Multifunction digital thermostat

EN

TER-9

Contents

Warning

Device is constructed for connection in 1-phase main alternating current voltage AC 230V or 24V AC/DC (based on type of device) 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 disturbancies 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 disturbancies 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

- digital thermostat with 6 functions and built-in time switch clock with day, week and year program. You can also limit temperature functions and courses this way in real time.
- the temperature profile can be changed using the time program
- complex home and water heating, solar heating, etc.
- two thermostats in one, two temperature inputs, two outputs with dry contact
- maximum universal and variable thermostat including all ordinary thermostat functions
- functions: two independent thermostats, dependent thermostat, differential thermostat, two level thermostat, zone-based thermostat, dead zone thermostat
- monitoring function for short circuit or sensor disconnection
- program setting of output functions, calibration of sensors according to reference temperature (offset)
- the thermostat is subject to the digital clock programs
- wide range for setting control temperature - 40 to 110°C
- clear display of set and measured data on a backlit LCD
- 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:
  - *TER* - switches according to set thermostat function (switches based on temperature sensors and associated function)
  - *TIME PROGRAM* - switches or sets required temperature according to set time program
- 100 memory locations for time programs (common for both channels).
- Programming can be performed under voltage and in backup mode.
- The relay outputs do not work in backup mode (battery-powered)
- Choice of menu display - CZ / SK / EN / RO / PL / HU / RU (factory setting EN).
- Choice of automatic daylight savings time transition according to time zone.
- Backlit LCD display.
- Easy and quick setting with the help of 4 control buttons.
- Pluggable transparent cover on front panel.
- The time switch clock has a battery backup, which retains data in case of a power outage (reserve backup time - up to 3 years).
- Power supply: AC 230V or 24V AC/DC (based on type of device).
- 2-module, DIN rail mounted

Technical parameters

Supply	
Supply terminals:	A1 - A2
Supply voltage:	AC230 V (AC50-60Hz), galvanically isolated or AC/DC 24 V, not galvanically isolated
Consumption:	max. 4 VA
Supply voltage tolerance:	-15 %; +10 %
Backup battery type:	CR 2032 (3V)
Measuring circuit	
Measuring terminals:	T1-T1 a T2-T2
Temperature range:	-40.. +110 °C
Hysteresis (sensitivity):	adjustable within range 0.5...5 °C
Diference:	adjustable 1 .. 50 °C
Sensor:	thermistor NTC 12 kΩ at 25 °C
Sensor failure indication:	displayed on LCD *
Accuracy	
Measuring accuracy:	5 %
Repeat accuracy:	< 0.5 °C
Temperature dependance:	< 0.1 % / °C
Number of function:	6
Output	
Number of contacts:	1x switching for each output (AgNi)
Rated current:	8 A / AC1
Switching capacity:	2000 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 30 V DC
Output indication:	symbol ON/OFF
Mechanical life:	$1x10^7$
Electrical life (AC1):	$1x10^5$

Time circuit	
Real time back-up:	up to 3 years
Accuracy:	max. ±1s/ day at 23°C
Minimum interval:	1 min.
Data stored for:	min. 10 years
Program circuit	
Number of memory places:	100
Program(SHT-3, SHT-3/2):	daily , weakly, yearly
Data readout:	LCD display, with back light
Other information	
Operating temperature:	-10.. +55 °C
Storage temperature:	-30.. +70 °C
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 clips
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	max.1x 2.5, max.2x1.5/ with sleeve max. 1x2.5
Dimensions:	90 x 35.6 x 64 mm
Weight:	(230V) 127 g (24V) 120 g
Standards:	EN 61812-1. EN 61010-1. EN 60730-2-9; EN 60730-1; EN 60730-2-7

* *ERROR* - sensor short circuit
NO SENSOR - interruption sensor

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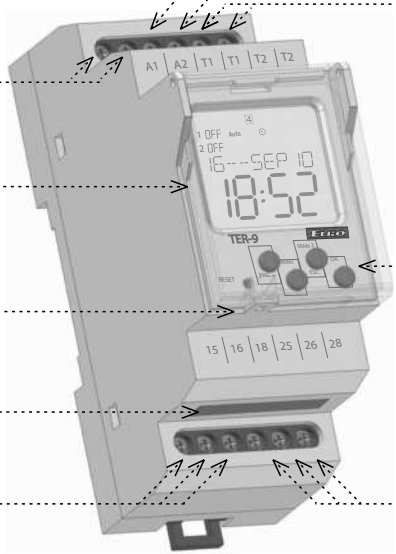
Description



