ELKO EP, s.r.o.
Palackého 493
769 01 Holešov, Všetuly
Czech Republic
Tel.: +420 573 514 211
e-mail: elko@elkoep.com
www.elkoep.com

Made in Czech Republic

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SHT-13, SHT-13/2

Multifuntion digital time switch
with Wi-Fi connection

Characteristics

- All programs in one device (daily, weekly, yearly and astronomical).
- UNIversal supply voltage in range of AC/DC 24 – 240 V (AC 50-60 Hz).
- Simple setting after the first start-up.
- Replaceable battery for time back-up (replace battery without losing real time clock, after disconnection of supply voltage).
- Built-in web server for setup and control via Wi-Fi connection.
- Time synchronization through NTP server (require internet connection).
- New well-arranged display with white backlight.
- ASTROnomic program: manual entry of coordinates or selecting one of the preset cities.
- One/two channel design (each with an operating hours counter).
- Pulse/cycle output mode.
- Transition of summer/winter time – AUTO or OFF.
- Lead-sealing transparent front panel cover.
- PIN code protection against unauthorized changes.
- Wireless firmware update.

A first setup wizard will guide you through the initial configuration after inserting the battery or after connecting to the power supply.

Each channel can be assigned a different program or operating switching mode, this allows control of two independent circuits. In the event of a mains power failure, the device will retain all the set values required for reliable switching after the power is restored. After installation, it does not require any special service or maintenance.

The astronomical program does not need any optical sensors or other external devices to function. Its operating principle is that during the year every day, based on an algorithm and real-time (set in the time switch), automatically controls switching on and off times of e.g. public lighting. This is because the sunrise and sunset times change throughout the year. With the offset (deviation) function, the turning ON and switching OFF times can be corrected within ± 120 minutes. The delay is fixed for each day but can be adjusted for each channel separately.

- Operation modes of switching: (configurable for each channel separately)
  - Time program (switches according to set time programs)
  - Holidays / Time program (switches according to set holidays and time programs
  - Astro / Time program (switches according to the set astronomical and time program)
  - Holidays / Astro / Time program (switches according to set holidays, astronomical and time program)
  - Random program (switches randomly in an interval of 10-120 min)
  - Locked – Manual (fixed output state that cannot be changed other than through settings)
- Possibility to manually control the output contacts at any time (out of operation mode, Locked - Manual).
- 200 memory locations for time programs (common for both channels).
- Up to 30 memory locations for holidays
- Programming can be done under power and in backup mode.
- Optional languages – CZ / SK / EN / ES / PL / HU / RU
- Selection of summer/winter time transition:
  - AUTO (changes automatically according to the entered time zone)
  - OFF (permanently switched off winter/summer time transition)
- The time switch is backed up by a battery, which enables it to operate in backup mode in the event of a power failure. All settings and programs are saved in memory in the event of a power failure - they can thus be restored even in the event of a power failure and a discharged battery. However, a time correction will need to be made.
- **Attention:** in case of battery power and waking up the time switch to standard mode and subsequent connection of the supply voltage, no button must be pressed for 15 s to restore the power supply.
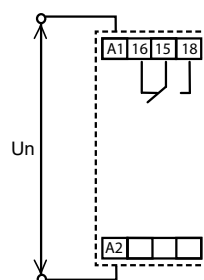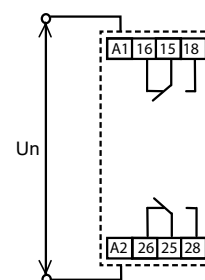
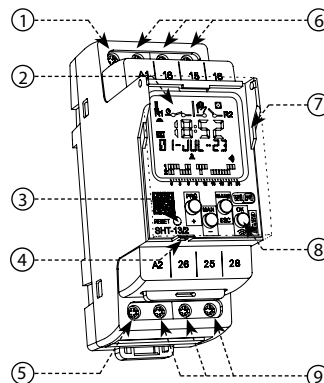## Symbol

