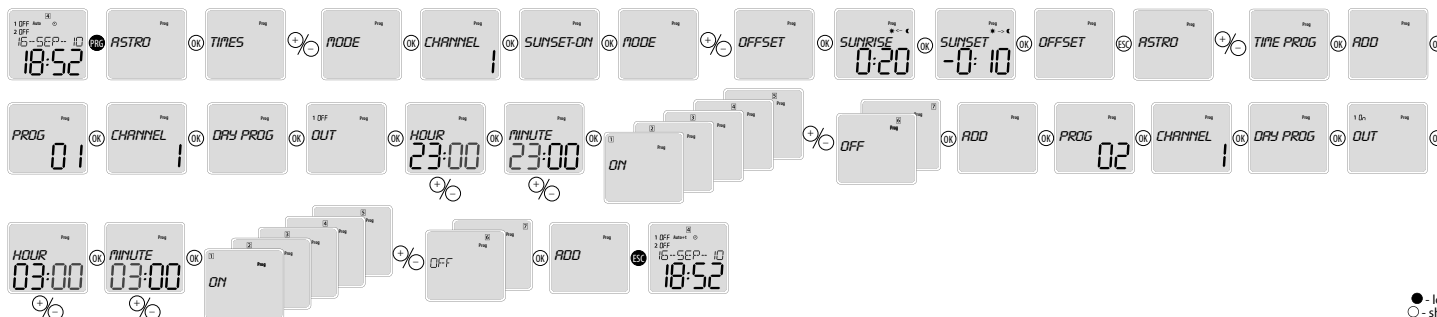


Performed by shortly pressing the hidden RESET button with a blunt-pointed object (e.g. a pencil or screw-driver with a diameter of at most 2 mm).

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 (setting ASTRO 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.



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