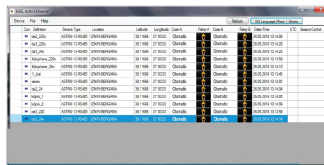


ASTRO-13 - RS485

Digital Astronomical Time Relay

KAEL ASTRO Software



CON-03
Usb to infrared data transmitter

- Rechargeable battery
- MODBUS-RTU with RS485
- 2 Relay Output (16A)
- No Backlight ; ASTRO-01 & ASTRO-03
- Backlight ; ASTRO-11 & ASTRO-13
- Easy to use with English menu
- Real time clock and calendar
- 100 programs
- Astronomical and/or time switching function
- Automatic or manual summer/winter time option
- ON/OFF switching times
- Easy to program with PC Software
- Optical loading the programs with CON-3 Device
- Graphical simulation program for both outputs
- Automatic sunrise/sunset calculation using coordinates and time
- Offset for adjustable programming of sunrise/sunset times
- Quiet mode
- 2 Manual modes
- PIN code protection

Area of Usage:

- Park, garden and farm irrigation
- Street, park, garden illuminations
- ATM ,store window, billboard illuminations

General:

ASTRO is a digital time switch that calculates the sunset and sunrise times by using coordinates and real time clock. It operates according to the program setting and it has no need for a photocell sensor.

Device could be used as astronomical or digital time switch.

Protection of the programs and the real date and time information in the device from unplanned power outages is provided by a rechargeable battery. As soon as the device is energized, the charging circuit inside will automatically fill the supercap.

NOTE1: If the device is not powered, ASTRO automatically enters power save mode to conserve the battery life. When the device is in this mode LCD screen is turned off. The screen would turn on when pressing any button and so the user would be able to change the settings and programming the device manually or by CON3. After 15 seconds of inactivity the screen would be turned off again.

NOTE2: In order to load the program as infrared with CON3, make sure that a key is pressed and the screenshot appears. If there is no screen display, the device must be energized and charged.

NOTE3: ASTRO-RS485 has been developed for systems with modem Infrastructure. It can work flawlessly every time the modem is energized and periodically updated at certain times.

NOTE4: 4 preset programs are available on the device. If this programs will not be used, delete these programs from program menu.

| | | | | |
|-----------|-----------|-------|---------|-----|
| Program 1 | : Relay A | Astro | Sunset | ON |
| Program 2 | : Relay A | Astro | Sunrise | OFF |
| Program 3 | : Relay B | Astro | Sunset | ON |
| Program 4 | : Relay B | Time | 00:00 | OFF |

Button Functions:

ASTRO is an easy to use device with 3 buttons.

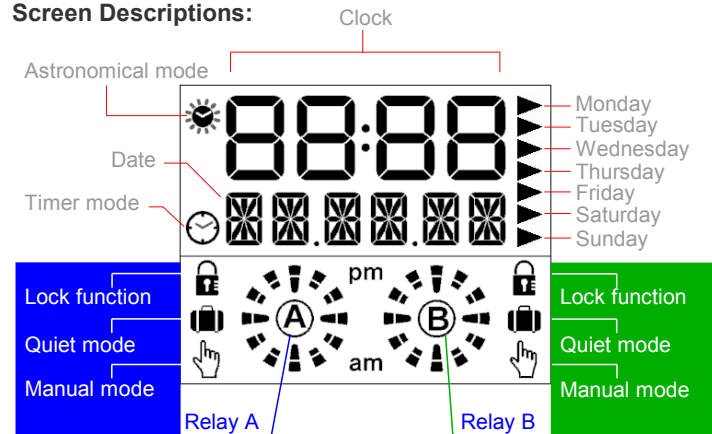
▼ : Press to move between menus or decrease the related parameter.

▲ : Press to move between menus or increase the related parameter.

SET : Press to go into the menu or save the related parameter.

▼ ▲ : Press two buttons at the same time to go back to the pre-menu screen
Press two buttons long at the same time to return to the main screen.

Screen Descriptions:



Clock faces represent output states of the relay contacts during current day. Before midday, am icon appears. After midday, pm icon appears. There are two clock faces, on the left for Relay A and on the right for Relay B.

Warnings:

- The connection of device must be done by authorized technical service staff according to the wiring diagram.
 - Before making the connections to device's terminals, please be sure that there is no voltage across the cables or terminals. Also be sure that the panel is de-energized.
 - Before cleaning the device, please be sure that it is de-energized and use only dry tissue-paper to clean it. Water or any other chemicals used for cleaning may harm the device
 - Before commissioning the device, please be sure that the terminal connections are made exactly the same as in the connection diagram
 - To protect the device, please mount it on DIN rail in a panel.
 - Contact your authorized dealer, if a problem occurs with your device.
- Following the precautions is to prevent the users from physically and spiritual damage. The manufacturer is not responsible for any injuries or damages due to violation of the warnings.



MANUAL MODE

Manual mode is used for setting or testing the desired relay output, or deactivating the program operation. This mode could be activated for both of the relays separately. If output A is locked it can't be switched to manual mode for output A, but it can be switched for output B. For blocking the activation of manual mode, the related output should be locked. Lock function is described on page 7. There are two different manual modes.

1-TEMPORARY MODE : When the subsequent program steps in, temporary manual mode would be deactivated.

Temporary manual mode for Relay A :

Push ▼ button until the flashing hand icon appears on the left of the screen.

Throughout the manual mode, for changing Relay A output, it is necessary to push and release ▼ button.

In this mode, if the subsequent program for Relay A changes the output, manual mode would be deactivated automatically and ASTRO operates the program. Otherwise manual mode would continue to be active for Relay A.

To deactivate this mode for Relay A as an option, push ▼ button until the flashing hand icon disappears.

Temporary manual mode for Relay B :

Push ▲ button until the flashing hand icon appears on the right of the screen.

Throughout the manual mode, for changing Relay B output, it is necessary to push and release ▲ button.

In this mode, if the subsequent program for Relay B changes the output, manual mode would be deactivated automatically and ASTRO operates the program. Otherwise manual mode would continue to be active for Relay B.

To deactivate this mode for Relay B as an option, push ▲ button until the flashing hand icon disappears.

2- PERMANENT MODE : It is only possible to deactivate permanent mode as manually.

Permanent manual mode for Relay A:

Push ▼ and SET buttons at the same time until the hand icon appears on the left of the screen.

Permanent manual mode is not deactivated automatically. The only way to deactivate this mode is manually.

Throughout the manual mode, for changing Relay A output, it is necessary to push and release ▼ button.

To deactivate this mode for Relay A, push ▼ button until the hand icon disappears.

Permanent manual mode for Relay B:

Push ▲ and SET buttons at the same time until the hand icon appears on the right of the screen.

Permanent manual mode is not deactivated automatically. The only way to deactivate this mode is manually.

Throughout the manual mode, for changing Relay B output, it is necessary to push and release ▲ button.

To deactivate this mode for Relay B, push ▲ button until the hand icon disappears.