Terminals -sensor 1

Terminals -sensor 2

Supply voltage terminal (A1)(A2)

Display with back-light

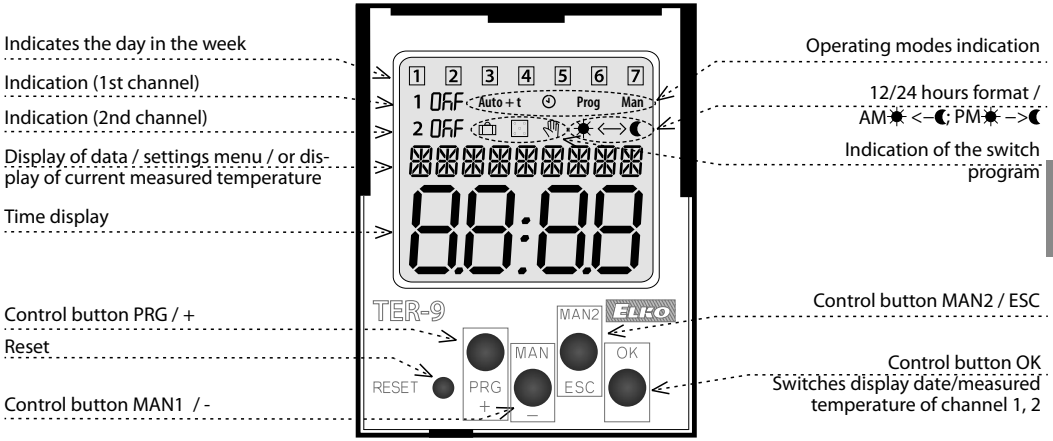
Control buttons

Place for seal

Plug-in module for replacing backup battery

Output - channel 1 (15-16-18)

Output - channel 2 (25-26-28)



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.

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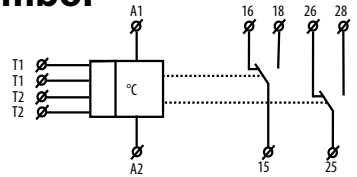
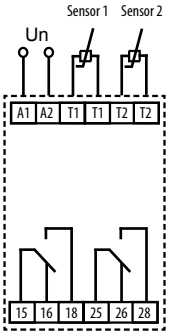
Symbol



Connection



Temperature sensor TC, TZ

Resistance value of sensors based on temperature

Temperature (°C)	NTC sensor (kΩ)
20	14.7
30	9.8
40	6.6
50	4.6
60	3.2
70	2.3

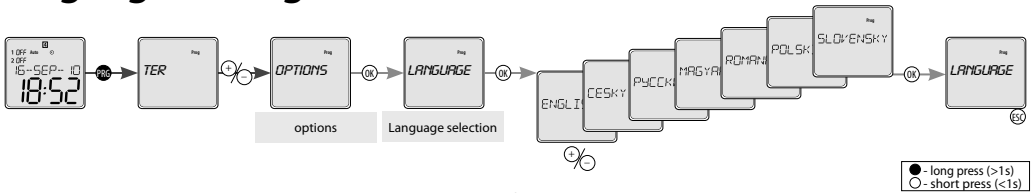
Tolerance of sensor NTC 12 kΩ is ± 5% at 25 °C..

Mode precendence

mode precedence	display	output mode
mode with the highest priority ➤➤➤	ON / OFF ✋	manual control
➤➤	ON / OFF 🧳	holiday mode
➤	ON / OFF	time program Prog
	TER	thermostat