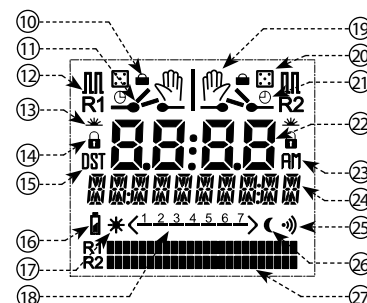SHT-13
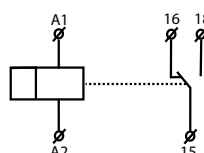
SHT-13/2
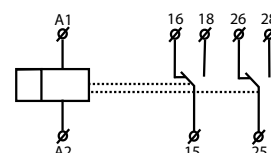
Connection

SHT-13

SHT-13/2

Description

SHT-13/2

1. Supply terminal (A1)
2. Backlight display
3. Reset
4. Sealing spot
5. Supply terminal (A2)
6. Output - 1. channel (16-15-18)
7. Transparent cover
8. Control buttons
9. Output - 2. channel (26-25-28)
10. Holiday program
11. Output indication
12. Pulse/cycle mode
13. Astro program
14. Manual control locked
15. Summer time
16. Battery indication
17. Sunrise indication
18. Days in week
19. Manual control
20. Random program
21. Time program
22. Time
23. AM/PM
24. Text line
25. Wi-Fi connection
26. Sunset indication
27. Bargraph

DISPLAY BACKLIGHT CONTROL

Powered: By default, the display is backlit for 90 seconds from the time of the last press of any button. The display still shows: the date, time, day of the week, state of contacts, and battery or the type of program in progress. The backlight is permanently switched on/off by pressing the MAN1, MAN2, and OK buttons at the same time. When activating / deactivating the permanent backlight, the display will briefly flash twice.

Backup mode: In the event of a power failure, the display will automatically switch to sleep mode, during which time only the following will flash on the display: the date, time, day of the week, and battery state. The time switch can then be woken up at any time by pressing the OK button to the standard mode - e.g. for setting (without working Wi-Fi or output contacts) - however, take into account that in this case the consumption from the battery is significantly increased, which affects its service life. It will return to sleep mode if no buttons are pressed for 20 seconds.

Technical parameters

	SHT-13	SHT-13/2
Supply terminals:	A1-A2	
Supply voltage:	AC/DC 24 – 240 V (AC 50-60 Hz)	
Consumption (max.):	Wi-Fi "OFF" 0.5 W/2 VA ǀ "ON" 1 W/3 VA	
Supply voltage tolerance:	−15 %; +10 %	

Output

	SHT-13	SHT-13/2
Contact type:	1× changeover (AgSnO$_2$)	2× changeover (AgSnO$_2$)
Rated current:	16 A/AC1*	
Switched power:	4000 VA/AC1, 384 W/DC1	
Inrush current:	30 A/< 3 s	
Switching voltage:	250 V AC/24 V DC	
Power dissipation (max.):	1.2 W	2.4 W
Mechanical life:	30.000.000 ops.	
Electrical life (AC1):	100.000 ops.	

Time circuit

Accuracy:	max. ±1 s/day at 23°C (73.4 °F)
Min. switching interval:	1 s
Data retention time:	min. 10 years
Set time backup:	up to 120 days (CR 2032 - 3V)

Program circuit

Number of memory locations:	200
Program type:	daily, weekly, yearly, astro
Displayed data:	LCD display with white backlight
Settings via website:	by Wi-Fi (2.4 GHz)

Other information

Operating temperature:	−20 .. +55 °C (−4 .. 131 °F)
Storage temperature:	−30 .. +70 °C (−22 .. 158 °F)
Dielectric strength:	
supply – output	AC 4 kV
output 1 – output 2	AC 4 kV
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 front panel / IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Cross-wire section – solid/ stranded with ferrule (mm^2):	max. 1× 2.5, 2× 1.5/ max. 1× 2.5 (AWG 14)
Dimensions:	90 × 35 × 64 mm (3.5˝ × 1.4˝ × 2.5˝)
Weight:	122 g (4.3 oz) ǀ 135 g (4.8 oz)
Standards:	EN 61812-1

* With a permanent maximum load on the relay contacts of 16 A/AC1 and ambient temperature of +55 °C, the manufacturer recommends using a supply wire with insulation temperature resistance (min.) up to +105 °C.