MENUS:

Press SET button on the main screen to access the menus. If the lock function is deactivated, PROG menu appears on the screen. Use the direction buttons to see ADJUST,DISPLY and EXIT

information :

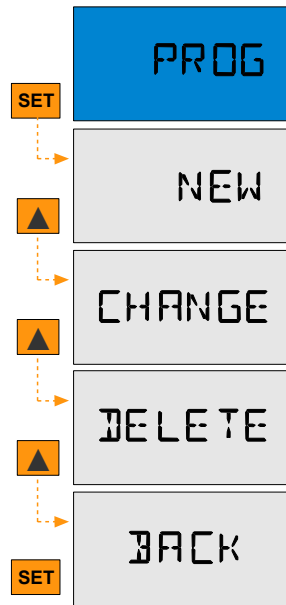
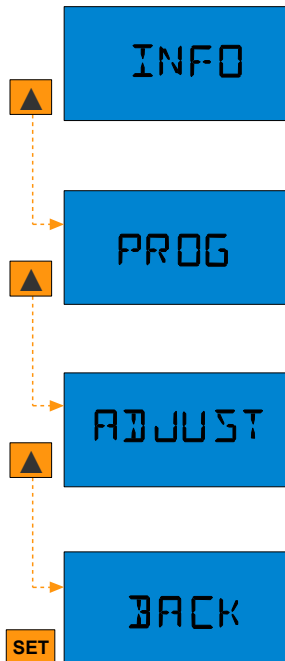
In this menu, program and device settings could be monitored without making changes. Use the direction buttons to see information about sunrise, sunset, programs, memory status, season (summer-winter), latitude, longitude,quiet mode status.

PROGRAM:

All program settings could be done. Creating new program, changing or deleting an existing program.

ADJUST:

Device settings could be done.



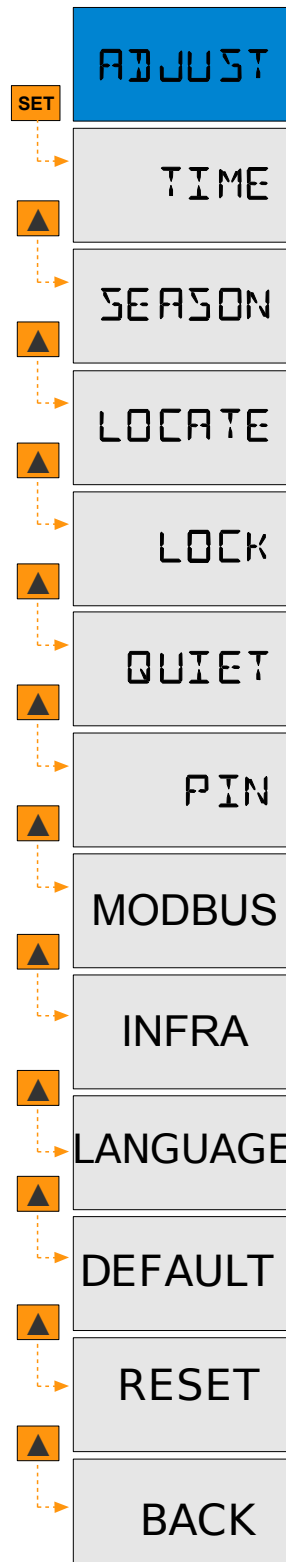
PROGRAM MENU:

Press SET button on PROG screen to access the Program Menu. Use the direction buttons to see NEW,CHANGE,DELETE and EXIT menus.

NEW : New programs are created.

CHANGE : Existing programs could be changed.

DELETE : Existing programs could be deleted. It is possible to delete all of them or the selected one.



ADJUST MENU:

In this menu, device settings could be done.

TIME Real Time Clock and Calender could be set in TIME menu

SEASON In this menu, daylight saving time settings could be done. If AUTO is chosen, device determines beginning dates of the summer and winter automatically.

LOCATE Coordinates and time zone settings of the location could be done in this menu.

LOCK Lock function could be activated to prevent unauthorized persons from using the device. This mode could be activated for both of the relays separately.

QUIET Quiet mode could be activated to stop the program operation for a certain period.

PIN In this menu, PIN code could be changed. PIN code is a 4 digit number.

MODBUS Function to set Modbus RTU parameters

INFRA Infrared (con03) communication could be Enabled or disabled

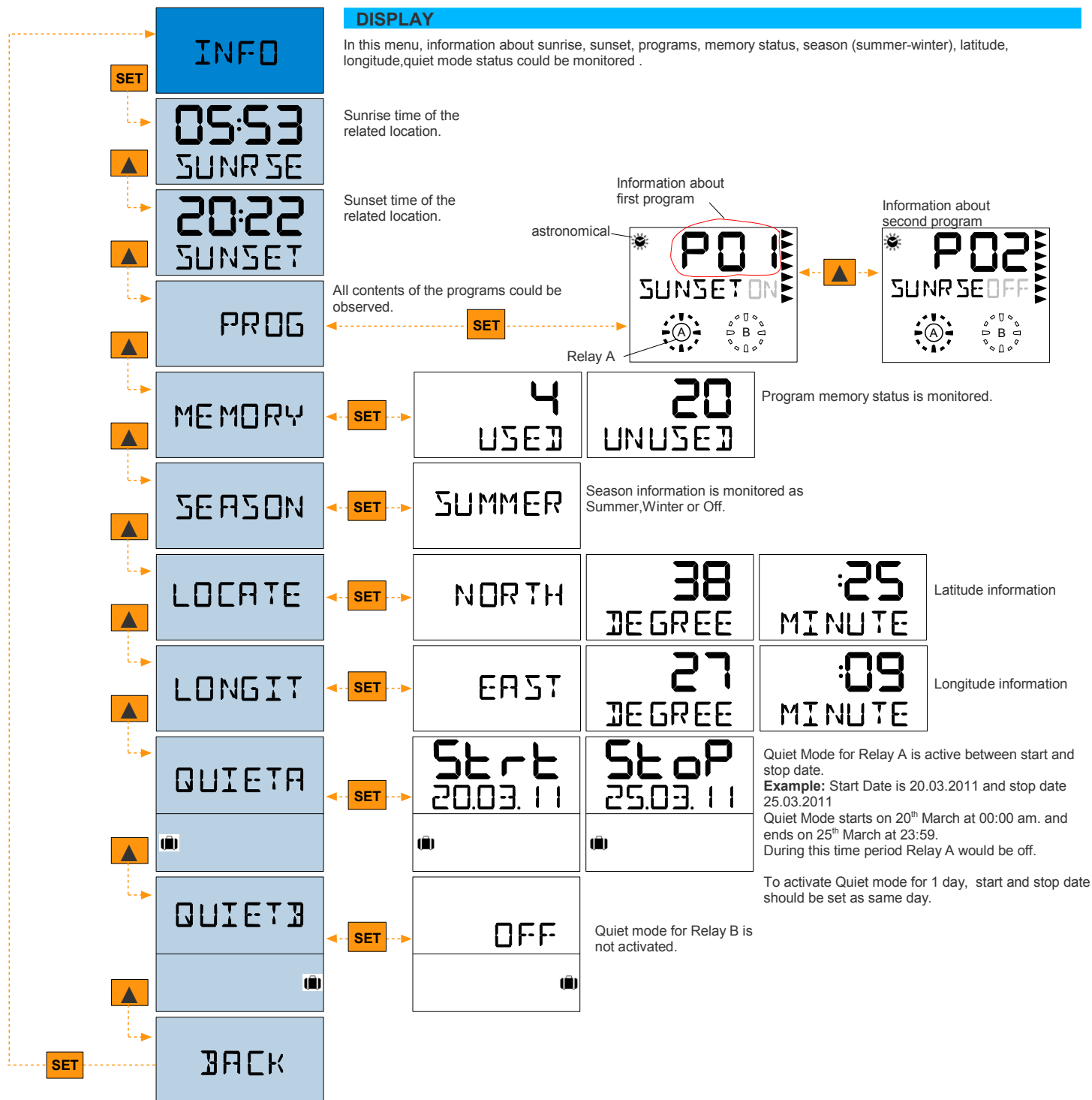
LANGUAGE Language could be changed to turkish or english

DEFAULT All device settings except time and date are set to default.