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

Language settings



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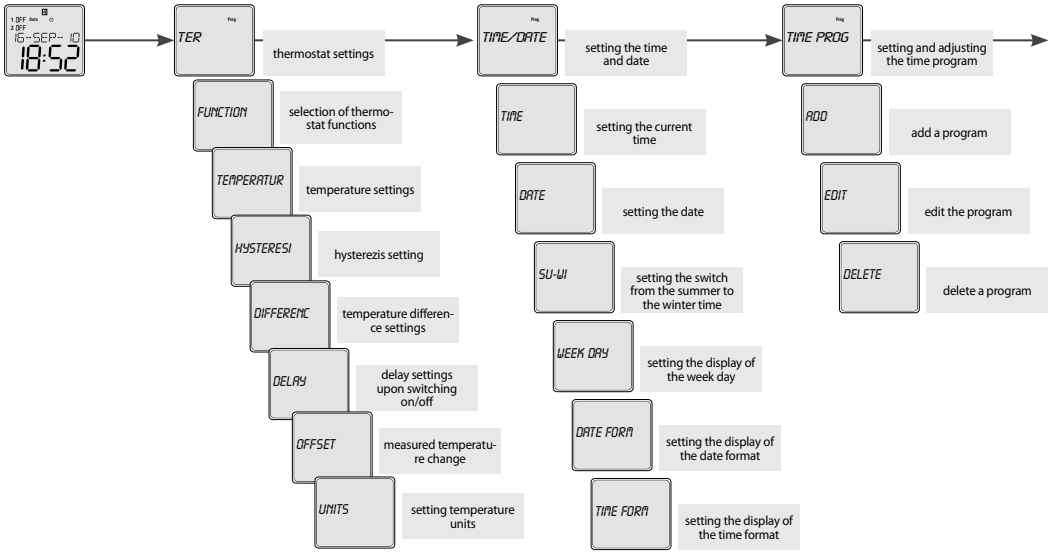
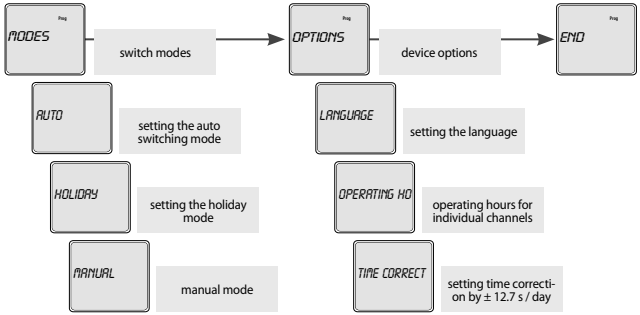
Menu overview



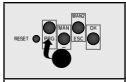
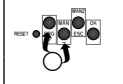
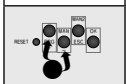
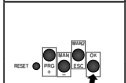
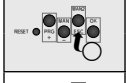
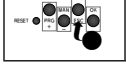


Device differs short and long button press. In the manual marked as:
◯ - short button press (<1s)
● - long button press (>1s)

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

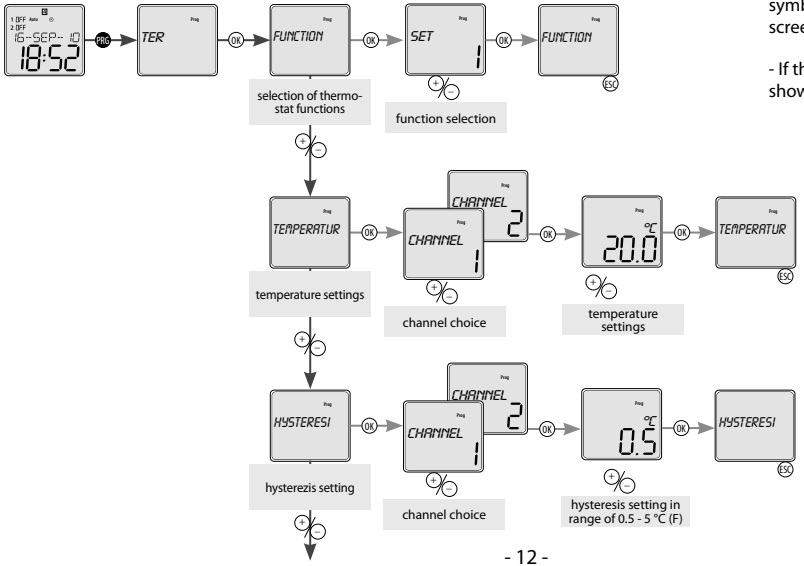
In the start screen, press OK to toggle between displaying the date or measured temperature.