Warning

This device is constructed for connection in 1-phase network AC/DC 12 – 240 V or AC 230 V (according to the type) and must be installed according to norms valid in the state of an application. Installation, connection, setting and servicing must be carried out by qualified electrician staff only, which have perfectly understood the instructions and functions of the device. This device contains protection against overvoltage peaks and disturbing impulses in the power supply network. For the correct function of the protection of this device, there must be suitable protections of higher degrees (A,B,C) installed in front of them and according to the standards, interference of switching devices must be securely eliminated (contactors, motors, inductive loads, etc.). Before installation, make sure that the device is de-energized and the main switch is in the "OFF" position. Don't install the device to sources of excessive electromagnetic interference. Ensure correct installation by perfect air circulation so that during continuous operation and a higher ambient temperature, the device does not exceed the maximum allowed operating temperature. For installation and setting use a screwdriver with a width of approx 2 mm. Keep in mind that this is a fully electronic device and approach accordingly with the installation. Non-problematic function of the device is also dependent on the previous method of transportation, storage, and handling. In case of any signs of damage, deformation, malfunction, or missing parts, don't install this device and claim it at the dealer. The product must be treated as electronic waste at the end of its life.

Control description

	PRG	entrance into programming menu
		browsing in menu
		setting of values
		quick shifting during setting of values
	OK	entrance into required menu
		confirmation
		Wi-Fi activation/deactivation (on main screen)
	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 120s of inactivity (from the last press of any button) the device will automatically return into the main screen.

Manual output control
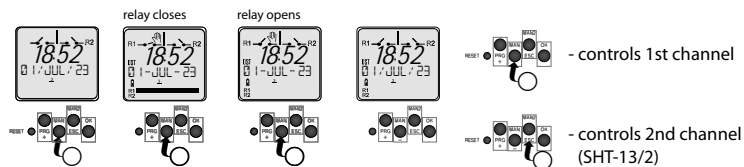
We have two types of manual controls available:

- Permanent 🖐
  The second highest priority of all control modes. The state of the output cannot then be changed other than by manual change (e.g. by switching to temporary manual control or by activating Locked manual control, which has a higher priority). The last option is to deactivate this control mode.

- Temporary 🖐
  Temporary manual control has the same priority as the previous, permanent one. However, it can be changed in the future, unlike permanent manual control, by one of the programs with a lower priority (if configured in the time switch). With power supply disconnection, temporary manual control is deactivated.

Modes priority

		symbol	mode
highest priority	▶▶▶▶▶	🖐 🔒	locked - manual control
	▶▶▶▶	🖐 ǀ 🖐	manual control (temporary ǀ permanent)
	▶▶▶	⊡	random
	▶▶	🧳	holidays
	▶	🕐	time
lowest priority	▶	☀	astronomic

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

Type of load	cos φ ≥ 0.95 AC1	(M) AC2	(M) AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12
Contact material AgSnO$_2$, 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	(M) DC3	(M) DC5	DC12	DC13	DC14
Contact material AgSnO$_2$, 16A	x	250V / 6A	250V / 6A	24V / 16A	24V / 3A	24V / 2A	24V / 16A	24V / 2A	x

Display indication

⊙	⊙	time program is active | time program is planned for future	
☀	☀	astro program is active | astro program is planned for future	
⊡		random program is active	
🔒	🔒	holiday is active | holiday is planned for future	
✋	✋	temporary | permanent manual control	

