SATR-2408 / SATR-2416

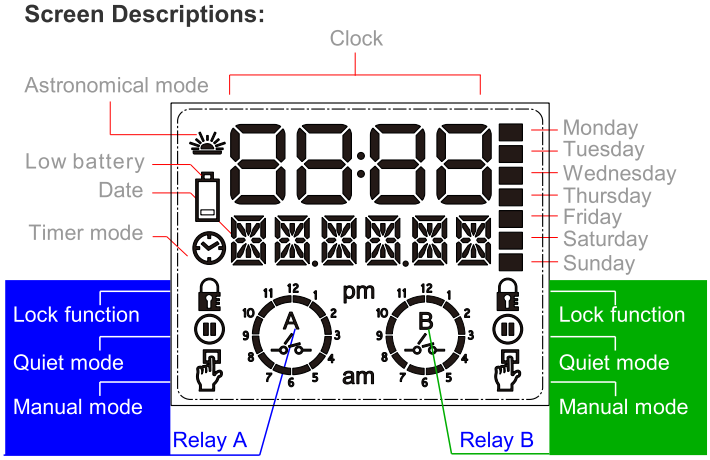
Astronomical Time Relay



Area of Usage:
- Park, garden and farm irrigation
- Street, park, garden illuminations
- ATM ,store window, billboard illuminations

- User replaceable battery
- SATR-2408 2 Relay Output (8A)
- SATR-2416 2 Relay Output (16A)
- Easy to use with English menu
- Real time clock and calender
- 24 programs
- Astronomical and/or time switching function
- Automatic or manual summer/winter time option
- ON/OFF switching times
- Automatic sunrise/sunset calculation using coordinates and time
- Offset for adjustable programming of sunrise/sunset times
- Quiet mode
- 2 Manual modes
- PIN code protection

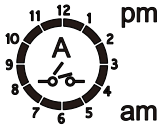
Screen Descriptions:



General:
SATR is a digital time switch that calculates the sunset and sunrisetimes by using coordinates and real time clock. It operates according tothe program setting and it has no need for a photocell sensor. Devicecould be used as astronomical or digital time switch.
SATR has two reserves to protect the real time clock and calenderagainst power outage.
For long term reserve there is CR2032 battery. If the device is powered, battery life is approx. 5 years. When the battery life is expired,the user is able to replace the battery easily.
Super capacitor is used for short time power failures. It supplies the device for 3-7 hours. In this case battery is not used, so battery level is conserved.

NOTE1: Before commissioning the device, please insert the battery into the battery compartment .
NOTE2: If the device is not powered, SATR 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. After 15 seconds of inactivity, the screen would be turned off again.
NOTE3: 4 preset programs are available on the device.

Program 1 : Relay A	str	Sunset	ON
Program 2 : Relay A	str	Sunrise	OFF
Program 3 : Relay B	str	Sunset	ON
Program 4 : Relay B	Time	00:00	OFF



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.

Button Functions:
STR 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.

Push in this direction and remove the battery cover



Insert the battery with the positive(+) side facing forward as shown in the figure.



Make sure the battery is seated correctly in the battery slot. Replace the battery cover.

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:

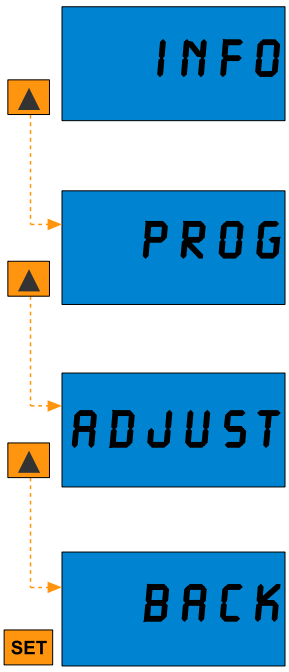
Push ▼ and **SET** buttons at the same time until the hand icon appears on the left of the screen.
Permanent manual mode is not deactivated automatically. The only way to deactivate this mode is manually.
Throughout the manual mode, for changing Relay **A** output, it is necessary to push and release ▼ 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.

Real Time Clock and Calender could be set in TIME menu

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

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

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

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

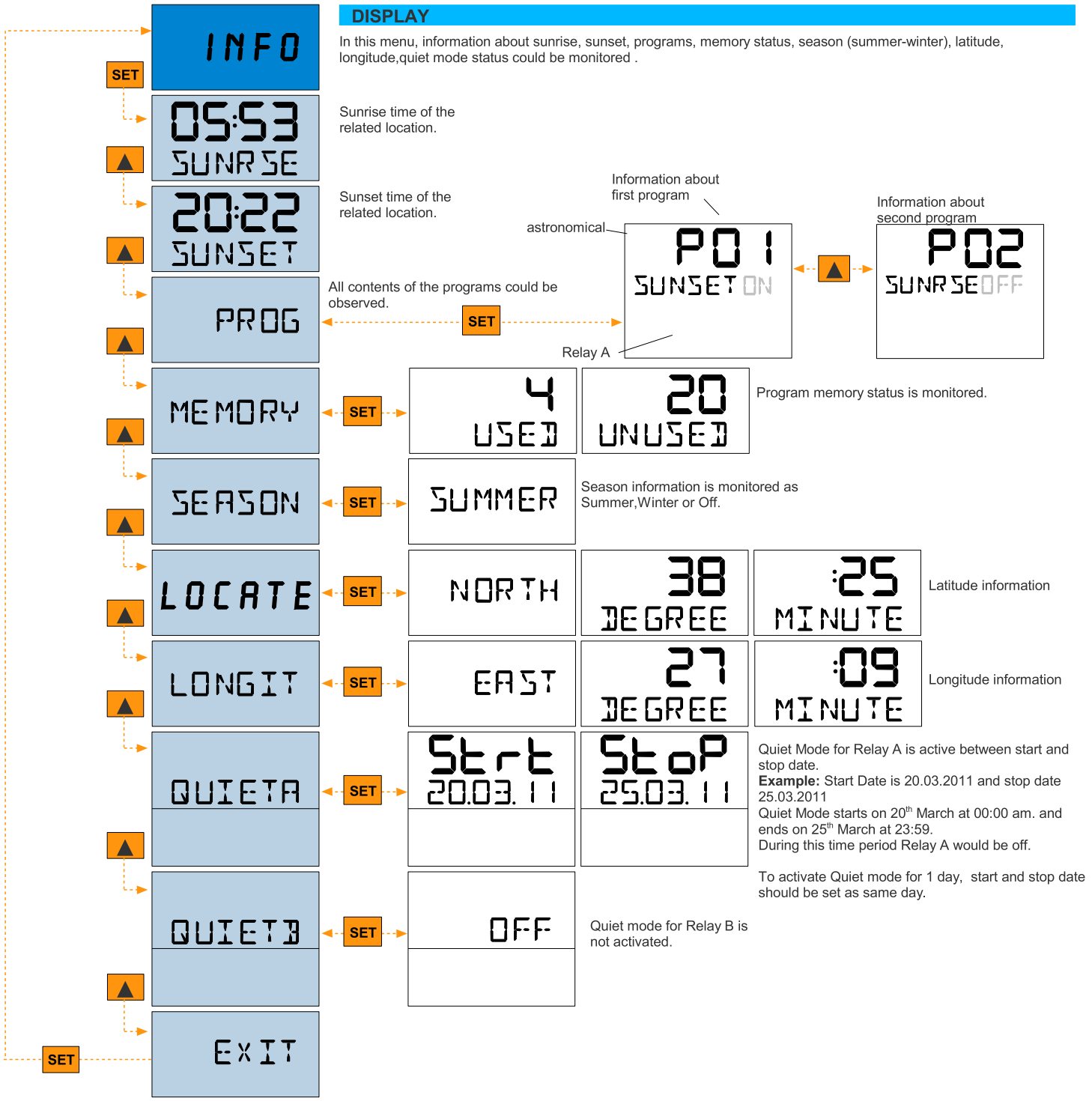
Language could be changed to turkish or english