Control

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

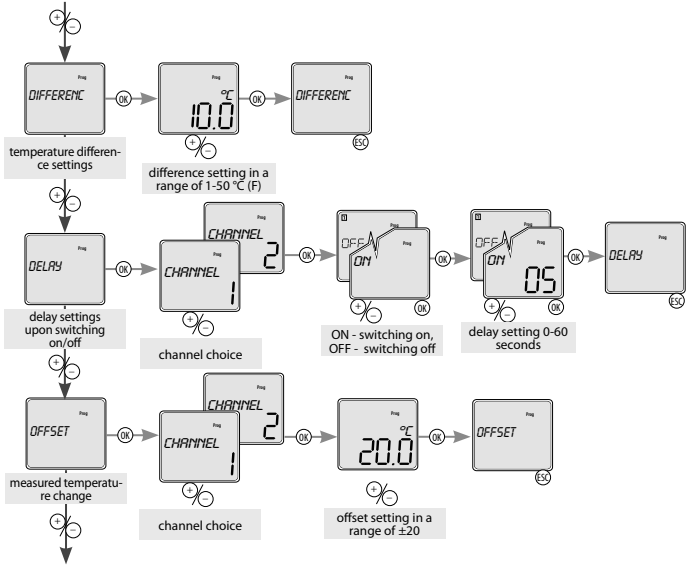
EN

TER Zobrazení a nastavení TER



- If the function *TER* is active, then symbol „Auto" is displayed on the screen

- If the entered switching delay is shown on the display „Auto + t"



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

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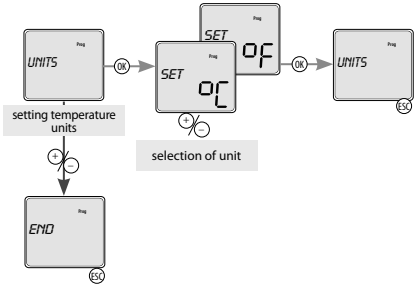
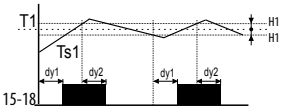


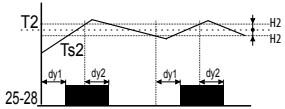
Thermostat functions

2 independent single-stage thermostat

Heater function



Heater function

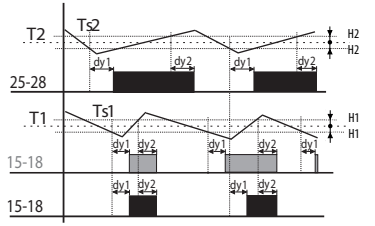


Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1 - set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

- Output contact switched until adjusted temperature is reached. Hysteresis eliminates frequent switching. Heating/cooling function adjusted in the menu.

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

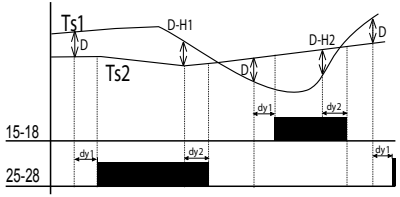
Dependent functions of 2 thermostats



Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
25-28 output contact (for T2)
15-18 output contact (intersection T1 and T2)

- Output 15-18 is closed, if temperature of both thermostats is bellow an adjusted level. When any thermostat reaches adjusted level, the contact 15-18 open. Serial inner connection of thermostats (logic function AND).

Diff erential thermostat



Legend:
Ts1 - real (measured) temperature T1
Ts2 - real (measured) temperature T2
D - adjusted diff erence
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

- Switching of output corresponds with input, which has lower temperature when diff ference is exceeded diff erencial thermostat is used for keeping two identical temperature e.g. in heating systems (boiler and reservoir), solar systems (collector, reservoir, exchanger), water heating (water heater, water distribution)etc.

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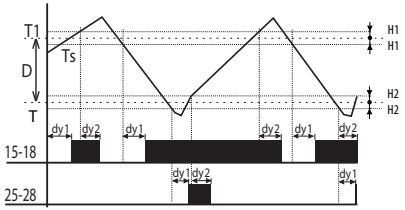
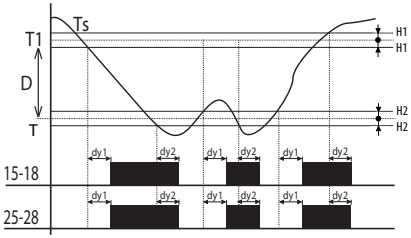
2-stage thermostat



Legend:
Ts - real (measured) temperature T1
D - adjusted diff erence
T1 - adjusted temperature T1
T=T1-D
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

- Typical example of use for two-stage thermostat is e.g in boiler-room, where there are two biolers from which one is main and the other one is auxiliary. The main boiler is managed according to set temperature and auxiliary boiler is switched in case temperature falls
under set diff erence. Thus it helps to the main boiler in case outside temperature dramatically falls. In the range of set diff erence (D) output 15-18 functions as normal thermostat to input 1 (type 1). In case temperature falls under set diff erence, output 2 switches.