RESET The device could be restarted time and date Settings would be cleared.

DISPLAY

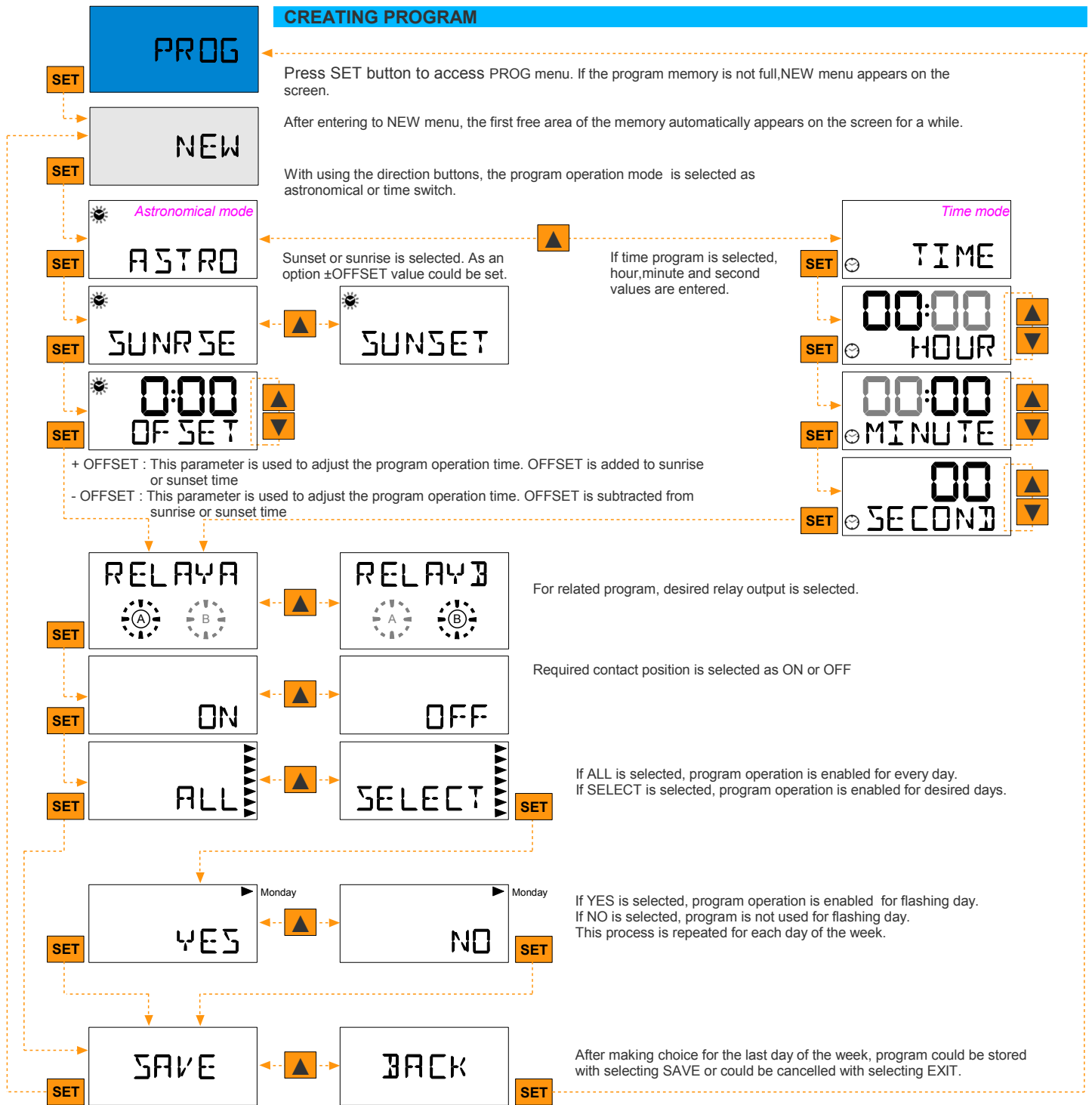
In this menu, information about sunrise, sunset, programs, memory status, season (summer-winter), latitude, longitude, quiet mode status could be monitored.