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

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

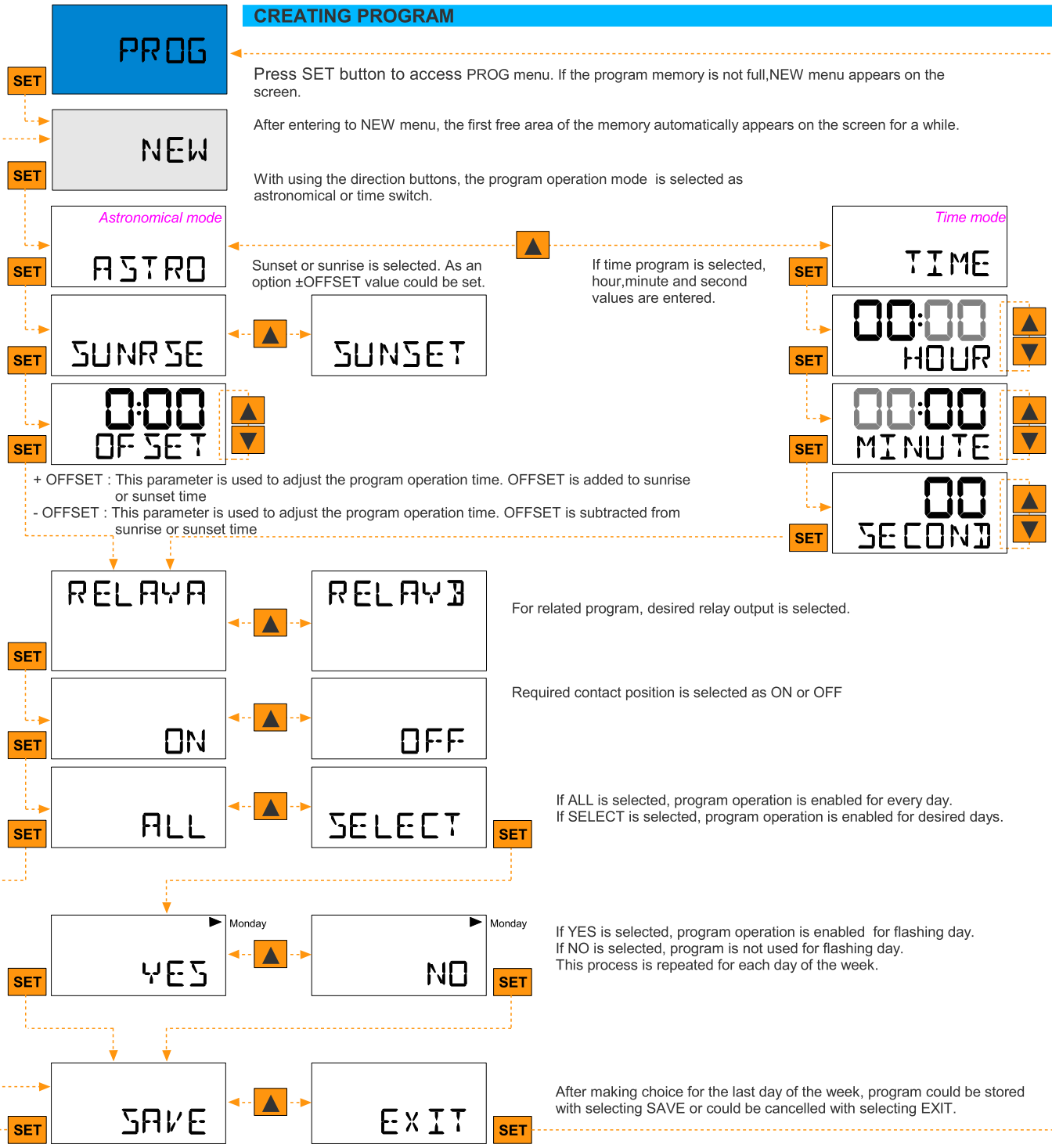
ADJUST	adjust
ALL	entire week
ASTRO	astronomical mode
AUTO	automatic
CHANGE	change
COORD	coordinates
CUSTOM	custom
DAY	day
DEFAUL	factory defaults
DEGREE	degree
DELETD	deleted
DELETE	delete
INFO	display
EAST	east
ERR2	PIN code error
ERR5	Program overload error
EXIT	exit
HOUR	hour
LANGUA	language
LATITU	latitude
LOCATE	locate