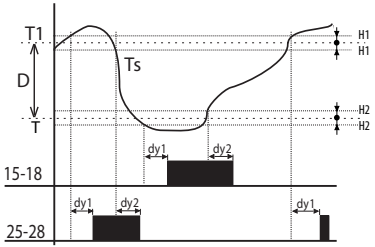
Thermostat with "WINDOW"



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
T=T1-D
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

- Output is closed (heating) only if temperature is within adjusted range.If temperature is out of range, the contact opens. T is set as T1-D.The function is used for protection of gutters against freezing.

Thermostat with dead zone



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
T=T1-D
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (heating)
25-28 output contact (cooling)

- In case of thermostat with a „dead zone" , it is possible to set temperature T1 and a diff erence (respectively a width of dead zone D). If temperature is higher than T1, output contact of cooling switches ON; if the temperature gets bellow T1, the contact switches OFF. If
the temperature gets bellow temperature T, the contact of heating switches ON and it switches OFF when temperature T is exceeded. This function can be used for example for automatic air warming and cooling in ventilation so the sit is always within the range T1 and T.

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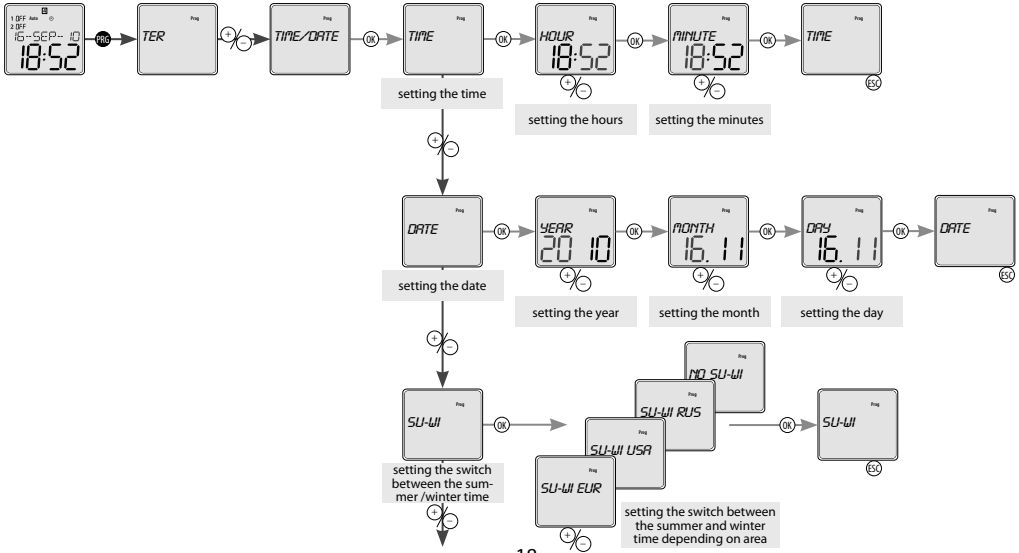
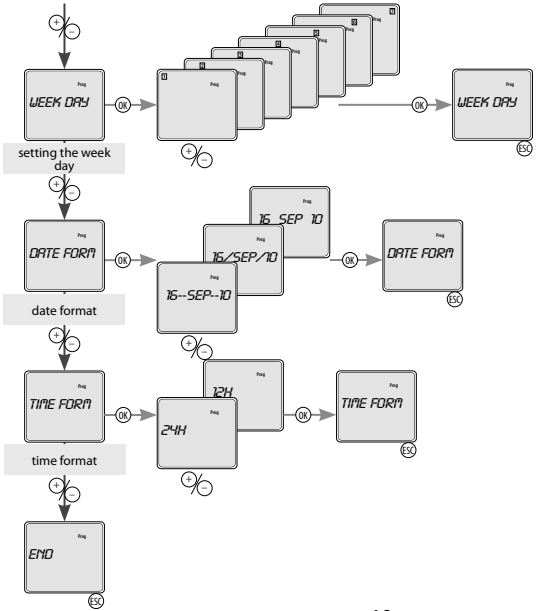
TIME/DATE Date and time setting





- After entering the date is normally calculated and numbered by day of the week : Monday = first day of the week

- Numeral showing the day of the week, may not correspond to the calendar day of the week. It can be set in the menu „Display settings of the week .“ Set the number from the set to the current date

Note: After the date is changed , the numbering of days back to the standard numbering ie Monday = first day of the week