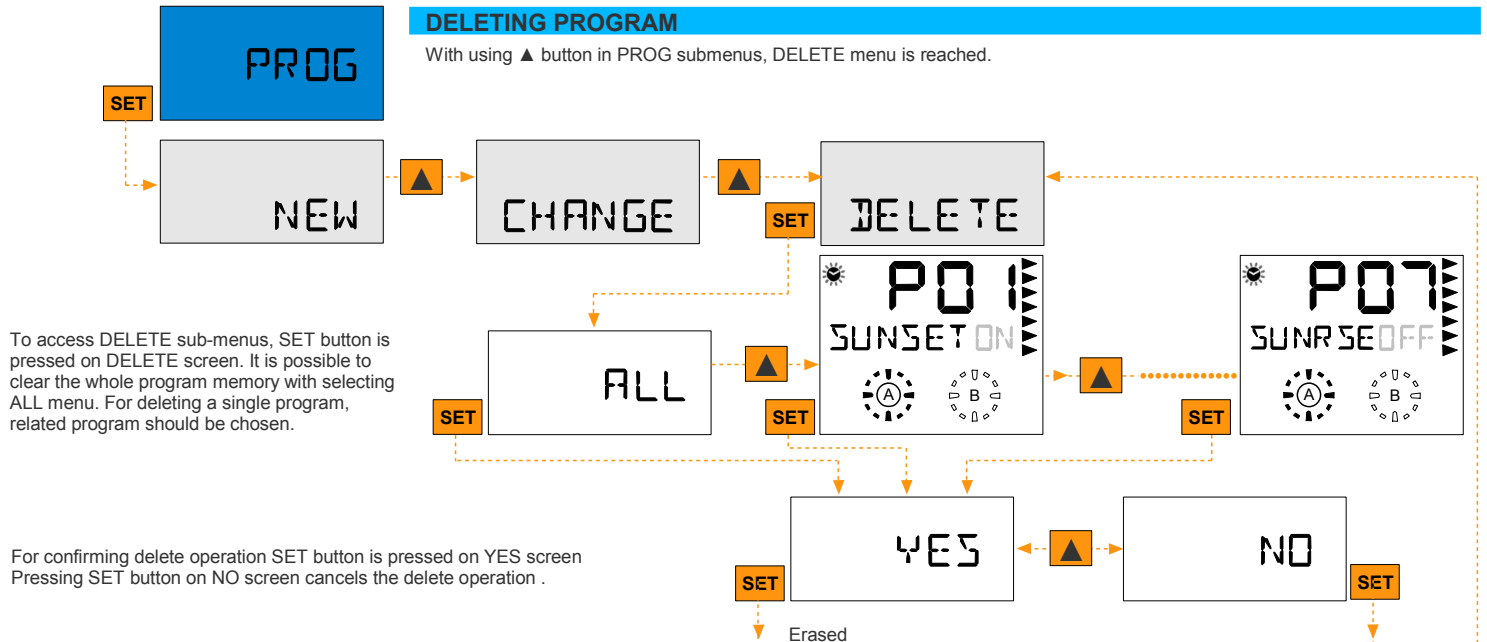
ABBREVIATIONS

| | | | | | | | |
|---------|--------------------------------------|--------|----------------------------------|--------|--------------------------------------|--------|----------------------------|
| ADJUST | adjust | ERR5 | Program overload error | ON | relay is on | STOP-M | end of quiet mode(month) |
| ALL | entire week | EXIT | exit | P1 OK | program1 is saved. | STOP-Y | end of quiet mode(year) |
| ASTRO | astronomical mode | HOUR | hour | PIN | pin code | STRT-D | start of quiet mode(day) |
| AUTO | automatic | INFRA | infrared | PROG | program | STRT-M | start of quiet mode(month) |
| CHANGE | change | IR OK | data communication is successful | QUIET | quiet mode | STRT-Y | start of quiet mode(year) |
| CON-03 | data is coming from CON-3 device | LANGUA | language | QUIETA | quiet mode for relay A | SUMMER | summer |
| COORD | coordinates | LATITU | latitude | QUIETB | quiet mode for relay B | SUNRSE | sunrise |
| CUSTOM | custom | LOCATE | locate | RELAYA | relay A | SUNSET | sunset |
| DAY | day | LOCK | lock | RELAYB | relay B | T-ZONE | time zone |
| DEFAULT | factory defaults | LOCKA | lock function for relay A | REPEAT | repeat | TIME | time |
| DEGREE | degree | LOCKB | lock function for relay B | RESET | reset | UNUSED | unused |
| DELETED | deleted | LONGIT | longitude | S-DAY | summer beginning(day) | USED | used |
| DELETE | delete | MANUAL | manual | S-HOUR | summer beginning(hour) | UTC | coordinated universal time |
| INFO | display | MINUTE | minute | S-MIN | summer beginning(minute) | W-DAY | winter beginning(day) |
| EAST | east | MONTH | month | S-MON | summer beginning(month) | W-HOUR | winter beginning(hour) |
| ERR1 | CON3 communication error | NEW | new | S-WEEK | summer beginning(week) | W-MIN | winter beginning(minute) |
| ERR2 | PIN code error | NO | no | SAVE | save | W-MON | winter beginning(month) |
| ERR3 | Parameter values are out of max-min. | NORTH | north | SEARCH | data signal is not coming from CON-3 | W-WEEK | winter beginning(week) |
| ERR4 | CON-3 has no data | OFF | off | SEASON | season | WEST | west |
| | | OFF | relay is off | SECOND | second | WINTER | winter |
| | | OFSET | offset | SELECT | select the day | WRONG | wrong |
| | | OK | okay | SOUTH | south | YEAR | year |
| | | OLD | old | STOP-D | end of quiet mode(day) | YES | yes |
| | | ON | on | | | | |