LOCK	lock
LOCKA	lock function for relay A
LOCKB	lock function for relay B
LONGIT	longitude
MANUAL	manual
MINUTE	minute
MONTH	month
NEW	new
NO	no
NORTH	north
OFF	off
OFF	relay is off
OFSET	offset
OK	okay
OLD	old
ON	on
ON	relay is on
P1 OK	program1 is saved.
PIN	pin code
PROG	program
QUIET	quiet mode

QUIETA	quiet mode for relay A
QUIETB	quiet mode for relay B
RELAYA	relay A
RELAYB	relay B
REPEAT	repeat
RESET	reset
S-DAY	summer beginning(day)
S-HOUR	summer beginning(hour)
S-MIN	summer beginning(minute)
S-MON	summer beginning(month)
S-WEEK	summer beginning(week)
SAVE	save
SEASON	season
SECOND	second
SELECT	select the day
SOUTH	south
STOP-D	end of quiet mode(day)
STOP-M	end of quiet mode(month)
STOP-Y	end of quiet mode(year)
STRT-D	start of quiet mode(day)

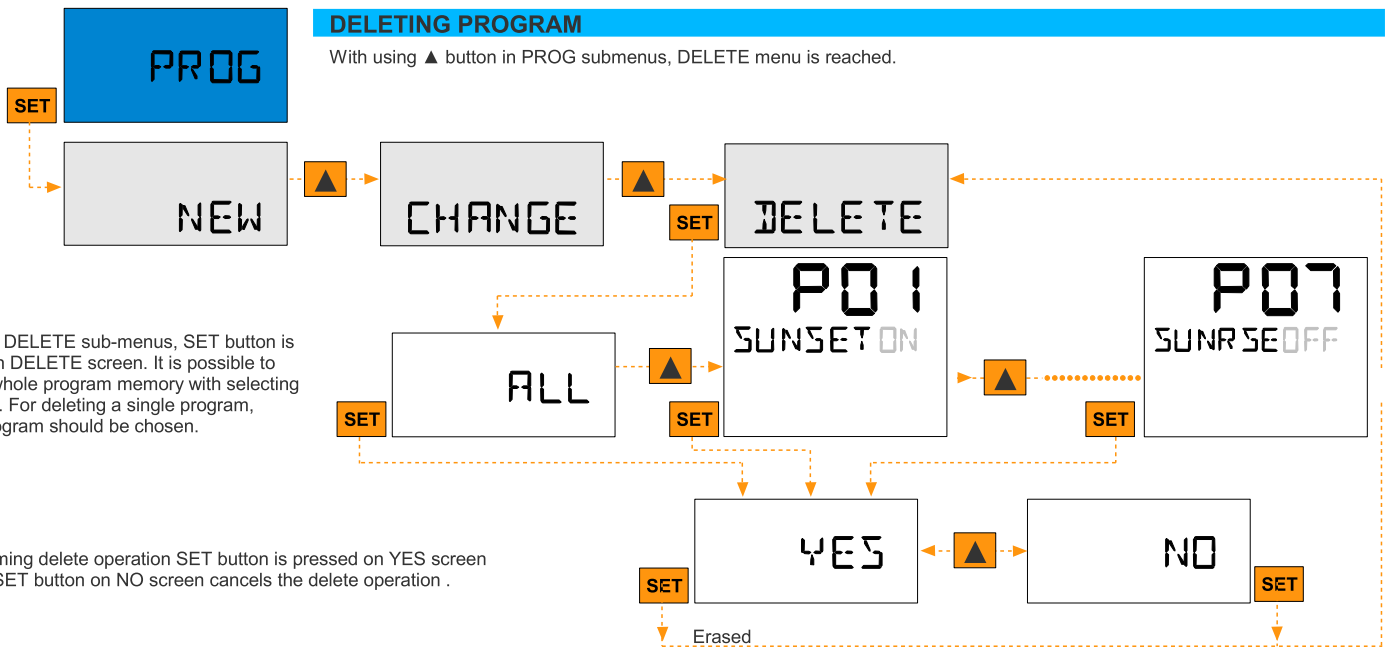
STRT-M	start of quiet mode(month)
STRT-Y	start of quiet mode(year)
SUMMER	summer
SUNRSE	sunrise
SUNSET	sunset
T-ZONE	time zone
TIME	time
UNUSED	unused
USED	used
UTC	coordinated universal time
W-DAY	winter beginning(day)
W-HOUR	winter beginning(hour)
W-MIN	winter beginning(minute)
W-MON	winter beginning(month)
W-WEEK	winter beginning(week)
WEST	west
WINTER	winter
WRONG	wrong
YEAR	year
YES	yes

CREATING PROGRAM



DELETING PROGRAM

With using ▲ button in PROG submenus, DELETE menu is reached.