Ⅱ		pulse program is active	
Ⅲ		cycle program is active	
·))	·))	Wi-Fi is connected | transmitting	
🔋	🔋	🔋	battery is discharged | 50% of capacity | not inserted
☀	☾	sunrise | sunset phase of astronomic program	

THE BAR GRAPH reflects only time programs or permanent manual control! If the segment of the given time is lit, it means that there is a scheduled time program for switching the output for at least 1 s at the given hour. If the segment of the given time is not lit, it means that no time program for switching the output is scheduled at the given hour.

First setup

To set up the time switch you have two options (including canceling it), please follow the steps below.

ENGLISH → FIRST SETU → USE WEB IN / CONNECT TO

set your time switch using Wi-Fi

MANUALLY O → OPERATION → CHANNEL 1 → TIME PROGR → ASTRO MODE → CHANNEL 1 → SUNSET-ON/

set your time switch manually

CANCEL SET → R1 00:00 R2 01-JAN-23

cancel setup (you can set up the device later on)

Now connect your smart device (PC/Phone/Tablet/....) to Wi-Fi (2.4 GHz) of the time switch.

Data for wireless configuration (default):
Wi-Fi SSID hostname: SHT-13_serial number
Wi-Fi password: elkoep13
Web address for configuration: 192.168.1.1 or sht-13.local

Setup wizard will guide you through each step after opening configurator.
If you need advice on the individual steps, follow the instructions below in the Wi-Fi connection headline.

ASTRO SETTINGS :

ASTRO MODE — selected one of the ASTRO operation modes

CHANNEL 1 — starts with 1st channel & follows with 2nd but depends on previous configuration

SUNSET-ON/ — set astro mode

starts with 1st channel, follows with 2nd (SHT-13/2)

TIME PROGR — set operation mode

CYCLE → ON TIME[1 → OFF TIME 1 → START-ON S → 00:00 SUNRISE → 00:00 SUNSET

set the output type | set impulse time | set pause time | set starting with impulse or pause | set offset for sunrise | set offset for sunset

PULSE → PULSE TIME 1 → 00:00 SUNRISE → 00:00 SUNSET

set the output type | pulse length | set offset for sunrise | set offset for sunset

ON/OFF → 00:00 SUNRISE → 00:00 SUNSET

set offset for sunrise | set offset for sunset

ASTRO SETTINGS:
Menus for ASTRO settings (mode, output type, location) will pop up only if you have selected one of the ASTRO programs as operation mode for 1st or 2nd channel. If you have selected the ASTRO program for both channels you will need to set up the mode and output type for both since each channel can have a different setup.

ASTRO MODES:
SUNSET-ON/SUNRISE-OFF (the output of the selected channel turns on at sunset and opens at sunrise)
SUNSET-OFF/SUNRISE-ON (the output of the selected channel opens at sunset and turns on at sunrise)
SUNSET-ON/SUNRISE-ON (the output of the selected channel turns on at sunset and sunrise)
SUNSET-OFF/SUNRISE-OFF (the output of the selected channel opens at sunset and sunrise)

LOCATION → COORDINATE / COUNTRY → CESKA REPU / PRAHA

setting the location | select an option | setting the country | setting the city

COORDINATE → 49 LATITUDE → 17 LONGITUDE

setting the latitude | setting the longitude

DATE → 2023 YEAR → 01.07 MONTH → 01.07 DAY

setting the date | setting the year | setting the month | setting the day

TIME → 18:52 HOUR → 18:52 MINUTE → TIME FORMA → 24H / 12H → FIRST DAY → MONDAY

setting the date | setting the hours | setting the minutes | time format | select format | setting the first day of the week | select the day

SUMMER/WIN → AUTO / OF → TIME ZONE → EUROPE → PRAGUE → R1 18:52 R2 01-JUL-23

summer/winter time switching | AUTO: automatically according to selected time zone OFF: permanently deactivated | setting the time zone | select region | select city

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

Wi-Fi connection

First, make sure that you have a smart device with Wi-Fi of 2.4 GHz band that supports a web browser and is close enough to SHT-13 that you want to connect. The time switch does not support a 5 GHz band.