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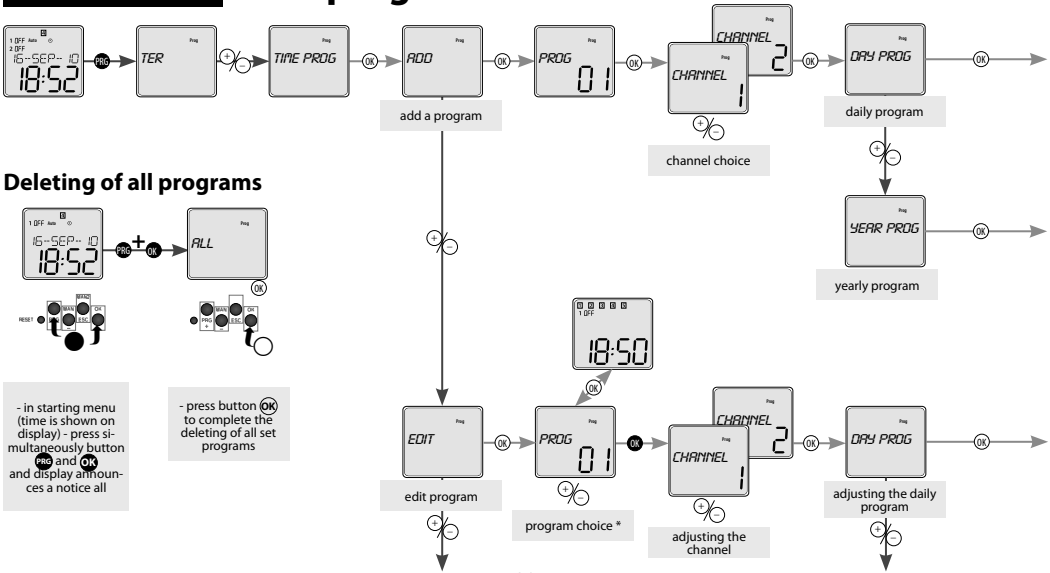
● - long press (>1s)
○ - short press (<1s)

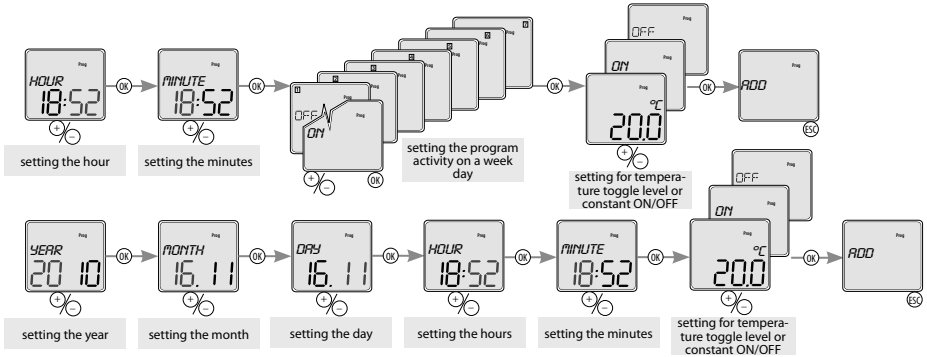
TIME PROGRAM Time program



Deleting of all programs

- in starting menu (time is shown on display) - press simultaneously button PRG and OK and display announces a notice all

- press button OK to complete the deleting of all set programs



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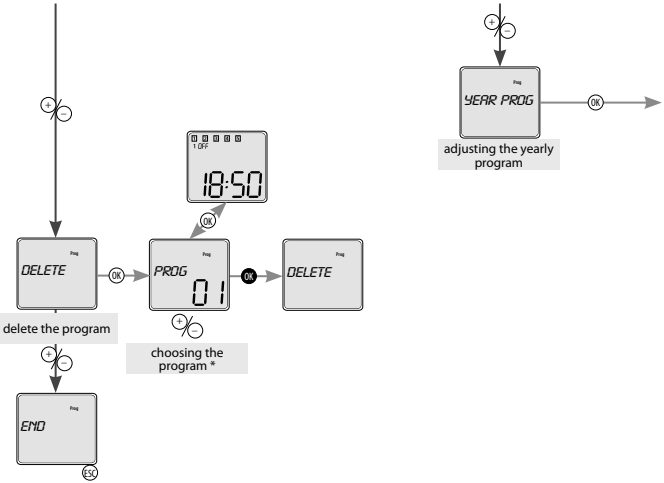
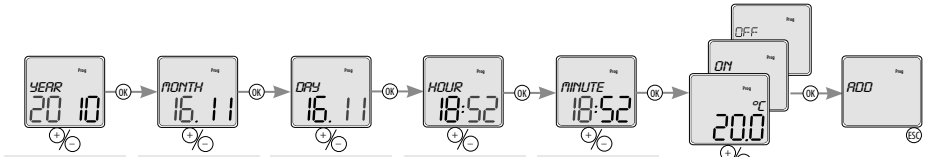
● - long press (>1s)
○ - short press (<1s)