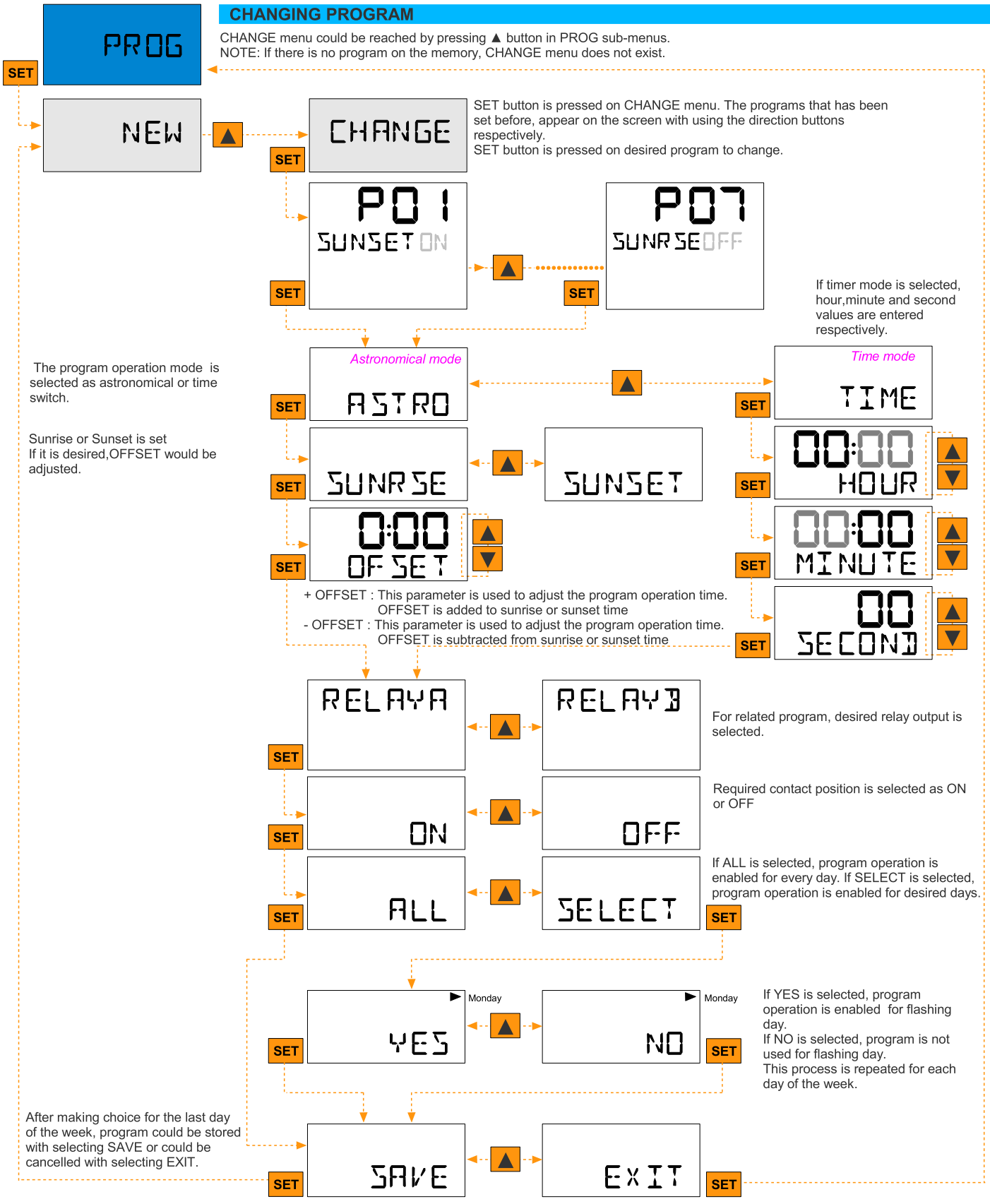


To access DELETE sub-menus, SET button is pressed on DELETE screen. It is possible to clear the whole program memory with selecting ALL menu. For deleting a single program, related program should be chosen.

For confirming delete operation SET button is pressed on YES screen
Pressing SET button on NO screen cancels the delete operation .

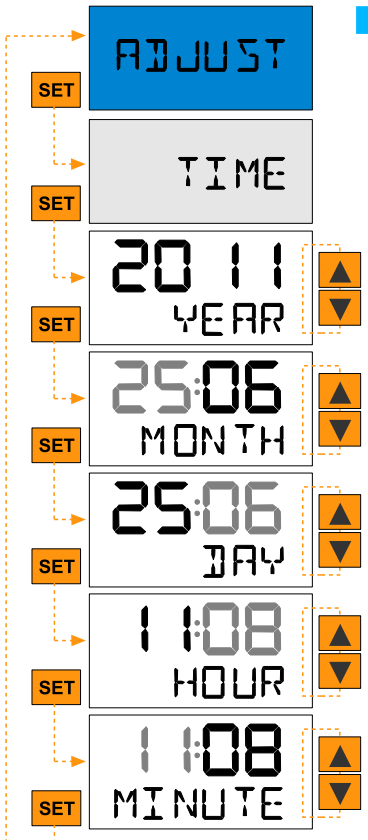
CHANGING PROGRAM

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.

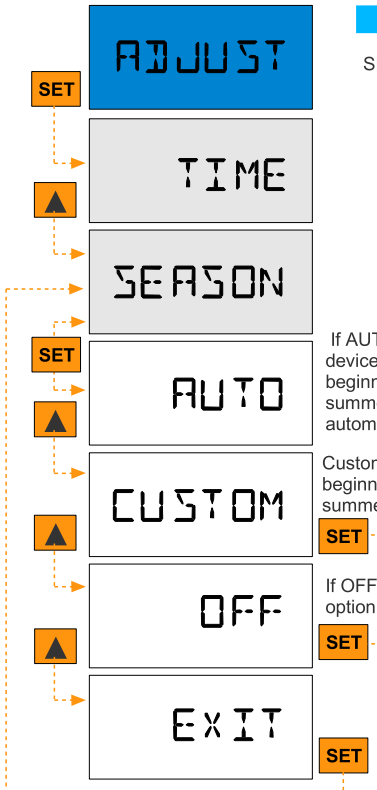
With using ▼▲ buttons, day value is increased or decreased.
When desired value is reached, it is stored by pressing SET button.

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

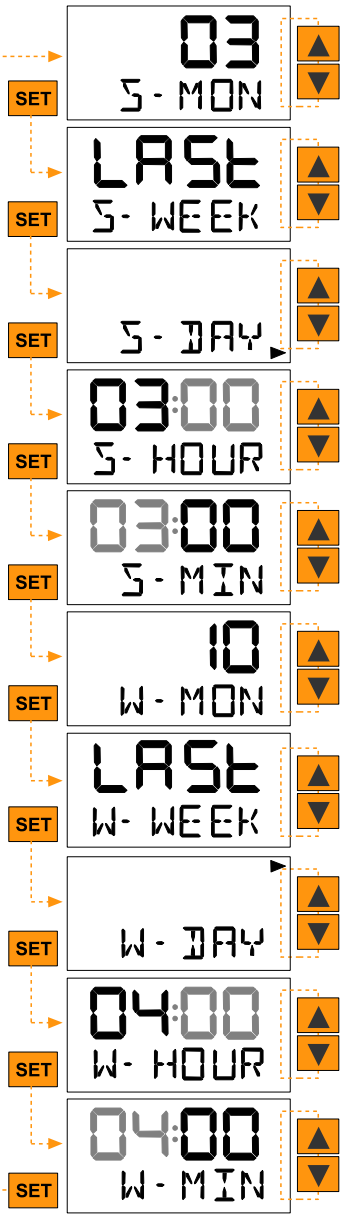
SEASON menu could be reached by pressing ▲ button in ADJUST sub-menus.