CREATING PROGRAM

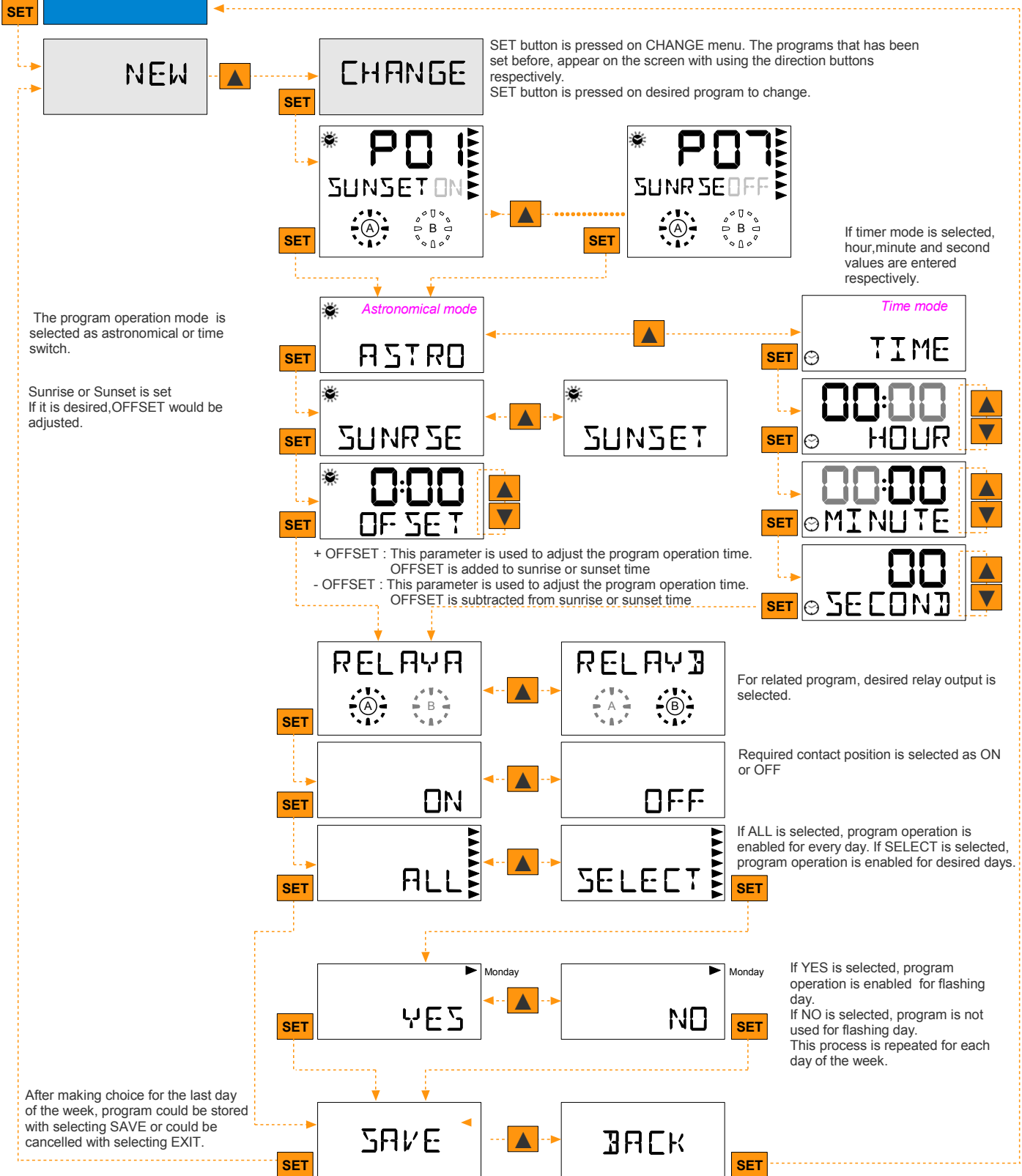


DELETING PROGRAM



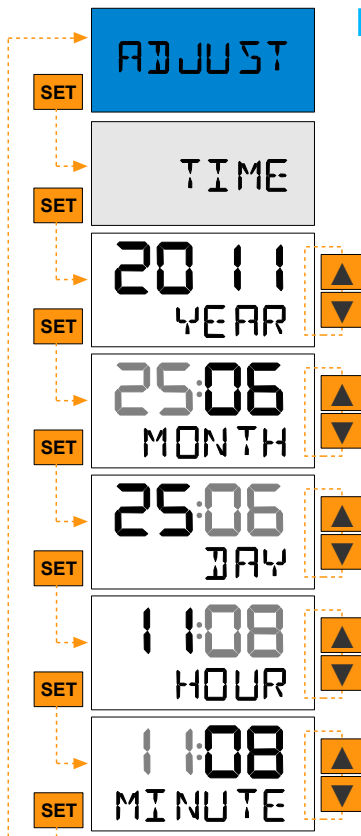
CHANGING PROGRAM

CHANGE menu could be reached by pressing ▲ button in PROG sub-menus.
NOTE: If there is no program on the memory, CHANGE menu does not exist.



TIME AND DATE

In ADJUST sub-menus could be accessed TIME menu.



With using ▼▲ buttons, year value is increased or decreased. When desired value is reached, it is stored by pressing SET button.

With using ▼▲ buttons, month value is increased or decreased. When desired value is reached, it is stored by pressing SET button.

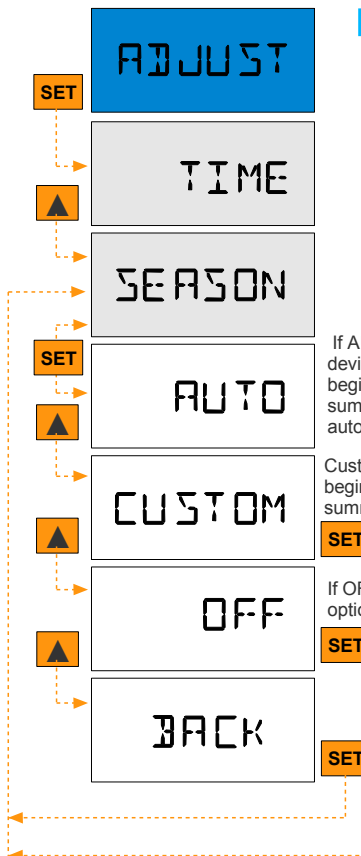
With using ▼▲ buttons, day value is increased or decreased. When desired value is reached, it is stored by pressing SET button.

With using ▼▲ buttons, hour value is increased or decreased. When desired value is reached, it is stored by pressing SET button.

With using ▼▲ buttons, minute value is increased or decreased. When desired value is reached, it is stored by pressing SET button.

SEASON

SEASON menu could be reached by pressing ▲ button in ADJUST sub-menus.

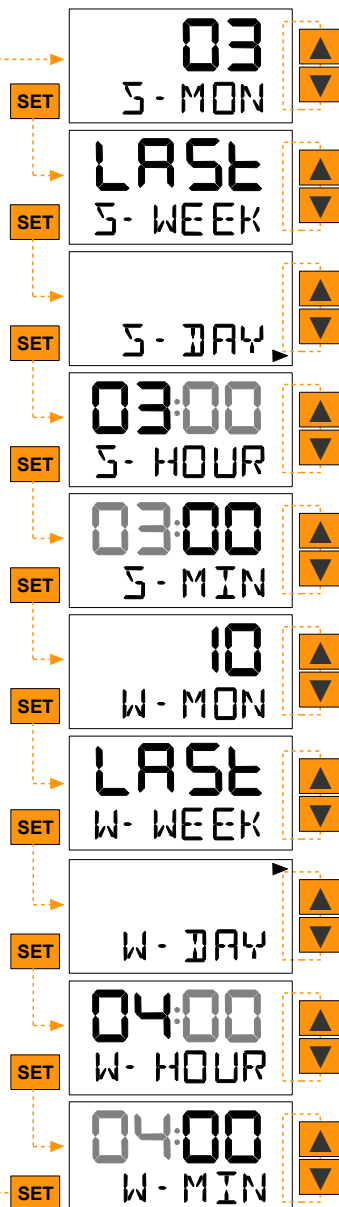


If AUTO is chosen, device determines beginning dates of the summer and winter automatically

Custom dates for beginning of the summer and winter

If OFF chosen, daylight saving option is disabled.

NOTE:
Auto Season mode
winter→summer change: last Sunday in March 03:00:00
(Clocks are adjusted forward one hour)
summer→winter change: last Sunday in October 04:00:00
(Clocks are adjusted backward one hour)



First parameter of custom season setting is beginning month for the summer season. With using ▼▲ buttons, month value is increased or decreased. When desired value is reached, it is stored by pressing SET button

Second parameter is beginning week for the summer in chosen month. With using ▼▲ buttons week value is set as 1,2,3,4 or last.

Third parameter is beginning day for the summer. With using ▼▲ buttons day is set.

Fourth parameter is beginning hour for the summer. With using ▼▲ buttons hour value is set.

Fifth parameter is beginning minutes for the summer. With using ▼▲ buttons minute value is set.

Sixth parameter is beginning month for the winter season. With using ▼▲ buttons, month value is increased or decreased. When desired value is reached, it is stored by pressing SET button

Seventh parameter is beginning week for the winter in chosen month. With using ▼▲ buttons week value is set as 1,2,3,4 or last.

Eighth parameter is beginning day for the winter. With using ▼▲ buttons day is set.

Ninth parameter is beginning hour for the winter. With using ▼▲ buttons hour value is set.

Tenth parameter is beginning minutes for the winter. With using ▼▲ buttons minute value is set.

QUIET MODE

QUIET menu could be reached by pressing ▲ button in ADJUST sub-menus.

Quiet mode allows forcing of the OFF output for a time period.