*

1. ON - permanently ON
1. OFF - always off
1. OR - controlled by twilight switch

* 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*



adjusting the setting of the year

adjusting the setting of the month

adjusting the setting of the day

adjusting the setting of hours

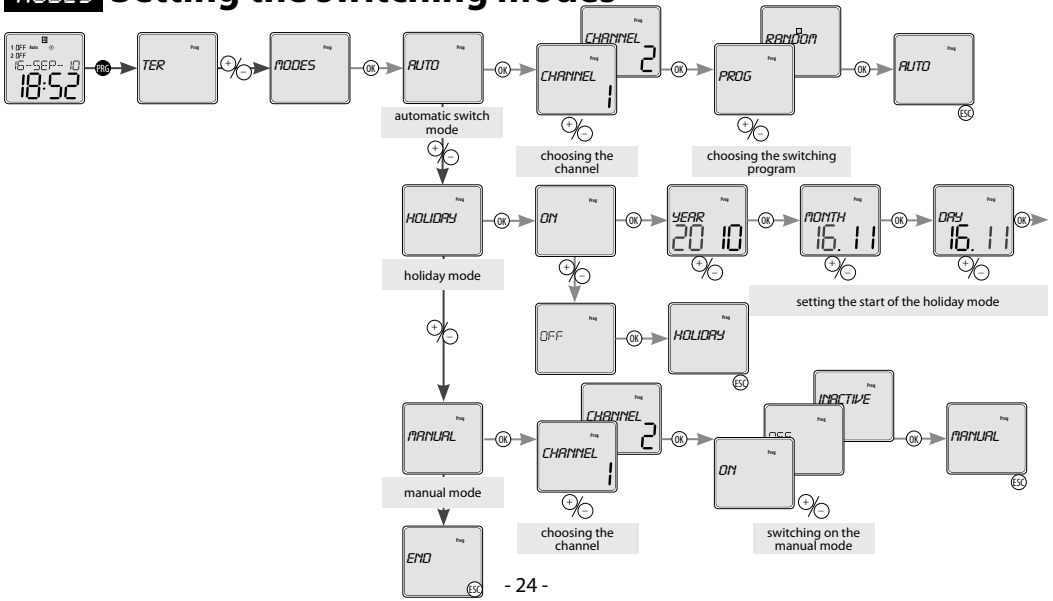
adjusting the setting of minutes

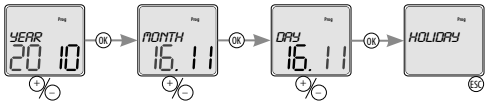
setting for temperature toggle level or constant ON/OFF