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.



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.

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)

QUIET MODE

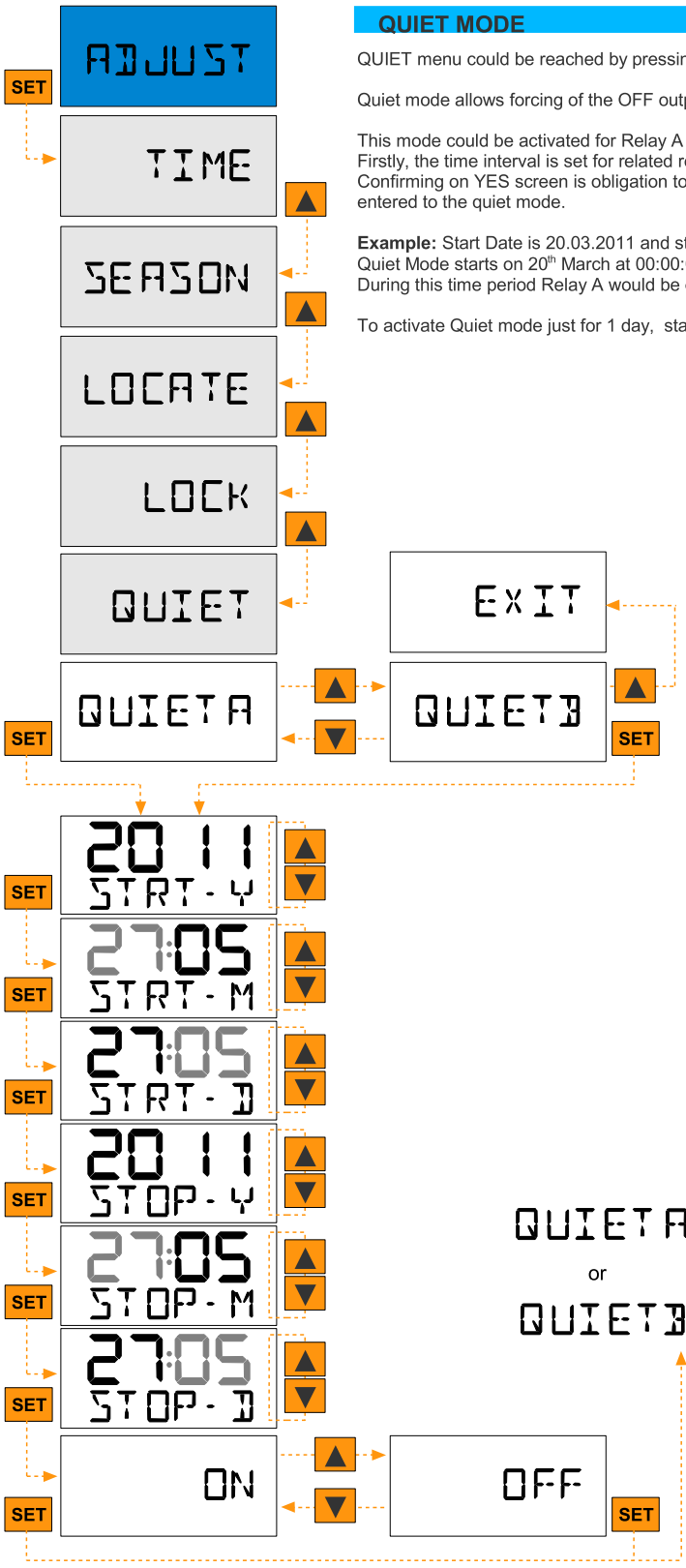
QUIET menu could be reached by pressing ▲ button in ADJUST sub-menus.

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.