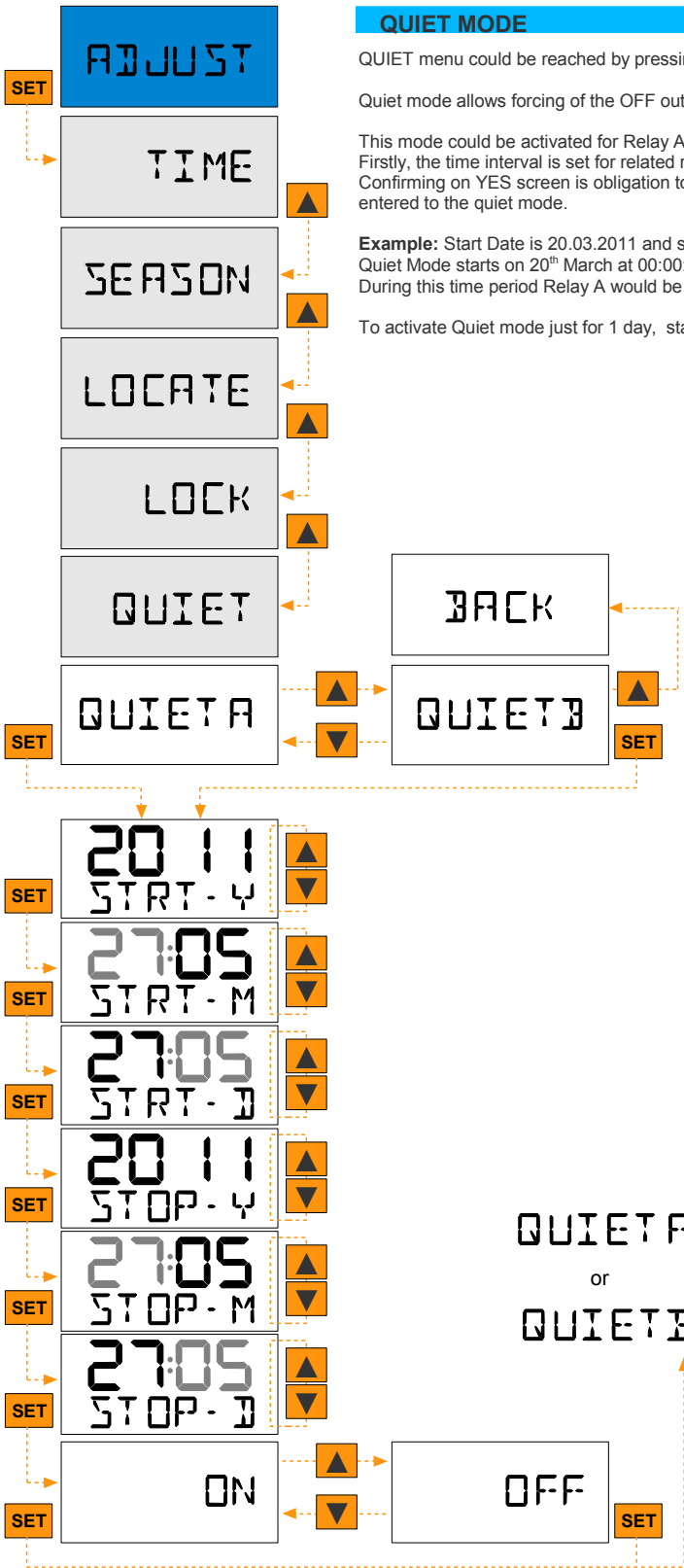
This mode could be activated for Relay A and/or Relay B.

Firstly, the time interval is set for related relay.

Confirming on YES screen is obligation to activate this mode. If the time period is set but not confirmed, related relay would not be entered to the quiet mode.

Example: Start Date is 20.03.2011 and stop date 25.03.2011
 Quiet Mode starts on 20th March at 00:00:00 am. and ends on 25th March at 23:59:59.
 During this time period Relay A would be off.

To activate Quiet mode just for 1 day, start and stop date should be set as same day.



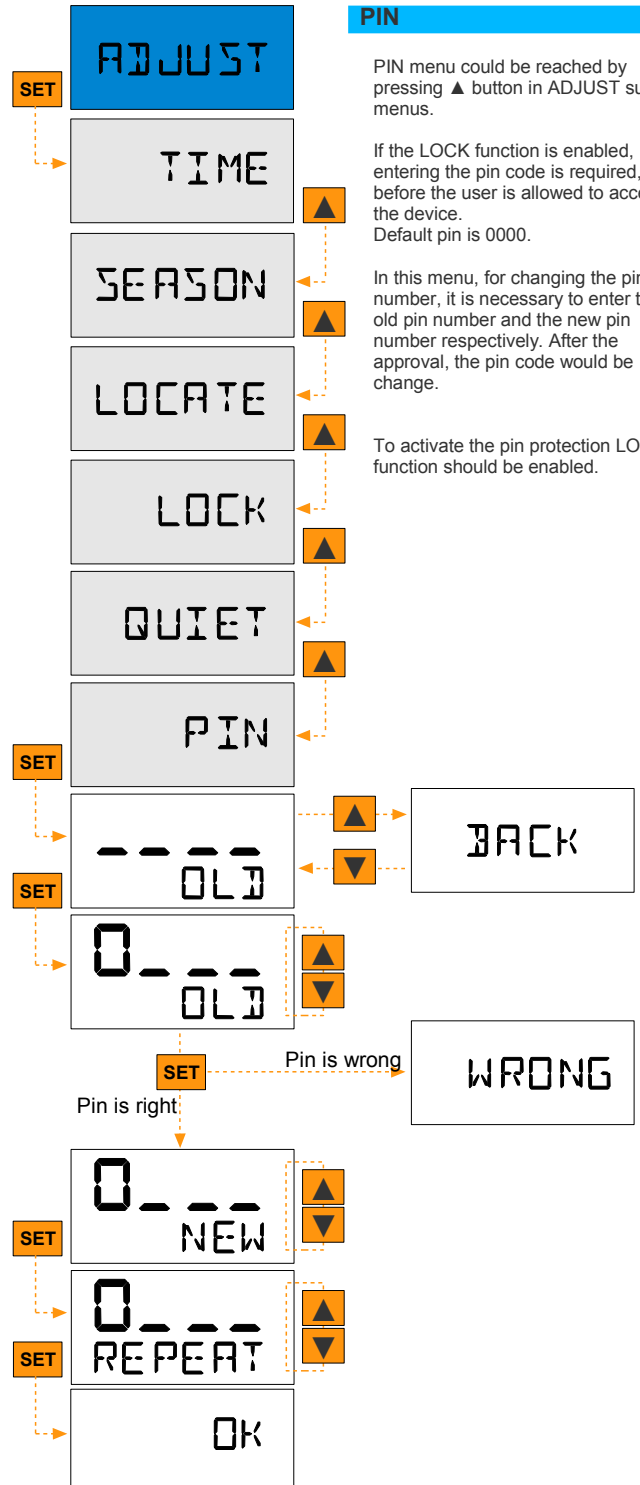
PIN

PIN menu could be reached by pressing ▲ button in ADJUST sub-menus.

If the LOCK function is enabled, entering the pin code is required, before the user is allowed to access the device. Default pin is 0000.