For connection to a web server - configuration, you don't need any mediator (e.g. router) nor access to the internet. The time switch works also as an access point so you are connecting directly to the device (not your local network). However, if you require time synchronization using an NTP server, you need to make sure there is a router with access to the internet close enough to SHT-13.

press the OK button, to activate the Wi-Fi of the time switch for 90 s

NOTE.: Wi-Fi can be activated permanently through the settings, once the setup wizard is complete

R1 18:52 R2 01-JUL-23 | R1 18:52 R2 01-JUL-23 — active Wi-Fi is indicated by an icon on the display

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

Now connect your smart device to the Wi-Fi of the time switch (follow the instructions provided by the manufacturer of the smart device).

Data for wireless configuration (default):
Wi-Fi SSID hostname: SHT-13_serial number
Wi-Fi password: elkoep13

When the connection is established between the devices, the Wi-Fi icon on the display with start flashing. The timer for Wi-Fi deactivation (90 s) is canceled. The connection between the devices will be established until one of the devices loses the signal of the second one or one of the Wi-Fi isn't turned off. If that occurs, a timer for Wi-Fi deactivation is established.

Once connected, open your smart device's web browser and enter one of these addresses in the address bar:

192.168.1.1 or sht-13.local

Time and date setting

OPERATION → OPTIONS → DATE/TIME → DATE
setting the date

DATE → YEAR 20.23 → MONTH 01.07 → DAY 01.07 → DATE
setting the year / setting the month / setting the day

TIME
setting the date
→ HOUR 18:52 → MINUTE 18:52 → TIME
setting the hours / setting the minutes

TIME FORMA
time format
→ 24H 12H → TIME FORMA
select format

DATE FORMA
date format
→ DD-MM-YY → DATE FORMA
select format

FIRST DAY
setting the first day of the week
→ MONDAY → FIRST DAY
select the day

SUMMER/WIN
summer/winter time switching
→ AUTO OFF → SUMMER/WIN
AUTO: automatically according to selected time zone
OFF: permanently deactivated

TIME ZONE
setting the time zone
→ EUROPE → PRAGUE → TIME ZONE
select region / select city

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

Astro settings

ASTRO MODES:
SUNSET-ON/SUNRISE-OFF (the output of the selected channel turns on at sunset and opens at sunrise)
SUNSET-OFF/SUNRISE-ON (the output of the selected channel opens at sunset and turns on at sunrise)
SUNSET-ON/SUNRISE-ON (the output of the selected channel turns on at sunset and sunrise)
SUNSET-OFF/SUNRISE-OFF (the output of the selected channel opens at sunset and sunrise)

OPERATION → ASTRO SETT → ASTRO MODE
set astro mode
→ CHANNEL 1
select channel
→ SUNSET-ON
set astro mode

ON/OFF
set the output type
→ SUNRISE 00.00 → SUNSET 00.00 → ASTRO MODE
set offset for sunrise / set offset for sunset

PULSE
set the output type
→ PULSE TIME 1 → SUNRISE 00.00 → SUNSET 00.00 → ASTRO MODE
pulse length / set offset for sunrise / set offset for sunset
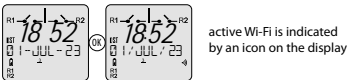
CYCLE
→ ON TIME 1 → OFF TIME 1 → START-ON → SUNRISE 00.00 → SUNSET 00.00 → ASTRO MODE
set impulse time / set pause time / set starting with impulse or pause / set offset for sunrise / set offset for sunset

LOCATION
setting the location
→ COUNTRY → CESKA REPU → PRAHA → LOCATION
setting the country / setting the city