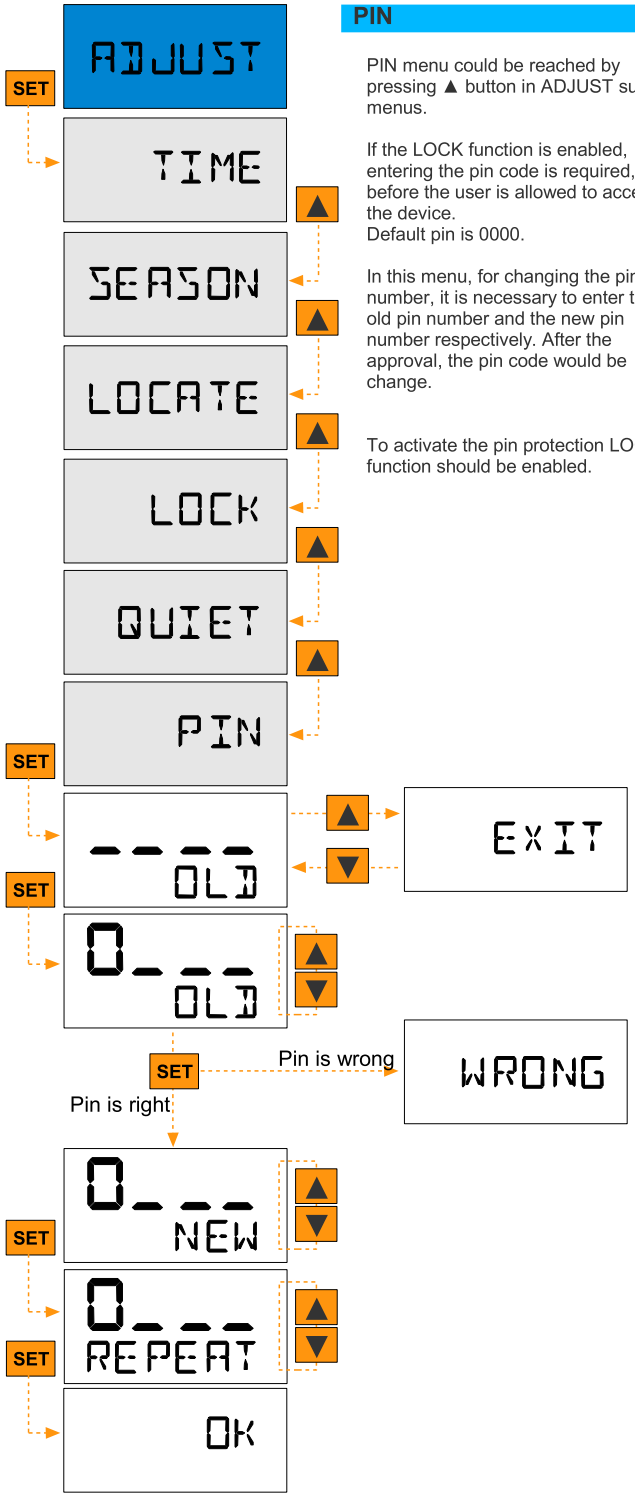
PIN

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.

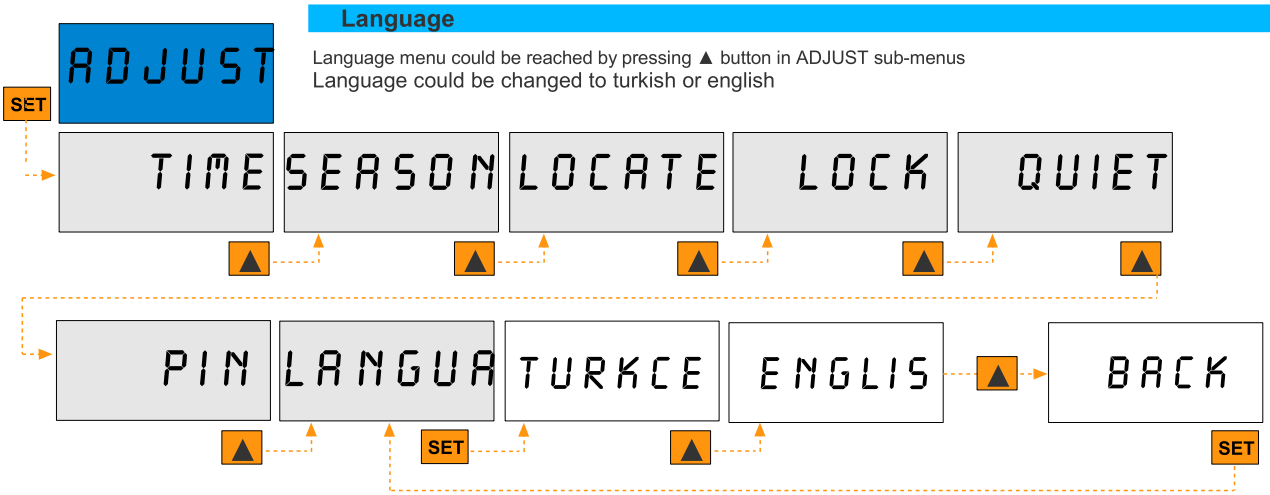
In this menu, for changing the pin number, it is necessary to enter the old pin number and the new pin number respectively. After the approval, the pin code would be change.

To activate the pin protection LOCK function should be enabled.



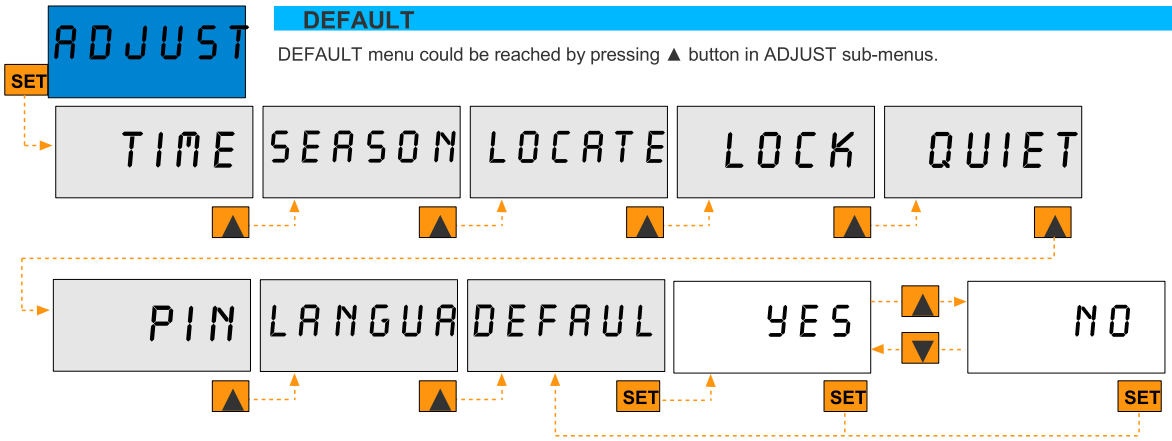
Language

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



DEFAULT

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



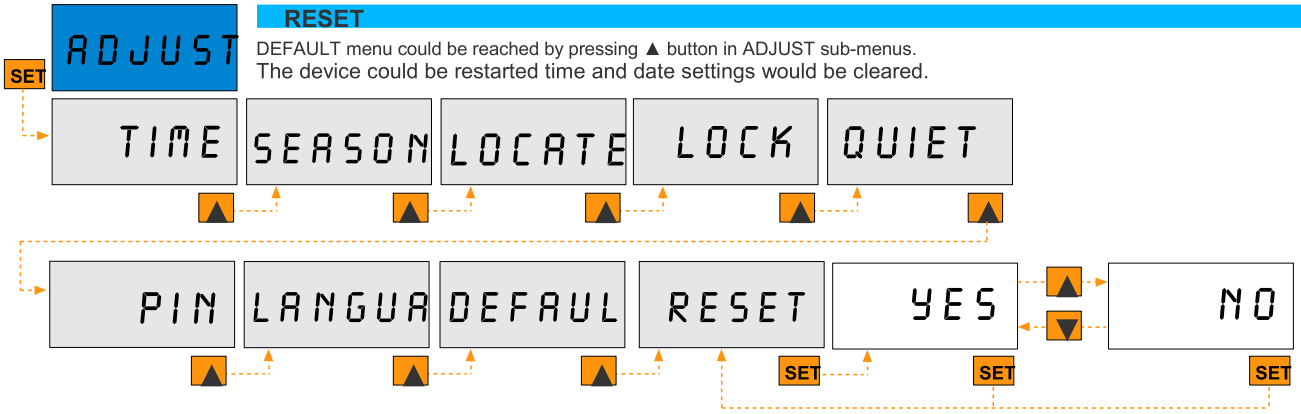
By restoring an SATR to factory defaults, following settingsare installed.