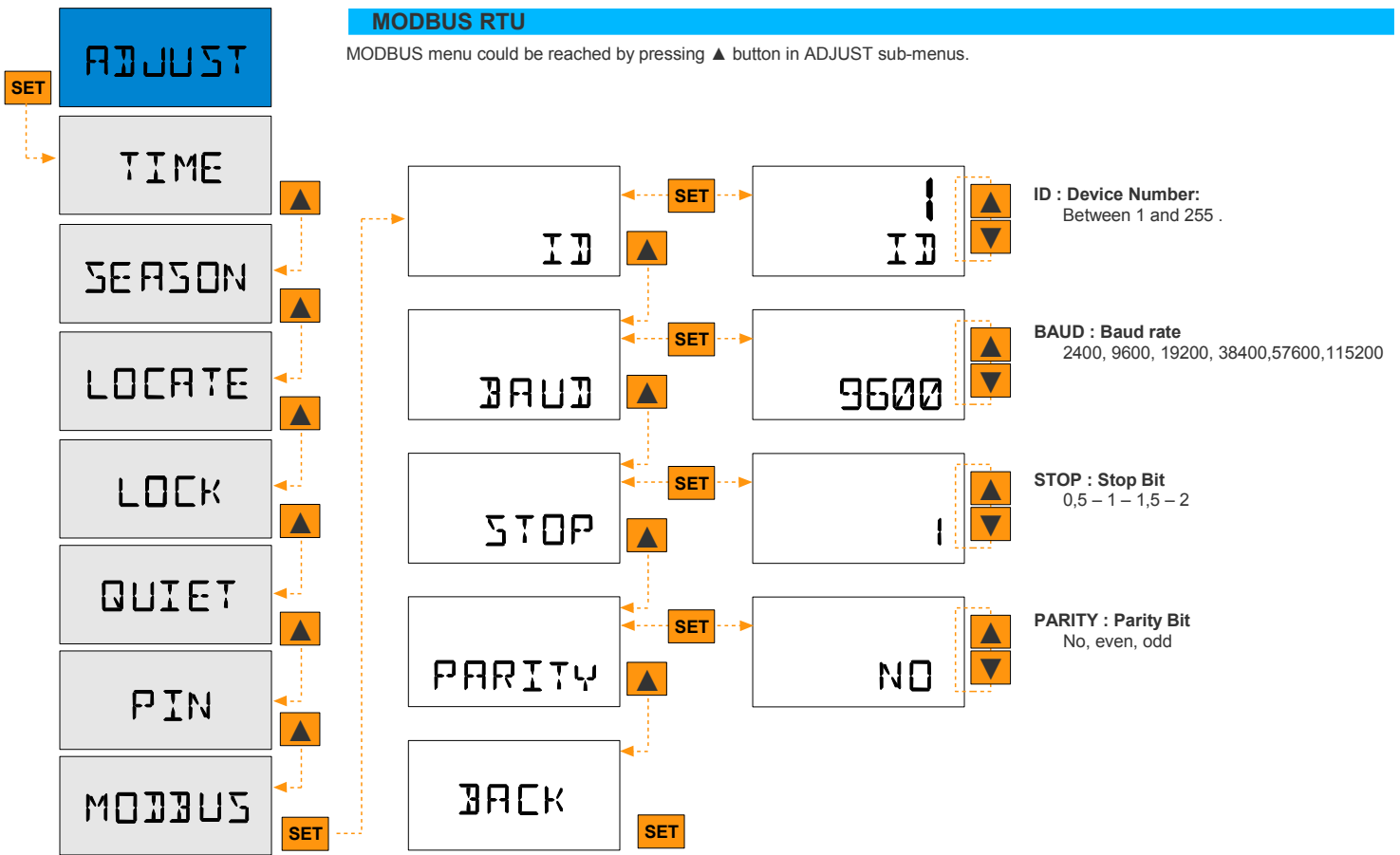
In this menu, for changing the pin number, it is necessary to enter the old pin number and the new pin number respectively. After the approval, the pin code would be change.

To activate the pin protection LOCK function should be enabled.



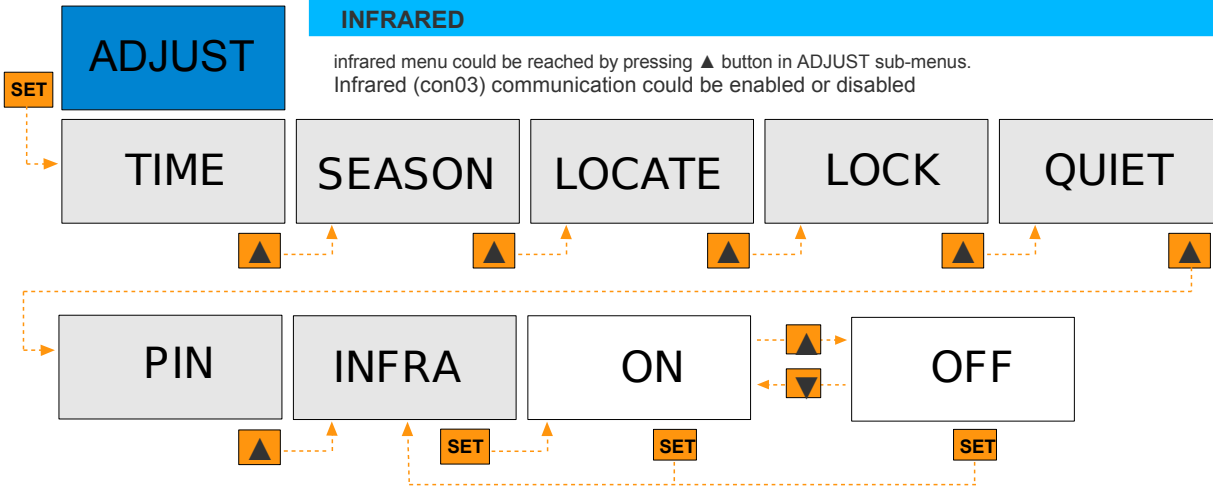
MODBUS RTU

MODBUS menu could be reached by pressing ▲ button in ADJUST sub-menus.



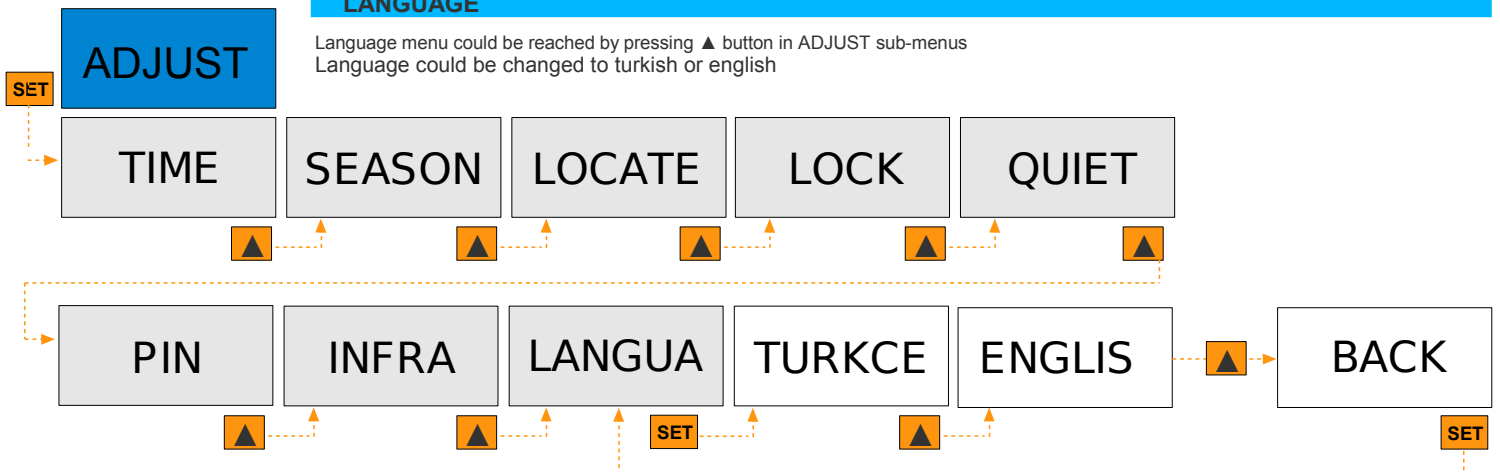
INFRARED

infrared menu could be reached by pressing ▲ button in ADJUST sub-menus.
Infrared (con03) communication could be enabled or disabled