→ COORDINATE
select an option
→ LATITUDE 49 → LONGITUDE 17 → LOCATION
setting the latitude / setting the longitude

SIMULATE
simulates astro times
→ CHANNEL 1
select channel
→ YEAR 20.23 → MONTH 01.07 → DAY 01.07 → 04.58 01-JUL-23 → 21.16 01-JUL-23 → SIMULATE
setting the year / setting the month / setting the day
shows astro times for selected date (offset included), to see following days continue pressing ○

SIMULATION
alternate astro times with date on main screen
→ ON OFF → SIMULATION
select state

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

Other settings

set operation mode

select channel

select operation mode

set locked settings

select channel

set required state of contact (for operation mode, Locked - Manual)

set language

select language

delete measured operating hours

operating hours

select channel

show measured operating hours

TIME CORRECTION:
Steps of 1 minute/year.
The numerical value is relative to minutes per year. The time correction is set at the factory and is individual for each product, so that the current time clock runs with minimal deviation. The time correction value can be changer arbitrarily, but after factory reset the value will be set back to the factory value.

time correction

correct time (± 20 m/year)

permanent Wi-Fi

select state

change PIN code

set new PIN code

PIN code setting

select state

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

Delete all (programs/holidays)

delete all holidays

delete all time programs

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

To delete all time programs/holidays on a time switch simply press and hold the button as shown in the pictures above and follow the options.

Location - preset locations

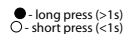|			
AUSTRIA		LATVIA	
	INNSBRUCK		RIGA
	WIEN	LITHUANIA	
BELARUS			VILNIUS
	MINSK	NORWAY	
CESKA REPUBLIKA			OSLO
	PRAHA	POLAND	
	BRNO		GDANSK
	OSTRAVA		KRAKOW
	HRADEC KRALOVE		WARSZAWA
	CESKE BUDEJOVICE	ROMANIA	
ESTONIA			ARAD
	TALLINN		BUCHAREST
FRANCE		RUSSIA	
	PARIS		MAGADAN
GERMANY			MOSCOW
	BERLIN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

Battery change

You can replace the battery without disassembling the device with the main voltage on or off. When replacing the battery, always take extra care to avoid contact with the bottom terminals of the product, above which the battery slot is located (they could be live). Alternatively, make sure they are not.

To replace the battery with power on, continue with steps #3 - 6, below.
To replace the battery and keep the set time only on battery power, continue with steps #1 - 6, below.
To replace the battery and maintain the set time with the supply voltage disconnected, continue with steps #2 - 6, below.

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

1. Wake up the timer from the backup mode by pressing the OK button, the main screen will appear.
2. Press and hold the PRG button on the main screen, use +/- to navigate to OPTIONS, short press OK, use +/- to navigate to BATTERY CHANGE [30S], short press OK to confirm, this will bring you to the START option.

- If you are only doing the replacement when powered from the battery, confirm the above START option again with the OK button. The display will show CHANGE. The time data has now been saved - you have 30 s for exchange, continue with step #3.
- In case you carry out the exchange with disconnection of the supply voltage, confirm the above START item again with the OK button. The display will show CHANGE. You now have 2 minutes to disconnect the supply voltage, during which time data will be saved - you have 30 s to replace, continue with step #3.

NOTE: Insert the battery plug-in module exactly at the time when the 30 s interval for replacement is running out to minimize the inaccuracies. The timer works by adding 30 s to the saved time data (time reserved for replacement).

3. slide out the plug-in module with the battery
4. remove the original battery
5. insert the new battery so that the upper edge of the battery (+) is aligned with the plug-in module
6. insert the plug-in module as far as it will go into the device - pay attention to the polarity (+ up)

If you did it right, the battery icon on the display will go out after the replacement (if is fully charged) and there will be no or minimal deviation in the time data. If the battery was not inserted exactly at the end of the 30 s interval, the deviation may be higher.