Programs : 4 preset programs
Lock A-B : Off
Quiet A-B : Off
Manual A-B : Off
Season : Auto
Location : BeiJing

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

RESET

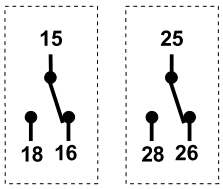
DEFAULT menu could be reached by pressing ▲ button in ADJUST sub-menus.
The device could be restarted time and date settings would be cleared.



TECHNICAL DATA

Rated Voltage (Un)	:
Contact Current(15-18)(25-28)	: max. 8 A / 250Vac (N.O); SATR-2408
Contact Current(15-18)(25-28)	: max. 16 A / 250Vac (N.O); SATR-2416
Supply Power Consumption	: < 3VA
Clock Precision	: ± 1 sec/day
Programming Resolution	: 1 sec
Number of Programs	: 24 programs
Memory	: EEPROM
Battery	: CR2032 (Replacable)
Battery Life	: 5 year (not inserted in device)
Additional Reserv Time	: 3 - 7 hour
Screen	: LCD
Language	: English
Mounting	
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



ASTRONOMICAL RELAY QUICK CITY SELECTION TABLE

Level 1 No.	Country / Region	Level 2 No.	City	Display
1	Algeria	1	Algiers	ALGIER
2	Argentina	1	Buenos Aires	BAIRES
3	Australia	1	Melbourne	MELBRN
3	Australia	2	Brisbane	BRISBN
3	Australia	3	Perth	PERTH
4	Austria	1	Vienna	VIENNA
5	Bahrain	1	Manama	MANAMA
6	Bangladesh	1	Dhaka	DHAKA
6	Bangladesh	2	Chittagong	CHITTA
7	Belgium	1	Brussels	BRUSSL
8	Brazil	1	São Paulo	SAOPAU
8	Brazil	2	Rio de Janeiro	RIOJAN
8	Brazil	3	Brasília	BRASIL
9	Cambodia	1	Phnom Penh	PHNOMP
10	Canada	1	Toronto	TORONT
10	Canada	2	Montreal	MONTRL
10	Canada	3	Vancouver	VANCOU
11	Chile	1	Santiago	SANTGO
12	China	1	Beijing	BEIJNG
12	China	2	Shanghai	SHNGHI
12	China	3	Guangzhou	GUNGZO
12	China	4	Shenzhen	SHENZN
12	China	5	Hong Kong	HONGKG
12	China	6	Taipei	TAIPEI
13	Colombia	1	Bogotá	BOGOTA
14	Czech Republic	1	Prague	PRAGUE
15	Denmark	1	Copenhagen	CPNHGN
16	Ecuador	1	Quito	QUITO
17	Egypt	1	Cairo	CAIRO
17	Egypt	2	Alexandria	ALEXND
18	Ethiopia	1	Addis Ababa	ADDIS
19	Finland	1	Helsinki	HELSNK
20	France	1	Paris	PARIS
20	France	2	Lyon	LYON
21	Germany	1	Berlin	BERLIN
21	Germany	2	Hamburg	HAMBUR
21	Germany	3	Munich	MUNICH
21	Germany	4	Frankfurt	FRNKFT
22	Ghana	1	Accra	ACCRA
23	Greece	1	Athens	ATHENS
24	Hungary	1	Budapest	BUDPST
25	India	1	New Delhi	NDELHI
25	India	2	Mumbai	MUMBAI
25	India	3	Kolkata	KOLKAT
25	India	4	Chennai	CHENAI
25	India	5	Bengaluru	BNGLRU
25	India	6	Hyderabad	HYDRBD
26	Indonesia	1	Jakarta	JAKRTA
26	Indonesia	2	Surabaya	SURBYA
27	Iran	1	Tehran	TEHRAN

Level 1 No.	Country / Region	Level 2 No.	City	Display
28	Iraq	1	Baghdad	BAGDAD
29	Ireland	1	Dublin	DUBLIN
30	Israel	1	Tel Aviv	TELAVV
31	Italy	1	Rome	ROME
31	Italy	2	Milan	MILAN
32	Japan	1	Tokyo	TOKYO
32	Japan	2	Osaka	OSAKA
33	Jordan	1	Amman	AMMAN
34	Kenya	1	Nairobi	NAIROB
35	Kuwait	1	Kuwait City	KUWAIT
36	Lebanon	1	Beirut	BEIRUT
37	Malaysia	1	Kuala Lumpur	KULUMP
38	Mexico	1	Mexico City	MEXICO
38	Mexico	2	Guadalajara	GUADAL
39	Morocco	1	Casablanca	CASABL
40	Myanmar	1	Yangon	YANGON
41	Nepal	1	Kathmandu	KTMNDU
42	Netherlands	1	Amsterdam	AMSTRD
42	Netherlands	2	Rotterdam	ROTTRD
43	New Zealand	1	Auckland	AUKLND
43	New Zealand	2	Wellington	WELGTN
44	Nigeria	1	Lagos	LAGOS
44	Nigeria	2	Abuja	ABUJA
45	Norway	1	Oslo	OSLO
46	Oman	1	Muscat	MUSCAT
47	Pakistan	1	Karachi	KARACH
47	Pakistan	2	Lahore	LAHORE
47	Pakistan	3	Islamabad	ISLAMB
48	Peru	1	Lima	LIMA
49	Philippines	1	Manila	MANILA
50	Poland	1	Warsaw	WARSAW
51	Portugal	1	Lisbon	LISBON
52	Qatar	1	Doha	DOHA
53	Romania	1	Bucharest	BUCHST
54	Russia	1	Moscow	MOSCOW
54	Russia	2	Saint Petersburg	STPETR
55	Saudi Arabia	1	Riyadh	RIYADH
55	Saudi Arabia	2	Jeddah	JEDDAH
55	Saudi Arabia	3	Dammam	DAMMAM
56	Singapore	1	Singapore	SINGPR
57	South Africa	1	Cape Town	CAPETN
58	South Korea	1	Seoul	SEOUL
58	South Korea	2	Busan	BUSAN
59	Spain	1	Madrid	MADRID
59	Spain	2	Barcelona	BARCEL
60	Sri Lanka	1	Colombo	COLOMB
61	Sweden	1	Stockholm	STKHLM
62	Switzerland	1	Zurich	ZURICH
62	Switzerland	2	Geneva	GENEVA
63	Tanzania	1	Dar es Salaam	DARESL