EN

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

MODES Setting the switching modes



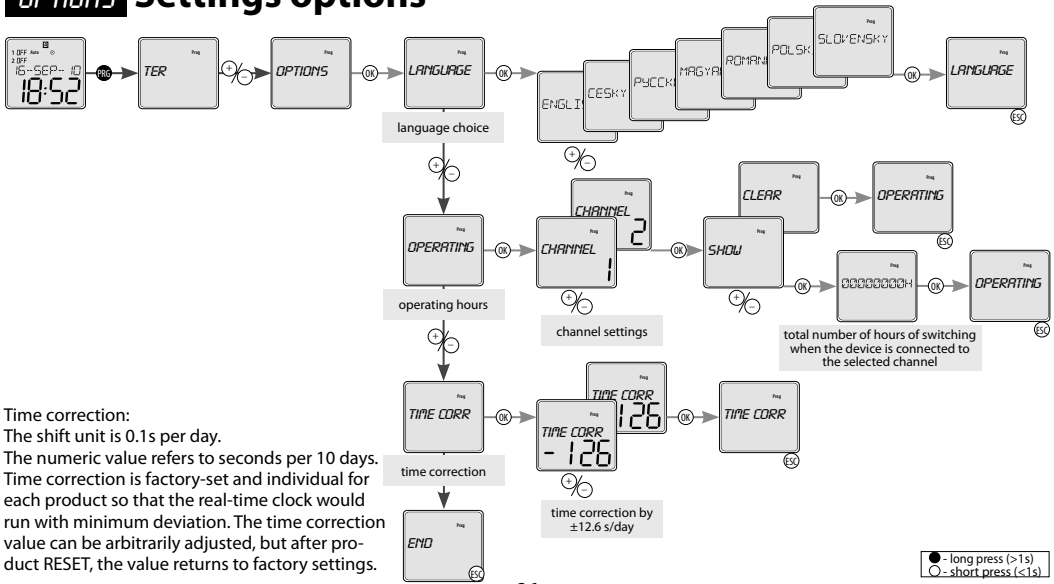


setting the end of the holiday mode

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.

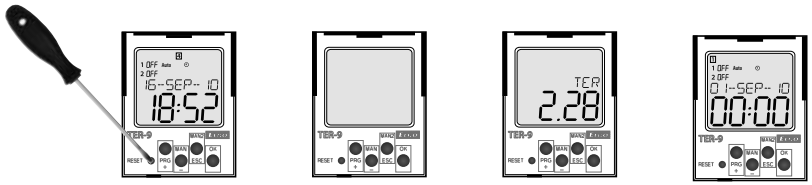
● - long press (>1s)
○ - short press (<1s)

OPTIONS Settings options



Time correction:
The shift unit is 0.1s 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



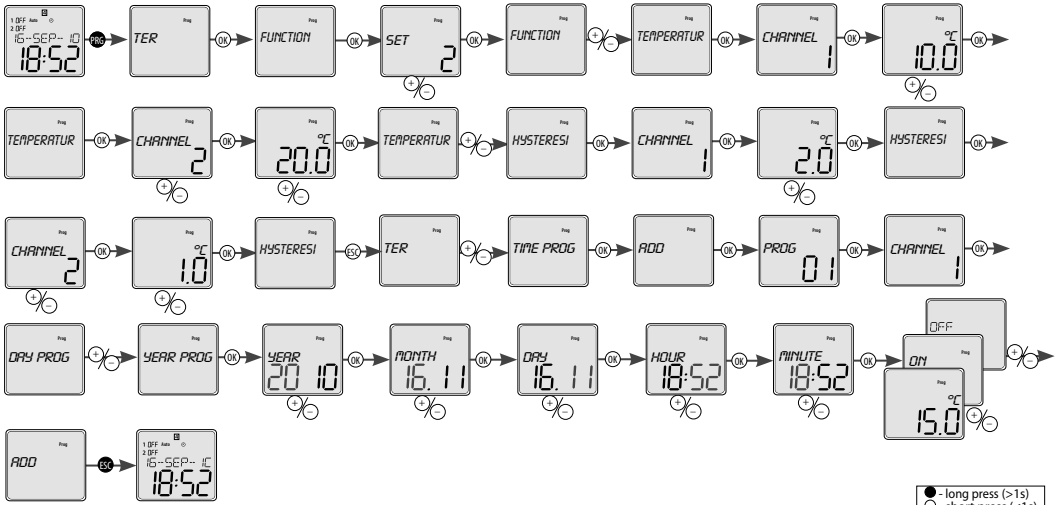
EN

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).

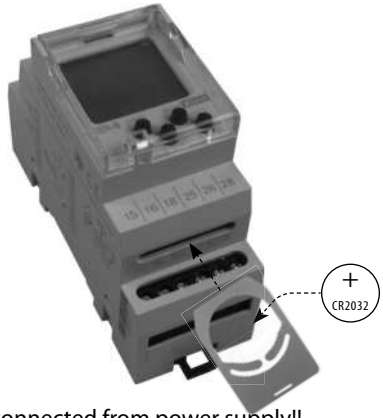
The type of device and software version will be displayed for 1 second, then the device will enter default mode. This means that the language is set to EN, all data is zeroed (thermostat function, time/date, user programs, device options function).

An example of TER-9 programming

Setting the TER-9 in the function: two dependent thermostats with temperature setting T1 = 10°C a T2 20° C with hysteresis setting T1 = 2°C a T2 = 1° C. With automatic controlled temperature change on 18.11.2010 at 6:52 p.m. to the temperature T1= 15°C



Battery replacement



EN

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

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