Time program/holiday setting

Time program setting

- add program
- edit program
- delete program
- select program *
- adjust selected program
- select program *

- daily program
- weekly program
- yearly program
- setting the output type (e.g. cycle)
- set impulse time
- set pause time
- set starting with impulse or pause
- setting the hours
- setting the minutes

- setting the output type (e.g. pulse)
- pulse length
- setting the hours
- setting the minutes
- setting program activity on days of the week

- setting the output type (e.g. ON/OFF)
- setting the year
- setting the month
- setting the day
- setting the hours
- setting the minutes

Holiday setting

- add holiday
- edit holiday
- delete holiday
- select holiday *
- select holiday *
- switch between start & end
- select the state of output for 1st channel
- select the state of output for 2nd channel (SHT-13/2)

Holiday start :
- setting the year
- setting the month
- setting the day
- setting the hours
- setting the minutes

Holiday end :
- setting the year
- setting the month
- setting the day
- setting the hours
- setting the minutes

* 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 - EDIT / 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 MEMORY on the display. If the programs memory is empty and you want to change or erase a program, the display will show NO PROGRAMS/NO HOLIDAYS.

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

Firmware update / factory reset / restart

• **Firmware update:**
The web interface itself will guide you through the update process. After connecting to Wi-Fi SHT-13 and opening the configurator in the browser, go to the Service menu, select the file with the new firmware and click the update button.

The hidden RESET button has two functions depending on the length of the press:

• **Factory reset:**
It is performed by long pressing <5 with a blunt tip of the hidden RESET button (e.g. a pen or a screwdriver with a diameter of max. 2 mm).
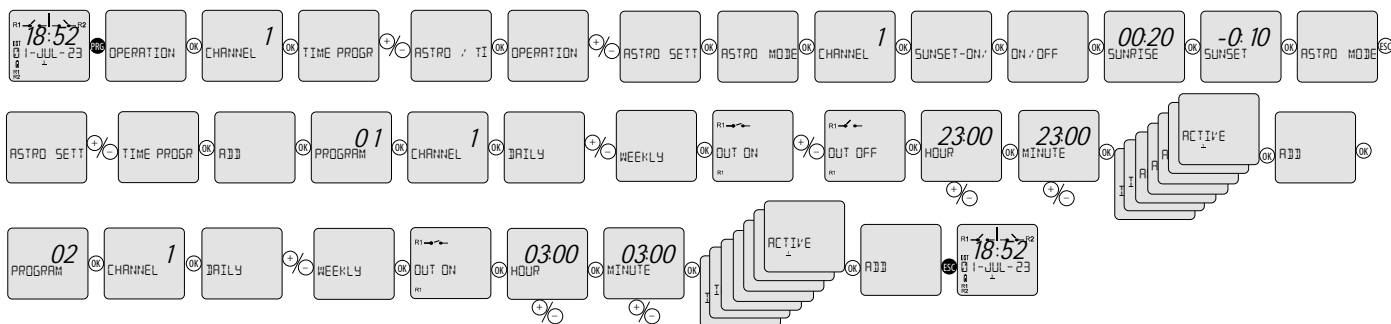The display briefly shows all display segments, then the device type and firmware version. The following is a setup guide - i.e. the same state in which you received the timer from the factory. Settings and all configured programs/holidays are erased by this step.

• **Restart:**
It is done by briefly pressing <1 with the blunt tip of the hidden RESET button. The display briefly shows all display segments, then the device type and firmware version. This is followed by a transition to the main screen - date, time, program activity, contact status, etc. This step will not result in the loss of settings or configured programs/holidays.

SHT-13 programming example

Setting 1st channel to switch ON from the sunset to the sunrise with an offset (deviation) of +20 minutes for the sunrise and −10 minutes for the sunset with turning OFF from 11 p.m. to 3 a.m. every MONDAY - FRIDAY.

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