Level 1 No.	Country / Region	Level 2 No.	City	Display
64	Thailand	1	Bangkok	BANGKK
65	Tunisia	1	Tunis	TUNIS
66	Türkiye	1	Adana	Adana
66	Türkiye	2	Adiyam	Adiyam
66	Türkiye	3	Afyon	Afyon
66	Türkiye	4	Agri	Agri
66	Türkiye	5	Aksara	Aksara
66	Türkiye	6	Amasya	Amasya
66	Türkiye	7	Ankara	Ankara
66	Türkiye	8	Antaly	Antaly
66	Türkiye	9	Ardaha	Ardaha
66	Türkiye	10	Artvin	Artvin
66	Türkiye	11	Aydin	Aydin
66	Türkiye	12	Balike	Balike
66	Türkiye	13	Bartin	Bartin
66	Türkiye	14	Batman	Batman
66	Türkiye	15	Baybur	Baybur
66	Türkiye	16	Bileci	Bileci
66	Türkiye	17	Bingol	Bingol
66	Türkiye	18	Bitlis	Bitlis
66	Türkiye	19	Bolu	Bolu
66	Türkiye	20	Burdur	Burdur
66	Türkiye	21	Bursa	Bursa
66	Türkiye	22	Canakk	Canakk
66	Türkiye	23	Cankir	Cankir
66	Türkiye	24	Corum	Corum
66	Türkiye	25	Denizl	Denizl
66	Türkiye	26	Diyarb	Diyarb
66	Türkiye	27	Duzce	Duzce
66	Türkiye	28	Edirne	Edirne
66	Türkiye	29	Elazig	Elazig
66	Türkiye	30	Erzinc	Erzinc
66	Türkiye	31	Erzuru	Erzuru
66	Türkiye	32	Eskise	Eskise
66	Türkiye	33	Gazian	Gazian
66	Türkiye	34	Giresu	Giresu
66	Türkiye	35	Gumush	Gumush
66	Türkiye	36	Hakkar	Hakkar
66	Türkiye	37	Hatay	Hatay
66	Türkiye	38	Igdir	Igdir
66	Türkiye	39	Ispart	Ispart
66	Türkiye	40	Istanb	Istanb
66	Türkiye	41	Izmir	Izmir
66	Türkiye	42	Kahram	Kahram
66	Türkiye	43	Karabu	Karabu
66	Türkiye	44	Karama	Karama
66	Türkiye	45	Kars	Kars
66	Türkiye	46	Kastam	Kastam
66	Türkiye	47	Kayser	Kayser
66	Türkiye	48	Kirikk	Kirikk

Level 1 No.	Country / Region	Level 2 No.	City	Display
66	Türkiye	49	Kirkla	Kirkla
66	Türkiye	50	Kirseh	Kirseh
66	Türkiye	51	Kilis	Kilis
66	Türkiye	52	Kocael	Kocael
66	Türkiye	53	Konya	Konya
66	Türkiye	54	Kutahy	Kutahy
66	Türkiye	55	Malaty	Malaty
66	Türkiye	56	Manisa	Manisa
66	Türkiye	57	Mardin	Mardin
66	Türkiye	58	Mersin	Mersin
66	Türkiye	59	Mugla	Mugla
66	Türkiye	60	Mus	Mus
66	Türkiye	61	Nevseh	Nevseh
66	Türkiye	62	Nigde	Nigde
66	Türkiye	63	Ordu	Ordu
66	Türkiye	64	Osmani	Osmani
66	Türkiye	65	Rize	Rize
66	Türkiye	66	Sakary	Sakary
66	Türkiye	67	Samsun	Samsun
66	Türkiye	68	Siirt	Siirt
66	Türkiye	69	Sinop	Sinop
66	Türkiye	70	Sivas	Sivas
66	Türkiye	71	Sanliu	Sanliu
66	Türkiye	72	Sirnak	Sirnak
66	Türkiye	73	Tekird	Tekird
66	Türkiye	74	Tokat	Tokat
66	Türkiye	75	Trabzo	Trabzo
66	Türkiye	76	Tuncel	Tuncel
66	Türkiye	77	Usak	Usak
66	Türkiye	78	Van	Van
66	Türkiye	79	Yalova	Yalova
66	Türkiye	80	Yozgat	Yozgat
66	Türkiye	81	Zongul	Zongul
67	Ukraine	1	Kyiv	KYIV
68	United Arab Emirates	1	Dubai	DUBAI
68	United Arab Emirates	2	Abu Dhabi	ABUDHB
69	United Kingdom	1	London	LONDON
69	United Kingdom	2	Manchester	MNCHST
70	United States	1	New York	NEWYRK
70	United States	2	Los Angeles	LOSANG
70	United States	3	Chicago	CHICAG
70	United States	4	Houston	HOUSTN
70	United States	5	Miami	MIAMI
70	United States	6	Dallas	DALLAS
70	United States	7	San Francisco	SANFRA
70	United States	8	Seattle	SEATTL
71	Venezuela	1	Caracas	CARACS
72	Vietnam	1	Hanoi	HANOI
72	Vietnam	2	Ho Chi Minh City	HCMCTY

Menu order: select Country / Region first, then select City. Countries and cities are arranged according C code array order. The Display column matches the city name shown on the relay.