LANGUAGE

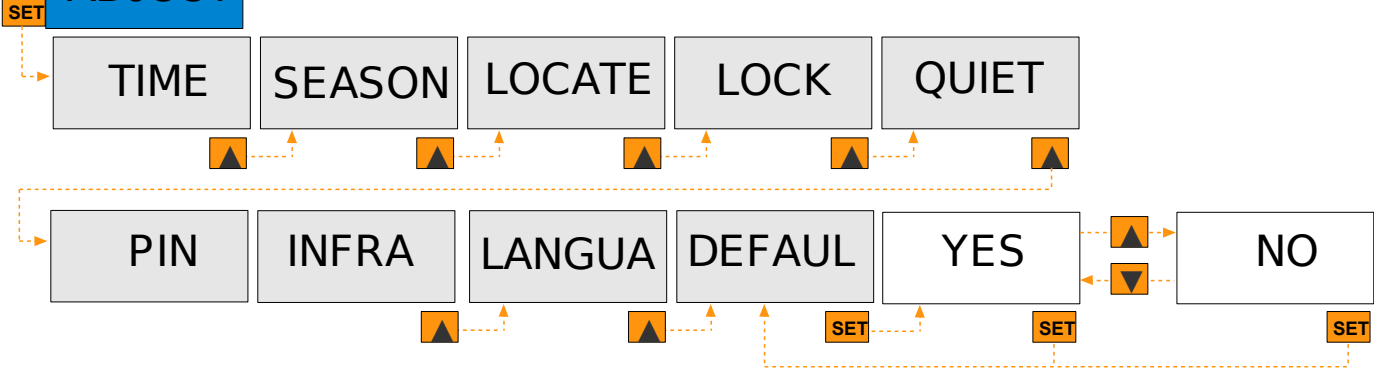
Language menu could be reached by pressing ▲ button in ADJUST sub-menus
Language could be changed to turkish or english



DEFAULT

ADJUST

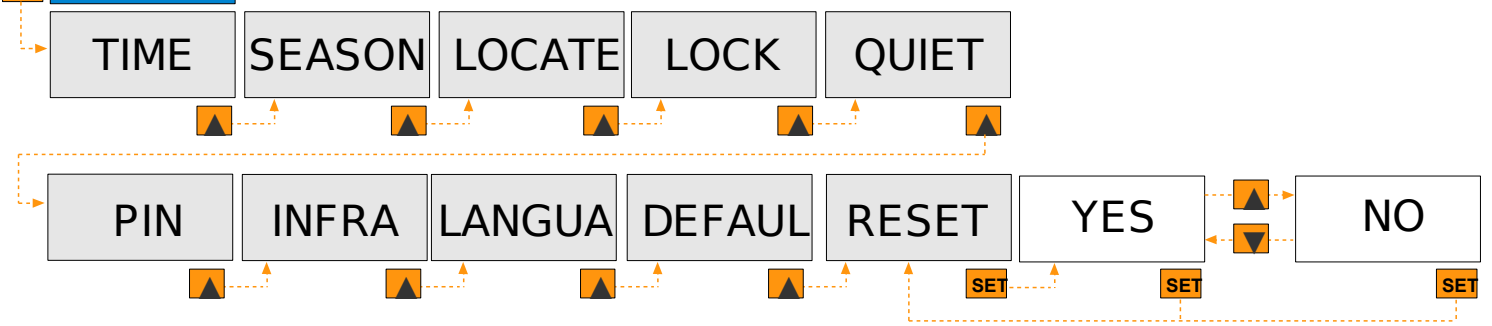
DEFAULT menu could be reached by pressing ▲ button in ADJUST sub-menus.



RESET

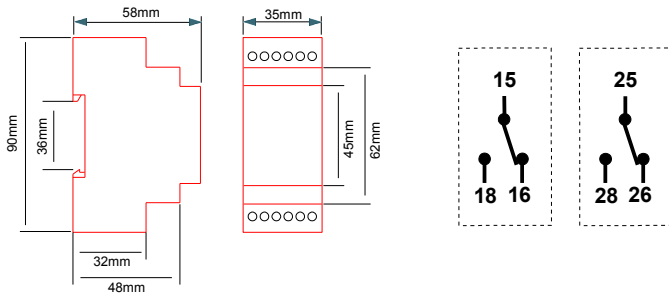
ADJUST

DEFAULT menu could be reached by pressing ▲ button in ADJUST sub-menus.
The device could be restarted time and date settings would be cleared.

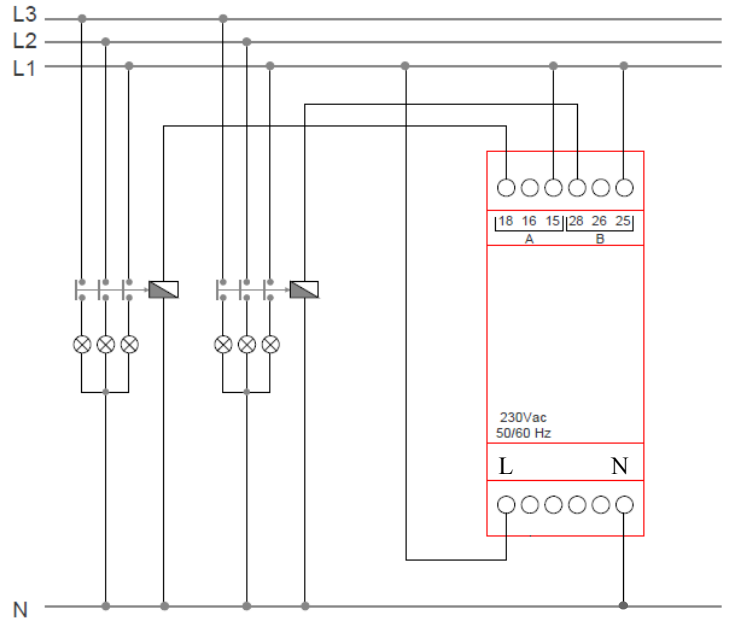


TECHNICAL DATA

| | |
|-------------------------------|--|
| Rated Voltage (Un) | : 230Vac |
| Operation Range | : Un x (0,85 – 1,10) |
| Contact Current(15-18)(25-28) | : max. 16 A / 250Vac (N.O) |
| Supply Power Consumption | : < 3VA |
| Clock Precision | : ± 1 sec/day |
| Programming Resolution | : 1 sec |
| Number of Programs | : 100 programs |
| Memory | : EEPROM |
| Screen | : LCD |
| Language | : English - Turkish |
| Programming with InfraRed | : Yes |
| Mounting | : To connection rail in electrical panel |
| Storage Temperature | : -10 °C +70 °C |
| Ambient Temperature | : 0 °C +50 °C |
| Device Protection Class | : IP 20 |
| Connector Protection Class | : IP 00 |
| Dimensions | : 2 x DIN modules |



CONNECTION



By restoring an ASTRO to factory defaults, following settings are installed.

| | |
|------------|---------------------|
| Programs | : 4 preset programs |
| Lock A-B | : Off |
| Quiet A-B | : Off |
| Manual A-B | : Off |
| Season | : Auto |
| Location | : !!!!!!! |
| Contrast | : 7 |

NOTE:
Reset an ASTRO to factory defaults does not change the pin code and the real time.